

Exploring the impact of COVID-19 pandemic lockdown on informal settlements in Tshwane Gauteng Province, South Africa.

Authors: ¹Nyashanu Mathew, ²Simbanegavi Prisca, ³Gibson Linda

¹ Nottingham Trent University, 50 Shakespeare Street, Nottingham, NG1 4FQ
United Kingdom Email: mathew.nyashanu@ntu.ac.uk

² School of Construction Economics and Management University of the Witwatersrand Jan Smuts Avenue Braamfontein Johannesburg South Africa

³ Nottingham Trent University, 50 Shakespeare Street, Nottingham, NG1 4FQ
United Kingdom

Abstract

Background

Informal settlements remain a public health problem as they lack basic infrastructure and space. Furthermore, it is challenging to enforce public health regulations and protocols to prevent the spread of infection during a pandemic. This paper was set out to explore the impact of lockdown during COVID 19 among people living in informal settlements.

Method

An exploratory qualitative design was utilized for this study. Purposive sampling was used to select research participants for the study. In-depth one to one interviews were held involving 30 research participants through a WhatsApp online telephone platform. A thematic approach underpinned by the four stages of data analysis in Interpretive Phenomenological Analysis (IPA) was utilised to analyse the data.

Results

The study found that during the COVID 19 pandemic lockdown the research participants were affected by lack of space to practice social distancing, over-burdened infrastructure, lack of savings, loss of income and shortage of food, hunger and diseases, anxiety and depression and poor access to education.

Conclusions

There is need to prioritize the needs of informal settlers and endeavor to establish permanent homes. Health promotion and communication initiatives and pandemic awareness programmes are needed to mitigate the impact of lockdown during a pandemic in informal settlements.

Key words: Pandemic, COVID 19, Informal settlements, Isolate, Social distancing.

Introduction

There are considerable challenges affecting informal settlements in constraining control of COVID-19¹. The COVID-19 pandemic first emerged in Wuhan, China in December 2019². The virus then spread across the world at an alarming rate. Owing to its mortality and morbidity rate, on the 11th of March 2020 the World Health Organisation (WHO) declared the COVID-19 a global pandemic. Information

concerning the COVID-19 pandemic and who is at risk is exclusively based on data from middle- and high-income countries (MHICs). The generic public health recommendations to use sanitizer, wash hands, self-isolate and social distancing assume basic conditions and access to running water and essential amenities.³ In high income countries public health systems relies on a good understanding of the profiles of their populations and a strong scientific system to monitor changes during pandemic periods. Much of their attention is focused on improving levels of critical care and the capacity of hospitals to accommodate critically ill patients.

When applying control measures which restrict social and economic activities many high-income countries have provided economic support packages to vulnerable communities as a way of mitigating economic challenges.⁴ Such programmes are not possible in low and middle income countries (LMICs) and especially in urban informal settlements. There is currently more than one billion people living in informal settlement in LMICs.⁵ With the advent of the COVID-19 pandemic there is an urgent need to consider the feasibility of developing locally appropriate approaches to protect these populations from the worst impacts of this so far untreatable pandemic.

Informal settlements are affected by a myriad of problems ranging from population density to inadequate access to water and sanitation.⁶ This makes advice on social distancing and washing hands implausible for many local communities. The big challenge of informal settlements (IS) is the lack of formal public health data about them prior to and during pandemics like COVID-19. Due to their illegal or informal status of IS there is no epidemiological data about the number of the people who live in the settlements. On many occasions local authorities are preoccupied with clearing these informal sectors and there is no clear policy articulated about the populations health and well-being.⁷ This makes it difficult for many governments in LMICs to prepare and provide survival packages during emergencies. The motivation to evict informal settlers often lead to inappropriate responses which are ineffective or could worsen the situation (for example as demonstrated by attempts to quarantine regions and cities in West Africa during the 2014-2016 Ebola outbreak).⁸ Presently many central governments in LMICs are mimicking restrictive control measures in high income countries which are not sustainable and could trigger serious additional harms when the socio-economic circumstances of the urban poor and vulnerable population are not effectively addressed.

There is an urgent need to act now, before widespread transmission of COVID-19 in LMIC cities. The challenge of epidemic control is laborious and needs positive local organisation of the affected populations.⁹ It also entails effective designing of public health policies to address social justice and societal inequalities. It is important to note that many governments in LMICs lack the ability to make policies that effectively addresses the problem affecting marginalised communities including those living in informal settlements. Health promotion and community engagement in challenging environments like informal settlements is painstaking and requires engagement with the affected communities. More importantly, data shows that urban expansion in the last ten years is increasingly unplanned with slums and informal settlements sprawling over many cities in LMICs.¹⁰ Cities are usually divided along wealth and socio-economic tracks, between the rich and poor and colonial and racial divisions. Slums and informal settlements are depicted as dirty and disease ridden including being a social, environmental, and developmental threat to wider city.¹⁰ Such an image marginalises residents of informal settlements as outsiders of society of and the victims of blame. This history creates hostility and opposition to public health control measures by the inhabitants of informal settlements.

In every context, there are specific local circumstances influencing relations between informal settlers and the local authorities controlling the city.¹¹ They also become central to how informal settlers perceive restrictive measures and question who will benefit from these measures in the city. In light

of the above assertions this research study set out to explore the impact of COVID-19 pandemic lockdown on informal settlements in South Africa.

Research site

There are many informal settlements in South Africa showing the deep socio-economic inequalities of apartheid that excluded the rights of the poor to urban land.¹² These settlements lack electricity, running water, sanitation, and roads. Plastic View is 1-kilometer way from Woodhill Golf Estate in Tshwane Municipality shown in Figure 1. People have faced evictions from the municipality with no success, as people are not willing to move further away from places of work.¹³



Figure 1: Plastic View Informal near Woodhill Golf Estate in City of Tshwane Coordinates (-25.823040, 28.317594)

Source.¹⁴

Methodology

This research employed an exploratory qualitative study (EQS) approach. As the name suggests, an EQS is designed to explore the topic under consideration in order to better understand it rather than offer a final and conclusive solution to existing problems under investigation.¹⁵ In doing so, an EQS can also identify possible areas for further investigations. Furthermore, an EQS is useful in understanding the overview of an existing issue from a new perspective and can provide key information for future interventions.¹⁶

Data collection and recruitment

Semi structured questions were devised and used to elicit perceptions about the impact of lockdown during COVID-19 pandemic among informal settlers. The interview guide was informed by the literature from previous primary and secondary research studies of COVID-19 and other pandemics.¹⁷ To test the appropriateness of the interview protocol four informal settlers were interviewed through WhatsApp an online telephone platform.¹⁸ Following the completion of the interviews, the four participants were asked whether they felt that the interview guide was suitable for the topic in question. None of the four participants suggested any substantial changes to the interview guide and it was therefore adopted for use in the research study. However, where appropriate their comments were included to shape the final research protocol. Following approval of the research proposal by

the Witwatersrand University Ethics Committee Thirty (30) informal settlers were recruited through contacts from community and faith organisations which are distributing food and clothes in the informal settlements during the current COVID-19 pandemic. The researchers sent letters and information sheets to the organisations inviting informal settlers to take part in the research study. Only those who had agreed to take part in the research study had their names and telephone contacts forwarded to the researchers to organise interview dates and time. The interviews were held through the WhatsApp online telephone platform. The use of WhatsApp was to maintain social distancing measures enforced by the government of South Africa to prevent infections during COVID-19 pandemic as the interviews were held during the lockdown period. Before the interviews research participants had an opportunity to read the information sheet and ask questions. Furthermore, all the research participants had to sign a consent form, which granted them the right to withdraw from the study at any time without giving reasons. The information sheet and consent forms were translated into five main South African local languages which included Zulu, Xosa, Sotho, Venda and Afrikaans. The interviews lasted for 45 minutes and were conducted in English or one of the listed five languages depending on which one the research participants were comfortable with.

Inclusion and Exclusion criteria

The inclusion criteria included men and women who were 18 years or above.¹⁹ The lower age limit of 18 years was chosen in line with the legal definition of an adult in South Africa. All the participants had stayed for more than five years in informal settlements without a break. It was important to recruit a heterogeneous sample with respect to the length of time they had spent living in informal settlements to elicit shared understanding of the life before and during the COVID-19 pandemic.

Data Analysis

All interviews were tape-recorded, transcribed verbatim and entered into NVivo for organisation to make analysis easy. For the verification of accuracy all transcriptions were read back to the research participants for confirmation of the main points through WhatsApp online telephone platform. A thematic approach underpinned by the four stages of data analysis in Interpretive Phenomenological Analysis (IPA) was utilised²⁰. In stage (1) of the analysis, transcripts were read repeatedly to identify accounts of experiences that were important to the interviewee. The phenomenological position adopted here was to hear and understand the participant's story in their own words and keeping their experience at the centre of their account. In stage (2), the accounts identified were re-read and pertinent sections summarized and given codes representing the researcher's interpretation. Stage (3) involved identifying how the codes identified in stage (2) clustered together into themes and how these themes were related to each other. In stage (4) comparisons were made across the body of interviews to determine important prevalent themes supported by captions from the interviews. These themes formed the final output of this research study.

Results

While it has been a government initiative to disperse and resettle people living in informal Settlements (IS), the Department of Human Settlements has not managed to do so given the number of IS in South Africa. Table 1 summarizes six (6) themes from interviews conducted at Plastic View Informal Settlement (PVIS) in Pretoria.

(1) Social distancing is impractical in informal settlements

There are about 9500 people who live in 960 shacks in PVIS and this means there are approximately 10 people living in a shack of 6-15 square meters. Participants explained how they live in fear of contracting COVID 19 as it is difficult, virtually impractical to observe social distancing as they are

squeezed. Children are at more risk as they keep playing outside without masks. People are committed to abide by the guidelines given to them by government, Ministry of Health and police services, however, access to information on what to do regarding COVID 19 is limited as most of the population cannot afford TV sets. NGOs such as South Africa Cares are providing pamphlets translated into local language to educate and raise awareness.

(2) Over-burdened infrastructure in the informal settlements

There is an extra pressure on the poor infrastructure available in the informal settlement and so the infrastructure becomes quickly over-burdened. The new norm from the compulsory lockdown has meant that more of the population is staying home in the PVIS during the day compared to pre-lockdown period. This has put pressure on the already stressed mobile toilets ('duped chemical toilets'). These are already disliked and resented because of the strong chemicals used, lack of comfort and windows. These mobile toilets have been increased to fifty (50) on the site serving xxx people. Because of this, people prefer to squat in the nearby bushes for toilets. A donation from the 'Keys4Life' NGO has provided convenient 'wash basins' for people to wash hands in the streets. Thus, it is possible to wash hands frequently as stipulated by the MoH. They have increased JoJo water tanks (communal tanks supplying water in the informal settlements) from 4 to 8 during the lockdown period and so access to clean water is not a problem. The municipality collect refuse once a week. However, there is no electricity in the PVIS because of an incident that caused a fire in 2016 which destroyed 20 shacks and killed many people. In place of that households install and use solar panels, generators, and batteries for power.

(3) Lack of savings – loss of income and shortage of food

Most informal settlers work in the informal economy as domestic workers, gardeners, in restaurants, as roadside vendors for example. The average wage is about R150 -R300 (USD 8 -16) per day when there is no lockdown. This is because most companies are cutting costs during COVID-19 period and shedding employees. This means many people have lost their means for survival during lockdown period. There is apparent hunger and shortage of food as people lose their income. Participants indicated that shops were open, but they have no money to buy food. They also had no saved money to stock food pre-lockdown. To the rescue of many, a church in the area has been donating food packs.

(4) Hunger and other diseases

People who suffer from other diseases such as Human Immuno-deficiency Virus (HIV) and Tuberculosis (TB) experience difficulties, as taking medication requires enough food. Some people have insisted on going out at the robots (Traffic lights) to beg for money. This is because food by NGOs are only distributing once a week per shack (informal shelter made of boxes and planks) and the shack-lord (owner of the informal shelter) has to share amongst the people he/she lives with. The food offered by NGOs are often not enough as the packs contain no meat or cooking oil but only maize meal and a few vegetables. This affects sick people who are particularly prone to infections.

(5) Anxiety and depression

So far 140 people has been tested by the MoH and no cases no cases of COVID-9 have been detected in PVIS. The social restrictions, such as the suspension of football and other activities is having an impact in terms of self-reported anxiety and depression. They can only play cards (gambling), and this leaves people stressed and vulnerable.

(6) Poor Access to education

Most schools have offered online teaching in South Africa, however, PVIS children who go to B Hope school have not been able to do so. They cannot access online schooling as they have no access to internet and even if they did data is not affordable for most people living in PVIS.

Table 1 shows quotations from research participants supporting themes.

<p>(1) Social distancing is impractical in informal settlements</p> <ul style="list-style-type: none"> • <i>Worrying about COVID- 19 infection due to limited space. “We are afraid of getting it from others. There is no space for 1-2-meter separation.”</i> • <i>Waiting for instructions. “We have heard that informal settlements will be dispersed, and we are waiting”</i> • <i>Access to information on what to do regarding COVID-19 is limited. “We do not know what we are supposed to do as we cannot afford TV sets.”</i> 	<p>(2) Over-burdened infrastructure in the informal settlements</p> <ul style="list-style-type: none"> • <i>There are more people during the day compared to pre-lockdown times. “Everyone is here, fathers, mothers and children, day and night.”</i> • <i>Mobile toilet facilities are not conducive. “We stand for 30 minutes to reach the toilet and the toilets are not enough.”</i> • <i>Access to water is improved. “Water is sufficient.”</i> • <i>Washing hands frequently is been made possible. “Thanks to NGOs that have provided wash basins in the streets”</i>
<p>(3) Lack of savings – loss of income and shortage of food</p> <ul style="list-style-type: none"> • <i>Informal settlers lost their jobs. “Lockdown means we do not go to work”</i> • <i>Informal settlers get no income during lockdown. “Me and my neighbors have not received any money from our employers as I work casual jobs as a domestic worker”</i> • <i>Shortage of basic food. “Shops are open, but we have no money to buy. We also had no saved money to stock food pre-lockdown. We earn between R150 -R300/day when there is no lockdown”</i> • <i>Efforts by government and NGOs are not well managed. “There is no help so far. I feel that they are classifying us as non- South Africans as we are immigrants from Botswana, Lesotho, Malawi, Mozambique, Namibia, Zambia and Zimbabwe”</i> 	<p>(4) Hunger and other diseases</p> <ul style="list-style-type: none"> • <i>Difficulties in finding enough food. “I am HIV positive and I need to eat before I can take my medication”</i> • <i>Health services from a Church. “Collaboration with University of Pretoria has helped us get access to a Doctor, Dietician, family Planner and Social Worker”</i> • <i>Tendency to postpone health protocols for the sick. “Queues pose risk of COVID 19 infection, I try to avoid going to the clinic because of queues.”</i> • <i>Mob mentality brings complications that exacerbates shortage of food. “The promised food packs get delayed; there is fear that trucks may get looted before the intended destinations.”</i>

<p>(5) Anxiety and depression</p> <ul style="list-style-type: none"> • Limited socializing due to COVID-19 • <i>There is no case for COVID-19 out of the 140 people tested by government. "No one is sick here"</i> • <i>Limited socializing is stressful. "Our children are not allowed to go out and play sport at the grounds"</i> • <i>The only sport is playing cards. "This leaves people stressed and vulnerable to infections.</i> 	<p>(6) Poor Access to education</p> <ul style="list-style-type: none"> • <i>Data for internet is not affordable. "Our children fail to access online education offered by government as we cannot afford smart cellphone and data"</i> • <i>Children are at more risk. "They keep playing outside without masks as they keep removing them"</i>
--	---

Discussion

Social distancing involves maintaining a reasonable distance normally 1-2 meters between individuals to circumvent the possibility of disease transmission within a population.²¹ This measure has been set as a standard by HICs. For social distance to be possible there is need for availability of space to accommodate people. The research participants reported limited space in the informal settlements, lack of information and waiting for instructions. People in informal settlements live in small houses with big families, so due to limited space social distancing is not practicable.²² This scenario puts the population in informal settlements at risk of spreading COVID-19 and other infectious diseases to each other during the lockdown period as they are now spending a longer time in squalid conditions compared to when there is no lockdown. There is a need, in the longer term, for central government to consider increasing space in informal settlements through having a specific manageable number in each unit. Fast, clear, and robust policies on health information dissemination to deprived communities in informal settlements during pandemics are needed. To achieve this, there is need for an interdisciplinary approach in improving the conditions of informal dwellers.²³ More importantly informal settlements need to be a short-term stopover before moving people into permanent non-restrictive settlements supported by a robust infrastructure.

Informal settlements as the name suggest are temporary and characterised by poor infrastructure and social amenities.²⁴ The research participants reported strained infrastructure and uncondusive mobile toiles during this COVID-19 pandemic lockdown due to the density of people in the informal settlement at all times. The deterioration of infrastructure including toilets increases the risk of contracting and spreading of disease.²⁵ It is clear that there is a possibility of contracting new infections in an overburdened informal settlement possibly enabling co-morbidities within the population. Regardless of informal settlements being temporary dwelling places central government should place a high priority in establishing and strengthening of infrastructure in all informal settlements as a strategy to curtail the impact of pandemics like COVID 19 and other communicable and non-communicable diseases. This can also help in alleviating the burden of comorbidity impacting on the population of LMICs. The establishment of social amenities in informal settlements should also be supported by a strong health promotion and communication agenda to raise disease infection awareness among the population in informal settlements.²⁶ More importantly regular mobile health facilities for different ailments need to service informal settlements to enhance access to health for these deprived populations.

Many people in informal settlements are not formally employed and depend on the informal sector to support their families.²⁷ Informal sectors hardly generate extra cash for use during hard times like the COVID 19 lockdown. The research participants reported loss of job, no income, shortage of food and poor support from the central government. Shortage of food among already deprived people can exacerbate the contraction of different infections and development of malnutrition conditions in children like marasmus and kwashiorkor.²⁸ Central government need to establish strong working policies on supporting vulnerable and hard to reach communities like those living in informal settlements and displaced people. Such policies can guarantee support for these communities during pandemics like COVID 19.²⁹ Organised food banks supported by central government and Non-Governmental Organisations (NGO) need to be established to provide food with nutritional values to affected communities like informal dwellers. The issue of food security for vulnerable populations becomes central to the impact of pandemic lockdown, it is therefore imperative that central government roll out food provision packages to vulnerable communities prior to a protracted pandemic lockdown.

Throughout the world, people who live in informal settlements have less access to health resources, have more illnesses and die earlier despite good health services in urban areas.³⁰ Pandemics put unprecedented strain on poor people who live in vulnerable conditions that lack basic infrastructure that include water, sanitation, and sewers increasing the risk of infectious diseases such as COVID-19.³⁰ The research participants reported delayed food handouts, difficulties in accessing health services and postponed appointments. This poses a difficult situation for people who were taking medication for chronic conditions like HIV and diabetes as they needed food prior to taking their medication. Furthermore, this may impact on the immune system of these individuals resulting in comorbidity and vulnerability to COVID 19 pandemic.³¹ There is need for central government through the relevant ministries to map out a supporting strategy for all people living with chronic conditions in deprived areas like informal settlements.³² It is important that government partners with the donor communities help increase food handouts in hard to reach and deprived communities. Such initiatives can help reduce the impact of COVID 19 among people living in informal settlements during lockdown periods to curtail the pandemic.

Depression caused by economic distress is associated with shame amongst many African communities when they lose their employment security is a major health challenge in the informal settlements.³³ Depressed people in informal settlements may cause many social ills such as theft, substance abuse, domestic violence, rape and sexual abuse.³⁴ The research participants reported that living in cramped slums make them feel stressed as they are not able to engage in their daily activities especially being able to work during the lockdown period. This is aggravated by lack of space making it difficult to engage in sport or any other physical activities compared to people who are living in established residences.³⁵ There is need for central government to plan for green spaces in informal settlements and enhance physical exercises for communities to mitigate mental health problems and other conditions associated with being inactive. Initiatives to engage deprived communities can provide reflection time and resilience to weather the problems.³⁶ More importantly the government through relevant ministries could facilitate vocational training to equip deprived communities with essential practical skills to build capacity and self-reliance in future. Such skills will become handy for entrepreneurial activities in post pandemic period. The intervention can bring hope to economic distress and reduce high levels of depression that may lead to other social problems associated with mental health.

Children living in informal settlements are exposed to poor health conditions, inadequate care giving, stunting of development and risks from organized crime, drugs, sexual violence, child labor including

denial of resources and other forms of exploitation.³⁷⁻³⁸ Research participants reported poor internet access preventing their children from accessing learning during the COVID 19 pandemic lockdown. They also expressed fear that their children may contract COVID 29 as they continued to play in tight spaces without any masks and impossible to practice social distancing. In line with providing educational opportunities for all children the government need to roll out internet in deprived communities to make sure that they are kept abreast with other children in accessing education during difficult times like lockdowns. More importantly targeted programmes like radio lessons to improve access to education for children can go a long way in enhancing learning during pandemic lockdown.³⁹ The government through the MoH should provide pandemic awareness and guidance during lockdown periods to make sure that children in vulnerable settings like informal settlements are better protected.

Implications for professionals and future practice

The basic problem of slums is not how to eradicate them, but how to make them habitable.⁴⁰ There is need to upgrade informal settlements and reduce exposure to public health dangers that increase loss of life to people living in vulnerable conditions. Central governments in developing countries such as South Africa need to disperse informal settlements, while decentralizing health facilities to make sure that vulnerable communities have access to basic health facilities catering for a wide range of needs. Through a programme called Upgrading of Informal Settlements Program (UISP), South African government need speed up the provision of electricity, running water, sanitation, and roads within existing informal settlements. New resettlements using mass production methods of better human settlements (with basic infrastructure) is the solution to the much-needed social distancing within informal settlements. On the other hand, there is need for government policy to promote entrepreneurial activities for people who live in informal settlements. Professionals working with informal settlers need to understand their problems and seek a solution through community consensus and action in line with the Ottawa Charter which advocates for involvement of the community when undertaking community initiatives.⁴¹ There is need for an interdisciplinary approach in solving the problems of people living in informal settlements. Public health professionals need to roll out strategic health promotion and communication campaigns and pandemic awareness programmes to alleviate disease burden in informal settlements.

Limitations of the study

The research study was carried out in the city of Tshwane however, research involving a wide range of cities in South Africa may be needed in future to enable comparisons of experiences in informal settlements in South Africa. This research was also qualitative in nature, future research could utilize mixed methods approach to enable broader exploration of the issues..

Concluding comments

There is need for proper planning and support for informal settlements before announcing a pandemic lockdown. More developments to upgrade infrastructure and social amenities of informal settlements is key in mitigating the impact of pandemics and other diseases. The central government in conjunction with NGOs should coordinate efforts to improve the conditions of informal settlements while taking practical actions to establish permanent and formal homes for informal settlers.

Conflict of interest

All authors declare no conflict of interest.

Funding

No funding was provided for this study.

Acknowledgement

Our sincere gratitude goes to all informal settlers who took part in this research study.

References

1. San Lau, L., Samari, G., Moresky, R. T., Casey, S. E., Kachur, S. P., Roberts, L. F., & Zard, M. (2020). COVID-19 in humanitarian settings and lessons learned from past epidemics. *Nature Medicine*, 1-2.
2. Wu, F., Zhao, S., & Yu, B. (2020). A new coronavirus associated with human respiratory disease in China [published online ahead of print February 3,]. *Nature*, 10.
3. Gibson, L., & Rush, D. (2020). Novel coronavirus in Cape Town informal settlements: feasibility of using informal dwelling outlines to identify high risk areas for COVID-19 transmission from a social distancing perspective. *JMIR Public Health and Surveillance*, 6(2), e18844
4. Loayza, N. V., & Pennings, S. (2020). Macroeconomic policy in the time of covid-19: A primer for developing countries.
5. Wang, Y., Gibson, L., Beshir, M., & Rush, D. (2018, October). Preliminary investigation of critical separation distance between shacks in informal settlements fire. In *Asia-Oceania Symposium on Fire Science and Technology* (pp. 379-389). Springer, Singapore.
6. Penrose, K., de Castro, M. C., Werema, J., & Ryan, E. T. (2010). Informal urban settlements and cholera risk in Dar es Salaam, Tanzania. *PLoS Neglected Tropical Diseases*, 4(3).
7. Mutisya, E., & Yarime, M. (2011). Understanding the grassroots dynamics of slums in Nairobi: the dilemma of Kibera informal settlements. *Int Trans J Eng Manag Appl Sci Technol*, 2(2), 197-213.
8. Waldman, L. (2015). Urbanisation, the peri-urban growth and zoonotic disease.
9. Swilling, M., Tavener-Smith, L., Keller, A., Von der Heyde, V., & Wessels, B. (2013). Rethinking incremental urbanism: Co-production of incremental informal settlement upgrading strategies.
10. Castro, C. P., Ibarra, I., Lukas, M., Ortiz, J., & Sarmiento, J. P. (2015). Disaster risk construction in the progressive consolidation of informal settlements: Iquique and Puerto Montt (Chile) case studies. *International Journal of Disaster Risk Reduction*, 13, 109-127.
11. Weinstein, L. (2014). *The durable slum: Dharavi and the right to stay put in globalizing Mumbai* (Vol. 23). U of Minnesota Press.
12. Huchzermeyer, M. (2009). The Struggle for in Situ Upgrading of Informal Settlements: A Reflection on Cases in Gauteng. *Journal of Development Southern Africa*, Vol. 26, (1), pp. 59-73

13. Meth, P. (2017). Informal Housing, Gender, Crime, and Violence: The Role of Design in Urban South Africa, *The British Journal of Criminology*, Vol. 57(2). pp. 402–421. Available at: <https://doi.org/10.1093/bjc/azv125>
[Accessed: 25 Feb 2019]
14. Google Maps, 2018
15. Gorynia, M., Nowak, J., Howak, J., & Wolniak, R. (2007). Motives and modes of FDI in Poland: An exploratory qualitative study. *Journal for East European Management Studies*, 132-151.
16. Lockett, D., Willis, A., & Edwards, N. (2005). Through seniors' eyes: an exploratory qualitative study to identify environmental barriers to and facilitators of walking. *Canadian Journal of Nursing Research Archive*, 37(3).
17. Robinson, O. C. (2014). Sampling in interview-based qualitative research: A theoretical and practical guide. *Qualitative research in psychology*, 11(1), 25-41.
18. Majid, M. A. A., Othman, M., Mohamad, S. F., Lim, S. A. H., & Yusof, A. (2017). Piloting for interviews in qualitative research: Operationalization and lessons learnt. *International Journal of Academic Research in Business and Social Sciences*, 7(4), 1073-1080.
19. Zuch, M., Mason-Jones, A. J., Mathews, C., & Henley, L. (2012). Changes to the law on consent in South Africa: implications for school-based adolescent sexual and reproductive health research. *BMC international health and human rights*, 12(1), 3.
20. Callary, B., Rathwell, S., & Young, B. W. (2015). Insights on the Process of Using Interpretive Phenomenological Analysis in a Sport Coaching Research Project. *Qualitative Report*, 20(2).
21. Yang, Y. T., & Silverman, R. D. (2015). Social distancing and the unvaccinated. *New England Journal of Medicine*, 372(16), 1481-1483.
22. Gibson, L., & Rush, D. (2020). Novel coronavirus in Cape Town informal settlements: feasibility of using informal dwelling outlines to identify high risk areas for COVID-19 transmission from a social distancing perspective. *JMIR Public Health and Surveillance*, 6(2), e18844.
23. Hiwasaki, L., & Arico, S. (2007). Integrating the social sciences into ecohydrology: facilitating an interdisciplinary approach to solve issues surrounding water, environment and people. *Ecohydrology & Hydrobiology*, 7(1), 3-9.
24. Mutisya, E., & Yarime, M. (2011). Understanding the grassroots dynamics of slums in Nairobi: the dilemma of Kibera informal settlements. *Int Trans J Eng Manag Appl Sci Technol*, 2(2), 197-213.
25. Wekesa, B. W., Steyn, G. S., & Otieno, F. F. (2011). A review of physical and socio-economic characteristics and intervention approaches of informal settlements. *Habitat international*, 35(2), 238-245.

26. Jewkes, R., Gibbs, A., Jama-Shai, N., Willan, S., Misselhorn, A., Mushinga, M., ... & Skiweyiya, Y. (2014). Stepping Stones and Creating Futures intervention: shortened interrupted time series evaluation of a behavioural and structural health promotion and violence prevention intervention for young people in informal settlements in Durban, South Africa. *BMC public health*, 14(1), 1325.
27. Hasan, A. (2006). Orangi Pilot Project: the expansion of work beyond Orangi and the mapping of informal settlements and infrastructure. *Environment and Urbanization*, 18(2), 451-480.
28. Walton, E., & Allen, S. (2011). Malnutrition in developing countries. *Paediatrics and Child health*, 21(9), 418-424.
29. Leach, M., Scoones, I., & Stirling, A. (2010). Governing epidemics in an age of complexity: Narratives, politics and pathways to sustainability. *Global Environmental Change*, 20(3), 369-377.
30. Friesen, J.; Friesen, V.; Dietrich, I.; Pelz, P.F. (2020). Slums, Space, and State of Health—A Link between Settlement Morphology and Health Data. *International. Journal of Environmental. Research and Public Health*, 17 (6<https://doi.org/10.3390/ijerph17062022> [Accessed: 07 May 2020]
31. Sanchez, P. A., & Swaminathan, M. S. (2005). Hunger in Africa: the link between unhealthy people and unhealthy soils. *The Lancet*, 365(9457), 442-444.
32. Brown, K. (2011). 'Vulnerability': handle with care. *Ethics and social welfare*, 5(3), 313-321.
33. Gibbs, A., Govender, K., Jewkes, R. (2018) An exploratory analysis of factors associated with depression in a vulnerable group of young people living in informal settlements in South Africa. *Glob. Public Health*, 13, 788–803.
34. Nasrullah, M., Zakar, R., Zakar, M.Z., Abbas, S., Safdar, R. Circumstances leading to intimate partner violence against women married as children: A qualitative study in Urban Slums of Lahore, Pakistan. *BMC Int. Health Hum. Rights* 2015, 15.
35. McFarlane, C. (2008). Sanitation in Mumbai's informal settlements: State, 'slum', and infrastructure. *Environment and planning A*, 40(1), 88-107.
36. Ward Thompson, C., Aspinall, P., Roe, J., Robertson, L., & Miller, D. (2016). Mitigating stress and supporting health in deprived urban communities: the importance of green space and the social environment. *International journal of environmental research and public health*, 13(4), 440.
37. Deb, S., Sunny, A.M., Majumdar, B (2019). Child Labour: A Global Challenge Disadvantaged Children in India pp 133-173
38. Kruidenier, R (2017). Personal encounters with children in an informal settlement: Exploring spirituality. *Verbum Eccles. (Online)* [online]. vol.38, n.1, pp.1-8. ISSN 2074-7705.
39. Rumble, G. (2019). *The planning and management of distance education*. Routledge.

40. Ndinda, C., Uzodike, N. O., & Winaar, L. (2011). From informal settlements to brick structures: housing trends in post-apartheid South Africa. *Journal of Public Administration*, 46(Special issue 1), 761-784.
41. Lovell, S. A., Kearns, R. A., & Rosenberg, M. W. (2011). Community capacity building in practice: constructing its meaning and relevance to health promoters. *Health & Social Care in the Community*, 19(5), 531-540.