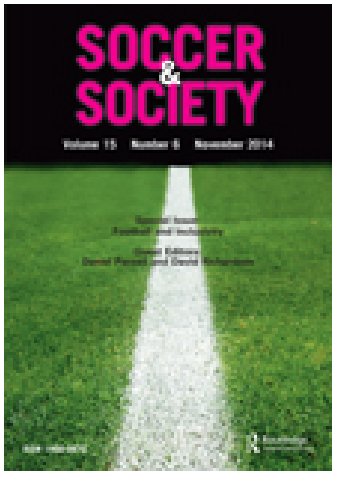

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'Motivate': the effect of a Football in the Community delivered weight loss programme on over 35-year old men and women's cardiovascular risk factors

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The purpose of this study was to examine whether an innovative, inclusive and integrated 12-week exercise, behaviour change and nutrition advice-based weight management programme could significantly improve the cardiovascular risk factors of overweight and obese men and women over the age of 35. One hundred and ninety-four men and 98 women (mean age = 52.28 ± 9.74 and 51.19 ± 9.04) attending a community-based intervention delivered by Notts County Football in the Community over one year, took part in the study. Height (m), weight (kg), fitness (meters covered during a 6 min walk) and waist circumference (cm) were measured at weeks 1 and 12 as part of the intervention. Changes in body weight, waist circumference and fitness for men and women were measured by a 2-way repeated measures ANOVA, with significance set to $p < 0.05$.Weight, waist circumference and fitness significantly improved over time in both men (4.96 kg, 6.29 cm, 70.22 m; $p < 0.05$) and women (4.26 kg, 5.90 cm, 35.29 m; $p < 0.05$). The results demonstrated that the FITC lead weight loss intervention was successful in significantly improving cardiovascular risk factors in both men and women. In particular, the weight loss reductions achieved were comparable to those seen in similar, more costly men-only programmes. This is the first study to demonstrate the efficacy of such an intervention in an inclusive, mixed gender programme and more specifically, in women.

Introduction

The World Health Organization has described obesity as a global epidemic.[1] Obesity has 'escalated' over the last four decades[2] and the prevalence in UK men is amongst the highest in Europe.[3] Moreover, there is a higher prevalence of total overweight and obesity (BMI ≥ 25 kg m^2) amongst men than women in the UK[4] and although a greater proportion of women are obese/morbidly obese, more men than women will be obese in the future: indeed, it is predicted that by 2050, the proportion of the population that is obese will be 60% of males and 50% of females.[5] Nottingham, located in the English Midlands (United Kingdom), it is estimated that around 25% of men (37,000) are obese (with a BMI ≥ 30 kg m^2). Applying projections set out in Foresight indicates that the predicted number of obese men in the city is likely to

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reach 41% (55,020) by 2020, thus overtaking the number of obese women.[6] Moreover, obesity results in considerable costs to health services in the UK (forecast to reach £50billion by 2050).[7]

There is considerable international evidence that demonstrates the serious health consequences of excess body weight.[8] Illnesses associated with obesity include coronary artery disease, stroke, type 2 diabetes, anxiety and depression, and some cancers.[9] In particular, cardiovascular disease (CVD) is responsible for the majority of morbidity and mortality of both men and woman in the UK, with obese men at 40 years of age likely to reduce their life expectancy by 5.8 years.[10] While these obesity-associated co-morbidities contribute to gender and socio-economic inequalities and premature mortality, they may also affect individual men's and women's concerns about their own bodies and health status. It is for these reasons that weight management in relation to CVD risk has been identified as a public health priority globally.[11] This emphasises the importance of designing interventions that are acceptable to populations effected by obesity.[12] Such interventions require imaginative solutions that are innovative and capable of baring sustainable services.

Since as early as the mid-1980s, a joint initiative by the Football League (FL) and the Professional Footballers' Association saw the majority of professional football clubs in the country, through their Football in The Community (FITC) departments, delivering mainly coaching-based programmes, with the primary aim of tackling the issue of hooliganism.[13] By the mid-1990s, football's potential had been elevated to be a position as a 'key' deliverer of policy objective for a range of social welfare issues, notable health.[14] This belief for football (alongside sport) was championed (by many with sport, policy-making and politics) in what Perkins (113,[15]) encapsulated as, 'what football … can be used for almost has no bounds these days given the huge public interest in sport'. Despite this widespread belief, there is little empirical evidence to support the role of football and sport in delivering on these key social welfare issues.

Numerous authors argue that there is a lack of robust evidence to support the impact of sport and physical activity on key issues including health and call for more rigorous and sustained testing.[16] Coalter argues further that the outcomes of such sport-based interventions are too vague and/or far too ambitious.[17] This situation appears to be worsened by that fact FITC schemes lack the resources or skill base to collect research and evaluation[18] and the understanding of health improvement.[19] There is strong recommendation for rigorous, controlled evaluations to be conducted on health promotion interventions delivered by professional sport clubs.[20] A body of literature has begun to emerge more recently with authors contributing to the evidence of the role football has in health improvement.

The potential of professional sports organizations to attract participants to participate in a range of health promotion initiatives has been recognized.[21] Through capitalizing on the powerful social and psychological connections to professional football and specific clubs (e.g. loyalty, identity, validation, belonging) that 'being a fan' creates.[22] Using professional sport clubs for weight management,[23] weight loss[24] and more recently as a 'key' deliverer in health improvement policy.[25] This research has mainly focused on the role of football-led health improvement in men. There is little research into the role of football in health improvement in adult women; however, a recreational football-based intervention for women has been shown to be more valuable at developing social capital (than running).[26] This literature continues to support the need for further research and evaluation, which has

been echoed by authors who have called for a culture change in FITC,[27] greater learning and development opportunities for practitioners[28] and the development of meaningful partnerships with higher education departments to improve research and evaluation and practice.[29]

The aims of the present study were to examine whether the FITC lead 'Motivate' programme could significantly improve > 35-year old men and women's cardiovascular risk and to see if there was any significant difference in these changes over time between men and women.

Methods

Participants and settings

Notts County Football in the Community (NCFIT) was established in 1989. NCFIT have a track record of success within FITC having won a FLs Trusts Best Community Initiative for working with young men with mental health issues in 2008, whilst also receiving the Best Community Project for Health in 2010 for their Active Schools initiative (Hindley and Williamson 2013). In response to the City's health inequalities, the 'Motivate' programme was designed by NCFIT, in order to improve cardiovascular health in overweight (BMI ≥ 25 kg m^2) men over 35 years old in Nottingham City. The programme was piloted by NCFITC and developed with the support of researchers from Nottingham Trent University and as a result, was subsequently commissioned by NHS Nottingham city as a service for any overweight adult city resident to take up for reducing their weight.

Participants were volunteers and recruited onto the Motivate programme via a telephone-based lifestyle behaviour change and referral service, provided by NHS Direct and commissioned by Nottingham City Council[30], or via self-referral following a city-wide promotion campaign employed by NCFITC. This included displaying posters in various community sites (e.g. Notts County FC, community centres, workplaces, libraries, pubs, barbers, betting shops), distributing flyers and through media coverage (e.g. local press and radio, use of social media such as twitter).Participants were accepted onto the Motivate programme if they were over the age of 18, classed as overweight (with a BMI of > 25 kg m^2) and permanently lived or worked in the City of Nottingham. Only participants who were 35 + were included in the present study, as this is the population identified as at risk of CVD by the health commissioners and the population most likely to benefit their health.[31] Upon acceptance onto the programme, participants were invited to take part in the present study via an information sheet. Consent was provided by 194 men and 98 women (Table 1; 23% BME). Ethical approval was obtained from the College of Business Law and Social Science Ethics Committee at Nottingham Trent University and all participants consented to their participation in the research.

Intervention context

The Motivate programme is a free 12-week weight loss intervention that aims to encourage and facilitate overweight individuals to increase their levels of physical activity, improve their diet and improve their lifestyle risk factors related to CVD. The service was delivered in community leisure centres across Nottingham City, offering an integrated approach to weight loss. Individual weekly sessions lasting 1.5 h, combining behaviour change and dietary information delivered by NHS dietetics staff (approx. half of the session); and high intensity exercise by NCFITC

Table 1. Mean (±SD) minutes and session percentage of physical activity by category of intensity during six different exercise sessions ($n = 12$).

Week	Physical Activity Intensity							
	Moderate		Vigorous		V. Vigorous		Total MVPA	
	Minutes	%	Minutes	%	Minutes	%	Minutes	%
3	6.19 (2.66)	15.5–17.7	1.54 (0.81)	3.9–4.4	2.36 (1.35)	5.9–6.7	10.08 (4.44)	25.2–28.8
4	8.68 (2.93)	21.7–24.8	5.53 (2.54)	13.8–15.8	6.62 (3.20)	16.6–18.9	20.82 (3.81)	52.0–59.5
5	7.84 (2.89)	19.6–22.4	2.69 (2.45)	6.7–7.7	3.64 (3.11)	9.1–10.4	14.18 (3.20)	35.5–40.5
7	4.81 (1.38)	12.0–13.7	2.62 (0.72)	6.6–7.5	3.99 (1.39)	10.0–11.4	11.42 (2.32)	28.6–32.6
8	8.40 (2.91)	21.0–24.0	4.06 (2.70)	10.2–11.6	6.06 (3.52)	15.2–17.3	18.52 (6.69)	46.3–53.0
9	6.81 (1.75)	17.0–19.5	2.01 (0.20)	5.0–5.7	3.97 (1.03)	9.9–10.8	12.79 (1.67)	32.0–36.5

coaches (a little less than half of the session after transition from classroom to sports hall; 35–40 min), were supplemented by reduced cost membership to leisure services within the City (Figure 1).

The approach to the design, delivery and content of Motivate is similar to that of the Football Fans in Training (FFIT) intervention outlined by Gray et al.[32] Process analysis of the FFIT intervention (a men-only weight management programme delivered through Scottish Premier League (SPL) clubs) revealed that such an approach to a weight loss programme was acceptable to 35–65-year old male participants. However, distinctive from Motivate, the FFIT programme used existing football club coaches(i.e. non-specialists in weight loss) to deliver both the nutrition and behaviour change aspects of the intervention. This aspect of the process evaluation was highlighted as a point for future consideration, as some coaching staff found it difficult to adequately prepare for these sessions; some of the calculations of calorific intake for weight loss proved difficult and therefore some coaches were unable to deliver the sessions as they were intended.[33] To that end, commissioners and the research team felt that using expertise from a commissioned NHS service to deliver this aspect of the Motivate strengthened the programme and in line with recommendations in the NICE guidance.[34]

During the pilot phase of the Motivate programme development, accelerometers were used to determine the intensity of the physical activity accumulated in a sample during the exercise sessions. The same 12 men wore an Actigraphuni-dimensional accelerometer (Model GT1M, ActiGraph, LLC, Fort Walton Beach, FL) on an elastic belt provided by the manufacturer, on the waistband above their right hip, for the duration of the exercise session on six separate occasions (Table 1). Accelerometers

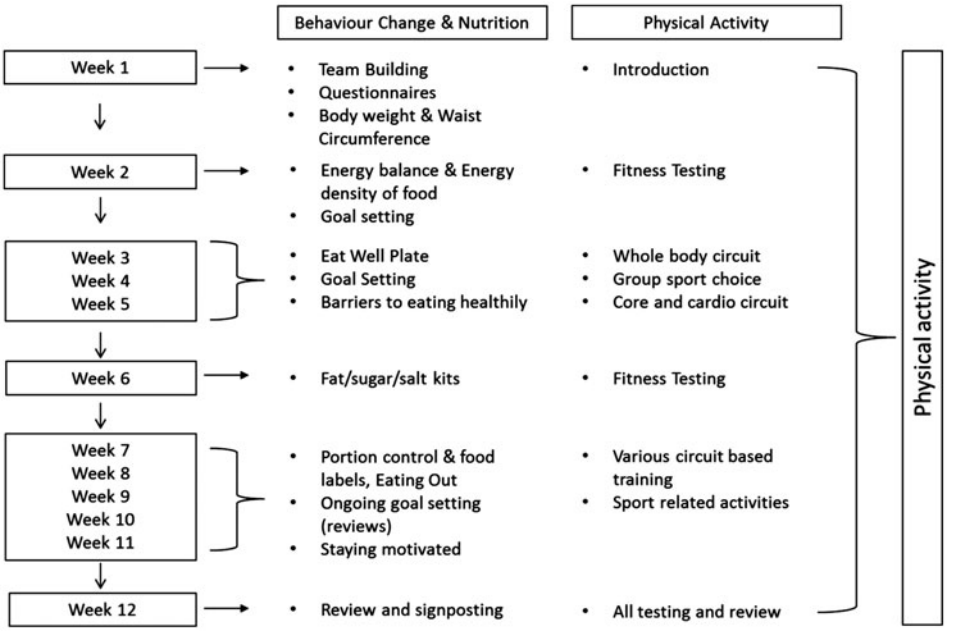

Figure 1. Schematic showing the content of the Motivate 12-week programme including behaviour change, nutrition and physical activity.

were chosen to measure physical activity as they provide a reliable, valid and objective field measure of physical activity.[35] To ensure that high and very high intensity physical activity was captured, 5 s measurement epochs were used.[36] After each session, data were downloaded from the ActiGraph and uploaded to the MAHUffe software (http://www.mrc-epid.cam.ac.uk/Research/PA/Downloads.html) for data reduction. The amount of time the men engaged in moderate, vigorous and moderate-to-vigorous intensity physical activity (MVPA) was calculated using cut-points determined by Freedson et al.[37] As women were only accepted onto the programme following the city-wide roll out of the Motivate, accelerometer data were unavailable for women during the pilot.

As an incentive to increase participants' physical activity beyond the weekly sessions, reduced cost gym memberships (including exercise classes) and courses of free swimming were offered. This incentive aimed to reduce the barrier of cost to participants, many of whom came from deprived communities within the city.[38]

Procedures

All measures (height, weight, BMI, waist circumference and cardiovascular fitness) were performed at week 1 and 12 of the programme within the physical activity sessions and were used as part of the monitoring and goal setting tasks to aid behaviour change within Motivate. Height was measured to the nearest 0.1 cm using a Leicester Height Measure (Birmingham, England[39]), with the participant stood upright and barefoot. Body mass was calculated to the nearest 0.1 kg using Seca weighing scales (Birmingham, England), and Body mass index (BMI) was calculated as $kg \cdot m^2$.

Waist circumference has been acknowledged as a substitute technique for the precise assessment of visceral fat around the abdomen.[40] Welborn and Dhaliwal[41] suggest that waist circumference is superior to BMI in predicting CVD risk, with the World Health Organization's cut-points of 102 cm in men and 88 cm in women used to denote high cadriometabolic risk within normal weight, overweight and obese BMI categories.[42] There are a number of anatomical landmarks used to measure waist circumference such as the umbilicus, the midpoint between the lowest rib and the iliac crest, and just above the iliac crest. In a study by Ross et al.[43] authors demonstrated that each of these waist circumference landmarks was equally effective in identifying all-cause mortality, CVD and diabetes risk. In order to maximise the reliability of the measurement across the different measurement sights, NCFITC coaches were trained in measuring waist circumference at the umbilicus to the nearest 0.1 cm, directly on the landmarked skin with a flexible, inelastic measuring tape.[44]

During the pilot phase of the 'Motivate' development, the Multi Stage Fitness Test was used as a submaximal estimate of cardiovascular fitness in men. However, due to the limited fitness of participants, many were unable complete the first shuttle of the test and it was observed and reported that this 'failure' had a negative effect on participants' self-confidence and was attributed to a number of individuals dropping out of the programme. While demonstrating that the programme was targeting those most at need of intervention, upon review, it was considered that a walking test would be a more inclusive and appropriate means of providing an estimate of cardiovascular fitness and indeed functional capacity.[45] The 6 Minute Walk Test (6MWT) was chosen because of its adaptability and acceptability.[46] In this case, it was easier to administer, better tolerated and better reflects activities of daily living than other walk tests performed in similar populations.[47]

To standardize the 6 min walk across each of the Motivate delivery sites, the leisure centre sports hall area was used and a 25 m track was marked out using plastic cones. Participants were required to complete as many laps of a 25 m track during the 6 min as possible, picking up a counter after each 4 lap cycle. Standardized encouragement was provided during the 6 min walk as follows:

- At minute one: 'One minute gone. Well done!'
- At minute two: 'Two minutes done. You're doing well – keep it up!'
- At minute three: 'Half way point. Three minutes remaining. Really well done!'
- At minute four: 'Last two minutes. You're doing well – keep it up!'
- At minute five: 'One minute remaining. Keep it up, you've done so well!'

At the end of the 6 min, participants were asked to stop and stand still. A tape measure was used to measure the distance from where each individual stopped in relation to the end of the lap. The distance was added to the distance denoted by the number of cones collected to calculate the total distance covered.

Statistical analysis

All data were first checked for normality using the Shapiro-Wilk test and any outliers were checked for faulty measurement. To examine whether there was a significant change in CVD risk by gender, 2-way repeated measures Analysis of Variance (ANOVA) were conducted for body mass, waist circumference and 6 min walk distance. Greenhouse-Geisser correction factors were applied where appropriate. All analyses were conducted using IBM SPSS Statistics 19 (IBM Corp.: Armonk, NY) and statistical significance was set to $p < 0.05$. The number of men and women meeting the criterion of 5% weight loss were also calculated.

Results

Table 2 demonstrates the mean (±SD) CVD risk factor scores for men and women at weeks 1 and 12 of the programme. Shapiro-Wilk analyses revealed that all data were normally distributed ($p > 0.05$). The 2-way repeated measures ANOVAs revealed a significant improvement in body weight ($F_{(1,147)} = 178.13$, $p = 0.000$), waist circumference ($F_{(1,129)} = 110.58$, $p = 0.000$) and cardiovascular fitness ($F_{(1,\ 94)} = 22.07$, $p = 0.000$) over time. Men were significantly heavier ($F_{(1,147)} = 9.91$, $p = 0.002$), had significantly larger waist circumferences ($F_{(1,94)} = 19.48$, $p = 0.000$) and covered significantly more meters during the 6 min walk test than women. However, no significant interaction was found between time and gender for any of the CVD risk factors, suggesting that the programme was as effective for both men and women.

Ten per cent of men and 18% of women were classified as overweight (90% and 82% classed as obese, respectively) at the beginning of the programme. While 25% men remained overweight, the percentage of men classified as obese reduced to 75% at the end of 12 weeks. Three women were able to reduce their BMI to become normal weight, with fewer classified as overweight (15%) and obese (78%) at the end of the programme. Forty-nine per cent of men ($n = 50$) and 37% of women ($n = 17$) who completed the 12-week programme achieved the target 5% weight loss. On

Table 2. Mean (±SD) anthropometric and CVD risk factor measures of men and women who took part in the Motivate programme.

	Men			Women		
	N	Week 1	Week 12	*N*	Week 1	Week 12
Age (years)	194	52.28 (9.74)	–	98	51.19 (9.04)	–
Height (m)	98	1.75 (0.07)	–	40	1.62 (0.07)	–
Weight (kg)	98	106.05 (17.07)*	101.09 (16.09)†	40	96.38 (17.88)*	92.11 (16.85)†
BMI (kg m^2)	98	35.27 (4.67)	33.44 (4.10)	40	36.77 (7.44)	35.12 (6.98)
Waist Circumference (cm)	92	116.89 (12.59)*	110.60 (12.06)†	39	111.23 (12.69)*	105.33 (12.06)†
6 Minute Walk (m)	64	773.30 (168.06)*	843.52 (149.96)†	32	661.14 (113.60)*	696.43 (109.19)†

*Denotes a significant main effect for gender $p < 0.05$. †Denotes a significant main effect for time $p < 0.01$.

average, men and women reduced their waist circumference by and 6.2 cm and 5.9 cm and improved the distance covered during the 6 min walk by 70.22m and 35.29 m, respectively.

Discussion

The aims of this study were to examine whether the FITC delivered Motivate weight management programme could significantly improve > 35-year old men and women's CVD risk and to determine if there was any significant difference in health risk improvement between men and women. The findings of the study show that the 12-week intervention, funded by a city council's Public Health Grant, delivered in partnership in the community was successful in achieving significant improvements in body weight, waist circumference and cardiovascular fitness in both men and women with a BMI over 25 kg m^2.

The key performance indicator of the Motivate programme from a commissioning point of view was that participants should reduce their body weight by 5% by the end of the programme. While there was a significant reduction in body mass over the 12 weeks ($p = 0.000$; 5.04 kg in men, 4.62 kg in women), 49% of men and 37% of women achieved this target. These results were less than the desired outcome set by commissioners at the outset of funding, but similar weight loss has been reported in professional Rugby settings,[48] and more recently by Hunt et al., who's RCT of the gender-sensitised FFIT healthy living programme reported 47% of men achieving a 5% weight loss.[49] When examining mean weight loss percentage, authors determined that the 4.97% weight loss of their participants was likely to be clinically beneficial. To that end, participants in the present study may also have experienced a clinical benefit to their weight loss (4.68% in men and 4.43% in women). Because of the novelty of this type of intervention for women, comparative data are unavailable. However, in an examination of a range of commercial- and primary care-led weight reduction programmes, Jolly et al. found that weight loss in women over a 12-week intervention ranged from 1.4 (±4.1 kg) and 4.4 (±4.3 kg), suggesting that women in the present study were as successful (4.27 kg) in reducing their body weight.[50] While there was not a significant reduction in BMI, 15% of men moved from the obese to a lower risk category (overweight; 4% of women) and three women were able to move from the overweight to normal weight category, significantly reducing their CVD risk.

Understanding why participants may have struggled to reduce their overall body weight is important, especially when interpreting the success of the programme for individuals and ultimately, the commissioner. Indeed, one of the possible reasons could be that participants demonstrated an overall increase in lean mass, which would underestimate weight loss. One for the possible reasons identified for this was the intensity of the physical activities performed during the exercise sessions. Accelerometer measured intensity of the physical activity sessions demonstrated that on average, half of the time spent in MVPA was of at least a vigorous intensity. This is supported by Randers et al. in their study exploring the activity profile and physiological response to football training for untrained males and females.[51] Authors demonstrated that small-sided football had the potential to create physiological adaptations and improve performance with regular training.[52] Furthermore, in their study on the physiological improvements of untrained premenopausal women undergoing a 16-week recreational football intervention, Bangsbo et al. also demonstrated that

as with men, women were able to increase their muscle strength, lean mass and fitness.[53] Another stimulus for the possible improvement of lean mass in Motivate participants could be the enrolment of individuals to discounted leisure facilities offered by the local authority.

A different measure of body fatness and a more accurate measure of the distribution of fat is waist circumference.[54] Waist circumference is an independent risk factor for CVD as it represents visceral fat stored in the abdomen.[55] Abdominal fat stores occur primarily in men and are likely to be more reactive than peripheral fat stores on the basis of lipolytic activity.[56] Jensky et al. demonstrated that a standard deviation increment in the ratio of abdominal fat is significantly associated with significant increases in thoracic artery calcification[57] and in large meta analyses have demonstrated that measures of central adiposity and not BMI are significantly related to cardiovascular mortality.[58] Furthermore, research by Fujioka et al., in their study of effects of reducing intra-abdominal adiposity on glucose and lipid metabolism following a low calorie diet, found that women reduced their visceral fat to a greater extent than abdominal subcutaneous fat and that this was associated with significant metabolic improvements, when controlling for adipose tissue volume.[59] Results from the present study show a significant reduction in waist circumference over the 12 weeks, with men losing on average 6.29 and women 5.90 cm, suggesting that participants on the Motivate programme are likely to have significant metabolic improvements.

When considering waist circumference as a possible performance indicator of weight loss programmes, Egger and Dobson suggest that a 1 cm waist loss within men was equivalent to an average weight loss of approximately 0.75 kg.[60] They recommend that neither weight nor waist circumference alone is sufficient to provide a true reflection of fat loss in men. Indeed, the use of both these measures may be necessary at different stages of a programme to get a true indication of relative success in men and women, although the greater emphasis may still be put on the more potentially dangerous abdominal fat stores through waist circumference measures. Since paradoxical weight changes are more likely to occur in the early stages of a programme, research has shown that after baseline weight and waist measurements are taken, weight should not be measured again for some time, possibly 4 ± 6 weeks for best results.[61] An exception to this may be as a check where no waist loss appears to be occurring in this time. Use of both weight and waist measures in the sequence allows for individual variations in the reactivity of fat depots between men and women and may also support individuals with their weight loss goals, especially if no change is seen in relation to weight loss.

Another independent risk factor for CVD is cardiovascular fitness.[62] During the 12 weeks, participants significantly increased the distance covered in the 6 min walk, with men covering 70.22 m and women 35.29 m on average. While the 6 min walk is a somewhat crude estimate of cardiovascular fitness, it is sensitive enough to detect change over time. Most other studies have looked at football specific fitness tests such as the YoYo test[63] or a VO_{2max} test. The 6 min walk allows non-experts collect fitness data in the field with minimal and non-specialist equipment.[64] Furthermore, Enright suggests that the minimum clinically important difference (i.e. improvement) in the distance walked in a 6MWT has been estimated as 54 m (with 95% confidence limits of 37 to 71 m),[65] suggesting that men on the Motivate programme were able to increase their cardiovascular fitness to a level that would clinically improve their health. This improvement may be more important to health as

well as from a motivational point of view when thinking about maintenance. As suggested by Egger and Dobson, people need to feel they are progressing even if progress falls short of the guidelines and it is therefore important to view change as a process requiring ongoing support.[66] Using feedback such as fitness improvements and waist circumference reduction may act as such.[67] To that end, follow on exit routes like the leisure card are important, especially in the maintenance of any weight loss or behaviour change post intervention.

Football remains a popular activity with men in health improvement programmes.[68] Indeed, in this intervention males were plentiful and not hard-to-engage, when recruitment was focused on their interests and delivered in non-clinical settings. While it has been reported that the complex lives of the participants can hinder retention in football-based interventions, the engagement and positive changes observed suggest that this project was able to overcome such barriers with the participants.[69] Activities were packaged in the male friendly language, which promoted sport and fitness as opposed to health. Further activities were delivered in local community venues vs. clinical settings which have been shown to be important in reaching men.[70] The successful engagement of women within the intervention is a unique and interesting finding, as there is very little research concerning this in health improvement interventions delivered by professional football clubs. Whilst gender-specific interventions have attracted 'non-fans',[71] suggesting other outcomes other than the draw of the football club may be influential in engaging 'non-fans'. The attraction of women suggests others factors may be in play. In fact, women's participation in football has increased exponentially over the past 15 years and it has overtaken netball as England's most popular female sport. There is a growing consensus belief that women and girls are gaining greater prominence in football culture and it is becoming a more normalised part of many girls' lives.[72] Consideration must be given to whether participating in football, a sport recognized as male,[73] can provide girls with the opportunity to resist traditional gender norms and perform alternative scripts of femininity.[74] This particular finding requires further research to better understand gendered identity and female participation in football club-based health improvement interventions.

Limitations and strengths

Compared to studies such as that of Hunt et al.[75] the sample size in the present study is relatively small with a high dropout rate (compared to the number of people who first enrolled onto the programme). Despite this, the population reflects the true nature of the intervention taken place in a real-world setting. While no process data were reported in this instance, qualitative data were captured from a sample of men from Motivate and will be used to better understand the reasons for dropout to help inform future programmes. However, due to the focus of the study, no process data were obtained from women and future research should include this to better understand women's reasons for engaging in a traditionally male-orientated programme. A number of studies have shown this context to be successful in improving health risk factors in men, but to the authors' knowledge, this is the first to evaluate a programme aimed to target men and women.

In terms of commissioners expectations, but in line with similar studies, there were relatively low numbers meeting 5% target (especially women), but this may be due to an increase in lean mass as a result of the high-intensity exercise programme.

In addition, despite training being provided by researchers, there may have been possible issues with measurement error associated with inexperienced and multiple testers.

Conclusion

Innovative and inclusive weight loss interventions designed and lead by Football in the Community and supported by a multidisciplinary team can be successful in significantly reducing body weight and waist circumference, improving cardiovascular fitness and reducing cardiovascular risk in overweight adults over 35 years old. The present study provides support to previous studies that have shown FITC lead programmes to improve health in men, but is the first to demonstrate that they can be as effective in women and in an inclusive mixed gender setting. When combining behaviour change, dietary information and high intensity exercise in a weight loss programme to reduce cardiovascular risk, commissioners should look beyond a 5% weight loss as the main measure of success of a programme, as body weight alone is unlikely to provide an accurate assessment of cardiovascular risk change. Future research should examine the reasons why women attend football-lead weight loss programmes and the possible impact of mixed exercise and dietary advice-based weight loss sessions on men and women's attendance and retention.

Acknowledgements

Notts County Football in the Community.

Notes

1. World Health Organization, *Global Strategy on Diet, Physical Activity and Health*.
2. Gortmaker et al., 'Changing the Future of Obesity: Science, Policy, and Action'.
3. International Association for the Study of Obesity, *International Obesity Taskforce Prevalence Data*.
4. NHS Information Centre, *Health Survey for England -2008 Trend Tables*.
5. Foresight, *The Foresight Report, Tackling Obesities: Future Choices – Modelling Future Trends in Obesity and the Impact on Health*.
6. Nottingham City Council, *Nottingham City JSNA Adult Obesity Chapter.*
7. Nottingham City Council, *Nottingham City JSNA Adult Obesity Chapter.*
8. Haslam and James, 'Obesity'; Ezzati et al., 'Selected Major Risk Factors and Global and Regional Burden of Disease'; Brown et al., 'Physical Activity and All-cause Mortality in Older Women and Men'.
9. Kopelman, 'Health Risks Associated with Overweight and Obesity'.
10. Logue et al., 'Management of Obesity: Summary of SIGN Guideline'.
11. Kahn et al., 'The Impact of Prevention on Reducing the Burden of Cardiovascular Disease'; Wang et al., 'Health and Economic Burden of the Projected Obesity Trends in the USA and the UK'.
12. Conn, Hafdahl, and Mehr, 'Interventions to Increase Physical Activity among Healthy Adults: Meta-analysis of Outcomes'; Gray et al., 'Football Fans in Training: The Development and Optimization of an Intervention Delivered Through Professional Sports Clubs to Help Men Lose Weight Become More Active and Adopt Healthier Eating Habits'; Pringle et al., 'Effect of a National Programme of Men's Health Delivered in English Premier League Football Clubs'.
13. Walters and Chadwick, 'Corporate Citizenship in Football: Delivering Strategic Benefits Through Stakeholder Engagement'; Anagnostopoulos and Shilbury, 'Implementing Corporate Social Responsibility in English Football: Towards Multi-theoretical Integration'.

14. Department for Culture, Media and Sport, *Report to the Social Exclusion Unit – Arts and Sports*; Mellor, 'Politics, Theory and Practice: "The Janus-faced Sport" English Football Community and Legacy of the "Third Way"'; Tacon, 'Football and Social Inclusion: Evaluating Social Policy'; Coalter, 'Sports Clubs, Social Capital and Social Regeneration: "Ill-defined Interventions with Hard to Follow Outcomes?"'; Bloyce and Smith, *Sport Policy and Development: An Introduction*.
15. Perkins, 'Exploring Future Relationships Between Football Clubs and Local Government'.
16. Collins and Kay, *Sport and Social Exclusion*; Spaaij, 'The Social Impact of Sport: Diversities, Complexities and Contexts'; Priest et al., 'Policy Interventions Implemented Through Sporting Organisations for Promoting Healthy Behaviour Change'.
17. Priest et al., 'Policy Interventions Implemented Through Sporting Organisations for Promoting Healthy Behaviour Change'.
18. McGuire and Fenoglio, *Football in the Community: Resources and Opportunities*; Nichols, *Sport and Crime Reduction: The Role of Sports in Tackling Youth Crime*; Parnell et al., 'Football in the Community Schemes: Exploring the Effectiveness of an Intervention in Promoting Positive Healthful Behaviour Change'.
19. Parnell et al., *Implementing Monitoring and Evaluation' Techniques within a Premier League Football in the Community Programme: A Case Study Involving Everton in the Community.*
20. Priest et al., 'Interventions Implemented Through Sporting Organisations for Increasing Participation in Sport'; 'Policy Interventions Implemented Through Sporting Organisations for Promoting Healthy Behaviour Change'.
21. Gray et al., 'Football Fans in Training: The Development and Optimization of an Intervention Delivered Through Professional Sports Clubs to Help Men Lose Weight Become More Active and Adopt Healthier Eating Habits'; Witty and White, *The Tackling Men's Health Evaluation Study*; Pringle, 'The Growing Role of Football as a Vehicle for Interventions in Mental Health Care'; Pringle et al., 'The Pre-adoption Demographic and Health Profiles of Men Participating in a Programme of Men's Health Delivered in English Premier League Football Clubs'; Brady et al., 'Sustained Benefits of a Health Project for Middle Aged Football Supporters at Glasgow Celtic and Glasgow Rangers Football Clubs'.
22. Hirt and Clarkson, 'The Psychology of Fandom: Understanding the Etiology, Motives, and Implications of Fanship'.
23. Witty and White, 'The Tackling Men's Health Evaluation Study'; Brady et al., 'Sustained Benefits of a Health Project for Middle Aged Football Supporters at Glasgow Celtic and Glasgow Rangers Football Clubs'.
24. Brady et al., 'Sustained Benefits of a Health Project for Middle Aged Football Supporters at Glasgow Celtic and Glasgow Rangers Football Clubs'.
25. Pringle, McKenna, and Zwolinsky, 'Health Improvement and Professional Football: Players on the Same Side'.
26. Ottesen, Jeppesen, and Krustrup, 'The Development of Social Capital Through Football and Running: Studying an Intervention Program for Inactive Women'.
27. Coalter, *Realising the Potential of Cultural Services: The Case for Sport.*
28. Hindley and Williamson, *Measuring and Evaluating Community Sport Projects: Notts County Football in the Community.*
29. Parnell et al., *Implementing Monitoring and Evaluation' Techniques within a Premier League Football in the Community Programme: A Case Study Involving Everton in the Community.*
30. Wilcox, Doherty, and Thompson, *Evaluation of Healthy Change – A Telephone Based Behaviour Change Service to Address CVD Risk Factors*.
31. Grey et al., 'Football Fans in Training: The Development and Optimization of an Intervention Delivered Through Professional Sports Clubs to Help Men Lose Weight Become More Active and Adopt Healthier Eating Habits'.
32. Gray et al., 'Football Fans in Training: The Development and Optimization of an Intervention Delivered Through Professional Sports Clubs to Help Men Lose Weight Become More Active and Adopt Healthier Eating Habits'.

33. Gray et al., 'Football Fans in Training: The Development and Optimization of an Intervention Delivered Through Professional Sports Clubs to Help Men Lose Weight Become More Active and Adopt Healthier Eating Habits'; Parnell et al., 'Football in the Community Schemes: Exploring the Effectiveness of an Intervention in Promoting Positive Healthful Behaviour Change'.
34. National Institute of Health and Clinical Excellence, *The Most Appropriate Means of Generic and Specific Interventions to Support Attitude Behavioural Change at Population and Community Levels*.
35. Nichols et al., 'Validity, Reliability, and Calibration of the Tritrac Accelerometer as a Measure of Physical Activity'; Brage et al. 'Re-examination of Validity and Reliability of the CSA Monitor in Walking and Running'; Trost, Mciver, and Pate, 'Conducting Accelerometer-based Activity Assessments in Field-based Research'; Welk, 'Principles of Design and Analyses for the Calibration of Accelerometry-based Activity Monitors'.
36. Welk, 'Principles of Design and Analyses for the Calibration of Accelerometry-based Activity Monitors'.
37. Freedson, Melanson, and Sirard, 'Calibration of the Computer Science and Applications, Inc. Accelerometer'.
38. Nottingham City Council, *Nottingham City JSNA Adult Obesity Chapter*; Seefeldt, Malina and Clark, 'Factors Affecting Levels of Physical Activity in Adults'.
39. Lohman, Roche, and Martorell, *Anthropometric Standardization Reference Manual*.
40. Janssen et al., 'Body Mass Index and Waist Circumference Independently Contribute to the Prediction of, Abdominal Subcutaneous and Visceral Fat'; Bigaard et al., 'Influence if Lifestyle Aspects on the Association of Body Size and Shape with All-cause Mortality in Middle Aged Men and Women'; Dagan et al., 'Waist Circumference vs. Body Mass Index in Association with Cardiorespiratory Fitness in Healthy Men and Women: A Cross Sectional Analysis of 403 Subjects'.
41. Welborn and Dhaliwal, 'Preferred Clinical Measures of Central Obesity for Predicting Mortality'.
42. Ness-Abramof and Apovian, 'Waist Circumference Measurement in Clinical Practice'.
43. Ross et al., 'Does the Relationship Between Waist Circumference, Morbidity and Mortality Depend on Measurement Protocol for Waist Circumference?'.
44. Ross et al., 'Does the Relationship Between Waist Circumference, Morbidity and Mortality Depend on Measurement Protocol for Waist Circumference?'.
45. Solway et al., 'A Qualitative Systematic Overview of the Measurement Properties of Functional Walk Tests used in the Cardiorespiratory Domain'.
46. Pringle, McKenna, and Zwolinsky, 'Health Improvement and Professional Football: Players on the Same Side'.
47. Enright, 'The 6 Minute Walk Test'.
48. Witty and White, *The Tackling Men's Health Evaluation Study*; Brady et al., 'Sustained Benefits of a Health Project for Middle Aged Football Supporters at Glasgow Celtic and Glasgow Rangers Football Clubs'.
49. Hunt et al., 'A Gender-sensitised Weight Loss and Healthy Living Programme for Overweight and Obese Men Delivered by Scottish Premier League Football Clubs (FFIT): A Pragmatic Randomised Controlled Trial'.
50. Jolly et al., 'Comparison of Range of Commercial or Primary Care Led Weight Reduction Programmes with Minimal Intervention Control for Weight Loss in Obesity: Lighten Up Randomised Controlled Trial'.
51. Randers et al., 'Activity Profile and Physiological Response to Football Training for Untrained Males and Females, Elderly and Youngsters: Influence of the Number of Players'.
52. Randers et al., 'Activity Profile and Physiological Response to Football Training for Untrained Males and Females, Elderly and Youngsters: Influence of the Number of Players'.
53. Bangsbo et al., 'Performance Enhancements and Muscular Adaptations of a 16-week Recreational Football Intervention for Untrained Women'.
54. Bangsbo et al., 'Performance Enhancements and Muscular Adaptations of a 16-week Recreational Football Intervention for Untrained Women'.

55. Janssen et al., 'Body Mass Index and Waist Circumference Independently Contribute to the Prediction of, Abdominal Subcutaneous and Visceral Fat'.
56. Brown, 'Waist Circumference in Primary Care'; Egger and Dobson, 'Clinical Measures of Obesity and Weight Loss in Men'.
57. Jensky et al., 'The Association Between Abdominal Body Composition and Vascular Calcification'.
58. Czernichow et al., 'Body Mass Index, Waist Circumference and Waist–hip Ratio: Which is the Better Discriminator of Cardiovascular Disease Mortality Risk? Evidence from an Individual-participant Meta-analysis of 82 864 participants from nine cohort studies'.
59. Fujioka et al., 'Improvement of Glucose and Lipid Metabolism Associated with Selective Reduction Of Intra-Abdominal Visceral Fat in Premenopausal Women with Visceral Fat Obesity'.
60. Brown,'Waist Circumference in Primary Care'; Egger and Dobson, 'Clinical Measures of Obesity and Weight Loss in Men'.
61. Brown,'Waist Circumference in Primary Care'; Egger and Dobson, 'Clinical Measures of Obesity and Weight Loss in Men'.
62. Fujioka et al., 'Improvement of Glucose and Lipid Metabolism Associated with Selective Reduction of Intra-abdominal Visceral Fat in Premenopausal Women with Visceral Fat Obesity'.
63. Jolly et al., 'Comparison of Range of Commercial or Primary Care Led Weight Reduction Programmes with Minimal Intervention Control for Weight Loss in Obesity: Lighten Up Randomised Controlled Trial'.
64. Solway et al., 'A Qualitative Systematic Overview of the Measurement Properties of Functional Walk Tests Used in the Cardiorespiratory Domain'.
65. Solway et al., 'A Qualitative Systematic Overview of the Measurement Properties of Functional Walk Tests Used in the Cardiorespiratory Domain'.
66. Egger and Dobson, 'Clinical Measures of Obesity and Weight Loss in Men'.
67. Brown, 'Waist Circumference in Primary Care'; Egger and Dobson, 'Clinical Measures of Obesity and Weight Loss in Men'.
68. Gray et al., 'Football Fans in Training: The Development and Optimization of an Intervention Delivered Through Professional Sports Clubs to Help Men Lose Weight Become More Active and Adopt Healthier Eating Habits'; Pringle et al., 'Effect of a National Programme of Men's Health Delivered in English Premier League Football Clubs.'
69. Fitzgerald et al., 'Muscular Fitness and All-cause Mortality: Prospective Observations'.
70. Gray et al., 'Football Fans in Training: The Development and Optimization of an Intervention Delivered Through Professional Sports Clubs to Help Men Lose Weight Become More Active and Adopt Healthier Eating Habits'; Pringle et al., 'Effect of a National Programme of Men's Health Delivered in English Premier League Football Clubs'.
71. Pringle et al., 'Effect of a National Programme Of Men's Health Delivered in English Premier League Football Clubs.'
72. Sherry, '(Re)engaging Marginalized Groups Through Sport: The Homeless World Cup'.
73. Caudwell, 'Women's Experiences of Sexuality Within Football Contexts: A Particular and Located Footballing Epistemology'.
74. Scraton et al., 'It's Still a Man's Game?' The Experiences of Top Level European Women Footballers'; Butler, *Gender Trouble*.
75. Hunt et al., 'A Gender-sensitised Weight Loss and Healthy Living Programme for Overweight and Obese Men Delivered by Scottish Premier League Football Clubs (FFIT): A Pragmatic Randomised Controlled Trial'.

References

Anagnostopoulos, C., and D. Shilbury. 'Implementing Corporate Social Responsibility in English Football: Towards Multi-theoretical Integration'. *Sport, Business and Management: An International Journal* 3 (2013): 268–84.

Bangsbo, J., J.J. Nielsen, M. Mohr, M.B. Randers, B.R. Krustrup, J. Brito, L. Nybo, and P. Krustrup. 'Performance Enhancements and Muscular Adaptations of a 16-week Recreational Football Intervention for Untrained Women'. *Scandinavian Journal of Medicine & Science in Sports* 20 (2010): 24–30.

Bigaard, J., J. Christensen, A. Tjønneland, Birthe Lykke Thomsen, K. Overvad, and T.I.A. Sørensen. 'Influence of Lifestyle Aspects on the Association of Body Size and Shape with All-cause Mortality in Middle-aged Men and Women'. *Obesity Facts* 3 (2010): 252–60.

Bloyce, D., and A. Smith. *Sport Policy and Development: An Introduction*. London: Routledge, 2010.

Brady, A., C. Perry, D. Murdoch, and G. McKay. 'Sustained Benefits of a Health Project for Middle Aged Football Supporters at Glasgow Celtic and Glasgow Rangers Football Clubs'. *European Heart Journal* 24 (2010): 2696–98.

Brage, S., N. Wedderkopp, P.W. Franks, L.B. Andersen, and K. Froberg. 'Reexamination of Validity and Reliability of the CSA Monitor in Walking and Running'. *Medicine & Science in Sports & Exercise* 35 (2003): 1447–54.

Brown, P. 'Waist Circumference in Primary Care'. *Primary Care Diabetes* 3 (2009): 259–61.

Brown, W.D., D. McLaughlin, J. Leung, K. A. McCaul, L. Flicker, O. P. Almeida, G. J. Hankey, D. Lopez, and A. Dobson. 'Physical Activity and All-cause Mortality in Older Women and Men'. *British Journal of Sports Medicine* 46 (2012): 664–8.

Butler, J. *Gender Trouble*. New York: Routledge, 1990.

Caudwell, J. 'Women's Experiences of Sexuality within Football Contexts: A Particular and Located Footballing Epistemology'. *Football Studies* 5 (2002): 24–45.

Coalter, F. *Realising the Potential of Cultural Services: The Case for Sport*. London: LGA Publications, 2001.

Coalter, F. 'Sports Clubs, Social Capital and Social Regeneration: 'Ill-defined Interventions with Hard to Follow Outcomes'?' *Sport in Society* 10 (2007): 37–559.

Collins, M., and T. Kay. *Sport and Social Exclusion*. London: Routledge, 2003.

Conn, V., A. Hafdahl, and D. Mehr. 'Interventions to Increase Physical Activity among Healthy Adults: Meta-analysis of Outcomes'. *American Journal of Public Health* 101 (2011): 751–8.

Czernichow, S., A.-P. Kengne, E. Stamatakis, M. Hamer, and G.D. Batty. 'Body Mass Index, Waist Circumference and Waist–Hip Ratio: Which is the Better Discriminator of Cardiovascular Disease Mortality Risk? Evidence from an Individual-Participant Meta-Analysis of 82 864 Participants from Nine Cohort Studies'. *Obesity Reviews* 12 (2011): 680–7.

Dagan, S.S., S. Segev, I. Novikov, and R. Danker. 'Waist Circumference vs. Body Mass Index in Association with Cardiorespiratory Fitness in Healthy Men and Women: A Cross Sectional Analysis of 403 Subjects'. *Nutritional Journal* 12 (2013): 12–20.

Department for Culture, Media and Sport. *Report to the Social Exclusion Unit – Arts and Sports*. London: HMSO, 1999.

Egger, G., and A. Dobson 'Clinical Measures of Obesity and Weight Loss in Men'. *International Journal of Obesity* 24 (2000): 354–7.

Enright, P.L. 'The 6 Minute Walk Test'. *Respiratory Care* 48 (2003): 783–5.

Ezzati, M., A.D. Lopez, A. Rodgers, S. Vander Hoorn, and C.J. Murray. 'Selected Major Risk Factors and Global and Regional Burden of Disease'. *The Lancet* 360 (2002): 1347–60.

Fitzgerald, S.J., C.E. Barlow, J.B. Kampert, R.R. Morrow, A.W. Jackson, and S.N. Blair. 'Muscular Fitness and All-cause Mortality: Prospective Observations'. *Journal of Physical Activity & Health* 1 (2002): 7–18.

Foresight. *The Foresight Report, Tackling Obesities: Future Choices – Modelling Future Trends in Obesity and the Impact on Health*. London: Department for Innovation, Universities and Skills, 2007.

Freedson, P.S., E. Melanson, and J. Sirard. 'Calibration of the Computer Science and Applications, Inc. Accelerometer'. *Medicine & Science in Sports & Exercise* 30 (1998): 777–81.

Fujioka, S., Y. Matsuzawa, K. Tokunaga, T. Kawamoto, T. Kobatake, Y. Keno, K. Kotani, S. Yoshida, and S. Tarui. 'Improvement of Glucose and Lipid Metabolism Associated with Selective Reduction of Intra-abdominal Visceral Fat in Premenopausal Women with Visceral Fat Obesity'. *International Journal of Obesity* 15 (1991): 853–9.

Gortmaker, S., B.A. Swinburn, D. Levy, R. Carter, P.L. Mabry, D.T. Finegood, T. Huang, T. Marsh, and M.J. Moodie. 'Changing the Future of Obesity: Science, Policy, and Action'. *The Lancet* 378 (2011): 838–47.

Gray, C.M., K. Hunt, N. Mutrie, A.S. Anderson, J. Leishman, L. Dalgarno, and S. Wyke. 'Football Fans in Training: The Development and Optimization of an Intervention Delivered Through Professional Sports Clubs to Help Men Lose Weight, Become More Active and Adopt Healthier Eating Habits'. *BMC Public Health* 13 (2013): 232–49.
Haslam, D.W., and W.P. James. 'Obesity'. *The Lancet* 366 (2005): 1197–209.
Hindley, D., and D. Williamson. 'Measuring and Evaluating Community Sports Projects: Notts County Football in the Community'. In *Routledge Handbook of Sport and Corporate Social Responsibility*, ed. J.L. Paramio-Salcines, K. Babiak, and G. Walters. London: Routledge, 2013.
Hirt, E.R., and J.J. Clarkson. 'The Psychology of Fandom: Understanding the Etiology, Motives, and Implications of Fanship'. In *Consumer Behavior Knowledge for Effective Sports and Event Marketing*, ed. L.R. Kahle and A.G. Close, 59–85. New York: Routledge, 2010.
Hunt, K., S. Wyke, C.M. Gray, A.S. Anderson, A. Brady, C. Bunn, P.T. Donnan, et al. 'A Gender-sensitised Weight Loss and Healthy Living Programme for Overweight and Obese Men Delivered by Scottish Premier League Football Clubs (FFIT): A Pragmatic Randomised Controlled Trial'. *The Lancet* 383 (2014): 1211–21.
International Association for the Study of Obesity. *International Obesity Taskforce Prevalence Data*. IOFT. http://www.ioft.org/database/index.asp.
Janssen, I., S.B. Heymsfield, D.B. Allison, D.P. Kotler, and R. Ross. 'Body Mass Index and Waist Circumference Independently Contribute to the Prediction of Abdominal Subcutaneous and Visceral Fat'. *American Journal of Clinical Nutrition* 75 (2002): 683–8.
Jensky, N.E., M.H. Criqui, C.M. Wright, C.L. Wassel, J.E. Alcaraz, and M.A. Allison. 'The Association Between Abdominal Body Composition and Vascular Calcification'. *Obesity* 19 (2011): 2418–24.
Jolly, K., A. Lewis, J. Beach, J. Denley, P. Adab, J.J. Deeks, A. Daley, and P. Aveyard. 'Comparison of Range of Commercial or Primary Care Led Weight Reduction Programmes with Minimal Intervention Control for Weight Loss in Obesity: Lighten up Randomised Controlled Trial'. *British Medical Journal* (2011): 343–59.
Kahn, R., R.M. Robertson, R. Smith, and D. Eddy. 'The Impact of Prevention on Reducing the Burden of Cardiovascular Disease'. *Circulation* 118 (2008): 576–85.
Kopelman, P. 'Health Risks Associated with Overweight and Obesity'. *Obesity Reviews* 8, no. s1 (2007): 13–7.
Logue, J., L. Thompson, F. Romanes, D.C. Wilson, J. Thompson, and N. Sattar. 'Management of Obesity: Summary of SIGN Guideline'. *British Medical Journal* 340 (2010): c154.
Lohman, T.G., A.F. Roche, and R. Martorell, eds. *Anthropometric Standardization Reference Manual*. Champaign, IL: Human Kinetics, 1988. http://www.bmj.com/content/340/bmj.c154
McGuire, B., and R. Fenoglio. *Football in the Community: Resources and Opportunities*. Manchester Metropolitan University, Department of Exercise and Sport Science, 2004.
Mellor, G. '"The Janus-faced Sport": English Football, Community and the Legacy of the "Third Way"'. *Soccer & Society* 9 (2008): 313–24.
National Institute of Health and Clinical Excellence. *The Most Appropriate Means of Generic and Specific Interventions to Support Attitude Behavioural Change at Population and Community Levels*. London: National Institute of Health and Clinical Excellence, 2007.
Ness-Abramof, R., and C.M. Apovian. 'Waist Circumference Measurement in Clinical Practice'. *Nutrition in Clinical Practice* 23 (2008): 397–404.
NHS Information Centre. *Health Survey for England-2008 Trend Tables*. NHS. http://www.ic.nhs.uk/statistics-and-data-collections/health-and-lifestyles-related-surveys/health-survey-for-england/health-survey-for-england–2008-trend.
Nichols, G. *Sport and Crime Reduction: The Role of Sports in Tackling Youth Crime*. London: Routledge, 2007.
Nichols, J.F., C.G. Morgan, J.A. Sarkin, J.F. Sallis, and K.J. Calfas. 'Validity, Reliability, and Calibration of the Tritrac Accelerometer as a Measure of Physical Activity'. *Medicine & Science in Sports & Exercise* 31 (1999): 908–12.
Nottingham City Council. *Nottingham City JSNA Adult Obesity Chapter*. Nottingham City Council. http://www.nottinghaminsight.org.uk/insight/jsna/adults/jsna-adult-obesity.aspx.

Ottesen, L., R.S. Jeppesen, and B.R. Krustrup. 'The Development of Social Capital through Football and Running: Studying an Intervention Program for Inactive Women'. *Scandinavian Journal of Medicine & Science in Sports* 20 (2013): 118–31.
Parnell, D., G. Stratton, B. Drust, and D. Richardson. Implementing Monitoring and Evaluation' Techniques within a Premier League Football in the Community Programme: A Case Study Involving Everton in the Community. In *Routledge Handbook of Sport and Corporate Social Responsibility*, ed. J.L. Paramio-Salcines, K. Babiak, and G. Walters. London: Routledge, 2013.
Parnell, D., G. Stratton, B. Drust, and D. Richardson. 'Football in the Community Schemes: Exploring the Effectiveness of an Intervention in Promoting Healthful Behaviour Change'. *Soccer & Society* 14 (2013): 35–51.
Perkins, S. 'Exploring Future Relationships Between Football Clubs and Local Government'. In *The Future of Football: Challenges for the Twenty-first Century*, ed. J. Garland, D. Malcolm, and M. Rowe, 102–13. London: Frank Cass, 2000.
Priest, N.R. Armstrong, J. Doyle, and E. Waters. 'Interventions Implemented Through Sporting Organisations for Increasing Participation in Sport'. *Cochrane Database System Review* 3 (2008a) No.: CD004812. 1–17. doi:10.1002/14651858.CD004812.pub3.
Priest, N., R. Armstrong, J. Doyle, and E. Waters. 'Policy Interventions Implemented Through Sporting Organisations for Promoting Healthy Behaviour Change'. *Cochrane Database System Review* 3 (2008b) No.: CD004809. 1–18. doi:10.1002/14651858.CD004809.pub3.
Pringle, A. 'The Growing Role of Football as a Vehicle for Interventions in Mental Health Care'. *Journal of Psychiatric and Mental Health Nursing* 16 (2009): 553–7.
Pringle, A., J. McKenna, and S. Zwolinsky. 'Health Improvement and Professional Football: Players on the Same Side?' *Journal of Policy Research in Tourism, Leisure and Events* 5 (2013): 207–12.
Pringle, A., S. Zwolinsky, J. McKenna, A. Daly-Smith, S. Robertson, and A. White. 'Effect of a National Programme of Men's Health Delivered in English Premier League Football Clubs'. *Public Health* 127 (2013): 18–26.
Pringle, A., S. Zwolinsky, A. Smith, S. Robertson, J. McKenna, and A. White. 'The Pre-adoption Demographic and Health Profiles of Men Participating in a Programme of Men's Health Delivered in English Premier League Football Clubs'. *Public Health* 125 (2011): 411–6.
Randers, M.B., L. Nybo1, J. Petersen, J.J. Nielsen, L. Christiansen, M. Bendiksen, J. Brito1 et al. 'Activity Profile and Physiological Response to Football Training for Untrained Males and Females, Elderly and Youngsters: Influence of the Number of Players'. *Scandinavian Journal of Medicine Science and Sports* 20 (2010): S14–23.
Ross, R., T. Berentzen, A.J. Bradshaw, I. Janssen, H.S. Kahn, P.T. Katzmarzyk, J.L. Kuk, et al. 'Does the Relationship Between Waist Circumference, Morbidity and Mortality Depend on Measurement Protocol for Waist Circumference?' *Obesity Reviews* 9 (2008): 312–25.
Scraton, S., K. Fasting, G. Pfister, and A. Bunuel. '"It's Still A Man's Game?" The Experiences of Top-level European Women Footballers'. *International Review for the Sociology of Sport* 34 (1999): 99–111.
Seefeldt, V., R.M. Malina, and M.A. Clark. 'Factors Affecting Levels of Physical Activity in Adults'. *Sports Medicine* 32 (2002): 143–68.
Sherry, E. '(Re)engaging Marginalized Groups through Sport: The Homeless World Cup'. *International Review for the Sociology of Sport* 45 (2010): 59–71.
Solway, S., D. Brooks, Y. Lacasse, and S. Thomas. 'A Qualitative Systematic Overview of the Measurement Properties of Functional Walk Tests Used in the Cardiorespiratory Domain'. *Chest Journal* 119 (2001): 256–70.
Spaaij, R. 'The Social Impact of Sport: Diversities, Complexities and Contexts'. *Sport in Society* 12 (2009): 1109–17.
Tacon, R. 'Football and Social Inclusion: Evaluating Social Policy'. *Managing Leisure* 12 (2007): 1–23.
Trost, S.G., K.L. Mciver, and R.R. Pate. 'Conducting Accelerometer-based Activity Assessments in Field-based Research'. *Medicine & Science in Sports & Exercise* 37 (2005): S531–43.

Walters, G., and S. Chadwick. 'Corporate Citizenship in Football: Delivering Strategic Benefits through Stakeholder Engagement'. *Management Decision* 47 (2009): 51–66.
Wang, Y., K. McPherson, T. Marsh, S. Gortmaker, and M. Brown. 'Health and Economic Burden of the Projected Obesity Trends in the USA and the UK'. *The Lancet* 378 (2011): 815–25.
Welborn, T.A., and S.S. Dhaliwal. 'Preferred Clinical Measures of Central Obesity for Predicting Mortality'. *European Journal of Clinical Nutrition* 61 (2007): 1373–79.
Welk, G.J. 'Principles of Design and Analyses for the Calibration of Accelerometry-based Activity Monitors'. *Medicine & Science in Sports & Exercise* (2005): S501–11.
Wilcox, J., R. Doherty, and H. Thompson. *Evaluation of Healthy Change – A Telephone Based Behaviour Change Service to Address CVD Risk Factors*. London: PHE Annual Conference, 2013.
Witty, K., and A. White. *The Tackling Men's Health Evaluation Study*. Leeds: Centre for Men's Health, Leeds Metropolitan University, 2010.
World Health Organization. *Global Strategy on Diet, Physical Activity and Health*. Geneva: WHO, 2004.