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**Accessibility of Medicines and Primary Health Care: the Impact of the
RDF in Khartoum State**

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A thesis submitted in partial fulfilment of the requirements of Nottingham Trent
University for the degree of Doctor of Philosophy

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Accessibility of Medicines and Primary Health Care: the Impact of the RDF in Khartoum State

This thesis presents a comprehensive evaluation of an experience where a Revolving Drug Fund (RDF) lasts for fifteen years and serves more than three million patients annually, with more than SDD2.8 billion (US\$11.1 million) annual turnover. Various studies of user fees in various countries in general have focused particularly on the revenues, and on community financing and community participation. Little is known regarding the accessibility of essential medicines and their impact on the utilization of public health facilities in areas where the RDF programmes have been or are being implemented, despite the fact that the supply of medicines and improvement in public health facilities utilization are among the main objectives of such policy. While the health literature is seriously lacking in empirical studies that specifically demonstrate the benefits of the RDF and examine the factors explaining success in achieving its objectives, it is widely accepted, based on theoretical grounds and personal experience, that RDF facilitates access to essential medicines. This thesis has used qualitative and quantitative research techniques to collect data from different stakeholders (i.e. health care providers and users) in order to evaluate the experience of the RDF operating in Khartoum State (KS). The findings are based on an analysis of forty-one semi-structured interviews with health care providers and 186 structured interviews with users. In addition, the data from my personal observations, and from archival and statistical records were also analysed. This doctoral study suggests that the unique RDF project implemented by the KS managed to make essential medicines available at its health facilities and consequently increases their utilization compared to non-RDF ones. Sustained availability of low cost medicines near to where people live through the RDF, is clearly benefiting previously disadvantaged poor population, particularly vulnerable rural groups. This doctoral study has made a meaningful contribution to Cost-Sharing Policy in Sudan in finding that the RDF could be successfully implemented as a self-sustainable medicine supply system in other states in Sudan. It also makes a significant contribution in exploring factors that make the RDF achieves its objectives. This study, therefore, presents empirical evidence suggesting that a RDF project could be designed and implemented to maintain a regular, self-financing medicines supply system, if certain prerequisites were put in place. Finally, the thesis will enrich the long debate about the effectiveness of RDFs as mechanisms for financing medicines in developing countries, particularly in Sub-Saharan Africa, by presenting the findings of a comprehensive evaluation study of the largest RDF in the world.

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Acronyms and Abbreviations

4WD	Four Wheel Drive
BI	Bamako Initiative
BMJ	British Medical Journal
CMSPO	Central Medical Supplies Public Organisation
CPP	Certificate of Pharmaceutical Product
CSP	Cost-Sharing Policy
CT	Computed Tomography
DFID	Department For International Development
DG	Director General
DHS	Demographic and Health Survey
FeFo	First-expired First-out
FMOH	Federal Ministry of Health
FSFA	Ferrous Sulphate with Folic Acid
GB£	Great Britain Sterling Pound
GDP	Gross Domestic Product
GMP	Good Manufacturing Practice
HAI	Health Action International
HDR	Human Development Report
HIS	Health Insurance Scheme
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immune Deficiency Syndrome
KCCCP	Khartoum Comprehensive Child Care Programme
km	kilometre
KS	Khartoum State
MDGs	Millennium Development Goals
MOF	Ministry of Finance and National Economy
MOH	Ministry of Health
MRI	Magnetic Resonance Image
MS	Microsoft
MSF	Medicines sans Frontieres
NDQCL	National Drug Quality Control laboratory
NGOs	Non Governmental Organisations
NHIF	National Health Insurance Fund
NLED	National List of Essential Drugs
PHC	Primary Health Care
RDF	Revolving Drug Fund
SC	Save the Children
SDD	Sudanese Dinar
SEDP	Sudan Essential Drug Programme
SPSS	Statistical Package for Social Sciences
TRIPS	Trade Related Aspects of Intellectual Property Rights
UK	United Kingdom
UN	United Nations
UNICEF	United Nation International Children Emergency Fund
US\$	United States of America Dollars
USAID	United States Agency for International Development
VAT	Value Added Tax
WHO	World Health Organisation
WTO	World Trade Organisation

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BMJ	British Medical Journal
CMSPO	Central Medical Supplies Public Organisation
CPP	Certificate of Pharmaceutical Product
CSP	Cost-Sharing Policy
CT	Computed Tomography
DFID	Department For International Development
DG	Director General
DHS	Demographic and Health Survey
FeFo	First-expired First-out
FMOH	Federal Ministry of Health
FSFA	Ferrous Sulphate with Folic Acid
GB£	Great Britain Sterling Pound
GDP	Gross Domestic Product
GMP	Good Manufacturing Practice
HAI	Health Action International
HDR	Human Development Report
HIS	Health Insurance Scheme
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immune Deficiency Syndrome
KCCCP	Khartoum Comprehensive Child Care Programme
km	kilometre
KS	Khartoum State
MDGs	Millennium Development Goals
MOF	Ministry of Finance and National Economy
MOH	Ministry of Health
MRI	Magnetic Resonance Image
MS	Microsoft
MSF	Medicines sans Frontieres
NDQCL	National Drug Quality Control laboratory
NGOs	Non Governmental Organisations
NHIF	National Health Insurance Fund
NLED	National List of Essential Drugs
PHC	Primary Health Care
RDF	Revolving Drug Fund
SC	Save the Children
SDD	Sudanese Dinar
SEDP	Sudan Essential Drug Programme
SPSS	Statistical Package for Social Sciences
TRIPS	Trade Related Aspects of Intellectual Property Rights
UK	United Kingdom
UN	United Nations
UNICEF	United Nation International Children Emergency Fund
US\$	United States of America Dollars
USAID	United States Agency for International Development
VAT	Value Added Tax
WHO	World Health Organisation
WTO	World Trade Organisation

Chapter 1 Introduction and Scope of the Thesis

1.1 Introduction

The World Health Organisation (WHO) health report (1999a) considers the desirable characteristics of health systems to be to: improve health status; enhance responsiveness to legitimate expectations of the populations; increase economic efficiency; protect individuals, families and communities from financial loss; and enhance fairness in the financing and delivery of health care. The provision of access to affordable and acceptable quality medicines is probably the most crucial element in achieving these aims, in relation to Primary Health Care (PHC) in developing countries. The financing of pharmaceuticals¹ is a crucial issue for several reasons. First, because medicines save lives and improve health, it is important that drug financing ensures access to essential medicines for all segments of the population. Second, medicines are often the most important cost driver of health care expenditure. Health services and patients spend a lot of money on drugs. For most ministries of health, medicines represent the largest expenditure after staff salaries (WHO 2005a). In developing countries, medicines commonly represent from 25% to 40% of total public and private health expenditures (Quick 2003a). Household expenditures on medicines in developing countries were 60% to 90% of their health spending (DFID 2004). Third, inadequate funding for drugs means that expenditures for staff salaries and other care costs may be used inefficiently or simply wasted. This is because without medicines public health facilities, particularly in rural areas, remain abandoned and people seek medical care in alternative sources, such as private clinics and pharmacies (Creese and Kutzin 1995). Fourth, the availability and effectiveness of drugs are key factors in generating and maintaining public interest and participation in health related activities. Possible financing options for medicines include: public financing; user charges; private or co-operative not-for-profit; donors and international loans (Quick, et al 1997).

Until the early 1980s, most basic health services, including medicines, in Sub-Saharan Africa (Sudan being no exception) were free in public health facilities. The stagnation

¹ In this thesis, the terms 'pharmaceuticals', 'pharmaceutical products', 'medicines' and 'drugs' are used interchangeably. Nevertheless, the term 'medicine' is used as much as possible in order to reflect the recent policy shift by WHO regarding the use of medicine instead of drug to avoid confusion with narcotics.

of African economies and the financial constraints in the 1980s, as a result of the fall in their export commodities and the rise in import prices (van der Geest 2000; Jitta, et al 2003), and the high international debt, led many countries to embark on economic stabilisation and structural adjustment programmes (Audibert and Mathonnat 2000). Most governments have found themselves unable to maintain a continuous supply of free medicines, which accounted for 40% of governments spending on health (Shaw and Griffin 1995). As a consequence, in many Sub-Saharan Africa countries the lack of medicines supply is a very important limiting factor to the improvement of health services (Huss 1996). Supported by international agencies such as the World Bank (1987), many countries have embarked on a process of health sector reform, in which the introduction of Cost-Sharing Policy² (CSP) is a key element, in addition to the decentralisation of health care services management and financing (Wilkinson, et al 2001). The CSP is advocated as a source of new revenues by mobilising community participation in health care. It is also regarded as a promising mechanism for improving accessibility to medicines and other services through the maintenance of a steady supply of pharmaceuticals. Moreover, the CSP increases the perceived value for money by reducing unnecessary utilization of services, particularly medicines. Should people face charges, they may think carefully about their need to seek medical care (World Bank 1987; Shaw and Griffin 1995).

To be successful in attracting uptake by patients, however, user fee mechanisms should generally be accompanied by perceived quality improvements in services: supply mechanisms for medicines are both prerequisites and outputs of successful programmes. It is thought, then, that properly designed cost recovery programmes can encourage higher demand for modern health care and, as a result, promote a higher level of utilization of health facilities (Hotchkiss 1998). The availability of medicines and good processes of care are therefore regarded as the two main factors which have a positive and significant impact on the utilization of both public and private health care sectors (Mariko 2003). Such a situation exists because the availability of medicines has a large effect on people's decisions about where to seek formal treatment (Litvack and Bodrat 1993; McPake, et al 1993; Chawla and Pellis 2000). Furthermore, although evidence suggests that, in general, demand for health care is price inelastic (Creese 1991; McPake

² Cost-Sharing, Cost Recovery, User Fees and User Charges are used interchangeably throughout this thesis.

1993), the most recent studies of demand indicate that at the level of the household, utilization of health services is more responsive to changes in price and income (Sepehri 2001).

Since the Bamako Initiative³ 1987, the CSP has received increasing interest in developing countries. This interest is not surprising, given the low priority given to health care by the governments and the limited resources available for health services financing in those countries. For example, in Sudan, the percentage of military expenditure increased to around 7.5% of Gross National Product by the late 1980s, while the allocation for health reduced from US\$1 to 50 cents per capita after the devaluation of the currency in 1987 (Dodge 1990).

It is not surprising that the utilization of public sector health services in Sudan was low during the 1980s and that personnel, especially in peripheral health facilities, were idle most of the time. In 1992, the government of Sudan adopted a number of health policy reforms (for example the implementation of Cost-Sharing and decentralisation policies) as a part of its programme of economic reforms, following a similar course taken by many developing countries. These reforms aim to improve the performance of the health care sector by ensuring the availability of essential supplies, such as essential medicines and, consequently, the health status of the country's population, particularly the poor. In spite of the fact that less than 50% of the Sudan population has regular access to the essential medicines (Quick, et al 1997), Khartoum State (KS) now has a high level of availability of essential medicines at affordable prices and this is attributed to the Revolving Drug Fund (RDF) (Graff and Everard 2003). The RDF of the Ministry of Health, Khartoum State, has been implemented with the technical and financial support of Save the Children (United Kingdom) better known as SC (UK) to improve chronic shortages of medicines in public health centres. After the first capital investment was made by SC (UK), the RDF has since 1989 used its own revenues generated from pharmaceutical sales to procure more affordable medicines. (I have given a detailed description of the development of the RDF KS in chapter three, section 3.6.1).

³ Bamako Initiative, launched in 1987 by the African Ministers of Health meeting in Bamako, Mali aims to improve effectiveness, optimising efficiency, ensure sustainability and promote equity within Primary Health Care system (Soucat, et al 1997a). I have given a detailed description of the theory of the BI in chapter two, section 2.2.4.

1.2 Aims and research questions

This thesis aims to evaluate the performance of the RDF in Khartoum State against its establishment objectives. It also aims to understand the interaction of factors shaping the performance of the RDF, fifteen years after it was first introduced in 1989, despite it having passed through very drastic conditions in the early 1990s (such as the liberalisation of local currency markets). It also draws invaluable lessons from the RDF experience in Khartoum which could inform the national roll-out of RDF now taking place (with RDFs being set up in seven other states of Sudan). In so doing, I will test and elucidate the perceived relationship between the RDF, the accessibility of essential medicines and the efficient utilization of health facilities. This evaluation has involved collecting and analysing quantitative data from patients in health care facilities and conducting a households' survey to evaluate the effect of access to essential medicines on health facilities utilization. I also undertook qualitative research among providers (i.e. policy-makers and practitioners) to understand the factors they believe determine the uptake of medicines and the use of health facilities. The views of senior policy-makers on the purposes and performance of the RDF were also sought. This is because their opinions and perceptions will affect the health policy reform, and they are also a rich source of information, since most of them witnessed the era of free health services as practitioners⁴ and can compare their earlier experiences to those under the RDF.

In this study, our principle objectives were to:

1. understand and explain the effects of the implementation of the RDF on the accessibility of essential medicines of acceptable quality and thereby on health facilities utilization;
2. to explore its achievements and shortcomings when reaching its establishment objectives (i.e. improvement in the utilization of Primary Health Care services by improving access to quality medicines at affordable prices).

Specifically in relation to these objectives, I conducted empirical research between June and September 2004 to find out:

⁴ The words: 'practitioners', 'doctors' and 'prescribers' are used interchangeably throughout this thesis.

1. the percentage of prescribed medicines dispensed to patients at RDF health facilities, to measure the degree to which facilities are able to provide needed medicines and to identify reasons 'if any' behind not having the prescribed medicines in stock;
2. the percentage of the availability of key medicines to treat common health problems over the past twelve months at both the health facilities and RDF warehouse, to measure the availability of medicines throughout the year;
3. whether or not the cost of the medicines is a barrier to use of the RDF public health facilities. How much do people now pay for a full prescription at public health facilities? The answer to this question will, therefore, indicate the proportion of the patients who do not receive their medicines because they can not afford the cost of their prescription;
4. whether or not the introduction of the RDF in the health facilities has made these facilities more attractive to all income groups (i.e. has the number of health care users increased after the enrolment of a health facility within the RDF system) and improved the quality of care by reducing the utilization of less effective alternatives sources, such as traditional healers and self-purchased medicines.
5. whether or not the introduction of the RDF in the health facilities improves the efficiency of the health care system by decreasing unnecessary use of health facilities and increasing the utilization of less expensive lower level PHC facilities (i.e. health centres);
6. what is the percentage of those who do not use public health facilities for financial reasons and what alternative health care sources are used when they fall sick and why?
7. do people delay in seeking health care until their conditions worsen to the extent that they require hospital admission and do the poorest groups fail to use public health facilities for financial or any other reasons;

8. how equitable is the existing pattern of KS's health care delivery system. What are the measures put in place by the government to provide a 'safety net' to those who are unable to pay for their medicines or other medical services?
9. if the policy-makers, health care providers and users⁵ are satisfied with the RDF as being one of the elements that improve the perceived quality of services in terms of medicines accessibility and why.
10. what factors and conditions that policy-makers perceive as contributing to the survival of the RDF for a relatively long period in Khartoum State.

1.3 Justification for the research

During the 1990s, Sudan began a number of initiatives to establish new medicine financing mechanisms as part of the health reform process. In 1992, the government abolished the constitutional right of free health care. The impact of the new Cost-Sharing Policy (CSP) on the quality of public services is not well documented (Mustafa, et al 2005). However, there is ongoing debate among policy-makers and other health care providers about the CSP (MOH 2003a). The ongoing debate includes discussions on the impact of health care financing mechanisms and resources allocation during the past decades on the effectiveness, efficiency and quality of health services provided in public health facilities in Sudan. While the health policy-makers and practitioners argue that the introduction of the CSP has negatively affected access to and utilization of health services, those who were responsible for budget allocation in both the Federal Ministry of Health, and the Ministry of Finance and National Economy (MOF), as expected, strongly support the CSP. This study, which is the first study of its kind since the introduction of the Cost-Sharing Policy in Sudan in the early 1990s, will give insight and information about the working of the CSPs, particularly the RDF KS model.

This PhD research is significant because the people's right to health includes the right of access to a reliable standard of health care and to the assurance that medicines prescribed are not only genuine but safe, effective, affordable and accessible (WHO

⁵ The health care users comprised patients who seek health care at public health facilities, as well as those who are not receiving services at health facilities (i.e. heads of households) at the time of the visit.

1997a). Cost-Sharing programmes have often been promoted as a way of making essential medicines accessible and rationally used. The availability of such medicines in the public health facilities (hospitals and health centres) are advocated as one of the most important ways to improve the quality of PHC service and increase its utilization (McPake, et al 1993; Soucat, et al 1997a; Fiedler and Wight 2000). This is because the regular availability of medicines at affordable prices and of acceptable quality leads to the improvement in the morale of staff because they have essential medicines to work with; increases the quality and hence utilization of health services; and imposes a beneficial moral obligation of the prescribers to adhere to the programme's list of medicines. This study will provide an evidence-based evaluation of whether the CSP and the RDF are meeting the objectives set when they were established and in reality deliver the potential benefits mentioned in the literature. That is, that CSPs could increase accessibility to essential medicines, improve health facilities utilization, generate additional revenues and foster equity. Moreover, now that the Comprehensive Peace Agreement⁶ has been signed, it is strongly expected that the government, World Health Organisation and other NGOs involved in drug supply will work out a drug supply system in line with the strategy for the development of the health care system. This thesis will therefore be a valuable document to build on. Finally, too little information has been available in Sudan on the effectiveness of various methods to protect the poor. This research, therefore, aims to provide information on the efficiency of the mechanisms (such as the Zakat⁷ and solidarity funds) put in place by the government to protect the poor, in so far as health care is concerned.

The main focus of this evaluation is on the impact of the RDF. This is for a number of reasons. Since the RDF has expanded over time, it was felt that it is now ripe for evaluation, in order that policy-makers can benefit from lessons learned from the RDF implementation, and accordingly form suggestions to overcome shortcomings, if any. It is the policy of the Federal Ministry of Health (FMOH) to expand the RDF to the whole of the country, and roll-out to seven more states has already commenced. There is interest by the states in introducing a medicine financing mechanism based on the experience of RDF within Khartoum State. It is therefore, important that the policy and

⁶ This is the agreement between the government of Sudan and the Sudan People's Liberation Movement (rebels of the south) signed in January 2005. The agreement put an end to more than twenty years civil war.

⁷ Zakat is a certain amount of money that every adult, self-reliant, mentally able Muslim, has to pay to support specific categories mentioned in the holy Qur'an. The poor and the needy are at the top of these categories.

operational decisions taken by the government officials are based on accurate information, with a clear understanding of the advantages and potential constraints of this mechanism. It is therefore important at this stage to conduct research to verify how successful the RDF Khartoum State has been in providing affordable access to quality medicines. Special attention will be given to its impact on vulnerable groups. This evaluation, therefore, addresses issues of health facilities utilization, equity of access to essential medicines, sustainability of self-financing drug supply system, and community participation. It will also provide the government at both Federal and State levels with documented empirical evidence about the relationship between the RDF Khartoum State model and health facilities utilization. This research presents comprehensive information to facilitate making the decision of whether or not the RDF KS experience deserves to be replicated in other states of Sudan and also in other developing countries in a similar economic situation.

1.4 Motivation for the research

The MOH KS has been approached by organisations (such as WHO) wishing to learn about its experience in operating a RDF project. The FMOH, like other interested parties around the world, has also required this experience to be documented for an international readership as a contribution to the debate on cost recovery and revolving drug funds. Numerous international NGOs and financing institutions working both in Sudan and abroad have already registered their wish to know about the RDF. For example, I have received more than ninety e-mail messages asking for a copy of my MSc dissertation⁸ on the experience of Khartoum State in managing the RDF.

In addition, I was motivated by my strong interest to find out more systematically how the policy-makers, practitioners and users perceived the RDF. This is because I have been involved during my previous work with FMOH (as a director of the Department of Pharmaceutical Services and Planning) in the debate about the cost-effectiveness of the Cost-Sharing Policy after improvement of the general economy in Sudan as a result of increased exploitation of oil reserves and the Comprehensive Peace Agreement. I also

⁸ This dissertation has described the experience of the RDF in Khartoum State. It gives detailed description of the RDF organisational structure, and its drug supply management and financial systems. The dissertation also highlights RDFs threatening factors that mentioned by Quick, et al (1997) and how the RDF KS managed to overcome them.

wanted to identify the main achievements of this unique project in regard to availability of quality medicines of affordable prices near to where people live. Similarly, what are the reasons behind its survival for a relatively long period (fifteen years)? Consequently, what suggestions have that policy-makers and practitioners to offer to improve the RDF services and outcomes?

1.5 Scope of the thesis

The remainder of this thesis presents an evaluation of the RDF in Khartoum State after fifteen years of implementation. The main issue that I would like to discuss in this PhD thesis is accessibility to essential medicines of good quality at affordable prices via the RDF KS. In addition, the changes in utilization of health care services provided in the public health facilities supplied by the RDF will be compared with the utilization of non-RDF public health facilities to establish whether the RDF has produced any improvement in the utilization of public health facilities. The utilization issues deal with changes in preventive and curative care utilization. In other words, the impact of the RDF on patients' use of health facilities, on unnecessary visits, on self-medication, and on the use of traditional healers was examined.

In addition to this chapter, the remainder of the thesis is structured in eight chapters as follows:

Chapter two is devoted to a description of medicines financing mechanisms and their justification, through a review of the literature relating to past experiences in developing countries. It therefore, reviews the published literature and experiences of other developing countries with mechanisms of medicines financing, with particular focus on the RDF. The review reveals that the published experiences on large-scale RDF schemes are largely anecdotal. The literature relevant to the evaluation of the RDF can be grouped in three main areas: medicines financing mechanisms in developing countries; accessibility to essential medicines; and empirical evidence on the impact of the user charges, in general, and the RDF, in particular, on the utilization of health facilities. The literature shows that almost half of the world's population has no adequate and sustainable financing mechanism for medicines (WHO 2004a). It also shows that the effect of CSP on the utilization of public health facilities varies greatly

between developing countries. However, increased utilization is the common outcome between countries where Cost-Sharing Policies have been introduced and are accompanied by improvements in the quality of services (Litvack and Bodart 1993; Soucat, et al 1997a).

Chapter three analyses the context of health care in Sudan with emphasis on health care financing, particularly drug financing mechanisms applied in public health care facilities. It also provides some background information and an overview of health services in Sudan, in general, and in Khartoum State, in particular. The chapter, then proceeds to give a detailed description of the establishment of the RDF, its aim and objectives and the major policy changes that have taken place in the RDF over the years.

In chapter four, I discuss my research design and its implementation. I set out indicators to measure changes in accessibility of essential medicines and health facilities utilization. This chapter offers an explanation and justification of the methods that have been used to collect data that are required to answer the questions of this study. Having set out the case for the use of a multi-method approach in establishing powerful insights into the RDF KS, the chapter then moves to present the instruments used to collect qualitative and quantitative data from the main health care stakeholders (i.e. policy-makers, practitioners and pharmacy staff, and patients and households). The chapter also details the steps undertaken to conduct structured and semi-structured interviews with users (i.e. patients and household heads) and health care providers (i.e. policy-makers and practitioners) respectively. The selection and size of the sample and the conduct of the fieldwork are also presented in detail. In this chapter, the validity and reliability of the results, ethical clearance, and the limitations of the research are discussed. Finally, this chapter explains the process of analysis of both quantitative and qualitative data to reach the findings of the study.

The presentation of findings is organised in the three following chapters, each focusing on a different set of issues. They are illustrated with verbatim quotations from interviews that have been translated to the best available English meanings by the author. Chapters five, six and seven summarise available evidence and information on accessibility to essential medicines and changes in health facilities utilization and users' health care seeking behaviour, sourced from unpublished documents (such as MOH

statistical and RDF annual reports), semi-structured interviews with policy-makers and practitioners, and from quantitative data from the users' surveys. All these data were collected during my fieldwork for this doctoral study in June – September 2004 in Khartoum State. More specifically:

Chapter five presents findings on the availability of medicines at health facilities. In so doing, this chapter examines the availability of medicines in the public health care facilities before and after the introduction of the user fees policy. The chapter then sheds light on the impact on the prescribers of the availability of medicines via the RDF. Chapter five also presents the contribution that the RDF has had on the Health Insurance Scheme in Khartoum State. In addition, the chapter presents findings of this research regarding the quality of medicines sold at the RDF health facilities. Finally, chapter five demonstrates measures taken by the RDF to maintain a regular supply of quality medicines to health facilities.

Chapter six looks at the impact that the RDF has had on geographical and financial accessibility to essential medicines, and questions the extent to which poor people, especially in rural areas, have had adequate access to medicines. The chapter then provides evidence about prescription costs at RDF facilities compared with non-RDF public health facilities and private pharmacies. It also presents data about out-of-pocket household expenditure on medicines as a share of household income. In addition, chapter six identifies the RDF measures to keep medicine prices below prevailing market prices. It looks in some detail at the issue of equity of access to essential medicines and other health care services in Khartoum State after the introduction of the Cost-Sharing Policy, in general, and the RDF, in particular. The chapter also assesses the types and efficiency of mechanisms that are applied by the government to protect the poor and other vulnerable groups from factors causing them to abandon attempts to seek health care at public health facilities.

Chapter seven is devoted to utilization issues. It deals with both preventive and curative care utilization and changes in users' health care seeking behaviour (i.e. whether or not there is a delay in reporting to health facilities, reduction of unnecessary visits, and the use of self-medication and traditional healers). The chapter presents the results of the effects of the Cost-Sharing Policy on the utilization of public health facilities in Khartoum State. The chapter seeks to explore the changes in utilization of health care

services provided in the public health facilities supplied by the RDF, in comparison with the utilization of non-RDF public health facilities (where Cost-Sharing Policy was introduced without a marked improvement in the quality of services such as availability of medicines) to find out whether the RDF has shown any improvement in the utilization of public health facilities and why.

Chapter eight discusses the findings of this doctoral study, in order to understand the current situation at KS public health care facilities in terms of access to essential medicines. It also analyses the impact of the accessibility to essential medicines on the utilization of public health facilities. The discussion highlights the achievements and potential pitfalls of the RDF. It also explores the factors that have made the RDF survive for a relatively long period in KS. In addition, some wider implications of the Cost-Sharing Policy, in general, and the RDF, in particular, for the health care system in Khartoum State will be discussed. Moreover, the lessons to be learned from the experience of the RDF in KS will also be presented in this chapter to inform policy-makers in other states of Sudan, in other developing countries and interested organisations about the preconditions necessary to establish an effective RDF project. Finally, the chapter reflects on the strengths and weaknesses of the research conducted for this thesis.

In the light of the literature reviewed for the thesis, and discussion of the data that have been presented in chapter five, six and seven of this thesis, the last chapter addresses the question: whether the Cost-Sharing Policy and the RDF are still needed. The chapter also offers a summary of the main findings that have emerged from this evaluation study and presents some conclusions about the effects of the RDF KS on access to essential medicines and thereby the utilization of public health facilities. In addition, the chapter proposes a set of recommendations to deal with the financing of medicines and to address the weaknesses identified by the thesis in the current RDF drug supply system. This chapter ends by suggesting future research that needs to be conducted to deepen our understanding of a number of issues that have been identified during the course of this thesis.

Chapter 2 Drug Financing in Developing Countries

2.1 Introduction

The provision of access to affordable and acceptable quality medicines across the developing countries is probably the most crucial element in implementing Primary Health Care. As a result, many developing countries have made it a principle to provide drugs free of charge as a reflection of their social ideals, have no intention to collect costs and have often defrayed the expenses by drawing money out of the national treasury. Unfortunately, few countries have the resources to fully implement such a policy. It has been noted (Cross, et al 1986; Umenai and Narula 1999) that the combined effects of increasing demand, declining financial public resources and the high prices of medicines lead to frequent shortages. Thus, the high cost of publicly financed medicines results in a scarcity of drugs and disillusionment amongst the public. Health professionals' morale also falls. They often become dispirited by trying to provide services without the resources they have been trained to use, and the public are often left frustrated by receiving considerably less than they were promised (Cross, et al 1986). For example, in Niger, Meuwissen (2002) reported that the public health system had severely deteriorated to the point where there were practically no medicines available in the health centres, irregular supplies, largely insufficient medical equipment, rundown buildings and no system of administrative or technical supervision of the health centres. Creese and Kutzin (1995, p.1) reported that 'utilization levels, particularly at rural health facilities, have declined. Outreach services no longer function, drugs are often unavailable, and health staff are unsupervised and sometimes unpaid for long periods of time. Rural populations have faced higher costs for health care in terms of transport and time to get to hospitals in larger towns, or have been obliged to make payments to private providers of treatment and medication. 'Free' care has come to mean unacceptably poor care'.

This problem has, to some extent, led to a re-direction of patients towards the small, rapidly growing, but expensive private sector of health care, with a resulting shift of qualified personnel towards the private sector aimed at the service of wealthier clients who can pay. The poor are then confronted with expensive private alternatives. Driven by market forces, the private health care providers are mainly concentrated in the high density population urban areas (Juni 1996). Due to the fact that the medicines in the

private sector are more expensive, it is likely that the presence of private pharmacies does not guarantee access for the urban poor. For instance, in Burkina Faso and Mali the retail price of French brand-medicines in private pharmacies was fixed at 150% to 200% of the retail price in France where most of the patients are socially secured (Foster 1990).

The aim of this chapter is to review the previously published work by providing a comprehensive and up-to-date critical review of the main studies in the Cost-Sharing literature, especially concerning the Revolving Drug Fund programme. The main argument of the impact of Cost-Sharing on accessibility to essential medicines and the utilization of health facilities and their underlying conceptual and theoretical framework is discussed. Section 2.2 presents the different mechanisms of medicines financing in developing countries, with particular focus on Cost-Sharing. Here the Revolving Drug Fund is of particular interest and is therefore discussed in more detail than other mechanisms. Section 2.3 highlights the world drug situation and factors that affect access to essential medicines. In section 2.4, attention is given to examples of empirical studies on the changes in health facilities utilization after implementation of Cost-Sharing in developing countries. This will help us to better understanding of the effects of user charges in today's real world. Section 2.5 provides a critical assessment of published research on Cost-Sharing Policy and evaluation studies of RDFs and their underlying limitations. Section 2.6 presents the contribution of the evaluation of RDF, Khartoum State, to knowledge about CSPs.

2.2 Medicine financing mechanisms: theoretical background

Drugs and other pharmaceuticals are essential for preventive and therapeutic health care and offer simple, cost effective solutions to many health problems, provided they are available, affordable and properly used (Quick, et al 1997). In addition to their direct health impact, the effectiveness of medicines against many common diseases serves to establish the credibility of health professionals who need to promote long-term health improvements through environmental and nutritional changes. But, the very rapid growth of expenditure on medicines is of particular policy concern and has attracted considerable political attention in both developed and developing countries (Dukes, et al 2003). In developing countries, pharmaceuticals generally account for a more significant share of overall health expenditures than in developed countries (for which

this share is about 15%). In several African countries, it is believed to exceed 50%. In developing countries, 50% to 90% of the overall pharmaceuticals expenditures are privately financed, which is considerably higher than in developed countries (median for developed countries private spending on pharmaceuticals is 34%) (Velasquez, et al 1998). In the developed world the main concern is about drug cost containment (Anderson, et al 2004), whereas, in developing countries, where the problem of access to essential medicines has been prevalent since early 1980s, the concern is about appropriate medicine financing mechanisms.

Worldwide, options for medicine financing range from full public financing (for example, Gulf States), Cost-Sharing through direct payment by the patients (for example, Sub-Saharan Africa countries) to the fully private through health insurance systems (for example, USA). In some countries, for example, the United Kingdom, all residents are covered by the National Health Service and access to medicines is directly subsidised by the state. Possible medicine financing options for developing countries include public financing; user charges; private or co-operative not-for-profit; donors and international loans. Nevertheless, it is the responsibility of governments to ensure that mechanisms of medicine financing are managed in such a way as to achieve universal access to essential medicines. These various methods of medicine financing can be classified into two main categories: free of charge and Cost-Sharing mechanisms. These are discussed in the following sections.

2.2.1 Free of charge mechanisms

The distribution of medicines free of charge is the only possible solution when the population to be served has no financial resources; where, for example, it includes people who are displaced, in refugee camps or living in poor rural areas. Such distribution can be via public financing through general revenues, or by NGOs, donors, and similar agencies

a) Public financing through general revenues

Governments in virtually every country in the world play a role in financing health services and pharmaceuticals. This role reflects, in part, the recognition by society that health is a fundamental right to which all sections of the population should have access.

It also reflects the realisation that the private sector, which is profit making, does not necessarily achieve equity, since it is mainly concentrated in highly populated urban areas (the poor live mainly in rural and peri-urban areas), nor does it sustain the precept of social solidarity. Private health care facilities provide services on a profit-making basis, thereby equity and solidarity will be compromised. As a consequence, the poor could be deprived of health care services. Therefore, the sustainability of solidarity, which is the prominent concern of governments, should be sustained by safeguarding the poor against high cost health care services. Without social solidarity and other pro-poor policies, the poor are easily excluded from access to services because they can not afford to pay the cost of prescription from profit driven private pharmacies. Many studies (see, for example, Sauerborn, et al 1996; Wallman and Baker 1996; Atim 1999) have shown that informal mechanisms of social solidarity in Africa play an important role in helping the poor to meet their health needs. Thus, social solidarity represents one approach through which African populations solve their social, economic and financial difficulties. It can be an additional source of income that expedites access to health care (Aye, et al 2002).

Though some public financing of health and essential medicines are necessary, the level of financing varies dramatically among different countries. The share of government expenditure on health care ranges from less than 5% in developing countries to 15% in the established market economies (Transparency International 2006). Within the health sectors, the budget allocated to medicines varies from 4% to 5% in Chad (less than US\$ 0.5. per capita) and 5.6% in Thailand, to 20% in Vietnam and 36.1% in Zimbabwe (US\$ 4.49 per capita) (Velasquez, et al 1998, p.12). The WHO (2004a, p. 45) has suggested a minimum global figure between US\$ 12 and US\$ 23 per capita annually as an appropriate target for public expenditure for drugs. Public financing of free medicines may be through national or local government general revenues, taxes, loans and donations.

Until the late 1970s, in many developing countries, health care was free. Currently, there are few developing countries which provide free medicines at public health facilities, for instance, in Bhutan and Papua New Guinea, 90% of drug expenditures are publicly financed (WHO 1998a) and in Uganda user charges were abolished in 2001 and the government committed itself to provide free services (Burnham, et al 2004). In the Gulf oil exporting countries, health services are publicly financed and provided free or highly subsidized from general governments' revenues. However, the drop in oil

revenues and rapid inflation in medical costs are encouraging policy-makers in these countries to adopt user fees and cost containment measures (Schieber, et al 1998) (see below).

b) NGOs, donors and others:

The percentage of international aid which contributes to health expenditure, varies considerably from country to country. 'In the Sub-Saharan region, the average contribution of international aid is nearly 30%, whereas in Asia (excluding China and India) it is 11% and in Latin America, it is under 8%' (Velasquez, et al 1998, p.20). With pharmaceuticals, donors may support the establishment of medicine supply systems and donations of medicines. The latter is frequently related to emergency relief or to the initial seeding of revolving drug funds. However, external funding must not be allowed to become a substitute for the effort of the countries themselves to develop sustainable financing mechanisms. For example, donors funded 80% of the capital budget in Uganda during the 1990s (Jeppsson, et al 2005). This has also been found to be the case in Mozambique in 1987, where 90% of recurrent expenditure on pharmaceuticals came out from external funding (WHO 2004a). Care should also be taken to ensure that financing which flows from outside sources does not lead to fragmentation of the national health system and thus decreases its sustainability.

Other mechanisms of medicine financing, including employer-provided health care, can be furnished either directly, through contracts with private providers or indirectly through insurance and reimbursement. This can also contribute to the overall health provision in a country.

2.2.2 Cost-Sharing mechanisms

Making essential medicines available is the foundation for nearly every public health programme aimed at reducing morbidity and mortality in the developing countries (Pecoul, et al 1999). The importance and popularity of medicines has led many governments in developing countries to espouse a general policy of free medicines. However, because of the global economic recession in the early 1980s (Vogel 1988) and as a result of the subsequent fall in developing countries' export revenues and a significant rise in import prices (for example, oil), civil conflicts during 1970s and

1980s (van der Geest 2000; Jitta, et al 2003), and high international debt, most developing countries, particularly in Sub-Saharan Africa, where Gross Domestic Product (GDP) declined by 13% from 1972 to 1992 (Kremer 2002), were confronted with budgetary deficits. The lack of adequate financial resources constrained the ability of these countries to maintain provision of free health services and medicines at the point of delivery. In the 1980s, most governments found themselves unable to finance and expand health services and to maintain a continuous supply of medicines, which have up until now accounted for over 40% of the annual budget of most ministries of health in developing countries (Shaw and Griffin 1995). The decline in publicly financed health services since the late 1970s and 1980s (WHO 1991a; Creese and Kutzin 1995) was exacerbated by an increased demand for health services attributed to population growth and aging, urbanisation, changing preferences and attitudes (such as an increasing public demand for better modern health services) and the appearance of new health problems, for instance, the prevalence of Human Immunodeficiency Virus/ Acquired Immune Deficiency Syndrome (HIV/AIDS) (World Bank 1987; McPake 1993; Akashi, et al 2004).

This fashioned a need for new sources to finance health care services, particularly medicines (Nolan and Turbat 1995). The successful experience of church missions in covering a considerable amount of their recurrent expenses, including drug costs, and maintaining an acceptable level of health services quality through user fees without deterring the poor who would be exempted from paying, demonstrated the practicality of Cost-Sharing Policy as a financing mechanism for health services, in general, and essential medicines, in particular (Vogel and Stephens 1989). It also provided evidence that people will pay for quality health care. Thus, by adopting properly managed Cost-Sharing programmes, as it was the case in church missions, governments could improve the quality of services, such as the regular supply of medicines, in their health facilities (World Bank 1987). And the patients become more willing to pay for the accessible services of acceptable quality and affordable prices.

The introduction of Cost-Sharing through user fees was first seriously proposed for developing countries in 1985 (Kanji 1989) and announced officially by the World Bank and WHO in 1987 (Knippenberg, et al 1997a; Zakus and Lysack 1998). Cost-Sharing is a drug financing programme that is sustainable with contributions from both the public sector as well as from the community through user fees (Cross, et al 1986). It has been

promoted by the World Bank (1987) as one of the strategies to lighten the physical burden faced by most governments, preserve the sustainability of the medicine distribution system, as well as improving the efficiency of the overall public health sector. The shortage of medical supplies for Primary Health Care in many developing countries, led health care policy-makers in developing countries to revisit their services financing policies (Haddad and Fournier 1995).

To be successful, user fee mechanisms must generally be accompanied by perceived quality improvements in services. The World Bank (1987) suggested that the negative impact of the introduction of user charges, such as the reduction in utilization by the poor, could be dampened or even outweighed by the positive impact of quality improvement, such as accessibility to essential medicines. Therefore, a sustainable medicine supply system is both a prerequisite (i.e. if the drugs are not available after imposition of Cost-Sharing Policy, the credibility of the new policy will be lost) and an output (i.e. generated revenues could be used to ensure regular supply of medicines) of successful programmes. Meuwissen (2002, p.310) points out that 'For any revitalisation of public health services, the presence of affordable drugs appears to be of paramount importance. Without guaranteed supply of essential generic drugs, serious thought should be given to abandoning any plan to implement a cost recovery system'.

In addition, a workable mechanism to protect the poor (for instance, lists of indigents who are not required to pay, for example, veterans and children under three years (World Bank 1998); the issuing of vouchers to the poor, based on evidence from, for example, a neighbourhood committee (a system that appears to work well in Ethiopia (World Bank 1987); and the exemption of certain diseases, such as tuberculosis) is an important ingredient of a successful cost recovery policy (McPake, et al 1993; Soucat, et al 1997a). Without such a mechanism, vulnerable groups will be deprived, for financial reasons, from one of the basic human rights: *access* to essential medicines (WHO 2002a; Hogerzeil 2003). Properly designed cost recovery programmes can encourage higher demand for modern health care and, as a result, higher levels of utilization (Hotchkiss 1998).

Community Cost-Sharing mechanisms can be based on the direct sales of medicines through a Revolving Drug Fund, the payment of a flat rate charge which covers consultation, laboratory investigation and medicines (for example, the Bamako

Initiative), prepayment for services via health insurance systems, as well as other income generating activities (for example, outpatient entrance registration fees, visitors' fees, fees for private rooms within governmental hospitals, and bus fair and cinema surcharges to generate revenues for health activities (Carrin 1987; Griffin 1988)). A key issue for government officials responsible for the health care financing policy in developing countries is how to implement cost recovery plans without adversely affecting health outcomes through decreased health care utilization. Whether individuals benefit from cost recovery plans depends on the quality of services that are delivered, the out-of-pocket price that is charged, and how individuals respond to quality and price. In addition, the long-term financial viability of government investments in health care services depends on the ability to finance future improvements in quality by increasing revenues through higher user fees.

2.2.3 Direct sales through Revolving Drug Funds

Payment for drugs has been seen as one component of the strategy of Cost-Sharing, but it has also been seen that when this is implemented most patients, especially the poor, are unable to afford medicines at market costs. One way proposed to help this group of patients is through the introduction of a Revolving Drug Fund (RDF) in which, after an initial capital investment, drug supplies are replenished using money collected from the sales of medicines (Cross, et al 1986). When affordable and effective medicines are made available through the RDF in health facilities closer to where poor people live, travel and time costs can be reduced, especially in rural areas where there are no private pharmacies as a result of the low population (Soucat, et al 1997a). The governmental budget previously used to meet medicine costs and/or generated from drug sales can then be reallocated to finance preventive programmes (such as immunisation). The World Bank (1987) has argued that the expansion of such programmes benefits the poor more than the rich, since the poor tend to suffer more from health problems that can be alleviated by Primary Health Care programmes.

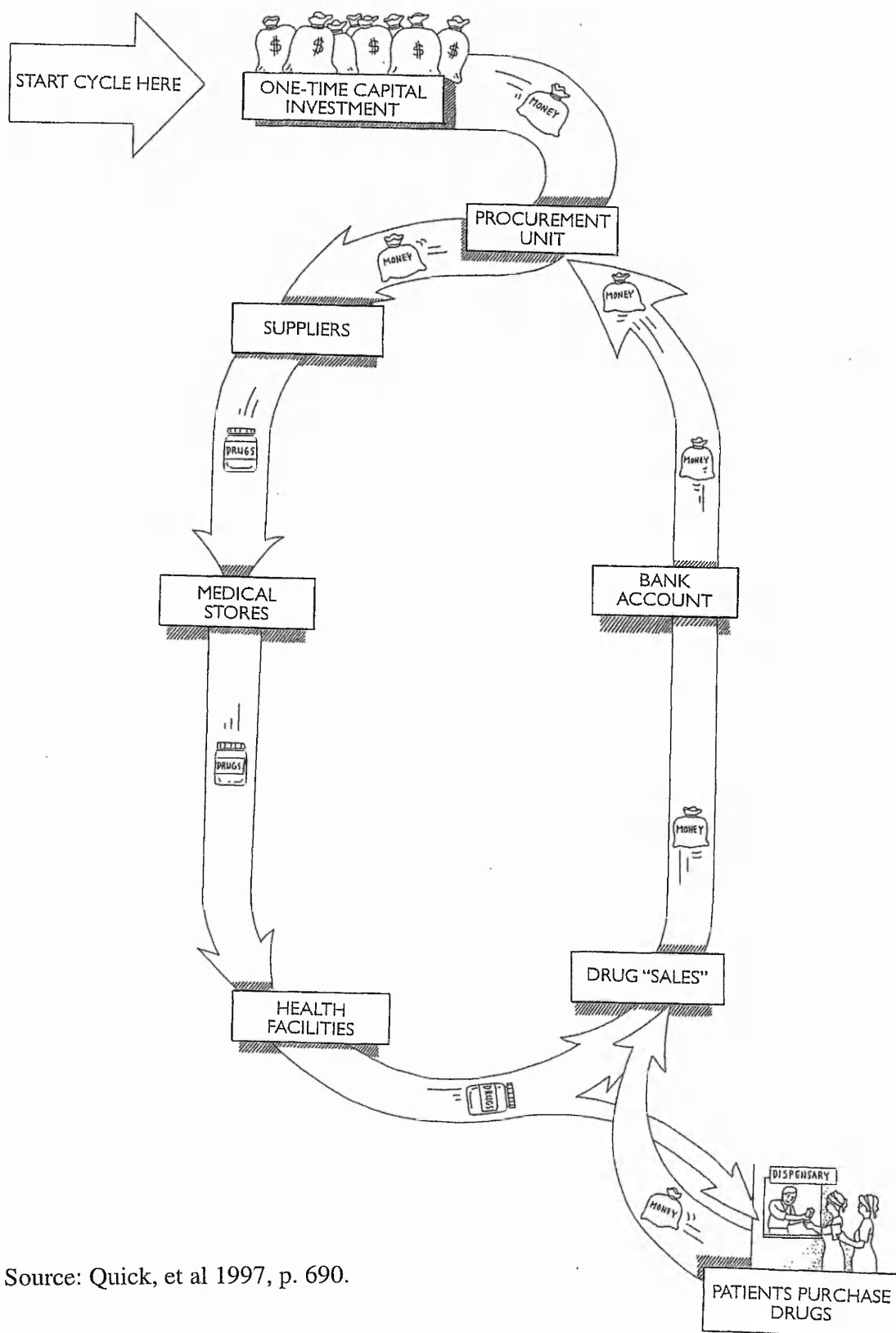
The World Bank (1994) defines a Revolving Drug Fund as community financing for the availability of essential medicines at full cost prices. RDFs, which are one type of medicine sales programme or cost recovery scheme, attempt to mobilise financial resources based on the willingness of people to pay for health services. RDFs are attractive, because they are theoretically self-financing after a one-time capital investment by the community, the government, external donors or loans. The one-time

initial investment could be either in medicines or in cash. In the latter case, cash is spent to purchase medicines for the creation of an initial drug stock. Medicines should be chosen from essential drugs: this means in practice medicines of high necessity from a medical perspective, and medicines which can be purchased at low cost because the patent on them has expired. The RDF seeks to recover drug costs in part (so long-term subsidies from governments are required for continuity of the RDF), in full or with marginal profit on the cost of drugs. This allows the target group (i.e. the poor and other vulnerable groups, particularly in rural areas) to buy the medicines and allows more drugs to be bought by the fund. A version of the RDF model first proposed by Quick and others (1981, p.231) and modified and refined by Cross, et al (1986) and then Quick and colleagues (1997, p.690) explains how RDF could work in practice. A summary of this model adapted for this study, is presented below.

Summary of RDF model restatement

The supply of medicines can be continued indefinitely without further government budget allocations as long as revenues from sales (or in some cases local health budgets) are sufficient and are funnelled back in purchasing new drugs (Quick, et al 1997). To determine the initial capital investment required to meet this criterion, it is useful to think of the RDF drug supply system as a 'pipeline' (Cross, et al 1986). To assure a continuous supply of medicines at health facilities, the pipeline (see figure 2.1) must be filled; once filled, consumption must be matched by purchases at the central level. The pipeline includes not only the flow of medicines from the RDF warehouse to the health facilities, but also the flow of money back to the RDF bank account to be used by the medicines procurement unit. Without the return of funds, new procurement cannot be made, supply becomes erratic, and the system soon fails to revolve. Two factors influence the amount of capital required to fill the pipeline: the diameter of the pipeline and the length of the pipeline. The diameter of the pipe is determined by the volume of sales per month, which relates to the rate of medicine consumption. The length of the pipeline represents the amount of time between the first commitment of the fund until the money collected from the sale of those medicines is available for buying replacement stock. The length is determined by procurement practices, supplier lead times, the distribution network, stocking policies, cash flow arrangements and related factors. The investment capital required is simply the product of the diameter of the pipeline expressed in volume of sales per month and the length of the pipeline expressed in months (Quick, et al 1997).

Figure 2.1: The RDF cycle (in theory: expenses for each cycle equal receipts)



Source: Quick, et al 1997, p. 690.

Rationale for Establishing RDF and its expected outcomes

Being one of the basic components of Primary Health Care as determined by the Alma-Ata declaration⁹ in 1978, the increased availability of medicines is perceived by policy-makers, health care providers and users as a real improvement in the quality of health services provided in public health facilities (Section 2.4.1). Additionally, as a result of common medicine shortages in health facilities, clients are already largely reliant on the private sector to fulfil their prescription, a situation that would not change substantially if the government starts to sell drugs (Griffin 1988). Further, medicines are tangible. The greater willingness to pay for drugs rather than other health care services implies that the RDF may be more acceptable to the majority of patients than other user charges (Booth, et al 1994; Collin, et al 1996). Moreover, the medicines from private sources are, for several reasons, more expensive than generic products sold in the public sector through the RDF. The response to the high cost of medicines in private pharmacies includes the purchase of smaller quantities than needed and the non completion of treatment courses, which result in sub therapeutic doses. Furthermore, both prescribers and patients will be more cost oriented. Therefore, the RDF provides a set of incentives to the population to use medicines more cost effectively, leading to rational prescribing and the promotion of patients' compliance with their prescribed medicines, because consumers value what they pay for. Thus, RDFs offer the potential for increasing the efficiency of drug services as well as generating additional revenues.

Compared with public free medicine programmes, RDFs make use of an untapped financial resource: patients' payment. This can lead to a significant increase in the availability of medicines and a corresponding increase in community participation in public health care services. The cost recovery objectives of RDFs also force improvements in the management of information and accounting systems, in inventory control, and in other supply management activities.

In comparison to commercial pharmacies which aim to maximise profits, RDFs have several potential advantages. Through the selection of the most cost-effective medicines, and competitive bulk procurement of generic medicines, cash and foreign exchange can be used more effectively.

⁹ This was at an international conference on primary health care, organised by the WHO in Alma-Ata in 1978. During this conference the PHC was declared as a strategy to protect and promote the health of the world population by the year 2000. It was widely known as the Alma-Ata Declaration.

It has been argued (Cross, et al 1986; Quick, et al 1997) that the RDF has the potential for improving the perceived quality of services in public health facilities. More specifically, the expected impacts of the RDF include: patients would have better access to medicines: the RDF could serve as a channel to stabilise the drug supply at health facilities; improved utilization rates of health facilities, and more appropriate retail prices, prescription activities and the use of medicines in places where there are few private pharmacies. Revolving Drug Funds have therefore attracted attention as leading methods for community financing of medicines in developing countries. They offer an appealing and potentially successful means of supplying medicines for many parts of the developing world.

The concept seems quite simple, but in practice these funds have proven to be substantially more complicated to plan and implement than systems which have simply given medicines away. Unlike publicly financed, free drug supply systems which benefit from annual budget allocations from general revenues, the RDF depends on a one-time capital investment. Health care administrators and community are responsible for the maintenance and sustainability of RDFs for as long a period as possible. Pharmacy staff are accountable for cash collected from drug sales. For many reasons (see Cross, et al 1986 and Quick, et al 1997), the revenues actually collected are not sufficient to replenish used stocks. Additionally, regular adjustment of medicine prices is required to avoid decapitalisation of the fund in the presence of local currency inflation (Hecht, et al 1993), particularly where medicines are imported. For example, Fiedler and Wight (2000) found that Honduras' community drug funds were rapidly under-capitalised. The authors attributed this problem to administrative issues, such as poor pricing and poor medicine purchasing practices. To maintain accessibility to affordable medicines for the community served by RDF, well-managed drug selection, procurement and distribution procedures must be put in place, since wastage in each of these steps can easily lead to doubling of costs to the users (Creese 1991).

2.2.4 Payment of flat rate charge

A flat rate charge covers both medical services and medicines. The amount may vary according to the level of service (dispensary, health centre or hospital) or the condition treated (such as malaria or childbirth). The model for this type of Cost-Sharing is the Bamako Initiative (BI). This was announced by the World Health Organisation's

Regional Assembly (Knippenberg, et al 1997a) attended by African ministers of health in 1987 in Bamako, the capital of Mali, as a response to the severe problems in financing health services in Sub-Saharan Africa. The goal of the BI is universal accessibility to PHC. In the BI, generated funds from medicines sales are not collected but kept at health facility level for purchasing medicine supplies, financing other PHC activities and payment of incentives to health workers. The BI proposed that mothers and children services be financed by the sale of medicines at two to three times their cost in public health care facilities (Chisadza, et al 1995). The BI had been adopted by more than thirty countries in Africa, Asia and Latin America by 1994 (Quick, et al 1997). For example, in 1988, the WHO, UNICEF and UK Department for International Development (DFID) provided financial and technical support to a BI programme in Nigeria aiming to maintain a regular supply of the essential medicines, prescribed under generic names, at affordable prices and accompanied by good prescribing practices (Uzochukwu, et al 2002). In Benin and Guinea, BI programmes have demonstrated their ability to raise preventive and curative coverage with key PHC interventions while keeping the health costs low (Soucat, et al 1997a).

The structure of the charges levied varies widely between countries and also within the same country. It ranges from a fixed amount per episode, including consultation, laboratory tests and medicines (for example, Benin, the Gambia, Namibia, Guinea and Zaire); through separate fees for drugs, which again could be flat rate or per drug item (for example, Burkina Faso, Cote d' Ivoire and Madagascar), to prepayments covering all visits over a specified period (for example, Mauritania, Niger and Zambia).

2.2.5 Prepayment

Through the payment of an insurance premium by individual insurance scheme members, whether ill or healthy, poor or wealthy, prepayment schemes (health insurance) separates in time the act of payment from the act of consumption. Hence, people who are well and are not patients (Quick, et al 1997; Dumoulin, et al 1998) pay for medicines. The fundamental concept behind health insurance is the sharing of an individuals risk and burden of paying for illness among a group of people or a society. There are different approaches to insurance, which can involve both the public and private sectors, such as social health insurance, community prepaid schemes and private health insurance. These schemes are advocated as better financing mechanisms than

user fees (Xu, et al 2003; WHO 2004b). However, Creese and Kutzin (1995) argue that governments in low income countries face considerable problems generating revenues for health from taxes or social insurance premiums. The authors attribute this situation to poverty and to the fact that, in poor countries, a high proportion of people work in the informal sector where it is difficult to identify how much they earn in order to develop efficient revenue collection methods. Therefore, with regard to who provides the insurance, more thought should be given to the respective roles of government and the private sector. However, government-run, social health insurance is most common in developing countries. For instance, in South Korea enrolment in health insurance is compulsory and most Korean people are insured (Kim, et al 2005). This is being said, the contribution of health insurance towards health expenditure in developing countries is still very small, ranging from only 2% in Sub-Saharan Africa to 8% in South Asia (Gottret and Schieber 2006).

Health Insurance is not without problems. Moral hazard, adverse selection, skimming, and cost escalation are examples of problems which may undermine the potential benefits of health insurance (Quick, et al 1997). In addition to these common problems, social prepayment schemes in developing countries face additional difficulties which include discrimination in access to quality health services. Experiences from Latin America, Iran and Turkey show that insured patients obtain services by high qualified health professionals in better equipped social security hospitals, than those available to the non-insured population in Ministry of Health hospitals (Sorkin 1986). In Tunisia and Kenya this demarcation exists, though the social insurance organisations have no separate hospitals for their beneficiaries and thereby use the same Ministry of Health hospitals (Sorkin 1986). Furthermore, health insurance in the African context faces different kinds of problems, such as the lack of reliable data on the incidence of illness and treatment costs. Then one must consider the anomaly which relates to the traditional extended family structure (i.e. where one insured member of the family, who pays the insurance premium, could enable many members of a large family, who are considered as insurance dependents, to gain access to medical care (Vogel 1988)). Nevertheless, governments in some Sub-Saharan Africa, for example, in Ghana, Senegal, Mali and Cote d' Ivoire have adopted health insurance for public sector employees.

2.3 Access to essential medicines

Essential medicines have been defined by WHO (2002b, p.1) as:

Those that satisfy the priority health care needs of the population. They are selected with due regard to disease prevalence, evidence on efficacy and safety, and comparative cost effectiveness. Essential medicines are intended to be available within the context of functioning health systems at all times, in adequate amount, in the appropriate dosage forms, with assured quality, and at a price the individual and the community can afford. The implementation of the concept of essential medicines is intended to be flexible and adaptable to many different situations; exactly which medicines are regarded as essential remains a national responsibility.

Improving access to quality medicines improves health, reduces suffering and extends lives (Quick 2003b). It is currently the most important strategy to reduce disability and death from diseases. More generally, ensuring access to effective treatment is a high priority issue for international public health. However, the lack of access to essential medicines in developing countries is one of the most pressing global health problems. People lack access to essential medicines where they cannot obtain the product they need to prevent or treat a medical condition (WHO 2004a). This could be due to many reasons, such as the product needed is unavailable, not accessible or not affordable. But the most important reason is poverty, which means that neither the poor nor their governments can afford to purchase essential medicines or ensure their rational use in well-run health systems (Wiedenmayer 2004).

In a quarter of WHO's 192 member states, spending on medicines was less than US\$ 5 per person in 2000. Anderson and colleagues (2006, p.8) reported that 'Asia, Oceania and Africa, which together account for 71 per cent of the world's population, are the recipient of only eight per cent of the total world sales of pharmaceuticals'. Accordingly almost half of the World's population has no adequate and sustainable medicines' financing system (WHO 2004a). As a result, 11 million people die each year from infectious diseases, many because they have no access to essential medicines (Oxfam 2001). The burden is especially heavy on vulnerable groups of the community who are still dying due to lack of access to essential medicines. For instance, two thirds of all

deaths of children under 15 are due to seven diseases which could be effectively prevented or treated (WHO 1999b). Benefo and Schultz (1994) found that a doubling of medicines prices was associated with a 50% increase in child mortality in Cote d'Ivoire and Ghana. Therefore, improving access to essential medicines in developing countries could save millions of lives every year.

Considerable progress has been made, since WHO introduced the concept of essential medicines in 1977 (WHO 1977). Nearly two thirds of the world's population are estimated to have access to full and effective treatment with medicines they need, compared to less than half of the world's population who had access to essential medicines in 1975 (WHO 2004a). Yet today, almost two billion people (i.e. one third of the population) do not have access to essential medicines. That is, the absolute numbers of people without access have not changed since 1975. In some of the lowest income countries in Africa and Asia, more than half of the population (for example, in India up to 65%) have no regular access to essential medicines (WHO 2004b).

Access to health care is a fundamental human right, preserved in international treaties and recognised by all governments throughout the world (WHO 2004b). However, this fundamental right to health could not be achieved without universal access to essential medicines. Revalidation of the essential medicines concept is taking place in the 21st century with inclusion of access to essential medicines in the internationally agreed Millennium Development Goals¹⁰ (MDGs) (UN 2000), which have a strong focus on health outcomes, and provision of access to affordable essential medicines in developing countries. For example, Goal 8: is to develop a global partnership for development. The target to achieve this goal is target 17, about which, WHO (2003b, p.28) states: 'In cooperation with pharmaceutical companies, provide access to affordable, essential drugs in developing countries'.

Access to essential medicines is one of the most cost effective components of modern health care. It remains a major objective of governments, NGOs and people everywhere. In developing countries the governments and communities struggle continuously to ensure access to the most basic life saving medicines, especially in rural areas. There are, however, many factors which deny access by the populations of low income

¹⁰ It was adopted by the heads of states and governments at the United Nation's General Assembly in New York from 6 to 8 September 2000, as a part of United Nations Millennium Declaration.

countries to effective medicines, for example, the presence of unstable situations (such as civil wars), and the nomadic nature of some tribes. Furthermore, economic, geographical and cultural factors reduce the effective access of, for example, some Africans to basic drugs exacerbating the high morbidity and mortality observed in Africa (Foster 1991). Therefore, the physical existence of pharmacies and public health care facilities may not in itself guarantee access to essential medicines.

The WHO (2004b) has identified six factors which should be in place to ensure that medicines are accessible, whenever and wherever they are needed. These factors are:

1. Rational medicines selection process: This includes defining which medicines are most needed, identifying the most cost-effective treatment for particular conditions while taking full account of quality and safety as well, and then ensuring that medicines are used effectively (Dukes, et al 2003). The access is further worsened, by irrational use of medicines, which is a major problem worldwide. It is estimated that half of all medicines are inappropriately prescribed, dispensed or sold, and that half of all patients fail to take their medicine properly (WHO 2004a).
2. Affordable prices: Final consumer prices are generally made up of a combination of the price charged by the manufacturer, import tariffs, port charges, insurance, freight and clearance costs, pre-shipment inspection fees, a pharmacy board fee, importer's margins, VAT, central government taxes, state government taxes, local duty, and wholesalers' and retailers' mark-up (Myhr 2003). Typically the largest mark-ups are the importers', wholesalers' and retailers' margins, which can add 50% to 80% to the ex-factory price. WHO (2004a) recommends that medicines on a national list of essential medicines should not be subject to tariffs. Affordability of medicines by individual patients in low-income countries is an important factor influencing access to care and treatment. For example, in Zambia, the cost of treatment of a single case of childhood pneumonia was US\$9, an amount equivalent to half the family's monthly income (Oxfam 2001). A course of treatment for peptic ulcer costs almost twice the wage of a government employee, in Cameroon (Creese 2003), and it is clearly not generally affordable.

Thus, the price of medicines is one of several reasons for lack of access to essential medicines. The situation has exacerbated since the creation of the World Trade Organisation (WTO) and the conclusion of the Trade Related Aspects of Intellectual Property Rights (TRIPS) agreement in 1994 (WHO 1997b). Patents are one of the main barriers to access to life saving medicines. They can play a significant role, in that they grant the patent holder a monopoly on a medicine for at least twenty years (HAI and MSF 2000). Therefore, patent holders can charge whatever price the market will bear, regardless of the consumer's ability to pay. This can make medicines unaffordable to the majority of people in developing countries. For example, Fluconazole is a drug used for treatment of AIDS-related meningitis. In Thailand, where several generic versions of the product are available (i.e. patent rules are not applied), competition has reduced the price to US\$0.30 per 200mg capsule. The drug costs US\$18.00 in Kenya, where it is patent protected (HAI and MSF 2000). If Kenya, where one quarter of the adult population is HIV-positive and less than 2% receive antiretroviral treatment - was able to import the drug Fluconazole from Thailand, it could lower the annual cost of treatment from over US\$3000 to US\$104 (Oxfam 2001). In the USA, the average wholesale price fell to 60% of the price of the branded medicine when one generic competitor entered the market, and to only 29% after being marketed by ten generic manufacturers (WHO 2004c). Various strategies adopted by governments to reduce the burden of medicine prices include: promotion of competition among quality generic medicines, negotiation of prices and therapeutic competition for patent drugs, use of the provisions mentioned under the agreement on TRIPS to increase affordability of medicines still under patent, reduction of duties and taxes, and reduction of wholesale and retail margins.

3. Reliable health and supply system: A good medicine supply system ensures the availability of the right medicines in the right quantities, at reasonable prices, and at recognised standards of quality at the right time at all levels of the health system (Quick, et al 1997). Failure at any point in the supply system can lead to medicines being out-of-stock and, consequently, to avoidable suffering and death (WHO 2004b). Despite all the efforts which have been made in the developing world to improve the performance of the health sector, in general, and the pharmaceutical sector, in particular, the access problem is far from being solved. Well-established health systems provide high levels of access, whereas poorly

performing ones lead to large numbers of people being without access to medicines, as well as to other forms of treatment, prevention and care.

4. Sustainable financing: Although there is no ideal method of financing medicines, those which exploit indirect financing and extended community solidarity, when possible, are the most equitable. For countries in all income groups (low, middle and high-income), the government's share in total pharmaceutical spending has fallen from 43% in 1990 to 39% in 2000 (WHO 2004a). However, increased private funding of a wider range of medicines, which leaves households and individual patients responsible for the cost of the essential drugs, place the heaviest burden on the poor and sick; those least able to pay. In some countries, for instance, one third of people living in poor households receive none of the essential medicines they need for acute illnesses. WHO (2004b, p.65) reported that 'fair and sustainable financing for the medicines component of health care should be ensured through adequate funding levels and equitable prepayment mechanisms, such as government revenues or social health insurance, to ensure that poor people do not face proportionally higher costs than the better off'. This represents a great shift in WHO's strategies for medicines financing (see section 2.2.2 above). The concept of community participation in addressing their own medicines' cost was formally articulated by the WHO at Alma-Ata in 1978, and was henceforth forged as a cornerstone of the strategy to achieve 'health for all' by 2000 (Zakus and Lysack 1998). WHO's new approach of prepayment will take the debate back to the early 1980s when it was about 'who pays', because there have been no real changes in the socio-economic situation of most of the developing countries, which adopted Cost-Sharing Policies to finance medicines.
5. Lack of new medicines: Apart from patent protection for pharmaceuticals, most medicine research is carried out by global pharmaceutical companies, which exist to make profits for their shareholders. This means that they focus mainly on the diseases of developed countries, with the result that diseases prevalent in developing countries are largely neglected. The Global Forum for Health Research (2004) estimates that US\$70 billion is spent each year on health research and development by the public and private sectors worldwide. Only 10% of these funds are allocated to the problems responsible for 90% of the world's burden of disease, mainly in poor countries. This discrepancy in health research funding,

which has been captured in the expression 'the 10/90 gap', needs to be reversed. For example, of 1,393 new chemical entities marketed during the last twenty-five years (i.e. between 1975 and 1999), only sixteen were for tropical diseases, which represent a substantial burden among developing countries, and account for 11% of the global disease burden (Trouiller, et al 2002). Research and development for products for the neglected diseases, such as malaria, diarrhoea and common tropical diseases is needed to redress the situation. This requires action by international agencies, pharmaceutical companies, the private and public sectors, and charitable foundations and NGOs who have a mandate to invest in public or non commercial research activities oriented towards addressing the health needs of poor people (DFID 2005).

6. Poor quality medicines: WHO (2004a, p.93) reported that 'the quality of medicines varies greatly, particularly in low-income countries, both in manufacturing and in the distribution system'. In many of these countries, 20% to 30% of samples collected from markets fail quality tests (WHO 2004b). For example, the percentage of drugs that failed quality control testing was found to be 92% in the private sector of Chad (WHO 1996). It has been estimated that up to 15% of all medicines sold across the world are fake (Cockburn, et al 2005). About 70% of counterfeit¹¹ medicines were reported by developing countries mainly in Africa and Asia (Helling-Borda 1995; WHO 1998b; Newton, et al 2001, 2002). Reports from Asia, Africa, and South America indicate that 10% to 50% of prescription medicines in certain countries may be counterfeit (Rudolf and Bernstein, 2004). For instance, in Nigeria where fake medicines may be more prevalent in circulation (60% - 70%) than genuine medicines (Osibo, 1998), 109 children died in 1990, after being administered fake Paracetamol (Alubo, 1994). Other cases were reported in Haiti in 1995 and in India in 1998, where the consumption of counterfeit Paracetamol cough syrup led to eighty-nine deaths and thirty infants deaths respectively (WHO 2006). Even in developed countries with well controlled drug distribution systems, counterfeit medicines are believed to be in existence. For example, in the USA the proportion of drugs that are counterfeit is thought to be less than 1% (Rudolf and Bernstein 2004). Within the UK, Andalo

¹¹ Products that are deliberately and fraudulently mislabelled with respect to identity and/or source (WHO 2003a)

(2004) reported that two counterfeit medicines found their way into the legitimate medicine supply chain for the UK during 2004.

Poor quality or counterfeit medicines may lead to low efficacy, adverse clinical results, treatment failure or death at the individual level and to public health problems by encouraging drug resistance. In the long term they may result in the waste of limited resources (WHO 2006). Regulation and secure supply of essential medicines are the basic devices employed by most governments to protect the public health against the production, import and distribution of substandard, counterfeit and low quality medicines, and to control prices.

2.4 Impact of user charges: empirical evidence

RDF projects generally aim to maintain a regular availability of commonly used medicines at public health facilities via the establishment of a self-sustaining and effective drug supply system. The availability of such medicines is supposed to increase the attractiveness and accessibility to Primary Health Care services, particularly at health centres and rural hospitals, resulting in higher facilities' attendance (see, for example, Quick, et al 1997; Mohamed 2000; Meuwissen 2002). Cost-Sharing, as a financing mechanism for essential medicines, has been subjected to a large number of empirical evaluations. Many researchers have looked at the impact of user charges on the utilization of health care services provided in public health care facilities in a number of African, Asian and Latin American contexts. Consideration of empirical evidence from different countries that have implemented Cost-Sharing Policies will help in establishing better understanding of the impact of such policies on utilization of public health facilities in the real world.

The purpose of this section is to review the evidence about impact of Cost-Sharing Policy on availability of medicines and utilization of health facilities. The evidence discussed in this section is mainly about positive and negative impacts of user charges on the utilization of public health facilities. Finally, the section critically appraises these studies in order to identify gaps and to explain the research questions adopted for this thesis.

2.4.1 Medicines availability and quality

The existence of a regular medicine supply system in public health facilities is perceived by policy-makers and health care providers as a basic component of a well-functioning health care system. In addition, evidence suggests that patients largely welcome the availability of medicines at health facilities and interpret medicine status as an indication of the quality of the health care provision (Gilson, et al 1993; Diop, et al 1995; Haddad and Fournier 1995; van der Geest, et al 2000; Meuwissen 2002; Uzochukwu, et al 2002; Mariko, 2003). Therefore, the extent to which drugs are available in a health facility has an important positive impact on the demand for services in that facility. People connect the availability of drugs with a higher probability that they will be cured or relieved of suffering (Creese and Kutzin 1995; Anderson, et al 2004). For them, the most unambiguous quality problem is a lack of medicines (Griffin 1988; Nolan and Turbat 1995). Of significance is that whenever the quality of care and thereby utilization rates were improved user contributions and reliable drug supply became constituent factors of a health care system (McPake, et al 1993; Litvack and Bodart 1993; Mwabu, et al 1993; von Massow, et al 1998). The advantage of having drugs available at all times at a cost outweighs the irregular supply of free medicines, which leads to several problems, such as loss of credibility of health systems and the demotivation of health workers.

The lack of access to medicines is symptomatic of wider problems relating to the public distribution system in which drugs are free but not available most of the time, and a private sector where medicines are available but are not obtainable by a large proportion of the population in developing countries. For example, in Laos, despite the free medicines policy in public health facilities, 70% of mothers consulted a private pharmacy when their children became ill (Paphassarang, et al 1995). Umenai and Narula (1999) showed that health services at Vietnamese communal health centres declined significantly during the free medicines era (i.e. before 1994). Drugs became unavailable, staff morale fell and health centres began to deteriorate. A decline in utilization was exacerbated by the emergence of private medicine stores. Communal health workers, being unpaid, resorted to private practice and, together with retail medicine stores, drew most patients away from the public sector facilities. In Uganda, Jitta and colleagues (2003) reported that important medicines had been out-of-stock for three months in one of the hospitals selected for their study, after the abolition of the

Cost-Sharing Policy. The result was that, patients were directed to purchase medicines at nearby pharmacies and private clinics, often owned by health workers. In Kenya, after UNICEF had stopped its medicines supply, BI pharmacies were experiencing major problems in medicines availability. The access gains achieved by locating pharmacies in previously underserved areas were undermined by the failure to develop a secure, local drug procurement system. The limited range of medicines was the most frequently identified criticism of BI activities (Gilson, et al 2001). Kazakhstan is not exceptional. Sari and Langenbrunner (2001, p.429) reported that 'pharmaceuticals are formally covered by the government for inpatient care, though most discussions and reports indicate that patients can effectively pay for up to half of the costs of inpatient care pharmaceuticals through informal payment mechanisms'. A similar situation is found in Tajikistan, where medicines are formally free for inpatients. However, the scarcity of such items in medical facilities has led to an increasing number of patients having to buy their requested medicines (Falkingham 2004).

Sepehri and Chernomas (2001, p.200) argue that 'Even if greater availability of drugs or any other consumable inputs is what the patients value the most, such measures of availability are influenced by the interaction of both demand and supply. While greater availability of drugs may increase demand (utilization), very high demand also contributes to the depletion of the available stock of drugs'. Assurance of medicine availability at health facilities through a RDF increases their utilization (Murakami, et al 2001). To the patients, availability of essential medicines is the most noticeable feature of the improvement in quality of service. In Nigeria, attendance rates dropped by 50% to 70% when health facilities ran out of medicines (World Bank 1994). In Uganda, dissatisfaction of customers with public health facilities services was mainly due to shortages in essential medicines and under staffing (Ndyomugenyi, et al 1998).

2.4.2 Cost-Sharing and health facilities utilization

The evidence from published studies on the impact of user fees on utilization varies greatly across the countries. On one extreme, the findings of numerous research studies in developing countries show that health facilities utilization would not be greatly affected by minor increases in user charges. Moreover, studies indicate that the utilization would actually increase where user fees are accompanied by improvements in the quality of services provided, for example, the availability of medicines (Heller,

1982; De Ferranti 1985; Akin, et al 1988; Mwabu 1988; Schwartz, et al 1988; Vogel 1988; Alderman and Gertler 1989; Gertler and van der Gaag 1990). More recent studies (see, for example, Litvack and Bodart 1993; Lavy and German 1994; Akin, et al 1995; Ching 1995; Murakami, et al 2001), have found that the availability of medicines through user fees led to improved access to health care, especially among the poor. For instance, after the introduction of full cost recovery for drugs in the Ghanaian public health facilities in 1992, which was associated with a more regular supply of medicines, the total outpatients' attendance slightly increased by 3.5% by 1995 (Asenso-Okyere, et al 1998). On the other extreme, many studies of the impact of Cost-Sharing on the utilization of health facilities concluded that the utilization was generally reduced (Kanji 1989; Waddington and Enyimayew 1990; Asenso-Okyere 1995).

Politicians and policy-makers become concerned when fee introduction or increase leads to marked reductions in utilization. For example, in Uganda, a Cost-Sharing strategy that was thought by the health workers and community to be successful, was abolished during the 2001 presidential election campaign as a reaction to a report stating that their national Cost-Sharing Policy was leading to unnecessary suffering and even death (Kipp, et al 2001). The attendance at health facilities was dramatically decreased seven months after its abolition, as a result of the depletion of drug stocks (Burnham, et al 2004). The frequent shortage of medicines is a typical symptom of many nominally free health services in developing countries' public health facilities. For example, the estimated annual per capita pharmaceutical needs that the Ugandan government should have made available in 2002 – 2003 (the first financial year after the end of Cost-Sharing) were US\$ 3.5. The available funds from local, central and externally funded project sources totalled only US\$1.2 (WHO 2004b), leaving two thirds to be met by households, mainly from expensive private alternatives.

The empirical evidence of the effects of user charges on utilization is obtained from research studies conducted in Sub-Saharan Africa, Southeast Asia and Latin America. These studies indicate that the objectives of user fees policies adopted in all countries reviewed for this thesis, are almost uniformly to improve quality, particularly the supply of medicines, through raising of or freeing up funds, in order to increase utilization of health facilities services, especially Primary Health Care. The evidence also shows that carefully designed Cost-Sharing programmes, accompanied by improved quality; such as regular availability of medicines, increase health facilities utilization. However, the

experience of countries, where imposition of user fees resulted in the decline in health facilities utilization, are also discussed to understand the reasons leading to that negative impact.

In the following presentation of the impact of Cost-Sharing on the utilization of public health facilities across the countries in Sub-Saharan Africa, Southeast Asia and Latin America, I find it convenient to distinguish between positive and negative impacts of user charges on the utilization, since there are similar factors which lead to reported effects. The discussion begins with the positive impact of Cost-Sharing on utilization.

Examples of Cost-Sharing: positive utilization impact

Previous studies (see, for example, Mwabu and Mwangi 1986; Litvack and Bodart 1993; Nolan and Turbat 1995; Soucat, et al 1997a; Fiedler and Wight 2000) indicate that the expected increase in utilization has been achieved in countries where introduction of Cost-Sharing programmes is concomitant with quality improvement. Public health services utilization increased after fees imposition in, for example, Cameroon, Niger, Benin, Guinea, Mauritania, Kenya, Burundi, Guinea Bissau, Liberia, Rwanda, Senegal, Sierra Leon and Togo in Sub-Saharan Africa; Vietnam, Nepal and Laos in Southeast Asia; and Honduras in Latin America. In all these countries, the availability of medicines was obviously improved and the local community was widely involved in administration, financing and policy making, for instance, with budget allocation and pricing policies. Therefore, one can argue that the clients' satisfaction with the availability of affordable and efficacious medicines is a key determinant of utilization of public health services.

In addition to stock replenishment, some countries use the revenues generated from medicine sale to finance other Primary Health Care activities. For example, the Mauritania experience suggests that the availability of medicines through a Cost-Sharing strategy has enabled Mauritanian health facilities to develop their activities. The observed results were an increased number of consultations and the ability of people to pay more for health care of perceived quality as a result of regular availability of essential medicines at health facilities (Audibert and Mathonnat 2000).

With the exception of Niger, where fee-for-service was applied, the charge structure in all countries was a fee for medicines. In some countries, such as Guinea, Benin, Burundi and Cameroon additional registration and consultation fees were also paid by users. However, the degree of utilization increase varies from country to country. Some studies are presented here as examples. Murakami and colleagues (2001) reported that, after one year of the RDF implementation in Vientiane municipality of Laos the number of outpatients was sharply increased by 25- to 66-fold at health centres and a 4- to 5-fold increase in inpatients at two district hospitals. In a controlled trial research in two districts of Nepal, the implementation of Cost-Sharing Policy in public health posts resulted in a drop in utilization by 18% during the first year and then increased by 22% two years later (Chalker 1995). Umenai and Narula (1999) found a marginal improvement in health facilities utilization after the implementation of RDFs in Vietnam. In Cameroon, Litvack and Bodart (1993) compared the combined impact of user fees with improved quality (measured by availability of medicines) on utilization in three health centres treatment areas where user fees were implemented with two control health centres areas in the Adamaoua province of Cameroon. The result was a significant increase in the utilization of health facilities in the experiment, compared to the control group. These results should, however, be carefully interpreted due to a relatively short time framework (five months after policy implementation) and significant external financial and technical support in establishing the Revolving Drug Fund (Litvack and Bodart 1993). This support includes, for example, availability of foreign exchange for importation of medicines and protection of RDF money against usage for other Ministry of Health activities.

In a similar study, of a pilot test of cost recovery in the non-hospital sector in Niger, Diop and colleagues (1995) found that the combination of cost recovery and quality (as measured by improved drug supply, the use of standardised diagnosis and treatment guidelines and good management) increased the total quality of care demanded, measured by the total number of consultations, significantly in the district of Say, where a fee-for-service method was implemented. In the district of Boboye, where the tax plus fee method was adopted, the number of initial visits increased by nearly 40% and the total quality of care demanded increased by 70%. Soucat and others (1997a) in community based studies in Benin and Guinea concluded that health care utilization has increased even among vulnerable groups (i.e. low socio-economic groups, women and children) after the revitalisation of health centres following implementation of Bamako

Initiative. From the reported experiences, it is apparent that user fees work best as a part of a larger process that includes quality improvement, such as accessibility to essential medicines (Reddy and van der Moortele 1996; Gertler and Hammer 1997a; Gilson 1997; Levy-Bruhl, et al 1997).

Examples of Cost-Sharing: negative utilization impact

Households' responses to price changes in public health facilities have been tested using, pre- and post-charges data (Parker 1986; de Bethune, et al 1989; Yoder 1989; Waddington and Enyimayew 1989 and 1990; Booth, et al 1994; Lake 1994; Thomason, et al 1994; Haddad and Fournier 1995; Mwabu, et al 1995; Yazbeck and Leighton 1995). These research studies reported a significant decrease in utilization where user fees were introduced or prices sharply increased in public health care facilities without a concomitant quality improvement (as mainly measured by medicine availability). This is because, when user charges were adopted without improvement in the drug supply system, people incurred substantial travel and time costs, in addition to the cost of expensive brand-name medicines, to fulfil their prescriptions in the private pharmacy shops which were concentrated mainly in the densely populated urban areas (Asenso-Okyere, et al 1998; Meuwissen 2002). Moreover, user payment in poor populations, without certain arrangements, such as exemption mechanisms, leads to a dramatic drop in health facilities utilization. It was expected that the introduction of fees at public health care facilities which were previously free, would lead to a temporary decrease in service utilization, but that, when people got used to paying the fees, services utilization would increase again. But the increase is not necessarily to the previous level, as consumers become more cost-conscious and are encouraged to pursue less unnecessary utilization. However, there is no evidence that suggests the utilization lost through the imposition of user charges was 'frivolous' (Creese 1991).

Cost-Sharing therefore has three negative potential effects on health facilities utilization: patients try to avoid seeking care at public health facilities; patients are reluctant to use health facilities or make few visits; and patients shift to alternative sources, such as private health care providers (Weaver 1995). For example, ten countries in Sub-Saharan Africa (namely Kenya, Mozambique, Zaire, Uganda, Zambia, Burkina Faso, Swaziland, Ghana, Gambia and Niger) reported a reduction in utilization after the imposition of a Cost-Sharing Policy. In these countries there had been no

improvement in accessibility to essential medicines. Mwabu and colleagues (1993) in a study of demand in Kenya reported that the greater availability of drugs (such as Aspirin and Chloroquin) in a medical facility is positively related to medical care use. Surprisingly they also found that the lack of prescription medicines had a positive effect on utilization. The authors attribute these controversial findings to excess demand, which depleted the available drug stocks. The same scenario was observed in Kabarole district of Uganda, where a Cost-Sharing Policy was introduced in 1993. One of its objectives was the alleviation of medicine shortages. Yet in several health facilities, although medicines were readily available, the supplies lasted for a shorter period of time, especially with antibiotics, because of increased utilization (Burnham, et al 2004). As a result, the utilization rates of outpatient facilities reduced in urban and periurban areas, whereas they increased at remote health facilities (Kipp, et al 2001). This is a common indicator of the introduction of user fees without quality improvement.

Moreover, all those countries (Burkina Faso is exceptional) had protection mechanisms for the poor in place, supported by community involvement in the identification of eligible households for fee exemption. However, the formal exemption mechanisms were largely non-functioning, excluding the poor from access to the public health services. For instance, in Ghana, where fee setting and collection was decentralised, Agyepong (1999) found a persistent equity problem after the imposition of user charges. Studying the implementation of user charges in Burkina Faso without mechanisms for protecting the poor, and without change in the quality of care (Nolan and Turbat 1995), Sauerborn and others (1994) reported that people at highest risk of ill health and death, the young and the poor, were further pushed out of the health system after adoption of Cost-Sharing.

Let us take the Kenya experience as an example, where their Cost-Sharing programme was initially based on a registration fee. The Kenyan registration fee caused outpatient attendance to decrease by 27% at provincial hospitals, 46% at district hospitals and 33% at health centres (Willis and Leighton 1995). Followed by implementation problems, the programme was soon suspended. Mbugua and colleagues' study (1995) in a poor rural area in Kenya revealed that the application of user charges led to a sharp reduction in attendance rates at all health facilities. When registration fees were removed nine months later, the utilization pattern rose again to the pre-policy level. Collins and colleagues (1996) reported that in 1991, the user charges were gradually reintroduced

but were based, this time, on a treatment fee. Being a fee for tangible services, and combined with broader exemptions, charges for treatment were more acceptable than a registration fee. The new outpatient treatment fee resulted in a smaller reduction in outpatient utilization. The same conclusion (i.e. utilization increases after removal of user charges) was shown by Waddington and Enyimayew (1989) in Ashanti-Akim district in Ghana, where charges were introduced with quality of care held constant. It is clear that patients' behaviour has been influenced by policy changes. These experiences show that user charges may give positive results when they are implemented in phases, top-down the health facilities hierarchy, associated with community participation and with properly administered exemption mechanisms.

The experience of Zambia illustrates the impact of medicine shortages when the fee structure is based on fee for medicines. Implementation of user fees in Zambia, where neither efficient mechanisms for poor protection, nor improvement in quality of services were in place, undermined general utilization levels and exacerbated the situation of the poorest (Gilson, et al 2000). As a medicine, rather than a consultation, fee was charged, patients complained that the time and money spent in travel, the long waiting times, and the unpredictable availability of medicine were not worth the charge they were supposed to pay. They virtually had to pay twice, once for consultation in the public facility and a second time in fulfilling their prescription from other sources. Their decision not to use the health facilities was based mainly on poor value for money, rather than ability to pay per se (Booth, et al 1994; Russel 1996). Therefore, the unstable supply of medicines in Zambian facilities resulted in a considerable reduction in their utilization after fees were introduced (Gilson, et al 2001). In Niger, Meuwissen (2002) argued that the imposition of a user charges policy, which was based on fee-for-service, and included drug costs, did not generate enough revenues to pay for new medicines and cover administrative expenses. Despite increased utilization during pilot user charges projects (Diop, et al 1995), a huge drop in utilization of health centres was reported after the cost recovery system was adopted. The reasons identified by Meuwissen (2002) include higher treatment costs, difficulties in monitoring fee-for-service methods, and the failing national drug supply.

The implementation of user fees, or their sharp increase (for example, in Mozambique, where the consultation fee was increased by 1,333% (Kanji 1989) in routine government services without improvement in the availability of medicines, access to

services and quality of care led to a decline in attendance rates often by as much as 50% in Swaziland, Mozambique, Ghana, and the Gambia (Kanji 1989; Waddington and Enyimayew 1989; 1990; Yoder 1989). In a longitudinal study in Zaire, Haddad and Fournier (1995) also found that, the utilization of health services had dropped by 40% over five years of user charges implementation. They concluded the steady supply of medicines and the improvement in technical quality of the service, such as qualification of staff and rehabilitation of the infrastructures, were not enough to compensate for further increase in the costs of services.

In summary, although the results of these studies are consistent with econometric findings that demand is sensitive to price (see, for example, Gertler and van der Gaag 1990; Waddington and Enyimayew 1990; Benett and Ngalande-Banda 1994; Mwabu and Wang'Ombe 1995), they do not eliminate the need for extreme caution in interpreting the results, because they report only the fall in utilization, and say little about the degree of price elasticity. Large drops in utilization could be associated with big price increases (see, for example, Kanji 1989), but demand could still be relatively price insensitive (Hutton 2002). In addition, these studies lack control groups, therefore, it is difficult to know whether the reported reduction in utilization was due to Cost-Sharing and fees increase or because of other factors, for example, changes in the pattern of diseases. Finally, they do not control for quality variations, such as regular supply of medicines pre- and post-policy. In spite of these observations, the findings of the studies discussed above are consistent with our argument, that if RDFs revenues are allocated properly, accessibility to essential medicines will improve and users become more willing to pay for quality public health services.

Lessons learned

The positive utilization consequences of some countries' experiences with Cost-Sharing may be due to the perceived and real quality gains in facilities with cost recovery programmes, which were translated into general levels of increased utilization. These experiences also raised the question 'why did Cost-Sharing increase utilization?' The reasons given by many authors (see, for example, Litvack and Bodart 1993; Reddy and van der Moortele 1996; Gertler and Hammer 1997a; Gilson 1997; Levy-Bruhl, et al 1997; Quick, et al 1997; Soucat, et al 1997a) were that they were partially due to improvements in accessibility to essential medicines, better quality of health care and

presence of poor protecting mechanisms. Creese (1991, p.313) reported that 'the availability of appropriate medication at the first point of contact with health care system is probably one of the most important components of the quality of primary health care, and therefore a primary determinant of utilization. Utilization patterns at health centres with frequent 'stock-out' (interruption in the supply of drugs) in some African countries show trends that coincide closely with the arrival and exhaustion of pharmaceutical supplies at the health units'.

An important finding from these studies is that the improvement in the availability of medicines through a well-designed Cost-Sharing programme has generally a positive and significant role in determining the health facilities utilization. In addition, the size of the price increase, the targeting and timing of improvements in services provided at health facilities, also affect the utilization rates. Further, the absence of improvement in the quality of services (as measured by availability of medicines) is the common reason among all those cases where utilization was negatively affected by the implementation of user charges (see, for example, Waddington and Enyimayew 1989; Yoder 1989; Gilson, et al., 2000). Conversely, the introduction of Cost-Sharing which was accompanied by improvement in health services as it has been observed in countries such as those mentioned above, increases service utilization even among the poorest groups (Litvack and Bodart 1993; Soucat, et al 1997a). Thus, changes in utilization depend on whether the total cost (i.e. services costs, transportation cost and opportunity costs) of accessing services of the desired quality level increases or decreases. Finally, the imposition of user fees could be reversed (examples of Uganda and Kenya) or neglected if the charges are not adequate to finance noticeable improvement in availability of medicines; the revenues from fees cannot be properly used due to bad management or highly centralised expenditure control procedures; or if a workable system of exempting the poor from fees is not in place.

To conclude, attentively designed, carefully implemented, and properly administered Cost-Sharing programmes, such as RDF, can improve the quality of services provided in public health facilities by maintaining steady drug supplies at such facilities. Quality improvement has clearly positive impact on utilization and may even outweigh the negative effect of fee imposition or increase, even among poor. The effects of fee structures and related policies, such as community participation and effective exemption mechanisms, should not be overlooked.

2.5 Critique of the published studies

This section aims at identifying gaps in the published studies on CSPs and RDFs. In so doing, the section highlights weaknesses that undermine their findings and which will be attended to in my own research for this PhD (for further details, see chapters four and eight).

User charges research

There has been various published work (theoretical and empirical) on the impact of the implementation of user fees as a mechanism of health service funding, which include, for instance, consultation fees, laboratory investigation fees, dressing fees as well as medicines' cost (Mills and Walker 1983; Foster 1991; Sauerborn, et al 1995). But most of these studies rely on data from 1992, and in a few cases 1993 (see, for example, McPake 1993; Nolan and Turbat 1993; Shaw and Griffins 1993; Benett and Ngalande-Banda 1994; Gilson and Mills 1995; Creese and Kutzin 1995). Also the previous utilization studies are criticised, for not adequately taking into account the effect of quality on services utilization (Wouters 1991; McPake 1993). This literature pertaining to the Cost-Sharing debate has been growing very fast during the past two decades and has resulted in a number of reviews with different scope and focus (Creese 1991; McPake 1993; Creese and Kutzin 1995; Reddy and van der Moortele 1996; Mwabu 1997; Sepehri and Chernomas 2001).

As we have seen above, it is widely asserted that the introduction of user fees during the 1980s and the 1990s contributed significantly to the decline in utilization rates on one hand, and to the increases in utilization rates on the other hand. The apparent contradiction and 'clashes' in the findings of published work about the user fees and their impact on the utilization of health facilities arise largely because studies have collected different kinds of data from different types of projects and categories of respondents at different times and contexts, or have used different methods of research and analysis to answer quite different questions. For example, most of these studies attempt to answer questions about the impact of Cost-Sharing Policies on utilization of health services and health status of individuals (Weaver 1995; Yazbeck and Leighton 1995; Stanton and Clemens 1989); raising revenues (Vogel 1990; Creese 1991; Fiedler 1993; Nolan and Turbat 1995; Collins, et al 1996); efficiency of health care system

(McPake, et al 1993; Gilson and Heggenhougen 1994) and improvement in the quality of health services as measured by availability of medicines (Akin, et al 1995). Also questions about the inequalities in access of health care (Onwujekwe and Uzochukwu 2005; Nyongator and Kutzin 1999) and ability and willingness to pay (Huber 1993; Weaver, et al 1996) were widely researched. The large differences that exist between countries and between different settings within the same country will generate ongoing debate about the impact of user charges on health facilities utilization. Therefore, a major distinction has to be made between those countries, such as Kenya and Uganda, which were introducing medicine prescription charges in the context of free health services, and those such as Guinea and Burundi where user charges already existed (McPake, et al 1993). Generally, the main possibilities that lead to the different responses of the users towards Cost-Sharing include:

- a. Regular access to free medicines: Implementation of user charges in situations, where medicines and other medical supplies were regularly available free of charge at public health facilities and with wide coverage, especially in the rural areas, which no doubt reduces the utilization. The reasoning, of course, is that people will not pay for the quality services that they previously received for free.
- b. Erratic drug supply of free medicines: In situations where the medicines were not available or irregularly available and where services have deteriorated to such an extent that patients have to resort to the private pharmacies to obtain their medicines at much higher cost, and few, if any, preventive or other services were provided to the households in the catchment area, there are two expected outcomes:
 - (i) The introduction of user fees policy improves the quality of services in the public health facilities by making essential medicines of acceptable quality and affordable prices available within walking distance of users. Therefore, regular availability of medicines at these facilities was bound to have a wide-reaching impact in the community, such as the removal of the need to travel to district or main referral hospitals. In such situations, the utilization of health facilities increases. For instance, Soucat and others (1997a) showed that Benin and Guinea experienced severe drug shortages throughout their public health facilities before implementation

of Bamako Initiative (i.e. when health services were supposed to be free of charges). They concluded, over six years of implementation, that the BI programmes in Benin and Guinea have dramatically raised preventative and curative coverage with a minimum primary health care package.

(ii) Implementation of user charges or increase of the existing charges without concomitant improvement in the quality of services provided (i.e. drug supplies are not available). In this scenario, the pre-policy situation is exacerbated and patients bypass the public health facilities and use the expensive private alternative. For example, in Ghana, Asenso-Okyere and colleagues (1998) and in Niger, Meuwissen (2002) reported that, the shortage in medicines after introduction of fee-for-service policy caused a reluctance to attend consultations at health centres and contributed to the decrease in the number of patients. This was because people found it difficult to understand why one could pay so much money at health facilities and yet still be asked to buy medicines from private pharmacies.

c. The design and structure of the policy: The outcomes of user charges are determined by a number of factors. These factors include: the objectives, the nature of the scheme and level of the charges; the policy regarding the retention and use of the collected revenues; the role of the local community, whether there are exemption mechanisms or not; and the attitudes of health care providers.

To sum up, Cost-Sharing in health is a broad concept that comprises quite different mechanisms in reality and country experiences vary greatly (Nolan and Turbat 1995). As a result, the rigorous efforts to research the impact of Cost-Sharing on health facilities utilization have proved inconclusive. The reason for this is that the outcomes vary depending on where, when and how the policy was implemented in practice (Gilson 1997). Also the research questions and the methods to answer them differ. Therefore, the empirical question of whether Cost-Sharing Policy promotes efficient and effectiveness medicine supply system and thereby enhanced health facilities utilization is still unresolved.

RDF published studies

No recent studies were identified that rigorously and comprehensively evaluated the impact of long-term, large-scale RDF on the utilization of health facilities. However, limited evidence is available mainly from short-term, small-scale, and often externally funded projects concerning the effects of RDFs on public health care facilities utilization from Zimbabwe (Chisadza, et al 1995), West-North province of Cameroon (von Massow, et al 1998), Kenya (Asenso-Okyere, et al 1999), Vietnam (Umenai and Narula 1999), Vientiane municipality in Laos (Murakami, et al. 2001), and Nigeria (Uzochukwu, et al. 2002). These studies did not give a comprehensive evaluation of the projects that were assessed, and have a number of methodological limitations sufficient to undermine their conclusions. For instance, most of RDFs' studies are facility-based and report the response of facility users (see, for example, Chisadza, et al 1995). They do not provide other important information, such as policy-makers and households' perspectives about RDFs. Precisely, because these studies used facility-based data, they provide information only about health facilities users and not those who do not use the facilities. As a result, one can not be sure whether the rise in utilization rate comes from higher usages of facility by the same users, or whether it comes from the wide range of the population in the catchment areas which reflects the accessibility of more people to the local health care facilities. Policy-makers' perspectives are also important in explaining the reasons behind the adoption of RDFs and whether other alternatives have been considered or not. They also can give information about future plans for medicine financing policies.

Additionally, while many studies show that some RDFs' have success in improving access to essential medicines and utilization rates of public health care facilities, the failure to ascertain what existed before the RDF makes it difficult to rule out the alternative possibilities, such as changes in disease patterns and the socio-economic status of the communities. There is also the possibility that the selected facilities were already superior to the controlled facilities, even before the policy was put into effect. These issues were considered in the research design of this doctoral study. Moreover, despite the prevalent problem of substandard and counterfeit medicine preparations (see section 2.3 above), especially in developing countries, such as Nigeria, none of the reviewed studies reported on the *quality* of medicines sold at health facilities where RDFs were applied, nor what measures were taken by such programmes to ensure the

quality of medicines. WHO (1997a, p.1) pointed that without assurance that the medicines meet acceptable standards of quality, safety and efficacy, any health service is evidently compromised. For example, WHO (2004b, p.5) recently found that 50% to 90% of samples of antimalarial medicines failed quality control tests and more than half of antiretrovirals assessed did not meet international standards (sources of such samples were not mentioned). Finally, none of the published experiences with RDFs has comprehensively assessed factors that could lead to the successful implementation and continuity of the RDF (Table 2.1 below).

The question arose from this literature review is that could the RDF positively affect the utilization of public health facilities by improving the perceived quality of services as measured by the accessibility to essential medicines. Khartoum State, Sudan (Chapter three), where a large-scale long-term RDF project was implemented, is the good place to answer that question. For enrolled health facilities and Khartoum State - Health Insurance Scheme, the RDF was only source of medicines over the last fifteen years. Additionally, the RDF served large number of patients (6,106,724) during 2001 and 2002 (RDF 2002a).

There are only two unpublished evaluations of the RDF KS at the time of this study. One was conducted in early 1996, before the handover of the RDF project to the MOH. The second one was undertaken in 1998. The latter was a rapid assessment based mainly on the archival records and the author recommended further comprehensive evaluation (Fundafunda 1998). Though these studies assert that RDF in Khartoum State has managed to achieve high percentage of availability of essential medicines within walking distance of patients' homes (Awadalkarim, et al 1996; Fundafunda 1998), they did not mention whether there were changes in the health facilities utilization or not. Also, previous evaluations did not comment on the quality of medicines and the reasons behind the project success at the time. Further, the first evaluation took place before the handover. At that time, Save the Children (UK) had an executive role in all RDF administrative and financial activities. Finally, these evaluations did not use a control group or pre- and post-policy assessment to exclude the effects of other factors on the quality services.

Table 2.1: Recent published RDFs' English articles

Author(s)	Year of study	Location	Source of data	Aims and objectives	Observed limitations
Uzochukwu, B., et al., 2002	1999	Oji River, Nigeria	1. Archival documents. 2. Patients' exit-interviews.	To compare the level of availability and rational use of drugs where BI-RDF was implemented with non-RDF facilities	1. Small scale project with only twenty-one PHC centres and two government hospitals. Total population 98,465. 2. Community-based RDF. 3. Study was conducted, six years after the implementation (relatively 'young' project). 4. Facility-based study. 5. The study measured physical availability of medicines only.
Jitta, J., Reynolds, W., and Nshakira, N., 2003.	1996	Tororo District, Uganda	1. Qualitative interviews with planners and administrators, health workers and users. 2. Archival records	To examine drug availability in six PHC units.	1. Small scale project. 2. Community-based user fees. 3. Study was conducted about six year after implementation of user fees. 4. The study measured only physical availability of medicines and their use.
Murakami, H., et al., 2001.	Oct. 1996 to Sep. 1998	Vientiane municipality, Laos.	1. Structured interviews with staff members in charge of the RDFs, households and exit-interviews with patients. 2. Observations in accordance with check list were conducted.	The research was aimed at assessing current financial status and assessing acceptability of services for the local community.	1. Small scale project implemented in one general hospital, nine district hospitals and thirty-one health centres. Total population was 528,000. 2. Two to four years after the RDF implementation (short term projects). 3. Community-based RDFs. 4. It is a report describing an action research conducted by the Vientiane public health department (i.e. it is not a research). 5. The study did not mention any thing about: affordability, quality of medicines, equity, self-medication, delay in seeking care, RDFs' effects on PHC services, success or shortcomings of the projects and user satisfaction.

Table 2.1 (continued)

Author(s)	Year of study	Location	Source of data	Aims and objectives	Observed limitations
Asenso-Okyere, W.K., et al 1999.	unknown	Three districts in three regions in Ghana	1. Focus group discussions with users and nurses. 2. In-depth interviews with prescribers and pharmacists.	Qualitative study aimed to find out the perception of health care seekers and health workers of the drug availability in rural and urban health care facilities.	1. Community-based user charges projects. 2. Duration at the time of study unknown 3. Study focused mainly on the physical drug availability and attitude of health workers. It is deficient in information about, for example, health facilities utilization, households' source of finance to cover the prescription costs, demographic characteristics of health facilities users.
Umenai, T., and Narula, I.S., 1999.	-	-	-	-	1. This article reported the experience of RDF in Vietnam. 2. It is not a research study. 3. Short (five years) RDF experience. 4. Community-based RDFs. 5. No data about community with access to essential medicines and households' expenditure.
Murakami, H., 1998	1996	Vientiane and Khammouane provinces of Laos	1. Key officials were interviewed. 2. Records and periodicals 3. Observation.	The objectives are to describe the structure of two RDF systems in Laos and also to compare the management of both systems.	1. Small-scale experimental schemes. 2. Short term three years old at the time of the study. 3. Community-based projects. 4. It is comparative study of managerial and financial aspects between two RDF systems.
von Massow, F., et al., 1998.	Unknown	The North-west province of Cameroon	Not mentioned	The paper presents a RDF approach developed within the scope of a technical assistance project, executed by the MOH and German Agency for Technical Co-operation	1. More than ninety community pharmacies and 100 drug stores at village health posts. Total population was 1.3 million. 2. Long term RDF (started in 1986). 3. It was a project which supplied a network of community pharmacies and drug stores. 4. The report focused mainly on the financial and managerial aspects of the project. 5. The time of study was not mentioned.

Table 2.1 (continued)

Author(s)	Year of study	Location	Source of data	Aims and objectives	Observed limitations
Umenai, T., and Narula, I.S., 1998	-	-	-	-	Short editorial article
Quick, J.D., et al., 1997.	-	-	-	-	1. Chapter in a book about the theory, implementation, managerial and financial related aspects of the RDF. Editorial article
Umenai, T., and Narula, I.S., 1996	-	-	-	-	
Chisadza, C.C.M., and Nazerali, H., 1995.	1991	Harare Central Hospital	1. Interviews with outpatients at hospital pharmacy; 2. Information on the individual's outpatient cards and observations.	The study aimed to appraise the administrative effectiveness, the actual charges to users, overall revenue and sustainability of the fee system.	1. The study examined the fee system in only one hospital in Harare. 2. Short term project (only six months after implementation of the system). 3. Facility-based study.
Litvack, J.I., and Bodart, C., 1993	1991	Adamaoua province of Cameroon	Households interviewed using a questionnaire.	To test how user fees and improved quality affect health facility utilization.	1. Small-scale project (twenty health centres at the time of study). 2. Short term project (only five months after the policy implementation). 3. Externally supported project. 4. Community-based project. This article focussed on ten questions that should be considered in establishing a RDF
Waddington, C., and Panza, A., 1991	-	-	-	-	This paper mainly about the concept and principles of the RDFs. It has mainly focused on how to establish an RDF.
Cross, P.N., et al., 1986.	-	-	-	Paper focused on: potential benefits and common pitfalls of RDFs; and central role of financial planning in establishing drug sales programmes	

2.6 Contribution of this evaluation research to knowledge

Quick and colleagues (1997, p.688) reported that 'Examples of successful large-scale public RDFs are limited'. This RDF evaluation research, therefore, contributes to the financing of health care, in general, and medicine, in particular, by offering a recent evaluation of a long-term, large-scale RDF project, which is administrated fully by a public organisation, based on a robust research design. This entails the use of a multi-method research design using semi-structured interviews with policy-makers and front-line health care providers, archival records and direct observation using previously prepared check lists. To cross check the findings of the qualitative information, quantitative data were collected from the patients of the selected health facilities and households in their catchment areas (see chapter four) using pre-tested questionnaires. As has been criticised above, most of the published studies about RDFs are either community-based or facility-based.

Further, various studies about user fees, in general, have focused particularly on the revenues, and community financing and community participation. Little is known regarding the accessibility to essential medicines and their impact on public health facilities utilization in areas where the RDFs have been or are being implemented. This is odd, bearing in mind that the drug supply and improvement in public health facilities utilization are among the main objectives of such projects. While the health literature is seriously lacking in empirical studies that specifically demonstrate the benefits and limitations of the RDF and examine the factors explaining success or failure in achieving its objectives, it is nevertheless widely accepted, based on theoretical grounds and personal experience, that RDF facilitates access to essential medicines and health facilities utilization.

Moreover, the Ministry of Health (MOH) in Khartoum State- Sudan in collaboration with SC (UK) established a RDF project in the late 1980s to secure the accessibility to essential medicines in primary care health centres. Evidence-based information about the impact of RDF in Khartoum State (KS) on the utilization of health care services is necessary for modification or expansion of the project and for the potential replication of KS experience nationally in other states and regionally in other countries. Also the knowledge of the RDF effects on health seeking behaviour would be beneficial in

formulating appropriate policies for medicines financing in developing countries with similar socio-economic situations, especially in Sub-Saharan Africa.

Finally, difficulties have been encountered in establishing sustainability by improving security of the RDF's one-time capital investment (stocks and funds) and in guaranteeing affordable medicines of good quality near the residence of the potential users (Patel 1986; Foster 1991; Waddington and Panza 1991; Sauerborn, et al 1995; Huss 1996). Examples of consequences of such difficulties are: the Sine Saloum revolving drug fund in Senegal funded by USAID in 1977, where by 1980, most of the health facilities in the project had gone bankrupt (Vogel and Stephens 1989). Another example is the Nigerian revolving drug fund which was established by Petroleum Trust Fund in 1996 (Erhun 2000), which ceased to revolve three years later.

There are other factors which make this study more important in the context of the current inconclusive debate about the impact of user charges on quality improvement and health facilities utilization. They include:

1. Unlike the Bamako Initiative (Parker and Knippenberg 1991; Soucat, et al 1997a; WHO 1998c), the RDF was generally not designed to finance other health programmes at the MOH. My study aims to evaluate the RDF KS project, which differs from the other projects mentioned above in six important respects: first, the system does not promote medicine sales for co-financing purposes but aims to support the prescribers in providing better medical care, and patients' access to the essential drugs at reasonable prices. Second, the project guarantees equal medicine prices throughout Khartoum State, regardless of the distance from the central distribution centre. Third, RDF sales of medicines are made directly to the patients and revenues are collected through its cash collection system. Fourth, the programme operates on efficient business management principles with a commitment to public health goals. Fifth, despite the devaluation of the Sudanese pound during the 1990s, the RDF KS has survived for fifteen years at the time of the study. Finally, RDF KS is not a simple community fund that revolves at local health facilities as it was at the other RDFs described in the literature. The RDF KS is a monopoly, parastatal enterprise importing and distributing medicines and other medical supplies. It is fully government owned and administered under the MOH. It maintains its own

network of retail pharmacies as well as selling medicines in all MOH health facilities.

2. The time-frame used for evaluation of the RDF. A fifteen year evaluation period permits the long-term effects of the policy to be evaluated, compared with the shorter time frame used by most of studies examined in the literature, most of which were conducted after a relatively short period of implementation of RDF policy in Sub-Saharan Africa and Southeast Asia. The clearest example of such studies is Litvack and Bodart's study (1993), which was conducted five months after implementation of user fee policy in Cameroon. The study took place within the time frame when people were still testing out the health centres' services. Perhaps many households were willing to attempt the new system when one of their members became ill (Litvack and Bodart 1993), but may not have continued to do so.
3. Limited experiences with RDF have been published (see table 2.1 above). Difficulties have been reported and many RDFs had ceased to revolve after the departure of the external supporters. In their review of experiences with revolving drug funds from variety of countries, Cross and colleagues (1986, p.335) concluded that 'All too often the monies actually recovered are insufficient to replenish supplies and the fund is soon depleted or 'decapitalised''. Although it has been argued (McPake, et al 1993) that the recovery of full medicines and other non-salary recurrent costs is rare, the RDF in Khartoum State covers full medicine costs and all its operating expenses, including salaries and incentives of its member of staff at both headquarter and pharmacies levels from sales of medicines.

Therefore the evaluation of such a long standing project, which was expanded to cover most (74%) of the health centres, all MOH KS hospitals (ranging from rural hospitals to highly specialised centres, for example Open Cardiac Surgery and Renal Transplantation Centres), and peoples' pharmacies (see chapter three), contributes to the Cost-Sharing debate on a number of key issues:

1. It demonstrates how security for the endangered structure of RDF can be established and presents reasons for its success, and its achievements and

pitfalls. The medicines' quality measures applied by RDF KS will also add to the existent Cost-Sharing literature.

2. In general terms, what seems to be at fault on many RDFs, is the dilemma of operating a fairly commercial enterprise within the public sector (Cross, et al. 1986). This is not the case in the RDF KS which combines social objectives with private style management (Mohamed 2000). Therefore, findings of this study will encourage planners and policy-makers to be open to the application of business instruments for operating RDFs within the public sectors. The study also provides them with information on the impact of the RDF on the public health facilities utilization rates and their variance by areas and economic groups, barriers to using public health facilities and perceived quality of services. So it will help planners and policy-makers in other countries, interested groups and organisations to tailor schemes of medicines financing to suit the needs of, and capabilities for payment by, the population.
3. The evaluation is important because it allows me to assess whether previous findings in the literature are also valid in Khartoum State, thus enriching the current debates among academic, planners and administrators, NGOs, and donors regarding the financing of essential medicines in Sudan and in other developing countries.
4. Lessons will be drawn concerning the RDF's potential as a mechanism to support sustainable and self-financing medicine supply systems, to assist in resolving critical resource allocation issues that need to be considered in implementation.
5. Co-operation between the government of Sudan and SC (UK) even after the RDF handover in 1996, through Currency Swap Agreement, is another area where there could be contribution.
6. My study goes beyond previous research by combining the advantages of a survey design with interviews with major stakeholders (i.e. policy-makers, practitioners, patients, and households). The data were then cross checked with each other and with those gathered from archival records and field visits to

selected health facilities. This multi-method research approach fills the gaps in published works by ensuring the reliability of gathered information. Therefore, I can argue that the combination of methods used in this study promises better results. This research design was not used by any of the other evaluations reviewed for the purpose of this PhD.

7. The integration of different data collection methods (see chapter four) employed in this research are needed if one wants to understand and obtain information on social phenomena such as health facilities utilization in developing countries using Cost-Sharing programmes to finance medicines in the public sector health facilities. These methods could be used to obtain information about, for instance, accessibility to essential medicines. Finally, the analysis of qualitative data using MS Excel (see chapter four, section 4.8.2) could be used by qualitative researchers in setting where other software for the analysis of qualitative data, such as NVivo and NUD.IST are not available. It could also be used to analyse data in languages that are not yet accepted by the available software.

Overall, the above discussion of published work about RDFs highlights the need for a careful study of long, large-scale experience of the implementation of this RDF as a medicine financing mechanism in the public sector. Thus, the study's primary contribution lies in its comprehensive evaluation of a unique, long lasting RDF project that was established on sound business principles. Its conclusion, however, also seeks to highlight some approaches that this evaluation suggests might strengthen future replication of the RDF in other states of Sudan or other countries. Finally, I believe that the research, although it is specific to Khartoum State, also has important messages for policy-makers and planners, donors and NGOs, and other stakeholders in relation to ongoing policy changes in health sector, in general, and in the financing of medicines, in particular, in developing countries, especially in Sub-Saharan Africa.

2.7 Summary

This chapter has sought to describe the development of Cost-Sharing Policy, in general, and the RDF, in particular, and the reasons that led to the introduction of this mechanism to finance public health care services, especially medicines, in developing

countries. As we have seen, access to essential medicines and their financing mechanisms has been the subject of a rich theoretical debate concerning Cost-Sharing programmes and their impact on the utilization of health care services during the 1980s and 1990s. We have also seen that there have been very few empirical studies about large and long lasting RDFs in developing countries, in general, and in Sudan, in particular, that tell us about the impact of the RDF as a medicine financing mechanism on the accessibility to essential medicines.

Overall, given the lack of research that has been focused on RDFs, there is very limited knowledge of the RDF's role in relation to the accessibility to essential medicines, the factors for its success, and measures that should be put in place to ensure the quality of medicines and their affordability. This PhD thesis sets out, therefore, to fill an important gap in our knowledge, by using qualitative and quantitative techniques to provide considerable insight about the RDF. The following chapter contextualises the readers with the setting of this evaluation and it gives historical background about the establishment of the RDF and its development over the years.

Chapter 3 Sudan Health Care System

3.1 Introduction

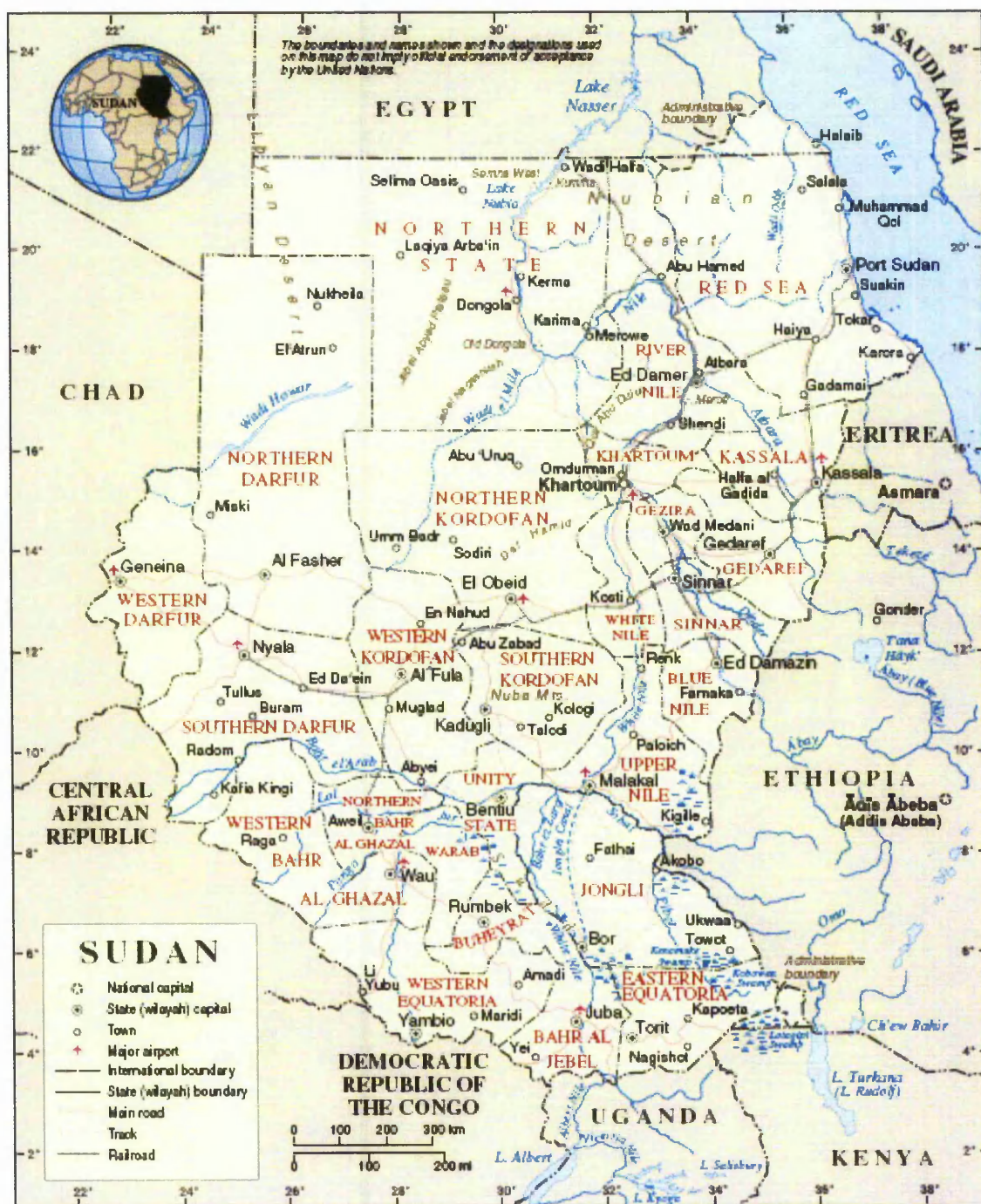
This chapter introduces the geopolitical, socio-economic and health profile of Sudan, in general, and Khartoum State, in particular, to familiarise readers with the context of the study. Section two is, therefore, devoted to the geography of Sudan, and the socio-economic and demographic characteristics of its population. Section three presents an overview of its health system and prevalent health problems. In section four, health financing mechanisms and government expenditure on health will be briefly discussed. Section five gives a brief description of Khartoum State. This section also presents a historical background of the Revolving Drug Fund in KS. Finally, the chapter gives a summary of main points presented in this chapter and their significance to the study.

3.2 Political and demographic overview

With an area of 2.5 million square kilometres, Sudan is the largest country in Africa. Regionally, Sudan is northern and Sub-Saharan Africa. It shares borders with nine African countries and is separated from Saudi Arabia by the Red Sea (Figure 3.1 below). This geographical location allows the Sudanese population and those of the surrounding countries to move freely across these borders. It also makes it difficult to control medicines smuggling and the transmission of communicable diseases. The Sudan climate ranges from damp rainy (i.e. tropical) in the south to desert in the north. The country is generally flat and is dominated by the River Nile and its tributaries.

Sudan became independent from Great Britain in January 1956. Since independence, the political situation of the country has been characterised by instability. Sudan has been ruled by a series of unstable parliamentary governments (during three periods of multi-party democracy) and three military coups including the current government. This government came to power as a result of a military coup in June 1989 and dissolved into the civil government in 1992.

Figure 3.1: Map of Sudan



Source: UN 2004

Sudan suffered from the longest civil war in Africa, which lasted more than twenty-one years before the Comprehensive Peace Agreement was signed between the government and the Sudan People's Liberation Movement (the southern rebels) in January 2005. conflict has also flared up in other parts of northern Sudan in recent years, particularly in Darfur states. The political instability and the civil war in the south have had a negative impact on the socio-economic and development of the country.

Under a decentralisation policy, the Sudanese governmental structure has been re-organised since 1994 into a Federal system with three levels: the Federal level, twenty-six states and 134 localities. Each state (Wilaya) is governed by an autonomous government which comprises the Ministry of Health and five to six other ministries. The state government is chaired by the Wali (the Governor), while the localities are headed by a commissioner. After the signing of the Comprehensive Peace Agreement, a government of national unity has administered the country on a national basis. A government of the south of Sudan was introduced as an intermediate level above the southern state governments. This administrative structure will continue for six years, and started in January 2005. After this transitional period, the people of the south Sudan will choose between unity and independence through a referendum.

The Federal government exercises its power over the whole country. However, significant responsibilities for social services have been decentralised to the states and localities. In the health sector, the administration and delivery of public health services has been decentralised. The Federal Ministry of Health (FMOH) retains responsibilities for overall policy, and legislation, as well as the posting and continuing professional development of health personnel, and the administration of fifteen tertiary hospitals (named Federal hospitals in this thesis) in Khartoum State. The states have responsibility for health centres and hospitals, while the localities are responsible for other PHC facilities that comprise the first level of the health care pyramid, such as dispensaries.

In 2005, the estimated mid-year population of Sudan was forty million (CIA 2006), based on projections from the 1993 census. The average annual population growth rate was 2.5% during the 1975 – 2002 period (HDR 2003). The population is unevenly distributed between the twenty-six states of Sudan. The majority are concentrated in six states of the central region including Khartoum. The mean population density in Sudan

is ten per square kilometre, increasing to fifty in the agricultural areas (Mustafa, et al 2005). Sudan is an ethnically and culturally diverse country of around 597 tribes (Mohamed 2000). The main, official language is Arabic, but numerous dialects are also spoken.

The age and sex structure of the population has remained about the same since 1983 (DHS 1990). In 2005, the economically active population (age 15 to 64 years old) comprised 54.5% of the total population (CIA 2006). The ratio of males and females in this age group was equal. But women constitute a slight majority overall (Mustafa, et al 2005). The population is relatively young: 45% are children under fifteen years of age (Table 3.1). The high ratios of young children and women imply a high rate of dependency, and thus increase the need for essential public services, such as health and education. The birth rate was 35.17 births per 1,000 population in 2005 (CIA 2005). It was estimated that 38% of the population live in urban areas (HDR 2003), which has placed increased demands on housing, water, and social services. The civil war in the south and natural crisis (such as drought in the early 1980s) resulted in high rates of rural to urban migration, reaching 15% in 2003 (FMOH 2003a).

Table 3.1: Sudan population age structure

Age group	Percentage of total population
Children under five	16.4%
Children under fifteen	45%
15 – 64	54.5%
Sixty-five years and over	2.4%

Source: compiled by the author from FMOH annual statistical report 2003b and CIA 2005.

3.3 Economy

Sudan has gone through a tough path since its independence in 1956. The country was embroiled in two prolonged civil wars during most of the second half of the 20th century. The first war began in 1955 in the south and ended in 1972, but restarted again in 1983. In addition, Sudan has suffered from chronic political instability, drought and famine, during the 1980s. Moreover, the country was confronted by economic sanctions and the withdrawal of international donor and investors after the current government

came to power in 1989. Finally, a large debt (Sudan's external debt was estimated at US\$ 20.9 billion) and arrears in repayments continue to cause difficulties to the already poor economy (FMOH 2003a).

Recently, two major events dominated the scene in Sudan. One was the discovery and exploitation of oil in the second half of the 1990s. By the end of 1999, Sudan recorded its first trade surplus since independence in 1956, which along with monetary policies, has stabilised the exchange rate. The second event is the signing of the Comprehensive Peace Agreement between the government and the southern rebels in January 2005, putting an end to more than two decades of war that devastated the country.

Despite the increased exportation of the oil (500,000 barrels per day (Robert and Tordo 2006)), agriculture continues to be the most important production sector, accounting for 39% of GDP and employing 80% of the labour force (CIA 2005). However, the agriculture contribution to GDP has declined during the last five years after the contribution of the oil sector increased to more than 11% of GDP. Sudan has substantially improved its manufacturing and services sector in such a way that the relative share of GDP from these sources is now almost double the share of that from agriculture (Shariff 2004).

Sudan is one of the poorest countries in Africa, with an estimated annual GDP per capita income of US\$340, lower than the Sub-Saharan Africa average of US\$460 (World Bank 2002). Poverty in Sudan is deep and widespread, increasing the vulnerability of wide segments of the population to ill health. Social Watch International (2003, p. 162) reported that 'in 1996, the proportion of people under the poverty line in northern Sudan stood at 84.6% in the urban areas and 93.3% for the rural population and no state had a rate lower than 76% for urban centres and 80% for rural areas'. However, the recent data shows that the current situation in relation to poverty has improved. According to the CIA (2006), 40% of the population in Sudan are below the poverty line¹². Regional and urban/rural disparities in economic resources have clear implications for health and nutrition outcomes as well as public services (Decaillet, et al 2003). The prospect of economic growth in Sudan in the coming years will make more resources available. The exchange rate stability, re-engagement with the international

¹² To allow for international comparisons, the World Bank has established an international poverty line of \$1.0 a day per person in 1985 (Soubbotina 2004). Despite being old, it is still used to measure the poverty.

community, the return of the donors and the possibility of debt forgiveness or rescheduling are setting the stage for further economic growth.

3.4 Health system

The health situation in Sudan is one of the least favourable in the world. Overall health indicators in Sudan, such as the Millennium Developmental Goals (MDGs) indicators provided in table 3.2, are comparable to the average of Sub-Saharan Africa countries, but are not as good as averages in the Middle East and North Africa (Mustafa, et al 2005).

Table 3.2: Some MDGs' health status indicators in Sudan

Indicators	Year		MDG Targets for 2015
	1990	2004	
Crude birth rate (births per 1,000 population)	39	33	na ^{**}
Crude death rate (deaths per 1,000 population)	14	11	na
Maternal mortality rate (per 100,000 live births)	660	509	140
Under five mortality rate (per 1,000 live births)	120	91	35
Infant Mortality rate under one year (per 100,000 live births)	74	63	34
Total fertility rate (children born per woman)	6.7 [*]	4.3	na
% Population access to safe water	67	75	na
% Population access to adequate sanitation	58	62	na

Source: compiled by the author from HDR 2003, FMOH annual statistical report 2004 and UNICEF 2005. ^{*} 1970 -1975. ^{**} Information not available.

Nevertheless, the life expectancy of the total population has seen some improvement during the past few decades. It rose from forty-four years during 1970 – 1975 (HDR 2003) to estimated fifty-nine years in 2005 (World Bank 2005). The average infant mortality rate reduced from 104 deaths in 1970 (HDR 2003) to sixty-two deaths per 1,000 live births in 2005 (CIA 2006). With malaria and childhood infections causing over 40% of hospitals' admission, communicable diseases are the major causes of death in Sudan (Table 3.3). For example, malaria, with estimated episodes of 7.5 to 10 million and annual deaths of about 35,000 to 40,000 is the main cause of morbidity and mortality in the country (Malik, et al 2005). The government has developed specialised

vertical programmes to address common infectious and parasitic diseases, such as malaria, tuberculosis, leprosy and AIDS/HIV national programmes.

Table 3.3: Top ten causes of mortality and morbidity in Sudan

Rank	Mortality	Morbidity
1.	Malaria	Malaria
2.	Pneumonia	Acute upper respiratory tract infections
3.	Septicaemia	Diarrhoea and gastroenteritis
4.	Circulatory system diseases	Dysentery
5.	Malnutrition	Acute bronchitis
6.	Diarrhoea	Malnutrition
7.	Dehydration	Anaemia
8.	Anaemia	Pneumonia
9.	Acute renal failure	Tonsillitis
10.	Other heart diseases	Injuries and wounds

Source: FMOH annual statistical report 2004.

3.4.1 National health plans and policies

The government, through both Federal and States' Ministries of Health, is responsible for most health care services in Sudan, with Primary Health Care (PHC) being the corner stone of the government's strategy for achieving health for all. The government adopted a national health strategy as a part of a ten-year national comprehensive strategy (1992 to 2002) and an action plan that would guide implementation steps during 1992 to 2002. During this period, the government of Sudan passed several laws and decrees related to health sector reform. These regulations have led to substantial changes in the management and financing of health care services. These changes include the decentralisation of management and financing responsibilities of public health care facilities, the introduction of Cost-Sharing Policy (CSP) early in 1992, the launching of Health Insurance Scheme (HIS) in 1996 and the introduction of free emergency treatment at hospital outpatient departments. These will be discussed later in section 3.5 of this chapter. Since 1992, when a law was passed that medicines are not anymore free-of-charge in the public health system, Central Medical Stores, the government medicines supplies system for the public health facilities, became an

autonomous medicine and medical supplies agency. It was renamed the Central Medical Supplies Public Organisation (CMSPO) and operates on a cash-and-carry basis.

The previous ten-year comprehensive strategic plan has made some progress in the areas of health and development. However, a lot remains to be done. Strategies to address health issues are reflected in the ambitious comprehensive twenty-five year plan (2002 - 2027) for health development. This strategic plan states that the CSP as a mechanism of health care financing, particularly for curative services, will continue. Social solidarity funds and health insurance were to be introduced to protect those who may forgo health care for financial reasons. However, the twenty-five year strategic plan also recommends an increase in public spending on health services to reduce the burden of direct out-of-pocket payments for health services by users.

3.4.2 Organisation of the health sector

The Sudanese health care system is divided into primary, secondary and tertiary levels of care, which are under the three tiers of government, though with some overlapping of responsibilities. The lowest is the PHC level and service delivery is through PHC units, dressing stations, dispensaries, and health centres. These facilities are under the responsibility of the locality. The health centre is the referral point for the lower-level facilities and, in principle, is staffed by a medical doctor, medical assistants, and nurses. In addition, vertical programmes, in particular those for tuberculosis and the Expanded Programme on Immunisation, work through the primary level facilities but also sometimes establish independent posts in peripheral areas. The State governments provide the secondary level of health care and the service delivery is through general referral hospitals (which also provide some primary care). Finally, the Federal government is responsible for tertiary care through highly specialised services in teaching hospitals and national specialised centres in Khartoum State: for example, the renal transplantation centre and the national centre for radiotherapy and so on. However, some states, such as Khartoum and Gazera, also provide tertiary care through state owned hospitals.

Health services are provided through different partners including (in addition to Federal and State Ministries of Health, Ministry of Social Care, Ministry of National Defence and Ministry of Interior) universities, and private sector (both for profit and not-for-

profit organisations). However, there is no co-ordination between these different levels. Health care services provided by the government are comprehensive and where physical facilities are not established, particularly in very remote areas in Khartoum State, mobile health services are provided. As a result of the much enhanced construction efforts to achieve equitable access to public health facilities, some improvement in the health infrastructure was achieved in the past decade (Table 3.4).

Table 3.4: Health facilities in Sudan and Khartoum State

Health institutes	Sudan			Khartoum*
	1989	2004	Percentage	2004
Hospitals	205	334	63%	41
Health centres	399	964	142%	140
Dispensaries	1,242	1,612	30%	200
Dressing and primary care units	2,812	2,741	-3%	0
Total public health facilities	4,658	5,651	21%	381
Total numbers of beds (Public facilities)	19,200	23,976	25%	6,595
Private hospitals	na	na		43
Private single doctor clinics	na	na		650
NGOs PHC units	na	na		214

Source: compiled by the author from annual statistical report FMOH 2004 and annual statistical report MOH KS 2004. *No information available for 1989.

3.4.3 The private sector as a health care provider

The economic liberalisation policy has led to a tremendous growth of private health care in the past decade. Under this policy, private facilities may be established anywhere in the country. Public sector doctors are allowed to run their own private clinics outside office hours (from my personal knowledge: some of them also run illegal practice during the office hours) or to work in private hospitals, provided their public services are not compromised. For example, the number of private hospitals, doctors' clinics, and pharmacies in Khartoum State increased from 5, 230, and 451 in 1992 to 43, 650, and 779 in 2004 respectively (MOH 2004). Being profit driven, private facilities are concentrated in places where there is a demand, leading to an accumulation in urban and better-off rural areas, particularly in KS and, to some extent, Gazera State. They are also

perceived to be of better quality than government services (MOH 2003a). The growth in private hospitals is driven mainly by the customers' need. It is not surprising, then that the focus of these hospitals is mainly on curative selective services and mainly accessed by the better-off (Mustafa, et al 2005). The bulk of the private health care facilities are single doctor clinics. An expansion of private secondary and tertiary care facilities is limited to few states like Khartoum and Gezira States. It is necessary to note that a growth in private sector should relieve some of the pressure of demand for health services, allowing the government to concentrate more on the provision of services for the poor.

The private not-for-profit health care system is operated by international and national NGOs. For example, in Khartoum State, such organisations operate up to 214 health facilities, mainly health centres (MOH 2003a). These are mainly in displaced people's camps. A set of specialised health care systems also exist for specific subsets of the Khartoum State population. These systems include health care services operated by large firms for their employees and their relatives. Often such facilities are in urban areas. However, they also exist on large plantations in rural areas, for example, Khartoum Refinery Hospital in Al-Giely area.

3.5 Overview of health care financing reform

During the past fifteen years, the government has introduced a number of initiatives to finance health care, in general, and essential medicines, in particular, as a part of the health system reform process. In this section, the health financing mechanisms adopted will be presented.

3.5.1 Cost-Sharing Policy

The government of Sudan has provided health services to its citizens, including the free supply of medicines, funded by general resources since independence in 1956 (Mohamed 2000). As we saw above, the government has been constrained by an array of political and economic problems. In consequence, the proportion of GDP allocated for the health sector reduced from 1.5% between 1978 and 1982 (Wang'Ombe and

Mwabu 1987) to 0.07% in 1990 (HDR 2003). As a result, the new government faced the question of how to meet the health needs of the population, especially the poor, with falling government resources. The government wanted to maintain the provision of services at low cost and of acceptable quality, but this was possible only if more resources were brought into the system. Cost-Sharing Policy (CSP), as a component of an economic reform plan adopted in 1992 (known as the economic liberalisation policy), was introduced at the same time in all public health facilities throughout the country. It was seen as a solution to generate and free more resources for the health care system, in order to stop the rundown of health services. The CSP could do so by alleviating frequent out-of-stock situations for medicines and other medical supplies, by covering non-salary recurrent costs and by encouraging doctors and other medical staff to work at health centres by giving incentives in a form of extra allowances. It also aimed to increase and maintain coverage, particularly for the poor who could not afford alternative private sources of medical care. In addition, the CSP aimed to strengthen community participation and to improve efficiency by reducing unnecessary utilization of public health facilities, following the principle that when a service costs money people will think twice about using it (Shaw and Griffin 1995). This is because the CSP introduces charges at the point of use. Finally, the CSP was thought to pave the road for other options of community participation in their health care cost, such as health insurance.

The introduction of the CSP was supported and made acceptable by a number of factors. Firstly, the hospital visitors' fee was instituted as early as the late 1960s to discourage loiterers, but was found to generate a large amount of cash (Griffin 1988). Secondly, people in Sudan are accustomed to paying traditional healers. Thirdly, the reality was that patients mainly bought their medicines from private pharmacies during the free public health services policy. Fourthly, an increasing cost to users of access to private sources of acceptable quality has made it easier for the government to implement the CSP. It was assumed that if people were willing to pay for private services, they would equally be willing to pay for public health care facilities, provided that the quality was improved.

User fees vary according to the level of care. At the first contact level (PHC units, dressing stations and dispensaries) where the provider is a community health worker, a trained nurse or a medical assistant, the consultations is free. Nevertheless, users have to

pay for simple diagnostic tests like blood films for malaria and urine or stool tests, in addition to the cost of medicines. At health centres, the provider is a medical assistant, or a medical doctor, or may be a specialist doctor in some urban areas, and all curative services must be paid for. The fees paid by users include: a medical consultation fee; diagnostic fee; wound dressing and minor surgical procedure fee and dental fee. The charges range from SDD250 (US\$1.0) to SDD500 (US\$2) for specialist services at the time of this doctoral study in 2004. Other forms of payment in health facilities comprise medicines cost (calculated by each item dispensed) at both health centres and hospitals and fees for surgical operations and admission in hospitals. Yet some subsidies and exemption mechanisms are operated for emergency cases and for poor people, at least in theory at hospital levels.

- The CSP has also experienced a number of problems, due to insufficient training and preparation, non-phased implementation, and weak mechanisms to protect the poor (MOH 2003a). The fact is that revenues from CSP were not enough to bring the health services to a level that the population could clearly perceive as improvement. The resulting problems include reduction in access and utilization of health services, shortages of essential medicines and poor quality of services. As a consequence, the government launched Health Insurance Schemes in different States (see below) as a radical solution to the problem of health care financing.

3.5.2 Health Insurance Scheme

As a part of Sudan government's commitment to meeting the health needs of the population, the government decreed compulsory social health insurance for all employees of public and private sectors in early 1996. It was introduced as an alternative option to overcome the drawbacks of payment at the point of service delivery, which emerged from health financial reform: user charges. Examples of the drawbacks of user charges are inability to pay and low revenues generation. HIS, therefore, aims at promoting equitable access, improvement of the quality of curative medical services and raising revenues for health sector in Sudan. According to the Health Insurance Scheme Act (2001) all active individuals in both formal and informal sectors should be insured (i.e. Health Insurance is compulsory according to this Act). The family of an insured person is included, and enjoys benefits from the insurance plan with the same premium. The family includes the wife, siblings, father and mother.

HIS is funded through a variety of sources, including 10% of the gross wage (4% from the employee and 6% from the employer). The government pays the premiums of retirees, poor people and full-time students from its various organisations, such as the Zakat chamber. Those who are not in the formal sector and are willing to join have to pay a total of SDD12,000 annually (US\$47 annually per family), paid on a monthly basis. Other sources of financing the Insurance Scheme comprise contributions from Federal government; revenues generated through investments by the funds of HIS; and charity donations and other forms of contributions that support the objectives of the insurance plan.

The benefit package includes all medical consultations, admissions, diagnostic procedures and therapeutics including surgical operations. Dental services are included with the exception of denture and plastic surgery. The highest cost diseases, namely cardiac surgery, renal failure and cancers, are excluded. HIS coverage also includes 75% of the cost of medicines on its approved list of essential medicines. The beneficiaries pay the remaining 25% of their prescription and pay the full cost of medicines prescribed out of the list. Each level of health professionals has a defined list of drugs that they allowed to prescribe (with different lists for medical doctor and specialists) and only generic medicines are allowed.

Despite the celebration of its 10th anniversary in 2005, the HIS provides limited insurance coverage for only 13% of the population (Mustafa, et al 2005). Most (85%) of the insured individuals are public sector employees, 6% are members of the informal sector, 4% are poor families, 3% are families of martyrs and 2% are students (NHIF 2002).

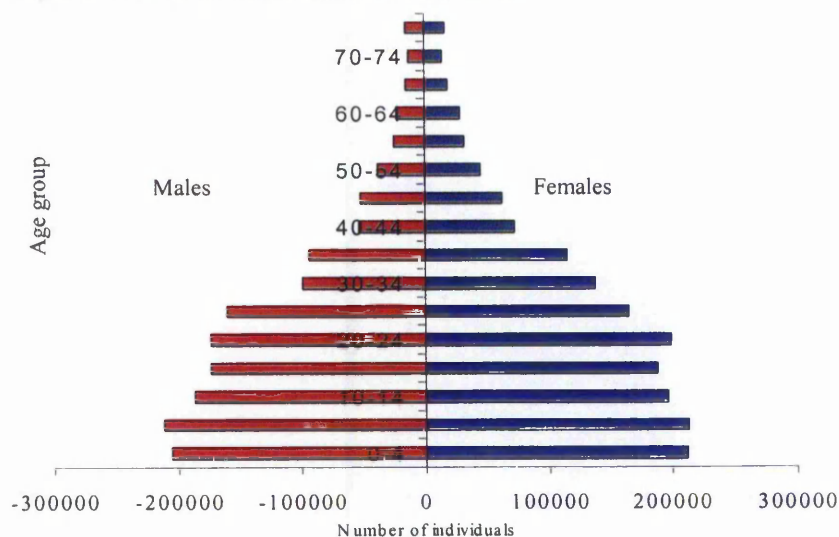
In Khartoum State, Health Insurance was set up in early 1996. However, the situation in KS (where the number of persons insured by HIS in 2003 was 1,605,600, equivalent to 30% of the population) is far better than elsewhere in Sudan (MOH 2003a). The army, police and security forces are excluded. The Zakat chamber at State level pays the insurance premium for 20,000 poor families (each family comprises, on average, five persons). They were selected by local people's committees out of the 300,000 households (i.e. about 1,500,000 population) currently classified by the Zakat as poor (MOH 2003a). In Khartoum State, insured persons are registered at a health centre, which acts as a first point of contact with the health care system, and buy medicines at the RDF health centres (fifty-nine health centres) hospitals or people's pharmacies.

3.6 Brief profile of Khartoum State- Sudan

Khartoum State comprises the national capital of Sudan with an area of 28,000 square kilometres. KS is administratively divided into seven localities. Khartoum State Ministry of Health accounts for all public health centres (140) and twenty-two hospitals. In Khartoum State, there are also a number of public health facilities which are administered by the FMOH (fifteen hospitals), universities (two hospitals) and Ministry of National Defence (three hospitals) and Ministry of Interior (one hospital).

The population of Khartoum State is 5,144,510 as estimated from the 1993 census with a growth rate of 4.04% per year (MOH 2003a). The distribution of Khartoum State population among different age groups follows the normal population pyramid of Sudan and the developing countries as well. The wide base of the pyramid indicates a large number of children (Figure 3.2). The age group of under-fives comprises 14%, while age group fifteen to sixty-four represents 42% of the total KS population. Unlike the rest of the country, in KS males outnumber females (112:100) (MOH 2003a). The high ratio of young children implies a high rate of dependency and thus an overburdened social service sector, such as health and education. The majority (86%) of KS population lives in urban areas (MOH 2003a). This reduces the cost of health services delivery and improves its coverage.

Figure 3.2: Khartoum State population pyramid



Source: translated by the author from MOH 2003a

3.6.1 RDF: historical background

Before the introduction of the RDF, medicines were financed by government resources gleaned mainly from general taxation, and distributed free to public health facility users. But the irregular and largely insufficient budgets allocated for drugs (for example, in 1989 the annual public tender for medicine was cancelled due to the lack of money) led to frequent and lengthy stock-outs which forced patients to fulfil their prescription at high cost private pharmacies (FMOH 1990).

Due to the deterioration of the physical conditions of the health facilities, incomplete lists of appropriate medical equipment for curative and preventive services (especially for mothers and children), public health care centres, particularly in rural areas, were more likely not to have qualified staff who were usually absent when the users arrived. Most of the time they have experienced a stock-out of medicines (Mohamed 2000). As a result, people would frequently by-pass these less credible local PHC facilities, spending additional time and money on transportation to big hospitals (for example, Khartoum, Omdurman and Bahry hospitals) or would resort to high cost private clinics in cities' centres or self-medication through private pharmacies (RDF 1998b). Patients who consult health services were forced to fulfil their prescriptions in private pharmacies, which are sparsely distributed, and are mainly in the cities' market areas in Khartoum State, and are thus unable to fill the gap completely (Mohamed 2000). The frequent shortages of medicines in public health care facilities obliged those who could afford it to go to the private sector. This situation was disadvantageous to the poor, because they did not have protected access to free services at public health facilities (RDF 1998b). The situation also led to the overburdening of service provision at the referral hospitals thus increasing their cost. In addition, poor health services could increase morbidity and mortality from preventable diseases, especially among the vulnerable members of the community (for example, women, children and the elderly) in both urban and rural communities. Moreover, the shift from low level primary facilities to referral hospitals increased the cost of health service provision. Finally, low quality of services and lack of regular supplies caused staff frustration and low morale, due to their inability to offer service (SEDP 1988).

This situation, coupled with the severe shortage of government funds to meet recurrent costs, resulted in the establishment of the Khartoum Comprehensive Child Care

Programme (KCCCP) in 1987, as a joint health programme between SC (UK) and MOH KS (KCCCP 1987). It aimed to revitalise PHC services through improved drug supplies, equipment, staff training, refurbishment of health centres, and improving PHC systems. The RDF was included as a component of KCCCP. The RDF was initiated in the mid-1980s, though it took until 1989 for the first drugs to be supplied to health centres. The SC (UK) agreed to provide a seed stock of essential medicines, basic medical equipment for targeted health centres (sixty centres), and funds for training and logistic support in Khartoum State. According to its obligation in the agreement, SC (UK) provided the capital seed stock of medicines (UK£ 1.8 million) for the RDF, in separate lots of drug consignments that were completed in 1992 (Mohamed 2000). Since then, the RDF has used its own drug-sales revenues for the purchase of further medicine supplies and to pay for operating expenses.

Aim and objectives of the RDF

The primary aim of the RDF is to improve the utilization of PHC services through establishment of a reliable and self-financing supply system of essential medicines of acceptable quality at low cost to the community (mothers and children, to those who can least afford them or those who have to travel great distances, that is, the poor and those in rural areas) with full area coverage and full cost recovery within the PHC. The project was thus in line with the KS interpretation of the Alma Ata Declaration (Mohamed 2000). More specifically, the RDF was initiated, according to KCCCP (1987), by its partners to achieve the following objectives which form the main subject of this doctoral study:

- improving the quality of services by providing quality essential medicines to the KS population, especially in rural and periurban areas, at an affordable price which is less than that at alternative sources, so that patients are willing and able to pay for drugs;
- enhancing better utilization of PHC services and fostering efficient use of public health facilities by reducing unnecessary burden on referral hospitals via improving supply of medicines to health centres. It also aims to encourage rational use of medicines by, for example, reducing self-medication;

- establishing an effective and a financially self-sustaining drug supply system at an affordable cost to the Ministry of Health and KS population, by using the revenues collected from the medicines sales to replenish the exhausted stock by purchasing more medicines;
- promoting and maintaining community participation in providing health care and assuring capacity building and management development at all levels of the system.

The Principle of the Revolving Fund

Fee payment for medicines has been seen as a key component of the strategy of Cost-Sharing. In this form of medicine financing, the supply of medicines can be sustained without external funding after first-time capital investment. This is possible when revenue from sales is positive and sustained, and funds are used to replenish drugs stocks, as pointed by Cross and colleagues (1986) and Umenai and Narula, (1999).

The RDF was founded on the principles laid down by the conference of Ministers of Health in African countries in Bamako the capital of Mali in 1987 (widely known as Bamako Initiative). These lay down that medicines should be made available at an affordable price, and sustained through cost recovery by the sale of drugs, taking into account considerations of equity (Parker and Knippenberge 1991; Soucat et al, 1997a). Unlike the BI, the RDF was not designed to finance other health programmes at the Ministry of Health. The RDF followed the strict revolving drug fund model (Cross, et al 1986; Quick, et al 1997), with funds collected being channelled back into further procurement of drugs. This is the major difference between the RDF KS model and other kinds of RDFs implemented in other countries (see, for example, Umenai and Narula 1999; Murakami, et al 2001; Uzochukwu, et al 2002; Jitta, et al 2003).

3.6.2 Significant policy changes on the RDF

Over the years, suggestions and new ideas on how to implement or extend the RDF were presented to the MOH KS. With increased demands on the RDF and perhaps other developments in the health system, the RDF was compelled to respond to those ideas that contributed to the security of the project and the integrity of the revolving fund

process. While it was essential to retain the focus, ideas that met objectives of the MOH KS were given priority, as long as they ensured the RDF did not lose sight of its purpose. Some of the policy changes on the RDF were as follows:

Currency Swap Agreement

The devaluation of the Sudanese pound during 1991, when it jumped by 200% and later shot up by 723% in 1992, resulted in the first decapitalisation of the RDF (Awadelkarim, et al 1996). For instance, during this period, the RDF lost about US\$1.2 million from its initial capital of US\$2.6 million (i.e. 46%) when large sums of local currency were deposited in the bank (Mohamed 2000). As a response to this loss, the Federal Ministry of Finance and Economic Planning and SC (UK) have signed a Currency Swap Agreement. According to the Agreement, local funds generated from RDF medicines sales and allocated for overseas procurement of medicines are swapped for the equivalent foreign currency allocation at the SC-Sudan office. According to the Agreement, since 1992, revenues collected were regularly converted to hard currencies, because medicines were usually imported. Over the years, the local currency devaluated from UK£1 = SDD0.72 at the beginning of the RDF in 1989, to UK£1 = SDD500 in 2003. During this period, the RDF KS used to utilise a monthly currency swap with the SC (UK). By 2003, and as a result of economic improvement after oil production, the RDF enjoyed the free circulation of convertible currency to meet its need for hard currency directly from the market.

RDF expansion and provision of additional services

The RDF was focused on meeting its objectives of achieving efficient procurement and effective distribution of medicines to all project health centres. The success of the RDF in solving the problem of medicines availability in health centres has encouraged the MOH KS to expand its mandate. In 1995, the MOH KS and SC (UK) took the decision that the RDF should extend its medicines supply services to health facilities that were not part of the RDF project, in view of the fact that many of these health facilities suffered from irregular medicine supplies. Its view was that the RDF was well-equipped financially and managerially to do the job. Therefore, the RDF began providing a basic

procurement service to other facilities, including hospitals, open cardiac surgery and renal transplantation centres, and people's pharmacies¹³.

The task of the RDF, at its inception, was to supply medicines to only sixty health centres as a precondition of the quality of health care. Today the total number of health facilities operating the RDF is 126 (104 health centres and twenty-two hospitals). This is in addition to eighteen people's pharmacies managed by the programme. During the past three years (2001 – 2003), a total number of around nine million patients were seen with annual average of 2,983,316 patients out of around five million Khartoum State population. This impressive development in the RDF led to the RDF policy of cost recovery becoming a key government policy in health, throughout the country, and recommended that the RDF KS model must be expanded nationwide and seven RDFs were set up in other states, financed by the CMSPO (Graaff and Everard 2003).

In addition, the reliability and responsiveness of the RDF distribution system encourage the MOH KS to give the responsibility for the storage and distribution of free emergency medicines to the RDF (RDF 1998b). The RDF therefore provides a free service of handling, storing and distributing the free emergency medicines to the KS MOH hospitals. The MOF finances these medicines through CMSPO to ensure free service in the first twenty-four hours of hospitalisation. Moreover, the RDF handles procurement for some public health care services, such as the PHC department and the malaria programme, as well as financing the MOH (see below). Finally, the pressures on the RDF from KS communities for further RDF expansion during the mid 1990s, forced the RDF to think about assuring additional capital for its inevitable expansion. To meet these growing needs, the RDF started to sell medicines to non-RDF members, such as other states, Federal hospitals and NGOs on a cash-and-carry basis (Mohamed 2000). Despite these changes for the RDF's original mandate, the RDF maintains its main goal of providing affordable quality medicines to the KS MOH health facilities. From my personal knowledge as a MOH employee, these new tasks performed by the

¹³ These are quasi-public establishments retailing drugs and medical supplies at below market prices to improve access and availability of pharmaceuticals. They were founded in the early 1980s as a pilot study for a drug cost recovery system. They differ from the private commercial pharmacies; firstly, in having access to the CMSPO drugs (i.e. generic and large pack products), in addition to the brand products from the private wholesalers. Secondly, the people's pharmacies are only owned by public organisations (such as hospitals), people's committees, trade unions and NGOs. Mark-up on cost for drugs from CMSPO 35% and from private drug wholesalers, profit margin is 10% (Mohamed 2000). However, they have become commercialised now, though unlawful and operate in a similar way to private pharmacies.

RDF are considered by the policy-makers to be evidence of the RDF's strength, particularly its flexibility and responsiveness to the MOH and other customers' needs.

Regular transfer to the KS MOH

In a context where MOH KS budgets were very tight and there was a lack of funding at MOH, the SC (UK) and MOH agreed in 1995 to dedicate 6% of the RDF sales to finance other PHC activities. The RDF generates considerable revenues. Since 2001, the RDF pays SDD17.5 million (US\$67,000), equivalent to 8% of the RDF sales, to MOH each month. The total amount of SDD210 million paid in 2001 was found to be twice the KS government development budget for health in the fiscal year (RDF 2001a). This RDF amount was used by the MOH to finance most of its preventive and curative services, such as the establishment and maintenance of Ahmed Gasim open cardiac surgery centre and purchasing of hospital equipment. The RDF surplus amount was also used to fund other services, which have a low priority according to the MOF, such as procurement of meningococcal vaccines and other essential equipment for PHC cold chain, and the overseas training of doctors.

RDF handover to the MOH

According to the technical agreement between the MOH KS and SC (UK), and to achieve full institutionalisation of the project within the MOH, the MOH KS requested the transfer of the project from the SC, because this support cannot go on forever and the MOH has to take over its responsibility (Mohamed 2000). On the 31st of March 1996 the RDF was handed over to the MOH (MOH-SC 1996a). The MOH gave the project its complete financial freedom from the rules that govern other publicly financial projects. In KS, all revenues from the RDF medicine sales remain under the control of the RDF and cannot be used for anything apart from RDF's drug purchases and operating costs. The government of Khartoum State realised that the RDF would not continue forever as an exception from the law of the Public Treasury. To legalise the RDF's exceptional situation, a further development in the RDF took place in 2002, when the RDF Currency Swap Agreement was modified in the RDF Act which was signed by the Wali of Khartoum State after its approval by the KS legislative assembly. This development gives the RDF independent establishment status. According to the new Act (MOH 2002a), the RDF is a juristic person, it can sue and be sued. The Act

gives the RDF project the legislative authority to conduct its business as an autonomous organisation under the direct supervision of the administrative board (which is composed of the General Directors of the KS Ministries of Health and Finance, and heads of the main departments within the MOH) chaired by the Minister of Health. This gives the RDF legal independence from certain public sector regulations.

This step has acknowledged the contribution the RDF had made to improving access to essential medicines in KS. The legalised autonomous status of the RDF allows it to hold funds, and regulate procedures for medicine supply management, cash collection, accountancy, supervision, audit and control, and staff development for a project which had an annual turnover of GB£9.1 million and served 2.8 million patients in 2003 (RDF 2003a). It also allows the RDF to explore other business ventures, while retaining its main purpose of providing affordable quality medicines to the public health facilities of MOH KS. However, the independent RDF is not without problems. The RDF is now isolated from the MOH KS. This situation renders it more profit-oriented and we discuss the implications of this below in section 8.4.

The employment contract and performance-based incentives

After the handover to the MOH in early 1996, the RDF introduced a new employment policy. The policy introduced direct contribution to RDF staff salaries from funds collected by the RDF (RDF 1998b). This was done to address chronic staff turnover, regular losses of medicines and funds, and to improve staff morale. As a result of this policy, all RDF pharmacy staff signed a contract with the RDF. A performance-based incentive system was applied. The contract also clearly stated the obligations of the RDF and its pharmacy staff. The result was that these measures translated into, among others, an improvement of availability of medicines (Fundafunda 1998).

3.7 Summary

Communicable diseases dominate the health scene, with high vulnerability to outbreaks. Overall health indicators in Sudan, are comparable to Sub-Saharan Africa averages. However, overall averages mask significant urban/rural and regional disparities, related to conflict, displacement and chronic poverty.

The government health system is a three-tiered network. Strengthening Primary Health Care has been adopted as a main strategy for health care provision in Sudan in 1976 and re-emphasised in the National Comprehensive Strategy for Health in 1992 and in the twenty-five years Strategic Health Plan 2002-2027. Health services are provided through different public partners including, in addition to Federal and State Ministries of Health, the Ministries of National Defence, Interior, and Social Care. The public health care facilities provide a range of comprehensive subsidised health services including both preventive and curative services. However, those partners are performing in isolation due to ill-defined managerial systems for co-ordination and guidance.

The private sector, encouraged by the government, witnessed a significant increase during the 1990s and the new millennium. Private health services, are concentrated mainly in urban areas, and are perceived to be of better quality than government services and are mainly accessed by the better-off. The private-for-profit sector provides mainly curative services at full cost plus profit. The private-not-for profit sector, which is mainly concentrated in displaced people's camps, provides both curative and preventive services at primary care levels either free (international NGOs) or on a Cost-Sharing basis.

During the past fifteen years, the government introduced a number of initiatives to finance health care, in general, and essential medicines, in particular, as part of health reform. The lack of evidence-based policy-making system means that the government subjectively changes health care financing policies frequently. It is clear that the intent of the government has been to increase equity of access to health services of acceptable quality. This evaluation study represents the first empirical evidence of the impact of CSP, in general, and RDF, in particular, on the accessibility to essential medicines and thereby the utilization of public health facilities. The next chapter presents the design of this research and the methods that were used to gather relevant data from multiple sources.

Chapter 4 Research Design and Research Methods

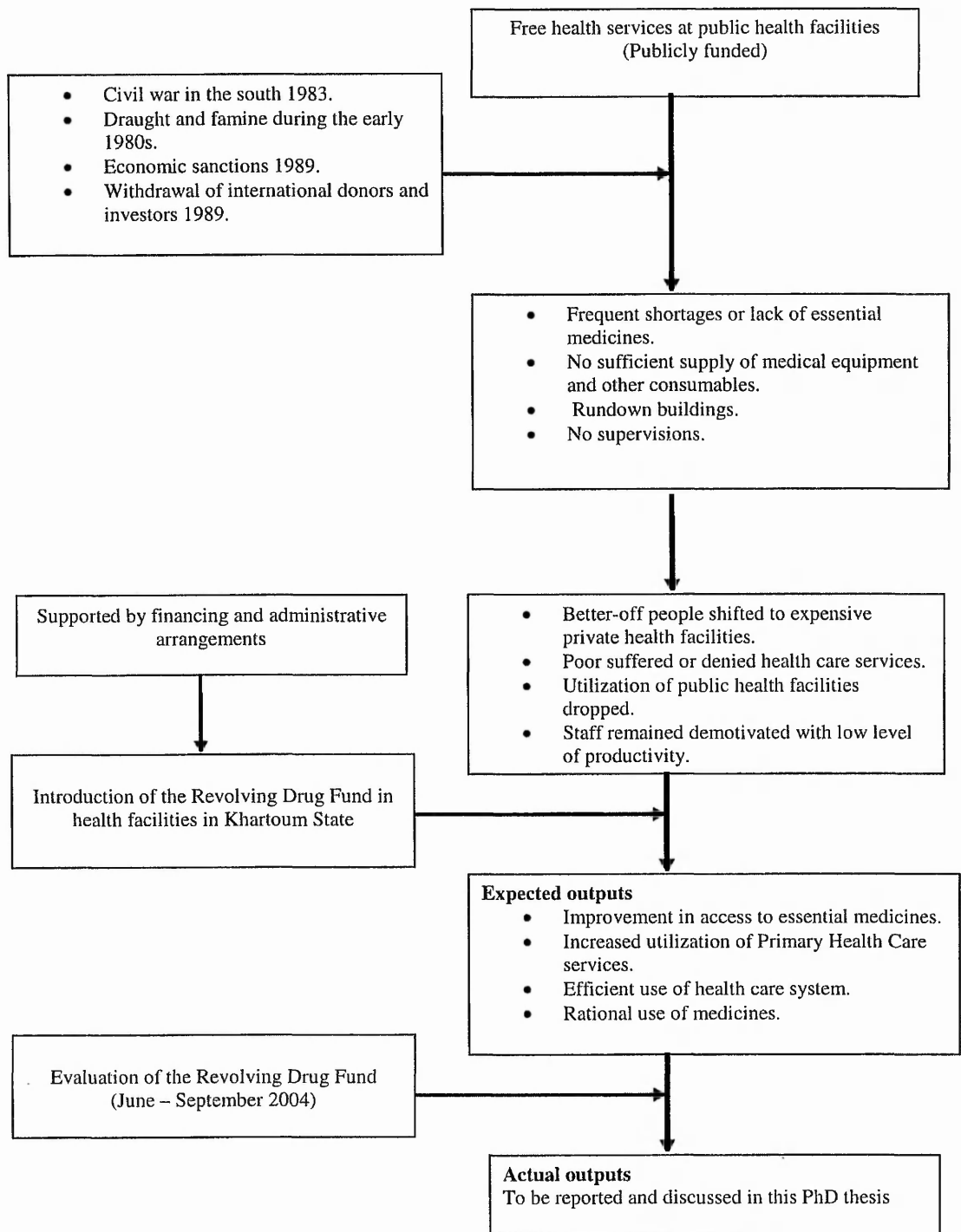
4.1 Introduction

Chapters two and three reviewed the relevant literature to identify gaps in the literature on Revolving Drug Funds, in order to develop research questions and to familiarise the readers with the context of the study respectively. This literature (Cross, et al 1986; World Bank 1994; Quick, et al 1997; Soucat, et al 1997a) showed that the RDF as a long lasting self-financing programme is one of the most promoted mechanisms of medicine financing in many developing countries in Sub-Saharan Africa and Southeast Asia. But the implementation of such RDF has so far been overwhelmed by multiple problems in most countries (Cross, et al 1986; Hecht, et al 1993). The review of the relevant literature also resulted in an analytical framework being identified. The framework has also been influenced by my personal knowledge and experience working in the Ministry of Health. This analytical framework was described in chapter three, and is set out in the form of a diagram over the page in figure 4.1 to illustrate the context in which the RDF KS has been introduced as a mechanism to finance the medicine supply system in the public sector in Khartoum State. It also shows that the key assumption driving this thesis is that it is introduction of the RDF and the way in which it has been financed and administered which has resulted in a significant improvement in access to medicines and thereby increased utilization of health facilities and more efficient and effective use of health resources. To test this, I undertook primary research in Sudan (KS) to find out if these outputs had actually occurred and why.

Research aims

To reiterate, the primary purpose of this research is to assess the influence of the RDF on the accessibility of essential medicines and thereby the utilization of PHC services in public health care facilities in KS. This will consolidate the previous evaluations of the RDFs (Litvack and Bodart 1993; Awadalkarim, et al 1996; Asenso-Okyere 1998; Fundafunda 1998; Murakami 1998; von Massow, et al 1998; Umenai and Narula 1999) by providing comprehensive and up-to-date information on the role of the RDF as a mechanism of drug financing for improving the accessibility to essential medicines.

Figure 4.1: Analytical framework



Therefore, careful evaluation of nearly two decades experience of Khartoum State RDF which is the largest project in the world of its kind, may provide much needed insight into the RDF. The evaluation may contribute to a firmer foundation for this much valued project which is recognised to be very complex and difficult to manage (Patel 1986; Foster 1991; Waddington and Panza 1991; Sauerborn, et al 1995; Huss 1996). My work in this area (see chapter two above) will contribute to discussion about the RDF on a number of key issues: it demonstrates how more security can be given to the endangered structure of RDF, and explores the impact of factors such as political commitment, availability of hard currency, autonomous management structure and community acceptance (Graaff and Everard 2003) on its performance and future survival. It is, therefore, an attempt to provide documentation, on a larger scale and long-term RDF project that is administered fully by a government organisation. Specifically, the investigation aimed to answer the following questions about the RDF of the Ministry of Health, Khartoum State – Sudan:

1. whether or not implementation of Revolving Drug Fund in Khartoum State improves the availability of essential medicines of affordable prices and acceptable quality closer to where the people live;
2. whether or not the introduction of the RDF makes health facilities more attractive to all income groups, improves the quality of care by reducing the utilization of the less effective alternatives sources, and rations the use of health services by decreasing unnecessary use of health facilities;
3. do people delay in seeking health care until their condition worsens and they required hospital admission, and do the poorest groups fail to use public health facilities for financial or any other reasons. How equitable is the existing pattern of health care delivery system. What kinds of mechanisms exist to protect the poor?
4. what are the factors and conditions that have enabled the RDF to survive for a relatively long period in the Khartoum State. How factors, like those mentioned by Graaff and Everard (2003) which include political support and access to hard currency, affect the sustainability of the RDF and its performance.

It is the purpose of this chapter to present the research design and methods that I have used to gather data from different sources to answer these research questions. Section 4.2 presents the research design. It also provides indicators to measure the impact of the RDF on accessibility to essential medicines and health facilities utilization and offers an explanation and justification of the design of the project that has been used to collect and analyse data for this doctoral study. Section 4.3 presents a detailed account of the methods that have been used to operationalise the design and to meet the aims of this project. Section 4.4 gives details about the conduct of the fieldwork. Reliability and validity issues are discussed in Section 4.5. This section also presents the measures applied to obtain data of high quality. Sections 4.6 and 4.7 address methodological limitations encountered during this research and the ethical clearance respectively. Section 4.8 explains the process of analysing both quantitative and qualitative data. Finally, the chapter concludes by offering a brief summary of the key points of the methodology.

4.2 Research design

The research methodology has been adapted from evaluation protocols prepared by the WHO (2003b), the findings of previous research on Cost-Sharing programmes (Audibert and Mathonnat 2000; Geest, et al 2000; Murkami, et al 2001; Meuwissen 2002) as a financing mechanism for essential medicines, and has been supported by a literature review on research methodology relevant to the task. To overcome the weaknesses I have identified (see chapter two above) in the published evaluations of RDFs, this study was designed to gather data from main health care stakeholders¹⁴. To reiterate, these weaknesses include: most of these studies are facility-based and thereby do not provide other important information from policy-makers and households' perspectives (Litvack and Bodart 1993; Chisadza, et al 1995; Asenso-Okyere 1998; Murakami 1998; von Massow, et al 1998; Umenai and Narula 1999). This section reviews indicators set out to measure the impact of the RDF on access to medicines and utilization of public health facilities. The section, then moves to discuss the kind of data needed to answer research questions and makes reference to stakeholders as a main source of such data. Finally, the section discusses the strategy of using multiple research methods for this project.

¹⁴ In this PhD study, unless stated otherwise, stakeholders referred to policy-makers, practitioners, patients and households.

4.2.1 Measurement indicators

Health outcomes have become a widely used term in health care policy over the past decade (Jee and Or 1999). Nevertheless, the meaning behind the term differs greatly depending on the user and the context. A traditional definition of health outcomes is the 'changes in a patient's current and future health status that can be attributed to antecedent care' (Donabedian 1980, p.83). However, it is extremely difficult to assess health outcomes directly associated with the implementation of the RDF project in 1989, because there are many factors, such as health system related factors (i.e. diseases patterns, quantity and quality of health personnel, vaccination programmes, medical technology), social and economical factors, environmental factors, lifestyle factors, and so on. All these factors have effects on health outcomes. Also health outcomes are the result of inputs from many other sectors including politics, agriculture, education and national security (Wang'Ombe 1997). Attributing changes in health outcomes to specific causal factors is therefore beyond the scope of this research.

Due to difficulties of precise measurement of changes in the health status of the population after the adoption of the RDF in Khartoum State in the late 1980s, changes in accessibility to essential medicines and health facilities utilization are used in this thesis as indicators of the direct impact of the RDF. I decided to use accessibility to essential medicines because it is a strong contributing factor to the health status of the population (WHO 2004b). It is thought that improvement in the availability of medicines increases utilization of public health facilities (World Bank 1987). Vogel and Stephens (1989, p.479) argued that 'While quality of health care has many dimensions, one incontrovertible fact is that modern curative and preventive care depends heavily on pharmaceuticals. The availability or unavailability of a sufficient supply of pharmaceuticals might be used as one indicative proxy of quality of care'. Thus, accessibility is a determinant factor of user utilization for health care (Singh 2003).

However, accessibility is difficult to define precisely. When one asks, 'When is a service accessible?' or, 'When does one have access to needed services?' the tendency is to provide a list of responses that includes adjectives, such as 'affordable', or 'available', suggesting the need for a more comprehensive and precise definition of accessibility (WHO-MSH 2000). Penchansky (1977) and Penchansky and Thomas (1981) have therefore defined access in terms of the effects of interaction between

characteristics of the individual (such as demographic and socio-economic characteristics) and relevant health services. Within this framework, access is a variable representing the relative degree of fit between the patient or user and the system (Penchansky 1977, and Penchansky and Thomas 1977). Good access exists when various individual, social and health system factors are optimally aligned for a particular context (i.e. when it is possible for patients to obtain health care when needed).

To measure the accessibility to essential medicines and its impact on the public health care facilities utilization, I used three sets of basic indicators that were modified from WHO-MSH (2000). These indicators were chosen to allow objective assessment of the impact of the RDF on accessibility to essential medicines. The judgement whether the RDF is a successful programme or not was therefore made using these indicators:

- Accessibility indicators: Physical availability of essential medicines at public health care facilities; ability of patients to pay for their medicines; geographical coverage with public health care facilities which stock essential medicines; and quality of the medicines available at these health care facilities.
- Utilization indicators: These were used to examine whether the demand for health care changed after implementation of the RDF and other Cost-Sharing mechanisms. Indicators of better utilization include improvement of health care seeking behaviour (such as reduction of self-medication, reduction in use of traditional healers, reduction in delay in seeking treatment, enhanced utilization of PHC services, lightening of unnecessary burdens on referral hospitals, and doctors' availability in rural health centres) and the reduction of unnecessary utilization, for instance, for self-limiting diseases.
- Equity indicators: I looked at RDF impact on the equal distribution of medicines to health facilities users, mainly to find out whether or not personal characteristics of the users (such as clinical status, gender, ethnicity, religion, age, social characteristics, geographical location and ability to pay the full cost) deter their access to essential medicines.

4.2.2 Sources of data

Reference to stakeholders and the use of stakeholders' analysis as a tool for evaluation have become increasingly popular in the evaluation of crime (Pawson and Tilley 1997), and also in the management, development and health policy fields during the last decades (Brugha and Varvasovszky 2000). This popularity reflects a recognition among managers, policy-makers and researchers of the central role of the stakeholders (individuals, groups and organisations) who have an interest and the potential to influence the actions and aims of organisations, projects or policy direction. Therefore, this RDF evaluation was designed to identify all important effects of the project, and to encapsulate the views and perceptions of as many important stakeholders as possible. According to Pawson and Tilley (1997, p.164) evaluation research has the task of getting a fix on the action and beliefs of each of the various stakeholders. The authors argue that stakeholders could hold the key to the success of programmes. The aim was to develop an analysis which allows exploration of different perspectives of the RDF. The rationale being that those embracing a range of perspectives will give the most powerful insights into the research questions (Patton 1990) and, just as important, help us understand the kinds of recommendations that are likely to command support and to be capable of being implemented in practice.

Table 4.1 presents measurement indicators used in this study. It also shows the kind of data needed to assess each indicator. In columns three and four of this table, sources of data and methods used for gathering them are presented. The basic sources of data collected for this project were:

- Information and data available at health facilities: These data were collected by interviewing practitioners and patients, and reviewing health facilities' medicine stock records.
- Information available at Ministries of Health: These data were collected from archival records at MOH, RDF and National Drug Quality Control Laboratory (NDQCL)¹⁵, and by interviewing policy-makers.
- Information and data available from interviewing heads of household in the catchment area of selected health facilities.

¹⁵ The national governmental authority responsible for quality control testing of medicines.

Table 4.1: Research questions, sources of data and methods of data collection

Questions	Data needed	Source of data	Methods of data collection
Accessibility of medicines	The percentage of patients managed to get their prescribed medicines fully dispensed at public health care facilities	Patients	Structured interviews with patients.
	Reasons for those who failed to fulfil their prescription at public health care facilities.	Patients	Structured interviews with patients.
	How much did those who received their full prescription pay.	Patients	Structured interviews with patients.
	Sources of the total amount paid to get prescribed medicines.	Patients and heads of households	Structured interviews with patients and heads of households.
	The percentage of availability of medicines in local public health facilities	1. Patients and heads of households 2. Policy-makers 3. My field visits to health facilities 4. RDF office	1. Structured interviews with patients and heads of households. 2. Semi-structured interviews with policy-makers. 3. My own observation using a checklist 4. Annual reports of the RDF.
	Availability of medicines during the last twelve months prior to the study.	1. Health care providers 2. My field visits to health facilities and RDF warehouse	1. Semi-structured interviews with practitioners. 2. Stock records at health facilities and RDF warehouse.
	Is there any bad experience with quality of medicines supplied by the RDF?	1. Patients and heads of households 2. Health care providers 3. RDF office and NDQC	1. Structured interviews with patients. 2. Semi-structured interviews with policy-makers and practitioners. 3. Annual reports at NDQCL and RDF.

Table 4.1 (Continued)

Questions	Data needed	Source of data	Methods of data collection
Utilization of health care facilities	Whether or not the introduction of the RDF in health facilities makes these facilities more attractive.	1. Patients and heads of households 2. Health care providers	1. Structured interviews with patients and heads of households. 2. Semi-structured interviews with policy-makers and practitioners.
	Satisfaction with current situation in the public health facilities.	1. Patients and heads of households 2. Health care providers	1. Structured interviews with patients and heads of households. 2. Semi-structured interviews with policy-makers and practitioners.
	Changes in the availability of doctors in remote rural areas.	Health care providers	Semi-structured interviews with policy-makers and practitioners.
	Changes in the number of attendance of public health care facilities.	Health care providers	1. Archival records. 2. Semi-structured interviews with policy-makers and practitioners.
	Changes in the utilization of Primary Health Care services.	Health care providers	Semi-structured interviews with policy-makers and practitioners.
	Changes in seeking treatment behaviour.	1. Patients and heads of households 2. Health care providers	1. Structured interviews with patients and heads of households. 2. Semi-structured interviews with policy-makers and practitioners.
	Changes in self-medication and use of traditional healers.	1. Patients and heads of households 2. Health care providers	1. Structured interviews with patients and heads of households. 2. Semi-structured interviews with policy-makers and practitioners.
	Whether or not the RDF improves efficiency of health care system by reducing unnecessary visits and increasing utilization of less expensive PHC facilities.	Health care providers	Semi-structured interviews with policy-makers and practitioners.

Table 4.1 (Continued)

Questions	Data needed	Source of data	Methods of data collection
Equity issues	How equitable is the existing pattern of health care delivery? Are there any discrepancies in the provision of medicines with regard to, for instance, gender, age, ethnics, socio-economic groups and so on. Are there any arrangements to protect the poor?	1. Patients and heads of households 2. Health care providers	1. Structured interviews with patients and heads of households. 2. Semi-structured interviews with policy-makers and practitioners.
	How the poor being identified?	1. Patients and heads of households 2. Health care providers Health care providers	1. Structured interviews with patients and heads of households. 2. Semi-structured interviews with policy-makers and practitioners. Semi-structured interviews with policy-makers and practitioners.
	Do people deter from using public health care facilities for financial reasons	1. Patients and heads of households 2. Health care providers Health care providers	1. Structured interviews with patients and heads of households. 2. Semi-structured interviews with policy-makers and practitioners. Semi-structured interviews with policy-makers and practitioners.
Miscellaneous	Do people delay seeking health care for financial reasons	1. Patients and heads of households 2. Health care providers Health care providers	1. Structured interviews with patients and heads of households. 2. Semi-structured interviews with policy-makers and practitioners. Semi-structured interviews with policy-makers and practitioners.
	Background information relevant to context and development of the CSP and RDF in KS	1. Policy-makers 2. Archival records at MOH Policy-makers	1. Semi-structured interviews with policy-makers. 2. review of official MOH documents Semi-structured interviews with policy-makers.
	Consequences of RDF overall for resources allocation	Policy-makers	Semi-structured interviews with policy-makers.
	Factors that make the RDF KS survives for fifteen years Demographic characteristics of the users of public health care facilities.	Patients and heads of households	Structured interviews with patients and heads of households.

4.2.3 Multiple research methods

The literature suggests that the impacts of Cost-Sharing programmes on the utilization of public health facilities tend to be complex and context dependent. The evaluation of their effectiveness must therefore be sufficiently comprehensive and rich to encompass that complexity and to understand context (Rychetnick, et al 2002). The RDF evaluation is a complex study in which broad, complex questions have to be answered. No single method is sufficient to capture all aspects that may have contributed to the RDF's impact on accessibility to medicines and its effects on health facilities utilization. The combination of qualitative and quantitative approaches, in which the two approaches inform one another to fulfil the specific aims of the study, has broad appeal in public health research (NIH 1999). This evaluation study, therefore, used a number of different methods to collect relevant data to answer questions and to capture different views and perceptions of key stakeholders about the effects that the RDF has on the accessibility to essential medicines and thereby public health facilities utilization in Khartoum State. Four methods, which together comprise the research design, are structured interviews with health facilities users (which were analysed quantitatively), semi-structured interviews with health care providers (i.e. policy-makers¹⁶ and practitioners), which were analysed qualitatively, verification of archival and statistical records to enable the gathering of data about availability of medicines, changes in utilization rates of public health facilities and RDF history and its operational procedures, and systematic observations using checklists to check the availability of medicines and their quality during health facilities visits. These methods will be discussed later in section 4.3.

In this project the multiple methods were used because some dimensions of access (such as availability of medicines throughout the year) were complex and not easy to be measured or assessed using one research method. Soucat and colleagues (1997b, p.S157) argue that, 'accurate data on household attitude and past experience regarding health services' utilization is difficult to collect. Quality of information coming from community based surveys performed by health staff using a directive method of interviewing may be questioned', because health staff may have hindered the expression of real perceptions, especially critical ones, from respondents. In addition, an interviewee who is already a patient or likely to become one may wish to please health

¹⁶ Unless understood otherwise from the context, policy-makers in this thesis are those who work at Federal and Khartoum State Ministries of Health and have been interviewed as part of this doctoral study.

professionals by giving the responses that he or she thinks the interviewer wants (Britten 1995). Because I was a member of staff of FMOH, the multiple methods were used to help compensate for the personal bias that might arise from a single method to secure the accuracy of the information, and thereby, the credibility of the findings and conclusions.

The primary aim of using different methods is deepened insight, not formal validation. Denzin (1989, p. 27) explains that the logic of triangulation is based on the premise that 'Because each method reveals different aspects of empirical reality, multiple methods of observations must be employed'. It should be apparent that the strengths of one approach potentially complement the weaknesses of the other, and vice versa. For example, I decided to consolidate the data about availability of medicines by asking patients and practitioners but also by verifying stock records at health facilities, since stock records could give information about the consistency of the drug supply system during the year. Such systematic information is difficult to obtain from the patients at the time of the facility visit.

However, the multiple methods strategy used in this study was not without problems. It is difficult to analyse different kinds of data properly, for the data collected by different methods, (for instance, qualitative and quantitative data) come in different forms, and this presents a challenge when attempting to make direct comparison. To overcome this challenge, I compared findings of qualitative data on each predetermined theme with those from other sources, such as users' surveys. The data obtained from semi-structured interviews with health care providers, field observations, and archival documents of the health facilities pharmacies, MOH statistical office and RDF's headquarter and warehouse were complemented with information collected by questionnaires. The archival and statistical records (manuals and guidelines, RDF annual reports, and so on) provided valuable insights about the CSP that can not be observed or noted in other ways, such as number of patients before and after application of the CSP, availability of medicines during the last twelve months prior to survey, and quality of medicines imported by the RDF. This allowed me to trace changes in utilization patterns and identify the factors responsible for the changes, such as changes in prices, service quality and availability of medicines. Nevertheless, Denzin's critique (1989, p.251) indicates that 'analysts must realize that any public archival documents represent the imprint of the organisation that produced it, and thus bias arises

simultaneously from both the author and the organisation'. The perceived assumption is that, public organisations, generally, tend to give an accurate picture about their performance. However, the fact that official records were not prepared for the purpose of the evaluation gave me more confidence in them. Some of them are stock records which are likely to be accurate, because the stocks of medicines at RDF's warehouses and health facilities were taken by independent teams on monthly and weekly basis respectively. To check these data, official records were supplemented by field observations, and other data sources, such as interviews with policy-makers, front-line practitioners and users. Stock records were also cross-checked with total quantities of medicines received, medicines sold and the amount of money collected by the cashier (RDF 1998b).

This descriptive information relates primarily to the operational issues of the RDF, and was used to compare two groups of health facilities at the same time. In both groups CSP is applied. The only difference is whether the facility is enrolled in the RDF or uses another Cost-Sharing mechanism to finance their medicine supply system. This contemporaneous comparative approach was chosen to overcome the shortcomings and limitations of comparing the same facilities before and after the introduction of the RDF, because a direct comparison between two periods might reflect differences in other dimensions, especially with regards to changes in outpatient attendances, which are influenced by a complex array of factors, such as population growth and emergence of new health problems, for instance HIV/AIDS, (see chapter two). Thus, it would be difficult to attribute the changes in the number of outpatient visits to any single factor, especially the introduction of the RDF. In addition, the use of health facilities is subjected to seasonal variations depending on changes in diseases patterns, climatic variations and so on (Blas and Limbambala 2001). Moreover, the availability and quality of services may be liable to influence from short-term economic and political events¹⁷, resulting in, for instance, availability or non-availability of essential medicines during a certain period or in a particular health facilities (in the urban or rural areas). Finally, since there were no major changes in the availability of medicines in the non-RDF facilities, the data from selected non-RDF facilities were used to inform how and why the RDF has improved the availability of medicines in its facilities and consequently their utilization.

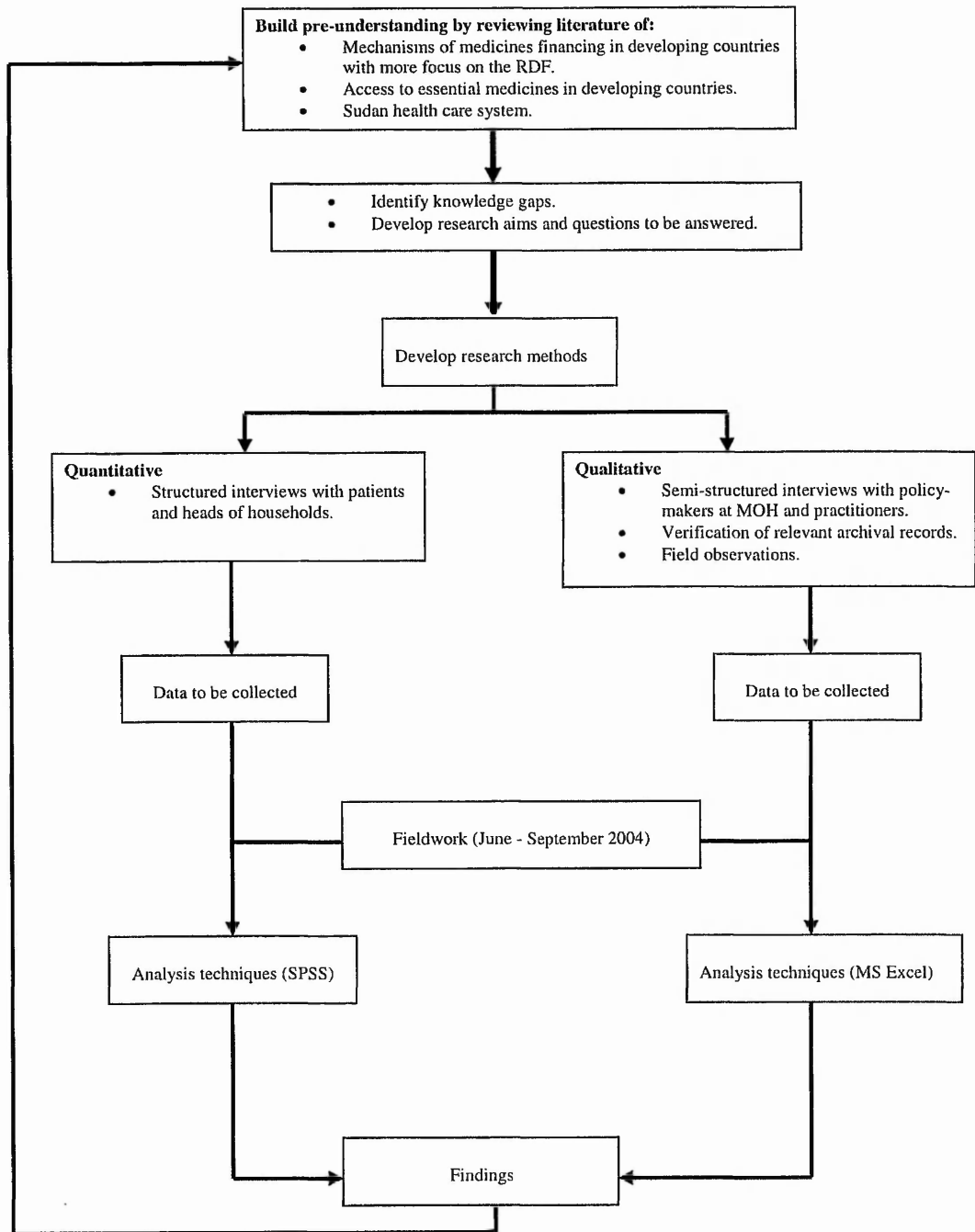
¹⁷ For instance, in Uganda, user fees were abolished during the presidential election campaign in 2001 (Jitta, et al 2003). The government of Uganda doubled the medicine budget, and as a consequence attendances at public health facilities have almost doubled (DFID 2004).

In this study, the focus was therefore specifically on changes in the quality of health services and their utilization in the light of accessibility to essential medicines following the policy of Cost-Sharing, focusing more heavily on the RDF, instead of undertaking a comprehensive assessment of the effects of this policy on health outcomes more generally. In undertaking this research, I spent three months (June to September 2004) in the field. Figure 4.2 (below) provides an overview of the research process and shows how the fieldwork fitted into it. The following sections illustrate the choice of approaches in more detail.

I conducted qualitative interviews with policy-makers in Federal and State Ministries of Health (listed in Appendix 1), to show how policy-makers' understanding and perception operated in the inner workings of the policy making process. Also other sources could give a lot about what was done, but less about what was not done, and less still about how and why (McPherson and Raab 1988). Furthermore, it was expected that they would also have a personal and important role in the Cost-Sharing programmes as a medicine financing mechanism in the public health facilities. Finally, the policy-makers were interviewed because their opinions and perceptions will affect the implementation of health policy reform.

Systematic information about access to medicines and facilities utilization is not available solely by interviewing end users and policy-makers. Therefore, information was also obtained at facility level using qualitative interviews with front-line health care practitioners and also data from official archives. The rationale for interviewing practitioners lies in an exploration of their perceptions, views and opinions, and experiences with the RDF as a drug financing mechanism in the public health facilities in KS. Moreover, interviews with practitioners (Appendix 2) allowed me to find out the impact of Cost-Sharing Policy, in general, and the RDF, in particular, on the morale of prescribers who face daily challenges presented by the user fees at public health care facilities.

Figure 4.2: Flow chart depicting the research process



The semi-structured, face-to-face interviewing strategy was used because it could provide a framework within which the health care providers (i.e. policy-makers and practitioners) can express their own understanding of the Cost-Sharing Policy and its impact on the health facilities utilization in their own terms (Patton 1987). The interviews were designed to capture the respondents' perceptions in their own words and allow me as a researcher to present the meaningfulness of the RDF experience from the policy-makers' points of view as well as from practitioners' perspectives. Therefore, the semi-structured interviews allowed me to examine from the perspective of health care providers the effects of the Cost-Sharing Policy, in general, and the RDF, in particular, on the utilization of health facilities. These data might be difficult to access using direct quantitative approaches, because the structured nature of the quantitative method does not allow respondents to elaborate on research issues (Henn, et al 2006). In addition, a predetermined list of question and answer choices, would not allow an interviewee to see things from his or her own perspective.

4.3 Research methods

As discussed in the previous section, this evaluation adopts a multiple research method using stakeholders to give a full picture of the impact of the RDF in KS. This section details how the research has been conducted, focusing primarily on the implementation of data collection methods. Section 4.3.1 explains the data collection instruments used in the study. It also offers justifications for using face-to-face interviews to collect both qualitative and quantitative data. Section 4.3.2 commences with a discussion of qualitative research methods. It also presents criteria for the selection of policy-makers and practitioners who participated in this study. Section 4.3.3 is devoted to quantitative methods. It presents sampling process, detailing how and why health facilities and their users were selected.

4.3.1 Data collection instruments

The data about the availability of medicines, the demographic characteristics of users and their ability to pay for their medicines were gathered from the health facilities. These quantitative data were obtained by interviewing users and by examining records of the facilities' pharmacies, where available, to determine the sustainability of

medicines stocks during the twelve-month period prior to the month of the study (August 2003 to July 2004). In addition, the modified WHO checklist, which focuses mainly on the availability of the key medicines and their quality, was also used to collect quantitative data about the availability of key medicines and their quality at the time of my visit to these health facilities. The data needed to assess the quality of medicines sold at RDF health facilities include:

- results of samples of medicines sent to NDQCL for quality testing;
- presence of expired and/or damage medicines in pharmacies of selected public health facilities and in the RDF warehouse during my field visits to these premises;
- if patients had experienced any problems regarding quality of medicines, such as purchasing expired medicines or the leakage of bottles;
- whether MOH officials and practitioners received any complaints that pertain to the quality of medicines sold by the RDF.

Qualitative data were collected from MOH and RDF archival records and by interviewing policy-makers and practitioners to collect data relevant to the context of the CSP in KS, such as equity in access to health care services. Their views about the performance of the RDF and its impact on the quality of services were also sought (see section 4.3.2 below).

Face-to-face interviews

Face-to-face structured and semi-structured interviews were conducted to collect quantitative data from selected health facilities users as well as qualitative data from the health care providers. I decided to use face-to-face interviews as the principle method of research amongst all these groups, for several reasons. These reasons include: poor postal services in Sudan (too slow and unreliable), high (40.1%) illiteracy rate (HDR 2003), and low (21 per 1000 people) telephone coverage services in the rural areas (HDR 2003). In addition, a culture of filling questionnaires does not exist, especially among lay people in Sudan (FMOH 1999). Consequently, face-to-face interviews were the only practical means available to me in the geographical areas where research was conducted at the time of the study.

Additionally, face-to-face interviews, in comparison with other kinds of interviews, such as telephone interviews, offer more flexibility in terms of the content of questions and target population. For instance, interviews with patients are difficult using telephones or questionnaires in Sudan. Face-to-face interviews generate higher response rates, are more appropriate for long interviews with complex questions, enable unobtrusive interviewer observations of the respondents and their surroundings, and allow questions to be clarified by interviewers when necessary (Rizk 2003).

However, these kinds of interviews are always expensive and time consuming. Anonymity is lost, and there is greater possibility of interviewer bias. Choosing a suitable time, sampling, and situational issues, such as where and when to conduct the interview, should all be considered too (see section 4.4.8). Interviews could also be influenced by the personal characteristics of the interviewer, including his (her) race, class, ethnicity and gender (Denzin and Lincoln 1998). Moreover, interviewers can subtly influence responses by inflections of the voice, facial expressions or gestures (Boynton, et al 2004). To avoid these potential effects, a number of measures were adopted in this project. These measures include training of collectors of quantitative data, and development of guidelines (Appendix 3) to conduct semi-structured interviews (for further details, see sections 4.3.2 and 4.4.3 below)

4.3.2 The qualitative research method

The semi-structured face-to-face interviews with health care providers provide opportunities for me and the interviewees to discuss relevant topics in more detail. These interviews also allowed me to use cues or prompts to encourage the respondent to speak and to correct mutual misunderstandings. In semi-structured interviews, the interviewer also has the freedom to probe the interviewee to elaborate on the original response or to follow a line of inquiry produced by the interviewee (Mathers, et al 2002). The semi-structured interviews consisted of open-ended questions: as Patton (1987, p.122) claims 'for purposes of qualitative evaluation, good questions should be, at a minimum, open-ended, neutral, sensitive and clear'. The questions for these two kinds of interviewees (i.e. policy-makers and practitioners) were developed in consultation with my PhD supervisory team at Nottingham Trent University. These questions were carefully worded and arranged for the purpose of taking each respondent from the same group (i.e. policy-makers or practitioners) through the same sequence

and asking each respondent the same questions, in order to reduce the variation that can occur from asking different questions to different respondents. This also enabled me to minimise my personal effect on the data, and to avoid the problem of obtaining much data from certain people while getting less from others. In addition, this approach was very helpful in data analysis, because I was able easily to locate the respondents' answers to the same questions and compare similar questions and answers quickly (Patton 1987). Although there was an overlap of more than 50% of the key questions to prescribers and dispensers with those of the policy-makers, separate questions guides were developed for policy-makers and for different groups of health care providers. These guides helped me pace the interviews and made interviewing more systematic and comprehensive. The first question in the semi-structured interviews with health care providers was an introductory question to warm up discussion and explore general views about the Cost-Sharing programmes, in general, and RDF, in particular. The following questions and probing focused on the issues of: accessibility to essential medicines; equity issues; policies and procedures for granting exemptions; public health facilities utilization; and advantages and disadvantages of the policy of the CSP. The interviews also asked for deep insight into the RDF and respondents' opinions about the factors leading to its survival for a relatively long time.

Selection and sample size of health care providers

Data collection using semi-structured interviews is time consuming and consequently data were collected from smaller numbers of people than would usually be the case with quantitative methods (NSF 2002). It was not my aim to decide upon a specific sample size of health providers for this research, as I was not primarily interested in numbers but in the quality of data and depth of responses from the health care providers. However, in order to maximise variation in the sample, participants were selected to ensure participation of a range of health care providers considered likely to offer deeper insights into the impact of the RDF on accessibility to essential medicines and thereby the utilization of public health facilities. These providers included key policy-makers at Federal and Khartoum State Ministries of Health and practitioners from selected health facilities.

The choice of policy-maker was based upon his or her role in the policy making process within the FMOH or MOH KS, or as the head of department with a direct link to the

services provided at local public health facilities. Interviews were conducted with fourteen senior policy-makers in the relevant branches of the Ministry of Health to collect qualitative evidence about their perceptions of the effects of the RDF on accessibility to essential medicines of affordable price and acceptable quality and on rational use of health facilities, the efficiency of the exemption mechanisms and so on. All policy-makers had worked as practitioners in the public health facilities before coming to the MOH as policy-makers. Some of them had witnessed the free services era during their career as practitioners in hospitals or health centres. In addition, I interviewed the former Minister for Finance and Economic Planning, the key architect of the privatisation policy in Sudan which included the adoption of the Cost-Sharing Policy. He was interviewed to find out why the government abolished the constitutional right to free health care and what measures were taken to remedy the drawbacks of abolition. He was also asked if he thought there was an improvement in the quality of health services provided in public health facilities after the adoption of the Cost-Sharing Policy.

In Khartoum Teaching Hospital and Ibrahim Malik Hospital, I interviewed the most senior practitioners, often heads of hospital clinical disciplines. Most of them had witnessed the free medicines era. In addition, some of those working in the outpatient clinics at the time of visit were also interviewed. The selected rural hospital and all the health centres were single doctor facilities, and the doctors and pharmacy assistants in these facilities were interviewed. A total of twenty-seven practitioners (who implement the Cost-Sharing Policy and face its implications) were interviewed to gather information about the state of their morale, their commitment to the RDF list, the quality of medicines, and their perceptions about the working of exemption mechanisms and utilization of health facilities.

Tape recorded interviews

I decided to tape all interviews with health care providers for several reasons. Working alone, I was concerned that note taking might distract me and compromise focusing on listening and responding (i.e. interviewing process). The interviews were conducted with senior staff, so I wanted to maximise the efficient use of the time allowed. The discussion flowed smoothly because I did not have to write down the response to one question before moving on to the next. Tape recording ensures that the whole interview

is captured and provides complete data for analysis, so cues that were missed the first time can be recognised when listening to the recording. Interviewees may feel inhibited if the interviewer suddenly starts to scribble: they may wonder why what they have just said was of particular interest (NSF 2002). Tape recording also allows independent checking, analysis and replication of the interviews.

However, the disadvantages of tape recording include the potential for interviewee to be reluctant to speak freely in front of a machine. In this study, three prescribers refused to tape record the interviews (section 4.4.8). On the other hand, all policy-makers told me they did not mind and in fact they were used to being interviewed by the local media. However, to overcome potential disadvantages, the reasons for recording the interviews were explained and I asked the interviewees if they minded the use of a tape recorder. General permission for the study from the Director General of MOH KS allowed them to talk freely. Lastly, the interviewees perceived that there was nothing to be afraid of when responding truthfully and giving factual information about public policy.

I used to check the tape quality on my way back to the office, using the car recorder. At the office, I gave myself sometime after each interview to make notes about the interview. During this time, I also checked those notes I sometimes took during interview to capture and highlight major points, to describe surroundings and the environment in which the interview was conducted. This time also allowed me to report other events that took place, particularly at health facilities, during interviews so it could be taken in consideration during data analysis. For example, during one of my interviews with practitioners at Ibrahim Malik Hospital, a female patient presented her prescription at the office windows and asked for help to meet her prescription cost. This event supported what was said by practitioners that the exemption mechanisms applied to protect the poor patients does not function effectively (see chapter six).

Data transcription

I conducted the interviews with health care providers in Arabic language and audio taped and transcribed verbatim. The transcribed data were entered into the computer as a text file using Microsoft Office Word 2003. Being not more than thirty-two minutes for practitioners and fifty-two minutes for policy-makers, the length of the interviews was relatively short. Transcription was an immensely time consuming process, as each

hour's worth of health care providers' interviews took on average 4.4 hours to be transcribed. Transcripts were checked for accuracy and slight cosmetic changes were made before analysis.

4.3.3 Quantitative survey

Conducting surveys to gather information from health facility users is a complex task. Mathers and colleagues (2002) point out that there are a range of approaches to interviewing, from completely unstructured in which the subject is allowed to talk freely about what ever they wish, to highly structured in which the subject responses are limited to answering direct questions. In this research, structured questionnaires using close-ended questions were framed to enable interviewers to ask each respondent the same questions in the same way, in order to get reliable, consistent and comparable information. They were also designed so that many questions could be asked in a short time and so that the data collected could be easily analysed. However, the disadvantages of closed quantitative interview, according to Patton (1987, p.117) include: 'respondents must fit their experiences and feelings into the researcher's categories; may be perceived as impersonal, irrelevant, and mechanistic; and can distort what respondents really mean or experienced by so completely limiting their response choices'. This is most disadvantageous using self-completion questionnaire. In my research, the survey of users was carried out through face-to-face interviews conducted by a team of interviewers recruited from the MOH KS. The interviewers were informed during the training period (see section 4.4.3 below) to tick the category that best describes the respondent's answer, but in such away that the interviewee could not see the answers, and to write down his or her answer on the space provided after each question, if it was not one of the choices provided. This allowed maximum opportunities for respondents to answer in their own way, while retaining the advantages of a structured questionnaire.

Data were collected through the use of two closed questionnaires: one addressed to the patients and the other to the heads of household. These questionnaires were developed in consultation with my supervisory team and several modifications were made in the process. The questions were phrased in such a way that a limited range of responses was invited and a category 'other please specify' was provided after each question to accommodate any other responses. The questionnaires were then translated into clear,

simple Arabic language, to avoid ambiguous questions that would lead to responses that did not accurately capture respondents' views or to them not bothering to respond (Boynton, et al 2004). The questions then pre-coded and agreed upon with the team of interviewers. Minor changes were also made at that stage. The final version of each questionnaire (i.e. households and patients' questionnaire) was field tested in two RDF health facilities, which were not selected for the main study, but where there were similar types of community to those used for the main study. After completion, the questionnaires were retranslated back into English in order to ensure minimum loss or change of meaning and were electronically processed using the Statistical Package for Social Sciences (SPSS) for the purposes of this thesis. See section 4.8, for further details about data analysis and statistical tests that I performed on these data.

In contrast, to the patients' interviews which lasted for fifteen minutes, the households' interviews were relatively long and continued, on average, for thirty minutes. The respondents in the households' interviews showed a great need to talk about health issues, particularly when they knew that the interviewers were members of staff of the MOH. This might indicate that health issues are of high concern. However, it did not skew the results of the thesis, because conversations (as reported by interviewers) were about general health issues which are not directly linked to the Cost-Sharing Policy or the RDF. For instance, discussions include poor environmental health, epidemic of malaria during rainy season, prevalence of HIV/AIDS in Sudan in recent years and general experiences of heads of households with the health care system. During almost all the households' interviews (especially those in the rural areas), the interviewers were very warmly welcomed and offered soft drinks or tea.

I collected data on the availability of medicines during my visits to the health facilities, using a previously designed checklist (see page 112). Among unpublished primary sources I have used to supplement data that were collected from health care providers and users, are a wide variety of official reports produced by MOH different departments and projects. The annual reports of RDF to the Minister of Health Board, from 1996 until 2003, were photocopied on site and reviewed and analysed back in Nottingham. Information about the availability of medicines and the number of patients were obtained. These reports are particularly useful, but the non-RDF health facilities (i.e. control group) had no stock-taking records on a monthly or annual basis. At the Federal Ministry of Health, statistical office information about the number of patients using

public health facilities annually in Sudan and Khartoum State were collected from 1989 up to 2003, to enable comparison between the pre- and post-adoption of the Cost-Sharing Policy. However, information on utilization rates of public health facilities administered by Khartoum State, Ministry of Health exists only in aggregated form. That is, data for facilities that were enrolled in the RDF and those that were not disaggregated in the MOH statistical annual reports. To compare utilization rates, the annual number of patients using public health facilities throughout Sudan and KS Federal and State facilities was divided by the estimated annual number of the population obtained from Federal and KS statistical offices. In this way, the attendance rate per 100,000 population was then calculated to avoid showing a misleading increase in the number of patients as a result of population increase. Information about Central Medical Supplies Public Organisation (CMSPO) annual tenders since 1984 up to 2003 were collected to find out if there were changes in the annual allocated budget for the purchase of medicines. All measures taken by the RDF to ensure that patients receive safe, efficacious and high quality medicines were checked. A report on quality of medicines tested by NDQCL was copied to compare the quality of medicines imported by RDF with those imported by other sources, such as CMSPO, NGOs and private medicine importing companies.

Users' structured interviews

Users were interviewed because the reasons why health facilities are visited - or not visited – are difficult to obtain from the records at health facilities (Hentschel 1997). The users' survey questionnaires covered the following themes:

- Demographic information: This was collected to find out who were the users of the public health facilities after the adoption of Cost-Sharing Policy;
- If they received their prescribed medicines or not;
- Users' alternative source of medicines;
- Costs incurred in receiving a full prescription and transport to the facility and how they pay for them;
- Users' main reasons for the selection of the health facilities. Patients were also asked to report the place where health care was first sought, if different;

- Users' satisfaction with the quality of services, in the light of accessibility to essential medicines (i.e. availability, affordability, geographical coverage and quality of the medicines);
- Satisfaction with arrangements adopted by the government to protect poor patients.

Patients' structured-interviews

To substantiate how the system works in practice, it was necessary to gather information on the patients' experience with the RDF. Structured interviews were conducted with outpatients who visited the selected health facilities. The outpatients were interviewed to gather data about:

- their perception of the availability, accessibility, affordability and quality of medicines;
- completeness in filling out the prescription;
- if they use other alternative sources before coming;
- if they had managed to pay for their prescription and how much;
- the source of the money to pay for medicines;
- whether they come immediately or after some delay and why.

In the case of children, the father or mother or the adult who brought them in to the health facility was interviewed. Given the fact that children do not usually make their own health care decisions, in the analysis of patients aged less than eighteen, the education and occupation variables refer to the education and occupation of their father or carer.

Households' structured-interviews

The patients' interviews described in the section above provided information about the Cost-Sharing Policy from those who have already taken the decision to consult health facilities: there is therefore likely to be a tendency for them to give responses which highlight what they see as the advantage of such a decision. In other words, the patients' interviews and other facility-based data do not tell the full story about the RDF from the community perspective. For example, patients' interviews tell nothing about those who

do not use the facilities due to economic or geographical constraints, or because of other factors such as the quality of services provided. In the same way, these interviews tell us little about health care seeking patterns or the use of alternatives, and why they are used (Quick, et al 1997; David and Haberlen 2005). To counter the inbuilt bias resulting from patients' interviews, which suggested that cash was rarely problem, households in the communities around the health facilities surveyed for this project were therefore interviewed, too. The purpose was to gather data on households' decisions about whether to utilise health facilities, the cost of travel and treatment, how they pay for their prescribed medicines, usual place of purchase and to find out if they have sometimes foregone seeking health care due to cost or other factors. The respondents were also asked the reason for their particular choice, especially if they did not seek care, or sought care at some provider other than the nearest public health care facility. Information sought also included the demographic characteristics of the head of household and his monthly cash income. In addition, interviewers were asked to report on home conditions (for example, whether the house is with electricity, tap running water and has its own toilet), but without asking interviewees in order to avoid embarrassing the respondents (WHO 2003b). Although apparently there is an ethical issue here, it can be argued that, considering the ability of visitors to observe home conditions, this covert reporting has not infringed upon ethical rights of any of the household interviewees. The home condition, and educational level and occupation of a head of household reflect his or her socio-economic status.

Selection and sample size

The ideal target was a small sample that could describe the population group. However, the survey did not attempt to reflect the entire population of households and patients using public health facilities in KS because the objectives of study were not to generate statistically significant, generalisable findings. Rather, the purpose of the project was to make a provisional assessment of the performance of the RDF in KS and to understand the interaction of factors shaping the degree of performance (see chapter one above), compared with those proposed for the establishment of the RDF (Figure 4.1 above). The sample used to gather quantitative data was sized to be feasible in the time and resources available. These samples of quantitative data are nevertheless thought to be sufficient to establish key descriptive and indicative differences between RDF and non-RDF health facilities and to draw valid if provisional conclusions from this evaluation.

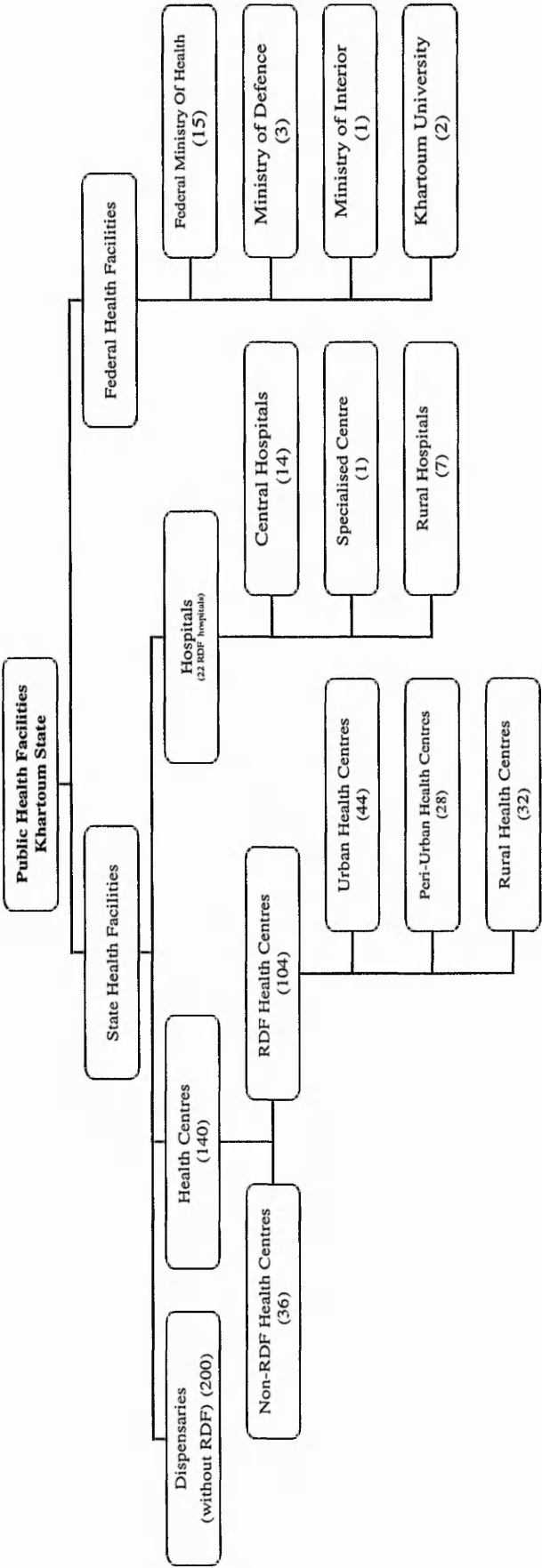
Study sites

The selection of facilities broadly reflected the range of health facilities to which the population of KS has access. In Khartoum State, there is a big difference between RDF and non-RDF health facilities in terms of practices concerning the source of medicines and their distribution, fee types, price structure and exemption mechanisms. Health facilities are administratively categorised into two groups:

1. Federal health facilities: as shown in figure 4.3 (below), including fifteen hospitals managed by the FMOH. The system of financing medicine in these hospitals is identical. These facilities use their own financial resources to purchase their medicines from the CMSPO. Khartoum University also has two teaching hospitals with similar financing mechanisms to those of FMOH hospitals. In addition, there are four army and police hospitals. These four hospitals were not considered in this research, because they provide free services including medicines to army and police forces and are financed by the National Defence and Interior Ministries. They are seldom used by the public.
2. Khartoum State public health care facilities: comprising twenty-two hospitals and 104 health centres that use the RDF supply system, and thirty-six health centres without RDF. The hospitals include: seven rural hospitals, fourteen general hospitals in the urban areas and one highly specialised centre (Ahmed Gasim centre for open cardiac surgery and renal transplantation) (MOH, 2003a). The RDF health centres are further classified according to the load of patients into: Class A, Class B and Class C (A-class with high number of patients and down to class C). Most of the class C health centres are located in rural areas, whereas most of the class A and class B health centres are in the urban and periurban areas respectively.

The RDF's pharmacies in both KS MOH hospitals and health centres are absolutely the same, in terms of the source of medicines, the ordering and delivery system. They have the same list of medicines at similar prices. The procedures of medicine dispensing; the financial system; the prescription format; the supervision system; staff payments, the discipline and training system; and so on are all very similar. They are a single network of drug distribution outlets. The thirty-six health centres and 200 dispensaries without RDF in KS use different sources of funds to finance their medicines (Figure 4.3).

Figure 4.3: Schematic diagram depicting classification of public health facilities in Khartoum State



Selection of health facilities

Although there was no difference among selected sites in terms of the health environment of respondents, such as morbidity patterns and public health service facilities, a stratified random sampling procedure was used to select the RDF rural hospital and health centres, using a simple random sampling method. The names of the health facilities from each stratum (i.e. RDF rural hospitals, urban health centres, periurban health centres and rural health centres, and non-RDF rural health centres) were put into a hat and one name from each group was selected blindly. Table 4.1 shows the names of the health facilities, and the number of practitioners, patients and households interviewed. Seven health facilities were sampled for this research. Five health facilities were with the RDF and two without the RDF. The RDF health facilities comprised one teaching hospital (Ibrahim Malik Hospital) outpatient department, one rural hospital and three health centres distributed in rural, periurban and urban areas. The non-RDF health facilities included the biggest referral hospital in Sudan (i.e. Khartoum Teaching Hospital) with 700 beds and one rural health centre (Alshiekh Altayeb health centre). The Khartoum Teaching Hospital was selected to represent the Federal non-RDF hospitals and Alshiekh Altayeb health centre was chosen to represent non-RDF health centres in the rural areas, since all urban and periurban health centres were enrolled in the RDF. Due to a complete lack of pre-RDF information, these two health facilities were used as a control group, in order to assess whether the changes in drug availability and utilization were a result of factors other than the introduction of the RDF. The sampled health facilities were located in four out of seven localities in KS.

Table 4.2: Health facilities surveyed and sample size of interviewees

Health Facility	Location	Financing mechanism	Patient/ month	Sample size		
				Providers	Patients	Households
Componi HC ¹	Periurban	RDF	1,000	2	5	5
Almaigoma HC	Urban	RDF	1,800	2	8	8
Alsilamania HC	Rural	RDF	400	2	5	5
Alshiekh Altayeb HC	Rural	Non-RDF	400	2	5	5
Algazera Islang Hosp ² .	Rural	RDF	4,500	2	10	10
Ibrahim Malik Hosp.	Urban	RDF	11,000	7	20	20
Khartoum Hosp.	Urban	Non-RDF	25,000	10	40	40
Total				27	93	93

¹HC = Health centre, ² Hosp. = Hospital

Selection and sample size of patients

The information necessary to conduct this evaluation was collected from ninety-three patients at the exits of selected public health facilities. The eligibility criteria for patients' selection were as follows:

- Patients or their representatives had to be eighteen years or more, so they could answer the questions. In the case of children their guardians (the term used in Sudan is co-patients) were interviewed. The eighteen years old patients were not asked directly because up to that age, a person does not care for himself and is considered by the Health Insurance Scheme as a dependent, since most people at this age are school students;
- Health insurance patients were excluded on the basis that they had no problems about paying for their medicines. Insured patients have access to free consultation and diagnosis, and pay only 25% of their prescription cost.

The average of the monthly attendances at a small health facility was found to be 400 patients (RDF 2002a). The sample size of this group was five patients. Then the sample size increases as the average of monthly attendances increases. In five health facilities all (five to ten patients per visit) patients attending outpatient clinics were interviewed (exit-interview) after visiting the pharmacy on the day of the study. On a few occasions in the two big teaching hospitals where the flow of patients was much greater, the first ten and twenty patients were interviewed in Ibrahim Malik Hospital and Khartoum Teaching Hospital respectively during two successive days, to complete the sample of twenty in the case of Ibrahim Malik and forty for Khartoum Teaching Hospital.

Selection and sample size of households

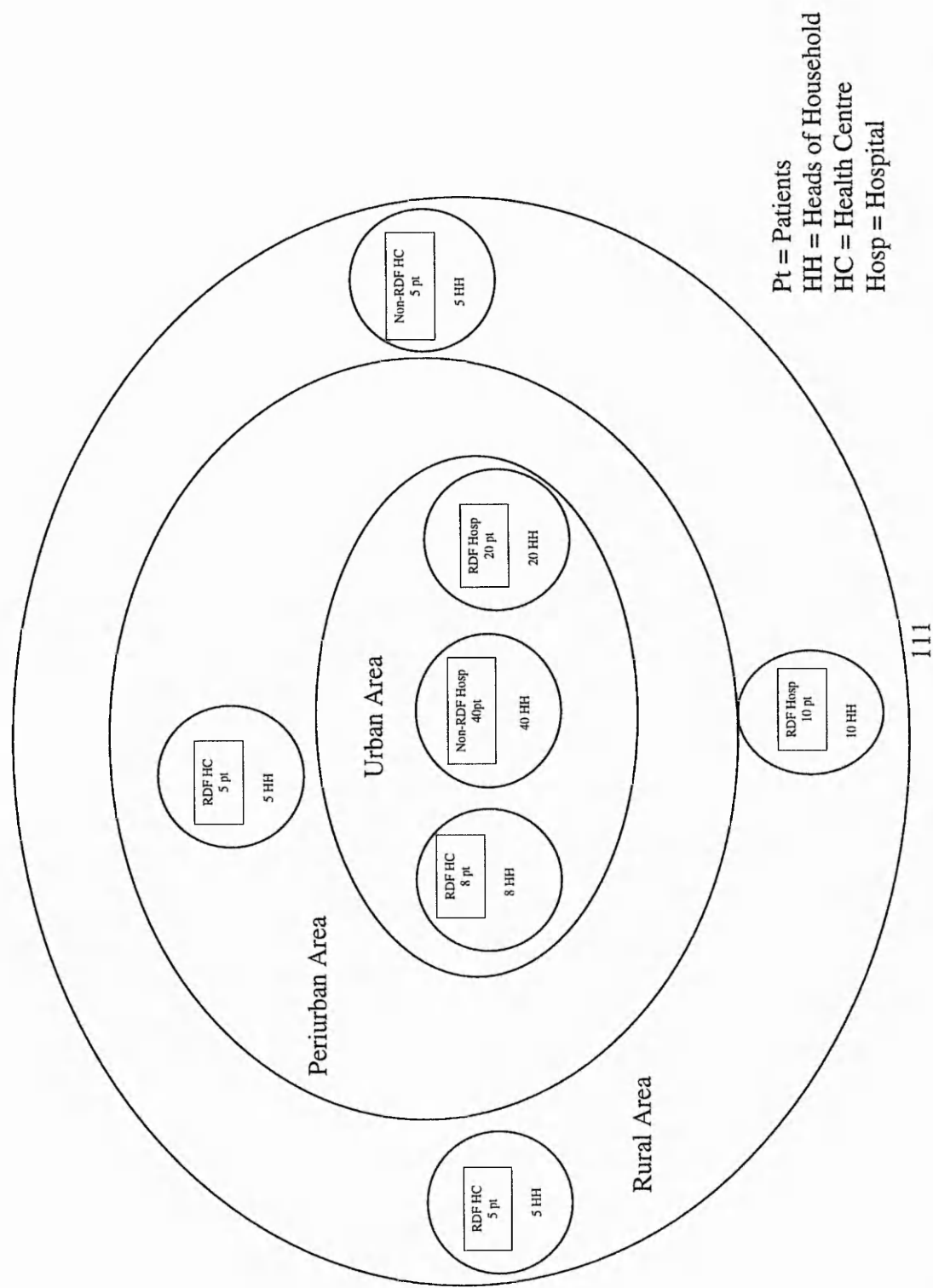
While those indicators (such as availability and affordability indicators) used to measure access to medicines at health facility level have proven to be useful (WHO 2003b), the household survey is an important tool to obtain accurate information about how a population group is accessing the medicines it needs. Although the Ministry of Health documents state that there is a health centre for each 15,000 inhabitants, there are no official records to document this figure for each facility. It is therefore not possible to

determine how many households in each health centre catchment area. Therefore I decided to select the number of patients and households from the health facilities catchments areas according to the number of health facility users per month. The sample of households was selected within a five kilometre radius of the selected health facility (after five kilometres, most probably they enter a catchment area of another health facility) to include communities near to and far from health facilities (Figure 4.4 below).

In the households' survey the sample was taken from urban, periurban and rural areas. The survey was carried out in the seven-selected health facilities' catchment areas. The households' survey sample was purposive. Because there was interest in learning about the use and non-use of public health services by the households, only those households where someone had experienced an illness in the last two weeks preceding the survey were interviewed. According to Soucat and colleagues (1997b, p.S138): 'in all studies, a two weeks illness recall was used, as this period has been shown to be the limit for reliable recall for events like minor illnesses'. This inclusion criterion meant that the interviewers took a long time to complete the sample.

The first household was selected by the interviewers. If the household was absent, or refused to participate or had no member within the household who had fallen ill during the last two weeks, his immediate right-hand side neighbour was tried, if not his left immediate one and so on, until the required number had been obtained. In line with WHO (2003b, p.5) recommendation, which states that, 'the ideal respondent is the household member who is acting or acted as caregiver to the member who was ill', all interviews were conducted with the head of the household. The head of household was responsible for the care of his or her family in all surveyed households. The total number of households was ninety-three (seventy households from the hospitals' and twenty-three households from selected health centres' catchment areas). These numbers correspond to those of patients who were interviewed at the selected health facilities. As has been mentioned earlier, the sample was sized to be feasible in the time and resources available. Thus, the household interviews were done in large urban areas as well as in periurban and rural areas.

Figure 4.4: Schematic diagram depicting sample selection



The catchment areas were more easily defined in rural areas and the choices for care were easily identified (i.e. there was not more than one health facility per village and private facilities did not exist in all selected rural areas). For example, each of the three rural areas in this study has its own public health facility, which provides inhabitants with a port to the modern health care system. This was important as I desired to know the health care seeking behaviour of the households in these areas, because one of the objectives of RDF KS was to increase access of essential medicines to the targeted population in periurban and rural areas (RDF 1998b).

Preparation of the observation checklists

I developed two checklists to be used during my field visits to the health facilities pharmacies to gather data about physical availability of key medicines and their quality.

- **Key medicines checklist:** A list of eighteen key medicines used to treat common health problems of the majority of the health facilities users was copied from the RDF manual (1998b). The list (Appendix 4) was used to measure the availability of the key medicines at the time of the visit, because physical availability is a basic measure of access to essential medicines. The list of key medicines contains life saving items and should be available at all times, and are considered as basic requirements in all levels of health care by the MOH and RDF. These medicines were intentionally selected, because they are fast moving items and are more likely to run out-of-stock (RDF 1998b). Selection of key medicines did not mean that the rest of the RDF list was not checked. Within the pharmacy, I went through the shelves to identify which of the listed items was available at the time of the visit. On the list, if a medicine was available, it was marked '1', if not available marked '0'. Then on an Excel spreadsheet, calculations were made for two groups of health facilities. Since non-RDF (control group) comprises two facilities and RDF health facilities comprise five health facilities, an average was used to report findings of each group (Appendix 4 and 5). The same process was used in the central RDF warehouse which was composed of four big stores.

- Adequacy of storage and dispensing of medicines: A checklist (Appendix 5) was developed to check storage conditions and handling of medicines because both of these factors can affect the quality of medicines. The presence of expired medicines was also checked. The checklist was used to rate the storage conditions and handling of medicines. On the checklist, '1' indicated that statement was true and '0' was used to indicate a false statement. A score was then calculated by dividing the total number of true reports of the total items checked, multiplied by 100%. These calculations were carried out using an Excel spreadsheet.

4.4 Fieldwork preparation

Before embarking on fieldwork, I sent an e-mail to the Director General (DG) of the Ministry of Health, Khartoum State informing him about the research, to get his permission to do this study at MOH KS health facilities and to ask him for help regarding recruitment of the data collectors. The response of the DG was positive. After arrival in Khartoum, I met the DG and the director of the Research Department. The purposes of this meeting were: to brief the DG about the research, to arrange the fieldwork and to recruit the data collectors, to inform him about line of the study and identify potential interviewees from MOH KS. At the end of the meeting I had received formal permission from the DG to do an interview with him and six senior relevant staff who work with MOH KS. The policy-makers at the Federal Ministry of Health were contacted on an individual basis to agree the time and place of interviews. All interviewees (i.e. policy-makers and practitioners) were contacted either by phone or at their offices.

It was important that each health care provider agreed enthusiastically to talk to me, and that their experience, particularly that of the policy-makers and senior practitioners, helped them to talk in breadth and depth about Cost-Sharing programmes, in general, and RDF, in particular. It was also evident that the policy-makers were well informed, and most of them had played an important role during the preparation time for launching the Cost-Sharing Policy. For instance, four of them saw themselves as one of the architects of the recent health reform policies, such as the Cost-Sharing Policy, Health Insurance Scheme, the free medicines project at hospital outpatients' clinics and the decentralisation policy.

4.4.1 Time of the research

Data collection was completed during three months intensive field work in Sudan between 26th June to 22nd September 2004. This time period was chosen on the basis that: first, health problems associated with the rainy season appear in the second half of September every year and the policy-makers would be too busy to participate in the study. Secondly, it is also too difficult to reach some rural health facilities during the rainy season. Thirdly, the Comprehensive Peace Agreement between the government and the Sudan People Liberation Movement was expected to be signed in September 2004¹⁸. The agreement was expected to make major changes, including replacement of the current senior staff who had a major role in the health financing policy reform, in general, and development of the RDF, in particular, during the early 1990s. I therefore wished to interview these policy-makers before the Agreement was signed.

4.4.2 Experience of data collectors (interviewers)

Data collection is the most crucial part of the research, so the data collectors were carefully selected. Four interviewers were appointed from Research Department MOH KS for the two user surveys. All have a higher education (one has masters degree) and were employed by the MOH as social surveyors. They are well trained and have a long experience in patients and households research using questionnaires for face-to-face interviews. On average, each one had participated in seventeen surveys of this kind since 1998, and had been promoted to be data collection supervisors. Their participation reflected the fact that the Director General and head of the Research Department very much supported the study. For them it was the first of its kind since the handover of the RDF to the MOH in early 1996. These interviewers did the structured interviews with patients and heads of households. This is the quantitative part of the study. The interviewers were divided into two teams (two each). To ensure consistency of interviews and, since patients' interviews were slightly different from the households' interviews, one team did the patients' interviews and the other did the households' interviews. The experience of interviewers in this kind of community research was worth a great deal and was thought to minimise, for instance, mistrust of strangers asking questions about individual or family situations, through their choice of words, and thus increase the value of data. In spite of their experience of field of public

¹⁸ The Peace Agreement was signed in January 2005, after completion of my fieldwork.

surveys, the interviewers were reminded to be patient and cautious to sensitive situations or issues that might arise during interviews.

4.4.3 Interviewers orientation workshop

It is vital that surveys should be well managed for results to be reliable and useful. Poorly managed surveys can result in a multitude of problems, such as falsified or incomplete survey questionnaires, biased sampling, lost data and large numbers of people refusing to be interviewed or being upset by interviewers (Nyandieka, et al 2002). Interviewers from the MOH KS Research Department were therefore given refreshment training during a two days orientation workshop, to introduce them to the purpose of this study, to ensure the reliability and validity of the survey results and to alleviate potential problems that might affect the quality of data.

General information about the research was given to the interviewers at the beginning of the workshop, as well as brief introduction about the history of the CSP policy, in general, and RDF, in particular. I also answered their questions about the RDF. The participants went through the questionnaires word by word to check their Arabic wording. Part of the workshop was devoted to interviewing techniques. Issues like how to approach the interviewees, how to ask questions in appropriate ways and how to complete the questionnaires without affecting the respondents' frankness were discussed. During the workshop, I assured myself about the understanding of interviewers of the required information and their knowledge about how to gather the data and to complete questionnaires in a standardised way. The following areas were covered during the workshop:

- Specific approach for selection of interviewees by explaining inclusion and exclusion criteria;
- Details regarding the purposes of specific questions;
- Confidentiality and voluntary participation;
- The impact on the quality of my PhD if the survey was done incorrectly;
- Logistics required for the fieldwork;
- Appropriate time for health facilities and households' survey.

4.4.4 Pilot survey

The first step in producing good questionnaire research is getting the right questionnaire. However, even the best questionnaire will not get adequate result, if it is not used properly (Boynton 2004). Structured-interview questionnaires were tested to make sure that all relevant issues were covered, that the pre-codes were correct, that the interviewers have understood the task and questions were appropriate. By the end the pilot survey, each team had collected data from ten respondents. These data were not used in this doctoral study. The pilot survey helped the interviewers to become familiar with questionnaires and to identify problems that might arise during their fieldwork. The results were assessed and difficulties encountered were discussed in a meeting attended by myself, the data collectors, a statistician and the head of the Research Department at MOH KS. Minor changes were made to both questionnaires, mainly in the formatting and the addition of 'not applicable' as one of the choices to answer certain questions.

4.4.5 Interviewers' guidelines

To ensure that all interviewees received the same set of questions asked in the same order, the interviewers were asked to do every interview in a like manner. There was very little flexibility in the way questions were asked or answered on the ground. They were also informed that all respondents should be allowed to say what they really think, and they should not be corrected if they say negative things about the RDF. In addition, written guidelines were developed and discussed during the orientation workshop to help the data collectors do the job perfectly. As a result of these guidelines, the questionnaires provided valuable quantitative data on the access to medicines by the surveyed population after the implementation of Cost-Sharing Policy. The guidelines' instructions included:

- Rephrasing the question: Accuracy of interviewee responses depends on the skills of the data collectors. Interviewers were informed that the question should be read as it was written, but that they should not read the answer options provided, because reading responses or giving examples of expected answers could lead the interviewee.

- Marking the answers: Interviewees' responses should be marked right away in the questionnaire. The responses that were not included in the options provided should be written in the provided space after each question labelled 'others (please specify)'.
- Responses verification: To verify the respondents' answer, questions like 'what, why, how' could be asked or by repeating the answers to check its accuracy.
- Inclusion and exclusion criteria: were developed to select patients.
- Cautiousness: will help me to do proper research and thereby to write a good PhD thesis. The interviewers were informed that less carefulness or ignorance will weaken overall findings of this doctoral study.

4.4.6 Fieldwork logistics

The necessary logistics for the fieldwork were prepared before the beginning of the survey. These preparations included:

- Transport: Transport was crucial to the success of the fieldwork. A 4-WD Toyota pick-up double cabin was made available by the Directorate of Pharmacy, FMOH, with full service and an on-request driver.
- The survey kits: Time was taken to prepare survey kits. The experience of the interviewers in this area was of great value. The following items were made available to the interviewers for their daily use, before the beginning of the fieldwork:
 1. 100 copies of questionnaire to each team as appropriate;
 2. Some blank A4 papers to take notes, in particular, any thing that might be important for data analysis and interpreting of the findings;
 3. Official letter of introduction to the practitioners, patients and households showing the approval of the research from MOH, describing the purposes of the research and providing my background, supported by a certificate obtained from Nottingham Trent University's research office to be presented on request;

4. A letter from the Research Department, MOH KS to the medical directors of health facilities. The letter certified the permission given to me by the MOH to conduct the survey;
5. Informed consent: to be signed by the interviewee when necessary;
6. Calculator, erasers, pencils, sharpener and stapler for each team;
7. A bag in which to carry questionnaires and other items for each team;
8. A clipboard to lean on when recording responses;
9. A mobile phone for each team of interviewers to be used when they faced a problem or needed help during interviewing. It was also used by the teams to call me to pick them up when they finished their task.

4.4.7 Fieldwork supervision

During the users' survey, I visited the sites and supervised the surveyors to assure the interview quality. For instance, I observed the interviewing activities of each team throughout the first five interviews (each health facility visit comprised five to ten interviews). Also I took the interviewers to the first five health facilities and facilities' catchment areas. In the two big teaching hospitals the situation was different. Each team of interviewers went alone to do the interviews. The practitioners' interviews and pharmacies visits also took place on different days.

In all facilities including those used for the pilot survey, permission to conduct the interviews was obtained from the facility medical director. All interviewers including myself were properly introduced to the facilities managers by an endorsement letter from the MOH KS Research Department. On arrival at the facility, I (the data collectors in the case of Ibrahim Malik and Khartoum Hospitals) spoke to the medical director to obtain his permission to start the patients' interviews and arrange the time for interviewing him. During these visits I visited the health facility pharmacy, interviewed the pharmacist and recorded observations according to the previously designed check list. Stock records of the last twelve months (August 2003 to July 2004) were also verified.

4.4.8 Location and time of interviews

Planning data collection is important. This section presents locations and times of interviews with health care providers and users. It also justifies the choice of such locations and times. Finally, the section discusses the practical problems and constraints that I faced during these interviews.

Health care providers' interviews

I tried to avoid the common pitfalls that have been identified by Field and Morse (1989) - which include outside interruptions, competing distractions, awkward questions, jumping from one subject to another, and the temptation to counsel interviewees - by developing questions guides and by conducting interviews where and when it was convenience to the interviewees. While six policy-makers were interviewed after working hours (i.e. between 3:00 and 6:00 pm), eight respondents were interviewed during working hours (i.e. between 7:30 am and 2:30 pm). The health facility doctors in the first five health facilities visits were interviewed after the pharmacy visit. This was recommended by doctors at these health facilities, since the doctors preferred to finish with their patients and free themselves for the interview. On the other hand, the dispensers (pharmacists and pharmacy assistants in the case of rural hospital and health centres) in all facilities were purposely interviewed between 9.00 am and 12:00 pm, to observe patients' behaviour when they received the medicines and paid the fees.

The interviews of policy-makers and practitioners generally, took place in a wide range of settings. This limited my control over the environment. For example, ten interviews with practitioners took place at their offices at health facilities. Others practitioners' interviews took place at outpatient clinics, theatre changing rooms or intensive care units. The senior doctors at Ibrahim Malik and Khartoum Teaching Hospitals were interviewed at their offices with exception of three who chose to be interviewed at an outpatient clinic, a pharmacy and at the FMOH. A small meeting room at the FMOH was chosen as a place for interviewing the policy-makers to avoid interruption, to provide privacy, to prevent distractions, and to ensure that interviews could be clearly recorded. Only six of the policy-makers agreed to be interviewed at the meeting room. The remaining were interviewed at their offices.

Interviews of patients and households

Throughout the day, facilities, especially rural ones, tend to have peak times between 8:30 am and 12:00 pm, when conducting targeted interviews was easy. In all sampled facilities, interviewers arrived at 9:00 am. In one case, the patients' data collecting team needed to visit Alsilamania health centre twice to complete the sample, because there were not enough patients during the first visit. Because the questionnaire contained questions about the availability and cost of medicines in the public health facility pharmacy, the exit-interviews were chosen to ensure that the respondent presented his prescription to the pharmacy before being interviewed.

All households' interviews took place at their homes between 5:00 pm and 8:00 pm. The time was chosen for three reasons: first, the heads of households are usually available during this period. Secondly, to avoid meals time (lunch time is between 3:30 pm and 4:30 pm.). Thirdly, being females, the interviewers needed to go back home early.

Practical problems and constraints

In three doctors' interviews, a tape-recorder was not used because they thought that the tape would be given to the government security people. Detailed notes were taken instead. There were only four patients who refused to be interviewed. The main reason given by two of them was that they could not spare the time required to be interviewed. The other two patients were unwilling to do the interview, because they felt too ill. This, however, did not affect the sample size, because those patients were substituted for by others to complete the target size of ninety-three patients. Due to a shortage of participants (less than five) on one occasion a health centre was visited twice to complete the required sample size. It was two hours driving from the city centre. One of the respondents found the question about the source of finance uncomfortable and showed his surprise by asking why the MOH staff would like to know such private things. The interviewers explained to him the reasons for asking this question, and then he continued the interview.

4.5 Reliability and validity of the research instruments

The research instruments were designed to describe the perceptions of the respondents about the effects of the RDF on the accessibility to the essential medicines and health facilities utilization in Khartoum State, not to allow statistical inferences to be drawn about the population of respondents. The validity of the quantitative findings depends on how well the sample mirrors the population (Rowntree 2000). The samples of the two groups selected (ninety-three patients and ninety-three heads of households) are not sufficiently large to be truly representative of all public health facilities users in Khartoum State. Nevertheless, the systematic manner in which respondents were selected (see section 4.3.3), and the training and checks described above and below, enables me to have some confidence in concluding that the views and experiences represented in the data are likely to be indicative of those of the two population groups. However, the methodological issue is whether there are any reasons to suppose that the experiences of the RDF described by these respondents were typical. The answer to this question emerged from the nature of this project, which was designed basically to find out the impact of the RDF on access to medicines and to explore factors that contributing to its survival for a relatively long period and why.

Although establishing the reliability of measures is important for assessing their quality (Bryman 2004), re-interviewing patients and heads of households, to test the reliability of the quantitative research instrument was not possible due to the time and resources constraints. However, I believe that the quality, relevance and usefulness of the qualitative data obtained were significantly enhanced by the manner in which the semi-structured interviews were conducted. In the semi-structured interviews with health care providers, I used clear guidelines to maintain control and to ensure consistent quality of interviews. During these interviews I tried to be as neutral as possible and remained open to the possibility that the concepts that might emerge would be very different from those that I had anticipated at the outset of the study. The danger is that interviewees are too willing to provide the kind of information the researcher wants (Britten, 1995). To counter this potential bias, I reminded all health care providers to be as frank as possible about the need to provide honest response before the beginning of every interview. During interviewing, I avoided being too helpful, but sometimes I found myself in a position to explain some questions by giving examples, to give appropriate verbal and non-verbal feedback, and to check my understanding of what had been said by an

interviewee when necessary. These interventions were found to be important to ensure the quality and enhance the richness of the data obtained. The strong commitment of health professionals to their colleagues enabled me, as a pharmacist, to successfully develop rapport with interviewees at health facilities in most interviews. From their answers, I confidently believe that most respondents gave their real feelings about the statements and questions I asked them to answer. This belief is supported by the fact that they square with other evidence collected for this study, are consistent with other accounts, are internally consistent and coherent, are plausible because policy-makers and practitioners could give reasons and examples, and because my own familiarity with most policy-makers gives me confidence in being able accurately to interpret what they had to say.

I consider the RDF's archival records as reliable sources, because the RDF has developed a system to control for the quality of data and information reported by the RDF pharmacies' staff. The measures applied by the RDF include registration of patients, the medicines dispensed to them and the amount paid; daily dispensed prescriptions are kept for further check by supervision teams; and the total amount of sold medicines is cross-checked with actual cash in cashiers' safes. The accuracy of this information is verified on a weekly basis at the RDF meeting with supervision teams' leaders. The annual report is discussed at a meeting chaired by the Minister of Health and attended by senior staff of the MOH, most of whom have their own cross-check supervision and reporting systems. However, attendance data obtained from statistical offices at both Federal and Khartoum State Ministries of Health are of dubious quality, because the health information system that collects utilization data is often not in place or does not produce reliable information. The reporting system at facility level depends passively on a patient registering himself, or on the ability of the health facility registrar to catch them. A clerk is designated to register patients before they see the doctor. But some patients may bypass the registration step, because after getting the entrance ticket they can go directly to see the doctor. Lack of time caused by pressure of work, particularly at hospital levels, was also mentioned by MOH officials as a reason for poor statistical data.

In sum, the reliability of these data is considered to be generally good because of the care taken in collecting and analysing them and because information from structured and semi-structured interviews was compared and cross-checked with archival records

and with my observations during the field visits. The agreement in the findings of the quantitative surveys and qualitative data suggests that the data are of good enough quality (i.e. the findings from one method seemed to validate those from the other) to reach a conclusion. Therefore, the findings and recommendations that will be provided by the research will make a very valuable contribution to the existing knowledge about the RDF.

4.5.1 Data quality assurance measures

A great deal of attention in this study was devoted to the quality of data gathered for the RDF evaluation. The following measures were applied to assure the reliability of the data gathered for this project.

Supervision of the interviewers

I directly, observed the first ten interviews (five interviews with each team). Although I was convinced that the interviewers were competent enough to do the job perfectly, I maintained close supervision throughout the period of the study to minimise the interviewers' bias. But, interviewers were still advised to report all comments of the interviewees on a provided blank sheet.

Feedback sessions

To ensure the quality of information, which depends on the quality of data collected, I decided to meet with data collectors at the end of each field visit for not more than thirty minutes, in a small well furnished office in the Directorate of Pharmacy FMOH allocated for me during my fieldwork time. The meeting aimed to ensure that the agreed procedures and methods were being followed and the data collected were complete and of high quality. The interviewers submitted a brief verbal report of the data collection process. The problems observed by the interviewers were discussed and solved before next interviews. The feedback sessions, although very short, proved to be invaluable in:

- assuring uniformity in the data collectors' approaches to gathering data and completing questionnaires;

- maintaining reliability of, and consistency during interviews, since new assumptions about the asking of questions and interpreting of answers were constantly occurring;
- planning of the coming visits. At the end of the meeting I received the completed questionnaires.

I checked the questionnaires at the end of each survey day for completeness, unclear statements or illegible writing before the next visit.

Respondents checking

The telephone numbers of household respondents were obtained where available. Due to time constraints, I managed to contact only 14% of those who had agreed to give their telephone numbers to make sure that they had in fact been interviewed. However, all of them confirmed their participation in the study.

4.6 Research limitations

The sample sizes used are not statistically large enough to allow generalisation to be made from their results for national policy (see section 4.3.3). Nevertheless, the interviewing of the targeted populations (i.e. ninety-three patients and ninety-three heads of household) supported by data from records and staff, made meaningful comparison between two sets of health facilities possible and to address the purposes of the research (which is to investigate what effects the RDF has had on the accessibility to essential medicines and the public health facilities utilization).

Inevitably, a doctoral study of this nature has limitations. First, the health facilities chosen, despite the stratification and random selection used, may not have precisely represented the Khartoum State as a whole. Secondly, although patients were interviewed in two health facilities without RDF, which were selected as a control group, the sample may not be descriptive of other areas across KS with respect to enrolment in the RDF or areas without public health facilities. Finally, being a member of staff of the FMOH with past experience in KS MOH and the RDF, the expression of my personal views might sometimes have been unavoidable, which may affect the

impartiality of this study. In spite of these limitations, I have considered conclusions drawn from this PhD research as valid, for two reasons: First, the main purpose was to develop an analysis that would allow for exploration of variations in the differences in perceived quality of services provided in RDF and non-RDF public health facilities and their consequences for the utilization rates of such facilities. And secondly, the use of different methods in this project's research and my success in collecting data from all targeted population (i.e. 186 respondents and forty-one health providers) and other sources, such as archival records and my personal observations, will go a long way to compensate for these limitations, and thereby would increase the credibility of my conclusions. This being said, the study results cannot necessarily be generalised and applied to other states of Sudan where CSPs were in place or to neighbouring countries.

4.7 Ethical clearance

Research ethics are about how to acquire and disseminate honourable information without causing any damage or distress to the participants (Neuman 1994; Rubin 1983). To obtain high quality data in interviews, people should feel confident to answer questions and express feelings openly, without shame, embarrassment, or fear of retribution. One key principle according to Boynton and colleagues (2004) is to assure privacy and non-threatening surroundings when completing questionnaires and total anonymity when analysing responses. During the patients' and health care providers' interviews, privacy was considered. The interviewers took the respondent, who had verbally consented to be interviewed, to a calm place for interviewing. The names of the respondents were not asked for during users' interviews (i.e. patients and heads of households were not identified by names). To maintain participants' anonymity in the case of semi-structured interviews with health care providers, no identification information, such as names or institution were mentioned during analysis or when quotes from their interview were reported. Before starting the data collection, ethical clearance was obtained from the FMOH research ethics committee. Permission was sought from interviewees for their participation. The participants were also informed that there were opportunities to discuss any concern with interviewers.

The respondents were verbally informed that all the data are for academic research purposes only, the data processing would not be used to support decision making about them and no harm, damage or distress would be caused as a result of participation in the

survey. It also indicated the degree of confidentiality of the data and emphasized that participation was fully voluntary and the interviewee could freely opt out if they chose. For the patients and households' interviews, verbal consent was sought from the respondents after the objectives of the study were fully explained to them. I also gave the health care providers interviewees a full, clear and accurate statement verbally about the purpose and scope of the study, the expected length of interviews (sixty minutes), the fact that the interviews would be tape-recorded, information about arrangements for data confidentiality and security, and checked out the possibilities of returning to them if more information was needed. They were also informed that I might publish this information in anonymised form.

4.8 Data analysis

This section discusses the analysis of the data collected for this doctoral study during my fieldwork. The quantitative analysis was based only on data collected from two groups of health facilities with different medicine financing programmes (RDF and non-RDF facilities), because no household-based data on health facilities utilization are available before the implementation of the RDF. The analysis of qualitative data that were collected from semi-structured interviews with policy-makers at KS and Federal Ministries of Health, and practitioners at both RDF and non-RDF public health care facilities was discussed in section 4.8.2 below.

4.8.1 Quantitative data

The quantitative data were entered into a data base using SPSS version 12.6 for Windows. I entered the data and checked them twice before analysis. A few mistakes in data entry were found and corrected. The entry of each questionnaire took eight minutes on average. In cases of more than one answer for a question, the answers were considered as separate variables.

Quantitative analysis consisted of simple descriptive comparisons between two kinds of health facilities (i.e. RDF and non-RDF health facilities) regarding accessibility issues. This analysis was done using Pearson's Chi square (χ^2) test to determine key indicative differences between the RDF and non-RDF health facilities with respect to certain

variables, such as availability, cost and quality of medicines. It is not the aim of the study to find causal relationships between demographic characteristics of the users and utilization of the public health facilities scrutinised. However, demographic information was obtained to describe the users of the sampled health facilities.

4.8.2 Qualitative data

The management, analysis and interpretation of qualitative empirical materials are a complex process (Denzin and Lincoln, 1998). Analysis of qualitative data in this study aimed to summarise the mass of data collected from health care providers and to present the findings in a way that identifies and communicates the most important features (NSF, 2002).

Data from semi-structured interviews were transcribed into Microsoft Office Word 2003. Analysis of the qualitative data followed the principle of the constant comparative method (Strauss and Corbin, 1998) whereby the hard copy of transcript was read multiple times to facilitate familiarity and to identify predetermined themes, such as accessibility, affordability, availability, quality of medicines, equity, and utilization of health facilities. Any text that could not be categorised by predetermined themes was given a new category. Themes that emerged from the interviews included advantages, disadvantages, status quo, sustainability, reasons for success and pitfalls, prescribing effects, and recommendations. A miscellaneous category was used to encompass various issues that arose during interviews and did not fit into existing themes. While reading the transcript, relevant items of text were highlighted. Codes which relate to categories and further subcategories were created during my reading of the transcript (Figure 4.5 below). Each highlighted segment and its code was then copied and pasted on the Microsoft Excel 2003 spreadsheet programme, which I created to organise and analyse the qualitative data (Appendix 6). This spreadsheet was developed by me for the purpose of the research because other software, such as NVivo and NUD.1ST appeared not to accept the Arabic language.

The full range of data was used in developing the qualitative analysis presented in chapters five, six and seven, but its main use was to aid the selection of quotations from the interviews with health care providers to point up particular views and perceptions and to triangulate evidence from these interviews with the analysis developed from

quantitative data. Comments from the patients and households' surveys were also presented when necessary to illustrate important points. These quotations have been used to demonstrate some of the main themes that have emerged from the data, as typical examples of the occurrence of certain phenomena and as a means of allowing research participants' voices to be heard (Lofland 1971). In this regard, the quotations were deliberately chosen to provide examples of views that were commonly expressed, or to reflect the perception and beliefs of policy-makers and practitioners. Different perceptions and views which were not so common were sometimes quoted to give a picture from different perspectives and where this is the case, the minority status of such views has been indicated. Having said that, conclusions were drawn from the dominant views, common ideas, or the views and perspectives of minorities, especially when supported by evidence from other sources, such as my own observations during my field visits, archival records or quantitative data from the users' surveys. I have translated the chosen quotations and comments to their best English meaning for the purposes of this thesis. In presenting such quotations the anonymity of the interviewee is preserved, although the respondent category, such as policy-maker or practitioner is identified.

4.9 Summary

This chapter has provided a detailed account of the methods that have been used to conduct this evaluation study and to meet the purposes of the research. Whilst addressing a variety of methodological and design issues, such as sampling, access and ethics, justification has been given for the use of a complex research design in establishing a comprehensive evaluation of the RDF KS. Moreover, the ability of this design to deliver useful and reliable research findings has been demonstrated. The adoption of such a research design has also enabled a set of questions to be asked that have been neglected by the previous evaluations of RDFs (such as Litvack and Bodart 1993; Asenso-Okyere 1998; Murakami 1998; von Massow, et al 1998; Umenai and Narula 1999). More specifically, the most important questions which were not answered in these evaluations are: what makes RDFs work successfully, what is the impact of RDFs on the self-medication and use of traditional healers, and what measures have been put in place to assure the quality of medicines sold by these programmes. The information that has been generated through this evaluation research has therefore shed

important light on a range of factors that have made the RDF KS revolves successfully for more than fifteen years.

Bearing in mind that the government of Sudan is determined to rollout the experience of Khartoum State with the RDF to other states of the country, I have paid a great deal of care and attention to ensuring that the information that has been generated in this evaluation achieves a high level of validity and reliability. I have, therefore, sought to deliver information of high quality by applying a number of measures to assure the reliability of the results of this research. These measures include: taking a consistent approach during interviews, making a recording of interviews rather than depending on note taking, producing a verbatim transcription of each interview; subjecting the interviews transcript to consistent analysis; and directly supervising the quantitative data collectors by meeting them after each field visits.

The next chapter is the first one of the three chapters that present the findings generated by this study. It presents the findings of this research in regard to the availability of quality medicines. It also demonstrates the measures applied by the RDF to maintain regular supply of quality medicines to its health facilities, which is the crucial factor accounting for the success of the RDF in KS.

Chapter 5 Availability of Quality Medicines at RDF Health Facilities

5.1 Introduction

Chapters five, six and seven present the findings of this thesis. In each chapter, the discussion is broken down according to the central themes and topics of the research, such as availability of quality medicines, equity of access to essential medicines and changes in the utilization of public health care facilities. As the first of three chapters considering findings from the fieldwork interviews and other sources, this chapter concentrates on the results and findings relating to the *availability* and *quality* of medicines. It presents the findings to answer the following research question: whether or not implementation of Revolving Drug Fund in Khartoum State improves the availability of essential medicines of acceptable quality in its health facilities.

What follows are therefore the main findings according to the indicators set before the beginning of the fieldwork and the themes identified during analysis. These results are confirmed by quantitative data gathered from different sources including archival records, patients and households' surveys, and field observations. The findings of RDF and non-RDF public health facilities were compared to shed light on the effect of the RDF on availability of essential medicines.

In this chapter, section 5.2 examines the availability of medicines in the public health care facilities during the free medicines era. The findings regarding the availability of medicines at RDF health facilities are reported in section 5.3. Section 5.4 presents the impact of the availability of medicines via the RDF on the prescribers. The contribution of the RDF to the performance of the Health Insurance Scheme in Khartoum State is highlighted in section 5.5. Section 5.6 examines whether the RDF is managing to assure the quality of medicines sold in its RDF health facilities. In section 5.7, the measures adopted by the RDF to ensure the regular supply of quality medicines to its health facilities will be presented. Finally, the chapter provides a brief summary and conclusion.

5.2 Availability of essential medicines: an analysis of the pre-RDF

Essential medicines were free of charge in all public health facilities till the early 1990s when the Cost-Sharing Policy was imposed. During the free medical services period, the government financed medicines from its general resources, especially from alcohol taxes. Until the late 1970s and early 1980s, the availability of medicines was very high in all health facilities (dispensaries, health centres and hospitals) in both urban and rural areas in all parts of the country, including remote areas in far states. Senior doctors remember with nostalgia an era of free medicines. The following quotations are typical of their feelings:

In the past, all life-saving items, such as antibiotics, Insulin and other oral hypoglycaemic agents and antihypertensive were available... it is true that minor treatment like irritable bowel was not available. But all life-saving medicines were available. The availability of free medicines at that time reduced the hospitalisation period because all patients had access to free drugs (Interviewee No.23, a practitioner).

The Central Medical Supplies which organises tenders on annual basis distributes medicines and other medical supplies, such as medical equipment, gauze and medical cottons, radiographic materials and surgical sundries and other disposables to health facilities on request. During that period even medical journals, for example, the BMJ, were sent to doctors in hospitals (Interviewee No.20, a practitioner).

When I started my career as a medical doctor twenty to thirty years ago, the medicines were simple and cheap and available free of charge for all patients (Interviewee No.22, a practitioner).

I was graduated as a doctor in the early 1980s. At that time drugs were available, though they were free... very strange... isn't it? You could find them in the wards ...all cupboards were full of a wide range of medicines... you could prescribe whatever you like, if you thought it would treat your patient (Interviewee No.18, a practitioner).

Due to the economic recession, drought and civil war in the 1980s, medicines started to disappear from government facilities, especially the low level facilities (such as dispensaries and health centres) in rural areas. The situation was exacerbated in 1983, when alcoholic drinks were destroyed and banned in Sudan. The taxes generated from alcohol, which had been mainly allocated to finance free medicines distribution, was no longer available (Practitioners' interview No.25). As a result, there were severe drug shortages throughout the country, mainly linked to the lack of financial resources and foreign currency for drug importation, and weak management at different distribution levels. Irrational use and waste of medicines also contributed to the problem.

When I was a senior medical officer in a hospital in eastern region during the free medical services time, I saw a white line on the ground starting from the back gate of the hospital, I asked the people around me what was that? I had been informed that the patients took free medicines and they occasionally disposed of them on their way to the city centre. The reason was they simply were not ill patients or genuine patients who thought the free medicines were useless (Interviewee No.24, a practitioner).

In the mid 1980s, at the beginning of the third democratic government (multi-parties period), the most important medicines were out-of-stock in the public health facilities and to some extent in the private pharmacies. Consequently, patients purchased very expensive brand drugs from private pharmacies or imported them from Gulf States on a personal basis through their expatriate relatives. The following quotations are fairly typical:

Before 1992, the government's claim of providing free medicines existed only on paper. In reality, people often paid at expensive private pharmacies, because medicines were not available at government health facilities (Interviewee No.2, a policy-maker).

It was a very common occurrence during 1980s for brand medicines to be found in expatriates' luggage when they came back home on holidays. This phenomenon completely disappeared after the imposition of CSP and privatisation policy (Interview No. 12, a policy-maker).

During the free policy era (before 1990s), the most common problem confronting public health facilities in Sudan was a lack of drugs to last between deliveries. The medicines were often released on a monthly basis from central or regional stores. It was also very common that medicines ran out-of-stock in the first three to five days. During these days, the health centres were very crowded due to the rush of people competing to find medicine regardless of whether they really needed it or not. The attendance at the health centre fluctuated with drug availability. It was high when there were medicines available but dropped rapidly to nil when the medicines were exhausted. Nobody visited the health centres during the rest of the month. People simply did not go to health facilities when they knew the medicines were out-of-stock. Below are typical quotations:

Our drug consignment usually arrived during the first week every month and attendance was much heavier when the medicines for the month had not yet been used up. Three to five days later, the stock was depleted, with the staff and community waiting patiently for the next month's quota (Interviewee No. 1, a policy-maker).

We used to study during the last twenty days of each month because we had no patients at all. The rest of the staff remained idle until the medicines were brought to the health centre the following month (Interviewee No. 13, a policy-maker).

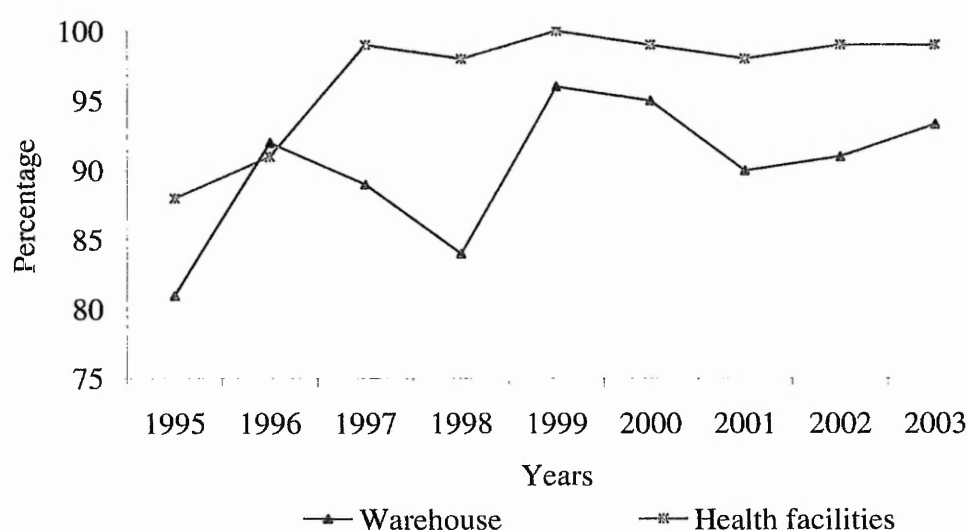
Patients sought drugs everywhere. They ended up buying low quality medicines from non-pharmaceutical shops scattered in neighbourhood. At the time black market in medicines rapidly prevailed (Interviewee No.1, a practitioner).

5.3 Medicine availability at RDF health facilities: empirical evidence

Today medicine availability is far better, in contrast to the situation prevailing before the establishment of the RDF, when the government's financial constraints, along with free dispensing of medicines and lack of control over their use, resulted in persistent out-of-stock of medicines in health facilities. Data from the household survey, demonstrate that 73% of respondents agreed with the statement: 'the Cost-Sharing Policy increases the availability of essential medicines in the public health facilities'. Over a third (36%) of respondents did not consult public health facilities when a member of a household was ill two weeks before the study. Only 9% of them said that

this was because medicines were not available. Since 1996, when a policy of performance-related pay to RDF pharmacy staff was introduced (for further details, recall section 3.6.2), the availability of medicines on the RDF list (particularly the eighteen key items which are considered most important) has remarkably improved. RDF records showed that the availability of medicines in the RDF health facilities ranged from 95% to 100% (Figure 5.1), according to the RDF annual reports (1996 to 2003). I consider these to be reliable sources, because the RDF has developed a system to control the quality of data and information reported by the RDF's pharmacy staff (recall chapter four, section 4.5).

Figure 5.1: RDF medicine availability 1995 - 2003



Source: compiled by the author from the RDF annual reports 1996-2003a

Policy-makers and practitioners perceived the regular availability of medicines in public health facilities as a basic component of a well-functioning health system. The interviews with them revealed that, the RDF is believed to maintain a regular supply of medicines in its health facilities compared with non-RDF health facilities which rely on facility funds. The availability of a wide range of medicines is the one of the most visible symbols that distinguishes the health facilities supplied by the RDF. For example, the list of RDF facilities contained eighty-six items (different dosage form and strength), whereas the list of non-RDF ones contained only twenty-five to thirty-two items at the time of the study. The average availability rate of key items, that had been determined prior to the fieldwork as fast moving items in the government facilities, was

greater (93%) in the RDF facilities compared to 86% in non-RDF facilities. Of equal importance is the fact that the remainder of the RDF listed medicines are also regularly available at the RDF health care facilities.

The percentage of the availability of selected items in the RDF warehouse¹⁹ was 94%. The quantities of these medicines (eighteen key items) in the RDF warehouse were checked and expressed as the estimated duration for which the stock would be adequate to cover the expected average consumption (Table 5.1). Increases in stocks of certain items and out-of-stock of the others (for example, two key items had clearly been over stocked, whereas the other three were almost out-of-stock), indicate a trend towards less efficient resource management. This suggests that the quantification process needs more attention for a number of reasons. First, to avoid medicines' overstock which increases value of tied-up funds that could have been used for purchasing of new stocks. It also leads to the expiration of overstocked items. Secondly, to avoid emergency purchases (which usually will be at high prices because they need to be shipped by air). On the other hand, improvement in the quantification process will ensure sufficient and regular supply of medicines which in turn increases the confidence of users in the RDF. It also maximises the benefit of limited fund available for the RDF.

Table 5.1: Stock of key items at the RDF warehouse end of June 04

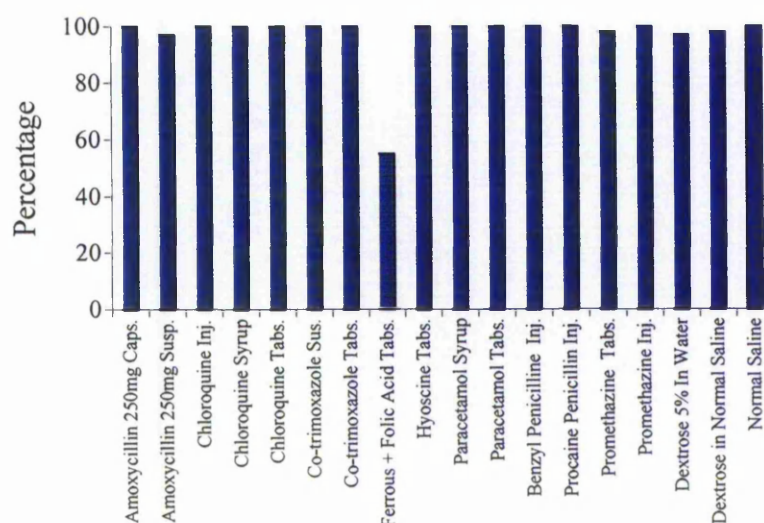
		Average/ Month	Stock	Stock Units	Month Worth
1	Amoxycillin 250mg Capsules	428,389	6,317,000	Capsules	15
2	Amoxycillin 125mg Suspension	11,007	220,000	Bottles	20
3	Chloroquine 200mg/5ml Injection	122,209	638,491	Ampoules	5
4	Chloroquine 50mg Syrup	10,802	94,033	Bottles	9
5	Chloroquine 150mg Tablets	127,879	1,630,000	Tablets	13
6	Co-trimoxazole 240mg/5ml Suspension	11,871	20,923	Bottles	2
7	Co-trimoxazole 480mg Tablets	117,286	119,200	Tablets	1
8	Ferrous 200mg + Folic Acid 0.25mg Tablets*	161,473	1,000	Tablets	0
9	Hyoscine Butyl Bromide 10mg Tablets	57,871	229,000	Tablets	4
10	Paracetamol 125mg Syrup	13,431	163,823	Bottles	12
11	Paracetamol 500mg Tablets	387,287	2,081,000	Tablets	5
12	Benzyl Penicilline 1MU Injection	73,811	360,256	Vials	5
13	Procaine Penicillin 1MU Injection	13,548	14,086	Vials	1
14	Promethazine 25mg/ml in 2ml Ampoule	3,560	11,248	Ampoules	3
15	Promethazine 25mg Tablets	19,803	208,000	Tablets	11
16	Dextrose 5% in Water, 500ml +giving set	11,513	154	Bottles	0
17	Dextrose 5% in NaCl 0.9%, 500ml + giving set	11,833	32,477	Bottles	3
18	Sodium Chloride 0.9%, 500ml + giving set	10,312	4,816	Bottles	0

*Out-of-stock for more than three months at the time of my visit.

¹⁹ Khartoum Hospital and Alshiekh Altayeb health centre have their own Cost-Sharing system. They have no warehouses. They purchase their medicines directly from CMSPO and private drug companies.

The verification of the RDF facilities stock records revealed that all key items were highly available (97% on average) during the past twelve months (August 2003 to July 2004). All RDF health facilities had eighty-four out of eighty-six pharmaceutical products that they are authorised to sell during the field visits that I made to the selected health facilities. The Ferrous Sulphate with Folic Acid (FSFA) tablets (which are mainly used to prevent and treat anaemia of pregnancy) was out-of-stock for two to ten months in all visited RDF health facilities (Figure 5.2). The responsible pharmacist of the RDF warehouse explained that: in 2002, the Department of PHC had distributed this medicine free of charge to all Khartoum State public health centres including RDF ones. As a consequence, the consumption of the RDF's FSFA tablets was reduced. In 2003, the free FSFA tablets were out-of-stock resulting in high consumption of the RDF's FSFA tablets leading to the depletion of the available stock. In addition, the received quantity of FSFA was in the wrong form being soft gelatine capsules instead of tablets. It took the RDF almost one year to arrange re-exportation of this consignment and to receive the replacement. However, the officials at the RDF claimed that this medicine is cheap and regularly available in the private pharmacies. It is also sometimes freely distributed in health centres by the Department of PHC.

Figure 5.2: Key items availability during the last twelve months in RDF health facilities



According to Quick and colleagues (1997), this level of availability of medicines at the RDF facilities could be considered as satisfactory. The authors (p.214) argued that 'The amount of safety stock required to achieve a 99 percent level may be double that

required to achieve a 95 percent service level'. The cost of having large stocks of medicines to maintain maximum availability is a matter of trade off. Similar information was not available at non-RDF health facilities (control group). This is because the two selected facilities had no medicines in their pharmacies in the few preceding months of 2004. For example, in Alshiekh Altayeb health centre, the local community fund was established only three months before my field visit. The newly appointed medical doctor mobilised the local community to find a donor. They succeeded in securing funding from the Nile Petroleum Company to purchase the seed stock.

Policy-makers at both Federal and Khartoum State Ministries of Health and practitioners at Khartoum Hospital were of the opinion that, despite the introduction of CSP, the medicines were not available at non-RDF health facilities. The reason noted by policy-makers and pharmacists was that the hospital pharmacy had no separate account. For example, in Khartoum Hospital almost all patients were told that some or all of the medicines they needed were not available at the hospital pharmacy. The patients had to buy virtually all their prescribed medicines from expensive private or people's pharmacies. Those who had used rural non-RDF health centres were advised to travel to the cities to buy their medicines. The private pharmacies also met the needs of the RDF patients when a drug ran out-of-stock or when medicines were not on its list of essential medicines.

In contrast, the policy-makers and most practitioners expressed similar perceptions about the regular availability of medicines in all RDF health facilities. Most practitioners who had been interviewed in both rural and urban RDF facilities expressed relief that after the introduction of the RDF most of the medicines they prescribe to their patients could be obtained at the RDF pharmacy. However, RDF health facilities practitioners' perceptions of drug availability seemed inconsistent, perhaps because, although most (97% during the past twelve months) medicines on the RDF list were readily available, others out of the RDF list were only sometimes prescribed. This finding does not mean that the results from different sources are different, but it focuses what had been said by practitioners that the RDF list is very short. It was generally believed that the medicines designated as essential by the RDF, are regularly available (only 8% of the patients did not find their prescribed medicines at RDF). Those RDF health facilities practitioners (only three out of ten) who were of the opinion that many

patients present special cases that require some medicines not on the RDF list. This is why there is a continuing problem of some patients being asked to buy some of their prescribed medicines outside RDF hospitals. The practitioners claimed this causes inconvenience and a financial strain on people, particularly in rural areas, since it may entail travel outside the village. Generally, the most frequently identified practitioners' criticism of the RDF, during the semi-structured interviews conducted with RDF health facilities practitioners in this study included the limited range of medicines and the lack of participation of senior doctors in the decision making process regarding the selection of medicines on the RDF list. Below are typical quotations:

If medicines like third generation Cephalosporins could be made available on the RDF list, we would not need to refer patients to the private pharmacies. Patients here in this rural area travel to Omdurman to fill their prescription because one or two items are not on the list. As a result, patients incur unnecessarily heavy expenses to get the medicines (Interviewee No.2, a practitioner).

...the medicines on the RDF list are selected by the management of the RDF without consulting prescribers, especially consultants. No voice exists for practitioners in the RDF (Interviewee No.21, a practitioner).

For the RDF to be successful, it has to be flexible and responsive to patients' needs, particularly in rural areas (Interviewee No.2, a practitioner).

As a result, most of the doctors at RDF health facilities, particularly in hospitals, were not aware of which medicines exist in the RDF pharmacies. This situation could be rectified by the involvement of senior doctors at MOH KS hospitals in the revision of the RDF list (see chapter nine, section 9.7). Doctors and pharmacists at the RDF health facilities argued that a mechanism should be developed for regularly updating the RDF list of essential medicines and that the specialist doctors should be involved or consulted in the RDF list revision exercise. In my view, this should be done with caution. A personal communication with the former RDF manager revealed that the dangers in expansion of the RDF list to include far too many items could increase the volume of unused or slow moving stocks. This has the potential to increase losses due to expiry dates for slower moving medicines, and to increase storage costs (for example,

warehouse space, air conditions). Moreover, the list of RDF people's pharmacies is so long. Actually, it contains all registered medicines available on the market. The RDF people's pharmacies which are investment for RDF can, therefore, solve the problem of those individual patients.

The RDF which is constrained by limited resources is there to supply medicines that meet the needs of the majority of the population. The current list contains essential medicines used mainly in Primary Health Care to treat common diseases, such as malaria and acute respiratory tract infections. Taking this into account and according to the WHO (2005b) definition of essential medicines: essential medicines are those that satisfy the priority health care needs of the population, I argue that the current RDF list of medicines is sufficient to meet the needs of the majority of health facility users, particularly at health centres. Furthermore, the WHO (2004a) in its on-going World Medicines Survey regularly asks a local medicines expert in each country to estimate the percentage of the population who have access to a minimum of twenty essential medicines, which are continually available and affordable at a health facility. Results to this question form the basis of the WHO (2004a, p.61) evaluation of access to essential medicines. This implies that people are considered by WHO to have access to essential medicines when they have access to at least twenty items. The addition of the expensive brands of medicines, despite the fact that the alternative cheap generic ones are available, may lead to a waste of available funds which are limited. Finally, brand products and rarely used medicines could be readily purchased from the private pharmacies. However, it could be possible for the RDF to add generic versions of them at hospitals, particularly in rural areas.

There was a general perception among policy-makers and practitioners that medicines are now available in all health facilities supplied by the RDF compared to those which use other Cost-Sharing mechanisms. This perception was confirmed by the findings of the facility and community surveys conducted for this doctoral thesis. For instance, the health facilities survey showed that from a total of forty-eight respondents who visited RDF health facilities, almost 85% reported that they managed to buy their prescribed drugs from the RDF pharmacy. Only 8% failed to fill their prescription at RDF health facilities because the medicines were not available. This is mainly attributed to the fact that these medicines are not on the RDF list which in fact contains only eighty-six items (35% of the National List of Essential Drugs (NLED)). Conversely, 25% of non-RDF

health facilities users failed to get their medicines at health facilities (Table 5.2). In non-RDF health facilities (the control group) the drug lists were very short containing less than thirty-two (13% of NLED) medicines on average in the selected health facilities.

Table 5.2: Reasons why patients did not get their prescribed medicines at public health facilities

	Health Facilities	
	RDF* (n = 48)	Non-RDF (n = 45)
Patients filled their complete prescription at facility	85%	67%
Patients failed to get their medicines because medicines were not available	8 %	25%
Patients did not have enough money to buy their prescribed medicines	6 %	4%
Medicines' prices are too high	0	4%

*The total of these percentages appearing in the RDF column does not equal 100% due to rounding of figures.

Contrary to what I expected, when analysed by location, there is no difference between urban and rural RDF health facilities in the level of drug availability. The percentages of those who obtained their recommended medicines at RDF rural facilities and urban ones are 80% and 88% respectively. This difference is statistically insignificant (χ^2 , $p = 0.319$). In addition, most respondents mentioned at the end of their questionnaire that the supply of medicines had increased since the introduction of the RDF. Some typical responses were:

Before the RDF we had difficulties as public health centres were without medicines. Thanks to the RDF; the medicines are now available and affordable (A patient at RDF rural health centre).

People are no longer worried about medicines availability... even in this rural area, medicines are regularly available at our hospital (A patient at RDF rural hospital).

The RDF is a good system; drugs are now available and accessible. The quality of medicines is good (A patient at a RDF urban health centre)

However, as I expected, the practitioners varied in their views about the availability of medicines in government facilities before and after the imposition of Cost-Sharing programmes. This in turn seems to reflect their past experience and the type of their health facility. For example, those who witnessed free medicines during the 1970s have a very positive perception compared with those who started their career in the mid 1980s. When compared with the pre-policy situation, practitioners at non-RDF health facilities tended to perceive medicines availability as being worse than practitioners at RDF facilities who have very positive perceptions about the RDF, particularly at rural RDF facilities.

In sum, there is a common consensus between policy-makers and practitioners working in the RDF health facilities, that RDF has had an important role in the financing of essential medicines compared to other Cost-Sharing programmes applied in health facilities in Khartoum State. The availability of medicines in the RDF health facilities was checked during my fieldwork for this doctoral study. The average percentage of availability of medicines was found to be very satisfactory (97%) during the past twelve months, though it was 93% on the day of my visits to the selected RDF health facilities. All RDF health facilities visited during the study fieldwork showed a great improvement in the availability of essential medicines compared to non-RDF ones. This is consistent with information collated from different sources (i.e. archival records, and interviews with policy-makers, practitioners and patients). Very few items were found to be out-of-stock during the last twelve months preceding the study and on the days of our visit to the health facilities. Thus, the RDF has succeeded in making the medicines on its approved list available at a high rate in its facilities in both rural and urban areas.

5.4 Availability of medicines and doctors' motivation

For doctors to be effective, they must have medicines and supplies to work with. The availability of medicines in the RDF public health facilities increases staff motivation and improves the efficiency of such facilities. For example, some practitioners, especially those in rural health facilities, said that their morale had been raised by the

regular availability of medicines through RDF. This is largely because they have essential medicines to prescribe for their patients. The following are typical quotations:

The existence of a doctor in a remote health facility without medicines is absolutely useless. The role of the doctor is to relieve patient's suffering as quickly as possible. My role is to treat the patient - not issuing prescriptions. How can I treat my patients, if medicines I prescribe are not available? (Interviewee No. 11, a practitioner)

I would have not stayed here in this remote rural hospital, if medicines were not available. The pharmacy is very important side in the treatment triangle [i.e. doctor, diagnostic lab and pharmacy]. It is well-known in this rural area that patients mainly come to this hospital because the medicines are available. (Interviewee No. 2, a practitioner).

In addition, regular availability of medicines increases the utilization of health facilities. This increases health facilities income from other services (such as doctors' consultation fees) because medicine revenues are controlled by the RDF. The increased facilities income leads to an indirect increase in doctors' income. Finally, the availability of medicines at public health facilities has also been reported to be an important factor that encourages doctors to work in remote rural hospitals and health centres. Awadalkarim and colleagues (1996) found that only 60% of RDF health centres were covered by medical doctors. Now the coverage of health centres with doctors is 100% (MOH 2003a). Below are typical quotations:

The availability of doctors in remote health centres is multi-factorial. These include an increased number of doctors in recent years, availability of medicines, incentives, and preference to stay in Khartoum State. But the availability of medicines is one of the most important factors that encourage those doctors who have been compelled to work in remote areas, as a result of high competition in Khartoum State. (Interviewee No.13, a policy-maker).

...it goes without saying that the availability of medicines encourages doctors to stay at health facilities during working hours. It leads to doctors' stabilisation in their place of work. (Interviewee No.10, a policy-maker).

This is very important... shortage of medicines is one of the main obstacles that make specialist doctors very reluctant to work in remote areas and far states. For them it is useless to write a prescription if a patient could not find it. (Interviewee No.1, a practitioner).

In contrast to these positive views regarding the impact of enhanced availability of medicines on prescribers, in their interviews, practitioners at selected teaching hospitals clearly showed their dissatisfaction with the working conditions and hotel services in hospitals. Health professionals are not without concern for the financial problems facing their patients. Interviews reveal that doctors work under the psychological pressure of seeing a patient who is seriously ill, knowing that his case could be treated if a certain diagnosis or other medical interventions could be made for him. Senior doctors in these teaching hospitals also questioned the use of a patient who pays for every thing (medicines, diagnostic tests, hospital's accommodation, and operations costs) as a demonstration for medical students and junior doctors' training. Practitioners claim that they spend a lot of time trying to arrange financial help for patients. Pharmacy staff at the RDF hospitals reported that they spend a considerable time arguing with patients who believe that their prescribed medicines are on the free emergency list when they are not. Absconsion is a new phenomenon that appears with user fees. One practitioner, in Khartoum Hospital reported '...we noticed that the absconsion rate from wards had increased after the introduction of the user charges' (Interviewee No 22, a practitioner). The practitioners at Khartoum Hospital also observed that the number of hospitalised patients who request their doctors to discharge them increases '...many patients ask for early discharge. Usually patients justify their requests by saying we have a nurse neighbour who could give us the injections and our intravenous fluids' (Interviewee No 23, a practitioner).

5.5 Availability of medicines and Health Insurance Scheme

The insured patients represented 32% of the RDF health facilities and 38% of its people's pharmacies users in 2003 (RDF 2003a). The absolute figures were correspondingly 385,050 and 634,268 patients. Interviews with four policy-makers (who previously worked as HIS KS managers) suggested that the availability of medicines via the RDF was the main factor which led to the high (30%) coverage rate in KS compared with the situation in other states. The other states suffer from the lack of

reliable medicines supply systems and HISs in these states rely mainly on the private pharmacies which provide expensive brand medicines.

I can still remember my experience in one of the states, when I was a manager of the Health Insurance Scheme, the only one constraint that we failed to resolve was the availability of medicines at health facilities... I recall... the minister and I, used to mention experience of RDF Khartoum State, where medicines are regularly available. In that state the main source of drugs is the private pharmacies (Interviewee No.2, a policy-maker).

A consensus was shown in the data among all policy-makers and practitioners that the HIS is the mechanism of choice for financing health care in Sudan. Despite the fact that the majority had a good opinion about the HIS, a few practitioners pointed to their dissatisfaction with its current performance regarding the quality of services, accessibility and equity.

5.6 Quality of medicines supplied to the RDF health facilities

The quality of medicines is of primary consideration throughout the RDF procurement and distribution systems. The RDF's quality assurance system, therefore, aims at assuring that each medicine sold at its health facilities is safe, efficacious and of good quality. The comprehensive measures (section 5.7) applied by the RDF include selection of medicines of well-established safety, purchasing from reliable and internationally recommended manufacturers and suppliers, maintaining adequate storage and transportation conditions, and quality testing of medicines at NDQCL. Five of the former General Directors of the KS MOH who are now working at the Federal MOH in senior policy making positions reported that they did not receive any complaints concerning the quality of the RDF medicines during their time at KS MOH. Below are typical quotations:

There is a reliable quality assurance system for RDF medicines. No medicine is released before its quality is approved by NDQCL (Interviewee No. 14, a policy-maker).

In our supervisory visits to private pharmacies and NGOs clinics, we sometimes detected expired medicines and other problems related to the medicines quality; such as medicines from unknown sources. But we did not find any of these problems at our health facilities supplied by the RDF (Interviewee No. 3, a policy-maker).

Unlike private pharmacies which may have a range of problems, such as the selling of medicines from unknown sources, the RDF medicines are of good quality, because it follows the guidelines of the Directorate of Pharmacy (Interviewee No. 21, a practitioner).

The RDF distribution system was thoroughly assessed by my fieldwork. The RDF warehouse and pharmacies were clean and tidy. The medicines in the RDF warehouse as well as in each pharmacy of visited RDF health facilities were stored properly and in a well-organised manner (either alphabetically or according to the dosage forms). This enables ease of inspection and regular stock-taking by the supervision teams. This also helps the dispensing staff to pick the needed items for dispensing. Table 5.3 shows the findings of my field visits to the RDF and non-RDF facilities.

Table 5.3: Storage conditions checked on the day of my field visit

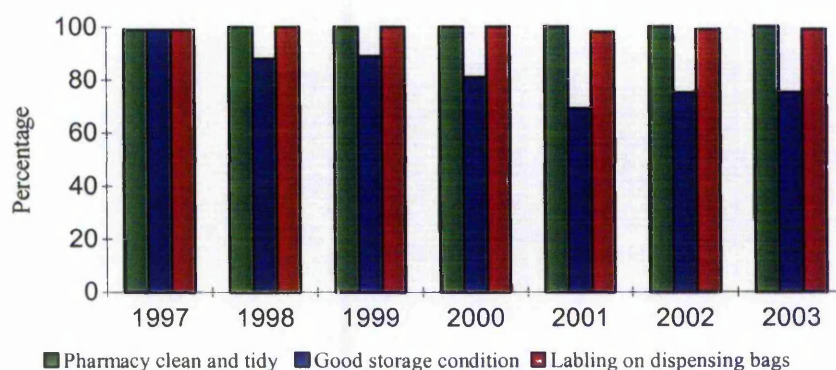
Item	RDF- Warehouse	RDF (Average)	Non-RDF (Average)
	True = 1* False = 0*	True = 1 False = 0	True = 1 False = 0
There is a fan or an air conditioner	1	1	1
No direct sun light can enter the area	1	1	0.5
Area is free from moisture	1	1	1
Medicines are not stored directly on the floor	1	1	1
Tablets and capsules are not manipulated by naked hands	n/a**	0	n/a
There is a refrigerator for keep cool items	n/a	1	1
There is a cold storage system with monitor	1	n/a	n/a
There is no evidence of pests in the stock area	1	1	1
There are no expired medicines in the distribution area	1	1	1
% of True (total of scores/target)	(7/7)100%	(7/8)88%	(6.5/7) 93%

*'1' if all parts of statement are true and '0' if any part of it is false. ** Not applicable

However, the disturbing storage element mentioned by an assistant pharmacist at one of the sampled RDF facilities was the frequent electric power cuts. She claimed that she

used to take Insulin (a 'keep cool' item) to her home in order to store it in her home refrigerator. This is why storage indicator scores are low in figure 5.3, because damage of air coolers at RDF facilities was very frequent as a result of their unstable electric power supply. This problem was solved at the RDF warehouse by the installation of a big generator. The policy-makers at KS MOH pointed out that the frequency of power cuts does not make it worthwhile to install and maintain generators for more than 100 health centres. On the other hand, each hospital has its generator because it is vital to have regular electricity supply at hospital levels: many areas need electricity, such as hospital theatre, delivery rooms, and diagnostic test facilities and so on.

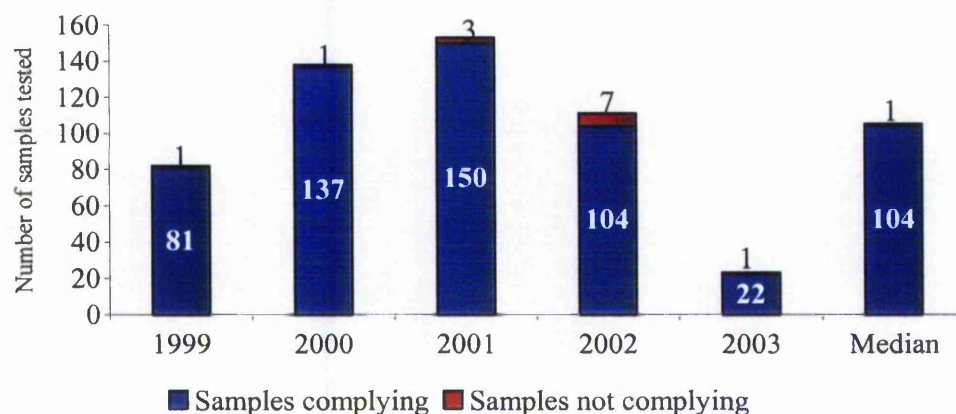
Figure 5.3: Percentage of quality indicators at RDF health facilities



Source: compiled by the author from the RDF annual reports 1997-2003a

Samples of imported medicines have been tested at the NDQCL, with an average, 1% failure rate during the last few years. However, 6% of the samples tested for approval failed the quality test in 2002 (NDQCL 2003). Moreover, in 2003, the number of drug samples (the available data were presented in figure 5.4) sent to the NDQCL was sharply reduced from the average of 119 in the previous years, to only twenty-three (19%) samples. This is may be due to the lack of experts in medicine supply management in the last two years. During this period the RDF lost its five top senior staff. Three policy-makers at MOH KS attributed this to rapid turnover of the RDF managers during 2003 (in one year, the RDF had been managed by three managers). These policy-makers pointed out that despite being legally independent, the RDF has lost its independence as a result of frequent political interference from the Ministry of Health. The RDF administration board, which is chaired by the Minister of Health, was practically frozen, and the Minister exercises authority on behalf of the board.

Figure 5.4: The results of the analysis of RDF medicine samples 1999 - 2003



Source: compiled by the author from the NDQCL report 2003

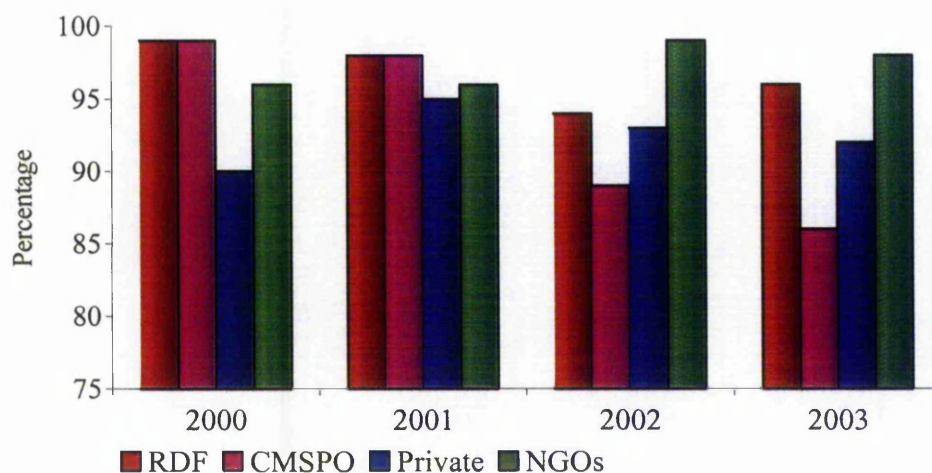
Nevertheless, the records of NDQCL and RDF show that the medicines imported by RDF were of good quality. The percentage of RDF drugs that failed quality control testing was found to range between 1% and 6%, but in the CMSPO ranged from 1% to above 12%. Figure 5.5 provides a quick reference for comparison between RDF and other sources in Sudan. These data confirmed the fact mentioned by the policy-makers: the RDF medicine sources were fairly good but that the open tender operated by CMSPO poses a number of quality issues.

We, in the national laboratory, used to test RDF medicines since 1995. The suppliers of the RDF are now well-known and their medicines proved to be of good quality compared with medicines purchased through CMSPO's open tender (The director of the NDQCL).

One of the practitioners at Khartoum Hospital heavily criticised the quality of medicines imported by the CMSPO.

There is a wide range of brands on the market, for example, Cephalosporin injection imported from different sources. The government does not import from European companies. Instead, the CMSPO imports cheap medicines from India, Pakistan and Jordan. Ineffective medicines are costly and dangerous. Patients spend more money to get the same effect as medicines produced by multinational research companies (Interviewee No. 25, a practitioner).

Figure 5.5: Percentage of samples from different sources that passed quality testing



Source: compiled by the author from the NDQCL report 2003

The main issues of quality reported by three of policy-makers at KS MOH and five pharmacy staff at visited RDF health facilities were the use of large hospital packs containing 1,000 tablets or capsules. At facility level, pharmacy staff repackage the tablets and capsules manually (according to the course of treatment) in plastic self-sealed dispensing bags with their naked hands. Despite all dispensing bags being labelled with drug name and dose (for example, one capsule every 6 hours), the strength and date of expiration were not included in the label. Staff at the visited health facilities argued that they keep the repackaged product in its original container and that the patients obtained one course of treatment (i.e. there was no need for expiration date). Time was also mentioned as a barrier to writing full information on dispensing bags.

Apart from the Core incident²⁰, we did not face any problem. But sometimes patients refuse to receive repackaged courses of treatment in dispensing bags when they see a nurse counting tablets with naked hands ...a tablet counting machine is badly needed (Interviewee No.16, a pharmacist).

Table 5.4 demonstrates experiences of surveyed facilities respondents in regard to quality of medicines. Nearly one-tenth of the surveyed patients reported poor quality of

²⁰ Core was an Indian intravenous fluids manufacturer. It was the main CMSPO supplier during 1990s. Its products were found to be contaminated. The incident was widely publicised in the media and national press.

repackaging at RDF compared to only 2% at non-RDF facilities. This is because most of the non-RDF health facilities users fill their prescriptions at private pharmacies where only patient packs are allowed (i.e. repackaging does not occur). For example, in Alshiekh Altayeb all tablets and capsules were in small patient packs. These findings, however, suggest that the RDF provides acceptable quality medicines at its health facilities. The findings also confirm the efficiency of the measures (see section 5.7 below) applied by the RDF to maintain the quality of medicines throughout its distribution channels up to the end users.

Table 5.4: Experience of surveyed patients with quality of medicines at public health facilities

Have you had any experience with the quality of medicines such as:		Health Facilities		Total
		RDF (n = 48)	Non-RDF (n = 44)	(n = 92)
Expired medicines	Yes	0%	2%	1%
	No	100%	98%	99%
Poor repackaging	Yes	8%	2%	5%
	No	92%	89%	95%
Leakage of bottles	Yes	0%	0%	0%
	No	100%	100%	100%

In summary, the quality of medicines supplied by the RDF was a major issue for the RDF. To ensure that all medicines were of high quality, only reliable and internationally recommended suppliers were used to source medicines. As a result the medicines sold in RDF facilities were of acceptable quality. The RDF has well-developed infrastructures for medicine storage and distribution. The interviews conducted for this study showed that good quality measures (such as selection of suppliers, drug quality control testing in the NDQCL and good storage conditions) were in place.

5.7 RDF measures to maintain regular availability of quality medicines

Direct distribution of essential medicines to the public health facilities is a key strategy of the RDF for rebuilding credibility of the government facilities, especially PHC

centres in the rural areas, and for ensuring accessibility to essential medicines. In order to achieve better results and to maximise the benefit of its health facilities users, the RDF has applied a number of stringent measures to ensure that the medicines reaching end users are of good quality, safe and effective, and regularly available. These measures are discussed below:

5.7.1 Financial measures

This section presents descriptive findings on the financial measures taken by the donor SC (UK) and the Federal and Khartoum State governments to give the RDF a more autonomous financial status in order to maintain regular supply of medicines. These measures include:

Separate account

The Republic of Sudan Treasury regulations require that revenues collected by any public organisation must be remitted to the MOF. The RDF agreement obliges the government to allow the RDF to have its own Bank Account in both local and foreign currencies (GB£ and US\$). Its revenues are, therefore, excluded from MOF budget information. The regular cash flow from the drug sales can not be used for any purpose apart from purchasing RDF's medicines to replenish the exhausted stocks and pay for operational expenses. Policy-makers believe that the continuity of this separate account, even after the RDF's handover, has protected the RDF against the MOF. Below is the typical quotation:

...if the revenues generated by the RDF medicines sales were not allowed to be kept by the RDF for further medicine purchases, the RDF would not have survived for this relatively long period. Because the economy has struggled, medicines are not at the top of government priorities. This was the main reason behind the rapid depletion of facility-based RDFs in Federal hospitals (Interviewee No. 10, a policy-maker).

Cash collection system

The RDF maintains an adequate cash collection system. The RDF cash collection of drug sales at health facilities is based on monitoring how much money should have

been, and how much money actually was, collected. A 100% collection rate which depends on a sound drug financial management system has been achieved (see below). The pharmacy of the RDF health facilities is the place where the cash is collected from the patients and temporarily kept in the cashier's safe, to be collected by accountants of the supervisory team. Health facilities administrators have no right to use the RDF money. '...me as a medical director of this hospital, I have no right to borrow from RDF pharmacy to solve urgent issues like purchasing fuel for the hospital generator to operate on a patient' (Interviewee No.2, a practitioner).

The policy of contracting public sector employees (recall chapter three) clearly contributes to the regular availability of medicines and financial viability of the RDF. The quantities of medicines sold are checked by supervision teams' accountants against the cash to be collected. Cashiers in the pharmacies of the RDF facilities were trained in basic financial management and are accountable to the supervision teams' senior accountants who oversee their performance and collect the generated cash weekly or every two weeks, depending on the size and proximity of the health facility. This policy of regular inventory-taking, which was introduced after the employment contract policy in 1996, has reduced the deficit at health facilities due to leakage and theft from around SDD7.8 million (US\$178,000) in 1994 and 1995 (equivalent to 16% of the RDF sales in the same period) to zero level since 1997 (Mohamed 2000). Efficient cash collection mechanisms and the clear statement that revenues must be used only for the replenishment of the exhausted stocks of medicines, and also to finance other RDF operating expenses, safeguard the initial RDF capital and maintain the RDF's sustainability.

In contrast, interviews with policy-makers revealed that initial seed stocks were provided to Federal hospitals at the beginning of the Cost-Sharing Policy. Each hospital was held responsible for its fund management. Very soon these facility-based funds ceased to revolve, leaving the hospitals without medicines. As a result, at the Federal hospitals in Khartoum State as well as in other states, patients or their relatives are given prescription to buy elsewhere (usually in the private or people's pharmacies surrounding the hospitals) all of the medical supplies that are needed, including sutures, cotton wool, gauze and so on.

A patient has to prepare himself even for a major operation, sometimes I cancel my theatre list because the listed patients have failed to acquire the required disposables like sutures or pre- and post-operative drugs or they failed to pay the operation's fee (Interviewee No.13, a practitioner).

Interviews were conducted with hospital pharmacists who had previous experience in a Federal hospital, and the senior pharmacist of Khartoum Hospital. Their views were compatible with the views of policy-makers regarding reasons behind the lack of medicines at Federal hospitals. These reasons include: allocation of a limited budget for establishing a hospital drug fund; revenues directed to the hospital general account; failure of paying the suppliers (i.e. drug companies and CMSPO); diversion of medicine sales revenues to finance other hospitals services, such as catering services, theatre disposables; and payment of other recurrent costs, for instance, fuel and car maintenance.

Exemption from payment for medicines

The RDF has gained full independence from exemption mechanisms applied in non-RDF hospitals. The RDF pharmacy dispenses medicines only on RDF prescription issued by the authorised member of staff (i.e. doctors or medical assistants) in the health facilities, solely against cash. The poor and those who do not have enough money to pay for their prescriptions are referred to the solidarity or Zakat offices (this is discussed further in section 6.8.2). The RDF has a very rigid cash collection system. According to the contract, if the cash collection accountants detect any deficit, it should be paid by the responsible person within one week. 'In the RDF there is no excuse; everybody has to pay to get his medicines. Even me or the hospital general director can not take one tablet of Paracetamol for free' (Interviewee No.16, a pharmacist).

5.7.2 Logistic measures

The RDF constructed well-designed and furnished stores, according to the WHO (1991b) specifications for good medicine storage, including installation of five cold rooms. The suitable storage space enables RDF to accommodate its medicines and other medical consignments (including 'keep cool' items, such as Insulin).

Transport is crucial to the availability of medicines. The RDF's fleet of vehicles achieves its targets of drug deliveries (for example, in 2002, all scheduled deliveries (1,968 tours) and supplementary orders (1,271) were implemented). Good transport also made it possible for supervisory teams to achieve 99% (3,425 visits) of their scheduled visits in addition to surprise visits in 2002. These comprehensive deliveries and supervision programmes resulted in the retrieving of 100% of the RDF sales and high percentage (99%) of medicine availability (RDF 2002a).

The installation of radiophones (wireless communication system) in rural facilities and telephone lines in urban health centres, hospitals and people's pharmacies, strengthens promptness of the RDF response to medicine enquiries from its pharmacy outlets (RDF 1998b). It also assisted in the daily active reporting²¹ of the key items in 1995-1996. Shortages of medicine at health facilities are dealt with at most within twenty-four hours, and usually within a few hours after receiving the call. This rapid response to medicines shortages makes stock always available at RDF health facilities and enables the users to benefit from their local health facilities.

5.7.3 RDF orders payment measures

The sources of RDF medicines are mainly European drug wholesalers and to some extent the government medicine supply agency (CMSPO). In addition, the RDF purchases from local wholesalers including local manufacturers. Local private suppliers are the main sources of medicines distributed through the RDF people's pharmacies. As a result of its ability to effect immediate payment, over the years the suppliers (local and from the abroad) have built strong confidence in the RDF. This is rewarded by excellent contract terms of payment which have developed through the establishment of a 'RDF' between the RDF and its suppliers since 1999 (RDF 2000b). In other words, the RDF is entitled to bypass the regulations of the Central Bank of Sudan, which compel all medicines' importing companies in Sudan, including CMSPO, to pay for their drug consignments from foreign suppliers or manufacturers through a prepayment system (i.e. letter of credit²²).

²¹ Each health facility used to report to the Ministry of Health reception about the medicines availability on a daily basis between 8 and 10 am every morning. The report was submitted to the RDF-manager with carbon copy to the Director General of MOH before 11 am.

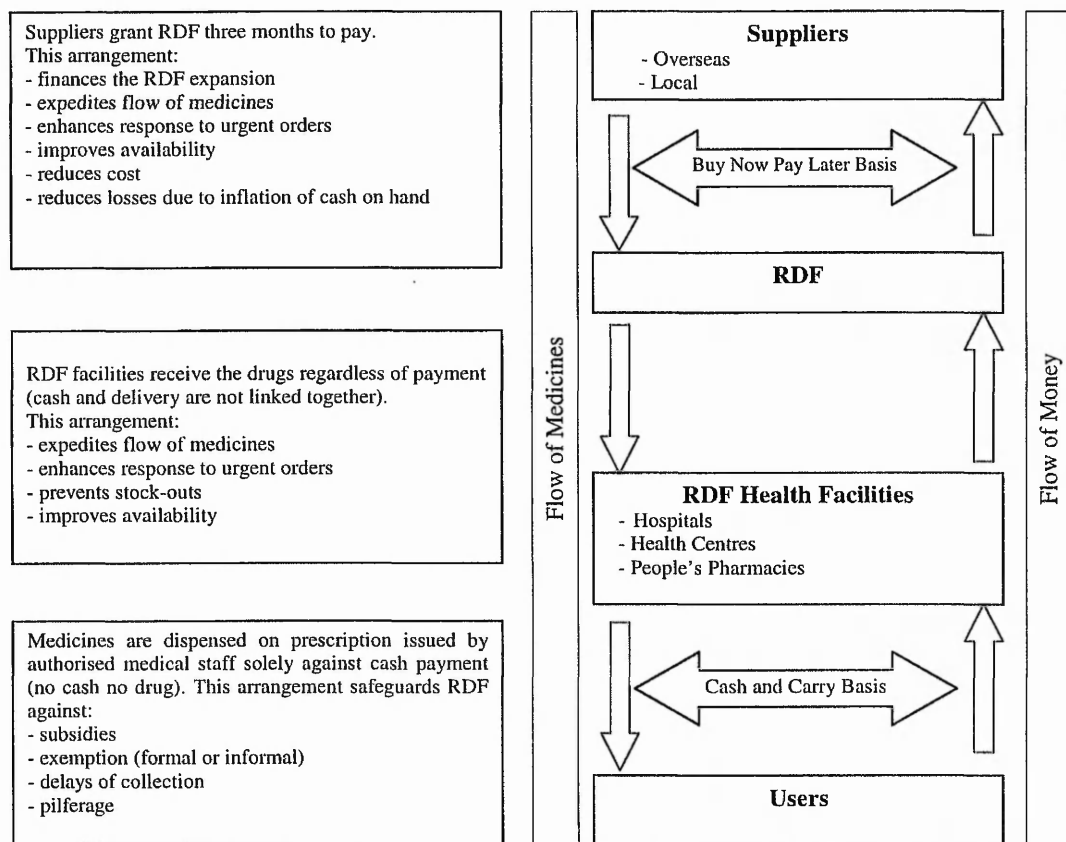
²² An inter-bank document issued by the buyer's bank. It states that a certain sum of money is available for the seller to claim from the bank as soon as consignment is shipped and required documents are presented, as specified in the letter of credit (Quick, et al 1997, p.339).

Through flexible terms of payment, the RDF receives contracted quantities from its tender winners on a deferred payment basis (Figure 5.6 below). European suppliers (mainly Missionpharma and IDA) offer the RDF three months from the date of invoice to effect the payment. Some local suppliers offer the RDF up to six months. The suppliers, particularly Missionpharma, therefore, have participated in impressive vertical and horizontal expansions of the RDF, as demand for cheap medicines continues to rise. For example, the number of medicines on the RDF list increased from eighty-four items in 1999 to more than 150 in 2004, and the number of health facilities enrolled in the RDF rose from 109 in 2000 to more than 130 in 2004. In addition, the RDF's suppliers' method of payment expedites the flow of medicines by bypassing the long and costly banking procedures involved in opening letters of credit, which in turn account for up to 3% of the total amount of each order (RDF 2000b). Moreover, it enables the suppliers to ship urgent RDF orders before receiving the payment. One example, proudly highlighted by the RDF, is the supply of an urgent order of 1,200,000 doses of meningococcal vaccine (ordered by the epidemiology department through the RDF) for school children vaccination in 2001, when Missionpharma was able, without any hesitation, to deliver the order (US\$270,000) within one week.

The RDF's report on financial performance for the first third of the year 2002, revealed GB£ 800,000 (44% of its initial investment capital) should be injected into the system for it to successfully revolve (RDF 2002e). This deficit resulted from the expansion of the project beyond its initial capital GB£ 1.8 million allocated by SC (UK) early in 1990s. This huge deficit is currently covered by deferred payment facilities given by the RDF suppliers. The report pointed out that if suppliers requested immediate settlement of their debts or cash against delivery for coming consignments, the RDF would have a real problem. Fortunately, though at a low level of enthusiasm, the co-operation between the RDF and its suppliers is still working. The RDF should recognise that guarantees of timely payment and financial credibility with its supplier are extremely important for its survival. To rectify the current situation and to maintain the unique relationship between the RDF and its suppliers, more money is needed to effect outstanding payments. This could be done through suspension of the monthly dividend paid to the MOH (recall chapter three), reduction of the RDF operational expenses and downsizing of its personnel. From my personal knowledge, if the RDF fulfils its commitment and commence its outstanding payments, the co-operation of its suppliers could be retrieved. Because suppliers want to know that they will be paid, and that

payment will be in a timely manner in accordance with signed contracts between each supplier and the RDF.

Figure 5.6: Relationships in Khartoum State RDF Model



Source: The author

5.7.4 Medicine selection measures

Medicine supply was said and found to be more regular in those facilities which were enrolled in the RDF. The RDF's records showed that it is often necessary for the RDF to procure and distribute only those medicines that are most needed, efficient and cheap. Having a limited fund, the selection of a short list of medicines increases coverage by increasing purchased quantities of each item, and leads to maximum use of the small budget available to the RDF. The question was: should a project such as the RDF seek to provide a list of a few, selected medicines, or should it provide drugs to address all categories of ill-health? It was decided by the RDF partners to have a limited list (RDF 1998b). The RDF's technical committee was responsible for the selection of medicines

to be included on the RDF drugs list. The starting point was the Sudan National List of Essential Drugs. The NLED was compiled by the Federal Ministry of Health experts' committee. The committee members include pharmacists, senior doctors from different disciplines (such as internal medicine physicians, obstetricians, surgeons, paediatrician and so on), representatives of health professional unions, and representatives from faculties of medicine and pharmacy. The RDF in its medicine selection had to balance cost factors with those of efficacy, safety, ease of administration, and other local considerations. As a result, the supply of high-cost, low volume medicines was left to the private sector, since such drugs can tie up working capital and result in losses due to low usage and expiry (1998b).

5.7.5 Medicine distribution measures

Stock management is done through a combination of manual (stock cards) and computer systems. The RDF uses a one year contract with its overseas suppliers. Consignments are divided into three or four instalments every year. Bulk consignments from overseas suppliers are shipped by sea through Port Sudan to the RDF warehouse in Khartoum North. Airfreight is reserved for cold-storage items (such as Insulin and Chloramphenicol eye drops) and urgent deliveries (RDF 2000b). To avoid stock shortages at the RDF warehouse, the RDF has a buffer stock for three months. This ordering system requires less storage space and minimises RDF capital requirements. The system has proved to be efficient, and stock surpluses and shortages are largely avoided. However, minor supply shortages are covered by purchasing directly from CMSPO or local private companies. At health facilities, a lower limit stock of each item is calculated. This early warning system reduces stock shortages, even when deliveries are delayed.

All health facilities enrolled in the RDF receive their regular drug deliveries from the RDF warehouse on a scheduled monthly basis. Quantities delivered to each facility are determined by the responsible person (pharmacist or assistant pharmacist in case of rural hospitals and health centres) at each health facility based on monthly consumption. The order book (called stock book) is collected and checked by the supervisory team leader. The stock book then is passed over to the warehouse to be approved by the warehouse pharmacist. To ensure even distribution to all health facilities, the warehouse pharmacist sometimes adjusts the quantities requested according to the available stocks.

In determining its needs for medicines and other medical supplies (such as disposable syringes), the RDF uses past consumption for calculating medicines. In this method, the required quantities of medicines to be ordered by the RDF are calculated on the basis of the last year consumption data. This is simple and most reliable due to stability of the prescribing pattern in the RDF facilities. It also achieves a high rate of availability at both warehouse and health facilities levels. In addition, the approach avoids mistakes resulting from transaction and unexpected changes in prescribing pattern and guarantees sufficient lead time between deliveries. Finally, it supports the RDF policy of consistently responding to demand (Mohamed 2000).

The RDF takes responsibility for ensuring medicines deliveries to all health centres, including those in the rural areas, using six trucks. Medicine deliveries to health centres and people's pharmacies are carried out according to a strict programme, based on the one developed in the early stages of the project. Unlike the health centres which do not have vehicles, hospitals pick up their stocks using their own transport system. This arrangement ensures the flexibility of deliveries to hospitals. All health facilities (i.e. hospitals, health centres and people's pharmacies) receive both scheduled and supplementary drug orders regardless of their ability to make a payment at the time of delivery. The RDF uses the facilities' pharmacy as selling points. This system ensures that no facility operates without medicines, and consequently no patient is put at risk. In fact, the RDF warehouse does not even ask whether the facility has paid for previous order or not. The cash collection is a separate mechanism with no direct link with medicine deliveries. This unique arrangement enables the RDF to achieve a high level of drug availability at all health facilities. Below is a typical quotation:

I had worked with Khartoum North hospital as a pharmacist, where we had to submit a request for the hospital general director to get money to purchase medicines ... in most cases our request was rejected because there is no money for medicines. Here, in the RDF hospital, it is so easy you need not worry about the money... only we fill the stock book and ask our pharmacy assistant to take the vehicle and go to RDF warehouse. Actually it is very easy and prompt (Interviewee No.16, a pharmacist).

5.7.6 Procurement measures to ensure quality of medicines

The RDF's efforts to get cheap medicines have not compromised the quality of its medicines. All medicines on the RDF list were selected from the Sudan NLED, which contains medicines of well-established safety. The RDF operates a restricted tender system for drug purchasing from well-known European suppliers whose products have been previously tested and with whom the RDF has satisfactory results. The well-known sources of medicines also have a positive impact on prescribers and users, for example Amoxicillin suspension distributed by the RDF is often requested by patients by name.

The RDF tender document (RDF 2002c) specifies labelling requirements, which should be written in both English and Arabic languages when possible, packaging specifications, a product shelf-life of at least two years, and pharmacopoeial standards for the assessment of drug quality by the NDQCL. It also requires certificates of analysis for each product, a WHO-type certificate of pharmaceutical product (CPP) and a GMP (Good Manufacturing Practice) certificate of all manufacturers of the supplied products. In addition, the RDF states in its tender document that European manufacturers are prioritised and strongly recommended. It also provides a list of Middle East and Southeast Asia prequalified manufacturers produced by the Federal Directorate of Pharmacy (the regulatory authority of Sudan).

To avoid difficulties with suppliers, the RDF clearly institutes a requirement that results of medicines analysis given by the NDQCL are final and its supplier should replace the failed batch free of charge. The deferred payment (ninety days grace period) offered to the RDF by its suppliers helps in this regard (i.e. the payment is not honoured until the replacement is received).

On arrival, all shipments (via Sea or Air) are physically inspected by the warehouse staff. Local shipping companies are not paid until the quantities are cross-checked against shipping documents. Claims are made to the suppliers, if damaged or shortages are detected and proved to be a supplier responsibility. Random samples are then taken from each product and sent to the NDQCL for a further quality control test. The samples which meet their pharmacopoeial standards are added to the RDF stocks for

distribution. The quality control test is done for each imported drug for a fee of SDD10,000 (US\$39) per sample (NDQCL 2003).

The quality of medicines at the RDF health facilities is regularly checked by the supervision teams. The RDF has developed a quality reporting system. The responsible person at the RDF pharmacy at facility level reports any change in the physical characteristics of medicines. Special forms were prepared for this purpose. Patients' complaints about the quality of medicines are seriously considered by the RDF management.

5.7.7 Other administrative measures

In this section a number of administrative measures are described. These include supervision of RDF health facilities; staff training; salaries and incentives; RDF reward system; and RDF discipline system. RDF's manuals (1998b and 2000b) and interviews with the RDF pharmacy staff revealed important information explaining the RDF administration measures and their impact on the RDF performance.

Supervision of health facilities

From its inception, the RDF had included the monitoring and supervision of drug supply as integral components of the programme. It is one of key components of the RDF business. The supervision was undertaken by seven teams according to a stated and agreed list of performance criteria and targets. It focuses on the actual work performed at facility levels, such as storage conditions, dispensing practices and general pharmacy environment (i.e. whether the pharmacy is organised, clean and tidy). Each team comprises a pharmacist (team leader), an assistant pharmacist, two accountants and a driver. The team leader monitors drug availability, storage conditions, and stock record keeping. The accountants collect the cash after cross-checking quantities of drug sold. The supervision teams also withdraw excess quantities, damaged or expired products. First-expired first-out (FeFo) principles have been applied for distribution from warehouse to health facilities and from the health facilities to end users. Excess medicines and those of three months shelf-life were commonly removed and redistributed to pharmacies of high consumption to minimise expired stocks. 'We did not face any problem regarding the quality of medicines. The team withdraws all 'due to

expire' medicines and damaged ones and replace them' (Interviewee No.11, a practitioner). As a consequence, none of the RDF health facilities reporting having excessive quantities, or damaged, obsolete or expired medicines. The value of expired medicines in the RDF, varied generally across the last eight years (1996 – 2003). On average only GB£5,300 (0.6% of average medicines stocks during the same period) was expired (RDF annual reports 1996 to 2003a). However, losses as a result of expiration rose from 2% in 2002 to 4% in 2004 (RDF 2002a; 2004). This is still within the range of acceptable value of annual expiry medicines which is 3% to 5% of drug stocks (Quick, et al 1997, p.229).

The supervision visits are conducted according to scheduled programme. All RDF health facilities surveyed reported they had been regularly visited by their RDF supervision teams. However, surprise visits also implemented by the leaders of the teams. One of the outcomes of this effective supervision system is the availability of medicines in all RDF health facilities. The availability of medicines at RDF health facilities is also cross-checked by the supervisory visits undertaken by the relevant departments in the Ministry of Health, namely the Primary Health Care (mainly health centres), Curative Medicines (hospitals supervision) and localities Health Services Affaires Departments (both hospital and health centres).

Staff training

The RDF has long experience of investing in people. It provides a wide variety of external and internal training and development opportunities for its staff. The RDF training and continuing development programmes aim to strengthen the technical capacity of the head office and health facilities staff in the field of medicine supply and financial management. For example, 250 pharmacy staff at health facilities received short training courses in dispensing and counselling skills. The managing drug supply²³ book written by Quick and et al (1997) has been distributed to all RDF leaders of the teams, warehouse pharmacists and hospital senior pharmacists. The RDF in its medicine supply systems seems to rely very much on the procedures laid down in this book. Development of staff also includes training programme on quality assurance to the RDF staff members at head office, warehouse and health facility levels. In the past several

²³ It is highly recommended by WHO as a manual for those who have a responsibility in pharmaceutical services, in general, and managing drug supplies, in particular.

staff had received training in various aspects of medicine supply management and had been exposed to weekly seminars and meetings. However, due to turnover of RDF managers since 2002, most of these training programmes were stopped. Although there is no evidence whether or not this action has detrimental effects on the performance of the RDF, one cannot fail to notice weaknesses in some areas of medicine supply management cycle, for example overstock of some items and out-of-stock of the others.

RDF rewards system

RDF has adopted a reward system since 1998. A prize of excellence is given at the end of each year for hard working staff at RDF head office and health facilities. In addition to significant cash awards, the prize winners are also awarded certificates signed by the Minister of Health. To avoid negative impacts of the reward system, it is accompanied by well laid out and tested guidelines for assessing the performance of each member of staff. The RDF's immediate supervisors keep records for all members of pharmacy staff at facility level. The criteria for evaluation include availability of medicines, keeping a tidy and clean pharmacy, good storage conditions and good financing performance (no deficit in cash against value of sold medicines). The candidates' performance is then evaluated by independent committee from the Ministry of Health Quality Department.

RDF discipline system

Alongside a reward system, RDF has also set a disciplinary system. A fine should be paid by responsible pharmacist or assistant pharmacist, each time a supervisory team showed there was a problem of drug shortages and failure to maintain a minimum stock. The fine is immediately transferred to the responsible pharmacist in the warehouse when a health facility pharmacist proves that he or she reported the warehouse twenty-four hours before the product had run out-of-stock.

5.8 Summary

A common finding was that severely disrupted or non-existent medicines supply system is made substantially more reliable through the RDF. The overwhelming majority of the policy-makers and practitioners agreed that a reliable, steady supply of quality medicines at the RDF health facilities has taken place after the RDF. The RDF measures

seemed to play important role in explaining the RDF's achieving a regular supply of medicines to its health facilities. Adequate quality measures are well-established in the RDF and are strictly followed throughout the system. These quality measures applied by the RDF have succeeded, so far, in preventing ineffective, substandard or counterfeit medicines from finding their way to the RDF drug supply system. The measures also maintained the quality of medicines during storage (at RDF warehouse as well as health facilities) and transportation.

In contrast, the availability of essential medicines in the non-RDF health facilities in Khartoum State is in a poor state. Various reasons have been given for this situation. For instance, inadequate funding for establishing facility based revolving fund and hospital management demands that revenues of drug sales be kept in the hospitals general accounts to be pooled with other revenues.

My findings were therefore in line with my expectations in regard to availability of medicines in the RDF health facilities. The information presented in this chapter shows how availability of essential medicines can be improved through the RDF. The consensus of all respondents is that the RDF has provided a uniquely, successful mechanism to increase availability of essential medicines of acceptable quality even in the most remote and impoverished rural areas of Khartoum State. The following chapter presents the findings of this research in regard to the impact of the RDF KS on geographical and financial accessibility to essential medicines. It also discusses the measures applied by the government and the RDF to ensure equitable access to health care, in general, and medicines, in particular.

6.1 Introduction

In the previous chapter, we found that the RDF has succeeded in maintaining a regular supply of quality medicines to its health facilities. This chapter presents the findings of fieldwork to find out how equitable is the existing pattern of KS health care delivery system, in general, and access to essential medicines, in particular, after the adoption of Cost-Sharing Policy, including the RDF. Section 6.2 sets out to shed light on geographical accessibility to essential medicines. Findings relating to the ability of users to pay for their prescribed medicines are presented in section 6.3. This section also examines whether the RDF is managing to provide medicines at below prices at alternative sources. Section 6.4 answers the question 'how users cope with the CSP'. Effects of this policy on prescribers practice are described in section 6.5. Section 6.6 presents measures that are applied by the RDF to keep the price of medicines below prevalent market prices. Section 6.7 examines issues of equity: who is using the RDF and who is being excluded, and why? Government measures to improve the financial access to health services are discussed in section 6.8. Then the chapter ends by giving a summary of the main findings.

6.2 Geographical accessibility

The RDF KS was designed to cover sixty health centres, including remote rural areas where population tend to be among the low income groups. From operating in thirteen health centres in 1989, to eighty-eight health facilities when the project was handed over to the government in early 1996, at the time of the study (June to September 2004), the RDF supplied 104 health centres and twenty-two hospitals, with forty-eight health centres operating two shifts. Health care services are provided by government hospitals for seven days a week (twenty-four hour services) and six days a week in health centres (from 7:30am to 2:30pm, and from 7pm to 10pm in the two-shift centres). This is in addition to eighteen people's pharmacies managed by the programme, of which, ten people's pharmacies operate two shifts six days a week (day and evening services) and the remaining eight offer around the clock services. Within the last ten years, Khartoum

State has developed a relatively dense network of hospitals and health centres in urban and rural areas. For example in 2003, thirteen health centres and two new hospitals were added to the network. Most of these recently constructed facilities were located in previously underserved rural areas. The RDF has, automatically, enrolled all of them. As a result, all Khartoum State hospitals and 74% of the health centres had a regular supply of medicines on the RDF's basic list of essential medicines. But still there are thirty-six health centres without a regular supply of medicines. These health centres are considered by the RDF not to be cost-effective in terms of the population they serve and the possibility of having access to the current RDF health facilities.

The policy-makers and practitioners at RDF health facilities believed that through this large-scale geographical coverage, the RDF has strongly improved geographical equity of access to quality medicines in both rural and urban areas and that people had better access to essential medicines, especially the poor, compared to the non-RDF health facilities. For example, RDF annual reports (RDF 2002a and 2003a) showed that the RDF has met the recommended treatment for 5.9 million patients in the past two years (i.e. 66% of the total number of patients using the public health facilities in Khartoum State in 2002 and 2003).

There are a number of factors which make it easy to provide accessible health services in Khartoum State. Unlike other states, Khartoum has a small area, a strong economy and most of its population live in high density urban areas. In addition, Khartoum State is well-covered by a transport network and paved roads (no serious problem was reported during the rainy season in regard to access of facilities). Distance is, therefore, not a problem for accessing the RDF health facilities in KS. Improvements in perceived accessibility to essential medicines were confirmed by quantitative data from the users. The Alma Ata declaration (1978) stated that people should not have to go more than five to ten km to get to a health facility. Our quantitative findings revealed that most of the sampled households were located at less than five km from the nearest RDF government facility. This suggests that geographical accessibility to essential medicines was improved, particularly for disadvantaged rural areas, and there is no evidence that the issue of proximity to facility is a major barrier to access the RDF health facilities. The vast majority (96%) of respondents at the surveyed RDF health facilities walked (52%) to the nearest RDF health centre or sometimes took a bus (44%) to the hospitals. This evidence coincided with the perceptions of health care providers.

When affordable medicines of good quality became available near to their residence, people did not incur the transportation and time costs of alternative sources, such as Omdurman hospital [one of the three biggest hospitals in the Sudan located in Omdurman city] and private pharmacies in Omdurman [i.e. the city centre of the Omdurman locality where many private pharmacies exist] (Interviewee No.11, a practitioner).

The rural areas tend to be poorer and generally the inhabitants paid higher indirect costs, such as when travelling to obtain the medicines prescribed to them at their local health facility from private pharmacies in urban areas. Unlike urban residents (who have multiple choices of health facilities and private pharmacies), during free medication era, the inhabitants in rural areas had experienced no access to medicines at their public health facilities. As a result, previous differences between rural and urban in accessibility to essential medicines were removed after introduction of the RDF. In addition, the ability of the RDF in maintaining a regular supply of medicines to its health facilities stimulated people's committees and many community leaders, whose health centres were not yet enrolled in the RDF, to contact MOH officials very frequently, asking for the addition of their local health centres to the RDF network. For instance, the medical director of Alshiekh Altayeb health centre pointed out during the interview that he and the village committee closely monitored their application to the RDF to add their health centre to the RDF network.

Knowing that drugs of acceptable quality at the RDF health facilities were regularly available and less expensive than those at alternative sources many community leaders contact us to introduce the RDF in their health centres and dispensaries, even if it is uneconomic for the RDF to supply a health centre which serves small population (Interviewee No.4, a policy-maker).

However, one of the important problems confronting the MOH is a chronic lack of medicines at dispensaries in rural areas of KS. There are 200 dispensaries without a formal drug supply system. These lowest units in health pyramids were managed by a medical assistant and serve small widely dispersed communities in rural areas, such as the western rural region of Omdurman, and Wadabusalih and Abudeleig in the East Nile locality.

Although the area of East Nile locality equals one third of Khartoum State, we have only twenty-three health centres. In East Nile the villages are very small and the distances between them are very long. The health services map of MOH based on health centre for every 15,000 population. This plan could not be applicable in our case. The best way to serve these villages would be the distribution of health centres according to the distance (Interviewee No.3, a policy-maker).

In the early 1990s, some villagers in rural areas of KS, as well as other states of Sudan, began to organise themselves into health committees. These committees emerged from people's committees established by the new government which came to power in mid 1989, to be responsible for community services in neighbourhoods. The health committees raised money for the refurbishment of their local PHC facilities and development of their drug supply funds. Most of these funds soon went bankrupt. The failure of facilities staff to collect sufficient cash against medicines dispensed (to be able to replenish exhausted stocks) was the main reason reported by the policy-makers. Individual medical assistants at dispensaries continue to buy and sell medicines as a profitable small scale business. Interviews with policy-makers reveal that the RDF's reluctance to enrol these dispensaries was based on the fact that the provision of medicines to widely dispersed communities is not cost-effective for a project with limited managerial and financial resources.

Internal displacement of people as a result of draught and desertification in the western states, civil war in southern part of the country during 1980s, and migration from rural and urban areas from throughout the country to Khartoum State, all led to the rapid growth of urbanisation. Most displaced people were settled in what have been known as 'displaced camps'. The displaced camps were found to be well-covered by the NGOs. Other urban dwellers that live in peripheral unplanned neighbourhoods were less well-covered by health facilities, since they live in marginal areas deprived of any services, such as water supply, electricity, transport and so on.

In sum, the study finds that the RDF health facilities were evenly distributed in Khartoum State. Thus, the RDF KS has been to some extent successful in providing an adequate network of health facilities with essential medicines. However, the lack of regular supply of medicines to the dispensaries in small villages, mainly in the East Nile

locality, needs to be considered. Establishment of a new dispensaries' RDF would be one of the possibilities (see chapter nine).

6.3 Ability to pay for prescribed medicines at RDF facilities

The provision of affordable quality medicines closer to where people live was one of the foundation aims of the RDF KS which was established in the late 1980s. Hence, the project is based on out-of-pocket payments to receive prescribed medicines in RDF health facilities. The cost of a RDF prescription, particularly at primary level, was perceived by health care providers and users as becoming more affordable, while the quality improved compared to previously free (but virtually non-existent) medicines in the public health facilities. However, the costs of health services - for instance, major operations, medicines for chronic diseases, doctors' consultation fees - are considered to be very expensive and are of high concern to policy-makers. When patients were asked about reasons for not obtaining medicines prescribed to them, 4% reported that the medicines were too expensive in Khartoum Hospital. But no patient claimed such a problem in RDF health facilities, confirming what had been said by government policy-makers and practitioners at local RDF health facilities.

Only 67% of patients in non-RDF health facilities (control group) could afford the cost of their prescribed medicines and 8% of them said they abandoned their medicines for financial reasons. Policy-makers and RDF health facilities practitioners reported that they had not received any complaint about RDF prices. The patients mainly complained of the other health services charges levied by MOH at health centres (even in those without medicines), such as consultation fees and other expenses.

The patients have no problem in paying for the RDF medicines. The prices are cheap. The problem is they also have to pay for doctor's consultation, laboratory and other investigations, dental and surgical treatment, and hospital accommodation (Interviewee No. 2, a practitioner).

Patients in non-RDF health facilities incurred greater expenditure than did patients in RDF ones. The average amount (SDD2,471) paid to obtain the full prescription at non-RDF health facilities was found to be eight times higher than the average full

prescription cost (SDD301) paid by respondents at RDF health facilities. In both cases, this cost included a transportation fee, but not consultation and diagnosis charges. Other costs, like waiting time, transport time and other opportunity costs, were excluded. The reason given by the policy-makers at Federal MOH was in Khartoum Hospital the patients fill their prescriptions in the private pharmacies around the hospital. This cost to obtain prescribed medicines at non-RDF facilities is significant in the context of the reported median monthly income of only SDD26,950 (US\$104) at the time of the study. For example, in Khartoum Hospital, the prescription cost equals 18% of monthly income (6% of annual income calculated at four visits per year) of the respondents in the low income group. These findings suggest that this level of medicines-related expenditure represented a large share of any poor households' income. Conversely, the average cost of a prescription (SDD301) at the RDF health facilities given by respondents who obtained their full prescription amounted to 1% of monthly (0.4% of annual income calculated at four visits per year) reported median income of the respondents and only 2% of the lowest monthly government salary which is SDD12,500 at the time of the study. It should be also mentioned that for the 30% of the population covered by the health insurance, only 25% of the prescription cost must be paid. There is no generally acceptable definition of 'affordability' in economics (Fabricant, et al 1999). However, this cost appears to be acceptable according to the World Bank (1993) which suggests 1% of household income to be sufficient for two annual visits to a health facility (World Bank 1987) and to what had been proposed by Russel (1996) who argued that 5% of income spent on health is a common benchmark of affordability. Additionally, the reported share of expenditure spent on medicines by the users of the RDF health facilities is markedly lower than those found by studies of other countries. For example, analysis of the data from the eight countries that participated in a recent study conducted in nine countries from the WHO African region (namely Ethiopia, Ghana, Kenya, Mozambique, Nigeria, South Africa, Tanzania, Uganda and Zimbabwe) revealed that in seven out of eight countries it would take almost five days or more salary to pay for medicines (WHO 2004e).

The RDF medicines were often considered affordable by users (records data revealed that the average cost of RDF prescription was less than SDD329 (US\$1.3) since year 2000) and very few (6%) patients at RDF health facilities reported that they did not have enough money to obtain the prescribed medicines. This is expected because it is difficult for potential users to assess in advance the cost of treatment, since fees are

charged for consultation, diagnostic tests and individual medicines. These payments have to be made at different stages in the course of a single visit to a health facility. The consequence of such a procedure is that some patients exhausted the money they had before reaching the window of the pharmacy cashier.

The data showed statistical significant difference ($P \leq 0.000$) in the prescription and travelling costs between RDF facilities and non-RDF ones (mainly Khartoum Hospital). For example, 84% of respondents from RDF health facilities had obtained their full prescription for less than SDD500 (US\$ 1.9) compared with 36% of respondents from non-RDF facilities. The travelling cost was less than SDD500 (US\$ 1.9) for 86% and 55% of RDF and non-RDF users respectively (Table 6.1). The difference between two sets of health facilities is statistically significant ($\chi^2, p = 0.015$). In travel to public health facilities, 57% of the rural patients paid less than SDD500 compared to 77% of the urban patients. This difference is statistically insignificant ($\chi^2, p = 0.241$).

Table 6.1: Travel cost to the selected health facilities

Travel cost in SDD	Health Facilities		Total (n = 60)
	RDF (n = 29)	Non-RDF (n = 31)	
Less than 500	86%	55%	70%
500 to 999	14%	29%	22%
1000 or more	0	16%	8%
Total	100%	100%	100%

The majority (85%) of exit-interview respondents at the RDF health facilities thought that the facility they had consulted was the cheapest place to get their medicines, compared to 68% in non-RDF ones. Nonetheless, only 13% of patients' respondents at the RDF health facilities reported the cost of medicines as a reason for selecting the facility. A similar percentage was found in the control group. However, when the reported inability of surveyed patients to pay the full prescription was analysed according to their income groups, no statistical difference was found between RDF and non-RDF facilities, though the figure was higher in the low income group (18%) in Khartoum Hospital. The policy-makers and practitioners explained this by the fact that in the event of illness people use a number of approaches to finance their medicines. This could suggest that the direct cost of medicines is not among the principle criteria

which users of health facilities take into account in their decisions whether to seek health care or not. Interviews with practitioners attributed this to the strong social networks of Sudanese communities. It is very common practice that patients' relatives and neighbours share the cost of the required treatment. It also suggests that the availability of the service is more critical than its costs (for further details see chapter seven).

When disease is perceived as serious, most patients or their carers would be forced to pay whatever is necessary, regardless of the implications for their economy. Therefore, affordability will have been shown, but it does not mean that the patients are able to pay anyway (Interviewee No. 10, a policy-maker).

There is considerable difference between households expenditure on medicines in the rural catchment areas (where the health care services available either through the RDF or non-RDF facilities in this study) of RDF and non-RDF health facilities. For instance, the selected household spent a total of SDD325 to obtain their full prescription at the RDF rural health facilities catchment areas compared to SDD393 in non-RDF ones. No comparison was made between households expenditure on prescriptions in the urban areas. It is difficult to know which type (RDF or non-RDF) of health facilities had been visited during two-week recall period, for households respondents do not know which financing mechanism was applied.

A large majority of policy-makers and practitioners agreed that the RDF medicines prices were affordable compared with the market prices. 'The results of opinion polls of patients at health facilities administered by Khartoum State MOH regarding the prices of medicines regularly reveal that the RDF drug prices are cheap' (Interviewee No.4 a policy-maker). A pharmacist at an RDF's hospital mentioned many examples of huge differences between RDF prices and private sector equivalents. For example, the cost of the same brand of Erythropoietin 400 International Unit injection (used for treatment of anaemic renal failure patients) was SDD8,100 in RDF compared to SDD14,000 in CMSPO. 'The prices of medicines we get from RDF health centres are reasonable, though further reduction will be better' (A patient at a RDF health centre commented). The policy-makers believed that it is manageable for everybody to pay the cost of medicines at health centres, because the estimated lower limit of daily earnings is SDD833. Despite the recognition of the ability of the majority of Khartoum State

population to pay for their prescribed medicines at RDF health facilities, the policy-makers at both State and Federal Ministries of Health are concerned that people will not be able to pay for treatment of costly life-threatening diseases. The concern of policy-makers, however, focuses on those who may not be able to afford the high cost of operations or hospital admissions, not on medicines.

Hospitals rely increasingly on user fees for supplies of medicines and other disposables. The practitioners angrily explained that patients have to pay the cost of utilization of every medical care service, including fees for doctor consultation, diagnostic test(s) and finally medicines, in addition to the cost of transport and the cost of time required in order to receive the services. Patients are often forced to secure the full range of medication, including pre- and post-operation medicines, prior to hospital admission. 'Problems of major operations and hospital admissions are in a standstill stance. These are major issues that should be addressed by the government'. (Interviewee No.21, a practitioner). The situation is very difficult when a patient needs a major operation, hospital admission or is prescribed for-life treatment (i.e. in the case of chronic diseases). The patient's relatives most likely share the cost. If it is beyond their financial capacities, they most often (for example, 54% of the surveyed patients in non-RDF health facilities) borrow from other relatives or friends to pay for the recommended treatment. Other approaches are sometimes used to obtain a larger amount of money to pay for an operation, such as double valve replacement cardiac surgery which costs SDD1.1 million. These approaches comprise selling valuable assets, begging, campaigning for donations or, most tragically, waiting to die. For example, in the Ahmed Gasim open cardiac surgery centre where the cost of operations ranges from SDD300,000 (US\$1,150) to SDD1.1 million (US\$4,200), it takes some patients one to three years to acquire the total cost demanded by the RDF. Sometimes patients die before completing the required costs for their operation. 'The ability to pay for RDF medicines at primary level is not a problem at all ... any patient could pay SDD1000, but it could be deathful at the tertiary levels' (Interviewee No.13, a policy-maker).

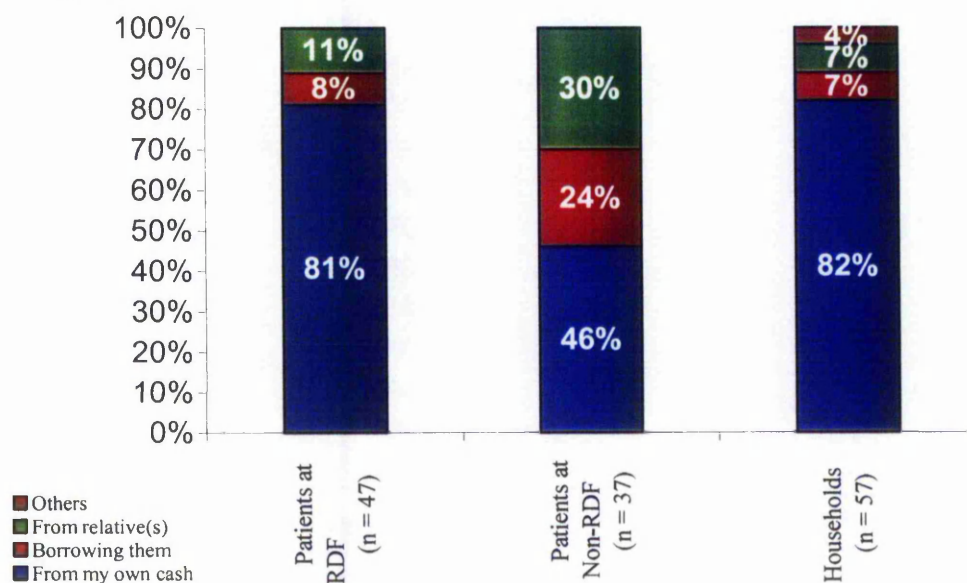
To conclude, a large body of evidence indicates that a considerable percentage of the population are able to pay for medicines offered at the RDF primary health facilities. These findings suggest that RDF has managed to make essential medicines of affordable prices available on a continuous basis at its health facilities. Therefore, most families and individuals are able to finance their prescribed medicines at the primary

level of care. However, the majority of the population were much more vulnerable and impeded when rare, but expensive tertiary care was needed.

6.4 How users cope with Cost-Sharing programmes

Interviews with policy-makers and practitioners revealed that a variety of voluntary, informal social support mechanisms are the most significant sources of paying medical costs, particularly at non-RDF health facilities where the cost of a prescription was found to be eight-fold higher than at RDF ones. This was confirmed by the findings from the patients and households surveys. In the users' surveys, the respondents were asked about the sources of the money they had paid to get their medicines. A sizeable proportion (above 80%) of respondents from both RDF patients and households reported that they paid their prescription cost from their available cash. These findings suggest that for the use of primary care level facilities, the prices are affordable. However, more than half of the non-RDF health facilities users paid for their medicines with money received from relatives (30%) or by borrowing (24%), compared with only 19% of respondents from RDF health facilities (Figure 6.1). The differences between the two groups (RDF and non-RDF) were statistically significant (χ^2 , $p = 0.004$). Surprisingly, these sources of finance apply across the different income groups without any significant statistical differences.

Figure 6.1: Participants' sources of money to pay the total costs of full prescription and transport



In rural areas, respondents from the households survey in both RDF and non-RDF catchment areas, mentioned their own available cash as the most frequently used source to pay the cost of transport and prescribed medicines. Nevertheless, 15% of households' respondents reported relatives were the source of finance to pay for their medicine and transport. Despite the relative ability of users to pay for their treatment from their own funds, this might be at the expense of other services in poor households. However, our research instrument did not contain any question to see whether the other needs of households were affected by RDF payments or not. The second most common strategy, though not allowed in the RDF health facilities, but widely mentioned by the practitioners in non-RDF health facilities, was to obtain an incomplete course of treatment. The third strategy, as shown by the interviews with policy-makers and practitioners, was to save the consultation and other fees charged at public health centres (hospitals outpatients clinics were free), by directly consulting community pharmacies. The direct consultation of community pharmacies was confirmed by quantitative data from the households' survey, which found that 7% of the respondents consulted a private pharmacy when a member of household was ill in the two weeks prior to the study (see chapter seven for further details).

Respondents to the households' survey were asked 'how have you managed to cope financially with costs of medicines since the introduction of CSP in 1990s?'. A large proportion (85%) of households said that they had found it difficult. When analysed according to the urban and rural areas, a considerable difference was identified. A substantial proportion (89%) of households in urban areas reported that it was difficult to cope with the cost of medicines since the imposition of Cost-Sharing Policy in the 1990s. About 70% of the households' respondents in rural areas said they had found it difficult to cope with the cost of medicines. This difference could be attributed to the fact that they had no medicines at their rural health facilities and had no access to private pharmacies in their areas before the adoption of the RDF.

6.5 Effects of the Cost-Sharing Policy on prescribers practice

Most prescribers consider the financial status of a patient when they decide to give him treatment. They indicated in interviews that they prescribe low cost medicines, but only after effectiveness and safety of alternative treatment are assured and when cost savings could be attained without compromising patient health. The prescribers explained that

this approach will assure patients' ability to get the medicines and enhance their compliance with treatment.

I used to ask my patients (even in my private clinic in the evening) how much they could pay for their prescriptions. Then I would decide the most reasonable treatment without compromising the efficacy and safety of the medicines. In general, I prescribe the cheapest medicines for the poor (Interviewee No. 22, a practitioner).

On the other hand, a few doctors (especially senior specialist doctors) said they were not guided by the expected cost of medicines to patients when writing a prescription, for the sake of the patient health. Those doctors pointed out that they only consider the patient's clinical need regardless of his or her ability to pay and argued that considering patients ability to pay would undermine the quality of prescribing.

I do not care about how much it is going to cost the patient. I prescribe the most expensive brand products of high quality from multinational research companies. The cost would be high, but effective. Actually, the cost would be high, if I prescribed inferior medicines at low cost, simply because the patient will come back to get a new treatment. Therefore, it is far better to prescribe appropriately than it is with patients' ability to pay in mind (Interviewee No.25, a practitioner)

When I am treating a patient my main concern is treating the patient, therefore, I prescribe the medicines that I think can cure the disease regardless of the ability of the patient to pay (Interviewee No. 21, a practitioner).

Doctors at local health facilities claimed that the RDF no longer distributed its price list to doctors. As a consequence, the prescribers' knowledge of RDF drug prices is generally weak. Three doctors at a RDF hospital clearly said that they did not know the price of the RDF medicines. One criticism of the RDF expressed by the practitioners in this regard is that the prices of medicines were determined by the RDF head office. The management of the RDF has never been open to the practitioners. Neither the doctors nor the community representatives are involved in RDF price setting. The health facilities' doctors and users representatives are entirely excluded. As a result, most

doctors and patients at RDF health facilities, particularly in hospitals, are not aware which medicines exist in the RDF pharmacies or their prices. One of doctors attributed this situation to the isolation of the RDF pharmacy from the hospital administrative system (Interviewee No.21, a practitioner).

6.6 RDF measures to provide low cost medicines

The potential negative impacts of Cost-Sharing programmes on poor and vulnerable groups were taken into account at the very early stages of the RDF planning and implementation process. The RDF has adopted a number of measures to maintain affordable prices of medicines for the targeted population (i.e. the poor and vulnerable groups) at all health facilities without compromising the medicines' safety, efficacy and quality. These measures are discussed in the following sections.

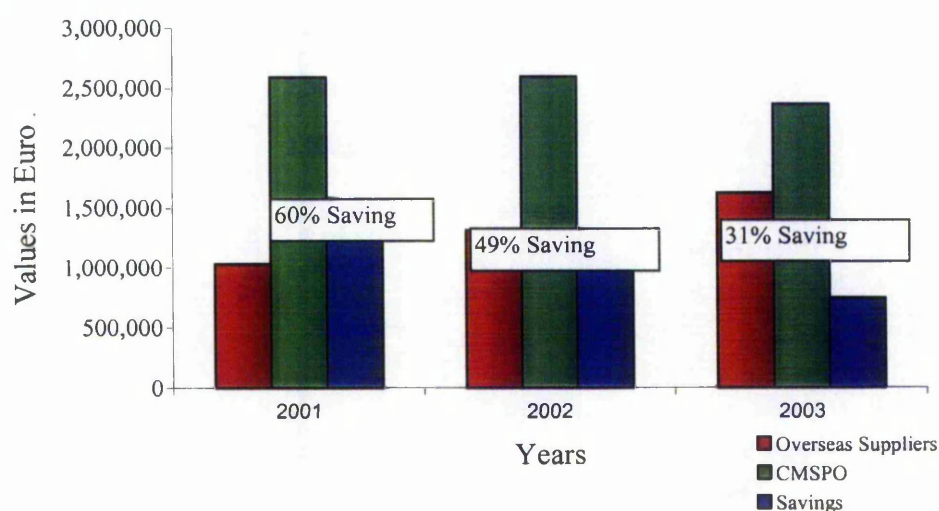
6.6.1 Selection and purchasing measures

The sustainability of affordable prices of medicines under RDF depends on drug supply management that maintains medicine prices at levels which can be financed by the anticipated users. In order to supply quality medicines at cheap prices, the RDF strongly advocates a policy of purchasing generic, off-patent medicines (RDF 1998b). Other strategies operated by RDF to maintain affordable prices include procurement from not-for-profit wholesalers, through an annual restricted tender. The RDF operates a restricted tender system, to reduce costs and ensure quality of medicines. To avoid the drawbacks of such systems, for example, buyer abuse (i.e. highest charges are paid), the RDF tender committee compares the prices offered by the overseas suppliers and an international price indicator published by MSH²⁴ and the prices offered by the CMSPO (the legal government agency for purchasing and distribution of medicine and medical supplies to all public institutions). After the tender winners are announced, the RDF tender committee usually negotiates with each winner separately to obtain further reductions (RDF 1998b).

²⁴The international price indicator is the median price for generic medicines quoted from one or more international non-profit wholesalers to public or non-profit procurement agencies. The source for these prices is the Management Science for Health (MSH 2003) which publishes the international price indicator book every year.

Since the early 1990s, the RDF has purchased medicines and other medical supplies from European generic wholesalers. The restricted tender system adopted by the RDF reduces the high costs of open tender transaction and other complications of open tendering. Interviews with policy-makers at both Khartoum State and Federal levels indicated that the prices charged by CMSPO are not competitive with prices offered to the RDF by the overseas suppliers (RDF 2002b). Figure 6.2 shows the results of the 2001, 2002 and 2003 tenders. If medicines for RDF were procured from CMSPO, the costs would have been, on average, 90% higher than from overseas suppliers. For example, the analysis of the RDF tender in 2003 (RDF 2003b), showed that the RDF ordered two million ampoules of Chloroquine injection (a drug which is used for the treatment of malaria). The lowest price was US\$0.062 (i.e. total amount was US\$124,000) and CMSPO price was US\$0.12 (i.e. total amount US\$240,000). The saving made by the RDF from one item alone was US\$116,000 (RDF 2003b). The consequences of procurement from CMSPO would be that the RDF current selling prices would have to be almost doubled to keep the current mark-up (i.e. 41%). This is why the RDF has been given the authorisation by the Wali (The governor) of the State to continue the procurement of medicines from European generic wholesalers. The CMSPO's attempt to stop the RDF purchasing from overseas was defeated by the affordable prices of medicines offered by the RDF.

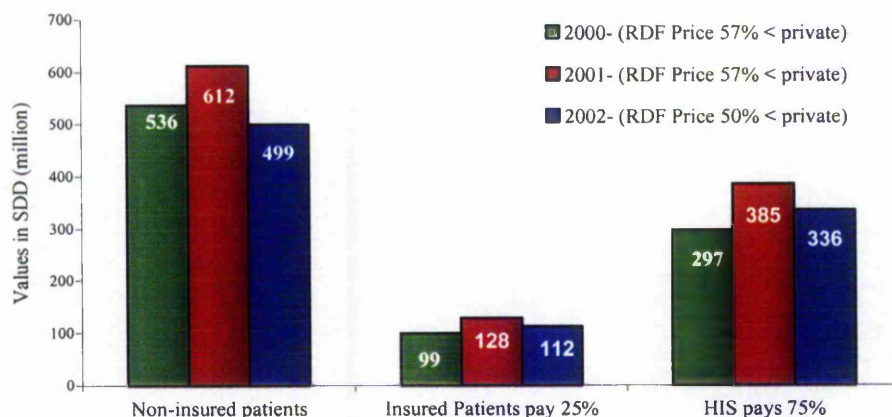
Figure 6.2: Values of RDF annual medicine orders: savings made via overseas purchase



Source: compiled by the author from RDF reports 2001b to 2003b

From my personal experience as a pharmacist, a practical disadvantage of getting medicines from private pharmacies, as is the case in non-RDF hospitals, is that patients buy their medicines at retail market prices. The private sector pay import duties and taxes on brand-medicines in small patient packs. The patients often lack information about cheap generic alternatives, and retail pharmacies benefit more when selling large quantities of expensive brand-products than generic ones (i.e. the mark-up on cost is similar). In contrast, the RDF can obtain bulk purchase discounts. In addition, the RDF has custom and tax exemptions which make the prices of its medicines far less expensive than those from private sources. The average cost of prescription (excluding opportunity and other cash costs) for one illness episode treated at the RDF health facilities over the last three years (2001 to 2003) was SDD 329, less than half (46%) of the private pharmacies (RDF 2001a, 2002a and 2003a). Therefore, the RDF cost control measures resulted in huge savings made by the RDF users via purchasing of RDF low cost medicines. Khartoum State Health Insurance Scheme (HIS) and its beneficiaries (health insurance pays 75% of the prescription cost for its members) also achieved considerable surplus from using RDF health facilities. This is why the HIS in KS finds the RDF critical to its financial viability. Figure 6.3 illustrates the savings made by different RDF customers during 2000, 2001 and 2002. These savings were calculated and presented by the RDF (RDF 2000a, 2001a and 2002a). The calculation is based mainly on the actual costs paid at the RDF pharmacies and the charges that patients paid for the same medicines in private ones. The difference between the prices (i.e. the RDF and the private pharmacies) was considered to be the subsidies made by the RDF to its clients (i.e. non-insured and insured users, and the HIS).

Figure 6.3: Annual RDF subsidies to its clients (in Sudanese Dinar)

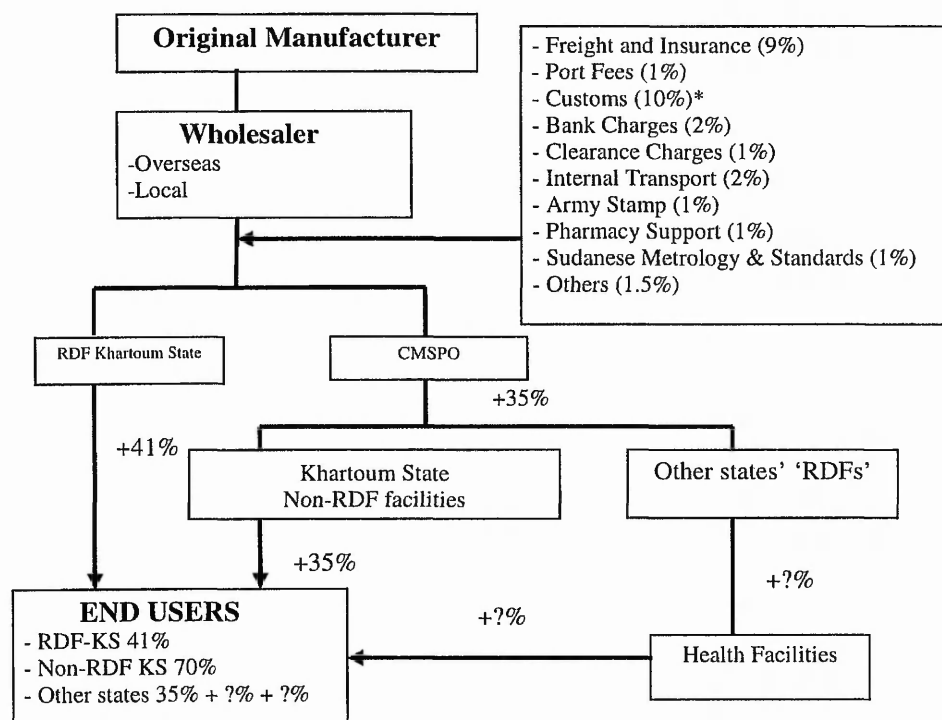


Source: compiled by the author from the RDF annual reports 2000a to 2002a

6.6.2 RDF one-layer distribution model

As shown in figure 6.4, Khartoum State RDF is unique within Sudan and in other developing countries (recall chapter two), in this regard: the RDF KS does not sell medicines to health facilities to sell on to the patients. Instead, the RDF sells directly to the patients via its pharmacy outlets (i.e. in health centres, hospitals and people's pharmacies). This approach means that the risk of losses from the expiry of stocks, freezing of assets and so on is borne directly by the RDF. In the CMSPO, the medicines are sold either to health facilities (as it is a case of Federal hospitals, such as Khartoum Hospital) or to the 'RDFs' in other states which in turn sell them to the public health facilities. Each level adds its own mark-up before the medicines are finally sold to end users. In this type of CMSPO drug supply system, any issues of cost recovery are problems for institutions not the CMSPO. And the original price of medicines is multiplied two to three times before reaching the end users. This is an important difference. In the case of CMSPO and other states' 'RDFs', each level sells on (after putting its own mark-up) to the one below, rather than taking the full responsibility for the complete cycle to the end user. All potential risks are, therefore, passed down the line.

Figure 6.4: Mark-ups on the original medicines cost in Sudan's public health facilities



*RDF is exempted from the customs

?% Mark-up varies by states and their health facilities

Source: The author

The positive features of RDF KS model are significant, and include the regular supply of medicines and, more importantly, the reduction of the prescription cost to the end users. The mark-up on medicines in the RDF was 41% in 2003, compared to 70% in the Federal hospitals and more than 70% in other states' 'RDFs' (RDF 2003a; CMSPO 2003).

The centralised distribution system in the RDF is justified by the small geographical area of Khartoum State and its infrastructure: for example, with exception of two health facilities, all RDF health facilities could be reached within one hour. The network of paved roads reaches almost all RDF health facilities. The current distribution network (from warehouse directly to the health facilities) reduces the average stocks needed in each outlet. This makes stock control and delivery simple and easy to manage compared with a multilayer distribution system. In addition, losses for different reasons, such as damage, theft and so on, can be cut down to the minimum. Moreover, the number of employees and their salaries and incentives could be controlled without affecting performance. Finally, the one-layer distribution system reduces operational expenses, which include storage space costs (rent or building depreciation), utilities, communications, depreciation of equipment, and other unseen costs. However, when interviewed for this study, four policy-makers at MOH KS were of the opinion that the RDF distribution system should be decentralised in order to respond effectively to the local needs. Their views are represented in the observation made below:

Although we in the MOH insist that there should be sub-stores at localities level to respond immediately to needs of remote facilities, the RDF management refuses, arguing that such stores need more money to be injected in the RDF cycle and has potential risk from increases to operational expenses and the decentralisation of the distribution will end up increasing consumers costs (Interviewee No.6, a policy-maker).

6.6.3 Periodic price adjustment

The pricing policy was built into the system as a routine administrative exercise from the very beginning of the RDF, because affordability is a critical factor in a country like Sudan (which is on the list of the world poorest countries). However, the RDF reviews medicines prices regularly to keep pace with inflation, especially in the early 1990s

when prices were revised twice per year in order to ensure the viability of the project. The price revision enables the RDF to maintain its ability to replenish exhausted stocks and to adjust its prices to those of alternative sources. This adjustment prohibits leakage and convinces people that RDF medicines are not of low quality and at the same time keeps down the cost of obtaining medicines. As practitioners pointed out, some patients, including the poor, perceive cheap medicines as low quality medicines. At the time of the study, the current RDF price list had last been updated in July 2003. It was noted that the prices of only seventeen out of eighty-six items were changed (Table 6.2). In 2002, private pharmacies prices were generally reduced because the CMSPO started to sell tenders 'generic products' to the private pharmacies. This led to a slight reduction in the margin between RDF and private sources. Yet the overall RDF charges amounted to 1.6 times the cost price. This profit rate was less than the range (two to three times) recommended by the Bamako Initiative to sustain the continuity of RDFs (Chisadza, et al 1995). Despite this, the average mark-up (64%) on cost charged by the RDF KS safeguarded the project during the hard time of local currency devaluation in the early 1990s. It also allows the RDF to offer the KS MOH a monthly amount of around 8% of its sales to finance preventive and curative care (recall chapter three).

Table 6.2: RDF prices changes during 2001 to 2003

	2001	2002	2003
Percentage price increase (decrease)	(1%)	(1%)	2%
Number of items with increased price	2	6	11
Number of items with decreased price	5	12	6
RDF prices compared to private sector	57% Less	50% Less	54% Less
RDF prices compared to the CMSPO	16% Less	4% Less	4% Higher

Source: compiled by the author from the RDF reports 2001c, 2002d and 2003c.

Policy-makers interviewed for this study argued that the RDF low medicines' prices were sufficient to offset the financial barriers to access and to generate equity. 'The RDF has thought about children and patients with chronic diseases when revising the medicines prices' (Interviewee No. 13, a policy-maker). Interviews with practitioners at the local RDF health facilities revealed that the RDF prices had been affordable and stable for more than three years, and that the price increases were very minor. RDF records showed in 2003 the percentage of price increase was only 2% (Table 6.2 above). This was also confirmed by quantitative data collated from the patients' survey. The

affordability problem was found to be restricted to only 6% of respondents who consequently failed to obtain their medicines at RDF health facilities. 'Patients are not affected by the price increase, it was a very minor change... they simply do not feel it (Interviewee No. 2, a practitioner).

6.6.4 Cross-subsidies mechanism

To ensure affordability for the majority of Khartoum State population, those in particularly poor and vulnerable groups, the RDF drug prices were set as low as possible to match the users' ability to pay. One of the major mechanisms to make medicines affordable to all is cross-subsidisation of more expensive, essential medicines, such as Insulin and Metronidazole infusion, through a higher mark-up on less expensive, but fast moving items, such as Paracetamol tablets and Chloroquine injections. The RDF also charges equal medicine prices for all health facilities throughout the State regardless of the distance from the warehouse (i.e. there is a cross-subsidy from closer health facilities to more remote rural ones).

Table 6.3 shows a comparison between the selling prices of the key generic medicines obtained from the current RDF price list, CMSPO retail prices, and private pharmacies at the time of the study. The average dispensing price for RDF selected items was 34% and 18% less than the private and CMSPO prices respectively. For the whole list of RDF medicines, the average selling RDF price was 54% less than that of the private pharmacies and 4% higher than CMSPO retail prices (RDF 2003c). Those differences reflect cross-subsidies operated by the RDF. One example of slow moving items is Insulin (which is prescribed 'for-life' for diabetic patients). The current RDF selling price of the Insulin is SDD1,900, whereas the selling prices of the same brand of the Insulin are SDD2,700 and 2,600 at private pharmacies and CMSPO respectively. The RDF mark-up on this item is only 1%.

The cross-subsidy system...I am not sure whether it is good or bad arrangement to protect the poor... but it made some patients feel that there is no difference between RDF and private prices, especially in commonly used items like Paracetamol tablets (Interviewee No. 10, a policy-maker).

Table 6.3: Prices of fast moving medicines: comparison between the RDF and alternative sources (prices in Sudanese Dinar)

Description	Unit	Private Pharmacies*	CMS	RDF	Private/RDF	CMS/RDF
Amoxicillin 250mg Capsule	Capsule	16	7	10	1.6	0.7
Amoxicillin 125mg Suspension, 100ml	Bottle	374	208	200	1.9	1.0
Amoxicillin 250mg Suspension 100ml	Bottle	492	293	250	2.0	1.2
Chloroquine 200mg/5ml Injection	Ampoule	50	49	35	1.3	1.4
Chloroquine 50mg Syrup 60ml	Bottle	250	221	125	2.0	1.8
Chloroquine 150mg Tablets	Tablet	8.3	7	5	1.7	1.3
Co-trimoxazole 200mg + 40mg Suspension	Bottle	250	195	150	1.7	1.3
Co-trimoxazole 400mg + 80mg Tablets	Tablet	10	3	5	2.0	0.6
Ferrous + Folic Acid Tablets	Tablet	20	0	10	2.0	0.0
Hyoscine Butyl Bromide 10mg Tablets	Tablet	10	11	7	1.4	1.6
Paracetamol 125mg Syrup 60ml	Bottle	200	143	130	1.5	1.1
Paracetamol 500mg Tablets	Tablet	5	3	3	1.7	0.9
Benzyl Penicillin 1MU Injection	Vial	40	39	40	1.0	1.0
Procaine Penicillin 1MU Injection	Vial	40	39	40	1.0	1.0
Promethazine 50mg/2ml Injection	Ampoule	75	34	50	1.5	0.7
Promethazine 25mg Tablets	Tablet	10	0	5	2.0	0.0
Dextrose 5% in water, 500ml	Bottle	300	325	250	1.2	1.3
Dextrose 5% in Normal saline 0.9%, 500ml	Bottle	300	325	250	1.2	1.3
Sodium Chloride 0.9%, 500ml	Bottle	300	325	250	1.2	1.3

*In private pharmacies where a range of generics with wide price variations were available, the median price is used because it is likely to be more valuable for estimating actual price, when there is skewed distribution (MSH 2004).

6.6.5 Operating expenses

Improving the cost-efficiency of administration is clearly an important concern in the RDF. Project operating expenses are defined to include staff incentives at both head office and health facilities, storage costs including cold chain, transports functioning and maintenance, and other recurrent costs. The operating expenses of the RDF have been kept to the minimum (Mohamed 2000). However, the RDF annual reports (2002a, 2003a and 2004) showed that the RDF operating expenses, particularly staff salaries and incentives, have substantially increased in 2004. Salaries and incentives of the RDF staff rose from SDD84.5 million in 2002 to SDD93.5 million in 2003 and SDD259 million in 2004. For example, a driver's salary, including incentive, was SDD15,000 in 2002: now he is earning SDD60,000. Overall RDF operating costs increased from SDD302.5 million (12% of the RDF sales) in 2002, to SDD506.7 million in 2004 (19% of the RDF sales). This percentage is higher by 4% than that agreed between Save the Children (the donor) and the MOH KS at the beginning of the project²⁵ (RDF 1998b). Though not yet reflected in the selling prices, the trend shows a regular increase in most operational expense lines, especially incentives paid for staff and donations of medicines and cash made by the current RDF manager. In the past the RDF used to distribute medicines only against cash and no cash donation was allowed for any reason. The above information was given during interviews with four policy-makers at MOH KS, who expressed resentment about the new changes in RDF policy. It is confirmed by the fact that donations in cash appeared in the financial statement of the RDF, for the first time in the RDF history, in 2004 (RDF 2004). The frequent political interference in the recent years was mentioned by the policy-makers at MOH KS as a main cause of the operating expenses escalation.

In sum, all the above mentioned measures indicate that strategies of the RDF KS to maintain affordable prices of medicines have had a positive impact on the ability of the users, especially the poor, to pay for prescribed medicines. However, it is likely to have a negative impact in that some of the needy patients (as noted by policy-makers and practitioners), are directly disadvantaged by the introduction of pricing. But interviews with policy-makers and practitioners also pointed out that the traditional social support and extended families reduce, to some extent, the risk of a patient being excluded from

²⁵ The RDF partners agreed to add 15% on the cost of medicines to cover operating expenses (RDF 1998b).

receiving his or her medicines at primary care level. 'We did not leave this country since our graduation. We worked in hospitals and health centres. Our experience and our social relations inform us that nobody fails to receive his medicines for financial reasons' (Interviewee No. 2, a policy-maker'). However, the social informal solidarity system faces difficulties in high cost medical interventions. The highest concern was therefore in high cost surgical operations or chronic diseases treatment at tertiary level.

6.7 Impact of the RDF on equity of access to essential medicines

To meet the challenge of providing equitable access to essential medicines, Khartoum State initiated the RDF (with help from SC UK) in public health facilities. The goal of the RDF was to develop a reliable supply of safe, efficacious and quality medicines to the community, especially the poor and those in rural areas (recall chapter three). The project was biased in favour of low income and more vulnerable groups. Equity is, therefore, one of the primary aims of the RDF. The introduction of the RDF in remote areas, though sometimes not cost-effective for RDF as a business, has been an important way of improving equitable access to health care, particularly PHC services, in Khartoum State. All respondents among health care providers and users agreed that the majority of the Khartoum State population has access to the essential medicines in the RDF health facilities.

Despite the suffering of some people, RDF improves the quality of service through regular supply of medicines. Before the RDF neither the poor nor those who could pay had access to medicines (Interviewee No. 9, a policy-maker).

Without RDF, this facility would remain without medicines... and private pharmacies could not survive in small remote rural areas (Interviewee No.11, a practitioner).

All policy-makers agreed that some patients may not afford to pay for their clinical needs at public health facilities. 'Although we have no evidence, there are definitely some patients who are denied medicines due to lack of money' (Interviewee No.4, a policy-maker). They attributed this to the liberalisation policy which hits hard on poor people who have to pay for their living expenses as well as for previously free health care and education of their children. For instance, in Khartoum Hospital, interviews

with doctors revealed that practitioners sometimes make payments from their own pockets to help their patients or campaign for donations of free samples from drug companies to give to the poorest patients or those who cannot afford the prescription cost. The informality of these arrangements, however, means that poor are not guaranteed protection. The prevalence of begging at hospitals and mosques after prayers is a clear sign of difficulties facing patients when health care is needed, particularly surgical operations, advanced diagnostic tests and medicines. Below are typical quotations from interviews:

After Cost-Sharing, here we sometimes pay from our own pockets to rescue indigent patients who came alone and seriously ill (Interviewee No. 27, a practitioner).

One of the clear negative impacts of Cost-Sharing Policy is the begging phenomenon, it is now very common in hospitals and mosques to see a person asking people to help him... this is a real prevailing problem (Interviewee No. 6, a policy-maker).

Our patients are very poor. They can not pay for their medicines and diagnostic tests recommended to them. In my department, we request and beg our colleagues in the pathology department to do free testing for some patients. Also we ask drug companies to donate free medical samples (Interviewee No.23, a practitioner. She showed me a small box with small quantities of different brand products collected from drug companies).

The patients' survey respondents were directly asked 'do you feel there are equity problems in access to essential medicines in relation to geographical coverage and economical status'. The answer was 'yes' for 39% and 52% of respondents respectively from the RDF and non-RDF health facilities, regarding geographical access. Regarding economic status the answer was 'yes' for 62% of the RDF patients respondents compared to 81% of the non-RDF health facilities. It is clear that there are significant differences between the two groups in both accessibility measures (i.e. geographical location and economic status of the users) in favour of the RDF. The households' survey also showed equity issues, as perceived by respondents regarding geographical and economic status. As many as 57% of the respondents thought there were

inequalities in geographical coverage and 81% said there were equity problems in regard to economic status of the population. Respondents made this judgement according to their own experience. These findings were corroborated by data from interviews with policy-makers which revealed a lack of health facilities in certain rural areas, and policy-makers also admitted that the current mechanisms to protect the poor are not functioning efficiently.

6.7.1 Who are the users of public health facilities?

To answer this question, the demographic characteristics of the population and their proximity to public health facility were investigated. In this study, the users' surveys showed that all population categories (for example, males and females, adult and children, old and young, poor or rich people) with different ethnic and religious background were proportionally represented in the population using the RDF and non-RDF health facilities. Table 6.4 breaks down the percentage of demographic characteristics of patients from all surveyed health facilities. As expected, in terms of occupation, educational level and economic status, the differences were generally not statistically significant between the RDF and non-RDF facilities, except for age. Half of the RDF patients were children under fifteen compared to 13% of the non-RDF (Khartoum Hospital) patients in the same age group. Conversely, 76% of the Khartoum Hospital patients surveyed were in the sixteen to fifty-four years age group compared to 48% of the RDF patients respondents. This was expected, because the distribution of Khartoum State population is characterised by a large percentage of children under fifteen years who most likely use their local health facilities for the treatment of common childhood diseases, such as diarrhoea and acute respiratory tract infections. Two third of the patients sample consisted of individuals of less than five years of age (35%) and in the age group sixteen to thirty-four (31%). The results were in line with the objective that the children are the main target of the RDF. Historically, the RDF arose out of recognition of the weaknesses of the Primary Health Care system in Khartoum State and the increasing number of common childhood illnesses being brought unnecessarily to the Khartoum Children's Emergency Hospital (Mohamed 2000).

Table 6.4: Demographic characteristics of the patients

	RDF (n = 48)		Non-RDF (n = 45)		Total (n = 93)	
	n	%	n	%	n	%
Sex:						
Male	20	42	22	49	42	45
Female	28	58	23	51	51	55
Age:						
Under 5 years	17	35	5	11	22	24
5 to 15 years	7	15	1	2	8	9
16 to 34 years	15	31	20	45	35	38
35 to 44 years	8	17	8	18	16	17
45 to 54 years			6	13	6	6
55 years and older	1	2	5	11	6	6
Education*:						
Not educated	9	19	5	11	14	15
Primary level	25	52	28	62	53	57
Secondary level	9	19	7	16	16	17
Higher education	5	10	5	11	10	11
Occupation* :						
Farmer	4	8	4	9	8	9
Self-employment	23	48	26	58	49	53
Labour job	10	21	7	16	17	18
Civil service employee	10	21	5	11	15	16
Private sector employee	-	-	2	4	2	2
Not employed	1	2	1	2	2	2
Income* :						
Low income group (less than SDD20,000)	14	31	10	29	24	30
Middle income group (SDD20,000 to 39,999)	23	51	13	37	36	45
High income group (SDD40,000 or more)	8	18	12	34	20	25

* Applied to those with job or the head of household in case of children and dependents

As shown in table 6.4 above, of the sample, only 11% of the patients reported having a higher education. The majority (72%) are either not educated (15%) or completed the primary school level (57%). The most frequently represented occupations among patients and household survey respondents who use public health facilities were labouring in nature (80%). For instance, the patients and household respondents showed an occupational mix including self-employment (53%), labouring work (18%) and farming (9%). All households surveyed (n = 93) lived in houses in close proximity to a public health facility (i.e. less than five km from the nearest facility). All houses were furnished with electricity and tap water supply, and almost all (98%) households have unshared toilets.

Respondents from both surveys were asked to estimate their monthly income. As many as 12% of patients respondents refused to disclose the approximate monthly income. 30% of those who gave a figure were in the low income group (less than SDD 20,000). Table 6.5 presents the urban and rural distribution of the patients respondents by their reported income groups. Almost 30% of patients in the low income group live in both rural and urban areas. This pattern was not consistent across other income groups: for example, 55% of patients were in the middle income group with only 15% of patients in the high income group living in rural areas.

Table 6.5: Patients income group²⁶ distribution

Income groups	Urban (n = 47)	Rural (n = 32)	Total (n = 80)
Low income group (less than SDD20,000)	30%	30%	30%
Middle income group (SDD20,000 to 39,999)	38%	55%	45%
High income group (SDD40,000 or more)	32%	15%	25%

The demographic characteristics of the public health facilities users confirmed what had been said by practitioners, that the low socio-economic class and the poor were the dominant users of the public health care facilities, particularly health centres. For example, a higher percentage of the public health facilities users were of lower education levels (72%) and worker occupations (80%). Only one fourth of respondents were reported to be in a high income group. This suggests that the imposition of user

²⁶ Income groups in this study were defined as the low, middle and high income groups because of the relatively small sample size of the patients (ninety-three participants).

charges shifted the utilization of health care by the rich people from public to private health facilities.

Qualitative data indicate widespread perceptions that the Cost-Sharing Policy enhances inequalities in access to secondary and tertiary care levels across low and middle income groups. But no discrimination was reported in delivery of health care services as a result of religion, ethnicity, regions, gender or diseases. According to the policy-makers and practitioners, under the rules and code of medical practice in Sudan, no patient can be discriminated against because of his or her religion, ethnicity or gender when seeking medical care. Below are typical quotations reported by the practitioners.

There is no discrimination between patients in the medical practice in Sudan... even the foreigners receive the same service provided to the nationals (Interviewee No. 16, a practitioner).

Although there is no discrimination between patients and we deal with any patient as a patient regardless of his ethnicity or his religion, we sometimes feel very sympathetic towards patients from minorities groups...occasionally we pay for them from our own pockets (Interviewee No. 18, a practitioner).

The quantitative data from households' survey confirmed what had been said by health care providers (policy-makers and practitioners) in regard to equal access to services to all users. The overwhelming majority (95%) of surveyed households said they did not experience any discrimination in regard to age, gender (96%), and ethnicity (98%). All respondents agreed that they have been treated regardless of type of the disease.

6.7.2 Geographical equity issues

In Khartoum State, there are a large number of health facilities but geographical maldistribution was reported in certain areas. This is mainly due to the fact that most of the government health facilities were built by the inhabitants themselves. As a consequence, public health facilities are concentrated in areas where the population is better educated and well-off, and where business, charitable and politically influential persons are available to support and mobilise resources for the establishment of facilities. This reflects the fact that, those who live in poor areas may not be able to

build their own facilities (waiting for mercy by way of the availability of budgets to the government or donors to do so). The voice of the poor within the communities was neither heard nor was influential. This explains the fact that some areas are over served while in others, the number of public health care facilities is below what is needed. The following quotation was used by a policy-maker to justify the unequal distribution of health facilities.

Unequal distribution of public health facilities was not a result of a geographical discrimination, but a result of the community leaders or influential persons who managed to raise funds to serve their local areas (Interviewee No. 10, a policy-maker).

More than half (57%) of households survey respondents believe there are equity issues in the geographical distribution of public health facilities. On the other hand, the policy-makers argue the health facilities distribution in KS is guided by the health services map. The clear objective of the map is to ensure equal access to health services close to the people's homes. The health service map sought, therefore, to achieve demonstrable improvements in the accessibility of good quality Primary Health Care. Nevertheless, policy-makers interviewed for this study admitted that there are inequalities in the current situation. The discrepancy was attributed to the lack of community leaders who can mobilise resources in under-served areas or to establish a health centre or a hospital in deprived areas. However, the RDF is found to be successful in making medicines available closer to where people live in KS, despite discussions with policy-makers at MOH which revealed that dispensaries and some health centres in small rural areas are still without medicines.

The geographical distribution of public health facilities (but not the services) was to some extent not equitable in some areas, such as displaced 'camps'. In internally displaced people areas, the existence of public health care facilities was less than in other areas. The explanation given by the policy-makers interviewed as part of this study was: that the displaced areas were saturated by national and international NGOs clinics which provided free services including medicines. This situation was described by the policy-makers as positive discrimination.

There is some sort of discrimination in some areas, for example, in displaced camps where health services are provided free of charge at NGOs' clinics. We call this positive discrimination (Interviewee No. 11, a policy-maker).

To summarise, this section shows that the provision of low cost medicines via RDF health facilities increases access to treatment at PHC level. At this level equitable access was achieved. 'If you measured it according to the majority of the population, it is clear that there is no equity problem at primary care level' (Interviewee No. 3, a policy-maker). The overall, results suggest that the RDF meets its objective of provision of medicines to the targeted groups. The findings, however, also show that the imposition of fee-for-service policy, particularly in secondary and tertiary care levels, causes real equity problems in accessing health care services at these levels.

6.8 Government measures to improve financial access to health services

At the beginning of the Cost-Sharing programmes in Sudan, the policy-makers built on existing informal social solidarity mechanisms, such as extended family networks. But very soon they were confronted by large numbers of patients who failed to meet their health needs, particularly at secondary and tertiary care levels. As a consequence, there has been a progressive introduction of different types of mechanisms to protect the poor. These mechanisms aim to enhance equitable access to health services, in general, and to essential medicines, in particular, by all socio-economic groups. The following sections describe the government mechanisms to foster economic accessibility of medicines and other medical services.

6.8.1 Mechanisms for protecting the poor

The mechanisms set up in hospitals at the beginning of user charges policy in the early 1990s attempted to identify and to protect patients who were not able to pay for the medicines they needed (i.e. the poor and special groups, such as orphans and martyrs' families) and to ensure that the rich, or those who could afford the costs, did not get exemption from charges via solidarity funds. Experience of practitioners interviewed for this study with such mechanisms revealed that the procedures were lengthy, bureaucratic and not well-understood by patients. These mechanisms, according to

policy-makers and practitioners, either no longer exist or are inefficient in guaranteeing prompt access of the poor patients to the recommended medical interventions.

Table 6.6 presents users' satisfaction with exemption mechanisms. The percentage of the RDF patients and households respondents who reported satisfaction with exemption mechanisms was very high (94% and 70% respectively) compared to the respondents from non-RDF health facilities where the percentages of satisfaction and dissatisfaction are the same (37%). Only one fifth of the households survey respondents who answered the question: 'Are there any exemption mechanisms for the poor and school children who may not afford the cost of medicines at public health facilities', said 'yes'. However, the high percentage of missing answers and low responses to the questions about satisfaction could be interpreted as a lack of knowledge about the exemption mechanisms or dissatisfaction with their performances.

Table 6.6: Users satisfaction with current mechanisms for protecting the poor

	Health facilities respondents			Household respondents
	RDF (n = 48)	Non-RDF (n = 45)	Total (n = 93)	
Satisfied	94%	37%	64%	70%
Neutral	6%	26%	17%	15%
Dissatisfied	0	37%	19%	15%
Response rate	35%	42%	39%	22%
Missing answers rates	65%	58%	61%	78%

Policy-makers argued that the Ministries of Health at both Federal and State levels are responsible for planning, development of health services and for providing health care of acceptable quality in all government health facilities. But they do not accept responsibility for fighting poverty or improving the socio-economic status of the population. 'Our responsibility is to make health services accessible and it is the responsibility of the Ministry of Social Care, Ministry of Finance and the Zakat to protect the poor' (Interviewee No. 2, a policy-maker). This is a typical response among policy-makers interviewed for this study.

Why exemptions were not allowed at RDF pharmacies?

Exemptions due to poverty or inability to pay were therefore forbidden as a matter of policy at all RDF pharmacies. Under the RDF regulations, pharmacies at health facilities require a cash payment before dispensing medicines to patients. Practitioners reported that the RDF pharmacy cashiers are very insistent in their application of the prices of medicines on the RDF list, and people without money are turned away. In the RDF pharmacies, credit is not allowed. Patients have to seek the assistance from a solidarity fund office or from the Zakat offices, and then come back, if they are successful, to pay for their medicines. All policy-makers and practitioners claimed that this process causes delay in reporting at health facilities after the onset of illness, though no evidence was shown for this claim in the quantitative data. 'Patients in emergency...say asthmatic patient...should not be prevented from having one shot of Aminophylline because the patient has no money to pay' (Interviewee No. 9, a policy-maker). The reasons given to justify the absence of exemptions at the RDF pharmacies relate to the RDF principle which requires cash payments against every medicine dispensed. The primary objective of the RDF is fund sustainability to replenish the used stocks of medicines. Exemptions lead to revenue losses which ultimately cause the fund to cease to revolve.

The data from the patients' survey indicated that many patients did not know about exemption mechanisms at the RDF hospitals. Although in exit-interviews 44% of patients in both types of health facilities (39% at the RDF and 51% at non-RDF) said that they knew the existence of exemption mechanisms, only 5% received assistance and all of them from Khartoum Hospital. This is in line with what had been said by the pharmacists at an RDF hospital (who had previous experience in Federal non-RDF hospitals), that in the Federal hospitals the medical directors have authority to exempt certain patients from payments for prescriptions and other services.

Unlike Federal hospitals, the RDF regulations are very rigid...the medicines are dispensed only against cash... no flexibility...even doctors and pharmacists have to pay for their prescriptions. In the Federal hospitals the medical directors have a right to exempt the poor (Interviewee No. 16, a pharmacist).

The strict application of medicines against cash principle was thought by the policy-makers to be one of the factors that enable the RDF to reach the stage of self-financing (for further details see chapter eight). Borrowing from hospitals' pharmacies and exemption from the payment of drug costs are among the reasons mentioned by the policy-makers and practitioners leading to the bankruptcy of facility-based revolving drug funds implemented in Federal hospitals in the early 1990s. It is important to stress that the RDF would not have revolved effectively, if it offered exemptions from drug fees, because exemptions undermine the revolving capacity of the RDF. However, the patients' questionnaire did not allowed me to know what were the implications of this for those who reported they could not obtain their prescribed medicines at RDF health care facilities for financial reasons.

6.8.2 Hospitals Solidarity Funds

The official policy announced by the government at the time of abolishing free services in the early 1990s was the exemption of the poor from payment through the Solidarity Fund. To achieve this aim, the government established Solidarity Fund offices in hospitals. The Solidarity Office pays on behalf of the patient who is judged to be exempted. The offices' source of finance is the Zakat. All health centres were excluded from this scheme and their users had to pay the full cost of received health services, including doctor visits fee, laboratory investigation, prescription costs and others. The exclusion of health centres from the Solidarity Fund Scheme was mainly due to the assumption that treatment at health centre levels was affordable and to the high administration cost of running 140 offices to cover all health centres in KS (Policy-makers' interviews No., 2, 10, 13, and 14).

Social researchers were recruited to identify eligible patients (i.e. poor and indigent patients) at the point of service delivery. Doctors and pharmacy staff refer a patient who has not enough money for medicines or other services to the medical director who in turn refers him or her to the Solidarity Office in their hospital. Patients eligible for exemption are selected by the social researchers employed by the hospitals to work in the Solidarity Fund Office. Interviews with policy-makers and practitioners at selected hospitals revealed that the social researchers make their decision about whether to offer payment or not based on an ad hoc interview and subjective information (for example, occupation or general appearance of a patient) given by the patients or their carers

(Policy-makers' interviews No., 2, 10, 13, and 14). Interviews with policy-makers and practitioners also revealed that, the social researchers must make a decision on the spot. So the decision made by the social researchers depends on their own judgement. No central guidelines on whom to exempt are published. Thus, decision making is very difficult at the moment when care is urgently needed. The ill health of the patient and pressure from his (her) relatives or sometimes from the patient's doctor, may bias the decision. In practice, how to target those who merit exemption or discount is a major problem.

The policy-makers admitted to me that the previous experience of Solidarity Funds at hospital level, where exemption decision was made at the point of services, were ineffective for a number of reasons. Four major factors were mentioned during my interviews with policy-makers and practitioners as causes of the failure of the hospital Solidarity Funds. The first is the method used to identify those to be paid for by the Solidarity Fund. The social researchers were trained to do the job but the task should be completed immediately by interviewing a patient or his (her) carer to decide whether to pay for or not.

Secondly, the budget allocated to the Solidarity Fund from the Zakat chamber was not well-calculated, because of the scarcity of socio-economic data about the Khartoum State population. The lack of information made it difficult to target poor or eligible persons. The monthly flow of funds to the hospital solidarity offices depends on the personal relations of the person in charge with the Zakat head office members of staff. It also relies on the enthusiasm of the solidarity office in that hospital to raise money. Socio-cultural constraints made it difficult to estimate accurately the annual budget need for each hospital. For example, the pressure of doctors and other health care professionals to assist their relatives, friends or colleagues to get free medicines and other medical services, despite their ability to pay, was highlighted by the policy-makers as reasons for the collapse of the system of poor protection.

Thirdly, there are weaknesses in hospital administrative systems. The procedures to be followed to get approval to receive money for treatment are quite long and bureaucratic. Such procedures lead to delay in receiving treatment. The late (i.e. after 10 o'clock in the night) emergency cases find it difficult to get exemption, simply because the solidarity office closes at 10 pm. Administrative weaknesses and the absence of clear

guidelines which identify eligible persons before they come to seek health care, led to the fact that the poor are not, in practice, exempted from paying for their medicines and other health services. They also lead to abuse of the system by those who do not have problems in paying. 'Non-poor had benefited from solidarity fund more than the poor' (Interviewee No. 25, a practitioner).

Finally, there is a lack of co-ordination between the MOH and the main financing institutions, such as the Zakat chamber which in the year 2003 spent more than SDD3.0 billion on health issues. Such a figure was far higher than the FMOH's budget allocated to support the poor in the same year (FMOH 2003b). A considerable proportion of the Zakat budget went to capital health inputs, such as the construction of health facilities and/or procurement of hospitals equipment. 'If the budget was channelled to treat the poor and needy patients through the MOH, there would be no equity problems' (Interviewee No. 14, a policy-maker).

Despite the fact that the current protection mechanisms financed from the Zakat appeared to work badly, the search for developing effective mechanisms based on the Zakat should not be abandoned, and this will be discussed further in chapter nine.

How to get the Zakat assistance

Recently, the Zakat started to make the payment directly to the patients. It was reported by the policy-makers and practitioners to be the main source of assistance for the poor in the neighbourhoods. The policy-makers and practitioners indicated that the Zakat only pays part of the total costs of expensive cases. For example, the RDF records (2002e) showed that the Zakat chamber allocated SDD50,000 as fixed assistance for patients diagnosed as needing to be operated on in Ahmed Gasim cardiac open surgery centre regardless of the total cost of the recommended operation. However, though the cost of the operations ranges from SDD300,000 to 1,100,000, the Zakat's share is only between 17% and 5%. The procedures to get assistance from the Zakat are complicated. 'It is so exhausting to get Zakat assistance' (A patient at Khartoum Hospital said). The Zakat office relies on the neighbourhood people's committees to decide on eligibility for getting financial assistance to pay for your clinical needs. A patient has to get a recommendation letter from the neighbourhood committee. If successful, he or she goes to the locality committee, which meets on a weekly basis, to decide on the requests. If

the requested amount is more than SDD25,000, the request is moved upwards to the Zakat State office, where another committee decides on it.

The main reasons highlighted by the policy-makers and practitioners as obstacles which make patients less likely to request assistance from the Zakat chamber include the delay in receiving health services, including medicines, as a result of long and bureaucratic procedures. 'Patients are frustrated by the lengthy process they must go through to getting the Zakat assistance' (Interviewee No. 18, a practitioner). In addition, the Zakat will not pay the full cost. So the complexity of the pathway is a disincentive for applying for small amounts. Moreover, policy-makers and practitioners believe that some poor patients do not know where the Zakat offices are in Khartoum State. Unlike better educated and rich patients, the poor patients do not know how to approach these committees or Zakat offices effectively. Finally, time is so critical in the event of the disease, especially in emergency situations (Policy-makers' interviews No., 4, 9, 10, 13 and 14, and practitioners' interviews No., 2, 14, 13, 21 and 23).

6.8.3 Free medicines at hospital emergency departments

In its efforts to contain the problems of those who cannot pay for their medicines, in 1996, the government announced a project for free treatment at hospital emergency units. The emergency free medicines project was intended to increase access for those who need emergency treatment in hospital casualty departments, regardless of their ability to pay. According to this project, all patients are entitled to receive free services including medicines, during the first twenty-four hours of admission. From my personal knowledge as a FMOH employee, the free emergency medicines' list is developed by an expert committee and revised on a regular basis. The list includes a very limited number of medicines, such as intravenous fluids and certain injections. The project also offers relevant investigations (lab tests and X-rays) and surgical operations. Interviews with practitioners at hospital levels as part of this PhD study revealed that after the first twenty-four hours of admission, the patient begins to pay for every service provided to him or her, including the food and accommodation (SDD1,000 per week), and the medical record file (SDD100).

The CMSPO receives a special budget from the MOF for the free distribution of emergency drugs at hospitals' emergency departments. The medicines are distributed on

monthly basis after their value has been deposited in the CMSPO account. The budget allocated for this was SDD3.0 billion (around US\$11.6 million) in 2005 (Mustafa, et al 2005).

Despite the political commitment to the right of patients to free services at hospital emergency departments, the range of emergency medicines is very limited (around thirty items) and their availability is less regular. The frequent shortages of free medicines at hospital emergency departments have attracted considerable national media attention in recent years. The reasons reported by policy-makers are insufficient budgets, shortages in stocks of some medicines on the list at CMSPO, arbitrary distribution of budgets allocated to finance free medicines across different hospitals in the country (it is more likely to favour Federal hospitals), and the fact that hospital medical administrators do not stick to the rules that the service is free for only first twenty-four hours. Below are typical quotations:

The government took us back to the time of the late 1980s when the shortages of publicly funded medicines were very common...the government always fails to maintain the finance of free medicines... the same claims during the free medicines era started to appear again in the project of the free emergency medicines (Interviewee No. 2, a policy-maker).

The most common complaint in the local press during 1980s was that medicines are rarely available in public health facilities. This complaint appears again after the adoption of free medicines project in hospital outpatient clinics. Frequently, there were media reports about the lack of life-saving drugs in the public hospitals (Interviewee No.10, a policy-maker).

6.8.4 Exemption for certain types of health services

To absorb the negative impacts of user fees and to foster equity of access, the government policies on user charges defined entitlements to full or partial exemption from payment for some types of preventive and curative care. Interviews with policy-makers at Ministries of Health who participated in this study showed that some medicines are provided free of charge through vertical programmes, funded by the government in collaboration with international donors to prevent the most prevalent

infectious diseases, namely tuberculosis and leprosy, acute respiratory tract infections, Schistosomiasis and Leishmaniasis in endemic areas, and free distribution of Chlamphenicol injection at the time of meningitis outbreaks. Most PHC services are provided free of charge. These free services include: contraceptive pills for family planning; Ferrous Sulphate with Folic Acid tablets for pregnant women; immunisation programmes for six childhood diseases (measles, tetanus, poliomyelitis, whooping cough, diphtheria and tuberculosis); preventive doses of Vitamin A; condoms for the protection from sexually transmitted diseases, such as HIV/AIDS; nutrition and growth monitoring of under-five children; and anti-tetanus vaccination of pregnant women and other preventive services for women of reproductive age. There are also exemptions for treatments of various categories of life-threatening diseases, including peritoneal dialysis for renal failure, immune suppressant medicines for renal transplanted persons, radio-therapy and chemotherapy for cancer patients, haemophilia, and blood transfusion and blood test for HIV/AIDS. In 2004, the expenditure on these diseases was SDD3.5billion (US\$13.6million) equivalent to 22% of the Federal expenditure on health (Mustafa, et al 2005). More recently, the First Vice President declared that cardiac and renal transplant operations would be free.

The policy-makers pointed that the provision of the above mentioned services, free of charges, aims to ensure financial access of the poor to curative care of life-threatening diseases as well as for diseases which cause public health problems, such as tuberculosis. These arrangements also encourage the use of preventive services. 'In May this year (2004), we in KS decided to lift the user fee for pregnant women. The intention of this was to encourage them to use antenatal care services at health centres' (Interviewee No. 1, a policy-maker).

6.8.5 Equity is of high policy-makers concern

Despite all these mechanisms and schemes, the majority of the population is still unprotected from the burden of payment in tertiary care health facilities. Interviews with policy-makers and practitioners revealed that they believe that the health needs of some groups, mainly the poor or those diagnosed with a life-threatening disease, such as cancer, renal failure or major operations, are not being met for financial reasons. Even at primary care level, the poor and school children are sometimes denied immediate treatment because they do not have enough money to pay for their prescribed medicines.

'Politicians emphasise free treatment for certain diseases, such as cancer, renal transplantation, but in practice, the required budgets are not secured' (Interviewee No. 10, a policy-maker).

While the government clearly indicates that no patient should be denied services for financial reasons, the findings of this study suggest that there is no clear policy to protect those who are not able to pay the cost of rare but expensive incidences. The policy-makers highlighted the need for political support based on evidence-based information to allocate sufficient funds to finance exempted diseases and other services. I agree with their argument and I also think that high level political commitment is crucial for unifying the channels of poor patients support, mainly the Zakat chamber, to ensure the reallocation of resources towards cost-effective services which are used by the vulnerable groups.

No studies of the protection of the poor from the burden of payment for health services at the point of delivery have been undertaken by the government, and until now, a suitable mechanism has not yet been developed in Sudan. This is mainly due to many unaddressed issues, such as the mechanism of health financing, the cost to be borne by the users, the role of the government, the services to be exempted and who is going to finance them and how, and the responsibility for the provision of health services. As a result, all existing mechanisms are ad hoc initiatives made by the President or the First Vice President. In practice, policy-makers believed that the financial resources and administrative prerequisites for proper implementation of these initiatives have not been secured. 'Unclear vision about health care financing leads to frequent changes in decisions about the poor protection mechanisms and causes confusion to the policy-makers, practitioners and users as well' (Interviewee No. 10, a policy-maker).

According to the findings of this doctoral study, recent policy-makers' concerns have centred on the need to increase the proportion of the population protected against the negative impact of the Cost-Sharing Policy by the expansion of the Health Insurance Scheme, the activation of poor protection mechanisms, and the implementation of the recent presidential decrees for free treatment of cardiac surgery and renal transplants. This is mainly attributed to the general economic improvement and availability of much needed funding after the Peace Agreement, the increased oil exportation and the

expected co-operation of the international community and donors (further details will be given in chapter nine).

6.9 Summary

Against seven indicators of equity (namely gender, age, religion, ethnicity, disease, geographical location, and economic status of the population) defined at the beginning of this study, a considerable improvement in equity has been achieved in primary health care. The improvement in the equity of access to essential medicines via the RDF appears to be a consequence of the regular availability of essential medicines of affordable prices near to where people live, particularly in rural areas. The steady supply of medicines to the widely spread RDF health facilities reduces the overall costs of buying expensive medicines at private pharmacies and travel expenses incurred by users during the free-medicines era and even after the introduction of the Cost-Sharing Policy in non-RDF health facilities sampled for this study (i.e. Khartoum Hospital and Alshiekh Altayeb health centre). As a result, the vast majority (94%) of the RDF patients managed to pay for the cost of their medicines. Equity of treatment was also improved by the stability of RDF drug prices compared to the higher and frequently changed prices at private pharmacies. However, equity problems were reported in regard to the economical status of the users in secondary and tertiary care, and geographical coverage of health care facilities. Government measures to protect the poor or those who are not able to pay at the time of disease event are generally not functioning well at hospital level. The insufficient funds allocated by the Zakat to finance the hospitals' Solidarity Funds, as a consequence of underestimating the level of real need, the absence of the guidelines about whom to pay for, the lack of co-ordination between financing and care providing organisations, and the influence of strong social relations appear to be the main reasons behind the failure of the solidarity funds as a mechanism for poor protection at secondary and tertiary health care levels.

This chapter shows that the provision of low cost medicines via RDF health facilities increases access to treatment at Primary Health Care level. At this level more equitable access is being achieved. All policy-makers and practitioners were of the opinion that the RDF medicines are affordable and this is borne out by the surveys of users. The overall results suggest that if the main goal of the RDF in Khartoum State was to make essential medicines of acceptable quality and affordable prices available closer to where

people live, particularly in the rural areas, the RDF seems currently to work successfully. In contrast, the findings from the control group (non-RDF facilities), indicated the failure of local facility funds in maintaining a regular supply of medicines. The findings, however, show that the imposition of fee-for-service policy, particularly in secondary and tertiary care levels, causes real equity problems in access to health care services at these levels. The next chapter demonstrates the effect of the improvement in access to essential medicines via the RDF on the utilization of its health facilities in comparison to non-RDF ones.

7.1 Introduction

The RDF project in Khartoum State primarily aims to increase access to essential medicines and to promote efficiency, equity and better health, particularly for vulnerable groups (i.e. mothers and children) in the rural areas, by enhancement of utilization of PHC services (Mohamed 2000). The utilization of health facilities was expected to increase as a result of improvement in the availability of medicines via the RDF. In other words, the improvement in the quality of services as measured by the improvement in the availability of medicines was expected to offset the negative effects of user fees on the utilization of health facilities.

Factors affecting health care utilization have been amply discussed elsewhere (see, for example, Heller 1982; Marquis 1985; Akin, et al 1986; Creese 1991; Litvack and Bodart 1993; Nolan 1993; Collins, et al 1996; Aseno-Okyere, et al 1998; Nandakumar, et al 2000). These include demographic and socio-economic characteristics of users; perceived severity of disease; proximity of health care providers and availability of alternative sources; perceived quality and costs of services; and seasonal changes in diseases and availability of *in cash* or *in kind* resources to the users. It would be beyond the scope of this thesis to repeat the discussion of these factors here. Instead, this doctoral study focuses mainly on the impact of Khartoum State-RDF model as a drug financing mechanism on the utilization of the public health facilities in Khartoum State.

In evaluating the impact of the RDF on primary health facilities utilization, the improvement of health care seeking behaviour (such as enhanced utilization of PHC services, reduction of self-medication practice and uses of traditional healers, and efficient use of referral hospitals and other facilities) was tested. In this chapter the findings relating to the following research questions will be analysed:

1. are policy-makers, practitioners and users satisfied with Cost-Sharing programmes as one of the elements that improve the quality of services in terms of medicines accessibility;

2. whether or not the introduction of the RDF in the health facilities increases their utilization by all income groups and improves the quality of care by improving utilization of PHC services, reducing the utilization of the less effective alternatives sources (such as traditional healers and self-medication) and rationing the use of health services by decreasing the unnecessary use of health facilities;
3. whether people delay seeking health care until their condition becomes worse and they required hospital admission and do the poorest group fail to use public health facilities for financial or for reasons of geographical location.

The chapter concentrates mainly on changes in users' health care seeking behaviour after the introduction of the Cost-Sharing Policy in public health facilities. To reiterate, the comparison to assess the impact of the policy will be made between the RDF health facilities (where a user fees policy was introduced and essential medicines were made readily available) and non-RDF facilities (where charges were levied without improvement in the pharmaceutical supplies). The chapter is structured in seven sections including this introduction. Section 7.2 describes the quality of services provided in the selected health facilities, and policy-makers' and users' satisfaction. This section also presents the waiting time at public health facilities to obtain prescribed medicines as reported by surveyed patients. The impact of the RDF on the utilization of health facilities will be shown in section 7.3. Section 7.4 focuses on the reasons reported by the patients and households' survey respondents for the selection of health facilities. Section 7.5 describes the impact of the RDF on the efficiency of the health care system. It demonstrates the lightening of hospitals' burden and the reduction of unnecessary visits to public health facilities. Section 7.6 is devoted to an analysis of the improvement in the utilization of health care system. It specifically explains the impact of the RDF on the utilization of the Primary Health Care services, self-medication and uses of traditional healers. The last section presents summary and conclusions drawn from the findings presented in preceded sections.

7.2 Quality of health services and users' satisfaction

The patients and households' survey instruments included a question to be answered by those who used public health facilities during the 1980s (the era of free medication) relating to the changes in the quality of services after the introduction of the user fees. The percentages of respondents from patients and households' surveys who used the public health facilities during this period are respectively 78% and 87%. The vast majority (90%) of facility survey respondents agreed that quality of services in the RDF facilities 'has got better' in the light of medicine availability, compared with 61% of those who answered the question at non-RDF ones. The difference between two groups is statistically significant (χ^2 , $p = 0.03$). Overall, 76% of heads of households thought that the health services have got better, when measured by the availability of medicines compared to the situation before the introduction of user fees.

All (fourteen) policy-makers and practitioners (with exception of two out of ten) at the RDF health facilities believe that the quality of health services at public health facilities supplied by the RDF had improved. This judgement was based mainly on the regular availability of medicines in the RDF facilities. This study (as previously mentioned in chapter five) revealed that during the late 1980s (when health services and medicines were theoretically free) and currently in non-RDF health facilities, medicines were either not available or they ran out-of-stock too frequently.

It is clear that the presence of a considerable number (eighty-six items on the RDF basic list) of good quality medicines at affordable prices in RDF public health facilities is of paramount importance for policy-makers, practitioners as well as users because for them, availability of medicines means access to treatment (see chapter five). It was perceived as a real improvement in the quality of services. 'RDF has managed to convince the users by its good credibility in having a constant supply of medicines' (Interviewee No. 1, a policy-maker). However, there was a very clear feeling of resentment among all practitioners at Khartoum Hospital (non-RDF), especially older doctors, that despite the payment for medicines and other services, there had been no improvements in the quality of services compared with the situation during the 1970s. This was understandable, since in Khartoum Hospital medicines were not regularly available.

As presented in chapter five, drugs are of great importance for health facilities users. This is why the RDF facilities appeared to be the most appreciated ones. One practitioner said 'When a patient has got his medicines, he believes he has got the secret of the life' (Interviewee No.22, a practitioner). Medicines are, therefore, the dominant indicator by which users judge the quality of health facilities. The failure of user fees in improving the availability of medicines in non-RDF facilities led directly to user dissatisfaction. As long as patients are being directed to private pharmacies to fulfil their prescription, there will be only one conclusion in their minds, that the imposition of user fees is a big problem because there is no difference in the quality of services before and after the introduction of user fees. According to WHO (2004b), the lack of medicines in health facilities has lowered people's confidence in health care delivery systems. If medicines are not available at public health facilities, particularly in rural areas, people need to travel again to get the medicines. Policy-makers at KS and Federal Ministries of Health agreed that for patients the importance of the health facilities comes from the availability of medicines. Below is a typical quotation:

People perceive a health centre physical structure which is recently renovated and has nice garden, well-equipped and manned by a competent doctor who did not have medicines to dispense as useless. They would simply leave it saying that it was like a toy camel made of clay, looks very nice but useless (Interviewee No. 2, a policy-maker).

The quality improvement of health services in the light of the drug availability was reported more often by the policy-makers and practitioners at the RDF health facilities than at non-RDF ones. The improvement in the health status of the patients as a result of regular availability of medicines was reflected in the following unique observation:

From a clinical perspective, we noticed that the number of diabetic patients with ketoacidosis²⁷ was reduced. This is mainly attributed to the regular availability of Insulin and general improvement in health awareness of the population. During the 1980s and the early 1990s, Insulin was obtained solely from CMSPO with frequent shortages. The Insulin is now available everywhere (Interviewee No.1, a practitioner).

²⁷ Diabetic ketoacidosis is a severe out of control diabetes (high blood sugar) that needs emergency treatment. It happens when blood sugar level gets too high because of the patient taking too little Insulin.

There was widespread satisfaction among the policy-makers with the quality of medical services provided in the public health facilities, particularly at health centres. This satisfaction was mainly attributed to improvement in availability of medicines. They also thought that the referral hospitals have the best staff and equipment to deal with serious conditions. 'We trust our hospitals because we know their quality' (Interviewee No.9, a policy-maker). With exception of one, all policy-makers answered 'yes' to my question 'As a policy-maker, if you or your child fell ill (hopefully not), would you go to the nearest health centre or not and why?' The reasons given were, in this order, good quality, free services via insurance and proximity of public health facility to where they live. But two of them said if their ill child or relative needed hospital admission, they would take him either to a private wing in a public hospital or to a private hospital. The waiting time, ability to see their preferred doctor and the visible quality of a facility, such as hotel services, have been reported by policy-makers as important determinants of their choice of the private sector. The low quality of hotel services at public hospitals was attributed to crowded facilities.

If my child or a close relative has a serious health problem that deserves hospital admission, I will consult a private hospital. Not because the clinical care is better, but because their hotel services are better than public hospital general wards (Interviewee No.4, a policy-maker).

Only one policy-maker said he would consult a private doctor, if one of his family members was ill regardless of the severity of the disease. He attributed this to the high demands on his time and to some extent to his social status, but not because the quality of health care at public hospitals is necessarily bad.

In the patients' survey, respondents were asked about the time required to get the medicines. One half of those in facility survey said that they had obtained their medicines within less than one hour, but 20% said that it took them two hours, and 30% reported it took them three hours or more to be served. There was absence of any statistically significant difference between RDF and non-RDF facilities. In contrast to what was expected, there is a clear difference in favour of referral hospitals (i.e. Khartoum and Ibrahim Malik Hospitals), where 50% of respondents are served within one hour compared to 31% at Primary Health Care facilities.

In sum, the quality of services at the KS RDF facilities in the light of the availability of medicines is improved compared with non-RDF ones. It is clear from both qualitative and quantitative data that the perceived quality of services is one of the most important determinants of usage of health facilities.

7.3 Changes in attendance rates at public health facilities

All policy-makers and most practitioners at the selected RDF health facilities were of the opinion that the RDF, through maintaining a regular supply of medicines to the health facilities near to where people live, has increased the utilization of those facilities, including PHC services, such as immunisation. Before the introduction of RDF people in rural areas had to incur high transportation and time costs to obtain medicines (prescribed to them at their local facility) in more distant urban areas where expensive private pharmacies were located. Now the RDF makes medicines readily available locally. This reduction in overall costs results in the increased utilization of the RDF facilities.

People are willing to attend health centres where medicines are readily available, though they pay for them. This is because patients want to obtain all medicines prescribed to them from one point instead of moving around to get the medicines from more than one facility. Moving around increases their time and monetary costs, and delays the start of the treatment (Interviewee No.2, a practitioner).

Three (out of ten) practitioners at the selected RDF health facilities were of the opinion that the remarkable increase in the utilization of the public health facilities, which is confirmed by statistical reports (see below), is not exclusively due to the regular supply of medicines through the RDF. But they agreed that the regular supply of medicines has very important effects. Other factors mentioned by those practitioners include availability of doctors, diagnostic tests and increased awareness of the population. However, the policy-makers and the majority of the practitioners argued that the improvement in the utilization is a consequence of improvement in the medicines supply, because there is no change in the utilization of non-RDF health facilities, despite the availability of doctors and diagnostic laboratory reagents. ‘...the value of

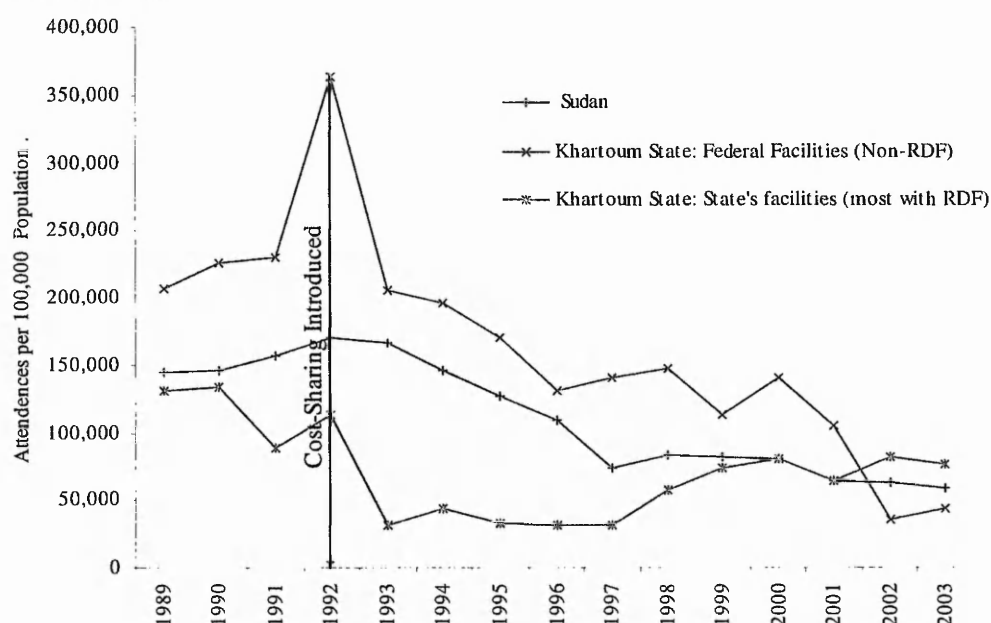
doctors was latent in the promptness in getting medicines they prescribed to their patients' (Interviewee No. 13, a policy-maker). The quantitative data support the latter opinion (i.e. the availability of medicines is the main factor that leads to increase in the utilization).

The impact of the Cost-Sharing Policy (which includes payment for medicines as well as for other services) on the utilization of public health facilities has been assessed in this study by comparing attendance rates (number of visits per 100,000 population was used to avoid misleading increase in the number of patients as a result of population increase), before and after the imposition of the user charges. Attendance in health facilities managed by KS MOH (including RDF and non-RDF facilities) were also compared with FMOH facilities (non-RDF facilities) using statistical reports available at FMOH and KS. The attendance data obtained from statistical offices at both Federal and Khartoum State Ministries of Health are of dubious quality because the health information system that actively collects utilization data is often not in place or does not produce reliable information (recall chapter four). In addition, changes in utilization over time are subjected to an array of factors which are discussed above in section 4.2.3. These factors include, for example, seasonal variations which affect disease patterns, and prevalence of new diseases, such as HIV/AIDS. Accordingly the findings presented here on this issue should be cautiously interpreted. Having said that, the attendance rates at all public health facilities throughout the country fell sharply in 1992, following the introduction of the user charges policy. The annual attendance records were not available per facility from pre-RDF situations. This makes it difficult to compare the changes in the RDF facilities utilization before and after the programme. However, the overall utilization rates of public health facilities managed by MOH KS steadily increased since 1997, when most MOH KS facilities were enrolled in the RDF, but never returned to the pre-policy level. Two policy-makers attributed the immediate reduction in the utilization to an expected reaction against user charges policy.

At the beginning of user charges people initially stayed away as a common sense reaction against the user charges for previously free services. But very soon they came back after they had made their own calculation against witnessed improvement in the availability of medicines (Interviewee No.1 a policy-maker).

It is not surprising that the utilization of non-RDF health facilities in Sudan, in general, and in Khartoum State, in particular, dramatically dropped after the introduction of the Cost-Sharing Policy in 1992, but without any remarkable improvement in the supply of medicines. Such a response to the introduction of the user fees or the increase of already existed fees was reported elsewhere (Carr-Hill 1994; Blas and Limbambala 2001). For example, Ryan and Birch (1988) estimated that a 10% increase in charges in the UK led to a 1.8% reduction in the utilization. Conversely, in MOH KS health facilities where the RDF maintains a constant supply of medicines, the introduction of user fees has positive effects on facilities utilization (Figure 7.1).

Figure 7.1: Changes in outpatients attendance rates at government health facilities 1989 to 2003



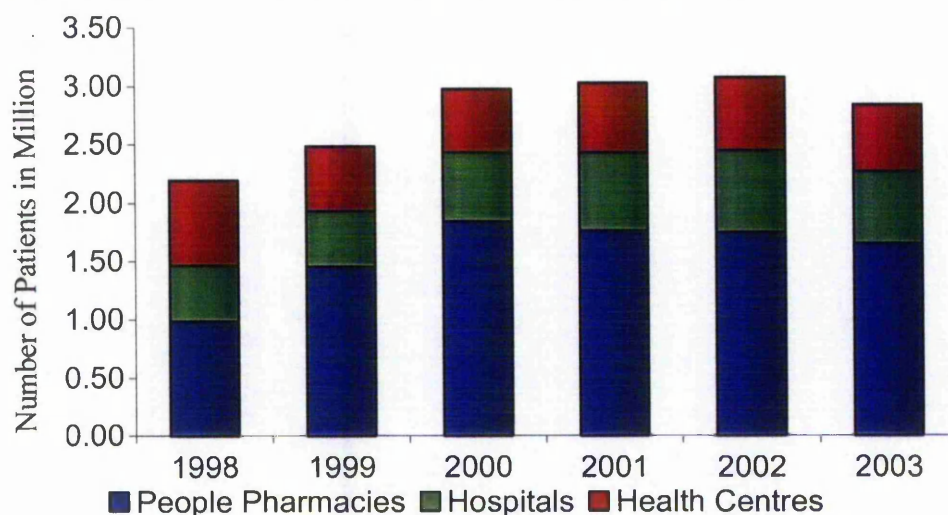
Source: compiled by the author from annual statistical reports, FMOH, 1989-2003b. Annual statistical reports, MOH KS, 1989-2003b

As it has been mentioned earlier in chapter five, the number of health facilities where the RDF is operated grew from thirteen health centres in 1989, to 104 health centres and twenty-two hospitals in 2003. With this impressive growth, the RDF has become a major contributor to the total number of users of public health facilities in Khartoum State. The absolute and proportional numbers of patients who fulfilled their prescription at the RDF facilities steadily increased from 683,069 (17,053 per 100,000 population) in 1996 (no figures were available before 1996), to 3,030,996 (61,406 per 100,000 population) in 2001. This remarkable increase in the utilization of the public health

facilities where the RDF is operated was due to the increasing number of RDF facilities as well as an increasing number of patients per facility. The increasing number of patients per facility is confirmed by figures of the years 1997 to 2001 because the number of facilities has not changed during this period. In 2002 and 2003, fourteen health centres and two hospitals were added to the network. As a result, in 2002, the RDF managed to meet the medicines needs of 3,075,728 patients out of the 5,139,000 estimated population of Khartoum State (i.e. two thirds of the population were served by the RDF pharmacies), though with small decrease in the proportional number (59,851 per 100,000 population) since 2002. The reasons for this reduction are as yet unexplained. However, a number of possible explanations exist. One possibility is that malaria cases in out-patient clinics fell by 15% from 836,831 cases in 2002 to 707,740 cases in 2003 (FMOH 2004) as a result of the launching of Khartoum Malaria Free Project in 2001. I considered the information collected from RDF records to be of high quality for a number of reasons, including the good reporting system in place at RDF's pharmacies (recall chapter four).

Users' confidence in the RDF resulted in the increased utilization of its facilities as presented above. This fact, including the increased use of the people's pharmacies side of the business (on average 57% of the RDF customers use the people's pharmacies during the last six years), will have contributed to the ease of providing public health care in Khartoum State as well as removing pressure from the referral hospitals. Figure 7.2 provides a quick reference for the distribution of the RDF customers among its outlets.

Figure 7.2: Distribution of users between different RDF pharmacies



Source: compiled by the author from RDF annual reports 1998a-2003a

When compared with the sharp decrease in the overall number of patients in other health facilities (see figure 7.1 above), this trend suggests that people are willing and able to pay more if the quality of services, especially accessibility to quality medicines, is improved. This was explicitly expressed by the household respondents who were directly asked in this study, whether they would be willing and able to pay, if the availability of low cost medicines was improved. The answers to these two questions were 'yes' by all (100%) respondents. These findings are similar to those reported by Murakami and colleagues (2001) in Vientiane, the capital of the Lao. The authors of that study found that 90% of the surveyed villagers were willing to pay, if an affordable fee level, with quality of service and availability of medicines, was guaranteed. My research instrument was not designed to ask respondents when they consider medicines to be affordable. However, Russel (1996) reported that the costs of health care, including medicines, can be considered affordable when households do not reduce health expenditure to levels that threaten their health and when spending on health does not threaten their productive assets (recall chapter six).

In-depth interviews with policy-makers and RDF health facilities practitioners were in line with the data in the archival records and households' survey. Policy-makers agreed that the RDF positively affects health facilities utilization even among the poor and most vulnerable groups, since they benefit more from the regular availability of medicines in their local facility. The interviewees perceived the availability of medicines at health facilities, particularly in rural areas, as a main factor leading to increased attendances at the RDF facilities. They also agreed that the utilization rates of all services provided at health facilities supplied by the RDF notably increased. 'It was very clear from our supervision visits that the number of health centre attendances dramatically increases after the introduction of the RDF' (Interviewee No.9, a policy-maker). On the other hand, the utilization rates of health centres without RDF (i.e. without medicines) were very low, despite the availability of medical doctors and equipped diagnostic laboratories. However, there were only thirty-six health centres without the RDF system at the time of this study. The introduction of the RDF in these remaining health centres appears to be an important direction for further improvement in public access to essential medicines in KS. There may be, however, a tension with the profitability of the RDF.

...we always have arguments with RDF managers: which came first, the chicken or the egg? The RDF managers claim the RDF should be introduced in health centres of high utilization rates. Our argument is that utilization rates would be increased after the introduction of the RDF but not before it (Interviewee No.7, a policy-maker).

7.3.1 Are public health facilities well-utilised?

The information gathered from the MOH KS statistics office relating to the period from 1989 to 2003 (i.e. three years before policy change and then until the last report available), showed a reduction in the average utilization rate of public health care facilities in Khartoum State. The utilization of these facilities reduced from 1.12 visits per person per year, before the introduction of the Cost-Sharing Policy in 1992, to the average of 0.57 visits per person per year ever since. But, the reduction in the average number of visits per person per year rose correspondingly to 3.06 and 1.85 visits when Federal health facilities in Khartoum State are also taken into account. This reduction in the number of visits per person per year is better than that reported by Gotsadze and colleagues (2005) in Georgia, where a health sector reform programme including out-of-pocket payments was introduced in 1995. The authors of this study found that outpatients utilization rates were reduced from, a very high eight visits per person per year in 1990 to only 1.3 in 2000. The reduction in health facilities utilization in KS is even far better than that reported by Allegri and colleagues (2006) in the Nouna Health District in Burkina Faso, where they attributed the low annual per capita average of only 0.16 contacts to the financial barrier imposed by user charges.

This information indicates the under-utilization of health facilities before and after the introduction of the Cost-Sharing Policy. The RDF health centres were also under-utilized. For instance, the average number of patients consulting RDF health centres per shift was only thirteen patients (RDF 2002a). This compares with findings reported by Abu-Zeid and Dann (1985) in Ismailia, Egypt where they found that each physician in a health unit sees an average of fifty patients every working shift. The authors actually considered these units were being under-utilized. However, the authors of that study did not mention the reasons that led to the under-utilization of public health facilities in Ismailia. In personal communication with the manager of MOH KS statistics office, he attributed the further under-utilization of public health care facilities after 1992, to the

introduction of user fees, the increased number of NGOs clinics (from less than fifty before 1992 to 214 clinics), and the rapid growth of private hospitals (from four before 1992 to forty-three hospitals in 2003) and private doctors' clinics after the adoption of the economic liberalisation policy in health.

7.3.2 Utilization of public health facilities by the poor and vulnerable groups

The policy-makers and practitioners thought that the current fees paid at health facilities, especially at hospitals (after the first twenty-four hours of admission - a period of free services), deterred some people from accessing hospitals services. '... definitely there is the poorest people who face financial barriers to utilization' (Interviewee No. 4, a policy-maker). According to them the utilization of health services by the poorest people is adversely affected mainly by the fees levied for other services, such as doctor's consultation, diagnostic tests and dressing fees at health centres and fees for surgical operations, X-rays, admission and other services at hospitals. This situation is of particular concern for policy-makers, since it increases patients' pain and suffering, and increases the overall costs because when the disease is, ultimately, reported, it may require more specialised care which may be very expensive. In addition, unequal access to health care creates public health problems and thereby affects the overall health status of the population, especially in case of infectious diseases, such as sexual transmitted diseases. Finally, ill health reduces earning ability and this in turn deepens the poverty in the community.

However, the policy-makers and practitioners agreed that, despite the presence of a few (exact figures do not exist) cases of people who could not pay for their medicines, low income groups were not deterred from attending Primary Health Care facilities. The practitioners can not give 100% certainty, but they are in a very good position to make professional judgements. Their perception of users' ability to pay for their prescription's cost was confirmed by quantitative data from the patients' survey, which revealed that only 6% of surveyed patients at RDF facilities failed to obtain their prescribed medicines for financial reasons. Explanations given by both the policy-makers and practitioners include the fact that overall costs at health centres were low, and strong informal social networks, such as extended families (which share the cost of health care when a poor member of the family is ill) as well as formal exemption mechanisms through the Zakat. Members of pharmacy staff at three RDF health facilities argued that

even those who do not have enough money to pay for their medicines immediately, by the end of the day got their medicines. 'Patients generally go home and come back on the same or following day to claim their medicines' (Interviewee No.3, an assistant pharmacist).

In the research reported in this thesis, only 2% of households' survey respondents reported that the costs of services were a reason for not using public health facilities. Surprisingly, these findings did not vary significantly by income group. The data also showed that a negligible proportion (2%) of household respondents have forgone seeking health care because a public health care facility was too far away. These findings confirm evidence from practitioners which show that in the event of illness even the poor seek care at public health facilities. The results also clearly confirmed the policy-makers' argument that the health services, especially at primary care level, are accessible and affordable for the majority of the population. Therefore I can confidently say that in Khartoum State user fees do not deter the low income group from seeking health care at primary care level. However, this does not mean that patients could afford to pay for the clinical intervention or medicines recommended to them at all levels. It means the patients come to health facilities regardless of their financial situation due to the widely held belief that health services are free at hospitals outpatients' clinics. But this does not guarantee that they receive the required treatment, because receiving prescribed medicines depends on how soon help could be obtained from a relative, a friend or other sources (recall chapter six for strategies identified in this doctoral study about how patients cope with the user charges).

7.3.3 RDF medicines' price increase and utilization response

In the early 1990s, the managers of the RDF used to increase medicine prices at least twice per year to avoid financial losses due to local currency inflation (1998b). Graphically, the price increase causes a temporary drop in the attendance rates, but the curve very soon returns to its normal position (i.e. pre-price increase). 'We noticed a drop in the number of attendance of the RDF health facilities immediately after the revised prices of medicines come into effect, but very soon it rises again to the previous level' (Interviewee No. 13, a policy-maker). Eight (out of fifteen) interviewees in the RDF health facilities mentioned similar observations. An in-depth interview with a policy-maker who was in close contact with the RDF during the 1990s suggested a

number of reasons for this phenomenon. These include the possibility that the new price might not be affordable to poor patients, some patients think of their diseases as self-limiting illness, or patients stop reporting unnecessary visits. This is why after one month or so, the attendance returns to its original level (i.e. before price increase). It is clear that users adapt themselves to the new prices. This also implies that the perceived quality and real gains of the users from the RDF outweigh the side effects of the increased price of medicines. The literature (see, for example, Fabricant, et al 1999) suggests that the recovery time and the residual decrease in the utilization (if any) depend mainly on the rate of the price increase, patients' perception of the severity of their disease, and on the availability of alternative sources of care.

7.3.4 Delays in attending to health facilities

The Cost-Sharing Policy was criticised by the majority of practitioners in both RDF and non-RDF hospitals who were interviewed for this doctoral study, for discouraging early treatment of diseases. The consequence of the delay in seeking health care is that the cost of treatment may increase, for example patients may need a specialist consultation and hospital admission which is more expensive. In-depth interviews with the practitioners revealed that they see many patients who delay consulting hospitals for too long, and till they become critically ill or till it is too late. The following are typical quotations.

...more patients come late and are severely ill than before the introduction of the user charges (Interviewee No.23, a practitioner).

This hospital serves people from poor areas, for example, displaced camps. Many of our patients do not have enough money to meet the hospital costs. The patients stayed at home until they get very ill, sometimes they come after it is too late (Interviewee No.21, a practitioner).

Contrary to my expectations, the quantitative data showed that nearly half (48%) of the patients respondents at the RDF health facilities had fallen ill three or more days before consulting the health facility. The most common reason among all respondents of the patients' survey in this study for coming late was 'wait and see', which was reported by 19% of the respondents. About 10% of the respondents delayed seeking care because it

took them some time to find enough money. The delay in seeking care was often associated with the seriousness of disease as perceived by the patients or his (her) relatives, for example, sometimes patients expected their disease to be self-limiting; how soon needed financial resources could be ready (Weaver 1995; Asenso, et al 1998); or for decision making process of finding a place where treatment could be sought (Ryan 1998). However, none of the patients who sought health care after three or more days reported the availability of medicines or distance from a health facility as a reason for delay. This suggests that geographical coverage and availability of medicines are no longer issues of concern for the users of the RDF health facilities.

7.4 Factors influencing the users' selection of health care providers

In Khartoum State, individuals are able to choose between a set of health care providers, particularly in urban areas. The choices are: public health care facilities including MOH health centres and hospitals; military and police hospitals; Khartoum University hospitals; private doctors' clinics and private hospitals; private pharmacies; and clinics run by NGOs. These choices are very limited or do not exist at all in certain rural areas where the public health care facilities and traditional healers are the most likely available choices. Based on many factors, such as their perception of symptoms, the quality of services available, proximity of the facility, and patients' income, people make choices amongst these options. For example, the five most frequently used sources of health care identified in the households' survey were public health care facilities (66%) or higher cost private clinics (22%). Other sources comprise private pharmacies (7%), traditional healers (3%) and diagnostic laboratories (1%). There was an absence of any statistically significant difference ($\chi^2, p = 0.468$) regarding the choice of health care provider across household income. This suggests that the households' choice of providers is not influenced by their income. However, the low income groups use public health care facilities, private pharmacies (i.e. self-medication) and traditional healers more than the other groups. Surprisingly, in this study all respondents to the rural households' survey had sought medical care at public health care facilities unlike their urban counterparts, who were found to seek care at all available sources (i.e. public health care facilities, private clinics, private pharmacies and traditional healers). The difference between urban and rural inhabitants, in terms of where care is obtained, was found to be statistically significant ($\chi^2, P = 0.016$).

The dominance (for example, 83% of patients came directly to the RDF facilities) of consulting a public health care facility as a first response when feeling ill meant that the public health facilities are still a provider of choice. In other words, the RDF health facility consultation is the first attempt made by the patients' survey respondents to treat their health problem. As many as three quarters of patients' respondents who had visited other health care providers brought the problem to the RDF facilities after treatment at other sources had apparently failed to achieve the needed result. The remaining (25%) have been referred to the RDF facilities. This reflects the fact that respondents perceived the quality of low cost services provided at the RDF facilities to be high, and that users either directly consulted the RDF facilities or resorted to them after trying other providers. The four most important reasons given by health facility survey respondents for their decision to seek care at the RDF health facilities, in descending order of frequency, are 'near to my residence'; 'good reputation'; 'I can manage to pay cost of medicines'; and 'medicines are available'. For other reasons, see table 7.1. These findings support what had been said by the majority of policy-makers that the public health care facilities are still the place of choice for all peoples regardless of their socio-economic status or their geographical location.

Table 7.1: Reasons for selecting health facility by patients' survey respondents

Reasons for selecting the facility	RDF facilities n = 48	Non-RDF facilities n = 45	Total n = 93
Near to my residence	44%	18%	31%
Good reputation	31%	13%	23%
I can manage to pay medicines' cost	13%	13%	13%
Medicines are available	10%	4%	7%
Best facility locally for me	6%	7%	6%
I have been referred to	4%	24%	14%
Doctor available	4%	0%	2%
Others	10%	22% ^{**}	17%
Total	[*] 122%	101%	113%

^{*}The total is more than 100% because some respondents identified more than one reason.

^{**}Ten patients out of forty-five everybody mentioned different reason for selecting the facility.

The households' survey showed that about one fifth of patients during the previous two-week recall period were not prevented from undertaking their normal activities, that is, they had mild diseases. Almost half of those in the household survey partially stopped their activities. But nearly one third of sick people had completely stopped their usual activities. Table 7.2 presents changes in the normal activities of the ill persons from data obtained from the households' survey, and the decisions they made about where to seek health care. This pattern supports the argument of health care providers that the public health facilities are still the first choice of the population in Khartoum State, regardless of the perceived severity of the disease. Nevertheless, changes in the normal activities, reflecting the perceived severity of the disease, influence the choices of the patients in the case of the private clinics and private pharmacies. For example, 30% of those who have had stopped their normal activities consulted private clinics compared to only 5% of those who reported 'no change in their normal activities'. These results seemed to suggest that changes in the normal activities of the ill member of the surveyed households played an important role in the selection of a health care provider.

Table 7.2: Changes in the normal activities of the ill persons from the households' survey and the sources of treatment

Providers	Changes in ill patient normal activities			Total (n = 92)
	Stopped his activities completely (n = 27)	Stopped his activities partially (n = 45)	No change in the normal activities (n = 20)	
Consulted public health facility	67%	60%	70%	66%
Consulted private clinic	30%	24%	5%	22%
Consulted private pharmacy	0%	7%	20%	7%
Consulted private diagnostic laboratory	0%	4%	0%	1%
Consulted traditional healer	4%	2%	5%	3%
Others	0%	2%	0%	1%
Total	100%	100%	100%	100%

As I have mentioned above, the results from both facility and households' surveys do not support the observation made by three practitioners that the public health facilities mainly serve the poor population and people in low socio-economic classes. Instead,

this study reveals that public health care facilities serve populations from different socio-economic groups, and rural and urban populations as well.

7.5 The Cost-Sharing Policy and efficient use of public health facilities

One of the RDF's objectives was to lighten the burden on the Federal teaching hospitals by shifting patients to the lower level of the health system pyramid. Generally speaking, at all levels of the health care system, the Cost-Sharing Policy has the potential to increase the economical use of health facilities. This section presents descriptive findings about the reduction of the hospitals' burden and the efficient use of the public health care facilities, after the introduction of the Cost-Sharing Policy, in general, and the RDF, in particular.

7.5.1 Reduction of hospitals burden

Despite the fact that the utilization of health centres and rural hospitals increased remarkably after the introduction of the RDF, the effect of the RDF on hospitals' burden is not clear after the introduction of free emergency services in 1996 (recall chapter six). Since then, the situation for outpatients' services has been reversed. Four policy-makers thought that the new policy moves patients up the health system pyramid. In other words, the burden on hospitals was increased after the introduction of free emergency treatment at hospital outpatient departments, because the policy of user fees is still applied at primary care level. They therefore believe that giving free services at hospital emergency units has a negative impact on the efficiency of the health care system. According to them, the new policy reduces the use of cost-effective care at health centres by unnecessarily encouraging the greater use of high cost services at hospitals level. One of the senior doctors argued that the hospitals' burden increased, because the Cost-Sharing Policy failed to make available the basic treatments for simple ailments, such as dressings or wound stitching, at low levels. My field observations, however, contradicted this argument. I noticed that the basic equipment mentioned is available at selected health centres. Among the possible explanations for this particular practitioner's observation are that he might not have seen the health centres recently, or he might have negative feelings towards the current government and its policies. Indeed, he explicitly demonstrated to me his opposition to the present government.

However, the argument that free medicines and less-equipped health centres shifted the patients to the hospitals is not supported by the statistical data presented in section 7.3. The attendance rates at Federal hospitals have steadily decreased while the attendance rates steadily increased at Khartoum State health facilities. These contradicting trends at Federal and State health facilities support the point mentioned by the majority of the policy-makers that the widespread of quality services at health centres, particularly in rural areas, lightens the load of Federal teaching hospitals which previously were heavily used. These policy-makers argued that, despite the rapid growth of KS population, the absence of a referral system (i.e. a system that prevents a direct access to hospitals by patients, and one that could channel patients more logically through the health pyramid), and the availability of free services during the first twenty-four hours; the outpatients' attendance rates at hospitals level did not markedly change. They also agreed that there was a sustained increase in attendance rates at rural hospitals and health centres supplied by the RDF, where fee-for-service is operating in health centres. The proximity of health centres to where people live, the perceived high quality, as measured by assured availability of medicines at the RDF health centres, the limited list of free emergency medicines and their frequent stock-outs, all leave users uncertain about whether they will have to purchase drugs from private retail pharmacies or not. 'I heard that drugs are free at Khartoum Hospitals, but this is not true' (A patient at Khartoum Hospital comments). These are the main factors mentioned by the policy-makers to explain this paradoxical situation, that is the increased utilization of health centres despite the existence of free services at hospitals' outpatient clinics.

It was clear from the interviews with policy-makers that they believe that, as people cannot be sure whether they will get free medicines at hospital outpatient clinics, many decide to use their local RDF health centres where medicines are regularly available. For patients, it was worth while paying the cash costs of medicines and other medical services, in order to avoid wasting time travelling to hospital. But it means that they end up getting medicines at a higher cost from private pharmacies.

Even if the services are now free at hospital outpatient departments, having medicines available at the RDF health centres convinces patients to use their local facilities. Because by doing so, they escape other cash and time costs, for example, transport costs, and travelling and waiting-time costs (Interviewee No.2, a policy-maker).

... they actually cheated us by saying medicines are free at Khartoum Hospital... I did not find any free medicines. I bought my medicines from a private pharmacy (A patient at Khartoum Hospital comments).

In practice, however, there remains considerable over-utilization at hospitals and under-utilization at health centres (Creese and Kutzin 1995). This statement is found to be true in Khartoum State. The policy-makers and practitioners believe that originally patients have tendency to go directly to hospitals, even when their health problem could be treated at health centre level. They attribute this problem to the lack of a proper referral system, and to the patients' belief that they will get better medical care at hospitals. 'Patients believe that they create a 'short cut' by coming directly to the hospitals. For them, seeking health care at health centres is a waste of time, because they will end up with a referral report' (Interviewee No.22, a practitioner). This tendency of the patients to use hospitals was exacerbated by a number of factors: the prices of medicines are equal throughout the RDF health facilities (i.e. there are no differential prices between hospitals and health centres). This pricing policy does not give patients any financial incentive to use the primary health centres as the point of first contact with the health care system. Secondly, charging patients at non-RDF health centres (where medicines are not regularly available) reinforces existing incentives to overuse hospitals. Thirdly, the policy-makers and practitioners argued, the Khartoum State Federal hospitals provide the medical care to Khartoum, but also to other states' population. These hospitals are referred to from all over the country because they are the best equipped, specialised hospitals in Sudan. This argument explains the overall high utilization rates of Khartoum State Federal hospitals (recall figure 7.1). Finally, the situation was thought by four policy-makers to worsen after 1996, when the free emergency treatment project was introduced at hospital outpatients' clinics. This situation reduces the efficiency of the overall health care system by encouraging patients to bypass health centres and go directly to the hospitals.

The best example of the negative impact of these factors on health care system efficiency is the decreasing share of attendances at health centres in the total outpatients' attendances of non-insured patients. In 2002 (changing reporting by the RDF makes it difficult to find disaggregated data in 2003 annual report), out of 1,234,090 non-insured patients reported at the RDF health facilities' pharmacies, only 27% visited RDF pharmacies at health centres (RDF 2002a). The remaining majority

consulted RDF pharmacies at hospitals. Whereas in the same year, patients of the Health Insurance Scheme, where the referral and pay-for-performance systems were well-applied, the share of health centres was found to be as high as 84% of the total insured patients who received medicines at the RDF pharmacies (RDF 2002a). This held for both health centres and hospitals. According to the RDF annual report of 2002, this unexpected situation was due to the continued late arrival or frequent absenteeism of the doctors at health centres, in addition to the above mentioned factors (i.e. free services at hospital levels, lack of referral system and similar RDF prices at all health facilities). The above results suggest that this efficiency problem has not been recognised, and that addressing the RDF structure of medicines' price across different types of its facilities was not a priority concern during this long period.

However, the MOH KS introduced new arrangements at hospitals emergency clinics one month before my fieldwork (i.e. in May 2004), to improve the efficiency of the health system (recall chapter six). These new arrangements aimed at encouraging patients to go to health centres, rather than going directly to hospitals. They also aimed to increase hospitals' revenues from patients who are not eligible to be treated through the free emergency treatment project, or those who are not referred from lower facilities (i.e. health centres). According to these reforms, patients who are genuinely emergency cases are treated free; otherwise they pay for all services, including medicines. In other words, these arrangements charge patients without emergency conditions the same consultation and diagnostics fees as those levied at the health centres. The patients also purchase their medicines at hospital RDF pharmacies instead of receiving free medicines from the emergency list. The results, according to MOH KS policy-makers' interviews, seem to have been very promising. However, the system is not without problems. For instance, the policy-makers at MOH KS reported that the system is confronted by the constraints imposed by the maldistribution of health centres. This situation has meant that inhabitants from villages without health centres need to travel first to a nearby health centre to get a referral report and then come to hospitals. The policy-makers admitted to me that this pathway is not practical, and that they have tried to find a solution to this issue.

7.5.2 Rationing of unnecessary utilization of health facilities

Unnecessary care has been defined as care provided, but medically not needed (Liu and Mills 1999). The user charges policy is sometimes advocated, because of its potential to hinder people from making unnecessary use of health facilities. According to Nolan and Turbat (1995, p.47), it is possible that user charges associated with quality improvement lead to a fall in frivolous visits, since people may be willing to pay for improved services when they have a serious illness, but not otherwise.

Consensus was shown by the policy-makers and practitioners interviewed for this study, about the reduction of the frivolous visits, especially to hospitals, after the introduction of user charges. They argued that, apart from adverse effects on those who really need medical care, the introduction of user fees, in general, and the RDF, in particular, strongly reduces unnecessary visits to the health facilities. Before 1992, when medicines and other services were publicly financed, it was very common practice for medically fit people to drop by a hospital outpatient department, to ask for general medical check up.

...before Cost-Sharing, visiting hospital was a part of the usual programme of pastimes for individuals... they normally did their shopping and visited the hospital to obtain free medicines (Interviewee No.5, a policy-maker).

I was a house officer in Khartoum North Hospital in the early 1990s (i.e. before user charges). It was very common in the outpatient clinics, to see a person (who had originally come to visit his inpatient relative or friend), putting a food carrier on your desk without any shame and asking you to do a general medical check up for him. All these practices have now disappeared (Interviewee No.10, a policy-maker).

The policy-makers and practitioners thought that users had stopped making multiple visits. Simply, because the payment for services makes people think carefully whether their health condition really needs a health facility consultation or whether it is a self-limiting disease, before deciding to visit a public health facility. The policy-makers also mentioned that, unlike the pre-policy situation, the regular availability of medicines makes people feel confident that they will find the medicines when they really do need them. The advantages of this change include freeing health professionals to deal with

genuine cases and a subsequent reduction in patients' waiting times. 'The availability of medicines in peripheral health facilities clearly reduces the load on the Federal hospitals. I recall when I was a house officer in Khartoum North Hospital in the early 1990s, that the outpatient department was so crowded that you could not scratch your head' (Interviewee No. 27, a practitioner). The payment for medicines also makes people use their medication rationally and helps in establishing adherence to the treatment regimen. However, these data did not exclude the possibility that some patients, despite being seriously ill, do not have enough money to pay for health facilities (i.e. user fees hindered patients who need tertiary care), as was mentioned in chapter six.

However, the symptoms of the free medical services (i.e. unnecessary utilization of health services) have emerged again. The same practice of asking for a general medical check up without any specific health problem or complaint was reported by practitioners as a common phenomenon with insured people nowadays. This unnecessary utilization of medical services by insured patients is attributed mainly to the free services provided to them. As mentioned in chapter three, insured patients are eligible for free medical services and pay only 25% of their prescription cost.

However, overall, evidence from in-depth interviews with policy-makers and practitioners, the archival and statistical records, and the examples of the insured patients' behaviour mentioned above, all suggest that the introduction of the fee apparently discourages unnecessary use of health facilities and thus contributes to improved efficiency of the health system.

7.6 Improvement in utilization of health care system

The primary aim of the RDF was to increase the utilization of PHC services so as to improve the health of children and mothers. It also aimed to correct undesirable practices, such as self-medication and use of traditional healers, by improving the availability of quality medicines at low cost in public health facilities, especially in the rural ones. The following sections present the findings of this doctoral study on the impact of the RDF on the utilization of the PHC services. They also demonstrate

findings on the prevalence of self-medication and the use of the traditional healers after the number of health facilities supplied by the RDF has been substantially increased.

7.6.1 Utilization of Primary Health Care services

Most PHC services, such as immunisation and growth monitoring, continued to be provided free of charge, even after the introduction of user charges. Policy-makers at KS MOH believe that the RDF has led to a remarkable increase in the uptake of immunisation against childhood diseases, nutrition and growth monitoring, health education, family planning services, and attendance for antenatal care. 'The greatest increase in the immunisation coverage and the utilization of other PHC services was clearly associated with regular availability of medicines at health centres through the RDF' (Interviewee No.6, a policy maker). He added, 'The availability of essential medicines by itself is the one of the PHC components declared in Alma-Ata. Medicines also are very attractive to the people when they become regularly available'. The policy-makers argued that the attractiveness of the RDF health facilities leads to increased utilization of curative care which in turn enhances the utilization of PHC services. The increased utilization of curative care also encourages the MOH to set measures to boost the utilization of PHC services. 'We established a pathway for mothers and children at health centres. They recommended to seeing the PHC office before consulting the doctor' (Interviewee No. 9, a policy-maker). The increased utilization rates of curative care, therefore, represent a good opportunity to increase the utilization of preventive care services. Finally, the availability of medicines at local health facilities has removed constraints on prompt care that resulted from the fact that an ill female member of a household could not travel alone. This improves the number of beneficiaries of PHC services. Below is a typical quotation:

Before the enrolment of the rural health facilities in the RDF, an ill female member of household might not be able to travel alone out of the neighbourhood to seek health services. Normally they wait until the head of household comes back from work to take her or her child to a hospital or a private clinic. The medicines are now available within walking distance and female members of households can seek treatment unescorted by a male family member for themselves or for their young children (Interviewee No.2, a policy-maker).

These findings were compatible with the findings of Thomas and colleagues (1996) in Ghana where the improvement in medicine supplies significantly improves nutritional status of children and with the argument of Yazbeck and Leighton (1995), that the increased utilization of curative care stimulates the utilization of PHC services.

7.6.2 Self-medication practice

Despite the lack of evidence, four policy-makers and three practitioners thought there had been a notable increase in public reliance on retail pharmacies. They believed that patients attempted initial treatment by buying medicines from retail pharmacies and consulted a health facility only when they experienced no improvement or when their condition became worse. This practice can be attributed to a number of factors, according to those policy-makers and practitioners. These factors comprise, first, doctors' prescribing practice '... doctors sometimes prescribe, for example, Chloroquine for all patients who complain of fever' (Interviewee No.22, a practitioner). Second, retail commercial pharmacies are thought to be more accessible, since no appointment is needed and no consultation fee is required. Third, there is the practice of pharmacists dispensing medicines to their clients without prescription. 'People do not necessarily have to consult a health facility to get a prescription, since it is possible to buy the medicines directly from retail private pharmacies' (Interviewee No. 10, a policy-maker). Fourth, many pharmacists sometimes play the role of the doctors, by conducting some medical consultations. This practice also encourages patients to use the pharmacies. '...often pharmacists pretend the doctor's role by asking patients who seek their advice, about the history of their diseases, as doctors do' (Interviewee No.10, a policy-maker). Fifth, patients try to save the consultation fees of health centres and wait for long time to be treated, by directly buying medicines from community pharmacies. Sixth, the difference in the prices of common, fast moving items, such as Paracetamol tablets, between the RDF and the private pharmacies is minimal. This reflects cross-subsidies operated by the RDF, which serve to raise the price of cheaper, more common items against more expensive ones. Finally, there is the Sudanese culture of self-diagnosis.

...patients assume all fevers are either malaria or typhoid, and go directly to a pharmacy and buy Chloroquine or Septrin. When we asked our patients, did you

take any medication, most of them said they had been injected with Chinese oily injection (i.e. Artemether) (Interviewee No.22, a practitioner).

Nevertheless, the majority of the policy-makers and practitioners at the RDF health facilities argued that most of the reasons underpinning self-medication have been solved by the RDF, especially in regard to availability of essential medicines at the local public health facilities. Additionally, substantial medicine price differences between the RDF and alternative sources compensate for the consultation and diagnostic fees. As a consequence, the reduced overall costs at the RDF health facilities encourage people to use their local RDF facilities instead of taking the risk of self-medication.

To answer this question [What is the impact of the RDF on self-medication], let us first answer the question: what factors encourage people to resort to self-medication? I think a patient resorts to self-medication when health facilities are known either to be perpetually without or frequently experience shortages of medicines, the expected total cost at the health facilities is higher than purchasing direct medicines from pharmacy and finally if quality of care at the health facilities is perceived as low. In Khartoum State all these causative factors are solved by the RDF. So I can confidently say the RDF has a very negative impact on the practice of self-medication (Interviewee No.3, a policy-maker)

...if medicines of assured quality and affordable prices are readily available, and if doctors and diagnostic facilities are also available, what makes people jeopardise themselves to trial and error through self-medication (Interviewee No.9, a policy-maker).

Three practitioners in selected rural health facilities believed that self-medication is unlikely to exist in rural areas, because in the rural areas there are no private pharmacies. The private pharmacies are mainly in cities and towns. The only sources of medicines available for the rural population are government health centres and hospitals. Most of these health centres are supplied by the RDF. According to the RDF regulations, medicines are dispensed only against prescription from an authorised health facility member of staff. This seemed to be true. All households' survey respondents in

rural areas reported that they consulted public health facilities when a member of their household was ill.

In urban areas, a small proportion (7%) of households' survey respondents reported that they consulted a private pharmacy when a member of the household was ill during the two weeks prior to this study. But, none of the patients' survey respondents consulted a private pharmacy or used any self-medication before coming to the RDF facility. These quantitative data confirm the perception that increased availability of medicines near to where people live reduces self-medication. The data also give an indication of the less frequent practice of self-medication in Khartoum State.

7.6.3 Use of traditional healers

The policy-makers and practitioners thought that the use of traditional healers is not prevalent in Khartoum State. The reasons they gave include awareness of the Khartoum State communities, and the availability of many choices of health care facilities including government health centres and hospitals, private hospitals, private doctors' clinics, NGOs' clinics and private pharmacies. The policy-makers and seven practitioners thought that the improvement in the quality of services, through the high percentages of availability of medicines at the RDF health facilities, reduces the utilization of traditional healers. Some typical quotations were:

The people resort to traditional healers either for culture and beliefs or when the medicines are not accessible. I think the RDF at least resolves the accessibility related issues (Interviewee No.13, a policy-maker).

...definitely the RDF has negative impact on the utilization of traditional healers (Interviewee No.11, a policy-maker).

...the logic said there is no reason for people to resort to traditional healers, after the medicines of low cost are made available even at rural health centres level (Interviewee No.3, a policy-maker).

As I said before, if an ill person has access to medicine of acceptable quality and reasonable price, and to a doctor who can diagnose him properly and

prescribe to him appropriate treatment, then there is no any single reason for a patient to ride the risk of trial and error by consulting a traditional healer. Because traditional healers pose a number of uncertainties about the disease, the dose and the correct treatment (Interviewee No.9, a policy-maker).

In addition, traditional healers also charge their customers fees that sometimes exceed those paid at health centres, including the prescription cost. Quantitative data from both patients and households' surveys confirm these qualitative data. For example, a negligible proportion (2%) of households' respondents said they had consulted a traditional healer, and only 3% of patients' respondents consulted traditional healers before coming to a public health facility. These results seemed to suggest that the downward trend in the use of traditional healers is multi-factorial in cause, but that accessibility of essential medicines plays an important role in its inhibition in Khartoum State.

7.7 Summary

The findings presented in this chapter indicate that the RDF has improved the quality of services in health facilities administered by MOH KS and has achieved its objectives in regard to the constant supply of essential medicines and better the utilization of public health facilities. The findings suggested that the quality does not vary by location (i.e. rural and urban). In other words, the quality of services provided, as measured by the regular supply of medicines, is similar in all RDF health facilities. The main area of concern was that the non-RDF health facilities, particularly rural health centres, suffer from severe drug shortages.

In the majority of locations selected for implementing the RDF, basic health services were poor at best, or non-existent. Therefore, sustained availability of medicines in these areas was bound to have wide-reaching impacts in the community, such as removal of the need to refer to the main teaching hospitals. Improvement in the drug supply system at the RDF health facilities has had a profound effect in regaining the confidence of potential users in their local public health facilities. This is reflected in increased outpatient attendance rates, particularly at health centres. The trend in the utilization pattern of the health facilities covered by the RDF is impressive. In 2002, the

RDF pharmacies met prescribed medicines of three million out of five million Khartoum State population, despite small decrease in 2003.

The study also showed that poor and vulnerable groups are more likely to benefit from quality medicines at affordable prices which are made constantly available through the RDF at their local health facilities. The reasons for this are that, before the RDF, costs of time and transport incurred by users, and then sourcing prescriptions from the private sector, were enough to enhance the utilization of the RDF health facilities, even by the poor. This analysis demonstrates that the public health facilities are still the place of choice for seeking health care for most of the population, regardless of the perceived severity of the disease, their socio-economic characteristics or their geographical location. It also shows that the quality and cost of services provided at public health facilities are, respectively, acceptable and affordable, and that the health facilities are easily accessible to the majority of the Khartoum State population in both urban and rural areas.

This is compatible with the opinions of the proponents of user fees (see, for example, World Bank 1987; Nolan and Turbat 1995; Shaw and Griffin 1995) who argue that, if user charges are accompanied by the regular supply of affordable medicines of acceptable quality, their negative impact on utilization will be mitigated, and that the poor would be benefited by improved health care services. Nevertheless, the findings show that the introduction of user fees has negative impacts on some poorest population, particularly when tertiary care level is needed. The current challenge for policy-makers is to design a mechanism to efficiently protect those who could not pay their medical care costs, especially at tertiary level.

The findings reported in this study demonstrate that the utilization of PHC services, such as immunisation, is positively affected by the introduction of the RDF in KS. The increased contact with the RDF health facilities for curative care, as a consequence of improved supply of medicines and the material benefits of saving cash and time costs, have played a substantial role in increasing the use of PHC services. The improvement in the utilization of health centres and rural hospitals was, therefore, accompanied by improvement in the utilization of preventive services, such as immunisation, growth monitoring of children and health education, which are all provided free of charge.

The availability of medicines at health centres was seen by all policy-makers and practitioners who participated in this study, as a fundamental factor promoting efficient use of the health care system. The perceived quality as measured by a regular supply of medicines at the RDF health facilities has obviously led to increased utilization of previously abandoned health centres. The increased utilization of health centres in Khartoum State does not provide support for the argument that the launching of a free services project in 1996 at hospital emergency departments, reduces usage of health centres and increases, unnecessarily, the burden of referral hospitals.

The accessibility of essential medicines through the RDF appears to play a role in shifting users away from self-medication and traditional healers, towards public health facilities. The health care providers at MOH and facility levels strongly believed that ensuring the availability of quality medicines at affordable prices in the RDF public health facilities reduces self-medication. In addition, they also believed that traditional healers played a very minimal role in the provision of health care in Khartoum State. For example, the public health facilities were the first choice of medical care for roughly two thirds of the household survey respondents who sought medical treatment during the last two weeks prior to the study, and for the majority (83%) of the RDF facilities patients' survey respondents. Thus, the public health facilities, particularly the RDF ones, outnumbered alternative sources of medical care. For instance, as few as 2% of the households' survey respondents said they consulted a traditional healer when one of their members was ill in the two weeks prior to this research.

As user fees are introduced, the availability of medicines becomes even more crucial. The study provides evidence that payment for medicines supplied by the RDF did not deter people, including the poor, from seeking health care. In fact, the utilization of the RDF health facilities steadily increases. This research also revealed that the RDF has maintained a constant supply of low cost medicines, closer to population throughout Khartoum State. The following chapter discusses these RDF achievements and the factors that have made it survives for a relatively long period and why. The chapter then proceeds to highlight the shortcomings and implications of Cost-Sharing Policy, in general, and the RDF, in particular, for the health care system in Khartoum State.

Chapter 8 RDF Achievements, Success Factors, Shortcomings and its Implications

8.1 Introduction

For the past two decades, access to essential medicines was a central concern of the governments in most developing countries, UN agencies (such as WHO and UNICEF) and interested NGOs. Underlying the efforts to improve accessibility to essential medicines is the belief that regular availability of quality medicines at local health facilities leads to increased utilization of both curative and preventive services provided in those facilities. Data assessing the effect of the Cost-Sharing Policy, in general, and the RDF, in particular, on health facilities utilization are not readily available in Khartoum State. This is the first comprehensive study of its kind concerning the impact of the RDF on health care seeking behaviour in Khartoum State, since it was adopted in the late 1980s.

The previous three chapters presented the findings from the fieldwork of this study, including data from health care facilities and administrative records. This chapter discusses the implications of the findings of this doctoral study to understand the current situation at KS public health facilities in terms of access to essential medicines and to describe the impact of the accessibility to essential medicines on the utilization of public health facilities. In particular, it discusses a set of issues to answer the question: Whether the Revolving Drug Fund of Khartoum State has been successful, and, if so, why? The answers to this crucial question were developed from the findings presented in the preceding chapters. This chapter is, therefore, devoted to discussing those findings in the light of the literature and experiences of other developing countries, to find out whether the RDF KS has succeeded in achieving its establishment objectives when judged in this context and if so why. The judgement is made according to the indicators which were set before the fieldwork of this doctoral study. To reiterate, these indicators include availability of quality medicines at low cost closer to where people live, equity of access to essential medicines in Khartoum State, and the improvement in the utilization of public health facilities. Section two summarises the RDF's achievements during the past fifteen years. Section three is devoted to presenting the factors that underlie the performance of the RDF in KS which have emerged from

interviews with policy-makers and practitioners, archival records, users surveys, and my own observations. In section four, the shortcomings of the RDF that were reported or observed during the fieldwork will be discussed. The impact of the RDF KS on the health care system in Sudan, in general, and Khartoum State, in particular, will be discussed in section five. Section six presents lessons to be learned from this study and the opportunity for replication of the Khartoum State RDF model into other states of Sudan and other countries in similar situations. In section seven, the implications of the Cost-Sharing Policy for health care system, using available evidence, are considered from the perspectives of policy-makers, practitioners and users (patients and households). The focus will be on the allocation of health resources after the free services had been abolished in the early 1990s. But I also devote a considerable time to the negative impact of CSP on the equity of access to the health care, health facilities utilization, households' economy, and other medical practices. Section eight mainly highlights the strengths and weaknesses of this doctoral study judged as a piece of empirical research. The last section presents the summary and overall conclusion, drawn from the preceding sections.

The years 1996 and 2002 are used as the benchmark for comparison throughout this chapter, for two reasons. First, in 1996, the Save the Children (UK) handed over the RDF project to be entirely managed by MOH KS. Second, by the end of 2002, the RDF became an independent foundation after its Act was approved by the KS legislative assembly.

8.2 Did RDF succeed in achieving its objectives?

This evaluation study reveals that the RDF is continuing to meet its original objectives by maintaining a self-financing medicine supply system which provides quality medicines at affordable prices near to where people live in Khartoum State in both rural and urban areas. The study also shows that the utilization of RDF health facilities has steadily increased over time. In this section, the findings which were presented in the previous chapters will be brought for discussion in the light of the published literature. This enables an assessment to be made concerning whether or not the RDF is a successful programme compared to ones elsewhere (for example, Litvack and Bodart 1993; Murakami, et al 2001; Uzochukwu, et al 2002; Jitta, et al 2003). The main

achievements and strengths of the KS RDF, according to the findings of this doctoral study will be discussed sequentially under the following subheadings:

- Regular supply of medicines;
- Adequate coverage of MOH KS health facilities;
- Below-market prices of quality medicines;
- Efficiency and equity implications of the RDF;
- Supply of assured quality medicines;
- Improvement in the quality of health care services;
- Credibility of health care system;
- Increased utilization of public health facilities;
- Improvement in health status;
- Prescribing efficiency and compliance with treatment;
- Efficient utilization of health facilities;
- Increased health insurance coverage in Khartoum State.

Regular supply of medicines

For service users, a major improvement in the quality of services could be attained, only if the availability of medicines is guaranteed. The availability of essential medicines in the RDF health facilities was good and, on average, 93% of medicines on the RDF basic list were available at the facility level on the days of my visits to the selected RDF health facilities. Consequently, medicines prescribed to 92% of the patients surveyed were dispensed by the RDF pharmacies. Stocks of essential medicines at the RDF warehouse were also satisfactory and only three out of eighty-six items on the main list were out-of-stock for more than three months during the previous twelve months.

In Khartoum State, all respondents amongst policy-makers, practitioners, patients and households acknowledged that the RDF had succeeded in making quality medicines of affordable prices regularly available at health facilities administered by MOH KS. They often consider the availability of medicines at low cost at public health facilities as a primary indicator for adequate health services. The contribution that the RDF has made to improved availability of medicines at health facilities was, therefore, welcomed by all stakeholders. They believe that this outcome has outweighed the potential negative effects of CSP on the utilization of the RDF health facilities by the poor people. The

availability of medicines, in fact, encouraged more people, including the poor, to seek health care at their local RDF health facilities, although many of them had not previously been able to easily obtain medicines for a considerable time; in fact since the mid 1980s, until the enrolment of their facilities in the RDF. The achievement of sustained availability of medicines resulted in other states in Sudan requesting to establish revolving drug funds too (Graff and Everard 2003).

Adequate coverage of MOH KS health facilities

The achievement of equitable access to medicines has seemed to be difficult for many developing countries like Sudan, where 40% of the population are below the poverty line (CIA 2006). Therefore availability of affordable medicines of good quality closer to residence of the population, particularly in remote areas, has often been a cause of policy-makers' concern, because it is the one of the factors that make Primary Health Care facilities in these areas truly effective (Antezana 1992). Our study reveals that in Khartoum State, the RDF has managed to maintain a steady supply of medicines in almost all public health facilities administered by the MOH KS. The findings reflect the fact that KS health facilities enrolled in the RDF are densely and widely distributed, so that geographical accessibility does not operate as a deterrent to utilization. Health centres (the type of facility that is the focus of the Ministry of Health Primary Health Care strategy) often operate in poorer or more difficult rural areas, serving populations of low economic power and high social need. They tend to serve a vulnerable population, with higher levels of health inequality that the government is trying to target.

The RDF KS has developed its own list of essential medicines based on the NLED. The limited list enables the fund to maximise coverage. The RDF has ensured that a reliable self-sustained medicine supply system is extended to rural areas in KS. People had, therefore, avoided substantial time and transportation costs, and the high cost of brand medicines at private pharmacies that were incurred during free medication era. I believe that these savings are enough to dampen the potential negative impacts of the cash-for-medicine policy. The increased utilization of RDF health care facilities, and the reported acceptance of communities in KS, are two indicators for this judgement. Conversely, in non-RDF health facilities, particularly in rural areas, patients still incur heavy expenses

when seeking treatment, in the form of travelling costs and the cost of buying expensive medicines at private pharmacies.

Before the RDF, most health centres, particularly in rural areas, were abandoned, because the people had to buy their medicines from the private pharmacies in towns and cities. And the MOH KS was reluctant to post expensive health staff, such as doctors, to distant health facilities where medicines were not available and where patients did not use them. The success of the RDF in solving the problem of medicines availability in facilities that have been enrolled in the RDF encourages the MOH KS to post medical doctors to these remote health facilities and also to construct new health centres and hospitals in previously under-served areas.

Below-market prices of quality medicines

In most low income countries, the largest proportion of health care expenditure is given over to medicines. They consume 60% to 90% of health expenses for poor households (WHO 2005b). According to the findings of this thesis, the expenditure of the RDF users on medicines forms only 34% of the total cost of one outpatient visit to a health centre (transport and other opportunity costs are not included). This could be attributed to the higher cost of other services (such as doctors' consultation and diagnostic fees) and/or lower cost of RDF medicines. The procurement of generic medicines from non-profit-making suppliers and their exemption from duties, and internal cross-subsidies within the RDF are the main reasons that make quality medicines regularly available at affordable prices. However, other medical costs, time costs, and lost income are costs which have not been taken into account in this PhD study.

The study showed that the impact of the price of medicines is extremely weak on the utilization of public health facilities, and that, among the sample of households not using health facilities, the percent of households who reported that costs of medicines were a barrier to service use was negligible (2%). But this should not be interpreted as supporting the ability of the patients to pay. Patients may sacrifice other things, for example, borrowing from relatives or friends, or selling their assets to meet their health need costs (see chapter six, section 6.4). Therefore the potential negative impact of medicine costs on the health and economic status of the poor should not be overlooked. For any RDF programme, to be successful, the negative impact of the drug price must

be considered. Otherwise, the programme will force individuals, especially the poor, to pay a significant proportion of their available cash and assets and push many households into poverty. But, according to the findings of this doctoral study, the average cost of full prescriptions per episode of illness was considerably higher (SDD2,471) in non-RDF health facilities than for the RDF ones (where the full prescription cost was only SDD301) reflecting the success of the RDF in maintaining a regular supply of low cost medicines (recall chapter six, section 6.3).

Efficiency and equity implications of the RDF

This PhD study shows that, before the RDF, public health care facilities in Khartoum State, particularly in the rural areas where no alternatives were available, were without a reliable supply of medicines. As a consequence, users were left uncertain where to seek health care. The enrolment of rural health facilities in the RDF makes medicines available almost in all rural areas in Khartoum State. The equity of access improved, because the poor are no longer wasting time by visiting unproductive health facilities or incurring high costs from having to travel to, and purchase their prescribed medicines from, private pharmacies in urban areas. But, the CSP has had a negative effect on the poor at both RDF and non-RDF health facilities when tertiary care is needed. This doctoral study has shown that, at tertiary level, user charges were bound to be inequitable as no effective mechanism was identified to protect those who were unable to pay the cost of their treatment.

The percentage of patients who reported not fulfilling their prescription at RDF health facilities because of financial concern slightly decreased from 8% in 1996 (Awadalkarim, et al 1996) to 6% in this doctoral study. This decrease could be mainly attributed to increase in health insurance coverage. The Health Insurance Scheme (HIS) was launched on a small scale in 1996 (when only seven RDF health centres provided health insurance services and insurance coverage rate was less than 2%). At the time of this study, 30% of the Khartoum State population were enrolled in the HIS including 20,000 (6%) poor families (MOH 2004). The numbers of the RDF health facilities that provide HIS services also increased to fifty-nine RDF health centres and to all hospitals (twenty-two hospitals belonging to MOH KS). In addition, the general economic situation improved after the exportation of oil began in the late 1990s.

Findings of this research indicate that the poor do not stop using the RDF health centres. And in fact, there seems to be a general consensus among policy-makers and practitioners at the RDF health centres that poor people benefit more than others from the RDF. The RDF makes it easier for the poor patients who previously (and still at non-RDF health facilities) spend money to consult a health facility doctor only to be told that medicines are out-of-stock. The findings from the RDF health facilities, however, contradict studies of health care demand (see, for example, Gertler, et al 1987; Mwabu, et al 1995; Yazbeck and Leighton 1995) which found that the poor respond to user fees by decreasing their consumption. This discrepancy may be due to the fact that the public health facilities in Khartoum State, particularly at health centres, were without medicines before the introduction of the RDF (recall chapter five). As a consequence, the poor and others were directed to expensive private alternatives to get their prescribed medicines. But our findings are similar to the results of the study of Litvack and Bodart (1993) in Cameroon which revealed that the introduction of user fees associated with improvement in quality, benefits the poorer people more than other groups, since availability of quality health services closer to population represents an effective decrease in the overall cost of quality health care.

Improved access to essential medicines by the poor was the most significant positive effect of the RDF reported by policy-makers, practitioners and most (74%) of the RDF users studied in this PhD. The real cost to patients, especially the poor, in terms of travelling time and cost, and additional suffering from disease (Ensor and Savelyeva 1998) appears to be reduced by the RDF in Khartoum State. Vulnerable groups, particularly in rural areas, gained more from the improvement of availability of medicines in their local health centres. The utilization rates of the RDF health facilities were higher than those of non-RDF centres. These equity attainments appeared to result from the ability of the RDF to maintain the regular availability of quality medicines of low cost closer to the population. As a consequence people, including the poor, use their local facilities instead of alternative sources of care where direct and indirect costs are higher.

The data collected from different sources for this PhD indicate that the improvement in accessibility to essential medicines at primary care level was shared by residents in urban and rural areas, and by wealthy and poor patients. Thus, the RDF appears to have had no negative impacts as far as equity is concerned at this level. In fact, the RDF KS

shows an improvement in equity of access to essential medicines when compared with the previous situation (i.e. before the introduction of CSP in 1992) and currently in non-RDF health facilities. However, inequalities were reported regarding access to treatment for rare but expensive diseases (such as cancer and renal failure) at tertiary care level. Such a situation was also reported at non-RDF hospitals, but older doctors claimed that the situation at tertiary care level was equitable up to the early 1980s. The current situation at tertiary care hospitals is mainly attributed by interviewees to the costs of hospitalisation and surgical operations, and medicines prescribed for 'for-life' use.

Supply of assured quality medicines

The measures adopted by the management of the RDF KS suggest that the quality of medicines was of high concern in the RDF. The absence of expired medicines and the good quality of their storage (average score of 100% at the RDF warehouse and 88% at the RDF pharmacies. Recall chapter five) confirm the quality of the pharmaceutical storage systems at the RDF warehouse and pharmacy level. The low rate (1% to 6%) of rejection of samples tested at NDQCL indicates that the RDF suppliers of medicines are reputable sources. The above findings indicate that the quality assurance system applied by the RDF prevents penetration of low quality or substandard medicines into its medicine supply chain. These medicines often lead to wastage of precious resources and loss of credibility of the facilities supplied by the RDF, and consequently to the failure of the RDF (recall chapter two, section 2.3).

Improvement in the quality of health care services

The quality of services at the KS RDF facilities in the light of the availability of medicines is far better than at non-RDF ones. As a consequence of well-developed medicines supply and supervision systems, medicines are available in RDF health facilities at high percentages. To ensure that a complete course of treatment is used, medicines are not allowed to be sold by the unit in the RDF health facilities. The medicines are dispensed in appropriate quantities for standard treatment courses as on the RDF price list (RDF 1998b). These findings are consistent with previous research in Sub-Saharan Africa (see, for example, Litvack and Bodart 1993; Haddad and Fournier 1995; Soucat, et al 1997b; Weidenmayer 2004) which shows that improvement in the quality of services at health facilities where user fees were applied has strong positive effects on their utilization by vulnerable groups.

The findings demonstrated by Gilson, et al (2000) in Kenya, identified private providers and self-medication as the two most important sources of care after the Bamako Initiative pharmacies²⁸ were established. Contradicting these findings from Kenya and other countries (Berman and Rannan-Elyia 1993; Gertler and Hammer 1997b), my data pointed to a reduction in self-medication and the use of traditional healers after the introduction of the RDF. According to the findings of this study, accessibility to quality medicines and the awareness of KS inhabitants are the obvious explanations for these differences. This being said, our research data, however, were compatible with the findings of Gilson and colleagues (2000) in regard to the growing importance of private hospitals and doctors' clinics as a source of health care. But the utilization of public health facilities is still much higher than the utilization of any other provider (such as private doctors' clinics and traditional healers). This is in direct contrast with the findings reported by Murakami and colleagues (2001) in Vientiane, the capital of Lao Republic, and more recently by Russell (2005) in Sri Lanka where these studies found that self-medication is the most common first response when a person feels ill.

It is clear from both qualitative and quantitative data that perceived quality of services is one of the most important determinants of health facilities utilization. The perceived quality is of paramount importance to outweigh the negative impact of Cost-Sharing, especially the reduction in utilization by the poor (World Bank 1987), since it influences the willingness of the population to pay (McPake, et al 1993). The role of the regular supply of medicines via the RDF in the improvement of the health facilities utilization has been emphasised by policy-makers and practitioners at the RDF health facilities. On the other hand, the interviews with policy-makers and practitioners tended to highlight the lack of medicines in non-RDF facilities as a major shortfall in quality of these facilities, particularly at Federal hospitals, despite the notable refurbishment in equipment, physical structure and general hospital environment.

Credibility of health care system

The performance and quality of health care depend on the availability of medicines (Anderson, et al 2004). Shortages of essential medicines undermine the ability of health

²⁸ These are community-level pharmacies, each supported by a network of community health workers who worked in the pharmacies and provided outreach activities. The pharmacies and community health workers sold bed nets as well as a limited range of medicines and were intended also to be the catalyst for developing income generating activities that could ultimately benefit community health (Gilson, et al 2000, p. 292).

care professionals to respond appropriately to patient needs and this in turn often erodes the confidence and trust patients and their families have in their local health facilities. See for example, the argument of Wiedenmayer (2004, p.5) who pointed that 'A well functioning medicine supply system is a major contribution for making a health system operational and improves the responsiveness of the health system to the health care needs of the population. Medicines are thus a very important component of health care...'. Communities in prioritising their health needs typically put availability of medicines at their nearest health facilities as very important. According to the findings of the study for this thesis, for the community the availability of medicines near to where they live via the RDF raises the credibility of the public health care facilities. Obtaining the prescribed medicines is the most important factor underlying community patterns of health care seeking behaviour, particularly in rural areas where health centres are very important facilities for mothers and young children.

Increased utilization of public health facilities

The literature (for example, WHO 1994; Collins, et al 1996; Aseno-Okyerere, et al 1998; Nandakumar, et al 2000) showed that the utilization of health facilities is affected by a number of factors, besides direct fees. These factors, as mentioned before in chapter seven, include the distribution of income in the population, cost and availability of substitute services, cost of complementary services, cost related to consumption of the services in question, quality of services, the state of a population's health, the supply of health services, geographical location, patients expectations of benefits of the service, and cultural factors. The accessibility of essential medicines at health facilities was reported by many authors in developing countries as the most important element of quality which leads to a dramatic increase in the utilization of health facilities (Abu-Zaid and Dann 1985; Unger, et al 1990; Waddington and Enyimayew 1990; Zwart and Woorhoeve 1990; Litvack and Bodart 1993; Mwabu, et al 1993; Haddad and Fournier 1995; Mwabu, et al 1995; Weidenmayer 2004). The importance of medicines availability on utilization of health services were explicitly reported by all interviewees (i.e. policy-makers and practitioners). From my interviews with health care providers and users surveys, the credit went to the RDF for improving quality by maintaining a regular supply of medicines at public health facilities, particularly in rural areas.

This doctoral study revealed that in the RDF health facilities, where the availability of medicines has improved, the utilization of health facilities increases progressively. These findings are compatible with those reported in the facility-based utilization research (for example, Murakami, et al 2001; Uzochukwu, et al 2002; Jitta, et al 2003). This examined the impact of small scale community-based RDFs when associated with quality improvement. However, whereas those studies used facility-based data, our results were obtained using qualitative and quantitative methods for collecting data from different stakeholders at both facility and community levels. This renders this RDF evaluation study more comprehensive and its findings more robust (see section 8.8) than the previously mentioned studies. The results of this study are also similar to the findings of previous studies of user charges conducted in Sub-Saharan Africa (Litvack and Bodart 1993; Mwabu, et al 1994; Lavy and Germain 1994; Akin, et al 1995). These researchers suggest that Cost-Sharing Policies concomitant with quality improvement, such as regular availability of essential medicines, resulted in increased utilization of health care among the poor, because the poor may suffer more if treatment is delayed because medicines are not available in their local public health facilities.

The improvement in the utilization of PHC services associated with the introduction of Cost-Sharing was reported in Mauritania (Audibert and Mathonnal 2000) and in Niger (Yazbeck and Leighton 1995) where user fees provide financial resources to subsidise preventive services. Unlike the situation in Mauritania and Niger, the RDF KS does not free direct resources to subsidise PHC services. Instead, it makes medicines regularly available, and therefore, induces the utilization of both curative and preventive services.

On the other hand, this PhD research showed that the selected non-RDF facilities, where other mechanisms of user fees were applied, did not have medicines or stocked only very limited items, and patients were most of the time given prescriptions to go and buy their medicines from private pharmacies. The experiences of health care providers (who witnessed the introduction of user fees in health facilities where they worked) informed us that the utilization dropped sharply in facilities where no improvement in the quality (such as availability of medicines) was observed. Such effect was reported elsewhere (see, for example, Blas and Limbambala 2001).

Improvement in health status

Combined with appropriate public health interventions, appropriately prescribed essential medicines and vaccines could, in principle, massively reduce the impact of disease on communities, especially children (WHO 2004a). In fact, since essential medicines alleviate the burden of disease and reduce morbidity and mortality, worldwide access to them yields significant and measurable economic returns through improved health outcomes (WHO 2005b). The empirical studies showed that increased accessibility to essential medicines improves health outcomes. For example, the child mortality rates were lower in families living near to public health facilities in Cote d'Ivoire and Ghana (Benefo and Schultz 1994). The authors also found that a 100% increase in medicine price led to a 50% increase in child mortality rates. Frankenberg (1995) showed that infant mortality in Indonesia was lower in families located near public health centres.

For very practical reasons, this doctoral study was not designed to measure the impact of the RDF on the health status of the population. These reasons included time constraints and difficulties in controlling for other factors which also affect health status. However, in the light of the above published literature and increased utilization of the RDF health facilities, particularly in rural areas (which confirmed the fact that it was not available to them before), it seems probable that the RDF has played a paramount role in improving the health status of Khartoum State population. The RDF pharmacies have provided quality medicines to more than three million patients every year since 2001 (RDF 2002a, 2003a). The implication of these high utilization rates of the RDF pharmacies will be, according to the WHO (2004a), reflected in the saving of lives and the improvement of the general health status of the population.

Prescribing efficiency and patients' compliance with treatment

The analysis of the data collected for this study reveals that the introduction of user fees encourages health staff to consider the financial status of their patients and to use resources, such as medicines, more economically without compromising patients' clinical needs. However, still more work is needed to make doctors more cost-oriented. By considering the financial capacity of their patients, doctors and other prescribers could make medicines more accessible to poor patients, by consciously prescribing clinically needed medicines of low cost. This will reduce the amount to be paid, without

compromising the patients' health. For instance, the cost of treatment of a single case of simple malaria using Chloroquine tablets was SDD50, but the treatment of the same case would be SDD275, if Chloroquine injection is prescribed (RDF 2003d). Losses from irrational prescribing of medicines have been estimated to reduce medicines availability by 50% (WHO 1993).

Payment for medicines is expected to increase patients' compliance. The interviews with practitioners in selected health facilities clearly showed that they believed that the payment for prescribed medicines significantly helped patients improve adherence to their treatment regimen. This is because the patients appreciate the value of those medicines they paid for.

To avoid provider-induced demand, and to prevent prescribers from making therapeutic decisions on profit grounds (with the exception of pharmacy staff), the incentives of doctors and other medical staff and the operating expenses of the facilities they work for were paid from MOH's general revenues (Mohamed 2000). But according to the findings of this doctoral research, these revenues are increased indirectly when a facility is enrolled with the RDF, because attendance increases. This being said, 'the pay for volume of patients served' approach was operated to minimise doctors' absenteeism and to encourage them to improve the quality of services provided in order to attract more patients to the health centres. The incentives for volume of work alone do not seem to prevent doctors' absenteeism in health centres (RDF 2002a). The Health Insurance Scheme has, therefore, introduced an efficient staff discipline system to reduce doctors' absenteeism and delay. Senior MOH officials need to consider a punishment system such as this one, alongside the incentives and allowances currently paid to doctors working at health centres.

The RDF and efficient utilization of health facilities

One of the theoretical advantages of community participation in health care financing is that a more efficient health care system can be developed by cost signals and other incentives to promote rational use of the limited resources allocated to the public health care sector (Audibert and Mathonnat 2000). One of the RDF's objectives was the improvement of the efficiency of the health facilities by lightening the burden on referral hospitals by improving the quality of services at health centres, especially in

rural areas, via a regular supply of medicines (RDF 1998b). This PhD reveals that despite the free medication available during the first twenty-four hours of admittance to hospital emergency units, and the prices charged at all RDF facilities (i.e. health centres and hospitals) are similar, the improvement in the quality of services by maintaining steady supply of medicines near to where people live through the RDF, affects the utilization pattern in favour of the health centres. This confirms what has been reported by Chawla and Pellis (2000) that the accessibility to medicines has significant impact on people's decision about where to seek health care. However, the regular supply of medicines at health centres, though necessary to reduce hospitals' burden, is by itself not enough, because of the low number of non-insured patients at health centres compared with insured patients. This situation was attributed by the RDF (2002a) to the lack of punctuality and absenteeism of the doctors who are not contracted to provide health insurance services (see above).

The findings of this doctoral study suggest that the utilization of all services increases in the RDF health facilities, particularly the health centres which had been abandoned before the RDF. People seemed to balance the time and cash cost of travelling and possibility of out-of-stock of free medicines at hospital emergency departments against assured availability of affordable medicines at their local RDF health facilities where medicines were rarely out-of-stock. It also demonstrates the argument of Knippenberg and colleagues (1997b, p.S44) that 'people act rationally and are willing to pay more if the product is otherwise not available, if access becomes easier, or if quality is perceived to have improved'.

The dramatic drop in attendance rates in Sudan, in general, and in KS, in particular, after the introduction of the Cost-Sharing Policy in 1992 (recall chapter seven), could be explained by the expected effect of Cost-Sharing that health facilities will be rationally used and consulted only when necessary care is required (Parker and Knippenberg 1991). The reduction in the unnecessary utilization of health services, in general, and in medicines use, in particular, as a result of the adoption of the Cost-Sharing Policy was documented elsewhere (see, for example, Leibowitz, et al 1985; Birch 1986; Soumerai, et al 1987; Harries, et al 1990). The policy-makers and practitioners interviewed for this doctoral study believe that despite the existence of a small proportion of patients, who may forgo health care for economical reasons, the majority of the patients seek care when they feel ill regardless of their financial ability to pay. However, an important

question of course is whether the forgone visits were really unnecessary in the first place? Due to the design and scope of this doctoral study we cannot provide a complete answer to this question. Further research is, therefore, needed to answer this question. This could be by collecting disaggregated access information for each of vulnerable groups, such as children, mothers and people living in poverty. The surveys should specifically aim at the foregone visits to find out whether they include necessary care needs or not.

Increased health insurance coverage in Khartoum State

Interviews with policy-makers who participated in this study showed that the Health Insurance Scheme (HIS) relies on the RDF to provide a reliable supply of affordable medicines to its members. As a result of low cost medicines, the HIS KS has made huge annual savings. The RDF has helped the HIS in Khartoum State to operate utilization and cost control measures to ensure that the drug benefits do not bankrupt the insurance scheme through over-prescription (Mohamed 2000). These measures include dispensing of generic products, maintaining a health insurance list of medicines, training, and so on. According to the findings of this thesis, credit also goes to the RDF in protecting the HIS KS from fraud and over-invoicing, which is found to be a common problem among HISs in other states where the main source of medicines is private pharmacies. So the RDF has made a positive contribution to the performance of the HIS in Khartoum State. This is in line with what has been reported by Fundafunda (1998) who pointed out that the success of HIS is linked to the high availability of medicines in RDF pharmacies. Interviews with health care providers (i.e. policy-makers and practitioners) and comments of the users revealed that HIS has supported insured people, especially those of limited income (i.e. civil servants). Although the coverage is still far behind, the interviewees thought that HIS has made a considerable contribution in overcoming most of the negative impacts associated with the imposition of user fees among the insured population.

8.3 Why the RDF KS has survived for a relatively long period?

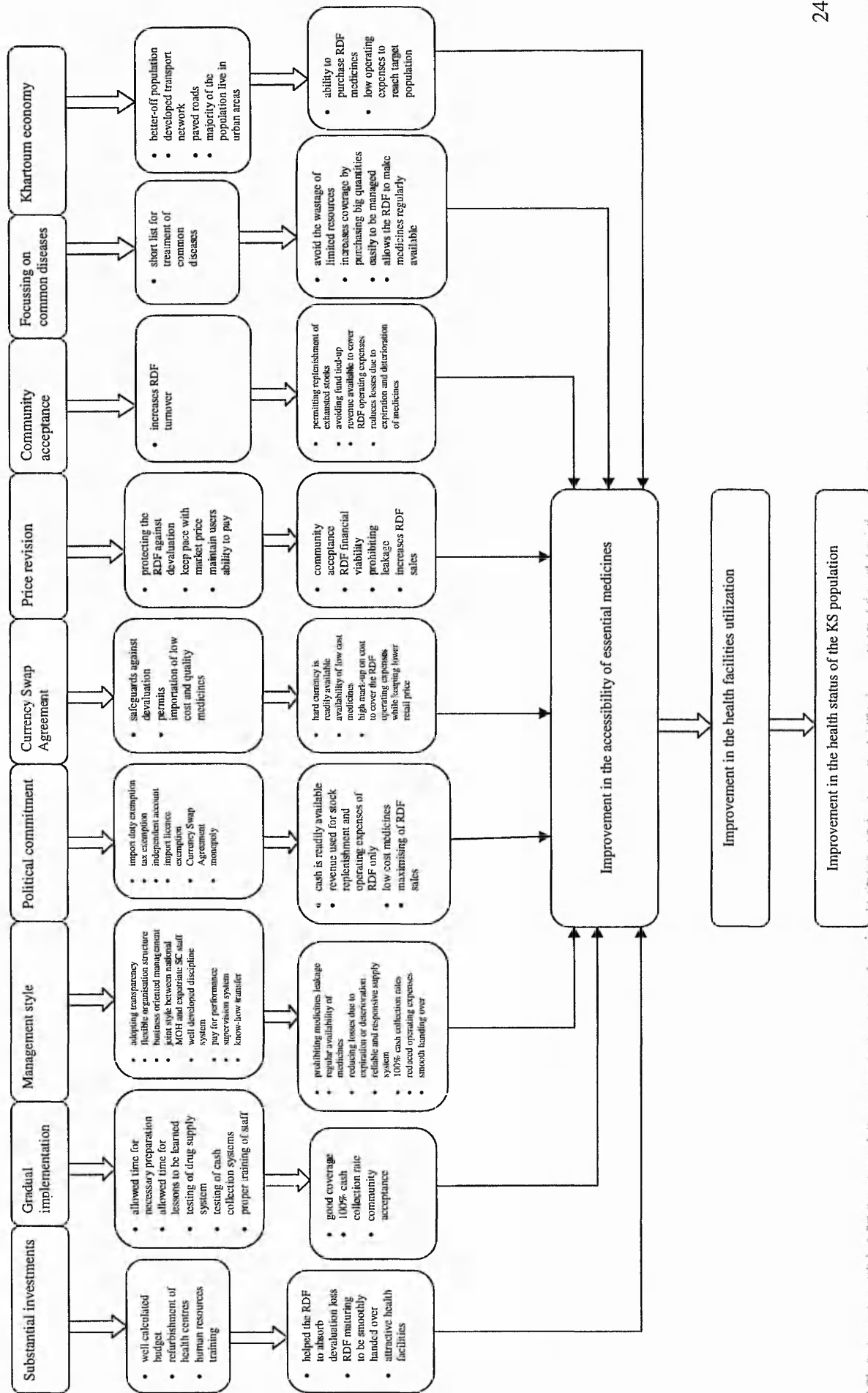
In the previous section, the success of the RDF was defined in regard to the ability of the RDF KS to maintain regular supply of essential medicines of good quality and

affordable prices to the RDF health facilities. This resulted in increased utilization of the RDF facilities compared to non-RDF ones. On the other hand, CSPs have not always been able to maintain sufficient revenues to finance medicines at non-RDF public health facilities in Khartoum and other states as well. The literature showed this was a case in seventeen Sub-Saharan Africa countries (Benin, Chad, Niger, Sierra Leon and Zaire are some examples) that operate community drug funds. It has also shown that the success rate for the recovery of funds has been about 50% (Shaw and Ainsworth 1996). The development of reliable, acceptable and self-sustainable medicines supply system through the RDF in KS can be attributed to a number of factors.

The main point is that a RDF, unless carefully designed and managed, will not work. The most common pitfall with revolving drug funds is that they soon fail to revolve (Cross, et al 1986). The authors of this study identified a number of reasons which lead to this outcome in the literature of RDFs in a variety of countries, of which Peru, Guatemala, India, Bolivia, Haiti, Senegal, Niger, Afghanistan, Mali, Indonesia and Thailand are examples. These reasons include undercapitalisation, prices set below the level of cost recovery, delays or failure to collect payment for dispensed medicines, rapid programme expansion without injection of additional capital, losses due to theft and deterioration, unanticipated international medicines price increases due to inflation or changes in parity rates, and foreign exchange restrictions.

The RDF Khartoum State, in contrast, provides a self-financing medicine supply system, which, at the time of this study, has remained viable for fifteen years. The question to be answered in this section is: why did the RDF achieve this position? This study suggests that a number of factors underlie the success of the RDF KS and its ability to revolve for a relatively longer period. It also gives an answer to the question of why such factors were important for the RDF's survival. These factors include: the substantial investments and phased implementation by SC (UK); leadership and RDF management style; commitment of the Federal and Khartoum State governments; availability of hard currency; design and selection of RDF medicine list; regular revision of RDF medicines prices; constant availability of low cost medicines; community acceptance and confidence in the RDF; focusing on common health problems faced by communities; and strength of Khartoum State economy (Figure 8.1). These factors will be discussed below.

Figure 8.1: Summary of factors that have led to the RDF KS reported success



Gradual implementation by RDF partners

The RDF began with eight health centres, then increased to fourteen and so on since 1989. Over this time, it has added to this list on an annual basis. Despite the recognition of the great need for essential medicines, Save the Children (UK) and MOH agreed to pace the expansion of the RDF. The gradual implementation of the RDF was identified in this study to be one of the RDF's success factors, because phasing-in the implementation of the RDF allowed time for necessary preparation, such as the development of systems for medicine distribution, financial management and supervision. It also allowed time for lessons learned during each stage to be applied so mistakes could be avoided in the next phase. This approach has also permitted testing of medicine supply and cash collection systems, proper training of staff, and adequate supervision. Moreover, it permitted testing of community acceptance. The RDF currently operates at all health care levels in Khartoum State, from health centres to rural and teaching hospitals, and successfully collects 100% of its medicines sales. In contrast, the CSP was simultaneously implemented throughout the country and in all health facilities. The RDF was not confronted by problems and constraints of the CSP, such as resistance from health professionals and low quality of paid services. As a consequence, there was a dramatic drop in the utilization of non-RDF health facilities, which either suggests weak acceptance of the CSP by the users or indicates their inability to meet the cost of health services.

Substantial investments by Save the Children (UK)

Substantial investment by SC (UK) has enabled the RDF's goals to be secured. The RDF is fortunate in having a well-calculated budget donated by SC (UK). According to its obligations set out in the agreement with the government, SC (UK) provided the capital seed stock of medicines. This helped the RDF to absorb its first huge loss (46% of the invested capital) which resulted from local currency liberalisation in 1992. It also set the foundation for the RDF to successfully mature, and to be smoothly handed over to the MOH after ten years of continuous development. SC (UK) investment was not only in medicines but also included human resources training, infrastructure development, such as refurbishment of health centres before introducing the RDF, and the establishment of an operational system of RDF management that would not totally rely on expatriate SC staff. This operational system clearly defined roles and responsibilities for RDF staff. The findings suggest that, SC (UK) provided not only

financial but also technical and managerial know-how during the early stages of the RDF implementation (see below).

Leadership and RDF management style

Good management was considered by policy-makers to be a crucial factor in the RDF's reported success. Success in running RDFs requires both political skills, to develop and mobilize political support, and technical skills, to manage and promote the RDF. It also requires public sector institutions that are capable of managing the process, preventing medicines leakage, adopting financial transparency and developing anticorruption measures. Examples of effective RDF KS measures include procurement through a tender committee, collection of cash after it has been checked against sold medicines on a weekly basis, high frequent supervision, and an annual financial audit by an independent authorised auditor (Mohamed 2000).

The RDF KS has a small flexible organisational structure which combines public objectives with private style management. The management systems at the RDF were approached from a strong business perspective, as was recommended by Cross and others (1986, p.337), who stated '...it is important that government officials and other individuals involved in establishing a revolving drug fund view the fund more as a commercial operation than a public service'. A RDF needs to be commercially oriented to meet its objectives of recovering medicines costs and raising sufficient revenues to become self-financing and viable. The business thinking in the RDF KS allows it to make some profit to finance its expansion. This expansion would not be achieved through reliance on the strength of the initial capital employed to start the RDF in the late 1980s. In contrast, public sector thinking tends to revolve around costing and to equate costing with pricing. This is not how the private sector behaves, and also the private sector has many incentives (for example, satisfaction of business shareholders by making profit and pressures of market competition) to be more efficient than the public sector, so operating costs, the cost wastage and losses are often significantly lower than they are in the public sector. This is because the concern of public sector accountants is to balance the fiscal budget with expenditure. They are not so familiar with a profit and loss account, which are of utmost importance in the RDF (Quick, et al 1997). The leadership is found to be of paramount importance for the implementation of this kind of project. The strong and consistent leadership from the MOH KS

throughout the design and implementation process of the RDF was highly appreciated by SC (UK). This appreciation was shown in a letter of understanding signed by MOH KS and SC (UK) after the handover of the RDF in the early 1996 to MOH KS to underpin their support of the RDF. In this letter SC (UK) agreed to continue the Currency Swap Agreement and to provide solutions whenever called upon to do so (MOH-SC 1996b).

From my personal knowledge as an MOH employee, the joint management of the RDF between MOH staff and SC (UK) expatriate staff provided appropriate opportunity to the national MOH staff to gain experience in the management of the RDF. This management style permitted the RDF to establish improved accounting and scheduled quality supervision for the RDF health facilities. The RDF accounting system allows the RDF management to monitor the RDF financial performance on a monthly basis through critical discussion of the RDF profit and loss account and balance sheet reports. The supervision system, as mentioned before in chapter five, allows the RDF to improve the availability of medicines at health facilities and, at the same time, reduces losses as a result of expiration, deterioration or pilferage. The joint management style also permitted transfer of administration and technical know-how to the MOH staff. As a consequence, the RDF was smoothly handed over to the MOH and did not face any managerial problem after the withdrawal of SC (UK) in 1996. As a result of the good management of the RDF, medicines are ordered regularly without waiting for stocks to run out before new orders arrived.

Commitment of Federal and Khartoum State governments

This study shows that a firm commitment from the Federal and Khartoum State governments is vital to the success of the RDF. In KS, the level of the political commitment from governments at both levels, which is a reflection of strong political will, was clearly expressed by all fourteen policy-makers interviewed for this study. They recognise that political commitment is of paramount importance for the sustainability and success of the KS RDF. Examples of such commitment are exemptions from customs which count up to 10% of the amount of imported medicines, business profit taxes (35%) and import licences. These exemptions helped the RDF to provide low cost medicines, despite its high mark-up (64%) on cost. Such a situation, among others, maintains users' willingness while it covers the RDF operating expenses.

Much motivation has been also given for the RDF to succeed, by drawing attention to and praising its success, at the highest levels of the government. RDF health facilities are not allowed to establish a parallel pharmacy to the RDF one. This monopoly maximises the market opportunity for the RDF, resulting in increased RDF sales. In addition, the RDF revenues are independent from being pooled in the Public Treasury. This political support must be continued to protect the RDF against the MOF which requires that revenues earned by any public organisation must be pooled in the Public Treasury.

Availability of hard currency

Access to convertible currency remains one of the major planks of sustaining international procurement. This is more so for public sector procurement in developing countries, particularly in Sub-Saharan Africa, where governments in many cases may not be in a position easily to provide foreign currency (Wang'Ombe and Mwabu 1987; Knippenberg, et al 1997a). The Currency Swap Agreement (recall chapter three) was the cornerstone for the RDF during its hardship time in the 1990s, because this Agreement (which also reflected the commitment of the government) had helped the RDF to have access to hard currency at official rates for medicines purchased from the European international suppliers of generic medicines at around 50% less than the prices offered by CMSPO. The RDF maintains its prescription cost to end users at half the prices charged at private pharmacies while making a surplus to finance its operating costs and to pay MOH KS a monthly contribution. Moreover, the availability of hard currency to the RDF from the very beginning allows a regular supply of medicines from abroad to the RDF, and from the RDF to its health facilities. Finally, the availability of hard currency has protected the RDF against excessive losses by devaluation of local cash in hand as a result of local currency inflation, particularly during the early 1990s. The Currency Swap Agreement, therefore, has played a very important role in the RDF's survival and success.

Regular revision of RDF medicines price

In its early stages, the RDF used to make frequent medicines price adjustments to keep pace with inflation and fluctuation of local currency. Since the late 1990s and after the local currency became relatively stable, the RDF began to revise its prices on an annual

or every eighteen months basis. This timely price revision, together with the Currency Swap Agreement, protects the RDF against local currency devaluation and international medicines price inflation.

In its medicine price revision exercise, the RDF takes into account the potential impact the new medicines price may have on the people's health care seeking behaviour. For example, medicines for children or those for treatment of chronic diseases are always set at the lowest possible price. This being said, the overall RDF medicines prices are set to be 50% to 60% less than the prices charged at private pharmacies. According to the interviews with policy-makers, such discount is maintained to avoid leakage of medicines from public health facilities to be re-sold in the open market. The RDF also maintains this discount, because very cheap medicines, compared to the private sector, are sometimes considered by the community as inferior medicines. Keeping low cost access to essential medicines is, however, of utmost importance for community acceptance of the RDF and for the RDF's financial sustainability.

Community acceptance and confidence in the RDF

In the early stages of the RDF, the project staff (from both MOH and SC) conducted an orientation meeting at a new health centre to inform the local community about the RDF and the benefits to be expected from the enrolment of their health centre with the RDF (1998b). These meetings were organised by the neighbourhood people's committees. The promotion of the RDF is a critical element in generating community acceptance that is often required to enable successful implementation of the RDF. It increases medicines sales and, consequently, the ability of the RDF to replenish used stocks and meet its operating expenses. It also helps the RDF to avoid tying up funds in the form of stocks at health facilities. In contrast, one example of the negative impact of community non-compliance was a revolving fund for a vaccination programme in Senegal which failed to revolve when villagers proved unwilling to pay for the entire series of vaccinations, and so revenues were insufficient to replenish the exhausted stocks (Cross, et al 1986).

The RDF KS is widely accepted. This is mainly because, during the time when medicines were theoretically free (i.e. before 1992), people were paying for medicines at private pharmacies and used to pay for traditional healers. The culture of payment for

treatment was, therefore, widely prevalent even before the introduction of the RDF. The facility and household surveys undertaken for this thesis confirmed, what had been mentioned by policy-makers, that the lack of medicines at public health care facilities, especially at primary levels in rural areas, explains the enthusiasm of the communities to get their facilities enrolled in the RDF. Since before the RDF, rural populations have incurred high cost in cash and time to fill their prescription.

This study showed that the widespread community perception that quality medicines of affordable prices are steadily available at the RDF health facilities has encouraged more pressure from community leaders on the MOH officials to enrol their facilities in the RDF. As many studies have shown (see, for example, Waddington and Enyimayew 1990; Litvack and Bodart 1993), people appear to be more willing to pay for tangible products, such as medicines, than for professional services, such as a doctor's consultation. The community acceptance of the RDF has also stimulated the community's purchasing power (Umenai and Narula 1999). Thus, the RDF sales steadily increase with time. For instance, the RDF sales rose from SDD0.27 billion (US\$1.8 million) in 1996 to SDD2.89 billion (US\$11.1 million) in 2003 (RDF 2002a, 2003a). As a consequence, the RDF's stock replenishment system has developed and strengthened. The RDF has also become stronger to accommodate and respond to community requests for enrolment of their local facilities in the RDF. This is because the high turnover enables the RDF to avoid high losses due to tied-up funds, theft, deterioration and expiration of medicines, and reduced value of stock in hand due to increases in medicine prices or inflation of local currency, particularly in the first half of the past decade.

Focusing on common health problems faced by communities

The RDF targeted the provision of essential medicines that meet the health care needs of the majority of the KS population. The selection of RDF medicines focuses on high priority medicines. Its basic list of medicines (which contains eighty-six essential items) includes products that could be used to treat common health problems in KS. Economically, it is good for the RDF to keep its number of medicines as small as possible, as the short RDF list reduces the wastage of limited resources. In addition, a small number of medicines eases stock management and reduces losses, because unlike other medicine supply organisations, such as CMSPO, the potential risk of losses,

expiry of stocks, and damage of medicines and so on in RDF health facilities is borne by the RDF. Finally, a carefully selected RDF drug list ensures stable medicine financing and enables the RDF to focus efforts on making selected medicines regularly available in all RDF health facilities.

The RDF was selective in its choice of health facilities, choosing those located in areas where the public hardly received health services (Mohamed and Fundafunda 2003). Other indicators for selecting a health facility included distance from the first level referral hospital and presence of a large and commercially active community. These considerations did not overlook the need to provide health care to those members of the public that could not afford to pay for medicines. The cost-effective selection of health facilities (without compromising access to essential medicines) allowed the RDF to avoid stock tie-up. Given the costs of transport to health facilities, this approach also minimises the RDF's operating expenses. The overall impact of these considerations in the selection of RDF drugs and health facilities is the maximisation of benefits from the available limited resources.

Strength of Khartoum State economy

Living in the capital of Sudan, the inhabitants of Khartoum State, despite the presence of a large number of displaced people, are better-off in terms of their financial capacity, health insurance coverage, and availability of alternative health care facilities, such as NGOs' health centres, private hospitals and doctors' clinics. The strength of the KS economy, therefore, enables the majority of the population to afford medicines sold at RDF health facilities. In addition, KS has a small geographical area, better infrastructures, such as transportation networks, and most of its population live in high density urban areas. These factors support the RDF in reaching its target population at relatively low cost.

8.4 RDF shortcomings

The RDF has rapidly progressed. It has expanded from being a project designed to supply only sixty health centres with less than seventy essential medicines, to being an independent foundation responsible for the distribution of more than 140

pharmaceutical products and other medical supplies (ranging from simple over-the-counter medicines, such as Paracetamol tablets, to high technology medical products, such as mitral and aortic valves for cardiac surgery) to almost all health facilities of MOH KS (ranging from health centres, hospitals, people's pharmacies to highly specialised open cardiac surgery and renal transplantation centres). This rapid progression is not without problems. This evaluation study of KS RDF's experience identified some areas of weaknesses that still need to be considered in order to ensure sustainable success of the RDF. This section will highlight the main shortcomings revealed by this study. These shortcomings include: inequitable access to the RDF medicines; lack of community and practitioners' involvement; and verticality in the management of the RDF within the MOH KS.

Inequitable access to essential medicines

This study showed that 6% of prescriptions presented to selected RDF health facilities were not dispensed for financial reasons. This could be considered as a small proportion of users because the RDF served around three million patients every year. The RDF operates on a restricted cash-and-carry basis. Those who are not able to pay for medicines are denied access to good quality medicines because formal mechanisms for the protection of the poor are limited and inefficient. This increases the problem of suffering and ill health among the poor, rather than their welfare. The RDF also failed to support measures to extend access in geographical terms. There are still 26% of health centres without the RDF, in addition to 200 dispensaries in Khartoum State rural areas.

Lack of community and practitioners involvement

Maintaining the participation of the local community in providing health care is among the RDF's principle objectives. However, the management of the RDF is very centralised. Health facilities administrators or neighbourhood health committees have no role in the financial management of the RDF pharmacies at their health facilities. The lack of community representation in the RDF administration board or any part of the RDF management system has allowed the RDF to become exclusively profit-oriented in recent years. Therefore, more work remains to understand how practitioners and the community can effectively participate in decision making processes in the RDF. It could be possible, for instance, to designate one seat for each category (i.e. practitioners and community) in the RDF administration board. This arrangement will

lead to true participation which means the beneficiaries of the RDF are consulted in decisions that affect them. It will also offer community and practitioners' representatives an opportunity to reflect the performance of the RDF in reality to the RDF decision makers.

In addition, although the RDF's contribution paid to MOH (recall chapter three) is used to finance MOH activities, if quality is to be improved within the local facilities, at least some proportion of this contribution must be redistributed to all health facilities for the use in quality improvement. Guidance on how to spend these additional non-budgetary RDF's funds at facilities level should be developed. The funds, however, should be mainly used for visible improvement to the health facilities to render them more attractive and to stimulate a further increase in health facilities utilization. It will also increase the commitment of health facilities non-pharmacy staff to the RDF by improving their ownership, which, according to the interviews with practitioners at the RDF health facilities, does not exist. The autonomous status of the RDF pharmacies within health facilities renders them isolated from health facility administration (MOH 2003a). The RDF needs to consider this abnormal organisational situation. In my view, establishing accountability of the RDF pharmacy staff to the medical director of the health facility could be one possibility.

Verticality of management

After it was converted to a fully independent public foundation with its own Act, the RDF was completely isolated from the MOH KS management framework. All previous efforts made to link the RDF to other policy concerns of the MOH were totally damaged. This situation reduced the gains which other departments of MOH had previously received from RDF resources. It also deprived the RDF itself of benefiting from MOH budgets, such as the payment of salaries of the RDF staff and training budgets. In addition, the RDF has been deprived of overall interaction with health issues, and the spirit of working as part of the MOH team was lost. This rendered the RDF to be more focused on profit-making than to promote PHC services. As a result, the supply of medicines to remote and less profitable health centres has been neglected. In my view, the RDF should not be considered by its managers as a profit-making company but as an establishment for strengthening the health care system and improving the quality of health services by making quality medicines readily available

at affordable cost near to where people live. This is achievable only through the development of partnership between the RDF and other departments of the MOH in the provision of reliable, appropriate, integrated and acceptable health services (as was the case before the approval of the RDF Act in 2002), since the RDF is principally designed to make essential medicines accessible, particularly to the vulnerable groups in rural areas. These recent trends in the RDF management threaten the discipline that makes the RDF successful and sustainable.

8.5 Impact of the RDF KS on health sector reform

A major contribution of the RDF has been the improvement in the quality of services in hospitals and health centres. During the late 1980s, Sudan hospitals and health centres suffered from a dearth of medicines, and this led to a fall in quality of services in these facilities. With the RDF ensuring an adequate supply of medicines to its hospitals and health centres, the situation had changed and patients are willing to use the public health care facilities. The question on the quality of services in the patients and households' surveys evoked a positive response. The vast majority (90%) of surveyed patients at RDF health facilities stated that public health services are better now than before, as measured in the light of medicine availability. This is also reflected in the growing use of preventive services like immunisation, growth monitoring and prenatal check-ups as reported by the policy-makers interviewees.

The successful experience of Khartoum State with the RDF has led to a clamour from other states to establish RDFs in every state of Sudan. The CMSPO is currently involved in establishing RDFs in seven more states. The President of the Republic responded by attending the RDF's opening ceremony at the CMSPO in 2001. On this occasion, the President decreed that the RDF should be established in all states (Sudan is divided politically and administratively into twenty-six states) and directed the FOM to fund the roll-out of the project. He also directed the Ministry of Justice and the Attorney General to draft a Federal framework Act for the RDF. It is hoped that CMSPO would benefit from the lessons learned from the KS RDF and one important lesson is that it is better to start operations on a limited scale and expand gradually. The adoption of the RDF programmes in other states through the promulgation of the presidential resolution, alongside the existing Cost-Sharing Policies, was a step taken to

ensure the availability of medicines in public health facilities at both Federal and states levels. This step clearly indicates the failure of the Cost-Sharing Policies in improving the quality of services as measured by regular availability of medicines. It also indicates high political acceptance of the RDF KS achievement of making quality medicines constantly available in RDF health facilities.

Potential for replication of the KS RDF model nationally in other states of Sudan and regionally in other countries of similar economic situation appears to be good, provided there are sufficient and well-targeted, managerial, technical and financial resources available. In other states of Sudan, the need for RDFs is stronger than it was in KS due to the lack of transportation and poor roads, which contribute towards the indirect costs of health visits. People in these states are poorer than inhabitants of Khartoum and doctors are very reluctant to work in the far states (for example, western and southern states). There is no doubt that strong government commitment is essential for adopting a RDF policy. In a national context which has been characterised by socio-political crisis (for example, Dar Fur and eastern crisis), the introduction of the RDF is especially needed, in order to make medicines regularly available to save the lives of children and mothers and other vulnerable groups.

The RDF has also played an important role in controlling the prices of some life-saving medicines sold by private pharmacies. For instance, from my personal knowledge as a pharmacist who works at the General Directorate of Pharmacy, FMOH, in 2001, the RDF managed to get Insulin Human (a product used by diabetic patients to control their blood sugar) to be sold at SDD1,900. The retail price of the same brand from the same manufacturer was SDD4,600 in private pharmacies. By the end of the year 2001, the Insulin retail price in the private pharmacies had been pulled down to only SDD2,700. This retail price for Insulin has continued at this level since then.

The internationally agreed Millennium Developmental Goals have strongly focused on access to affordable essential medicines in developing countries (DFID 2004). The implications of this RDF evaluation study could be important for encouraging the commitment of donors, in general, and SC (UK) the founder of the RDF KS, in particular, to health programmes which use RDFs as mechanisms for ensuring a regular supply of essential medicines. This study also provides empirical evidence that the RDF KS model could be successfully implemented, and make essential medicines accessible

to a large part of the population in developing countries, if certain prerequisites are put in place. The thesis, therefore, provides evidence from real experience of the largest RDF in the world, to the international community movement to increase access to essential medicines, particularly medicines for HIV/AIDS, tuberculosis and malaria, to the poor population in developing countries. Currently 30% of the population in these countries have no access to essential medicines (WHO 2004a).

8.6 Experience of the RDF KS: lessons to be learned

After fifteen years of providing a regular supply of medicine to more than 130 public health facilities in KS, a number of lessons have been learned from KS RDF experience, particularly in how best to utilise the one-time capital investment to meet the medicines needs of the KS population (more than five million).

First, given the time necessary to phase implementation of the RDF, it is clear that the experience and logistic input of SC (UK) was of paramount importance. It is therefore essential that international NGOs co-operation should not be underestimated in the development of RDF programmes. This is based on observation of the progressive expansion of the RDF KS since its inception in the late 1980s.

Second, political commitment largely governs whether medicines sales revenues are used to replenish exhausted stocks to maintain regular supply of medicines and to improve quality of services sufficiently to attract more users. Only government action can allow a separate account for the RDF and its managers so that they have a free hand in keeping generated revenues out of Public Treasury regulation. Therefore one of the important lessons to be learned from KS's long experience with the RDF is that revenues generated from RDF medicine sales should be kept in the RDF and entirely excluded from MOF budget information. And the RDF administration board must be the authorised body to decide how these funds are used.

Third, this study reveals that applying the commercial business management style, such as employment contract, efficient discipline system, and pay for performance, was not only possible and accepted within a public sector setting, but resulted in controlling operations and reducing risk. These measures which were applied by the RDF KS resulted in preserving the entity of the RDF (Mohamed and Fundafunda 2003). The

RDF measures also stem the brain drain of RDF pharmacists, because, according to the employment contract, the RDF pays its pharmacists on a semi-private basis (Mohamed 2000). In addition, the conduction of business management practices allows the RDF to recruit a small number of staff and establish clearly defined procedures for financial and stock management. The KS experience with the RDF showed the importance of recruiting senior staff that have a pharmacy background and previous experience in managing drug supply. Finally, staff with skills and expertise in economics, finance, accountancy, and with private sector experience also need to be recruited by the RDF. This enables the RDF to establish a profit and loss account on a commercial basis. The survival of the RDF mainly depends on how sufficient are revenues generated from drug sales to renewal of medicine supplies. An efficient discipline system that renders RDF's managers and other staff at both headquarters and facility levels accountable should be built into the system and administration cost should be low. Supervision team leaders must be authorised to take immediate action against RDF pharmacy staff who hoard revenues and use them for personal ends, or make unauthorised exemptions from payment.

Fourth, the Currency Swap Agreement signed between the government of Sudan and SC (UK), as I mentioned earlier, enabled the RDF to have access to hard currency at official rates. The lesson to be learned is that donors and development organisations wishing to setup effective revolving funds may need to be innovative in responding to constraints that arise on such projects. Access to foreign currency is one such constraint. However, by setting up this currency swap mechanism, to which both government of Sudan and SC (UK) were committed, the constraint was overcome. This is important because the literature on RDFs (see, for example, Murakami, et al 2001; Uzochukwu, et al 2002; Jitta, et al 2003) seems to have no evidence of the application of this mechanism between donors and governments in situations where the RDFs are supported by international donors. This currency swap mechanism ought to be explored within the co-operating partner framework, where common interest and concerns are evident. The need for hard currency, however, depends on whether the sources of drug procurement are local or international.

Fifth, for the RDF to be successful, reliable sources of quality medicines must be identified. There were three strategies for RDF drug procurement, based on the need to have access to a large quantity of drugs for annual orders and to respond to situations of

stock-out, damage to goods, emergencies, and so on. Firstly, the key source was procurement through closed (restricted) tender to a selected number of wholesalers (both international and local participants). Secondly, there was an option of direct purchase from the CMSPO in Khartoum State. Finally, the third option was procuring from local private manufacturers. All RDF health facilities receive their medicine orders regardless of their ability to make a payment at the time of ordering. This policy ensured that no health facility operated without medicines, and that no patients were put at risk. At the RDF pharmacy level, medicines dispensing is made with cash only and no exemption is allowed in the RDF pharmacies. The responsive and reliable medicine supply system appear to be a prerequisite for the establishment of a RDF, not only because without medicines there would be nothing to sell, but also because delivery and storage systems have major consequences on the cost of medicines (Kanji 1989) and/or the confidence of users in the RDF. The improvement of the quality of care, especially medicines availability, is important to justify patients' out-of-pocket payments and to increase users' satisfaction. KS RDF experience shows that the RDF's survival depends on a regular supply of high quality medicines of low cost, because users may lose their confidence in the RDF, if they experience frequent drug shortages or poor quality medicines. The consequence will be that the RDF quickly stops revolving. Policy-makers and managers involved in planning and managing RDFs should carefully consider the best procurement and distribution strategies (Quick, et al 1997).

Sixth, a major consideration for a Revolving Drug Fund is the cost of each medicine or class of medicines. Should a project such as this only supply cheap, high-turnover medicines, or should it seek to provide all key medicines to address all categories of ill-health? The RDF medicines list contained some essential medicines that are expensive. In order to make these medicines affordable, their cost has to be subsidised by the income from the selling of the cheaper drugs on the RDF list of medicines. To cover the potential loss, and to generate more funds for the continued procurement and supply of these expensive drugs, the cost of the cheaper medicines was always kept as low as possible to maintain their high turnover, and consequently to retain high income levels on the RDF. The RDF will be decapitalised, if medicines prices are not regularly adjusted for inflation. The most important thing, when updating the price of the RDF medicines, is to consider all possible negative consequences that may affect the utilization of the poor and other vulnerable groups. Prescribers also need to consider the financial capacity of their patients. The study of Isenalumhe and Oviawe (1988) in

Nigeria, despite being an old study, gives a good example of the impact of the cost of the prescription on obtaining prescribed medicines. The authors of this study found that when a cost of a prescription was 1.9 (local currency), it was filled in 83% of cases. But when the cost was higher than 20 (local currency), the rate of filling fell to 21%.

Seventh, the RDF KS has centralised management. The centralised system has enabled the RDF to have a standardised medicine list for each level (hospitals and health centres), bulk purchase for more than 130 health facilities and a uniform price system. The centralised distribution system reduces the RDF operating expenses and tied-up funds. This system also reduces potential losses due to expiration or pilferage mentioned by Quick and et al (1997) in multi-layer distribution systems.

Eighth, the replenishment of used stocks of medicines has been more of a limiting factor in the RDF than the granting of the first capital investment has been (Unger, et al 1990). The steady supply of quality medicines below prevailing market prices to the RDF health facilities depends on the RDF drug supply system: in particular a well-equipped warehouse must be established, exemption from tax and import duties should be granted, procurement from international generic suppliers through tenders must be in place, and further negotiation on prices of medicines must be undertaken with tender winners, all to reduce costs.

Ninth, monitoring, evaluation and reporting on project activities at the RDF health facilities have been performed by RDF supervision teams. The RDF's supervision of events and practices was done in accordance with a stated and agreed list of performance targets. The approach was referred to as target supervision, where supervision was focused on actual work performed, such as dispensing practices, cash collection and recording. Through the simple measurement of outcome, supervisors were able to observe and record improvement in operations, consequently measuring the quality of service being provided. Supervision teams also move medicines that are nearing their expiry date from over stocked facilities to under stocked ones with high consumption rates. This enabled the RDF to avoid losses due to expiration of medicines. The supervision teams also collect revenues and monitors the financial status of each RDF pharmacy.

Tenth, the increase in the utilization of RDF health centres, particularly in rural areas, suggests that people are prepared to go to a local health centre rather than to referral hospitals provided that medicines of acceptable quality are available there. The lesson to be learned from this evaluation is that introducing a RDF to enhance the utilization of cost-effective PHC facilities requires concomitant improvement in the quality of health care provided at these facilities, such as regular supply of medicines, because people in the era of fee-for-service must be able to see the value of the services they are receiving (Shaw and Griffin 1995).

8.7 Implications of the Cost-Sharing Policy for health care system in KS

Governments have to balance budgets in order to maintain a continuous supply of essential medicines. The introduction of a Cost-Sharing Policy has been proposed by international agencies, including the World Bank, to assure continuation of medicines and other health services financing in developing countries. The objectives of this policy include increased utilization of health facilities through quality improvement, regular supply of pharmaceuticals, as well as generation of revenues at the point of delivery. However, the CSPs have had serious implications for health care systems. In this section, the implication of the CSP for the health care system in KS will be discussed. First, the section will demonstrate the impact of the CSP on resources allocation and how such policy freed some budget to be used for health services improvement. The section then moves to discuss the negative implications that the CSP has had on access of vulnerable groups to health care, health care seeking behaviour and households' economy.

8.7.1 Allocation of public resources

Since the early 1980s, the government of Sudan expenditures have not favoured social services and, in particular, health. The civil war in the south has taken considerable resources. The cost of the civil war in the south of Sudan was US\$1 Million per day (Dodge 1990). From the introduction of the CSP in 1992, there was marked public support for the health sector. Total public expenditure on health moved from 0.7% of the GDP in 1990 (HDR 2003) to 4.9% in 2002 (WHO 2003c) and increased by eight fold per person in real terms (i.e. from US\$0.5 per capita in 1987 (Dodge 1990) to US\$4

in 2002 (Decaillet, et al 2003)). Total Federal government expenditure on health increased dramatically from SDD7.6 billion (US\$29 million) in 1999 to SDD15.2 billion (US\$60 million) in 2003 (the last year for which audited account are available) (FMOH 2003b). Government spending on health has therefore doubled in absolute figures since 1999. This is mainly due to increased oil revenues. Thus, the introduction of the CSP in Sudan did not affect the total volume of public resources allocated to the health. But, in fact the share of per capita expenditure on health was substantially (800%) increased compared to the situation before the introduction of user fees. But is still below 5.4% of the GDP reported in 1972 (World Bank 1987).

The recent increases in government health spending have been allocated to a considerable extent to salaries and capital expenditure, such as purchases of equipment and building of health facilities, particularly hospitals. For example, in their *Sudan Health Status Report*, Decaillet and colleagues (2003, p.8) found that the number of hospitals increased from 240 in 1994 to 309 hospitals in 2000 whereas, the number of Primary Health Care facilities slightly decreased from 6,413 in 1994 to 6,184 in 2000. However, most of the 2003 FMOH budget (SDD11.4 billion around US\$44 million) went to staff salaries (35%), other recurrent cost (33%), finance of mechanisms to support the poor (22%), Federal government support to the health insurance (9%) and only 1% for capital expenditure (FMOH 2003b). At the beginning of the second presidential turn in 2000, the government initiated a poverty eradication programme to assist the poor. The programme also contributes to the FMOH's efforts to fight poverty related diseases, such as tuberculosis. In 2002, the government launched a big programme for purchasing basic and more advanced medical equipment, to stem travelling outside the country, mainly to Jordan, to seek treatment.

This being said, in Sudan, spending on health per capita is still much lower than US\$34 recommended by WHO (Sabri 2003). Estimates made by the WHO (2004a, p.126) show that Sudan had spent US\$13 per capita on health in 2000. Analysis by source of funding shows that the government in Sudan provides 21% of health expenditure. The balance (79%) was met by citizens themselves. This extremely low public funding of health care (only 2% of government expenditure) has led to deterioration of public health services, particularly in the far states. Primary Health Care facilities (such as dispensaries and health centres), especially in rural areas, suffer severely from chronic shortages of medicines, doctors and nurses (Decaillet, et al 2003). The low financing of

the health sector and the resulting deterioration of working conditions were important factors in the increased brain drain of trained doctors (Badr 2005). The most threatening feature of this low public financing is the prevalence of communicable diseases, such as malaria and tuberculosis, which are main causes of death in Sudan.

The last publicly funded tender for purchasing of two years stocks of medicines was implemented in 1987 (CMSPO 2003). The total amount of this tender was US\$60 million. In 1989, a tender of US\$20 million was cancelled due to the lack of budget. In 1991, the CMSPO (after it was converted to a public corporation to work on cash-and-carry basis) restarted the purchase of medicines and other medical supplies to public health care facilities. Since then the government's expenditures on medicines and other medical supplies was reduced from US\$30 million in 1989, to only US\$9 million in 2003 to finance distribution of free medicines at hospital emergency departments and for the treatment of certain diseases, such as peritoneal dialysis and tuberculosis medicines. The findings showed that the budget allocations for medicines dropped by 70% (i.e. from US\$30 million in 1989, to US\$9 million in 2003). The spending of the government on medicines in 2003 was only 9% of its expenditure on health compared with over 40% of the annual budget of most ministries of health in developing countries (Shaw and Griffin 1995).

Purchases by CMSPO amounted to around US\$28 million in 2003 financed from its own revenues generated from sales of medicines and other medical supplies under the cash-and-carry policy (CMSPO 2003). Disaggregated information about CMSPO sales to public and private health care facilities was not available. However, the above information clearly shows that the government had made a considerable (around US\$23 million) saving via adoption of the cash-and-carry policy (around US\$19 million) and the import duties paid by the CMSPO (around US\$4 million) in 2003. In Khartoum State, the RDF total purchases equal SDD2.3 billion (around US\$9 million) in 2003 (RDF 2003a), which would have had to be paid by the government of Khartoum State, if there was no RDF. Thus, the CSP, in general, and the RDF, in particular, as a source of funds for medicines and medical supplies distribution in public sectors, have made huge savings for the government.

8.7.2 Impact of the CSP on the equity of access to health services

In Sudan, equity in access to health care, in general, and medicines, in particular, was advocated for by politicians at high level as a goal of the health financing reform (i.e. Cost-Sharing). The government has adopted a number of strategies (such as Solidarity Funds and free medical emergency treatment at hospitals) to protect non-insured individuals in low income and other vulnerable groups from the burden of the payment. But most interventions aimed at increasing equity of access to health care to date failed to provide prompt access to tertiary care services. In-depth interviews reveal that the policy-makers acknowledge that the CSP represents an economic barrier to the use of tertiary care services and that the current exemption mechanisms do not work efficiently. But the policy-makers, despite their expressed dissatisfaction with the current situations confronting poor people, continue to argue that their responsibility in the Ministries of Health is to make services of acceptable quality available near to where people live. They do not accept responsibility for fighting poverty or improving the socio-economic status of the population. Although the existence of groups who abandon health care for financial reasons is widely acknowledged among policy-makers, practically nothing has been done to solve this problem. According to Frank, et al (1990) and Gotsadze, et al (2005), this situation could lead to adverse health outcomes, because the lack of essential medicines may cost lives, increase suffering and increase the economic burden of diseases on the poorest families (WHO 2004b).

A lack of effective mechanism to protect the poor against the burden of payment for health services is a clear gap in the design and implementation of Cost-Sharing programmes including the RDF in Khartoum State. All trials of efficient exemption mechanisms have failed to protect poor health care seekers. With reference to the standard definition of health service equity which suggests that access to health services should match with need for them (Makinen, et al 2000; Macinko and Starfield 2002; Gwatkin, et al 2004), the current situation, particularly at tertiary care level, is clearly inequitable in Khartoum State. All health care providers at policy making and practice levels agree that extending the existing system of health insurance is the best available solution for ensuring access of the poor and other population groups to quality essential health care, particularly at tertiary level, as it offers free health services and 75% off medicines costs.

8.7.3 Reduction in health facilities utilization

This PhD thesis has revealed that the Cost-Sharing Policy has failed to make medicines regularly available in non-RDF health facilities at both Federal and Khartoum State levels. The consequences of the poor quality of services provided at these facilities were underutilization of PHC facilities and continued suffering of hospital users who have been directed to fulfil their prescriptions in private pharmacies. The expressed dissatisfaction with CSP lay in the fact that it did not guarantee the receipt of prescribed medicines. Conversely, those who were more positive about the RDF based their appreciation upon the fact that they do now get their prescribed medicines at their local RDF health facilities.

The CSP has adverse effects at referral hospital levels, where the costs to patients of admission and other medical services were found to be high. This leads to adverse health consequences, not because of delay in reporting to hospitals, but because some patients fail to pay for their recommended advanced diagnostic tests, for example, CT scan (Computed Tomography) or MRI (Magnetic Resonance Image), or medical interventions, for instance, surgical operations. This increases patients' pain and suffering, elongates hospitalisation stays, and increases the overall costs to both patients and hospitals. At worse, some poor patients who need high cost tertiary care, such as open cardiac surgery for double valve replacement or those who need kidney transplantation, were turned away and subsequently died.

8.7.4 Impact on households economy

The economic implications of delay in treatment include consumption of households' resources, significant loss of productivity when patients and carers remain ill longer, and absenteeism from schools in case of children and teachers. Studies in Kenya and Thailand reported that 24% and 60% of land sales respectively resulted from the need to generate money to meet expenses associated with illness (Sen 1979). Out-of-pocket costs of medical treatment including medicines, combined with loss of work due to illness, frequently reduce disposable incomes and deepen levels of poverty. The burden of health care expenditures influences the welfare of households and it can push people into poverty. This contributes to an increased burden of ill health (Sabri 2003).

This doctoral study showed that to meet the high cost of the tertiary care, patients or their relatives may go into debt, or sell or mortgage some important and productive assets. Others might be excluded from seeking care. The borrowing of money and selling of valuable and productive assets to meet the costs of serious family illness, including medicines, are likely to have a significant negative impact on the already stretched household economy and contribute to increasing impoverishment (Kanji 1989; Russell 1996; Saurborn, et al 1996; Pradhan and Prescott 2002; Wagstaff and van Doorslaer 2003; Xu, et al 2003; WHO 2005a). Most patients who need tertiary care have to sacrifice other family needs, such as food, clothing and children's education, in order to pay for high cost medicines and other medical intervention recommended to them or to their relatives. However, households' survey data collected for this study did not allow me to assess the impact of the health care expenditures on households' living standards, but proportional payments of high magnitude (6% of annual income) at non-RDF health facilities may be catastrophic both for poor and for many non-poor households. This suggests that illness contributes considerably to the impoverishment of households, resulting in the loss of a significant amount of income.

8.7.5 Other implications of the Cost-Sharing Policy

Other implications of the Cost-Sharing Policy, according to in-depth interviews with policy-makers and practitioners, emerged from the purchase of partial doses and non-completion of treatment courses. This practice has great potential for the development of medicine-resistant forms of diseases, because the most parasites and microbes are not completely eliminated, and these resistant microbes are then transmitted to others (Asenso-okyere, et al 1998; Kremer 2002). The best example is Chloroquine which was a medicine of choice worldwide, but Chloroquine-resistant malaria has now emerged and Chloroquine has been replaced by very expensive Artesunate derivatives in most parts of the world (WHO 2004d). Interviews also showed that patients sometimes purchase medicines directly from private pharmacies to save the cost of getting prescriptions. This thesis also reported increased rate of absconsion and an increase in the number of patients who ask for early discharge after the introduction of user fees, which suggest the dissatisfaction and/or inability to pay for hospital accommodations.

8.8 Strengths and limitations of this doctoral study

There are major differences between this RDF evaluation study and previous research on different kinds of RDFs (see, for example, Murakami, et al 2001; Uzochukwu, et al 2002; Jitta, et al 2003). These differences include, as mentioned in chapter two, the fact that previous studies of RDFs did not provide such a comprehensive evaluation of the projects that were examined, for example, questions of why these projects worked administratively and whether they have access to foreign currency were not answered. As has been outlined in chapter two, the studies also are somewhat limited methodologically speaking. In particular, I outlined the ways in which the methods selected led to only partial accounts of the issues raised. The research conducted for this doctoral study provides a multi-dimensional account, utilising a variety of methods and including a variety of sources of data. The benefits of this approach include deeper understanding of the RDF performance from different stakeholders' perspectives and it gives more integrated findings about accessibility of essential medicines. In addition, the published studies focused on small scale, community or facility-based RDFs, and the studies took place only after a short period of implementation ranging from only five months (Litvack and Bodart 1993) to six years (Uzochukwu, et al 2002; Jitta, et al 2003).

Unlike those studies, this evaluation study of KS RDF is more comprehensive. Its strengths include: it evaluated a well-established, fifteen years old, large-scale RDF which provides essential medicines and other medical supplies through more than 130 different health facilities to more than five million population of Khartoum State. The design of this doctoral study used a combination of qualitative and quantitative methods to gather information from different sources and from different perspectives. In-depth interviews were conducted to gather information from policy-makers at both Khartoum State and Federal Ministries of Health, and from practitioners and pharmacy staff of selected health facilities. These interviews give insights into the CSP, in general, and the RDF, in particular, and their impact on the health facilities utilization and health care system in Khartoum State as a whole. For example, interviews with policy-makers at MOH give factors that allowed the RDF to survive for fifteen years and at very large scale. Archival records at the MOH KS and the RDF head office, warehouse and health facilities give historical and current data about the RDF performance and its development over years. Stock records were also verified to check the availability of

medicines during the past twelve months prior to the study. This information gives a clear picture about the availability of medicines throughout the year. My personal observations using systematic checklists provide realistic judgements about what was the situation in the RDF pharmacies compared to non-RDF ones. These qualitative data collected from different sources were triangulated with each other and with quantitative data gathered from patients and households' surveys to consolidate conclusions that are drawn from this PhD study. As has been mentioned before in chapter two, this study is the first one which has assessed measures adopted by the RDF KS to assure the quality of medicines and to safeguard against leakage of counterfeit medicines to the RDF drug supply chain.

Set against these strengths, there are also some limitations (see chapter four, section 4.6) to this study:

First, it is a descriptive study. I was constrained by the limited resources and time available for fieldwork in Sudan to survey a representative sample of the health facilities' users. Thus, the samples chosen were indicative rather than fully representative. Nevertheless, the samples of quantitative data are thought to be sufficient in size to identify key indicative differences between two groups of health facilities. Multivariate analysis is needed to further examine the effect of Cost-Sharing as a drug financing mechanism on health facilities utilization (Liu and Romeis 2004).

Secondly, the study focuses on the change in accessibility to essential medicines in outpatient clinics of sampled health facilities. Because, inpatients and tertiary health care facilities, where the medicines are expected to be so expensive, were excluded from the research, the study cannot directly address the overall impact of the Cost-Sharing programme on Khartoum State health facilities users. The inpatients and the tertiary health facilities were beyond the primary aim of establishing the RDF. The aim of establishing the RDF was to develop a reliable supply system of essential medicines to the community with full coverage within Primary Health Care (RDF 1998b), and this has been achieved.

Thirdly, because of the descriptive nature of my analysis, I focus on changes in utilization of public health facilities following the introduction of the RDF instead of attempting to measure the comprehensive effects on the health status of the population.

This limitation resulted from the fact that, despite being strong contributing factor to health status of the population (WHO 2004b), accessibility to essential medicines is not the only factor which affects health outcomes.

Finally, I also emphasise that these findings should be regarded as specific to the RDF model of Khartoum State which has a clear advantage over other states of Sudan in terms of capacity, tax base and purchasing power. The economy of Khartoum State also conditions the success of the RDF. Therefore these findings and conclusions drawn from them should not be automatically extrapolated to other states of Sudan, or to poor or resource limited settings in other countries. The account of the process of developing the RDF and particularly its administrative and financial arrangements will, however, be useful and relevant to the roll-out to other states.

8.9 Summary

The RDF makes medicines widely available in most areas of KS, over the past fifteen years. The RDF has, therefore, contributed to making medicines more affordable for the poor and other vulnerable groups in both urban and rural areas. However, the arrangements adopted by the government to protect the poor failed to secure the access to medicines of up to 6% of the RDF health facilities users. The RDF seems to be succeeding in increasing the utilization of public health facilities, particularly at primary care levels, regardless of the income and geographical locations of the users. The increased utilization of the RDF facilities, especially the health centres, is a clear reflection of the quality and the affordability of the services as perceived by the users. The results are compatible with previous findings that the CSP, which did not improve the quality of services, particularly availability of medicines, reduces health care utilization as was a case in non-RDF health facilities in Khartoum State. This evaluation study clearly demonstrates that the RDF performs a useful function in KS health care system, particularly in rural areas where there are no private pharmacies or other alternative sources of medicines. The study also reveals that the RDF was widely accepted by the KS communities and that the users are willing and able to pay when quality medicines of low cost are made available in their local health facilities.

This evaluation study of the KS RDF experience has demonstrated several factors that are associated with the success of the RDF KS in making quality medicines regularly available at low cost in Khartoum State MOH health care facilities. First, the objectives of the RDF were specifically identified and adhered to. Second, the design and approach to the implementation of the RDF was critical. The RDF KS experience showed that it took the SC (UK) and MOH KS four years' preparation before the RDF was introduced in the first health centre in the late 1989 (RDF 1998b). Much preparation was made to implement the RDF so that it managed to maintain an effective cash collection and supervision systems. Third, the RDF is an autonomous organisation within the MOH. The revenues generated from its drug sales are used to purchase exhausted stocks and to cover the RDF's administrative expenses. These revenues are kept in a separate bank account and are not pooled in the Public Treasury. Fourth, the RDF enjoys the benefits of a strong political commitment (tax exemption, import licence exemption and hard currency availability). Fifth, sustaining a responsive, reliable and cost-effective supply of medicines is critical to the success of the RDF. This will increase people confidence in the RDF. Finally, the Currency Swap Agreement and the periodical price revision protected the RDF against decapitalisation during the rapid inflation of the early 1990s.

This study provides clear evidence that, despite the introduction of the CSP, the government clearly does not stop financing health care services even for non-staff inputs. In fact, government per capita spending on health remarkably increased eight-fold compared to per capita expenditure before the introduction of the Cost-Sharing Policy. However, the governments at Federal and states levels need to increase spending on health to match at least the average expenditure on health of US\$34 recommended by WHO (2004a). The study also reveals that individuals make substantial contributions to the health care system from private out-of-pocket payments. According to this doctoral study, the CSP could have serious quality of life and economic implications for households, particularly when expensive tertiary care is required. The following chapter therefore suggests some major approaches that need to be considered to improve the efficiency and utilization of health care facilities in Khartoum State in the light of the previous discussion of the findings of this PhD study. It also presents an overall summary and conclusion drawn from this thesis. Finally, the next chapter ends by giving some practical recommendations for the further improvement of the RDF and some suggestions for future research.

Chapter 9 Conclusion and Recommendations

9.1 Introduction

This thesis presents a comprehensive evaluation of an experience where a RDF lasts for fifteen years and serves more than three million patients annually with more than SDD2.8 billion (US\$11.1 million) annual turnover. It provides the first comprehensive empirical analysis of its kind on the impact and effectiveness of a large-scale and long lasting RDF. The evaluation of the experience of RDF KS, therefore, presents empirical evidence that a RDF project can be designed and implemented to maintain regular self-financing medicines supply system, if certain prerequisites have been put in place.

This chapter is structured in eight sections including this introduction. Following from the discussion in the previous chapter, section 9.2 tries to answer the question why the government needs to retain the RDF KS, despite the fact that the economic reasons that led to its establishment no longer exist. The answer to the policy question, whether the Cost-Sharing Policy is still needed, which arises from the discussion of the data gathered for this thesis and recent experiences of other countries with CSP, will be presented in section 9.3. Section 9.4 suggests some relevant policy options to halt the negative impact of the CSP, or to substitute the lost revenue, if the government agreed to remove user fees for medical services other than medicines. Section 9.5 gives a summary of the main findings and conclusions drawn from this thesis. Potential threats to the continuity of the RDF that need further consideration by the government of KS are discussed in section 9.6. Section 9.7 presents a set of practical recommendations to further improvement in the RDF. Finally, this chapter ends by suggesting some future research that needs to be conducted to deepen our understanding of a number of issues that have been identified during the course of this doctoral study.

9.2 Why should RDF KS be continued?

Some of the original reasons (dated back to the mid 1980s) which justified the creation of the RDF KS no longer exist. The overall economy of Sudan has improved. Hard currency to import medicines is no longer so constrained. Private pharmacies are more widely spread. However, the findings of this thesis suggest that the government still

needs to retain the RDF as a self-financing drug supply mechanism for the following reasons:

First, the paramount importance of medicines' availability to the perceived quality and hence the utilization of public health facilities, points to the continued significance of the RDF as a mechanism of medicine financing in Khartoum State. The RDF runs a relatively efficient medicine supply system for the MOH KS health facilities. The RDF operates a unitary price across KS, which benefits more remote and rural areas. The RDF is acknowledged by all (fourteen) policy-makers, practitioners at the RDF health facilities and most of the users who participated in this study as an effective drug financing mechanism. They thought that the RDF is critical for the viability of the public health facilities in Khartoum State. The RDF also passes on surpluses worth SDD210 million each year to the MOH KS. These transfers could substitute for lost revenues generated from other medical services, if the CSP is abolished (as will be discussed later in section 9.3). This RDF contribution which is paid on a monthly basis to the MOH KS represents a considerably greater revenue than that generated from doctors' consultation fee and other services at existing health centres (MOH 2005).

Second, the complete removal of user fees, including the RDF, after fifteen years without the establishment of viable alternative financing mechanisms, will result in the problems of quality experienced previously, such as medicine out-of-stock and low staff motivation, and thereby offset any gains from removal of user charges (James, et al 2005). Experiences from Sudan and many developing countries as well, informed us that whenever the government needs money desperately, the drug budget suffers (World Bank 1987). This is because the budget-makers believe that patients could manage to get their medicines from private pharmacies. The World Bank (1987, p.20) found that 'when public budgets must be cut, it is easier, especially in short run, to cut spending on fuel, drugs and vehicle and building maintenance than salaries. Because these inputs are usually small portion of total costs (typically less than 20%), they must be cut drastically to reduce total spending significantly'. The experience of Uganda, for example, showed that the removal of user fees for medicines leading to frequent unavailability of medicines (Xu, et al 2006).

Third, the policy-makers and practitioners strongly believe that returning to free medicines means pushing patients back towards unaffordable private alternatives. The

example given by them was the lack of a regular supply of medicines at those hospitals outpatient departments where the free emergency treatment project is adopted.

Fourth, the RDF runs a relatively affordable medicine supply system for its health facilities users. Interviews with the RDF practitioners (nine out of ten) and all (five) pharmacy staff together with comments of patients in the RDF health facilities demonstrate that the costs of medicines were not a significant deterrent to the use of health care, but that the cost of consultation, operation and hospitalisation were. This study also found that the cost of medicines was rarely mentioned by surveyed households as a reason not to seek health care.

Fifth, unlike the public supply of free medicines, which is usually accompanied by sub-optimal management (World Bank 1987), the RDF renders pharmacy staff to be more alert because any losses will take them to the court. It also encourages doctors to consider their patients' financial capacity and as a result they are prescribing more rationally and getting more cost oriented (Creese and Kutzin 1995; WHO 1997c). In this PhD study, the payment for medicines was also found to increase patients' compliance with their medicine regime. The practice of obtaining medicines to store at home and unnecessary utilization of health facilities to obtain medicines, which were both prevalent during the free medicines era, have totally disappeared.

Six, the RDF frees budgets that would be allocated for annual medicine purchases and releases resources in the form of reductions in the unnecessary utilization of services. Therefore, the government could still benefit from user fees for medicine in reallocating its health care expenditure. This is because expenditure on medicines constitutes a considerable (39%) component of governments spending on health (WHO 2004a) and was found to be the second component of recurrent cost after salaries (WHO 2005a). For example, Piachud (1980) found that in 1971 for nineteen African countries, the expenditure on drugs represented 86% of the overall public spending on health. This implies that continuity of user charges for medicines still could free a substantial proportion of the public health budget. It also means that waiving of fees for medicines would require a huge increase in government spending, which the MOF is unlikely to support.

Finally, the health insurance was seen by policy-makers and practitioners who participated in this doctoral study as the best solution available for health financing problem in Sudan. The continuity of the payment for medicines will encourage people in Khartoum State and other states as well, to join the HIS. The reason is that if people can receive quality health services, including medicines for free, they will not have much incentive to pay insurance premiums to cover unanticipated health problems (Shaw and Griffin 1995), particularly in a context where insurance culture is not prevalent and the majority of the population are working in the informal economic sector, such as agriculture.

I can conclude that the introduction of the RDF does not impose any greater financial charges on users of health facilities than they already bear under a policy where health services are theoretically free. In fact, the findings of this PhD study revealed that the overwhelming majority (94%) of the RDF health facilities users managed to pay for their full prescriptions at RDF pharmacies. The findings also show that all (100%) surveyed patients and heads of households are willing and will be able to pay for quality medicines of low costs, if they are made available near their residence. Therefore, if the government accepts the removal of the Cost-Sharing Policy for medical services other than drugs (such as consultation fees at health centres and hospitalisation charges), the KS RDF model which is found to be successful, could be used as an efficient mechanism to finance medicines in all non-RDF facilities, provided that the initial capital investment and other preconditions are secured.

9.3 Financing health care in Khartoum State: the way forward

The consequences of the increased oil exportation and the Comprehensive Peace Agreement include stability in the rate of inflation, the return of international donors, re-engagement with the international community (i.e. economic sanctions no longer exist) and possibility of debt cancellation or rescheduling. In this context, it is worth asking what value-added the CSP contributes, as it is presently functioning. To answer this central and serious question of policy, I discuss the original reasons (dating back to the early 1990s) that led to the introduction of the CSP. Some serious side effects of the CSP identified in this study, and experiences of other countries where user fees policies are applied, will be used to support my argument in answering the above question.

Economic and political changes which have taken place during the past fifteen years, and which could have real contribution to the economy of Sudan, will be also briefly highlighted.

First, when the Cost-Sharing Policy was introduced in the early 1990s, the economic situation of Sudan was very critical. This was mainly attributed to the civil war in the south, drought during the early 1980s, and economic sanctions and withdrawal of international donors after the current government came to power in 1989. It was thus within this context of acute budgetary difficulties that in 1992 the government decided that cost recovery was to be implemented across the board in all health facilities. The GDP was US\$7.9 billion in the early 1990s (World Bank 2003), but in 2005, it was US\$85.46 billion (CIA 2006). Economic growth rate increased from 3.5% in 1993 (World Bank 2003) to 8.6% in 2005 (CIA 2006). In addition, the return of international donors will add to the available health resources. For example, the Global Fund provides opportunities for Sudan to deliver comprehensive programmes which include treatment for HIV/AIDS, tuberculosis and malaria. In 2006, the FMOH has received amount of US\$8 million in form of equipment and antimalarials out of US\$15 million two-year grant allocated for Sudan (Al Sahafa newspaper 18 January 2006).

Second, at the time of the introduction of the Cost-Sharing Policy, the aims were to increase revenues for quality improvement and to contain unnecessary utilization of services, particularly medicines. These two aims could still be achieved after the removal of the fee-for-service. The lost revenues for recurrent non-salary costs could be substituted for by increasing the overall health budget after the increased oil exportation and the surplus amount paid by the peace dividend. For instance, in 2002, military and security spending in Sudan took up a significant proportion (32%) of public recurrent expenditure, while the allocation for health stands at 2% (Decaillet, et al 2003). Thus, the Peace Agreement could free up considerable resources (an estimated US\$1 million per day was spent on the civil war in the south (Dodge 1990)) for health and other social services. Various other income generating activities (such as visitors' fee) operating at hospital level will continue to generate considerable revenue at facility level. Other potential benefits of the CSP, such as improvement in the quality of services through regular supply of medicines, and setting cost signals to encourage more efficient practice by health care providers will continue through payment for medicines. Continuation of user fees for medicines can, therefore, still mitigate the problems of

unnecessary utilization that sometimes accompany free health services and which are mainly due to the intention of obtaining free medicines, as has been reported in this study.

Third, this doctoral study reveals that the CSP acts as an economic barrier to tertiary care for patients from low and middle income groups. For instance, it increases the number of patients who wait until their medical condition has much deteriorated. This reduces the efficiency of the health care system by increasing patients' suffering and ultimately leads to elongation of hospital stays. Evidence from different African contexts indicates that user fees have too often disproportionately hit hard on poor people (Arhin-Tenkorang 2000). The literature therefore shows some experiences where Cost-Sharing has a negative impact on health care consumption. For example, Weaver (1995) found that, in Niger, outpatients who paid fees delayed seeking care for longer than those who did not. Russel (1996) reported experiences from Zambia and Uganda where, respectively, women expecting difficult child deliveries delay their admission for fear of paying more, and some mothers waited until their child was seriously ill to ensure their eligibility for free admission to the emergency ward. In Niger, Chawla and Pellis (2000) found that households in lower income groups have a 2% lower probability of seeking formal treatment compared with households in the highest income level. Of course, the CSP was not adopted specifically to reduce the utilization of necessary health care services at any level by the low or any other groups, but in reality it does.

Fourth, in Khartoum State, our study revealed that the CSP frees a small amount of resources for the health sector. For example, in 2005, the share of CSP (dental, diagnostic tests and medicines revenues not included) in the total expenditure on health in KS was only 7% (MOH 2005). However, this percentage is slightly higher when compared with the 5% reported by Gilson and Mills (1995) in Africa. Thus, the lost revenues, as a consequence of removal of user fees, will be a small proportion of total government spending. And the potential savings after the Peace Agreement will be far more than the lost revenues previously generated from user fees. The interviews also showed that the CSP failed to improve the quality of services, particularly availability of medicines, in non-RDF facilities at both Federal and State health facilities in Khartoum State. This study suggests that a small revenue is generated at the expense of reduced efficiency in terms of the failure to maximise the benefit for low income

groups, particularly at tertiary levels. Therefore, the CSP did not provide an adequate or strategic solution to the problem of health care financing in Sudan.

Fifth, mechanisms for protecting the poor appear to be inefficient and failed to protect patients from low income groups against the negative impact of user charges: this suggests that new arrangements to protect the poor are necessary. In Sudan, 40% of the population is below the poverty line (CIA 2006) and according to this PhD study, even the middle income group who earned approximately US\$4 per day were only US\$3 above the internationally recognised poverty line of US\$1. In this context, dependence on social networks to pay for medical care is costly and may not work in case of epidemics or high cost medical interventions. This is because ultimately whole social networks can be depleted by the large numbers of such claims (McPake, et al 2002). The system of informal social solidarity also may not last for a much longer time as the Khartoum State population becomes more modernised: as a result, previously strong social networks will be weakened. Nor can health insurance provide a solution. After more than ten years, since its inception, health insurance coverage is low. Only 30% of the Khartoum State population have insurance coverage. Most (80%) of them are public sector employees. Vulnerable groups, such as poor, self-employed and farmers, are without insurance coverage. The current situation is unlikely to be remarkably changed in the foreseeable future. These difficulties support our argument that the removal of fees for medical services should be considered.

Sixth, there is an international movement for removal of fees, particularly at the primary care level (McIntyre, et al 2006). For example, the World Bank (Claeson, et al 2001) has recognised that user charges for health services, particularly at hospital level, can make the difference between a household being poor or not. Recently in its medicines strategy, WHO (2004b, p.65) reported that 'fair and sustainable financing for the medicines component of health care should be ensured through adequate funding levels and equitable prepayment mechanisms, such as government revenues or social health insurance, to ensure that poor people do not face proportionally higher costs than the better off'. In response to this movement, Zambia translated its debt forgiveness, by scrapping user fees that had made health services inaccessible to millions of poor people in rural areas (Moszynski 2006)

Seventh, doctors confront an embarrassing and critical situation, particularly at health centres, when a patient fails to pay the doctor's consultation fee. This will end up by poor people switching to cheaper forms of health care, such as self-medication and traditional healers. As mentioned earlier, these practices will increase the overall health expenses when people ultimately return to a hospital after their condition has seriously deteriorated. The findings of this doctoral research show that patients sometimes resort to self-medication to save the consultation fee. The impact of these practices may have long-term negative consequences for their health status (Hopkins 2005). The removal of the consultation fee encourages patients to go first to see a doctor to get a prescription. This new proposed policy if accepted by the government, will, therefore, reduce the self-medication practice.

Eighth, abolishing medical services charges would strengthen the RDF by boosting demand for its medicines amongst groups which are at present unable to use RDF facilities or amongst those patients who use self-medication, consult traditional healers or wait until they are becoming seriously ill. This is because free medical services should encourage individuals to seek a consultation before medicines are received. The consequence of increased utilization of RDF facilities would be a high RDF turnover without any additional administrative costs. The high turnover could help the RDF to further reduce the prices of its medicines. It also finances the RDF expansion to non-RDF health facilities in Khartoum State. In addition, the current RDF contribution paid to the MOH KS could be increased.

Finally, continuing patients' charges after the country has jumped the hurdle of the 1990s would be politically embarrassing. Circumstances have been favourable to the removal of the CSP for medical services. The waiving of user fees for medical services, such as consultations, surgical operations and hospitalisation at all levels, will remarkably increase the number of patients using public health facilities. A recent study in Uganda showed that the abolition of user fees has a positive effect on the poor, and attendance at government health facilities was reported to show a 100% increase, after user fees were officially abolished (Jitta, et al 2003; Xu, et al 2006). Similarly, interviews with policy-makers at MOH KS revealed that the number of antenatal visits almost doubled after the fee for this service was abolished two months prior to the fieldwork of this PhD study. On the other hand, James and others (2005) argued that the Cost-Sharing Policy contributes to increased morbidity and mortality. The authors

conclude that the abolition of the CSPs could have a substantial impact on child mortality by preventing an estimated 233,000 deaths annually in twenty African countries. Brook and colleagues (1983, p.1432) inferred that for those in receipt of free care ‘...their risk of early death had been diminished’. The positive relationship reported between user charges and catastrophic health expenditures suggests that the removal of user charges may stabilise household income (Xu, et al 2003).

To summarise, it seems clear that the original circumstances which necessitated the introduction of the Cost-Sharing Policy for all health services provided in Sudanese public health care facilities no longer exist, and that the CSP failed to improve the quality of services in these facilities. More seriously, it represents an economic barrier to equitable access to health care, particularly at tertiary level. It is apparent from evidence presented here that without waiving of fee-for-service perspectives, further efforts for improvement are not encouraging. In the interest of equity and enhancing utilization of Primary Health Care services, user fees for doctors’ consultations and hospitals’ services other than medicines should be phased out. Expanding health insurance coverage to informal sectors including the poor, improving the efficiency of the Zakat system, and better co-ordination between different public providers of health care are now priorities (see below).

9.4 Other policy options to improve financial accessibility to health care

Access to essential medicines is a crucial element of the national strategy to achieve health for all (FMOH 2003a). In order to help Sudanese people to get access to essential medicines, the challenge for the government is to find sources of funds to provide affordable health services of acceptable quality to all populations throughout Sudan. The governments at Federal and states levels should therefore consider the following financial options:

Private rooms at public hospitals

Currently there are private wings in some public hospitals. This provision of hospital private rooms could be further improved by the introduction of a voluntary selective system, based on high payment for comfortable hospital accommodation. This reform would yield surpluses that could be used to provide free services for the poor in public

hospitals. The principles of the reform would be to grade hotel-type services of hospital accommodation. So, there will be no difference in the standard of clinical care and the differential will be in the hotel services only. A graded public hospital ward system would range from a one-bed room with, for example, separate toilet and shower, air condition, television, and fridge, to open wards with a number of beds. Stratification according to the level of comfort, privacy and hotel-type services (disparities that resulted from individual choice) would allow differential pricing. The levying of substantial fees for 'private rooms' in public hospitals, available to be selected by those who are willing and able to pay more for better hotel-type services, would generate a surplus. The generated funds could be used to provide free health services in general teaching wards in the same hospital. This reform would improve access to hospital services for the poor and suffering will be substantially reduced. This is because the relatively richer patients will be encouraged into private rooms within the public hospitals, leaving free beds in general wards for the poorest individuals. This proposal would serve to minimise the equity problem, but it would raise the issue of discrimination between patients on an economic basis in public hospitals. However, more calculation is still needed to work out the economic feasibility of this proposal and to find out whether the generated revenue would generate surpluses that could substitute for the losses from the waiving of hospital fees.

Expansion of social health insurance coverage

Efforts need to be made to extend the existing insurance scheme better to cover both formal and informal sectors of the economy, with more focus on the poor families. Currently, the premium for membership of poor families in KS is SDD5,000 (around US\$20) annually paid by the Zakat on monthly instalments to the Health Insurance Scheme in KS (Mustafa, et al 2005). For the government to insure the remaining poor families (about 280,000 households) in KS, the annual cost would be SDD1.4 billion (roughly US\$5.6 million). Sources for funding the insurance coverage of this group of the KS population could include the increased budgetary allocation for health after the Comprehensive Peace Agreement. The Zakat could also increase its contribution for insurance coverage, because the current Zakat burden of supporting other social activities could be lifted, particularly after the general economic improvement. The advantages of extending insurance coverage to the remaining poor families in KS beyond the current mechanisms for protecting the poor would allow the targeting of

poor households directly. The insurance coverage for the poor families would provide free medical services at the point of delivery together with a charge of only 25% of prescription costs, and would free up household resources for other basic needs. Moreover, the HIS KS would benefit by increasing its coverage. Such expansion would increase the HIS revenue to improve the quality of its services or to expand coverage of other services, which are currently not covered, such as medical devices and treatment of certain diseases, for example, cardiac operations. Finally, the poor people's insurance proposal does not require any new administrative arrangements.

Zakat coverage

This option could provide a way of avoiding the negative equity impacts of the RDF on those who are not able to pay for their medicines from their own income or savings. The Zakat was mentioned by the policy-makers and practitioners interviewed for the study as the main official source of financing hospital solidarity offices to assist poor patients. Patients who fail to get assistance at hospital level are referred to the Zakat Chamber. The system for accessing assistance from the Zakat, as described before, appears to be complicated. Potential improvements to the Zakat could include pre-identification of poor families who need Zakat assistance. The identified families and individuals could be given a card which would entitle them to receive free medical services and subsidised prescriptions for certain list of medicines and for a certain period of time (allowing for periodic reassessment of the families economic situation). The health facilities and the RDF would be repaid by the Zakat on an agreed frequency, for example, every month.

Co-ordination between different pro-poor agencies

The involvement of many governmental bodies in the delivery of public health care and the persistent lack of co-ordination between the Zakat Chamber, National Health Insurance Fund, on one hand, and Federal and State Ministries of Health, on the other, reduces the potential for improving access to health care, in general, and to essential medicines, in particular. This co-ordination is needed to avoid duplication of efforts, waste of scarce resources, confusion to users, unnecessary conflict between different government organisations, absence of accountability, unnecessarily heavy reporting requirements to the Zakat Chamber and so on. The Zakat and Health Insurance Schemes

should commit funds that strengthen existing health care system by proactively targeting the poorest people and rural areas, instead of trying to establish a new, parallel health system.

9.5 Overall summary of the thesis

This study presents very encouraging findings. The most important finding of this study is that the RDF KS model has been extremely effective in maintaining a regular, self-sustaining system of supply of safe and effective medicines of good quality and affordable prices to the KS population, regardless of their income and geographical location, for nearly two decades. This study did not find ethnic and gender disparities, or any kind of discrimination in access to health care, in general, and in the delivery of essential medicines, in particular, at either facility or household levels.

The improved accessibility to medicines was clearly reflected in the steady increase in the utilization of the RDF health facilities by different socio-economic groups, particularly the poor population and other vulnerable groups (such as mothers and children) in both urban and rural areas in Khartoum State. Thus, the RDF was strongly perceived by both policy-makers and practitioners to have had very positive effects on the achievement of high immunisation scores, the reduction of the self-medication practice and on the consultation of traditional healers. Therefore, it can be inferred from this study that the RDF has had a positive impact on the health status of Khartoum State population, particularly women and children. The RDF has also led to the reported tendency among practitioners to consider their patients' financial capacity. However, prescribers still need to take more account of their patients' economic status before prescribing expensive brand medicines.

The RDF's positive effects on improved service quality offset or even outweigh the negative impacts of the introduction of user fees into services that were previously theoretically free, but at the same time when a chronic shortage of supply was very common. It has also improved the efficiency of health care system by increasing the utilization of lower level, cheaper primary health centres. This research showed that the participation of the people in paying the cost of their medicines by paying a reasonable amount for their prescriptions was important in promoting the efficient use of health

facilities, because people often attach more value to services they pay for than for those that are free.

However, the regressive implications of CSP for equity, and utilization and, thereby, for health status reported in this study, combined with recent improvement in the economy of Sudan, are, in my personal view, strong enough to justify the removal of user fees for medical services, such as doctor's consultation and hospitalisation fees. The removal of user fees for these services will protect people from the risk of incurring catastrophic payments at tertiary care level, as reported by policy-makers and practitioners who participated in this doctoral study. This study could therefore be used to convince Ministries of Finance and Health at Federal and State levels to lift the fee for medical services at all health care levels and to increase the overall level of public spending on health. Resources freed up as a consequence of the Comprehensive Peace Agreement should be channelled to finance the previously under-financed health services. The potential of capital investment in health, expected through the return of international donors and investors, should also be wisely used to complement (but not replace) government spending on health, in order to improve and secure the sustainability of the health care system.

The RDF KS was established to solve the chronic problem of out-of-stock medicines that prevailed in both urban and rural public health facilities in Khartoum State during the era of free health services. The RDF KS also aimed to improve the utilization of abandoned health centres and thereby PHC services. It would appear that the RDF has accomplished these tasks very successfully. When the study's findings are examined in the light of the previously determined measures of accessibility (namely availability, geographical accessibility and affordability); equity; and improvement in utilization (i.e. efficiency, reduction of self-medication and traditional medicines, rapid reporting of illness, increased utilization of PHC services), it is clear that the RDF has succeeded in achieving its establishment objectives. This being said, the Khartoum State government needs to monitor the sustainability of the encouraging results reported in this RDF evaluation study. The Khartoum State government also needs to draw more attention to the RDF's weaknesses mentioned in this study. Finally, special consideration should be given to the recommendations set below.

The findings presented in this thesis were generated from the analysis of data collected from different sources, including in-depth interviews with policy-makers and practitioners, my own observations, structured interviews with patients and heads of household, and verification of relevant archival records at MOH, RDF and pharmacies of selected health facilities. These findings, therefore, differ from those of published studies (for example, Murakami, et al 2001; Uzochukwu, et al 2002; Jitta, et al 2003), which have evaluated community or facility-based RDFs of small size and short duration. This study also presented data collected from all feasible sources, using *both* qualitative and quantitative methods, whereas the published RDF studies used *either* qualitative or quantitative, and were community *or* facility-based. Therefore, the findings of this thesis are more robust and precise to be used by interested organisations and individuals (such as donors, policy-makers and researchers). This being said, these data can not be taken as representative throughout Khartoum State. This is because the very nature of the qualitative investigation makes it impossible to formally generalise findings to the whole population (Patton 1990).

The conclusions drawn in this thesis are intended to inform policy-makers across developing countries, in general, and in Sudan, in particular, and to invite reflection upon the factors which led to the success of the RDF KS model. The conclusions also inform policy-makers, researchers and concerned organisations that the RDF KS model could be a useful complement to publicly-financed health care. The model could be successfully replicated in the remaining non-RDF health facilities in Khartoum State, other states of Sudan, and low income countries with similar contexts, particularly Sub-Saharan Africa and Southeast Asia, where the accessibility to essential medicines is still an issue of concern, on condition that the success factors mentioned in chapter eight of this thesis are also met. Finally, the results of this doctoral study demonstrate empirical evidence on how international donors can help interested governments in developing countries to replicate the RDF KS model which has proved to work successfully on a very large scale. This being said, the success of a RDF remains context specific and lies in the details of planning and implementation.

It is not surprising, therefore, that there is no one typical RDF model which is suitable for all countries. The diversity of health systems, and the way in which health services are financed and provided, leaves little room for promoting of the RDF KS model as the sole solution for the problem of financing medicines in developing countries. It is also

important to note that the focus on the RDF KS model reflects the policy of the government of Sudan, and does not imply that the RDF is more appropriate than other medicine financing mechanisms, for example, the publicly funded programmes in certain developing countries, such as the Gulf States. This being said, these findings show that it might well benefit many developing countries of similar economic situations to adopt KS RDF model. In addition, international organisations, for instance, UNICEF, WHO, the World Bank and so on should be encouraged to replicate the KS RDF experience which was initially funded by the SC (UK).

9.6 Areas for further consideration by the RDF and the government of KS

This study concluded that the RDF has been successful and that it continues to fulfil the objectives set for it when it was established. The evaluation study also showed that the RDF faces some threats to its financial viability and its Primary Health Care role. The main potential threats identified in this evaluation study that should be considered by the government and the RDF administration board comprise reduction in availability of essential medicines compared to previous evaluations; discontinuity of management as a result of frequent political interference; and reduced number of drug samples being sent to NDQCL laboratory testing and other quality issues.

Reduced percentage of medicines' availability

In Sudan, access to medicines was a key objective behind the health financing reform (i.e. Cost-Sharing Policy). In KS, though the average availability of key medicines in the RDF health facilities is still high (only 8% of patients surveyed failed to get their prescribed medicines because the medicines were not available), the percentage of available stock in the facilities has dropped from 100% reported by Awadalkarim (1996) and Mohamed (2000) to 93% during the days of my field visits. The RDF is particularly vulnerable to the effects of frequent shortages of medicines, because if people do not receive all medicines prescribed to them at their local facility, their trust in the RDF would be lost. They may simply feel that the money paid and the time waiting to see the doctor were wasted, since they have to go elsewhere to get their medicines. The RDF officials should draw special attention to this trend of low availability of medicines in the last years. An expected consequence of this trend is that

many users will stop coming to RDF health facilities and the revolving fund will soon cease to revolve. Lessons should be learned from experiences of RDFs' failures in different countries (such as Senegal (Cross, et al 1986) and Nigeria RDFs (Erhun 2000)), and facility-based RDFs in Sudan. To maintain and develop the RDF achievements discussed above, the MOH must be more concerned with the sustainability of the RDF. The RDF administration board needs to intervene and to closely monitor the RDF performance.

Discontinuity of management

Interviews with policy makers at MOH KS revealed that the RDF has suffered from an unfortunate discontinuity of management over the past two years. During this short period, the RDF has been managed successively by four different directors. Given the fact that this kind of project requires, as mentioned earlier (chapter eight), active leadership and advocacy at the local and national levels, this presents a major challenge to the RDF. Active and stable leadership is of utmost importance, if the RDF is to continue its viability and maintain its good record in providing quality medicines.

Symptoms of the discontinuity of RDF management were clearly reflected in the dramatic reduction of the number of samples sent to NDQCL for quality testing (see below). But, it has been more seriously reflected in the RDF's financial situation. Although the discussion of the RDF's financial situation is beyond the scope of this thesis, it is worthwhile highlighting some worrying financial trends. Interviews with MOH KS officials and RDF annual reports (RDF 2004) reveal that the RDF currently suffers from financial problems. The increased operating expenses (see chapter six above) have affected the ability of the RDF to pay its creditors, which is essential for its continued procurement on deferred payment basis from the main suppliers. The RDF's good reputation with those suppliers has enabled the RDF to finance its expansion and to maintain the regular availability of medicines at its health facilities. The current trend at the RDF will not change spontaneously, and high level intervention by the Wali (the Governor) of the State is badly needed to activate the RDF administration board, to enforce the RDF Act, to stop escalating operating expenses, and to inject some money in the RDF in order to enable RDF to pay its creditors. Without the high level intervention, the danger is that the RDF will linger a few years and then disappear.

Reduced number of drug samples being sent to NDQCL and other quality issues

The RDF is becoming too focused on profitability. As a consequence, less attention is currently paid to assure the quality of medicines. The focus is now very much on procuring cheap medicines regardless of the reputation of manufacturers. The number of samples being sent to the NDQCL for quality checks in 2003 dropped dramatically (from 104 in 2002 to only twenty-two samples in 2003), which is as yet unexplained. However, a number of possible explanations exist. This may be due to the discontinuity of management in the past two years. It may also depend on the fact that the medicines tests in the RDF are done voluntarily and rely mainly on managers' commitment and awareness of serious problems that could emerge from the distribution of non-registered²⁹ medicines. To comply with the new Pharmacy, Cosmetics and Poisons Act (2001), the RDF should reconsider its current policy of importing non-registered medicines. The importation of registered medicines would safeguard against the entry of substandard or counterfeit medicines to the RDF supply chain (see section 9.7 below).

The monitoring of stock is another area that has also been affected by discontinuity of management. The percentage of expired medicines to the annual average stock of medicine rose by two-fold: from 2% in 2002 to 4% in 2004. This raises questions about the RDF's quantification method to determine medicine needs and the quality and preciseness of the extensive supervision, which is being carried by the RDF. Other quality issues observed at RDF health facilities include electric power outages which will affect the quality of 'keep cool' items. The storage conditions at some RDF pharmacies were not to the standard required due to frequent damage of the air coolers. One of the problems stressed by pharmacy staff was the repackaging of tablets and capsules with naked hands. According to Quick and colleagues (1997, p.488), the most important rule to follow is that the dispenser's hands must not be in direct contact with the medicines. Thus, tablet counting machines for repackaging of tablets, patients packs or strips in large boxes are required.

²⁹ All medicines should be registered by the General Directorate of Pharmacy to get marketing approval. Each manufacturer must present extensive information on the product (or products) submitted for registration, to allow qualified assessment teams evaluate the quality, safety and efficacy of medicines before marketing authorisation is given.

9.7 Recommendations for further improvement in the RDF

This study revealed a relatively high level of access to essential medicines in Khartoum State. Nevertheless, the RDF needs to consider the following recommendations for further improving the coverage of essential medicines:

Availability of medicines

Although this study showed that RDF health facilities have a more regular medicine supply system compared to non-RDF ones, effort is still needed in KS to increase the availability of medicines. Shortcomings in the method of quantifying should be addressed and treated. Better training in medicine supply management and the development of an effective procurement system, including needs assessment, should be considered, in order to further decrease the shortages and overstock of medicines in the RDF warehouse. The RDF health facilities should have adequate quantities of medicines on the NLED, so that patients can obtain all their prescribed medicines at the health facility they visit. To do this, the RDF needs to review its list of essential medicines, to ensure that it is up-to-date with current prescribing practice.

Distribution of registered medicines

Despite being seen as satisfactory, the RDF's measures to assure the quality of imported medicines need to be revised. The RDF no longer needs to import non-registered medicines, for a number of reasons. First, this practice will create a big loophole in the whole Sudanese pharmaceuticals' legal framework, which will inevitably lead to the marketing of counterfeit medicines. Second, counterfeit and substandard medicines are already prevalent (WHO 2006). It is within this context, that the WHO (1997, p.13) recommends 'Where a legally based national drug registration system exists, all procurement agencies must comply with the law and limit their procurement to duly registered products'. Third, the procurement of generic medicines, regardless of their registration status, will not guarantee the quality of medicines with regard to stability and bioavailability³⁰, since pharmacopoeial specifications do not necessarily address these issues (Alfadl 2005). The laboratory tests are carried out mainly to confirm the

³⁰ Bioavailability refers to the speed and completeness with which a drug administered in a specific form (tablet, capsule, intramuscular injection, subcutaneous injection) enters the blood stream (Quick, et al, 1997, p.273).

accuracy of content of active ingredients in the drug sample. Finally, the number of registered medicines in Sudan was more than 3,000 in 2005 (GDOP 2005). The RDF main suppliers can easily access the list of registered medicines and their manufacturers and supply the RDF with registered medicines without additional costs. The RDF should think about importing of registered medicines to guarantee the availability of quality-assured medicines.

Differential prices

Charging higher prices for medicines at hospitals has the potential advantage of promoting efficiency of the health care pyramid by encouraging patients to use low cost services provided at health centres. For example, in Zambia, graduated fee levels were found to promote the use of lower level facilities (Gilson, et al 2003). The RDF needs to revisit its unitary price policy and introduce a discriminating system based on the level of the facility, particularly if the government agrees to provide free medical services at all health care levels.

Involvement of practitioners

According to the research undertaken for this PhD thesis, practitioners show concern about the selection of medicines for the RDF. Thus, the involvement of doctors in the revision of the RDF list of medicines is an important aspect of sustaining legitimacy of the RDF. The current situation could be remedied by the establishment of an expert committee to revise the RDF drug list periodically, for example, every two years, because the pharmaceutical market is always changing. In addition, changes in disease patterns may also justify the changes to the RDF list. Senior specialists in each clinical discipline should be among the members of the committee. Clear guidelines should be drafted and strictly followed to avoid the undue influence of commercial medicine companies.

Participation of community

Involving communities in the RDF management at health facility level and in its board of administration important to enforce accountability and foster transparency in the management of the RDF, and to increase community support to the RDF. It is also

important to protect the RDF against diversion from its primary objectives. This could be done by selecting one or two members from community leaders or from civil society organisations, such as consumers' protection society.

RDF expansion: dispensaries' RDF

The successful experience of the RDF in maintaining a regular supply of medicines to health centres and hospitals could help in the establishment of new community-based RDFs. An initial stock from the short list of essential medicines could be made available from the current surplus paid by the RDF to MOH. A total of SDD20,000,000³¹ (this represents less than 10% of the annual amount paid to the MOH) would be sufficient to finance initial stocks of all (200) dispensaries in KS. The initial capital could be given to medical assistants as a loan (i.e. re-paid investment) against open check of the amount given to them payable to the RDF as trust bond. The source of medicines is RDF. The price would be 20% less than the price of RDF health facilities to enable the dispensary to make a mark-up of 15%. So the end users benefit from 5% discount at dispensary level. This discount will encourage people to use their local dispensary. The income generated should be used to replenish exhausted stocks and to finance operating expenses. However, an agreed proportion of the net profit could go to the responsible medical assistant of the dispensary as incentive against its financial and administrative responsibility. The remaining profit should be added to the capital to meet medicines price increases. Each dispensary should be audited at least once per year by the locality Department of Health with a representative from the RDF.

9.8 Future research

This study has focused on the evaluation of the experience of the RDF in KS. However, in so doing, it has also shed some light on the CSP. In both of these cases, the study has identified some issues that merit further investigations. Firstly, the results of this thesis show that additional research and assessment of the RDF's financial situation is urgently needed to develop the most effective strategies for controlling the escalating

³¹ I have made these calculations based on the average monthly consumption (RDF 2003a) of small size RDF health centres which are more or less serve equal number of population as do dispensaries.

operating expenses in recent years, and to make the RDF capable of ensuring prompt payment to suppliers that have agreed to offer deferred payment terms.

Secondly, future research efforts should focus on whether or not the CSPs encourage the rational use of health services and to find out if unnecessary use of health facilities no longer exists. This research is important to find out whether the forgone visits were really frivolous ones. Thus, this research will provide important insights into understanding the relationship between the CSP and efficient use of the health care system.

Thirdly, further research should be conducted to explore the impact of the RDF on the rational use of medicines. Such research will be useful in developing strategies to improve prescribing practice, in order to maximise benefits and minimise wastage of users' resources.

Fourthly, interviews with policy-makers and practitioners revealed that the MOF makes funds available to assist with high cost medical interventions, such as cardiac and renal transplantation operations, and radiotherapy for cancer patients. The Zakat was also mentioned to be the main source for assisting poor people to pay high hospitalisation costs. While these are considerable costs, it would be important to know which groups are benefiting most from these arrangements. The practitioners also claimed that the Zakat beneficiaries are more likely to be better-connected and more knowledgeable rich individuals. The findings of such research will be of great value in testing the cost-effectiveness of the current exemption mechanisms at hospitals which are mainly financed by the Zakat.

Finally, research is needed to study the effect of user charges on household income, consumption and health care seeking decision, particularly the poorest households. In addition, the impact of the CSP on the households' expenditure on other basic needs, such as clothing and children's education also needs to be researched.

Bibliography

Unpublished official documents

Alfadl, A.A., 2005. Quality assurance and quality control in central Medical Supplies Public Organization (CMS). A report submitted to the Federal Ministry of Health, Khartoum, Sudan.

Awadelkarim, M.A., et al., 1996. Evaluation Report: Khartoum Comprehensive Child Care Programme (KCCCP). Ministry of Health, Khartoum State-Sudan.

CMSPO 2003. CMSPO tenders between 1984 and 2003. Central Medical Supplies Public Organisation, Federal Ministry of Health, Khartoum- Sudan.

FMOH 1989. Annual statistical report, Federal Ministry of Health, Khartoum- Sudan.

FMOH 1990. Annual statistical report, Federal Ministry of Health, Khartoum- Sudan.

FMOH 1991. Annual statistical report, Federal Ministry of Health, Khartoum- Sudan.

FMOH 1992. Annual statistical report, Federal Ministry of Health, Khartoum- Sudan.

FMOH 1994. Annual statistical report, Federal Ministry of Health, Khartoum- Sudan.

FMOH 1996. Annual statistical report, Federal Ministry of Health, Khartoum- Sudan.

FMOH 1998. Annual statistical report, Federal Ministry of Health, Khartoum- Sudan.

FMOH 1999. Health research operational manual, Federal Ministry of Health, – Sudan.

FMOH 2000. Annual statistical report, Federal Ministry of Health, Khartoum- Sudan.

FMOH 2002. Annual statistical report, Federal Ministry of Health, Khartoum- Sudan.

FMOH 2003a. 25 years strategic plan for health sector. Federal Ministry of Health, Khartoum- Sudan.

FMOH 2003b. Annual statistical report, Federal Ministry of Health, Khartoum- Sudan.

FMOH 2004. RBM progress in Sudan 2003. Prepared by the National Malaria Control Team. Federal Ministry of Health, Khartoum- Sudan.

Fundafunda, B., 1998. Evaluation report on revolving drug fund at the Khartoum State Ministry of Health. SCF (UK), London & Khartoum State Ministry of Health.

GDOP 2005. Annual statistical report. General Directorate of Pharmacy, Federal Ministry of Health, Khartoum- Sudan.

Health Insurance Act 2001. Ministry of Social Care, Khartoum, Sudan.

KCCCP 1987. Khartoum Comprehensive Child Care Programme: a joint project of the Ministry of Health and Social Welfare, Democratic Republic of The Sudan, and The Khartoum Commission (Directorate General of Health Affairs). Funded by Save the Children Fund, UK. July 1987.

Mohamed, G.K., and Fundfunda, B., 2003. The revolving drug fund (RDF) at Khartoum state Ministry of Health, Khartoum, Sudan.

MOH 1990. Annual statistical report, Ministry of Health, Khartoum State-Sudan.

MOH 1992. Annual statistical report, Ministry of Health, Khartoum State-Sudan.

MOH 1994. Annual statistical report, Ministry of Health, Khartoum State-Sudan.

MOH 1996. Annual statistical report, Ministry of Health, Khartoum State-Sudan.

MOH 1998. Annual statistical report, Ministry of Health, Khartoum State-Sudan.

MOH 2000. Annual statistical report, Ministry of Health, Khartoum State-Sudan.

MOH 2002a. RDF Act. Ministry of Health, Khartoum, Sudan.

MOH 2002b. Annual statistical report, Ministry of Health, Khartoum State-Sudan.

MOH 2003a. Health services in Khartoum State. Ministry of Health, Khartoum State-Sudan.

MOH 2003b. Annual statistical report, Ministry of Health, Khartoum State-Sudan.

MOH 2004. Annual statistical report, Ministry of Health, Khartoum State-Sudan.

MOH 2005. Annual financial report, Ministry of Health, Khartoum State-Sudan.

MOH-SC 1996a. Handover of KCCCP Report. Ministry of Health, Khartoum State-Sudan and Save the Children, United Kingdom in Khartoum.

MOH-SC 1996b. Letter of understanding. Signed between Ministry of Health, Khartoum State- Sudan and Save the Children, United Kingdom in Khartoum 31st March 1996.

Mustafa, M.S., et al 2005. Health system profile: Sudan. Division of Health System and Services Development. Eastern Mediterranean Regional Office (EMRO), WHO.

NDQCL 2003. Annual Report, National Drug Quality Control Laboratory- Federal Ministry of Health. Khartoum Sudan.

NHIF 2002. Annual report. National Fund for Health Insurance, Ministry of Social Care, Khartoum, Sudan.

Pharmacy, Cosmetics and Poisons Act 2001. Federal Ministry of Health, Khartoum, Sudan.

RDF 1996. Annual report. RDF, Ministry of Health, Khartoum State-Sudan.

- RDF 1997. Annual report. RDF, Ministry of Health, Khartoum State-Sudan.
- RDF 1998a. Annual report. RDF, Ministry of Health, Khartoum State-Sudan.
- RDF 1998b. RDF operational manual, Ministry of Health, Khartoum – Sudan.
- RDF 1999. Annual report. RDF, Ministry of Health, Khartoum State-Sudan.
- RDF 2000a. Annual report. RDF, Ministry of Health, Khartoum State-Sudan.
- RDF 2000b. RDF operational manual. Ministry of Health, Khartoum State-Sudan.
- RDF 2001a. Annual report. RDF, Ministry of Health, Khartoum State-Sudan.
- RDF 2001b. The analysis of RDF tender report. RDF, Ministry of Health, Khartoum State-Sudan.
- RDF 2001c. RDF price revision report. RDF, Ministry of Health, Khartoum State-Sudan.
- RDF 2002a. Annual report. RDF, Ministry of Health, Khartoum State-Sudan.
- RDF 2002b. The analysis of RDF tender report. RDF, Ministry of Health, Khartoum State-Sudan.
- RDF 2002c. For quotation: RDF Order No. rdf 1/02. RDF, Ministry of Health, Khartoum State-Sudan.
- RDF 2002d. RDF price revision report. RDF, Ministry of Health, Khartoum State-Sudan.
- RDF 2002e. RDF financial performance report for the first third of the year. RDF, Ministry of Health, Khartoum State-Sudan.
- RDF 2003a. Annual report. RDF, Ministry of Health, Khartoum State-Sudan.
- RDF 2003b. The analysis of RDF tender report. RDF, Ministry of Health, Khartoum State-Sudan.
- RDF 2003c. RDF price revision report. RDF, Ministry of Health, Khartoum State-Sudan.
- RDF 2003d. RDF price list. RDF, Ministry of Health, Khartoum State-Sudan.
- RDF 2004. Annual report. RDF, Ministry of Health, Khartoum State-Sudan.
- SEDP (Sudan Essential Drug Programme) 1988. Sudan essential drugs and PHC support programme: a conceptual framework for Bamako Initiative. Fourth draft. 17 October 1988. Federal Ministry of Health, Khartoum, Sudan
- Shariff, A., 2004. A status report on macroeconomics and health sector in Sudan. Khartoum, Sudan. Submitted to the Federal Ministry of Health, Khartoum, Sudan.

Journal articles, papers and books

- Abu-Zaid, H.A., and Dann, W.M., 1985. Health services utilization and cost in Ismailia, Egypt. *Social Science & Medicine*, 21(4), 451-461.
- Agyepong, I.A., 1999. Reforming health service delivery at district level in Ghana: the perspective of a district medical officer. *Health Policy and Planning*, 14(1), 59-69.
- Akashi, H., et al., 2004. User fees at a public hospital in Cambodia: effects on hospital performance and provider attitudes. *Social Science & Medicine*, 58, 553-564.
- Akin, J.S., et al 1986. The demand for adult outpatient services in the Bicol region of the Philippines. *Social Science & Medicine*, 22(3), 321-328.
- Akin, J.S., et al., 1988. The demand for primary health care services in the Bicol region of the Philippines. *Economic Development & Culture Change*, 34, 755-782.
- Akin, J.S., et al., 1995. Quality of services and demand for health care in Nigeria: a multinomial probit estimation. *Social Science & Medicine*, 40(11), 1527-1537.
- Alderman, H., and Gertler, P., 1989. The sustainability of public and private health care for the treatment of children in Pakistan. Living standards measurements survey. Working paper No.57. World Bank, Washington, D.C.
- Allegri, M.D., Sanon, M., and Sauerborn, R., 2006. "To enrol or not to enrol?": a qualitative investigation of demand for health insurance in rural West Africa. *Social Science & Medicine*, 62, 1520-1527.
- Alma-Ata Declaration 1978. *International Conference on Primary Health Care, Alma-Ata, Union of Soviet Socialist Republics*, 6-12 September, 1978 [online]. Available at: <http://www.who.int/hpr/archive/docs/almaata.html>. [Accessed May 2005].
- Al-Sahafa 2006. Distribution of medicines and medical equipment by Malaria Control Programme to ten states. *Al-Sahafa*; 19th Jan, 1.
- Alubo, S.O., 1994. Death for sale: a study of drug poisoning and deaths in Nigeria. *Social Science & Medicine*, 38(1), 97 – 103.
- Andalo, D., 2004. Counterfeit drugs set alarm bells ringing. *Pharmaceutical Journal*, 273, 341.
- Anderson, A., et al., 2004. *Managing Pharmaceuticals in International Health*. Basel: Birkhauser Verlag.
- Antezana, F.S., 1992. Essential medicines: action for equity. *World Health*, 45(2), 7-8.
- Arhin-Tenkorang, D., 2000. Mobilizing resources for health: the case of user fees revisited. Commission on Macroeconomics and Health Working Paper Series No WG3:6. World Health Organization, Geneva [online]. Available at: www.cmhealth.org/docs/wg3_paper6.pdf. [Accessed December 2005].
- Asenso-Okyere, W.K., 1995. Financing health care in Ghana. *World Health Forum*, 16, 86-91.

Asenso-Okyere, W.K., et al., 1998. Cost recovery in Ghana: are there any changes in health care seeking behaviour? *Health Policy and Planning*, 13(2), 181-188.

Asenso-Okyere, W.K., et al., 1999. The behaviour of health workers in an era of cost sharing: Ghana's drug cash and carry system. *Tropical Medicine and International Health*, 4(8), 586-593.

Atim, C., 1999. Social movements and health insurance: a critical evaluation of voluntary, non-profit insurance schemes with case studies from Ghana and Cameroon. *Social Science & Medicine*, 48(2), 881-896.

Audibert, M. and Mathonnat, J., 2000. Cost recovery in Mauritania: initial lessons. *Health Policy and Planning*, 15(1), 66-75.

Aye, M., Champagne, F., and Contandriopoulos, A., 2002. Economic role of solidarity and social capital in accessing modern health care services in the Ivory Coast. *Social Science & Medicine*, 55, 1929-1946.

Badr, E.S., 2005. *Brain Drain of Health Professionals in Sudan: Magnitude, Challenges and Prospects for Solution*. MA Dissertation, Nuffield Institute, University of Leeds.

Benefo, K.D., and Schultz, T.P., 1994. Determinants of fertility and child mortality in Cote d'Ivoire and Ghana. Living Standards Measurement Study Working Paper 103. World Bank, Washington, D.C.

Benett, S., and Ngalande-Banda, E., 1994. Public and private roles in health: a review and analysis of experience in Sub-Saharan Africa. Strengthening the Health Service Paper 6. Division of strengthening Health Services. World Health Organization, Geneva.

Berman, P., and Rannan-Eliya, R., 1993. Factors affecting the development of private health care provision in developing countries. Major Applied Research Paper No.9, Health Financing and Sustainability Project, Abt Associates, Inc., MD.

Birch, S., 1986. Relationship between increasing prescription charges and consumption in groups not exempt from charges. *Journal of Royal college of General Practitioners*, 36, 154-156.

Blas, E., and Limbambala, M., 2001. User-payment, decentralization and health service utilization in Zambia. *Health Policy and Planning*, 16 (Supp 12), 19-28.

Booth, D., et al 1994. Coping with cost recovery: a study of the social impact of and response to cost recovery in basic services (health and education) in poor communities in Zambia. Report to SIDA: Development Studies Unit, Department of Social Anthropology, Stockholm University: Stockholm.

Boynton, P.M., 2004. Hands-on guide to questionnaire research: administering, analysing, and reporting your questionnaire. *British Medical Journal*, 328, 1372-1375.

Boynton, P.M., Wood, G.W., and Greenhalgh, T., 2004. Hands-on guide to questionnaire research: reaching beyond the white middle classes. *British Medical Journal*, 328, 1433-1436.

- Britten, N., 1995. Qualitative research: qualitative interviews in medical research. *British Medical Journal*, 311, 251-253.
- Brook, R., et al., 1983. Does free care improve adult health? *New England Journal of Medicine*, 309, 1426-1434.
- Brugha, R., and Varvasovszky, Z., 2000. Stakeholder analysis: a review. *Health Policy and Planning*, 15(3), 239-246.
- Bryman, A., 2004. *Social Research Method. (2nd.)*. Oxford University Press.
- Burnham, G.M., et al., 2004. Discontinuation of cost sharing in Uganda. *Bulletin of the World Health Organization*, 82(3), 187-195.
- Carr-Hill, R.A., 1994. Efficiency and equity implications of the health care reforms. *Social Science & Medicine*, 39(9), 1189-1201.
- Carrin, G., 1987. Community financing of drugs in Sub-Saharan Africa. *International Journal of Health Planning and Management*, 2, 125-145.
- Chalker, J., 1995. Effect of a drug and cost sharing system on prescribing and utilization: a controlled trial from Nepal. *Health Policy and Planning*, 10(4), 423-430.
- Chawla, M., and Pellis, R., 2000. The impact of financing and quality changes on health care demand in Niger. *Health Policy and Planning*, 15(1), 76-84.
- Ching, P., 1995. User fees, demand for children's health care and access across income groups: the Philippines case. *Social Science & Medicine*, 41(1), 37-46.
- Chisadza, E., Maponga, C.C., and Nazerali, H., 1995. User fees and drug pricing policies: a study at Harare Central Hospital Zimbabwe. *Health Policy and Planning*, 10(3), 319-326.
- CIA 2005. The World Fact book [online]. Available at: <http://www.cia.gov/cia/publications/factbook/geos/su.html>. [Accessed December 2005].
- CIA 2006. The World Fact book [online]. Available at: <http://www.cia.gov/cia/publications/factbook/geos/su.html>. [Accessed January 2006].
- Claeson, M., et al., 2001. Poverty-reduction and the health sector: the health, nutrition and population network's chapter in the World Bank's Poverty Reduction Strategy Sourcebook. Health, Nutrition and Population. The World Bank, Washington, D.C.
- Cockburn, R., et al 2005. The global threat of counterfeit drugs: Why industry and governments must communicate the dangers. *PLoS Medicine*, 2(4), 100-106.
- Collins, D., et al., 1996. The fall and rise of cost sharing in Kenya: the impact of phased implementation. *Health Policy and Planning*, 11(1), 52-63.
- Creese, A.L., 1991. User charges for health care: A review of recent experience. *Health Policy and Planning*, 6(4), 309-19.

- Creese, A.L., 2003. Are medicine prices a problem? *Essential Drugs Monitor*, 33, 13.
- Creese, A.L., and Kutzin, J., 1995. Lessons from cost recover in health. Discussion paper No 2. World Health Organization, Geneva. WHO/SHS/NHP/95.5.
- Cross, P.,N., et al., 1986. Revolving drug funds: conducting business in the public sector. *Social Science & Medicine*, 22(3), 335-343.
- David, P., and Haberlen, S., 2005. 10 best resources for measuring population health. *Health Policy and Planning*, 20, 260-263.
- de Bethune, X., Alfani, S., and Lahaye, J., 1989. The influence of an abrupt price increase on health service utilization: evidence from Zaire. *Health Policy and Planning*, 4, 67-81.
- de Ferranti, D., 1985. paying for health services in developing countries: an overview. Staff working paper No.670. World Bank, Washington, D.C.
- Decaillet, F., Mullen, P.D., and Guen, M., 2003. Sudan health status report. World Bank report, draft version [online]. Available at: <http://www.emro.who.int/sudan/pdf/Sudan%20Health%20Status%20Report%20August%202003.pdf>. [Accessed January 2006].
- Denzin, N.K., 1989. *The Research act. A Theoretical Introduction to Sociological Methods*. 3rd ed. London: Prentice-Hall (UK) Limited.
- Denzin, N.K., and Lincoln, Y.S., 1998. *Collecting and Interpreting Qualitative Materials*. Thousand Oaks, California: Sage.
- DFID (Department for International Development), 2004. *Increasing Access to Essential Medicines in the Developing World: UK Government Policy and Plans*. London: Published by Department for International Development.
- DFID (Department for International Development) 2005. Increasing people's access to essential medicines in developing countries: a framework for good practice in the pharmaceutical industry. A UK Government policy paper, March 2005 [online]. Available at: <http://www.dfid.gov.uk/files/pharm-framework.pdf>. [Accessed April 2005].
- DHS 1990. Sudan demographic and health survey 1989/1990. Department of Statistics, Ministry of Economic and National Planning and DHS, Demographic and Health Surveys, Institute for Resources Development/ Macro International Inc. [online]. Available at <http://www.measuredhs.com/pubs/pdf/FR36/00Frontmatter.pdf> [Accessed February 2006].
- Diop, F., Yazbeck, A., and Bitran, R., 1995. The impact of alternative cost recovery schemes on access and equity in Niger. *Health Policy and Planning*, 10(3), 223-240.
- Dodge, C.P., 1990. Health implication of war in Uganda and Sudan. *Social Science & Medicine*, 31(6), 691-698.
- Donabedian, A., 1980. *The Definition of Quality Approaches to its Assessment*. Ann Arbor, Michigan: Health Administration Press.

- Dukes, M.N.G., Haaijer, F.M., and Rietveld, A.H., 2003. *Drugs and Money: Prices, Affordability and Cost Containment*. Oxford: IOS Press.
- Dumoulin, J., Kaddar, M., and Velasquez, G., 1998. *Guide to Drug Financing Mechanisms*. World Health Organisation, Geneva.
- Ensor, T., and Savelyeva, L., 1998. Informal payments for health care in the Former Soviet Union: some evidence from Kazakhstan. *Health Policy and Planning*, 13(1), 41-49.
- Erhun, W.O., 2000. A modified Bamako Initiative drug revolving fund scheme - lessons from Nigeria. 11th International Social Pharmacy workshop, Kuopio, Finland. June 13-17, 2000.
- Fabricant, S.J., Kamara, C.W., and Mills, A., 1999. Why poor pay more: household curative expenditures in rural Sierra Leone. *International Journal Of Health Planning And Management*, 14, 179-199.
- Falkingham, J., 2004. Poverty, out-of-pocket payments and access to health care: evidence from Tajikistan. *Social Science & medicine*, 58, 247-258.
- Fiedler, J.L., 1993. Increasing reliance on user fees as a response to public health financing crises: a case study of El Salvador. *Social Science & Medicine*, 36 (6), 735-747.
- Fiedler, J.L., and Wight, J.B., 2000. Financing health care at the local level: the community drug funds of Honduras. *International Journal of Health Planning and Management*, 15, 319-340.
- Field, P.A., and Morse, J.M., 1989. *Nursing Research: The Application of Qualitative Approaches*. London: Chapman and Hall.
- Foster, S., 1990. Improving the supply and use of essential drugs in Sub-Saharan Africa. Policy, Research, and External Affairs. Working Papers. Population, Health, and Nutrition. Population and Human Resources Department. World Bank, Washington D.C.
- Foster, S., 1991. Supply and use of essential drugs in Sub-Saharan Africa: some issues and possible solutions. *Social Science & Medicine*, 32(11), 1201-1218.
- Frank, R.G., Salkever, S., and Mullann, F., 1990. Hospital ownership and the care of uninsured and medicaid patients: findings from the national hospital discharge survey 1979-1984. *Health Policy*, 14, 1-11.
- Frankenberg, E., 1995. The effects of access to medical care on infant mortality in Indonesia. *Health Transition Review*, 5(2), 143-62.
- Geest, S.V., et al., 2000. User fees and drugs: what did the health reforms in Zambia achieve? *Health Policy and Planning*, 15(1), 59-65.
- Gertler, P., and van der Gaag, J., 1990. *The Willingness to Pay for Medical Care: Evidence from Two Developing Countries*. Baltimore MD: Johns Hopkins University Press.

- Gertler, P., Locay, L., and Sanderson, W., 1987. Are user fees regressive? *Journal of Econometric*, 36, 67-88.
- Gertler, P.J., and Hammer, J.S., 1997. Strategies for pricing publicly provided health services. Policy research working paper No. 1762, the World Bank Policy Research Department, Public Economic Division. The World Bank, Washington D.C.
- Gertler, P.J., and Hammer, J.S., 1997. Strategies for pricing publicly provided health services. World Bank, Discussion Paper No. 365. 10 - 11 March 1997. The World Bank, Washington D.C.
- Gilson, L., 1997. The lessons of user fee experience in Africa. *Health Policy and Planning*, 12(4), 273-285.
- Gilson, L., Alilio, A., and Heggenhougen, K., 1994. Community satisfaction with primary health services: an evaluation undertaken in the Morogoro region of Tanzania. *Social Science & Medicine*, 39(6), 767-780.
- Gilson, L., and Mills A., 1995. Health sector reforms in Sub-Saharan Africa: lessons of the last 10 years. *Health Policy*, 32, 215-243.
- Gilson, L., et al 2003. The SAZA a study: implementing health financing reform in South Africa and Zambia. *Health Policy and Planning*, 18(1), 31-46.
- Gilson, L., et al., 2000. The equity impacts of community financing activities in three African countries. *International Journal of Health Planning and Management*, 15, 291-317.
- Gilson, L., et al., 2001. Strategies for promoting equity: experience with community financing in three African countries. *Health Policy*, 58, 37-67.
- Gilson, L., Kitange, H., and Teuscher, T., 1993. Assessment of process quality in Tanzanian primary care. *Health Policy*, 26, 119-139.
- Global Forum for Health Research 2004. 10/90 report on health research 2003 - 2004. Global Forum for Health Research. Geneva [online]. Available at: <http://www.globalforumhealth.org/pages/index.asp>, [Accessed September 21, 2004].
- Gotsadze, G., et al., 2005. Health care seeking behaviour and out-of-pocket payments in Tbilisi, Georgia. *Health Policy and Planning*, 20, 232-242.
- Gottret, P., and Schieber, G., 2006. *Health Financing Revisited: A Practitioner's Guide*. World Bank, Washington, D.C.
- Graaff, P., and Everard, M., 2003. WHO travel report: visit to Khartoum, Sudan. World Health Organization, Geneva.
- Griffin, C.C., 1988. User charges for health care in Principle and Practice. An EDI Seminar Paper No. 37. World Bank, Washington, D.C.
- Gwatkin, D.R., Bhuiya, A., and Victora, C.G., 2004. Making health system more equitable. *The Lancet*, 364, 1273-1280.

- Haddad, S., and Fournier, P., 1995. Quality, cost and utilization of health services in developing countries. A longitudinal study in Zaire. *Social Science & Medicine*, 40(6), 743-753.
- HAI and MSF 2000. Improving access to essential medicines in east Africa: patents and Prices in a global economy. 15-16 June, 2000. Nairobi, Kenya: Health Action International and Medicines sans Frontieres.
- Harris, B.L., Stergachis, A., and Ried, L.D., 1990. The effect of drug co-payments on utilization and cost of pharmaceuticals in a health maintenance organization. *Medical Care*, 28, 907-917.
- HDR 2003. *Human Development Report* [online]. Available at: http://hdr.undp.org/statistics/data/cty/cty_f_SDN.html [Accessed February 2005].
- Hecht, R., Overholt, C., and Holmberg, H., 1993. Improving the implementation of cost recovery: lessons from Zimbabwe. *Health Policy*, 25, 213-242.
- Heller, P.S., 1982. A model of the demand for medical and health services in Peninsular Malaysia. *Social Science & Medicine*, 16, 267-284.
- Helling-Borda, M., 1995. The role and experience of the World Health Organization in assisting countries to develop and implement national drug policies. *Australian Prescriber*, 20(Supp., 1), 34-38.
- Henn, M., Weinstein, M., and Foard, N., 2006. *A Short Introduction to Social Research*. London: Sage Publications.
- Hentschel, J., 1997. Distinguishing between types of data and methods of collecting them. Poverty group. World Bank [online]. Available at: <http://ideas.repec.org/p/wbk/wbrwps/1914.html> [Accessed May 2004].
- Hogerzeil, H.V., 2003. Access to essential medicines as a human right. *Essential Drug Monitor*, 33, 25-26.
- Hopkins, S., 2005. Economic stability and health status: evidence from East Asia before and after the 1990s economic crisis. *Health Policy*, 75, 347-357.
- Hotchkiss, D.R., 1998. The trade-off between price and quality of services in the Philippines. *Social Science & Medicine*, 46(2), 227-242.
- Huber, J.H., 1993. Ensuring access to health care with the introduction of user fees: A Kenyan example. *Social Science & Medicine*, 36(4), 485-494.
- Huss, R., 1996. Pharmaceutical consumer co-operative - the third path? CRAME: a case study of from Central African Republic. *World Hospitals*, 31(3), 13-15.
- Hutton, G., 2002. User fees and other determinants of health services in Africa: a review of formal and informal health sectors. Swiss Agency for Development and Cooperation (SDC).

- Isenalumhe, A.E., and Oviawe, O., 1988. Polypharmacy: its cost burden and barrier to medical care in a drug oriented health care system. *International Journal of Health Service*, 18(2), 335-343.
- James, C., et al 2005. Impact of child mortality of removing user fees: simulation model. *British Medical Journal*, 331, 747-749.
- Jee, M., and Or, Z., 1999. Health outcomes in OECD countries: a framework of health indicators for outcome-oriented policymaking. Labour market and social policy – occasional papers No.36. Organisation for Economic Co-operation and Development [online]. Available at: http://www.oecd.org/LongAbstract/0,2546,en_2649_33929_1887078_1_1_1_1,00.html [Accessed February 2005].
- Jeppsson, A., et al, 2005. The global-local dilemma of a ministry of health experiences from Uganda. *Health Policy*, 72, 31-320.
- Jitta, J., et al., 2003. The availability of drugs: what does it mean in Ugandan primary care. *Health Policy*, 65, 167-179.
- Juni, B.M., 1996. Public health care provisions: access and equity. *Social Science Medicine*, 43(5), 759-768.
- Kanji, N., 1989. Charging for drugs in Africa: UNICEF's 'Bamako Initiative'. *Health Policy and Planning*, 4(2), 110-120.
- Kim, J., Ko, S., and Yang, B., 2005. The effects of patient cost sharing on ambulatory utilization in South Korea. *Health Policy*, 72, 293-300.
- Kipp, W., et al., 2001. User fees, health staff incentives, and service utilization in Kabarole District, Uganda. *Bulletin of World Health Organization*, 79(11), 1032-1037.
- Knippenberg, R., et al., 1997a. Implementation of the Bamako Initiative: Strategies in Benin and Guinea. *International Journal of Health Planning and Management*, 12(Suppl.1), S29-S47.
- Knippenberg, R., et al., 1997b. Sustainability of primary health care including expanded programme of immunizations in Bamako Initiative programmes in West Africa: an assessment of 5 years' field experience in Benin and Guinea. *International Journal of Health Planning and Management*, 12(Suppl.1), S9-S28.
- Kremer, M., 2002. Pharmaceuticals and the developing world. *Journal of Economic Perspectives*, 16(4), 67-90.
- Lake, S., 1994. *User Charges in the Health Sector: Some Observation on the Zambian Experience*. UNICEF: Lusaka, Zambia.
- Lavy, V., and Germain, J., 1994. Quality and cost on health care choice developing countries. Living Standards Management Study Working Paper 105. World Bank, Washington DC.

- Leibowitz, A., et al., 1985. The demand for prescription drugs as a function of cost-sharing. *Social Science & Medicine*, 21, 1063-1069.
- Levy-Bruhl, D., et al., 1997. The Bamako Initiative in Benin and Guinea: improving the effectiveness of primary health care. *The International Journal of Health Planning and Management*, 12(1), 49-79.
- Litvack, J.I., and Bodart, C., 1993. User fees plus quality equals improved access to health care: result of a field experiment in Cameroon. *Social Science & Medicine*, 37(3), 369-383.
- Liu, S.Z. and Romeis, J.C., 2004. Changes in drug utilization following the outpatient prescription drug cost-sharing programme – evidence from Taiwan's elderly. *Health Policy*, 68, 277-287.
- Liu, X., and Mills, A., 1999. Evaluating payment mechanisms: how can we measure unnecessary care? *Health Policy and Planning*, 14(4), 409-413.
- Lofland, J., 1971. *Analysing Social Settings*. Belmont, CA: Wadsworth.
- Macinko, J.A., and Starfield, B. 2002. Annotated bibliography on equity in health. *International Journal for Equity in Health*, 1(1), 1-20.
- Makinen, M., et al., 2000. Inequalities in health care use expenditures: empirical data from eight developing countries and countries in transition. *Bulletin of the World Health Organization*, 78(1), 55-65.
- Malik, E.M., et al., 2005. From home to hospital: beliefs and practices related to severe malaria in Sudan. *Journal of Family and Community Medicines*, 12(2), 85-90.
- Mariko, M., 2003. Quality of care and the demand for health services in Bamako, Mali: the specific roles of structural, process, and outcome components. *Social Science & Medicines*, 56, 1183-1196.
- Marquis, M.S., 1985. Cost sharing and provider choice. *Journal of Health Economics*, 4, 137-157.
- Mathers, N., Fox, N., and Hunn, A., 2002. *Trent Focus for Research and Development in Primary Health Care: Using Interviews in a Research Project*. Trent Focus Group [online]. Available at: www.nova.edu/ssss/QR/text.html [Accessed 4 January 2005].
- Mbugua, J.K., Bloom, G., and Segall, M., 1995. Impact of user charges on vulnerable groups: the case of Kibwezi in rural Kenya. *Social Science & Medicine*, 41(6), 829-835.
- McIntyre, D., et al., 2006. What are the economic consequences for households of illness and paying for health care in low- and middle-income country contexts? *Social Science & Medicines*, 62, 858-865.
- McPake, B., 1993. User charges for health services in developing countries: A review of the economic literature. *Social Science & Medicines*, 36(11), 1397-1405.

- McPake, B., Hanson, K., and Mills A., 1993. Community financing of health care in Africa: An evaluation of the Bamako Initiative. *Social Science & Medicine*, 36(11), 1383-1395.
- McPake, B., Kumaranayake, L., and Normand, C., 2002. *Health Economics: An International Perspective*. London: Routledge.
- McPherson, A., and Raab, C.D., 1988. *Governing Education: a Sociology of Policy since 1945*. Edinburgh University Press.
- Meuwissen, L.E., 2002. Problems of cost recovery implementation in district health care: a case study from Niger. *Health Policy and Planning*, 17(3), 304-313.
- Mills, A., and Walker, G.J., 1983. Drugs for the poor of the Third World: consumption and distribution. *Journal of Tropical Medicine and Hygiene*, 86, 139-145.
- Mohamed, G.K., 2000. *Management of Revolving Drug Fund: Experience of Khartoum State- Sudan*. MSc. Dissertation, University of Bradford.
- Moszynski, P., 2006. Zambia scraps healthcare fees for poor rural people. *British Medical Journal*, 332, 813.
- MSH 2003. *International Price Indicator Guide* [online]. Available at: http://www.msh.org/resources/publications/IDPIG_2003.html. [Accessed January 2005].
- MSH 2004. *International Drug Price Indicator* [online]. Available at: http://www.msh.org/resources/publications/IDPIG_2004.html. [Accessed April 2005].
- Murakami, H., 1998. Management of the revolving drug fund: comparative case studies in Lao People's Democratic Republic. *Technology and Development*, 11, 49-58.
- Murakami, H., et al., 2001. Revolving drug funds at front-line health facilities in Vientiane, Lao PDR. *Health Policy and Planning*, 16 (1), 98-106.
- Mwabu, G., 1988. Non-monetary factors in the household choice of medical facilities. *Economic and Cultural Change*, 37(2), 383-392.
- Mwabu, G., 1997. User charges for health care: a review of the underlying theory and assumptions. WIDER working paper No.127. World Institute for Development and Economic Research, the United Nation University: Finland.
- Mwabu, G., Ainsworth, M., and Nyamete, A., 1993. Quality of medical care and choice of medical treatment in Kenya: an empirical analysis. *Journal of Human Resources*, 28(4), 838-862.
- Mwabu, G., and Wang'Ombe, J., 1995. User charges in Kenya: health service pricing reforms in Kenya, 1989-1993. A report on work in progress with support from the International Health Policy Programme. IHPP, Washington, D.C.
- Mwabu, G., Mwanzia, J., and Liambila, W., 1995. User charges in government health facilities in Kenya: effect on attendance and revenue. *Health Policy and Planning*, 10(2), 164-170.

- Mwabu, G.M., and Mwangi, W.M., 1986. Health care financing in Kenya: a simulation of welfare effects of user fees. *Social Science & Medicine*, 22(7), 763-767.
- Myhr, K., 2003. Measuring medicine prices and availability. *Essential Drugs Monitor*, 33, 13-14.
- Nandakumar, A.K., Chawla, M., and Khan, M., 2000. Utilization of outpatient care in Egypt and its implications for the role of government in health care provision. *World development*, 28 (1), 187-196.
- NIH (National Institute of Health) 1999. *Qualitative Methods in Health Research: Opportunities and Considerations in Application and Review* [online]. Available at: <http://obssr.od.nih.gov/Publications/Qualitative.PDF> [Accessed January 2005].
- Ndyomugenyi, R., Neema, S., and Magnussen, P., 1998. The use of formal and informal services for antenatal care and malaria treatment in rural Uganda. *Health Policy and Planning*, 13(1), 94-102.
- Neuman, W.L., 1994. *Social Research Methods: Qualitative and Quantitative Approaches*. Poston: Allyn and Bacon.
- Newton, P.N., et al., 2001. Fake artesunate in Southeast Asia. *The Lancet*, 357, 1948-1950.
- Newton, P.N., et al., 2002. Murders by fake drugs- time for international action. *British Medical Journal*, 324, 800-801.
- Nolan, B., 1993. Economic incentives, health status and health services utilisation. *Journal of Health Economics*, 12, 151-169.
- Nolan, B., and Turbat, V., 1995. Cost recovery in public health services in Sub-Saharan Africa. Economic Development Institute of the World Bank, Washington, D.C.
- NSF (National Science Foundation) 2002. *The 2002 User-Friendly Handbook for Project Evaluation* [online]. Available at: www.nova.edu/ssss/QR/text.html [Accessed 5 January 2005].
- Nyandieka, L.N., et al., 2002. Managing a household survey: a practical example from the KENQOL survey. *Health Policy and Planning*, 17(2), 207-212.
- Nyonator, F., and Kutzin, J., 1999. Health for some? The effects of user fees in the Volta region of Ghana. *Health Policy and Planning*, 14 (4), 329-341.
- Onwujekwe, O., and Uzochukwu, B., 2005. Socio-economic and geographic differentials in cots and payment strategies for primary health care services in Southeast Nigeria. *Health Policy*, 71, 383-397.
- Osibo, O.O., 1998. Faking and counterfeiting of drugs. *West African Journal of Pharmacy*, 12(1), 53-57.

- Oxfam 2001. Cutting the cost of global health. Oxfam Parliamentary Briefing Paper [online]. Available at: http://www.oxfam.org.uk/what_we_do/issues/health/opb16_globalhealth.htm. [Accessed April 2005].
- Paphassarang, C., et al., 1995. The Lao drug policy: lessons along the journey. *The Lancet*, 345, 433-435.
- Parker, D., and Knippenberg, R., 1991. Community cost-sharing and participation: a review of issues. UNICEF: Bamako Initiative Technical Report series 9, New York.
- Parker, R., 1986. Health care expenditures in rural Indian community. *Social Science & Medicine*, 22(1), 23-27.
- Parsons, W., 1995. *Public Policy: an Introduction to the Theory and Practice of Policy Analysis*. Aldershot: Edward Elgar.
- Patel, M., 1986. An economic evaluation of 'health for all'. *Health Policy and Planning*, 1, 37-47.
- Patton, M.Q., 1987. *How to Use Qualitative Methods in Evaluation*. London: Sage.
- Patton, M.Q., 1990. *Qualitative Evaluation and Research Methods*. 2nd ed. Newbury Park: Sage Publications.
- Pawson, R., and Tilley, N., 1997. *Realistic Evaluation*. London: Sage Publications.
- Pecoul, B., et al 1999. Access to essential drugs in poor countries: A lost Battle?. *Journal of American Medical Association*, 281(4), 361-367.
- Penchansky, R., and Thomas, J.W., 1981. The concept of access: definition and relationship to consumer satisfaction. *Medical Care*, 19(2), 127-40.
- Penchansky, R., 1977. The concept of access: a definition. National Health Planning Information centre, Hyattsville, Maryland.
- Piachud, D., 1980. Medicines and the third world. *Social Science & Medicine*, 140, 183-189.
- Pradhan, M., and Prescott, N., 2002. Social risk management options for medical care in Indonesia. *Health Economics*, 11(5), 431-446.
- Quick, J.D., 2003a. Ensuring access to essential medicines in the developing countries: a framework for action. *Clinical Pharmacology & Therapeutics*, 73(4), 279-283.
- Quick, J.D., 2003b. Essential medicines twenty-five years on: closing the access gap. *Health Policy and Planning*, 18(1), 1-3.
- Quick, J.D., et al., 1981. *Managing Drug Supply: The Selection, Procurement, Distribution and Use of Pharmaceuticals*. 1st ed. Boston, Mass.
- Quick, J.D., et al., 1997. *Managing Drug Supply: The Selection, Procurement, Distribution and Use of Pharmaceuticals*. 2nd ed. West Hartford, CT: Kumarian Press.

- Reddy, S., and van der Moortele, J., 1996. User financing of basic social services, a review of theoretical arguments and empirical evidence. Working paper, Office of Evaluation, Policy and Planning, UNICEF, New York.
- Rizk, N.J., 2003. Productive Face-to-Face Interview [online]. Available at: http://cblis.utc.sk/cblis-cd-old/2003/3.PartB/Papers/Science_Ed/Testing-Assessment/Rizk.pdf. [Accessed May 2004].
- Robert, B., and Tordo, S., 2006. Managing resource rents: the special challenges in post-conflict countries. Public Policy for the Private Sector. Note No 302. The World Bank Group [online]. Available at: <http://rru.worldbank.org/PublicPolicyJournal> [Accessed February 2006].
- Rowntree, D., 2000. *Statistics without Tears: an Introduction for non-mathematicians*. England: Penguin Books.
- Rubin, H.J., 1983. *Applied Social Research*. Columbus: Charles E. Merrill.
- Rudolf, P.M., and Bernstein, I.B.G., 2004. Counterfeit drugs. *New England Journal of Medicine*, 350(14), 1384-386.
- Russell, S., 1996. Ability to pay for health care: concepts and evidence. *Health Policy and Planning*, 11(3), 219-237.
- Russell, S., 2005. Treatment seeking behaviour in urban Sri Lanka: trusting the state, trusting private providers. *Social Science & Medicine*, 61(7), 1396-1407.
- Ryan, G.W., 1998. What do sequential behavioural patterns suggest about the medical decision-making process?: Modelling home case management of acute illnesses in a rural Cameroonian village. *Social Science & Medicine*, 46(2), 209-225.
- Ryan, M., and Birch, S., 1988. Estimating the effects of health service charges:evidence on the utilization of prescriptions, Centre for Health economics Discussion, paper No.37, University of York, UK.
- Rychetnik, L., et al., 2002. Criteria for evaluating evidence on public health interventions. *Journal of Epidemiology Community Health*, 56, 119-127.
- Sabri, B., 2003. Healthcare financing in the African countries of the east Mediterranean. *International Social Security Review*, 56, 73-85.
- Sari, N., and Langenbrunner, J.C., 2001. Consumer out-of-pocket for pharmaceuticals in Kazakhstan: implications for sectoral reform. *Health Policy and Planning*, 16(4), 428-434.
- Sauerborn, R., Adams, A., and Hein, M., 1996. Household strategies to cope with the economic costs of illness. *Social Science & Medicines*, 43, 291-301.
- Sauerborn, R., Bodart, C., and Essomba R.O., 1995. Recovery of recurrent health service costs through provincial health funds in Cameroon. *Social Science & Medicine*, 40, 1731-1739.

- Sauerborn, R., Nougara, A., and Latimer, E., 1994. The elasticity of demand for health care in Burkina Faso: differences across age and income groups. *Health Policy and Planning*, 9(2), 185-192.
- Sauerborn, R., et al., 1996. Seasonal variations of household costs of illness in Burkina Faso. *Social Science & Medicine*, 43(3), 281-290.
- Schieber, G., Maeda, A., and Klingen, N., 1998. Health reform in MENA region. *Forum News Letter* [online]. Available at: <http://www.erf.org.eg/nletter/May98-05.asp> [Accessed May 2005].
- Schwartz, J.B., Akin, J.S., and Popkin, B.M., 1988. Price and income elasticities of demand for modern health care: the case of infant delivery in the Philippines. *World Bank Economic Review*, 2, 49-76.
- Sen, A., 1979. Personal utilities and public judgements, or, what's wrong with welfare economics? *Economic Journal*, 89, 537-558.
- Sepehri, A., and Chernomas, R., 2001. Are user charges efficiency- and equity- enhancing? A critical review of economic literature with particular referring to experience from developing countries. *Journal of International Development*, 13, 183-209.
- Shaw, R.P., and Ainsworth, M., 1996. *Financing Health Services through User fees and Insurance*. Discussion Paper No. 294. World Bank, Washington, D.C.
- Shaw, R.P., and Griffin, C.C., 1995. *Financing Health Care in Sub-Saharan Africa through User Fees and Insurance*. A Direction in Development book. World Bank, Washington, D.C.
- Singh, A., 2003. *Health Financing Technical Brief Reviewing the Impact of User Fees: The African Experience*. WHO, Geneva.
- Social Watch Report 2003. The Poor and the Market. Instituto del Tercer Mundo, Montevideo [online]. Available at; http://www.socwatch.org.uy/en/informeImpreso/pdfs/sudan2003_eng.pdf [Accessed October 2005].
- Sorkin, A.L., 1986. Financing health development projects: some macro-economic considerations. *Social Science & Medicines*; 22(3): 345-349.
- Soubbotina, T.P., 2004. *Beyond Economic Growth: an Introduction to Sustainable Development*. 2nd ed. WBI Learning Resources Series. World Bank, Washington, DC.
- Soucat, A., et al., 1997a. Affordability, cost-effectiveness and efficiency of Primary Health Care: the Bamako Initiative experience in Benin and Guinea. *International Journal of Health Planning and Management*, 12(spl.1), S81-S108.
- Soucat, A., et al., 1997b. Health seeking behaviour and household expenditures in Benin and Guinea: The quality implications of the Bamako Initiative. *International Journal of Health Planning and Management*, 12 (spl.1), S137-S163.

- Soumerai, S.B., et al., 1987. Payment restrictions for prescription drugs under Medicaid. *New England Journal of Medicine*, 317, 550-556.
- Stanton, B., and Clemens, J., 1989. User fees for health care in developing countries a case study f Bangladesh. *Social Science & Medicine*, 29(10), 1199-1205.
- Strauss, A. and Corbin, J., 1998. *Basics of Qualitative Research*. 2nd ed. London: Sage Publication.
- Thomas, D., and Lavy, V., 1996. Public policy and anthropometric outcomes in the Cote d'Ivoire. *Journal of Public Econometrics*, 61, 155-192.
- Thomason, J., Mulou, N., and Bass, C., 1994. User charges for rural health services in Papua, New Guinea. *Social Science & Medicine*, 39(8), 1105-1115.
- Transparency International 2006. *Global Corruption Report 2006*. London: Pluto Press.
- Trouiller, P., et al., 2002. Drug development for neglected diseases: a deficient market and a public-health policy failure. *The Lancet*, 359, 2188-2194.
- Umenai, T., and Narula, I.S., 1996. Revolving drug funds in Asia and Latin America. *The Lancet*, 347, 1698-1699.
- Umenai, T., and Narula, I.S., 1998. Revolving drug funds and district community health-system development. *The Lancet*, 351, 297-298.
- Umenai, T., and Narula, I.S., 1999. Revolving drug funds: a step towards health security. *Bulletin of the World Health Organization*, 77(2), 167-171.
- UN 2000. Resolution adopted by the general assembly. United Nations Millennium Declaration. United Nations General Assembly, New York, 6 - 8 September 2000. A/RES/55/2 [online]. Available at: <http://www.un.org/millennium/declaration/ares552e.pdf> [Accessed June 2005].
- UN 2004. Map No 37.7 Rev. 7 United Nations [online]. Available at: <http://www.un.org/Depts/Cartographic/map/profile/sudan.pdf#search='sudan%20map> [Accessed February 2006].
- Unger, J.P., Mbaye, A., and Diao, M., 1990. From Bamako to Kolda: a case study of medicines and the financing of district health services. *Health Policy and Planning*, 5(4), 367-377.
- UNICEF 2005. At a glance: Sudan [online]. Available at: http://www.unicef.org/infobycountry/sudan_statistics.html?q=printme [Accessed February 2006].
- Uzochukwu, B.S., et al 2002. Effect of the Bamako-iniative drug revolving fund on availability and rational use of essential drugs in primary health care facilities in south-east Nigeria. *Health Policy and Planning*, 17(4), 378-383.
- van der Geest, S., et al., 2000. User fees and drugs: what did the health reforms in Zambia achieve? *Health Policy and Planning*, 15 (1), 59-65.

- Velaquez, G. et al., 1998. *Health Reform and Drug Financing. Selected Topics*. Health Economic and Drugs. DAP Series No.6. World Health Organization. Geneva. WHO/DAP/98.3.
- Vogel, R.J. and Stephen, B., 1989. Availability of pharmaceutical in Sub-Saharan Africa: roles of the public, private and church mission sectors. *Social Science & Medicine*, 29 (4), 479-486.
- Vogel, R.J., 1988. *Cost Recovery in the Health Care: Selected Country Studies in West Africa*. World Bank Technical Paper No. 82. World Bank, Washington, D.C.
- Vogel, R.J., 1990. Health insurance in Sub-Saharan Africa: a survey analysis. PRE working paper series 476. World Bank, Washington, D.C.
- von Massow, F., et al., 1998. Financially independent primary health care drug supply system in Cameroon. *Tropical Medicine and International Health*; 3(10), 788-801.
- Waddington, C.J., and Enyimayew, K., 1989. A price to pay, part 1: the impact of user charges in Ashanti-Akim district, Ghana. *International Journal of Health Planning and Management*, 4(2), 17-47.
- Waddington, C. J., and Enyimayew, K.A., 1990. A price to pay, part 2: the impact of user charges in the Volta region of Ghana. *International Journal of Health Planning and Management*, 5(4), 287-312.
- Waddington, C.J., and Panza, A., 1991. Ten questions to ask about revolving funds. *Tropical Doctor*, 21, 50-53.
- Wagstaff, A., and van Doorslaer, E., 2003. Catastrophe and improvement in paying for health care: With application to Vietnam 1993-1998. *Health Economics*; 12(11):921-934.
- Wallman, S., and Baker, M., 1996. Which resources pay for treatment? A model for estimating the informal economy of health. *Social Science & Medicine*, 42(5), 671-679.
- Wang'Ombe, J., 1997. Cost recovery strategies in Sub-Saharan Africa. Policy research working paper No. 1762, the World Bank Policy Research Department, Public Economic Division. World Bank, Washington D.C.
- Wang'Ombe, J.K., and Mwabu, G.M., 1987. Economics of essential drugs schemes: the perspectives of the developing countries. *Social Science & Medicine*, 25(6), 625-630.
- Weaver, M., 1995. User fees and patient behaviour: evidence from Niamey national hospital. *Health Policy and Planning*, 10(4), 350-361.
- Weaver, M., et al., 1996. Willingness to pay for child survival: results of a national survey in Central African Republic. *Social Science & Medicine*, 43(6), 985-998.
- WHO 1977. *The selection of Essential Drugs*. World Health Organization. Geneva.
- WHO 1991a. *Access to Drugs and Finance: Basic Economic and Financial Analysis*. World Health Organization. Geneva. WHO/DAP/91.5.

WHO 1991b. *Guidelines on the Storage of Essential Drugs in Eastern and southern Africa: A Manual for Storekeepers*. World Health Organization. Geneva.HRH/91.14.

WHO 1993. *How to investigate drug use in health facilities selected drug use indicators*. Action Programme on Essential Drugs. World Health Organization. Geneva.

WHO 1994. *The influence of financial participation by the population on the demand for health care: an analytical tool for countries in greatest need*. World Health Organization. Geneva.

WHO 1996. Comparative analysis of international drug policies. Report of the second workshop. Drug Action Programme, World Health Organization, Geneva, June 1996.

WHO 1997a. *Quality Assurance of Pharmaceuticals: a Compendium of Guidelines and Related Materials*. Volume 1. World Health Organization. Geneva.

WHO 1997b. *Health Economics: the Uruguay Round and Drugs*. World Health Organization, Geneva.WHO/TFHE/97.1.

WHO 1997c. Financing Drugs in South-east Asia. Report of the first meeting of WHO/SEARO working group on drug financing, Korat, Thailand 26 – 28 November 1996, SEA/Drugs/118.

WHO 1998a. *Financing Drugs in South-east Asia*. Health Economics and Drugs DAP series No.8. World Health Organization, Geneva. WHO/DAP/98.15. SEA/Drugs/140.

WHO 1998b. *Report of International Workshop on Counterfeit Drugs*. World Health Organization, Geneva. WHO/DRS/CFD/98.1.

WHO 1998c. Guidelines for implementing Bamako Initiative. Regional committee for Africa, 38th session, Brazzaville, 7-4 September, AFR/RC 38/18.

WHO 1999a. *The world health report 1999*. World Health Organization, Geneva.

WHO 1999b. *Report on Infectious Diseases: Removing Obstacles to Health Development*. World Health Organization, Geneva. WHO/CDS/99.1.

WHO 2002a. 25 questions and answers on health and human rights. Health and Human Rights Publication Series 1. World Health Organization, Geneva.

WHO 2002b. The Selection of Essential Medicines, WHO Policy Perspective on Medicines Number 4. World Health Organization, Geneva.

WHO 2003a. Substandard and counterfeit medicines. WHO fact sheet No.275 [online]. Available at: www.who.int/mediacentre/factsheets/fs275/en/. [Accessed April 2005].

WHO 2003b. Manual for core Indicators on Country Pharmaceutical Situations. Working Draft June 2003.

WHO 2003c. Core Health Indicators [online]. Available at: <http://www3.who.int/whosis/country/indicators.cfm?country=sdn&language=en> [Accessed January 2006].

WHO 2004a. *The World Medicines Situation*. World Health Organization, Geneva. WHO/EDM/PAR/2004.5.

WHO 2004b. *WHO Medicines Strategy: countries at the core 2004-2007*. World Health Organization, Geneva. WHO/EDM/PAR/2004.5.

WHO 2004c. Equitable access to essential medicines: a framework for collective action. WHO Policy Perspectives on Medicines No 8. World Health Organization, Geneva. WHO/EDM/2004.4.

WHO 2004d. *Sources and Prices of Selected Products for the Prevention, Diagnosis and Treatment of Malaria [online]*. Available at: <http://rbm.who.int/mmss> [Accessed 2005].

WHO 2004e. 9 countries from the WHO African region meet to analyse data from their medicines prices surveys [online]. Available at: <http://www.who.int/entity/medicines/areas/access/AFROmedicinesPricesShortarticle.pdf>. [Accessed November 2005].

WHO 2005a. Access to medicines [online]. Available at <http://www.who.int/trade/glossary/story002/en/print.html>. [Accessed November 2005].

WHO 2005b. Essential medicines [online]. Available at: http://www.who.int/medicines/services/essmedicines_def/en/print.html. [Accessed December 2005].

WHO 2006. Substandard and counterfeit medicines [online]. Available at: <http://www.who.int/mediacentre/factsheets/fs275/en/print.html>. [Accessed January 2006].

WHO-MSH, 2000. *Defining and Measuring Access: Background paper for the World Health Organization-Management Sciences for Health consultative meeting on Access to Essential Drugs, Vaccines, and Health Commodities. 11-13 December 2000*. Ferney Voltaire, France: Management Science for Health [online]. Available at: <http://erc.msh.org/seam/measuringaccess/index.cfm?action=background> [Accessed April 2003]

Wiedenmayer, K., 2004. Access to medicines. Medicine supply: lessons learnt in Tanzania and Mozambique. A capitalisation report established in the frame of the SDC backstopping mandate 2004 of the social development division's health desk. Swiss Tropical Institute. Swiss Centre for International Health.

Wilkinson, D., et al., 2001. Effect of removing user fees on attendance for curative and preventive primary health care services in rural South Africa. *Bulletin of the World Health Organization*, 79(7), 665 - 671.

Willis, C.Y., and Leighton, C., 1995. Protecting the poor under cost recovery: the role of means testing. *Health Policy and Planning*, 10 (3), 241-256.

World Bank 1987. *Financing Health Services in Developing Countries: an Agenda for Reform*. World Bank, Washington, D.C.

World Bank 1993. *World Development Report: Investing in Health*. Oxford University Press.

World Bank 1994. *The importance of Pharmaceuticals and Essential Drug Programmes. In Better Health in Africa Experience and Lessons Learned*. World Bank, Washington, D.C.

World Bank 1998. *Kazakhstan Living Standards during the Transition*. World Bank, Washington, D.C.

World Bank 2002. *Millennium Development Goal*. World Bank. Washington DC. [online]. Available at: <http://www.developmentgoals.org/> [Accessed November 2005].

World Bank 2003. Sudan at a glance [online]. Available at: http://www.devdata.worldbank.org/sdn_aag.pdf. [Accessed November 2003].

World Bank 2005. Sudan at a glance [online]. Available at: http://devdata.worldbank.org/AAG/sdn_aag.pdf [Accessed February 2006].

Wouters, A., 1991. Essential national health research in developing countries: health-care financing and quality of care. *International Journal of Health Planning and Management*, 6, 253-271.

Xu, K., et al., 2003. Household catastrophic health expenditure: a multicountry analysis. *The Lancet*, 362, 111-117.

Xu, K., et al., 2006. Understanding the impact of user fees: Utilization and catastrophic health expenditures in Uganda. *Social Science & Medicines*, 62, 866-876.

Yazbeck, A., and Leighton, C., 1995. Does cost recovery for curative care affect preventive care utilization? *Health Policy and Planning*, 10(3), 296-300.

Yoder, R.A., 1989. Are the people willing and able to pay for health services? *Social Science & Medicine*, 29(1), 35-42.

Zakus, D.L., and Lysack ,C.L., 1998. Revisiting community participation. *Health Policy and Planning*, 13(1), 1-12.

Zwart, S., and Woorhoeve, W.A., 1990. Community health care and hospital attendance: a case study in rural Ghana. *Social Science & Medicine*, 31(7), 711-718.

Appendices

Appendix 1: List of policy-makers interviewees

No.	Place of Work	Duration of interview in minutes	Previous experience*
1	MOH-KS	47	Quality Department (Dept) director
2	FMOH	62	Curative medicines Dept Director, Health insurance director- Sennar State, General Director-MOH, Health Insurance Director, Preventive Medicine Dept Director.
3	MOH-KS	33	Health Area Dept, Health Services Affaires Dept.
4	MOH-KS	60	Omdurman Province Health Affaires Director, PHC Dept, Preventive Medicine Dept, Preventive Medicine Dept FMOH
5	FMOH	50	Curative Medicine Dept, Health Insurance Director
6	MOH-KS	75	Khartoum North Province Health Affaires, PHC Dept,
7	MOH-KS	42	Omdurman Province Health Affaires Director
8	MOH-KS	45	Hospital Curative Dept, FMOH
9	MOH-KS	40	Khartoum North Province Health Affaires, Health Insurance Scheme Director,
10	FMOH	70	Khartoum North Province Health Affaires, Curative Medicine Dept, Health Insurance Scheme.
11	FMOH	40	General Director, MOH
12	FMOH	75	Curative Medicine Dept, General Director MOH.
13	FMOH	70	Khartoum Comprehensive Child Care Project Director, Economic Medical Care Project Director, Health Insurance Director, General Director MOH, Health Planning Dept,
14	FMOH	25	Health Economic Dept, Human resources Development Dept-FMOH Director
15	Private company	40	Former Minister of Finance and National Economy

Appendix 2: List of practitioners and pharmacy staff interviews

No.	Health facilities	Duration of interview in minutes	Remarks
1	RDF Teaching Hospital	41	Physician of Internal Medicine
2	RDF Rural Hospital	54	Medical Doctor (single doctor rural hospital)
3	RDF Rural Hospital	32	Assistant Pharmacist
4	Non-RDF Rural Health Centre *	71	Medical Doctor (single doctor rural health centre)
5	Non-RDF Rural Health Centre	28	Assistant Pharmacist
6	RDF Per-urban Health Centre	29	Medical assistant (Urban health centre)
7	RDF Per-urban Health Centre	24	Assistant Pharmacist
8	Non-RDF Teaching Hospital *	24	Senior Pharmacist
9	RDF Urban Health Centre	31	Medical Doctor (Urban health centre)
10	RDF Urban Health Centre	27	Assistant Pharmacist
11	RDF Rural Health Centre	30	Medical Doctor (Single doctor Rural health centre)
12	RDF Rural Health Centre	25	Assistant Pharmacist
13	Non-RDF Teaching Hospital	29	Surgeon
14	RDF Teaching Hospital	27	Medical Doctor
15	RDF Teaching Hospital	25	Medical Doctor
16	RDF Teaching Hospital	24	Senior Pharmacist
17	RDF Teaching Hospital	29	Obstetrician
18	RDF Teaching Hospital	35	Surgeon
19	Non-RDF Teaching Hospital	30	Chest Physician
20	Non-RDF Teaching Hospital	26	Senior chest physician (Consultant)
21	RDF Teaching Hospital	35	Obstetrician
22	Non-RDF Teaching Hospital	45	Senior Internal Medicine Physician (Consultant), member of standing committee for drug registration.
23	Non-RDF Teaching Hospital	25	Internal Medicine Physician (Consultant)
24	Non-RDF Teaching Hospital	30	Registrar
25	Non-RDF Teaching Hospital	30	Senior Orthopedic Surgeon (Consultant). Member of the CMSPO Tender committee.
26	Non-RDF Teaching Hospital	20	Registrar
27	Non-RDF Teaching Hospital	30	Registrar

Appendix 3: Semi-structured interviews guidelines

1. Policy-makers' questions

1. Do you (or perhaps does the Ministry) believe that CSPs make medicines available in the public health?
2. Those who pay the visit and diagnosis charges and have not enough money to pay for their medicines, what is the solution that you have to remedy the situation?
3. Are there any arrangements for those (for example, poor and school children) who may not afford the drug cost at the point of the service? If yes, what are these arrangements? Are these arrangements (exemption mechanisms) efficient?
4. As policy maker, are you satisfied with this situation (no efficient exemption mechanisms)?
5. Is there any equity problems in the access to essential medicines services in the light of geographical coverage; social or religious discrepancies; economics; ages; ethnics...etc?
6. Do you think the users are likely to face problem regarding availability, geographical coverage, RDF prices and quality of medicines (in terms of expired medicines, repackaging and sources)?
7. What are the effects of medicines on the utilization of public health facilities? What will happen if there is no regular supply of medicines to health facilities? And why the availability of medicines is important? Can you give me any example of a public health facility which faces a problem of irregular supply of medicines?
8. Are cost sharing programmes (RDF) have any positive effects on the utilization of the PHC services such as health education, antenatal care, nutrition, infants follow-up, vaccinations... etc? What are the reasons in your opinion, which lead to that effect(s)?
9. In your opinion what is impact of the RDF on the quality of health care? Can you explain why the RDF affects the quality of services and how? Is there any improvement in the health care services after the adoption of cost sharing policy in the following areas: 1- the availability of essential medicines 2- patients seek health immediately after feeling ill (no delay) 3- self medication 4- the burden on the central hospitals 5- regular availability of doctors in the health centres 6- the use of traditional medicines
10. What are the consequences of incentives to individuals and individual organisations provided by the price mechanism in the overall context of the RDF programme.
11. Do you think the cost sharing programmes have impact on the utilization of the health care services regarding:
 - 1- unnecessary visits;
 - 2- reduction in the utilization due to economic barriers;
 - 3- response to seek health care when feeling ill;
 - 4- traditional medicines.

12. As policy maker, if you or your child ill (hopefully not), will you go to the nearest health centre or not and why?
13. The RDF survives for more than 15 years. In your opinion, what are the main factors that make this unique project revolves for this relatively long period?
14. Do you think the CSPs met their objectives in making essential medicines of good quality available at affordable prices in Khartoum State public health facilities? Can you give examples for areas you believe that CSPs have sound outcomes?
15. Do these CSPs cause any problems? If the CSPs have some shortcomings can you give me some examples of these problems? In your opinion what are the reasons of such problems? Can you give some recommendations to remedy these situations?
16. What are the consequences of RDF overall for resource allocation involving the government sector: efficiency and interpersonal distributive effects?
17. Do CSPs help the MOH to benefit from the medicines budget in other activities? Can you give some examples of other activities which benefited from the former drug budget line?
18. Do you think the CSP and RDF have any effects on the self-medication practice and use of traditional healers? What factors in your opinion lead households to seek treatment from private sector and traditional medical practitioners rather than from public health facilities?
19. What explains a household's choice of a private rather than public health facilities?
20. If you have a chance to revise the cost sharing policy what will you do and why?
21. Are there any explicit problems or area regarding the accessibility to essential medicines and health services utilization uncovered or if there any thing else I need to understand about this policy that I am not persuade with you? Have you any other comments about the CSPs ?

2. Practitioners' questions

1. How do you feel about the Cost-Sharing Policies as mechanisms of medicines financing, such as RDF?
2. What is the problem in your opinion, if the medicines are not available at health facilities?
3. Do you believe that CSPs make medicines available in the public health facilities?
4. Are the medicines you prescribe available in the pharmacy? In your opinion, do the medicines available in the pharmacy cover the treatment of the most of your cases? If the answer is no, then he or she could be asked about the reasons and their suggestion to solve this problem.
5. Do your patients manage to fill their prescription from the health centre or hospital pharmacy? If the answer is no, then he/she will be asked about the reasons and what they usually do? What does he/she recommend to remedy this situation?
6. When you decide to prescribe a medicine to your patient do you consider his/her financial situation? Are there any patients who leave their medicines because the cost is too high? If Yes, do you think the numbers of those who leave their medicine' due to high cost, are significant? In your opinion what they will do? Have you any suggestion to solve this problem?
7. Do patients complain to you about:
 - 1- availability of medicines;
 - 2- quality of medicines;
 - 3- cost of medicines.If Yes, what kinds of complaints (for each of the above). Do you receive these kinds of complaints frequently or just from time to time during the year? How do you weigh these problems, do you think these problems hinder the health facility utilization? What do you suggest to solve these (this) problem(s)?
8. Are there any arrangements for those (e.g. poor and school children) who tell you that they have no (enough) money to meet their medicines' cost? If yes, what are these arrangements? Are you satisfied with these arrangements? Has the MOH do any work?
If the answer is no, from your experience in this health centre, what do those group of patients do to get their medicines?
What is your personal opinion? Why do you think this view will help?
9. Are the drug prices fixed or changes during the year? If the answer is yes or no why? What do you think about the RDF pricing mechanism? Does it have any negative impact on your patients?
10. In your opinion what is the impact of the RDF on the quality of health care? Can you explain why the RDF affects the quality of services? Is there any improvement in the health care services after the adoption of Cost-Sharing Policy in the following areas:
 - 1- the availability of essential medicines;

- 2- patients behaviour in seeking health care after feeling ill;
 - 3- self-medication practice;
 - 4- the use of traditional medicines;
 - 5- the burden on the central hospitals;
 - 6- regular availability of doctors in the health centres.
11. What are the effects of medicines on the utilization of public health facilities? What will happen if there is no regular supply of medicines to health facilities? And why the availability of medicines is important? Can you give me any example of a public health facility which faces a problem of irregular supply of medicines?
 12. Is RDF has any positive effects on the utilization of the PHC services, such as health education, antenatal care, nutrition, infants follow-up, vaccinations... etc? Can you tell us the reasons in your opinion which lead to that effect(s)?
 13. Do you think the CSPs met their objectives in making essential medicines of good quality available at affordable prices in Khartoum State public health facilities? Can you give examples for the areas which you believe that CSPs made very sound outcomes?
 14. Do these CSPs cause any problems (e.g. deterred vulnerable groups from using public health facilities)? If the CSPs have some shortcomings can you give me some examples of these problems? In your opinion what are the reasons of such problems? Can you give some recommendations to remedy these situations?
 15. What are the main categories of your patients: children under five, school children, mothers, employers or elderly patients? Have you any idea about your patients' economical situation?
 16. Do you think the CSPs met their objectives in making essential medicines of good quality available at affordable prices in Khartoum State public health facilities?
 17. Do these CSPs cause any problems? If the CSPs have some shortcomings can you give me some examples of these problems? In your opinion what are the reasons of such problems? Can you give some recommendations to remedy these situations? What are the major failures of the RDF, if any?
 18. What do you recommend to improve the cost sharing programmes performance?
 19. Are there any explicit problems or area regarding the accessibility to essential medicines and health services utilization uncovered or if there any thing else I need to understand about this policy that I am not persuade with you? Have you any other comments about the CSPs ?

Appendix 4: Key items checklist

Availability of Key Items at Health facilities

Health facility Name*	1	2	3	4	5	6	7
Time of Visit							
Number of Pharmacy staff							

Item	Yes=1 No =0	Yes=1 No =0	Yes=1 No =0	Yes=1 No =0	Yes=1 No =0	Yes=1 No =0	Yes=1 No =0
1 Amoxycillin 250mg Capsules							
2 Amoxycillin (125/250mg) Suspension.							
3 Chloroquine Injection							
4 Chloroquine Syrup							
5 Chloroquine Tablets							
6 Co-trimoxazole Suspension							
7 Co-trimoxazole Tablets							
8 Ferrous + Folic Acid Tablets							
9 Hyoscine Tablets							
10 Paracetamol Syrup							
11 Paracetamol Tablets							
12 Benzyl Penicilline Injection							
13 Procaine Penicillin Injection							
14 Promethazine Injection							
15 Promethazine Tablets							
16 Dextrose 5% in Water							
17 Dextrose in Normal Saline							
18 Normal Saline							
Total							
Percentage of Yes=Total/18X100%							

Source: RDF 1998b

*Health Facility Name

1= Alsilamania Health Centre

2= Alshiekh Altayeb Health Centre

3= Componi Health Centre

4= Almaigoma Health Centre

5= Algazera Islang Hospital

6= Ibrahim Malik Hospital

7= Khartoum Teaching Hospital

Appendix 5: Adequacy of storage conditions check list¹

1. Pharmacy Storage Condition

Number of Health Facility		1	2	3	4	5	6	7
Item		T = 1 F = 0	T = 1 F = 0	T = 1 F = 0	T = 1 F = 0	T = 1 F = 0	T = 1 F = 0	T = 1 F = 0
1	Windows, Fan or Air condition							
2	No direct sun light can enter the area							
3	Area is free from the moisture							
4	Medicines are not stored directly on the floor							
5	Tablets and Capsules are not manipulated by naked hands							
6	There is no evidence of pests in the stock area							
7	Refrigerator for keep cool items							
8	There are no expired medicines in the dispensing area							
Total								
Percentage of True (T)= Total/8X100%								

2- RDF Warehouse Storage Condition:

Number of store		1	2	3	4
Item		T = 1 F = 0	T = 1 F = 0	T = 1 F = 0	T = 1 F = 0
1	There is a Fan or an Air condition				
2	No direct sun light can enter the area				
3	Area is free from the moisture				
4	Medicines are not stored directly on the floor				
5	There is a cold storage system with monitor				
6	There is no evidence of pests in the stock area				
7	There are no expired medicines in the distribution area				
Total					
Percentage of True (T) =Total/7X100%					

¹ Source: modified by the author from WHO 2003a

Appendix 6: Qualitative data analysis using Excel

Microsoft Excel 2003 for Windows was used to group the semi-structured interviews statements. In an Excel workbook (its worksheets were renamed according to different themes identified), spreadsheet was designed for the analysis of the qualitative data. All data segments (answers, comments and statements) were copied from word document (hereafter the original) and pasted on cells in column No.2 on spreadsheet renamed 'All answers'. Figure 1 (below) shows the headings of each spreadsheet columns in this order: Cell A1 serial number (the number of the data segment on the original); Cell B1 answers (each data segment was copied and pasted on a separate cell on the B column); the third column (Cell C1) contains the code² of the data segment on the same row; the fourth column (Cell D1) contains a theme to which that data segment is related; the fifth column (Cell E1) for the names of interviewees; the sixth column (Cell F1) for the category of the interviewee (for example, rural hospital practitioner); the seventh column (Cell G1) labelled observation (for observations reported during interviews), here, I reported the body language or events and observation during that specific answer or statement; and finally column eight (Cell H1) for the page number (the serial number of the page on the original word document) from which the data segment was copied). The serial number and the page number helped me to check the data segment on the original document to read the context when necessary.

Codes were used to group similar data segments. All responses were organised in thirteen themes, namely accessibility, affordability, availability, advantage, disadvantage, equity, quality, status quo, sustainability, prescribing effects, miscellaneous, recommendations, and utilization. Each theme, then further classified into different categories. For example, accessibility is further classified into medicines are accessible and medicines are not accessible.

After copying and pasting all relevant data segments, I ended up with 1,402 data segments organised into 1,402 rows. It is relatively long spreadsheet. Then, with the cursor at the top of the theme column (i.e. Cell D1), the contents were sorted ascendingly to pull together the data relevant to each theme. Thanks to Excel, each line contents move together makes it easier to read the answer, its code and theme, the name

² For further details about how the codes and themes were derived, see chapter 4, section 4.4.2

of interviewee who said it and his or her category, the serial and page numbers so it is easy to check it on the original document, and finally, the observations, if any.

Figure 1: The spreadsheet contains all data segments (1,402 segments)

No	Answers	code	Theme	Name of Interviewee	Category	Observation	Page No.
16	Definitely al drugs بالتأكيد بالقطاع الخاص يمكنك الحصول على الكلوروكين يمكنك الحصول على الفانسادير يمكنك الحصول على الكينين يمكنك الحصول على حقن الأرتيميسين حيثما ذهبت حيثما ذهبت على مستوى القرى، ذهبت أينما ذهبت يمكنك الحصول على القطاع الخاص في أي وقت لا بد	acc	accessibility	AlFatih M.	PM FMOH		3
17	لكن إذا كنت تبحث عن قطاع عام احتمال في بعض الولايات تكون في مشكلة أساسية لأن القطاع العام ما كان يصل بعض المناطق أنا أقدر أقول القطاع العام الخدمات ما كان يصلها القطاع العام... لما في ولاية الخرطوم الدواء الفلاني تقريباً يعني كل المستشفيات والمراكز الصحية وعدد كبير من المستشفيات حتى المستشفيات لما منطقتها بصورة ماهرة للمساعدة الطين يلغوا... نعم أحسن ليهم يهوا يفتروا من الدولة الفلاني لأنهم في السيرة أرحص.	acc	accessibility	AlFatih M.	PM FMOH		3
75	أنا عموماً أفكر ولاية الخرطوم من أفضل الولايات في السودان في الخدمات الصحية وما يعنيه إلى عوامل محددة أول شيء هي مساحة ولاية الخرطوم (هي مساحة صغيرة جداً) يعني في ثلاثة ساعات أنت تنتمي من أولها لآخرها فالت في المسافة دي لو تحتيت لثة أربعة وحدات هي ممكن تكون accessible الناس. هذه واحدة النوع الثاني هم الناس على urban population وكلهم موجودين على جرد بسيط من للمساحة الكبيرة دي يعني جرد كبير من الناس موجودين على مساحة عدودة والخدمات فيها متوفرة. يعني walking distance بتكون لاي واحد لاكثر من وحدة صحية الحاجة الثالثة بتفكر إمكانيات الولاية نسيان أفضل والحلقة للناس فيها الولاية.	acc	accessibility	Mustafa S.	PM FMOH		9
76	كان في المشاكل في توزيع للمستشفيات بتفكر أنا إضافة بعض للمستشفيات الجديدة في مايو وأما بعدة حست كثير جداً من الناحية الجغرافية لخدمات للمستشفيات التي بصورة أساسية كان فيها	acc	accessibility	Mustafa S.	PM FMOH		9

After ascending sorting, all information related to a specific theme were copied and pasted on a new workbook. The first spreadsheet renamed code, the second spreadsheet renamed all answers, for example, all serial numbers, data segments, codes, names of interviewees and their categories, observations, page numbers related to 'Accessibilty' were copied and pasted on a spreadsheet renamed all answer (Figure 2). The cursor was placed, this time, at the top of the codes column. The contents were then ascendingly sorted to bring data segments of similar codes together. Each group of similar codes was then copied and pasted on a new spreadsheet renamed with that code. For example, on the Accessibility spreadsheet, data segments that were coded 'acc' were grouped together. This procedure was repeated with each theme.

Figure 2: Further analysis of the selected theme 'Accessibility'

Microsoft Excel - accessibility									
File Edit View Insert Format Tools Data Window Help									
Type a question for help									
C3 acc									
A B			C	E	F	G	H	I	
1	Accessibility								
2	No.	Answer	code	Name of interviewee	Category	Observation	Page No.		
3	16	Definitely al من ناحية توزيع الخدمات لو اخذت هناك القطاع الخاص بالتأكيد drugs are accessible every where you go you find chloroquine you find fansidar you find quinine you find artemether injection where you go حق على مستوى القرى ده اذا اخذت مناك القطاع الخاص اذا قدرنا ان للقطاع الخاص في تمويل الادوية	acc	AJFatih M.	PM FMOH		3		
4	17	لكن اذا مسكتها كقطاع عام احتمال في بعض الولايات تكون في مشكلة اساسية لانه القطاع العام ما قادر يصل لبعض المناطق انا اقدر اقول القطاع الام المستشفيات ما قادر يصلها القطاع العام.. اما في ولاية الخرطوم الدواء الناجي تقريبا بيغطي كل للمستشفيات ولمراكز الصحة وعدد كبير من المستشفيات حق المستشفيات لما مغطيتها بصورة مباشرة المساعدين الطين يملقوا تسهم احسن ليهم بيوتوا يفتروا من الدواء الناجي لانه السر فيه ارجح.	acc	AJFatih M.	PM FMOH		3		
5	75	انا عموما بتفكر ولاية الخرطوم من افضل الولايات في السودان في الخدمات الصحية وانا	acc	Mustafa S.	PM FMOH		9		
6	76	كان في المشاكل في توزيع المستشفيات بتفكر انما باضافة بعض للمستشفيات الجديدة في مايو	acc	Mustafa S.	PM FMOH		9		
	78		acc	Mustafa S.	PM FMOH		9		