

ANGLIA RUSKIN UNIVERSITY

FACULTY OF HEALTH, EDUCATION, MEDICINE AND
SOCIAL CARE

THE OPTIMISATION OF A NUTRITION AND
EXERCISE PROGRAMME FOR MEN AGED
BETWEEN 35 AND 64 YEARS OF AGE

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ABSTRACT

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The proportion of UK males (16 years and older) who were classified as overweight or obese in 2016 stood at 68%. Both single and multi-component weight loss interventions are advocated to address obesity prevalence (NICE, 2017) and yet there is disproportionately higher female engagement with few interventions targeting male gender-specific health issues (Robertson et al., 2008). Based on theoretical concepts, an optimised weight loss programme design was piloted to identify aspects which appeal to and therefore can engage men with meaningful weight management.

Utilising a mixed method sequential explanatory design, a male study sample (n=35) ages 35 to 64 years participated in a 91 week, optimised gendered football and nutrition programme which targeted weight loss as an empirically evaluated outcome. Qualitative feedback obtained from interviews was used to compare outcomes and evaluate the success of the intervention.

Engagement with programme concepts were facilitated by transformational leadership and creation of a community of practice accompanied by an innovative gendered dietary educational method alongside structured footballs skills and fitness development. Significant improvements were observed across all anthropometric measurements. Mean attendance for recruits in phase 1 and phase 2 of the programme were 46 and 39 weeks respectively, and in the total cohort significant improvement in anthropometrical markers were identified without adjustment for length of engagement with the programme over the full 91 weeks of intervention (weight: -3.30 (\pm 3.60 kg, $t = -5.317$, $p = <0.001$), Waist: -4.04 (\pm 3.70 cm, $t = -6.463$, $p = <0.001$), BMI: -1.05 (\pm 1.14 kg/m², $t = -5.477$, $p = <0.001$)).

Targeted, concise delivery of the fundamental components (dietary advice) required to successfully induce significant long-term weight loss were shown here to engage men in interventions that contain an engaging theme (football) and strong social element. Implementation of an evidence-led intervention design with collaborative delivery methods integrating feedback to inspire developments within the protocol facilitated achievement. Alignment of a group of individuals with a common set of problems (weight-related) and interests (football) within an intervention found to utilise transformational leadership strategies

facilitated success for both the intervention and those recruited to achieve its' goals (weight loss) through the community of practice which resulted. This research provides a scaffold for future programme design by suggesting the principle components required for engagement and maintenance and justification to adapt current obesity strategy and guidance.

Key words: male health, male help seeking, weight loss, lifestyle management, football, community of practice, transformational leadership, obesity strategy.

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Abbreviations

Abbreviation	Explanation
ACSM	American College of Sports Medicine
ADP	Air Displacement Plethysmography
AT	Adaptive Thermogenesis
BCT	Behaviour Change Theory
BMI	Body Mass Index
COMA	Committee on Medical Aspects of Food and Nutrition Policy
COP	Community of Practice
CV	Cardiovascular
CM	Centimetres
DBFD	Direct Body Fat Determination
DINE	Dietary Instrument for Nutrition Education
EBWL	Excess Body Weight Loss
FFIT	Football Fans In Training
FFQ	Food Frequency Questionnaire
FREP	Faculty Research Ethics Panel
FFM	Fat Free Mass
HSE	Health and Safety Executive
HSE	Health Survey for England
ISAK	International Society for the Advancement of Kinanthropometry
IT	Information Technology
Kg	Kilogrammes
MFP	My Fitness Pal
MRC	Medical Research Council
NDNS	National Diet and Nutrition Survey
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
NIH	National Institute of Health
NWCR	National Weight Control Registry
PA	Physical Activity
PAR-Q	Physical Activity Readiness Questionnaire
PLH	Premier League Health
PCF	Participant Consent Form
PIF	Participant Information Form
RCT	Randomised Controlled Trial
REE	Resting Energy Expenditure
RPE	Rate of Perceived Exertion

SACN	Scientific Advisory Committee on Nutrition
SES	Socio-Economic Status
SLS	Social Learning Systems
SSB	Sugar Sweetened Beverages
TAP	The Alpha Programme
TDEE	Total Daily Energy Expenditure
TL	Transformational Leadership
TMH	Tackling Men's Health
VAT	Visceral Adipose Tissue
VHWC	Very High Waist Circumference
VLCD	Very Low-Calorie Diet
WC	Waist Circumference
WHO	World Health Organisation

1 Introduction

1.1 Background to obesity

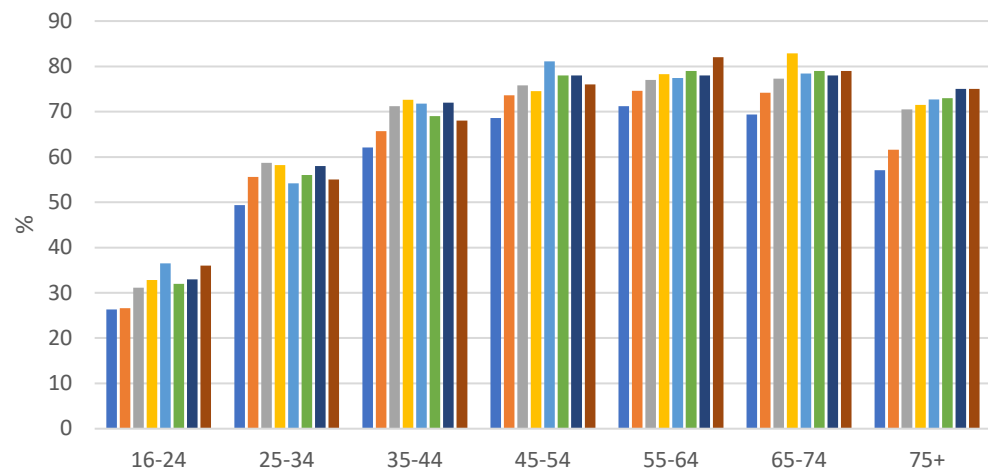
Obesity is an acknowledged risk factor in all population groups. The Framingham Heart Study (Peeters et al., 2003) reports reduced life expectancies of 5.8 and 7.1 years respectively for male and female non-smokers who were obese (Body Mass Index, BMI > 30 kg/m²) compared to those of normal weight (BMI < 25 kg/m²). There are numerous risk factors associated with obesity. They vary between those that can be manipulated to exact reductions in weight such as physical activity levels, and those that are not susceptible to modification such as age. Despite a growth in our understanding of the genetic propensity of obesity with over 200 (low risk of causing obesity) genetic variations having been discovered, genetic related obesity is considered heterogeneous and impacts only a small fraction of the population (Loos and Janssens, 2017). Both age and sex, ordinarily classified as singularly non-modifiable risk factors, do in fact straddle both modifiable and non-modifiable categories. This is due to several physiological adaptations such as atrophy and subsequent decreases in metabolism (Rosa-Caldwell and Greene, 2019) which present as we age, working in combination with behavioural lifestyle adaptations that lead to energy imbalances through aspects such as a deregulation of calorific intake and reductions in activity levels (Yang et al., 2017a; Smith et al., 2017). Interventions planned to help mitigate the impacts of obesity must acknowledge such new insights in their design.

Data from the UK Health Survey for England (HSE) suggests that 67% of males and 61% of females are overweight or obese (Conolly and Davies, 2018). For all adults, prevalence is highest between the ages of 45 and 54 years, and for men, this has increased temporally across all age groups since 1993 (figure 1.1).

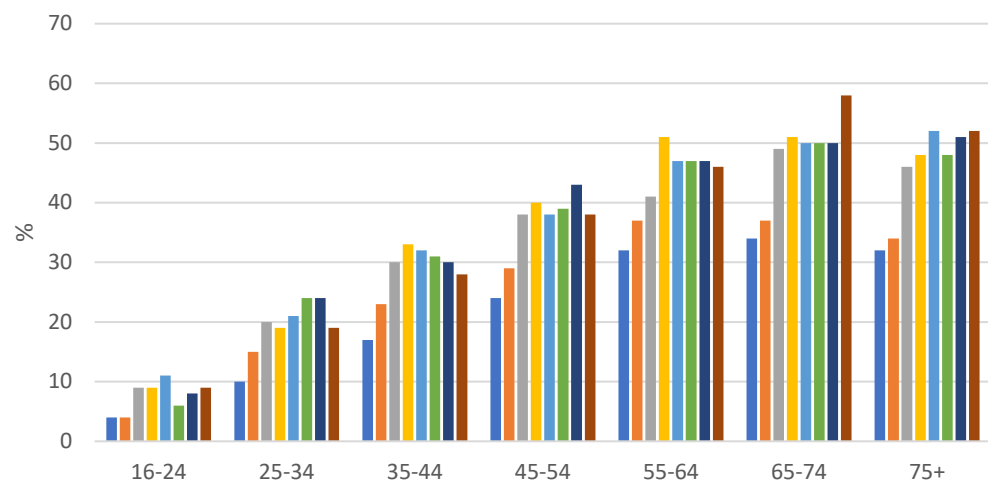
BMI (or the Quetelet index), was developed by Lambert Adolphe Jacques Quetelet (1796 - 1874). The calculation was originally designed to indicate the relationship between height and weight, though it has subsequently been employed as a method for assessing health status (Muralidhara, 2007). Despite being adopted as a surrogate measure of body fat by the World Health Organisation (WHO) (Lopez et al., 2006) given evidence that it '*works for most people, most of the time*' (Adab, Pallan and Whincup, 2018), BMI has a poor relationship with estimations of body fat or fat free mass, independent of age and gender (Jackson et al., 2002). The measurement does not take into account aspects including sarcopenic obesity (Shah and Braverman, 2012) or the relationship between muscle strength and mortality (Ruiz et al., 2008). Gómez-Ambrosi et al., (2012) provided insight into the inaccuracies of BMI by conducting a cross-sectional analysis of 6,123 Caucasian subjects (females n=4,208 / males n=1,915) ages 18–80 years. All subjects were measured using direct body fat determination (DBFD) and classifications were compared against each subject's BMI. 29% of subjects

classified as lean ($< 25\text{kg/m}^2$) and 80% of subjects classified as overweight ($>25\text{ kg/m}^2$) using BMI were determined by air displacement plethysmography (ADP) to be obese ($>30\text{ kg/m}^2$). However, only 0.2% of lean and 1.0% of overweight DBFD categorised subjects were classified as obese using BMI. This highlights how BMI under-estimates body fat percentage, especially in subjects who – using DBFD – are classified as overweight. As such, researchers are advised to acknowledge that BMI is likely to introduce high levels of misclassification and subsequent underdiagnosis of risk (Silva et al., 2012).

(a)



(b)



(c)

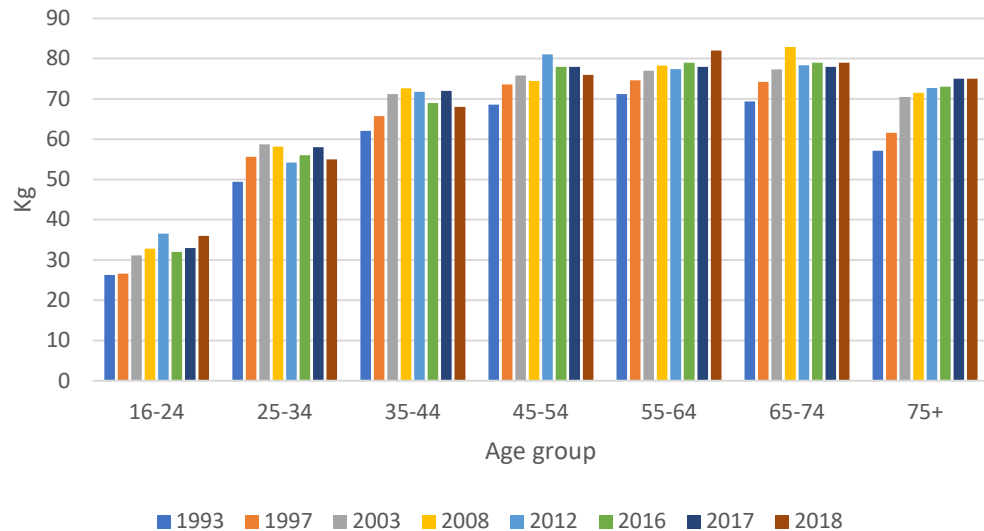


Figure 1.1: Trends in rates of obesity estimated using (a) Percentage males with a Body Mass Index > 25 kg/m² by survey year and age. (b) Percentage of men with a very high waist circumference (>102cm) by survey year and age. (c) Mean weight (Kg) in UK males by survey year and age (Conolly and Davies, 2018).

The public's perception of BMI classifications appears to have changed as well. Post et al., (2015) investigation indicated that 59.9% (n=308) of 515 sampled patients noted an awareness of BMI and its relationship with obesity, and yet 80% (n=412) of respondents had little or no knowledge of the cut-off values used for BMI or their meaning. Furthermore, self-awareness was also low: 16.4% (n=84) of respondents were unable to provide their own BMI classification. An investigation of weight perceptions amongst 1,998 UK overweight and obese respondents in 2007 (and then again in 2012) indicated a detrimental change in BMI knowledge over the 5-year period. In 2007, 12.2% (n=20) of 164 women questioned were able to correctly identify the BMI term 'obese'. Of the 143 questioned in 2012, this had declined to 8.4% (n=12) (Johnson et al., 2014). For men the results were more encouraging though still low, with only 5.1% (n=9) of the 178 men being aware of the classification in 2007, and a slight increase by 2012 to 7% (n=12) of 172 respondents (Johnson et al., 2014). Despite these limitations, BMI remains the most widely used tool in obesity classification (Silva et al., 2012) with the National Health Service (NHS) (NHS Choices, 2013a) and the National Institute of Health (NIH) (NIH, 2016) both relying heavily on the method due to its speed in estimating risk imposed by body mass (Weigley, 1994) and its capability to provide insight into living standards at a population level. Several research groups have suggested strong relationships between BMI and Socio-Economic Status (SES) which has helped provide insight into how living standards have influenced physiological adaptation over time (Khongsdier, 2002; Hiermeyer, 2009; Nowak-Szczepanska et al., 2016). Furthermore, BMI is shown to have some

predictive capability for risk of diagnosis with type 2 diabetes mellitus (Bays, Chapman and Grandy, 2007; Ganz et al., 2014) and the method has clear evidence of utility when applied across populations as opposed to individuals, where BMI derived errors ordinarily encountered in the individual would be negated through randomisation across a population (Hall and Cole, 2006). For instance, population data suggests that median survival rates reduce as BMI increases, such that for each 5 kg/m² elevation above the normal (18.5 to 25 kg/m²) BMI classification, mortality risk increases by approximately 30% (MacMahon et al., 2009). Application of such estimates at the individual level however remains problematic, necessitating development (and use) of more sensitive anthropometric methods in interventions which require interpretation at the individual level.

Waist circumference (WC) has been suggested as a supplementary means of improving classification of anthropometric risk, both used alone and in conjunction with estimates of weight and BMI (NICE, 2014a). Central obesity is presented as increased girth around the waistline with any loss in circumference in this area having a positive relationship with visceral adipose tissue (VAT): a significant contributor to cardiovascular disease and atherosclerosis (Shi, Neubeck and Gallagher, 2017). An increase in WC of just 5cm is associated with a 17% increased risk of death (Dyrstad et al., 2019). For men within the 35 to 64 year age group, data from the HSE showed WC to increase by 5.7cm (98.3 to 104 cm) between 1993 and 2018 (Conolly and Davies, 2018), an increase which suggests a rise in VAT. VAT is associated with increased risk of irritable bowel syndrome (Aasbrenn, Lydersen and Farup, 2018; Schneck et al., 2016) and cancer of the liver (hepatocellular carcinoma) (Kroh et al., 2019; Fujiwara et al., 2015) among other illnesses. A combination of sarcopenia and high VAT act as a predictor for postoperative death in patients who have undergone pancreaticoduodenectomy for pancreatic cancer (Pecorelli et al., 2016; Okumura et al., 2017) and metabolic syndrome (Cho et al., 2017; Delahanty et al., 2014; Qing et al., 2017). Data illustrated in figure 1b suggests that the highest proportion of men categorised as Very High Waist Circumference (VHWC) (>102cm) in 2018 occurred within mean ages 65 to 74 years, where 58% of the measured population were considered to have 'very high' risk. In younger age groups (e.g., 55-64 years), prevalence of VHWC was lower at 46%, however a greater proportion (31% in contrast to the 22% of men between 65 to 74 years) of men had measurements within the WC category below (94cm to 102cm), indicating the potential for increased risk with age. With an aging UK population and subsequent burden on clinical services envisioned, movement towards preventative intervention is justified (ONS, 2018) and the importance of earlier address of this risk is presumably also increased. In summary, measurements suggest an increase in health risk for men between the ages of 45 to 74 years which is attributed to waist and weight increases.

Obesity has a multifactorial aetiology. Physiologically, variance is impacted by ratios of lean: fat mass, skeletal and body water contributions (Weinheimer, Sands and Campbellnure, 2010). Each of these factors can be impacted by socio-demographic determinants including deprivation (impacted by income, employment, education, health (MHCLG, 2019)) and employment status such as manual, unskilled, skilled, retirement behaviour (Menai et al., 2014; Barnett et al., 2014). HSE data is collected through both questionnaire and interviews with a set of multi-stage, stratified, random probability calculations used to represent the UK population, reactive to the ideals of acknowledging this complex aetiology (NatCen Social Research and UCL, 2018). The sample used in the 2017 HSE (Conolly and Davies, 2018) consisted of 8,178 adult participants. HSE does not take into account the differences between current health state and behaviour however and so, though a participant may have ceased from engaging in poor habitual intake such as smoking, the consequences of these actions, such as chronic illness may still be present and yet be aligned to someone with low smoking and alcohol risk.

A truly accurate picture of the overweight and obesity levels within England and Wales would be difficult to create. Despite inaccuracies with collection methods used in surveys such as the HSE, we still use available data to provide us with an indication of weight and associated risk. Rising BMI, weight and WC measurements in adult males suggest that interventions have not successfully engaged men with health improvement (Robertson et al., 2016).

WC is positively correlated with abdominal fat content which in turn correlates directly with cardiovascular (CV) disease risk (Anuradha, Hemachandran and Dutta, 2012). The NHS suggests that WC is a more accurate predictor of Type 2 Diabetes than BMI and recommend a combined use of both measurements in health risk assessment (NICE, 2014a). There is no clear consensus as to the site from which waist measurements should be collected, primarily due to a correlation with abdominal fat across all measurement sites (Yang et al., 2017b; Bosy-Westphal et al., 2010). Though dependent on the site (and research evidence reviewed) there are varying predictive strengths (and limitations) for a range of diseases, contributing further to the lack of national consensus on measurement location. For instance, the NIH (1998) state that WC should be taken at the level of the iliac crest whereas the WHO (2008) suggest between the *“last palpable rib and the top of the iliac crest”*. Measurement accuracy is also confounded by laxity of abdominal muscle and posture, water retention in muscle; water, food material and gases in hollow viscera (WHO Expert Consultation, 2008; Misra, Wasir and Vikram, 2005), all of which can affect measurement value. Irrespective of the method used, it must be clearly stated to enable full appraisal of results, and accurate comparisons between reports.

Waist measurement cut-offs are clearly defined. WHO (2000) suggest an increased risk of metabolic complications for men with a WC exceeding 94cm and substantially increased risk above 102cm. Without a clear consensus on site location and allowances for stomach laxity however, inaccurate measurement must be assumed, particularly if measurements are taken outside the clinical environment. In addition, since cut-offs were derived from a Dutch study (Han et al., 1995), they are typically deemed unreliable for non Europids. Higher percentages of body fat (Deurenberg-Yap et al., 2001; Deurenberg-Yap, Schmidt, van Staveren and Deurenberg, 2000) have been found in Asian compared to Caucasian populations, and as a consequence there are now a multitude of cut-offs determined by racial type (Alberti, Zimmet and Shaw, 2007). Variations also exist between more localised populations. A 2016 German longitudinal study, surveying WC in male and female participants aged 45-64 years (n=32,651) over a 10-year period for example, indicated that mean WC differences were highly dependent on the region of measurement in Germany where the measurements were taken (Haftenberger et al., 2016).

Overall, WC cut-off values are shown to have a good level of accuracy, evidencing significant correlations with metabolic syndrome and insulin resistance though regional subgroups, and not just national differences may need to be recognised. Ma et al., (2013) rationalise the need for greater personalisation in use of such classifications, including ethnic variance and further adjustments based on specific disease diagnosis and utility of the method for diagnosis or prediction to account for this.

1.2 Overview of male lifestyle behaviours and risk

When examining relationships between men and health risk, both diet and physical activity require careful consideration. This section provides an overview of the relationships that men have with activity and diet, including the gendered nature of solutions for tackling weight gain. It explores how environmental and behavioural aspects have a strong influence on increasing male overweight since without a clear understanding of the barriers towards healthier eating and engagement with exercise, we can make only headway in providing solutions that attempt to negotiate them.

Physical activity is a modifiable risk factor proven to be an effective barrier to weight gain and a facilitator of health improvement (NHS Choices, 2013b). There is strong evidence that increases in physical activity can lead to improvements in numerous conditions including CV disease (Arija et al., 2017; Koolhaas et al., 2017), colorectal cancer (Nunez et al., 2018) and hypertension (Liu et al., 2017). This has led to current recommendations suggesting that adults should complete 150 minutes of moderate intensity or 75 minutes of vigorous intensity exercise per week and additional resistance training two or more times per week (Department of Health, 2019). When combined with aerobic exercise recommendations, adults should be

partaking in around 4 hrs 30 minutes of outside work activity per week. HSE data (Scholes, 2017) suggests that just 38% of men within the age 35 to 44 age range meet both CV and resistance training recommendations however. This declines to 18% for 55 to 64-year-old men and 17% for 65 to 74-year-old men. Government guidelines recognise that moderate to vigorous intensity exercise has a greater beneficial influence on health than low intensity exercise (Byambasukh, Snieder and Corpeleijn, 2020). In response, HSE activity data only reports on respondents who sit within the moderate to vigorous intensity categories (Scholes, 2017). Low intensity exercise is consequently overlooked, despite evidence suggesting its benefits for individuals who are untrained and/ or unhealthy however (Foulds et al., 2014).

Higher all-cause mortality exists amongst men in high occupational activity roles (Holtermann et al., 2012) due to consistently long hours of activity, increasing intravascular turbulence, sheer arterial wall stress and subsequent inflammation which present an environment for the development of atherosclerosis (Peiffer, Sherwin and Weinberg, 2013). Recognising that higher occupational activity roles will often be undertaken by men from lower socio-economic populations (Beenackers et al., 2012; Conolly, Saunders and Neave, 2017) where associations with poor dietary quality (Pechey et al., 2015) and excess energy intake (Hulsegge et al., 2016) are typical highlights a need for increased focus in this group

Weight control methods typically utilise a calorie-deficit model, with varying use of eating patterns (e.g., intermittent fasting) and macronutrient focus (e.g., ketogenic diets) to attain weight loss (Obert et al., 2017). Weight Watchers for example aims to induce a 500 kcal daily deficit in order to support a weekly weight loss of between 0.5kg to 1kg (1.1 – 2.2 lbs) in accordance with clinical guidance recommendations (NICE, 2014) and supported by research evidence which suggests that between 5% to 10% total body weight loss can lead to significant improvements in CV health (Wing et al., 2011; NICE, 2014b). There is little evidence of the influence that calorie counting has on individual perceptions around food however. Much of the research to date has been focussed on mobile calorie counting applications such as My Fitness Pal (MFP). MFP is a highly practical app, providing easy options to input food, produce calorie (and sometimes) macro and micronutrient information. It offers a degree of personalisation if personal information is added, with weight loss target and weekly/ daily energy utilisation estimates based on records of food consumed calculated. This requires regular interaction however which has been criticised for developing obsessive food tracking behaviours (Evans, 2017). Furthermore, research suggests that feedback provided by such apps can be inaccurate and even skewed, leading to a significantly imbalanced and highly restrictive approach to dieting (Levinson, Fewell and Brosos, 2017). Whilst recognising that the research discussed here focusses on that using MFP, calorie counting is used frequently in dietary programmes. Levinson, Fewell and Brosos, (2017) uncovered significant

disillusionment with this method. 74.3% (n=78) of 105 respondents stated that they had used the app to count calories and 73.1% (n = 57) reported that the method contributed to their eating disorder. Linardon and Messer (2019) suggest that 56% (n=69) of 122 men used calorie counting with the MFP app and 37.6% (n=26) suggested that this contributed to their eating disorder in some way (on a scale from somewhat, moderate and very much contributed). A recommendation from this research was for providers to include strategies on how to appropriately manage calorie limits and feelings of negativity that are associated with not meeting calorific goals. The efficacy of calorie counting as a viable method of weight control is fairly well evidenced (Jebb et al., 2011; Jolly et al., 2011), yet a reliance on this can lead to eating disorder symptomatology where compulsive routines may be further exacerbated due to the rigid approach (Simpson and Mazzeo, 2017). Lack of consideration for individual variances (daily calorie needs are typically based on predictive energy equations) may also contribute to the potential for targets to be out of reach, resulting in feelings of anxiety and/ or guilt, both recognised predictors of eating disorders (Stice, 2002). Reactive to the fact that higher nutritional value foods can easily be overlooked in favour of lower quality/ lower calorie options (especially when fat-rich foods such as dairy items are considered) (Romano et al., 2018), this approach also neglects the need for improved education around food choices.

Whether education is an integral part of any dietary programme used, amendments to dietary intake can facilitate health improvement, particularly when focused on dietary quality. Low energy diets are acknowledged to be nutrient poor (Gardner et al., 2010) leading to greater risk of malnourished status (Roust and Dibaise, 2017; Aigner, Feldman and Datz, 2014; Sánchez et al., 2016). Introducing dietary restrictions could increase risk further (Truby et al., 2008; Aigner, Feldman and Datz, 2014; Pascual et al., 2019), with specific nutrients including iron (Kaidar-Person et al., 2008; Aigner, Feldman and Datz, 2014), folate (Astrup and Bügel, 2019; Roust and Dibaise, 2017) and zinc (Astrup and Bügel, 2019; Kaidar-Person et al., 2008) being particularly affected in energy-restricted diets followed by obese subjects. Commercial, moderately energy restrictive diets focus on macronutrient intakes (Truby et al., 2008; Ma et al., 2007) and in doing so, often fail to consider the potential for low micronutrient intakes to contribute to subsequent health issues. Recognising that malnutrition is prevalent in individuals who over consume, and that poor diet quality is often the consequence of energy restriction, there is an opportunity to correct diet-related issues including weight loss through the introduction of a diet that focusses on diet quality improvement rather than energy restriction.

The social experience or desire related to food intake is an important consideration for all dietary interventions. Nutrients impact the psychology and neurology of the individual in different ways, but share common neural pathways including the dopamine system which can

induce positive emotions and pleasure (Berthoud, 2006). Abstinence from food intake for anywhere between two and 48 hrs is aligned with substantial increases in saliency (Blechert et al., 2014), while monotony has been highlighted as an incentive for bingeing and prolonged adherence to a limited range of foods leads to increased cravings for foods outside of this range (Pelchat and Schaefer, 2000; Blechert et al., 2014). This highlights the need for access to an intuitive approach to eating which deviates from the dichotomous (food is either good or bad) approach considered a facilitator of disordered eating (Linardon and Mitchell, 2017).

Emotions are related to short term responses to stimuli, while moods are prolonged and persist in the absence of said stimuli (Leigh Gibson, 2006). Early research suggests that negative emotions can trigger consumption of more palatable foods through a sequence of self-gratification and reward (Morris and Reilly, 1987), providing limited justification for over consumption of energy dense foods rich in sugars and fat (Noel and Dando, 2015). This approach is often a self-defeating process since gratification is short lived and manifests in feelings of guilt which can lead to additional consumption of poor nutrient quality foods (Macht and Mueller, 2007; Macht, 2008). Evidence from the National Diet and Nutrition Survey (NDNS) shows UK adults consume well in excess of the recommended 5% energy intake from foods containing free sugars (men 11.1%, women 11.2%) and considerably lower fruit and vegetable intakes (men 299 g/day and women 296 g/day; 400 g/day recommended) highlighting considerable scope for improvement in food choices in all UK adults (Roberts et al., 2018). In men, elevated consumption of red and processed meat comparative to women (men 77 g/day, women 47 g/day) and sugar sweetened beverages (159 g/day in contrast to women 100 g/day; Roberts et al., 2018) may require particular focus.

Although evidence exists to suggest that hypocaloric diets can be successful in some population subgroups and in the short term, interventions tackling weight loss in males require careful rebalance to emphasise sustainable lifestyle and eating patterns, focusing on dietary quality improvement rather than calorie reductions. Likewise, where food likes are ignored, sustainability is unlikely to be achieved.

1.3 A 'gendered' conceptual framework facilitating sustained male weight loss

The majority of health-related gender discussions place women's health practices and experiences at the forefront (Smith and Robertson, 2008; Baker et al., 2014). The Pagoto et al., (2012) systematic review highlighted aspects thought to influence male engagement with weight loss programmes and recognised a lack of focus on male gender preferences and behaviours by programme designers and researchers. Though psychological, physiological and cultural variations are acknowledged in research literature to exist between genders, they are commonly overlooked in health incentives (Morgan et al., 2013; Mróz et al., 2011). Food

and diet are particularly gendered. Rothgerber (2013) suggests that for men, engaging in vegetarianism is viewed as a rejection of masculinity. Mróz et al., (2011) suggests that masculinity acts as a barrier to healthier eating, with rejections of 'healthy' items such as vegetables and fruit in favour of convenience food and alcohol, despite the acknowledged threat of ill-health associated with the latter food types. Men are direct and unapologetic when faced with foods they deem unpalatable (Rothgerber, 2013), qualities which help paint a picture of stubbornness and indifference to particular foods, where even experimentation, such as food tasting is not considered. This in part, suggests men view food as a fuel source, relegating the experience of consumption to refuelling to keep hunger at bay and maintain work effort (Newcombe et al., 2012; Wandel and Roos, 2005). Admission of gaining pleasure from food is perceived as a weakness to emotion.

Positive discussions around food relationships and experiences also typically focus on women, with negative stereotypes relating to male cultures and stereotypes such as beer drinking and meat-eating (Abraham, 2014; Buerkle, 2009). Perpetuated by cultural and gender analyses around food, men are typified as having an unsatiated desire for meat through which the devouring of protein supports achievement of the masculine ideals of strength and power (Buerkle, 2009; Gough, 2007). Food manufacturers capitalise on this. Burger King's commercial "*I am man*" (Burger King, 2006) for example has been considered a prime example of masculine reassertion, with images and videos of men rebelling against suppression of food choice e.g. "*I am too hungry for chick food*" (Buerkle, 2009). Commercial dietary providers exploit masculine stereotypes using gendered discourse as drivers towards subscription to their services, suggesting that men can still drink alcohol and consume large amounts of food whilst dieting (Weight Watchers, 2017b). Aside from food, appeal is heightened by exploiting the male relationship with sport and alcohol. Sporting analogies such as '*What to eat at the ballpark*' (Weight Watchers, 2017a) again suggests that health defeating behaviours can still be pursued in the weight loss journey. This perception overlooks the male lifestyle (amongst other factors) approach that have led men to higher obesity and overweight prevalence (Bottorff et al., 2015).

These assumptions continue to support a belief that men have strong preferences for meat, partly because it affirms male status within society. However, it has been suggested that not all men conform to this norm and instead justify reduced meat consumption by supplanting it with a drive for physical perfection. This theory feeds into the perception that men can justify their practices using 'feminine' perceptions (Courtenay, 2000; Roos, Prättälä and Koski, 2001) around food, such as salad consumption and alcohol abstention to achieve gains in strength and power (Gough, 2006). Suggestions are that the strive for improved performance garners enough masculine capital to outweigh traditional masculine behaviours (Visser, Richard and

McDonnell, 2013). There is a growing digital trend towards symbolisms of wealth which support perceptions of power (Harvey, Ringrose and Gill, 2013). A similar approach is recognised with body aesthetics, where a muscular, trim physique expresses attractiveness and social success (Mulgrew et al., 2014). Research by Coffey, (2016) exploring men's perceptions of their bodies found that all 11 men interviewed trained to 'look good.' This work helped uncover a male construction of identity around body image, an important component in masculinity. If alternative programme approaches that exploited these aspects were offered, men may orientate themselves accordingly and engage further with health incentives. Continual stereotyping and misunderstanding of male behaviours may be the very factors that lead to low male help-seeking behaviours (Bottorff et al., 2015). Across the 244 weight loss trials investigated for the Pagoto et al., (2012), male participation was between 18% and 36% and despite nearly two thirds (63%) of the programmes being offered to both male and female participants, and only 12 (5%) had been designed specifically for men. The Weight Watchers (Jebb et al., 2011) referral programme had 57% of participants achieve their 5% weight loss target, 90% (26,252) of whom were female. Table 1.1 underlines the low number of men compared to women for a selection of large research-based weight loss programmes, despite all those listed encouraging male participation.

Table 1.1: Male and female attendance across a selection of popular research weight loss programmes.

Trial author	Total (n)	Women	Men	% male
Ahern et al., (2011).	29,326	26,252	3,074	10
Jolly et al., (2010).	740	538	202	27
Manzoni, Pagnini, Corti and Molinari, (2011).	8,324	6,384	1,940	23
Nanchahal et al., (2009).	123	99	24	20
Neve, Morgan, Jones and Collins (2010).	5,700	4,389	1,311	23
Stubbs et al., (2011).	34,271	30,604	3,667	11

Despite providing male 'variants' of their programmes, commercial slimming companies fail to provide a physical activity component or tailored behavioural support (Weight Watchers, 2016; Slimming World, 2016) despite clear evidence in the scientific literature and commercial recognition that exercise is vital to help men engage with lifestyle programmes (Pagoto et al., 2012; Archibald et al., 2015; Robertson et al., 2017). Dietary programmes often fail to recognise gendered preferences for food prescriptions, as they have been adapted from women's dietary interventions (Mróz et al., 2011). Men may have difficulty enrolling onto programmes where the majority of participants are women, feeling 'isolated' rather than

supported in their goals for weight loss (Young et al., 2012). Providers appear to frame men within a single homogenous stereotype of health defeating, risk taking, meat eating individuals rather than promoting engagement with health improving behaviours by designing an intervention that joins up aspects more attractive to men (Young et al., 2012; Robertson et al., 2016).

Though current dietary approaches can be effective in inducing weight loss, the length of weight maintenance thereafter is often short lived (Dombrowski et al., 2014) with early gains in weight loss often being reversed through a variety of compensatory behaviours, both physiological, biological and behavioural (King et al., 2012). Weight maintenance trajectories are largely poor, participants regaining approximately 30-35% of lost weight within the first year and, without intervention, most return to pre-treatment weight in 3 to 5 years (Young et al., 2012; Sarwer et al., 2009; Wing and Phelan, 2005; Phelan et al., 2020). Conclusive recommendations that support long-term adaptation are currently unavailable, as very few research programmes include sufficient follow-up detail on weight-loss maintenance. Interchangeable use of the terms 'loss' and 'maintenance' further complicate such assessments. Indeed, a systematic review by Ramage et al., (2014) suggests that in 92% of successful mixed gender interventions examined, strong dietary and physical activity adaptation and behavioural support mechanisms were present, suggesting a multi-component method is more effective at developing skills that can then be applied to address maintenance of weight loss.

Successful weight maintenance is associated with preservation of learned behaviours post weight loss (Lenoir et al., 2015; MacLean et al., 2015). Thomas et al., (2014) evaluated weight loss trajectories of successful dieters over a 10-year period ending in 2012. National Weight Control Registry (NWCR) registered individuals: 2,886 (2,251 female (77.5%) and 635 males (22.5%) entered onto the programme had lost and maintained losses of at least 13.6 kg for one year or more. More than 87% had maintained a minimum of 10% weight loss at both 5 and 10 years. Results suggest that larger initial weight losses are associated with better long-term maintenance outcomes, with successful participants engaging in higher levels of exercise, low fat and calorie diets and higher levels of restraint and self-weight tracking. Conversely, participants who had witnessed the largest weight gains had decreased their exercise levels, dietary restraint and frequency of self-weighing. Similar findings reported by Byrne, Cooper and Fairburn, (2003) show that successful weight-loss maintenance was associated with relatively low-fat diets, regular exercise and tracking of weight and/ or shape, highlighting that experienced weight-loss maintainers can quickly compensate for increases in weight through self-regulatory measures.

Focus on calorific intake and counting can divert the individual away from an education around food. Given that men have strong gendered preferences and perceptions around food, and traditional masculinity is depicted as an inability to engage with risk averse lifestyle behaviours (despite research evidence suggesting that a lack of engagement is more influenced by a failure to recognise gendered requirements within programme design), adaptation of protocols in design of weight loss interventions for men are vital.

Identifying key issues reported around obesity and treatment practices specific to the inherent goal of this thesis: attainment of long-term, sustainable weight-loss in males design of an evidence-informed weight management programme was targeted. Realising the importance of key components within this complex biopsychosocial disease aetiology, the contextual factors which inspire weight management in hard-to-reach population subgroups were integrated. The relationships between drivers of behavioural change combined with principle components targeted in this intervention (namely: diet, social, exercise and behaviour change), were included to trigger behavioural adaptations theorised to drive intrinsic behavioural development towards engagement and subsequently goal achievement (Figure 1.2). Fundamental principles that underpin the conceptual framework presented here are Transformational Leadership (TL) (Bass, 1990) and Community of Practice (COP) (Wenger, 2000). These principles are facilitated through four outlined catalysts which influence behavioural change and support the individual towards intrinsic motivation (Ryan and Deci, 2000).

This research aims to challenge current perceptions and influence future design and critique of weight management strategies through provision of a conceptual framework focused on behavioural approaches shown to support engagement with programme concepts. It encourages variation to traditional assessment practices integrating a personalised approach designed to complement engagement of users, integrating design concepts to positively influence achievement of current public health guidance. By provoking discussion as to how generalisation seen in current recommendations fail to recognise subgroups sufficiently, it hopes to inspire research and updates tailored specifically to meet the needs of our diverse UK population.

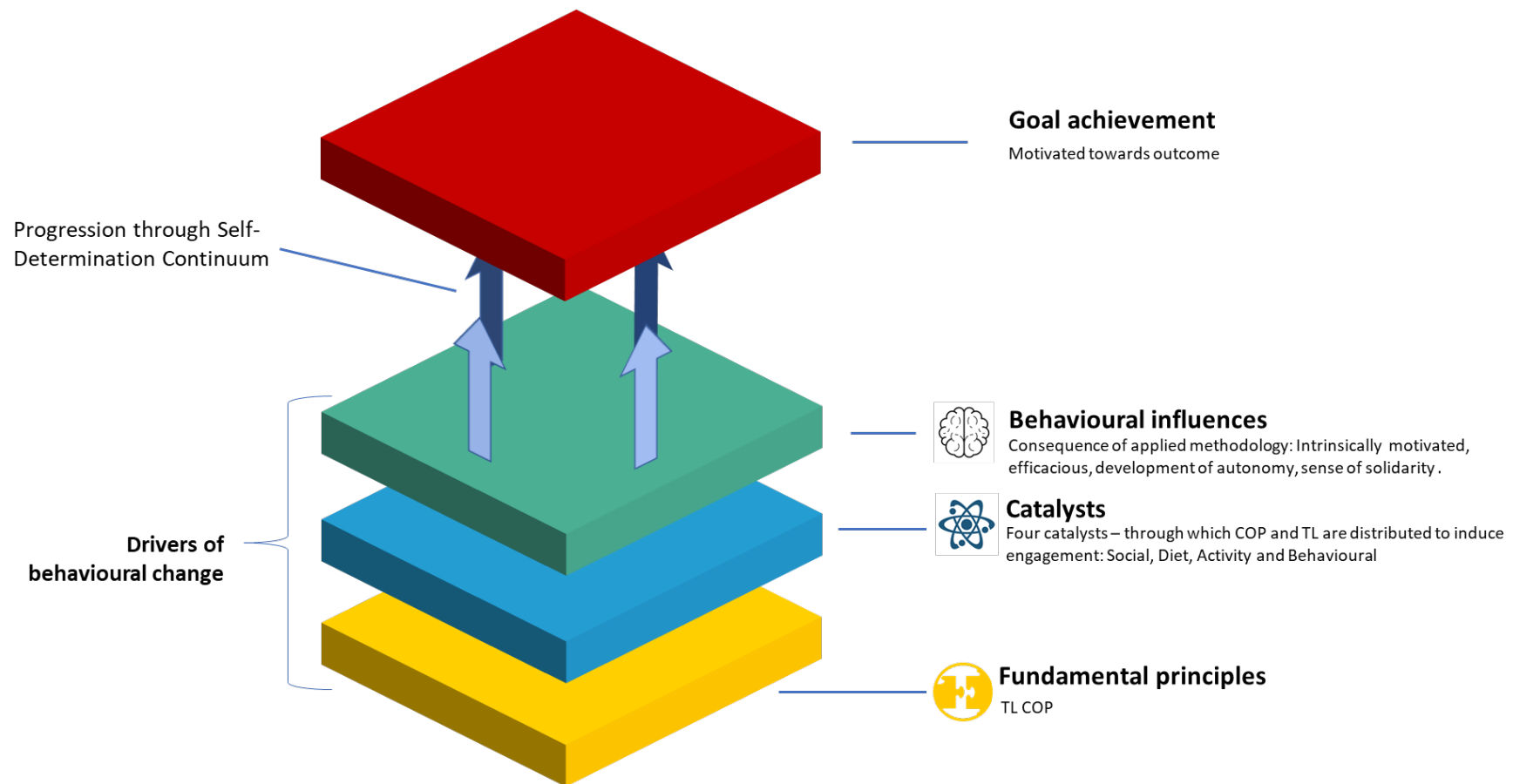


Figure 1.2: Weight management approaches to outcome achievement: unified model containing divers of behavioural change

2 Research question and study objectives

The work presented in this Ph.D. thesis aims to develop an evidence-informed football and weight management programme targeting males over 35 years, and to determine whether it can inspire behavioural adaptations that induce and sustain weight and waist loss through increased physical activity, improved dietary intake and the development of social cohesion. This will be achieved by elucidating the primary components and contextual factors which are required in weight management interventions developed to inspire weight management in previously hard-to-reach population subgroups. To achieve this goal, the aims and objectives detailed in Table 2.1 will be targeted.

Table 2.1: Summary of programme aims and objectives.

Aim
To elucidate the primary components and contextual factors which are required in weight management interventions developed to inspire weight management in previously hard to reach population subgroups.
Objectives
<p>The primary objective of the research included in this thesis centres on the design of an effective, evidence-informed multi-component weight management programme tailored to men over 35 years. Its design and implementation will utilise a mixed method approach and will be evaluated to:</p> <ul style="list-style-type: none">• Assess factors that induce engagement of men with sustained weight loss;• Uncover the underlying behavioural and social elements and their effectiveness in supporting continued engagement with programme aims;• Propose key methods and approaches that will inform future weight loss and weight management programme design; and• Offer additional evidence to influence obesity pathway identification, assessment, and management guidance.

3 Programme design aligned with the MRC framework

In 2000, the MRC developed and published a randomised control trial (RCT) framework for the development and evaluation of complex health interventions. The aim of this framework was to encourage a more theoretical underpinning for programmes, to support the development of more replicable interventions and standardise methods of evaluation (Mackenzie et al., 2010). This MRC 2006 framework was used to inform this research (Craig et al., 2008) as it provides guidance on choosing appropriate methods for utilisation and programme design. The MRC outlines 5 components that define an intervention as being 'complex' (Table 3.1).

Table 3.1: MRC 5 features of 'what makes a programme complex' (Craig et al., 2008).

#	Feature
1	Number of interacting components within the experimental and control interventions
2	Number and difficulty of behaviours required by those delivering or receiving the intervention
3	Number of groups or organisational levels targeted by the intervention
4	Number and variability of outcomes
5	Degree of flexibility or tailoring of the intervention permitted

Guidelines from the MRC are not explicit with regard the number of interacting components which need be included to categorise a programme as 'simple' or 'complex', though they do recognise the narrow gap between definitions. This programme is classified as complex, since it includes several interacting and yet separately recognised components within a single intervention (factor 1, Table 3.1) and there is a high degree of flexibility and / or tailoring with design of the intervention (factor 5, Table 3.1). As such, this research is qualified to be aligned against the MRC framework. The MRC suggest that the framework is designed with an RCT in mind and this research does not comply with that methodology. It is instead used here to provide a framework for a narrative review. Additional elements included in this research will adhere to the MRC framework as close as feasibly possible to maintain validity.

The four-stage process proposed for development and evaluation by the MRC (Craig et al., 2008) are illustrated in Figure 3.1. The four elements are approached in a feedback/ feed forward manner and are not therefore tackled in any specific order.

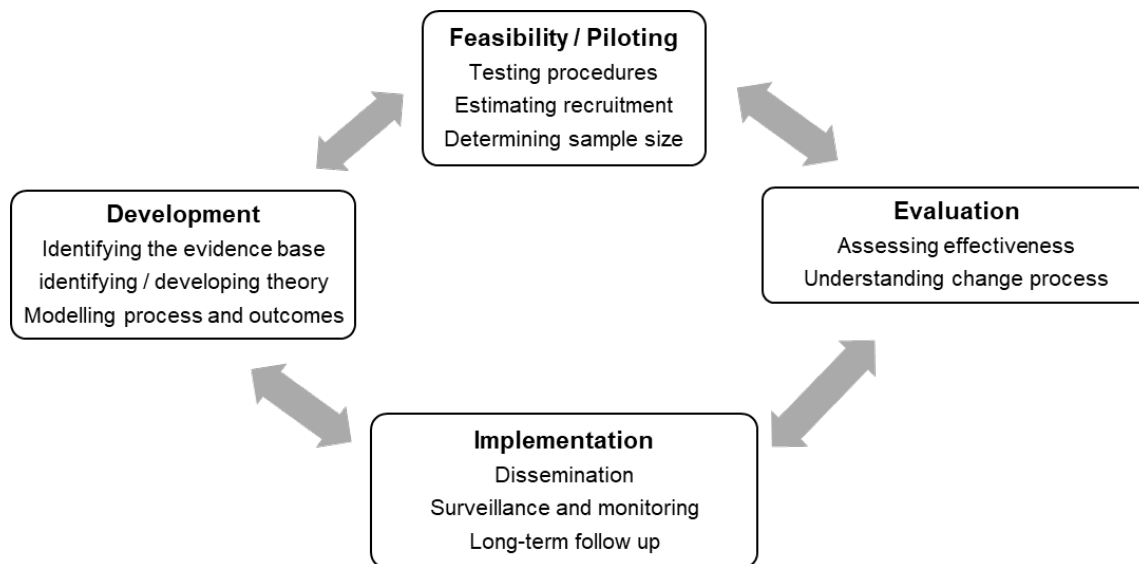


Figure 3.1: MRC Complex programme elements (Craig et al., 2008).

This research was conducted with the aim of producing an effective programme design to inform future work. The MRC guidance (Moore et al., 2015) recommends a ‘feasibility and piloting’ stage before commencement of the full trial to determine effectiveness. It was not within the scope of this research to implement a full trial once the pilot commenced.

Therefore this research consists of an informed design, followed by a piloted programme (outlined in sections 4.3 and methods section 5) then culminates in an evaluation (Figure 3.2). The evaluation is addressed within the results and discussion (sections 6 and 7 respectively).

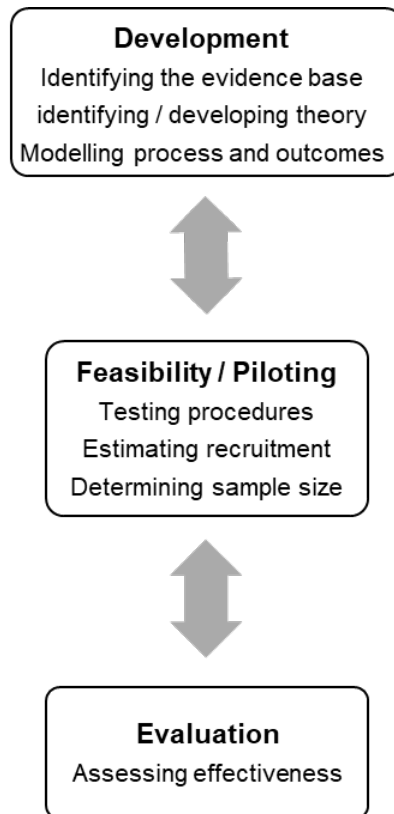


Figure 3.2: MRC Complex intervention framework elements that will be used for this research.

4 Intervention development

4.1 Identification of the literature

Systematic reviews highlight a need for male-tailored programmes including a physical activity component to enable sustained weight-loss and management (Williams et al., 2015; Robertson et al., 2016; Robertson et al., 2008; Young et al., 2012). Sport-related programmes have a large fan base and strong fan loyalty on which to draw, therefore a targeted review focused on these elements was initiated. The key objective of this narrative is to outline the key components required to attain weight loss in men following sport-themed programmes. Reactive to statistics outlined in Chapter One showing an upward trend for men becoming overweight after age 35 (Conolly and Davies, 2018), this group will be the focus of this review (all ethnicities, occupations and age groups are included to maximise opportunity to learn from previous research). Behavioural strategies are not explicitly discussed within programme designs; more typically these are provided as autonomous 'characteristics' rather than a clearly defined strategy. To address this and more clearly identify the individual behavioural techniques applied in selected research, each programme is scrutinised against Michie et al., (2013) taxonomy of behaviour change techniques which contain 93 behavioural programme characteristics.

For a study to be eligible, the primary outcome measure was change from baseline in one or more anthropometric criteria: body weight, body fat percentage, WC and/ or BMI. It is recognised that to select papers solely on this basis may impede progress towards uncovering programme design aspects. As such, report and programme evaluation literature (grey literature) was also included where deemed pertinent to the aims of the review. No specific date period was adhered to other than the limitations of the repositories and the period in which data was made available electronically. All studies included an active intervention conducted in person/ face-to-face and targeted diet, physical activity or both with the stated goal to enable weight loss. No online interventions were considered. No restrictions in programme length (including maintenance and follow-up) were applied and although ideally studies should be based within the UK to maximise comparability with the target population here, relevant programmes conducted outside the UK were considered for completeness. The inclusion criteria of studies included in the review are summarised in

Table 4.1: Inclusion criteria for papers included in review.

Table 4.1: Inclusion criteria for papers included in review.

Criterion	Detail
Population	Men, ages 18 years and older
Interventions	All relevant designs included (face-to-face only, not online)
Design	Sport based/ themed activity programmes. Dietary change promoting weight loss/ maintenance and behavioural aspects included. Designed for men.
Location	UK (though other geographical locations considered if relevant)
Period	No limitation (other than period in which made available electronically)
Follow up	No restriction

Literature indexed in Scopus (1970 – 2015), PubMed (1977- 2015), Web of Science, (1970 – 2015) and ScienceDirect (1996 – 2015) was reviewed. These periods represent the first digital presence of the journal until the period before programme commenced. Databases were searched using the following keywords and combinations thereof (Box 4.1: Search terms utilised in the literature review.), focused on male, sports themed weight loss programmes. It is acknowledged that some programmes may not define the sport or behavioural aspects as core components of the programme design and as such may not include the terms in the title or aims/ objectives. Relevant terms are included to reflect this, and reference lists of identified studies were searched to ensure completeness of the identified literature.

Box 4.1: Search terms utilised in the literature review.

“male sports weight loss programme(s)”, “sport(s) and weight loss for men”, “sport lifestyle programme(s) for men”, “sport lifestyle programme(s)”, “weight loss and sport”, “sport overweight men”, “sport obese men”, “football programme”, “weight loss football”, “sport(s) themed weight loss”, “sport themed programmes”, “rugby weight loss”, “cricket weight loss”, “hockey weight loss”, “hockey programme”, “cricket programme”, “rugby programme”, “sport overweight male / men”, “sport obese male / men”, “sport(s) and weight loss”, “sport overweight”, “sport obese”, “male weight loss”.

Following identification of relevant literature, all studies were evaluated against the pre-defined inclusion criteria. Those selected were checked against the inclusion criteria by Dr Marie-Ann Ha (Senior Lecturer, Anglia Ruskin University) and the author. Data including the study authors and year of publication; sampling methods (including method of recruitment and participant characteristics); intervention characteristics (including design, dietary, physical activity and behavioural methods); weight measurements; retention and attrition rates and behaviour change characteristics (coded by the researcher against Michie et al., (2013)

taxonomy of BCT) was extracted against a pre-designed checklist (Appendix A). A consort diagram detailing the search process and results is outlined in Figure 4.1 and data extracted from the retained papers is summarised in Table 4.2.

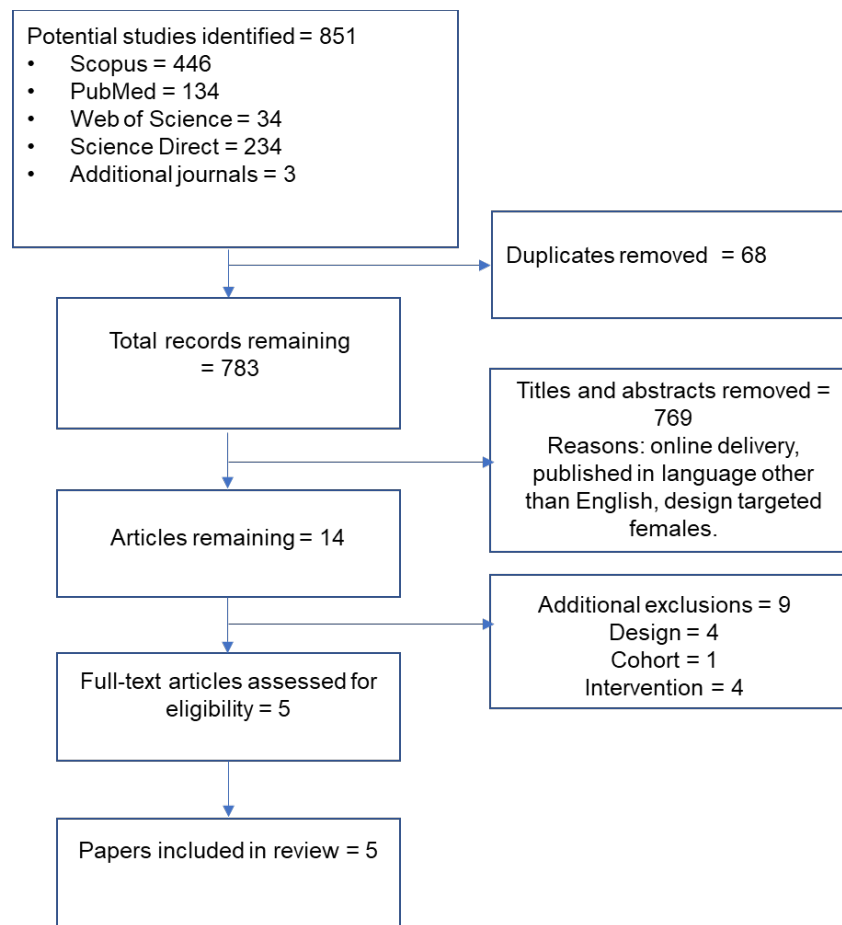


Figure 4.1: Consort diagram showing results from review of literature.

Table 4.2: Data extracted from papers included in targeted literature review.

Reference	Programme title	Location	Sample size*	Length of intervention (wks)	Age (yrs)	Activity
Pringle et al., (2013b)	Premier League Health	UK	4,020	156	18+	Variety
Wyke et al., (2015)	Football fans in Training	UK	747	52	35-65	Variety
Sealey et al., (2013)	The 12-week lifestyle programme	Australia	14	12	35-65	Circuit training
Rutherford et al., (2014)	Motivate	UK	292 (194 men / 98 women)	12	35+	Walking
Witty and White, (2011)	Tackling Men's Health	UK	202	12	18+	Not provided

* Sample is all male unless otherwise stated.

4.2 Summary of programme and key components

An overview of each programme (expanding on details summarised for between-study comparisons in table 4.2) is included below.

4.2.1 Premier League Health

The Premier League Health (PLH) (Pringle et al., 2013b) programme commenced in 2009 and was delivered across 16 English Premier league clubs. White et al., (2014) state that it was difficult to estimate how many men went through the intervention as no follow-up was performed and that the recruitment figure cited (n=4,020 men) was lower than they believed to have been involved with the programme. As such, it is difficult to ascertain either the total number of men who participated in the intervention, or its impact. Estimates (of impact) are feasible for 2,964 men, yet engagement, retention and withdrawal rates are not. Some 1,056 men completed pre-registration forms but did not provide post-intervention data. The researchers in this instance substituted the pre-data for post data (White et al., 2014) therefore the results presented are unlikely to reflect the true impact of the programme.

Provision consisted of health checks and raising awareness around health at match events. Men were offered weekly exercise classes which consisted of different forms of exercise. Delivery was not standardised and so provision varied between clubs, and different health-

related topics were covered dependent on the location. No explanation is made as to why provision varied, though it may be based on each Local Authorities' health priorities or health data.

Information provided on marketing material had been 'gendered' and avoided words such as 'dieting' and 'weight loss' and instead utilised more masculine terms such as 'sport' and 'fitness'. To show solidarity with the club, club branding was placed prominently on the literature.

Of the 4,020 men who joined the programme, 3,779 participated (White et al., 2014). Men of all ages were eligible, though the majority that attended were between 18 and 35 years (56.7%, n=2,143). The programme did not recruit from nor was able to focus on the demographic experiencing the highest incidence of male overweight and obesity prevalence at the time (Moody, 2016). Data obtained from one of the control arms highlighted that 59% of men (959/1,606) were fans of the host club while 29% (465/1,606) had no previous connection. It was stated that the recruitment approach was unsuccessful at encouraging men older than 35 years onto the programme (43.3% / n=1,636) since it is unlikely that men of that age range were not attending matches. Furthermore, the 465 recruited men who were unrelated to the club had received similar literature and suggests that the marketing or programme provision was less appealing to men who were not football fans.

At programme end, 2,916 (77%) of the men were engaging in physical activity (PA), improving from an average of 2.34 pre-intervention to 2.49 sessions per week. Sedentary time dropped from an average of 5.63 hours per day to 5.26, indicating that some increase in lifestyle activity was evident, but the programme did not make a significant long-term impact on either of these lifestyle behaviours. BMI scores were calculated pre and post intervention. Mean BMI decreased insignificantly by 0.08 kg/m² over the period (Pringle et al., 2013b). Weight, WC and weight-loss maintenance details were not published.

The researchers reported that health professionals found education sessions to be poorly attended. Times were changed to accommodate working men and sessions were tailored to the audience rather than presenting generic information that had little relationship to their lifestyle. This is considered a pivotal concept within the programme design since it begins to recognise gender distinctions. It is unclear how this impacted attendance, however.

Although the PLH programme demonstrated some positive results in lifestyle behaviours, refinement was needed to encourage engagement, though we must consider the nature of the population being targeted. PLH provided insight of an early trial into male gendered lifestyle interventions for instance, recognition of how trust supports engagement development and subsequently positive choice (White et al., 2014). Timely recognition of difficulties with

provision and engagement and real time adaptation of protocols in response to these difficulties was deemed a key success by the study authors (Pringle et al., 2013a).

4.2.2 Football Fans In Training

Football Fans In Training (FFIT) was a gender-sensitised RCT weight management programme which recruited 747 men and aligned them to either intervention (n=374) or comparator groups (n=373). The programme was conducted across 13 Scottish Premier League clubs and free 12-week physical activity and nutritional sessions (during the 2011-2012 football season) were provided. After the 12-week (one session per week) intervention period, men were moved over to a 9 month 'light touch' phase including six email prompts and this culminated in a group reunion at 6 months (Wyke et al., 2015).

Learning from previous programmes (Gray et al., 2009), the researchers utilised a variety of recruitment methods including newspapers, TV and radio and fieldworkers at football matches and activity days. Recruitment targeted men ages 35-65 years with a BMI of 28 kg/m² or greater reactive to a 2013 study conducted in America (Calasanti et al., 2013) which indicated that middle-aged men have the greatest capability to maximise the effectiveness of lifestyle interventions. The author's previous research also suggests that men are additionally motivated when informed they are 'obese' (Gray et al., 2009) and the assumption was made by the researchers that those 'nearing obesity' would be similarly motivated. Focusing recruitment to men with similar weight loss goals was intended to promote engagement and social cohesion within the group (Gray et al., 2013a). 250 men were required to power a detection of 5% difference in percentage weight loss between groups. The sample size was further increased to 360 men in each arm to account for 30% attrition (Wyke et al., 2015). Despite the difficulties recruiting men onto health interventions (Robertson et al., 2008; Young et al., 2012) FFIT staff recruited above this number, highlighting the perceived benefits of utilising a plethora of marketing approaches and exploiting fan loyalty when reaching out to men across a range of ages.

FFIT offered two activity components: a pedometer-based walking programme and a physical activity session, and a nutritional education element. The comparison group took the form of a waiting list, with members advised they would undertake the programme after the 12-month trial outcome had been completed. Other than a letter confirming acceptance on the programme and data collection periods, no further intervention took place in this comparison group, though measurements were collected at the 12-week and 12-month stage (where possible). Once the intervention group had finished their 12-week phase, a weight maintenance period began. This consisted of six e-mail prompts over 9 months and a group reunion at 6 months.

At programme end (12 months after recruitment), participants were asked for feedback including whether they had any recommendations for improvement of the programme. Out of the 41 recommendations received from the intervention participants, only one was associated with nutrition and requested healthy eating suggestions and improved tailoring of nutritional messages to men (despite the researcher's intention to do this). Within the programme design, discussions around diet were conducted in groups which may explain why more specific dietary advice may be necessary (Wyke et al., 2015).

The programme was completed by 330 (89% of total) men from the intervention arm at 12 months. Mean age was 47 years for the intervention group and 47.2 years for the comparison group. Mean weight loss with the intervention group at 12 months was -5.56 kg (95% CI, -4.70 kg to -6.43 kg) and -0.58 kg (95% CI, -0.04 kg to -1.12 kg) in the comparison group. At 12 weeks, intervention group mean weight loss was -5.80 kg (95% CI, -6.33 kg to -5.27 kg) and -0.42 kg (95% CI, -0.76 kg to -0.09 kg) for the comparison group. WC also reduced, by -7.34 cm (95% CI, -8.18 cm to -6.49 cm) for the intervention group and -2.04 cm (95% CI, -2.63 cm to -1.46 cm) at 12 months. At 12 weeks the intervention group had lost -6.70 cm (95% CI, -7.28 cm to -6.13 cm) and -1.00 cm (95% CI, -1.43 cm to -0.56 cm) for the comparison group. No assessment was made of the work done by individuals allocated to the comparison group to attain these losses; however, their independent successes are acknowledged. The proportion of individuals lost to follow up was n= 44 (11.76%) and n=18 (4.83%) on the intervention and comparison arms respectively.

Dietary improvements observed within the programme were evaluated by the Dietary Instrument for Nutrition Education (DINE) dietary assessment questionnaire (Roe et al., 1994). Nutritional education sessions targeted four key areas: restriction of alcohol, fatty and sugary foods, and promotion of fruit and vegetable intakes. Improvements were observed in all food categories, and although there was a decline in adherence to food recommendations at 12 months, improvement from baseline remained including a reduction in sugary and fatty foods and alcohol and a small increase in fruit and vegetable consumption (Table 4.3).

Table 4.3: FFIT change in DINE scores from baseline (Wyke et al., 2015).

Follow up	Fatty foods	Fruit and Vegetables	Sugary foods	Alcohol
12 weeks	-5.60	+1.60	-2.10	-6.20
12 months	-4.50	0.80	-1.30	-4.20

Camaraderie had a strong impact on the men in FFIT and responses to the feedback questionnaire indicate that it helped foster peer support, with 55% of men valuing it above both physical activity (PA) and education. Only 35.7% of men liked the PA element (this may have improved if a specific sport such as football was offered, since having been run at football

clubs, this would have been more related to the programme theme and thus appealing to the men). Indeed, 33.3% of men stated that they would like more football in the sessions.

Some 26.9% of men suggested that there should be less theory and more physical activity in the programme providing a glimpse into how lectures may negatively influence levels of enjoyment and possibly attendance. For every FFIT activity session, a classroom session was also provided. For the first week of the programme, 323 men attended sessions, and this declined to 233 men by programme end, a 28% decrease in attendance. It's unclear as to what influenced the change in attendance, however 41% (19 / 46) of those who dropped out attributed this to work commitments, 15% (7 / 46) to injury. Feedback from men who had completed the 12-week programme followed similar views highlighting that one of the biggest barriers to remaining active was injury and work commitments.

The FFIT programme was a successful attempt at engaging men into making healthier food choices. Activity levels increased as did levels of social interaction. However, the nutritional provision was still based on traditional weight loss methods (i.e., a hypocaloric diet). The researchers attempted to alleviate this somewhat by introducing flexibility into the dietary aspect by providing the opportunity to self-navigate food pitfalls through peer group discussion. However, feedback suggests that the breadth of food choice and support may have been limited. Behaviourally, the FFIT programme met 37 of Michie et al., (2013) 93 behavioural techniques (Table 4.4).

4.2.3 The 12-week pilot lifestyle programme

The 12 week intervention pilot programme (Sealey et al., 2013) was based on the FFIT programme (Wyke et al., 2015) but this time was held across two rugby club venues. Men were eligible for the programme if their BMI exceeded 25 kg/m² and they were between 35 – 65 years. Recruitment methods included adverts in emailed newsletters and flyers posted up and around each venue. Like the FFIT programme, each week included one activity session (45 mins) and a classroom-based session (45 mins) focussing on male health issues. Men were given a tape measure to measure their WC and exercise recommendations that could be undertaken outside weekly sessions were provided. Pre (week 1) and post (week 12) intervention health questionnaires were completed. 24 men enrolled onto the programme in 2011 (13 from a rugby union club and 11 a rugby league club).

Over the 12 week intervention, improvements were observed in a 12-item Short-Form Health Survey score (SF-12) (6.3 points) and health component scale (MCS-12) (5.1 points) (Gill et al., 2007). Mean (self-reported) WC decreased by 7.9 cm and weight by 2.5 kg.

No information on the methods utilised for dietary improvement or maintenance of losses was provided. Although social cohesion was targeted, the results of this work is also not detailed sufficiently to enable interpretation of successes or failures within their methodology.

4.2.4 Motivate

Loosely based on the FFIT programme, Motivate was run in a local football club (Notts County Football club) for a mixed gender group (n=194 men, n=98 women) over 12-weeks. Motivate is described as a behaviour change and nutrition advice-based weight management programme (Rutherford et al., 2014). In once weekly sessions, a combination of health information and activities were included (45 mins nutritional education; 35-40 minutes exercise). Fifty of the 98 men who completed the programme (49%) achieved the target 5% weight reduction from baseline. Mean weight loss for male completers (n=98) was -4.96 kg (106.05 kg down to 101.09 kg, $p < 0.005$). Mean male WC (waist was measured at the umbilicus, n=92) decreased by -6.29 cm (116.89 down to 110.60 cm, $p < 0.005$). Nearly half of the men (n=96) appear to have either left the programme or were not in attendance at week 12. Explanations as to why there was such a high attrition rate were not provided.

4.2.5 Tackling Men's Health

The Tackling Men's Health (TMH) initiative (Witty and White, 2010) based at the Leeds Rhinos rugby club in 2009, was a collaboration between the Department of Health, Leeds Rhinos Rugby League Club and Leeds Metropolitan University. The aim of the programme was to link up with local and national health services (such as nutrition and stop smoking incentives), with group based behavioural sessions delivered at Rugby League fixture match days. Weight loss and exercise classes (consisting of a mix of aerobic and resistance training exercises) were provided. Information covered in the sessions and classes was gender sensitive and related to a defined theme. Drop-in health clinics were placed around the stadium, with pre-match smoking cessation and weight loss sessions offered. Each pre-match session lasted 30 to 45 minutes. Design of this programme exploited supporter loyalty as a conduit for health promoting activities, however engagement was limited. Some 202 men were recruited yet follow up responses (n=89) highlighted that only 27 (30%) men had engaged with one or more programme components. Only 11 (12.4%) men accessed the pre-match weight loss group and due to poor recruitment, the stop smoking component failed to run at all (Witty and White, 2010). Of the 42 men approached during the first two matches, two men signed up.

Recruitment methods utilised substantial amounts of money to enable extensive promotion at fixtures and through the club's website. Evaluation of recruitment method effectiveness was a key goal of this programme, and insights reported include difficulties experienced at team matches approaching men they deemed to be overweight to enter sensitive discussion around weight and their need to address this (Witty and White, 2010). In the several stadium bars, separation across class demographics were observed and working-class men were deemed less willing to participate in a health check than middle class men. The strong drink culture within these locations were considered a barrier to recruitment.

The effectiveness and types of behavioural change were not explored within literature identified from this research programme, yet several insights into male behaviours impacting recruitment and engagement were provided. Firstly, practitioners reported a lack of motivation for men to instigate dialogue, they had to approach potential subjects and attempt to engage them. Targets were often found at bars, and this location could only be mediated with support from bar staff (and it remained ineffective even with this help). Despite reservations, men who engaged with the programme team were keen to become involved once the initial introductions had been made.

Pre-perceptions as to how the programme would run were discarded after several key aspects were proven to be untenable. For instance, it was planned that each man would have a single point of contact per programme component e.g. activity. This placed considerable workload onto the practitioner however, and the flexible approach led to difficulties with planning. Furthermore, most of the planned sessions were dropped early in the programme due to practitioners being unable to deliver required content within the available timescales. Instead practitioners reported the necessity for more autonomy to use methods that they deemed suitable at the time to telegraph their informed selection of pre-determined messages to participants. Recognising limitations with methods of working and communication within this public health setting, a key recommendation stated that staff should be experienced in working within a non-clinical setting (Witty and White, 2010). Staff also suggested that talking to the men more directly, using male focussed banter helped improve attendance and ultimately programme sustainability.

4.2.6 Behavioural aspects

In line with the key goals of this review, each of the selected interventions were evaluated against Michie et al., (2013) behaviour change taxonomy (n=93 aspects) to determine whether any particular behavioural aspects were conducive to engagement with behavioural changes leading to weight loss in male gendered weight-loss interventions.

Despite similarities between the design of three programmes, fewer behavioural techniques were included in the 12-week pilot lifestyle intervention (Sealey et al., 2013) and Motivate (Rutherford et al., 2014) when compared to FFIT (Table 4.4). Neither discussed behavioural or dietary approaches in detail, failing to rationalise how these related to each other and making it difficult to ascertain why weight and WC losses were lower than attained in the FFIT programme. The structure of the PLH (Pringle et al., 2013a) programme was also similar to FFIT, both offering weekly activity and education classes for example. The number of applied behavioural techniques included in PLH (n=4) however was much lower than FFIT (n=37). A large number (37 of 93) of techniques described by Michie et al., (2013) were included within the FFIT programme (Table 4.4) and the authors reported that the men witnessed improvements in self-esteem estimated using the Rosenberg Self-Esteem scale (Rosenberg,

1965). Unfortunately, this method was not used in any of the other studies therefore no comparisons are possible. Although it is not fully evaluated within the FFIT paper, we can infer that improvements in wellbeing observed may be attributed to general health improvements i.e., losing weight, gaining fitness, and to the comradery these methods helped promote amongst attendees or to the encouragement from coaches to prompt social engagement outside the programme.

Four out of the five programmes provided goal setting activities and information intended to help attendees understand the implications of negative health behaviours (Sealey et al., 2013; Pringle et al., 2013a; Wyke et al., 2015; Rutherford et al., 2014). Many behavioural strategies focus on the consequences of poor behaviour (Sealey et al., 2013; Pringle et al., 2013b) and provide suggestions on techniques which could help address them (including goal setting and problem solving as used here (Rutherford et al., 2014). However, those included in these five interventions lacked depth of explanation or rationale, acting as reactive solutions that (arguably) failed to introduce long term behavioural modification and this may explain the lack of follow-up observed after the initial interventions (Pringle et al., 2013b; Sealey et al., 2013; Rutherford et al., 2014). In FFIT, the post programme follow-up focussed heavily on maintenance of weight loss and health improvement behaviours, providing support to participants to facilitate adaptation to both social and independent determinants including 'restructuring the social environment', 'habit forming', 'adding objects to the environment' and 'avoidance/ reducing exposure to cues for behaviour' (Table 4.4).

Behavioural incentives provide a vehicle for engagement during a programme. However, to improve long term engagement with programme concepts, (and possibly also encourage attendance), additional educational and behavioural theories need to be implemented alongside a social environment which facilitates peer group support and camaraderie.

Table 4.4: Engagement with Michie et al., (2013) taxonomy of behaviour change techniques aligned with the five selected articles.

Ref /Programme	BCTs (Michie et al., 2013)	#
Wyke et al., (2015) Football fans in Training (FFIT)	<ul style="list-style-type: none"> • Action planning. • Adding objects to the environment. • Avoidance / reducing exposure to cues for behaviour. • Behaviour practice / rehearsal. • Behaviour submission. • Behavioural contact. • Commitment. • Demonstration of the behaviour. • Discrepancy between current behaviour and goal. • Feedback on behaviour. • Feedback on outcomes of behaviour. • Focus on past successes. • Framing / reframing. • Generalisation of a target behaviour. • Goal setting (behaviour). • Goal setting (outcome). • Graded tasks. • Habit formation. • Information about antecedents • Information about emotional consequences. • Information about health consequences. • Instruction on how to perform the behaviour. • Monitoring of emotional consequences. • Persuasive source. • Problem solving. • Re-attribution. • Reduce negative emotions. • Restructuring the social environment. • Review behaviour goals. • Review outcome goals. • Salience of consequences. • Self-monitoring of behaviour. • Self-monitoring of outcome behaviour. • Social comparison. • Social support. • Verbal persuasion about capability. • Vicarious consequences. 	37
Pringle et al., 2011 Premier League Health (PLH)	<ul style="list-style-type: none"> • Goal setting (behavioural). • Information about health consequences. • Provide information on consequences of behaviour in general. • Social support. 	4
Sealey et al., 2013 12-week men's healthy lifestyle project	<ul style="list-style-type: none"> • Goal setting (outcome). • Information about antecedents. • Information about health consequences. • Provide information on consequences of behaviour in general. • Reduce negative emotions. • Social support. 	6
Rutherford et al., (2014) Motivate	<ul style="list-style-type: none"> • Goal setting (behaviour). • Problem Solving. • Review behaviour goal. • Social support (unspecified). 	4
Witty and White, (2011) Tackling Men's Health (TMH)	No behavioural approaches included.	0

4.2.7 Diet

The dietary interventions used in most papers reviewed were not described in depth. Evidence suggests that these varied between use of clinical teams including a dietetic service (Rutherford et al., 2014; Sealey et al., 2013), healthcare practitioners (Witty and White, 2011; Pringle et al., 2013b) and a more public-health focused approach using nutritionists (Wyke et al., 2015). The specifics of what materials or techniques were used however was not explicit. Greater levels of detail were reported for the FFIT programme (Wyke et al., 2015) where the intention was to induce a 600 kcal (2,500 kJ) calorie deficit by encouraging men to complete a food diary and to adopt healthier food choices promoted in the UK Eatwell guide (Public Health England, 2016). No details are included to elucidate whether calorie restrictions were facilitated using calorie counting apps or replacement diets based on calories. Monitoring of dietary behaviours were conducted using an adapted food frequency questionnaire (FFQ) (Roe et al., 1994) completed every 7 days. No male-focussed healthy eating advice was included, despite authors acknowledging its importance (Gray et al., 2013b), particularly if gender influences on food choices are of interest. Without detracting from the weight loss achieved on the programme, questions remain as to how the programme was effective, and whether this could have been enhanced with greater engagement with male gendered approaches to diet.

4.2.8 Physical activity

None of the four programmes (Wyke et al., 2015; Rutherford et al., 2014; Sealey et al., 2013; Pringle et al., 2013a) that included activity focused on sport, despite being located within a related sporting club / stadium, utilising general exercise sessions instead. Two studies (Pringle et al., 2014; Wyke et al., 2015) mentioned the number of PA sessions offered, but did not provide session length or any in depth analysis of their content. Within literature describing the FFIT programme, an example session including 28 minutes of light walking, though it is unclear if this was a typical session length or content/ intensity. The 12-week lifestyle project (Sealey et al., 2013) offered a 45-minute PA session once per week including a 10-minute CV and 20 minute circuits class including a variety of strength exercises. Men were also encouraged to exercise for an additional 30 minutes per day outside of programme provision.

Despite actively participating in the PLH activity classes, only 13.5% of the men met government activity recommendations (Pringle et al., 2013a). No record of engagement with these guidelines is included in the other programmes.

Only Motivate (Rutherford et al., 2014) reported information regarding the intensity of exercise utilised (results suggest this was moderate to high) and was determined using hip located accelerometers in a small group of men (n=12). Considering the total male sample consisted

of 194 men, it would be difficult to ascertain levels of exertion for the overall sample, especially when considering individual variation in fitness, motivation etc. The pre-multistage fitness test used to ascertain participant's degree of fitness failed (men were unable to complete the first shuttle run) and the perceived 'failure' experienced by recruits contributed to issues with demotivation and drop out. It is not made clear as to how many men left the programme, however the authors report that the test was replaced with a walking fitness test, with trainers asked to encouragement from a list of tailored responses to encourage (e.g., "One minute gone, well done!") to prevent further reductions in engagement.

4.3 The pilot programme design

Design of a multi-component programme encapsulating activity, behavioural and nutritional aspects was deemed necessary to ensure the success of a weight loss and management programme for men. The following section outlines the steps taken to provide an optimised male pilot programme design and implementation. Within the review of selected programmes, behaviour was outlined as the strongest element. Both activity and nutrition (if included) did not receive the same level of analysis, despite both being fundamental components of the programmes. The pilot programme design will address these concerns by focussing on each of these three elements, assigning each equal gravity and recognising the crossover between them, for instance that group activity can help in the development in behavioural adaptation such as solidarity. Furthermore, of the programmes that mentioned diet, none were outlined as being different than any diet that had come before and may have neglected to recognise male aversions to 'diet' based terminology and components for example. The intervention design outlined here aims to recognise and negotiate the barriers outlined in experiences of previous research groups, while accommodating male preferences to maximise effect.

4.3.1 Eligibility criteria

Consistent with use of BMI as an indicator for 'health' in other studies, this anthropometric measurement is used broadly here as an inclusion criterion for the pilot programme. Any subject who self-identified as being 'overweight' (defined formally using a BMI ≥ 25 kg/m²) was invited to participate in the intervention. Given that overweight men are likely to becoming obese as they age (Moody, 2016), this required the programme to encompass both a preventative and a reactive approach.

Despite recent male obesity prevalence estimates within men ages 25 to 54 years showing a small decrease (Conolly and Davies, 2018) prevalence remains high and in older age groups (e.g., 55 to 74 years) and is continuing to rise (Moody, 2016). According to data from the HSE (Moody, 2016) the greatest number of men who are classified as obese are those between 35 to 74 years. Coupled with this, a decline in activity levels is observed in men between 55 and

74 years (Townsend et al., 2015). Recognising that moderate to vigorous activity over the age of 64 may not be suitable without clinical support, an upper age limit of 64 was established. In recognition of the age range, a Participant Physical Activity Readiness Questionnaire (PARQ+) (Eparmedx, 2017) was included to determine the individual's suitability for exercise prior to engagement with exercise. To address any concerns raised, participants will require a GP letter permitting engagement in exercise.

The pilot programme henceforth will be named 'The Alpha Programme' (TAP).

4.3.2 Activity component and links to recruitment

Of the papers reviewed in section 4.2, none integrated sport, despite recognition of the draw club identity has on supporters they aimed to recruit. This programme was designed to amend this, focusing on a single sport - football - as the activity component. Although competition is recognised for its capacity to enhance camaraderie and group cohesion, the intention of this intervention was wider than this, and thus football was used as a framework for education of attendees, designed to build stamina, fitness and skill first; with support for engagement and solidarity development integrated within competitive (fun) components.

Fan-based programmes exploit relationships between individuals and clubs to provide researchers with distinctive opportunities. Each fan has different motivations, yet they all aspire to emotional gratification linked to the club within which they share a sense of belonging (Fillis and Mackay, 2014). To facilitate engagement with health practises, club engagement has had proven success, for instance recruitment of a motivated cohort facilitating participation in health improvement activities (Wyke et al., 2015). With sports, the target demographic can also narrow and although recruitment may not be representative of the broad range of socio demographic groups which require engagement, this single aspect of unity can help engage all those recruited irrespective of their background (Witty and White, 2011).

Wenger, (2010) states that for communities to survive, their ability to adapt as a social learning system and participate in broader learning systems is key. Social learning systems (SLS) are viewed by some as the core purpose for membership in a community, since learning provides knowledge without which we would remain educationally and socially isolated. From the perspective of this intervention design, engagement, imagination and alignment were considered key components. Realisation of how these could be attained through engagement with the football club where all activities were held was used to frame the intervention and was hoped to benefit success. Integration of communities and provision of opportunities are acknowledged to share cultural practices and experiences (Wenger, 2010) and were used to promote personal development and learning of all recruits.

Reactive to government guidelines for exercise (Department of Health, 2019) and intentions for this programme to facilitate achievement of maximal, sustained health improvement in all recruits, two weekly sessions of 60 minutes each (at moderate to vigorous intensity estimated using the Borg (1998) perceived exertion scale) were included. The Borg, (2001) Rate of Perceived Exertion (RPE) 'CR10' scale provides a direct correlation with Vo2 max. Used to measure a patients exertion during exercise the Borg scale is a valid method to quantify training loads during short bouts of intermittent exercise (Scott et al., 2013a). At the end of each session, ratings of perceived exertion were provided by attendees, enabling the coach to maximise or reduce as necessary the intensity of subsequent training components (e.g., increasing repetitions or length of the task). This enabled real-time reactivity to the need for direction of subjects who struggle to keep up with the group, enabling direction to 'lower level' exercises which would continue to stretch them.'

A warm-up and warm-down period to be conducted at each session in relation to the American College of Sports Medicine (ACSM) guidelines (Sharp, 1993).

Wearing of club strips was encouraged at sessions, recognising that a football fan community is a social network with its own culture and rituals. The researcher aimed for all recruits to embrace these socially derived ideals within the group sessions to encourage and enhance engagement of attendees.

4.3.3 The dietary component

Most dietary interventions build nutritional prescriptions around substitution of current diets in favour of healthier solutions, and yet acknowledging that this can lead to poor assimilation of dietary messages if education incorporating a focus on dietary quality is not included, a more novel approach was used here. Of all reviewed programmes, only one provided a description of the dietary approach and this focused on a calorie deficit model (Wyke et al., 2015). Dietary approaches reviewed were not considered to be reactive to gender, and consequently difficulties to engage the male recruits were observed (Witty and White, 2011) within the group targeted. Given the aforementioned gender issues around diet (Section 1.3), it was considered prudent to introduce gendered aspects in this design, despite (and in places, due to) limited application of such techniques elsewhere.

One method that is often overlooked when designing methods to enhance engagement with dietary change is dietary prescription or a personalised nutrition approach (Ordovas et al., 2018). Those in receipt of personalised nutrition have shown improved uptake of healthy eating practices and engagement (Stewart-Knox et al., 2016) and this could be of advantage when used with men. Tailored approaches based on individual characteristics deviates from more common public health based dietary approaches, with methods including nutritional evaluation and prescription, in an inherently behavioural approach (Ordovas et al., 2018) This

has been shown to be capable of taking into account individual health, preferences and intolerances (Stewart-Knox et al., 2013), emphasising the potential for this construct to enable enhanced flexibility for ‘gendering’ of advice.

Though individualised dietary support can be effective within public health settings (Elizondo-Montemayor et al., 2013; Sartorelli et al., 2005), no large, personalised nutrition studies have yet been conducted to ascertain their effectiveness when levelled against non-personalised approaches. This is further complicated by the definition of what ‘personalised nutrition’ entails. One personalised nutritional research programme split participants into four groups with increasingly complex methods of nutritional assessment, from the basic level of nutritional support (based solely on dietary feedback) through to the most complex assessment and prescription (based on phenotypic and genotypic data) (Forster et al., 2016). The effectiveness of these different approaches is yet to be ascertained, and the costs of development, analysis of data and prescription are not mentioned. It can be assumed however that the complexity of design would incur costs in provision of support which would exceed traditional public health procurement budgets, thus rendering large public health roll-outs unsuitable (especially in the face of decreasing UK public health budgets and greater emphasis on programmes that produce value for money) (Buck, 2019). These methods could however be adapted to support larger groups if simplified procedures are developed. Reactive to the expectation that entrenched dietary behaviours would be encountered within the target population here, to influence them the dietary approaches used were developed to combine behavioural and dietary components that are influenced towards the target group (in this case, gender). In recognition that improved food knowledge could lead to greater access to healthier lifestyle behaviour (Grunert and Aachmann, 2016; Gracia, Loureiro and Nayga, 2007), and the potential that this could in turn benefit lifestyle behaviours (Kendall et al., 2017), the pilot dietary approach utilised in this intervention entwines education and improvement of nutritional knowledge. No calorie counting/ calorie deficit goals were included: the intervention focuses solely on improving dietary quality. With migration to better food choices, there is an expectation that energy consumption levels will decrease in line with greater levels of satiation, and a prescribed energy deficit will not therefore be required. To account for possible relapse and subsequent disengagement, men will be able to move backwards and forwards through the dietary advice to allow ‘treats’ in accordance with their attainments and progression. The intervention is therefore ‘staged’, each level being completed before subjects are pushed to engage with the next.

The nutritional methods used in the intervention were designed to provide flexibility, allowing participants to maintain their food preferences rather than replace the diet altogether as is witnessed with several commercial options (Rosemary Conley, 2020; Weight Watchers, 2020). Recognising that men may have difficulty acclimatising to food types included in some

weight-loss protocols, this approach aimed to facilitate transition to healthier foods. This design extends lessons learnt in research by (Morgan et al., 2011b) and previous (unpublished) experiences of the author where engagement with advice was enhanced by permitting inclusion of individual food selections selected by recruits. Recommended dietary changes were designed to be small yet significant, and accommodated into the usual diet using a phased, gradual dietary adaptation approach designed to support assimilation of knowledge and maintenance of practical applications.

Each step of the research programme nutritional procedure (summarised in Figure 4.2) was devised to help recruits adopt key nutritional recommendations while also supporting the assimilation of healthier eating behaviours. Each component consisted of simple messages the men could both remember and interpret only as intended.

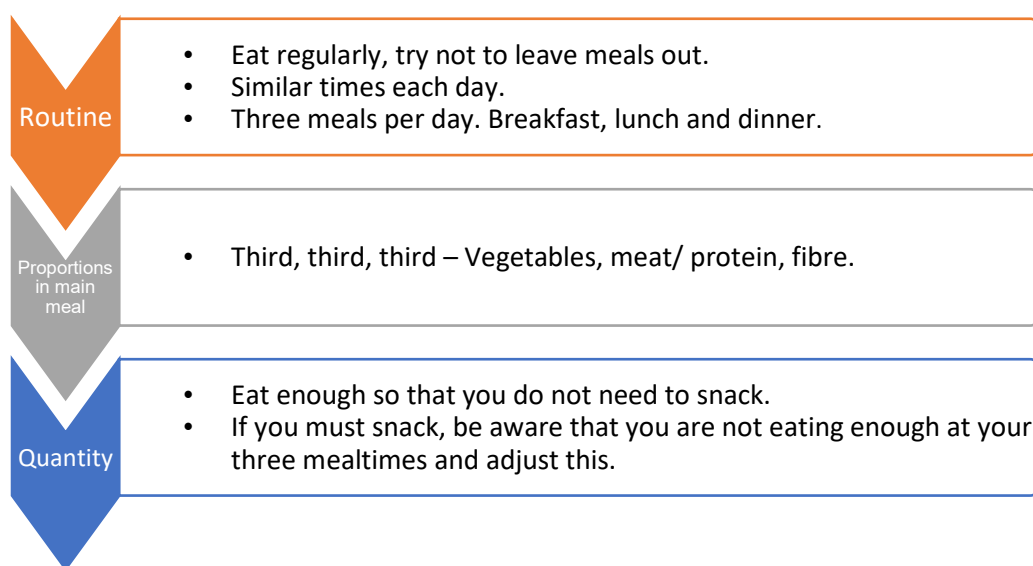


Figure 4.2: The Alpha Programme dietary procedure.

Integrating education within this framework, the sessions with recruits were used to explain how dietary manipulation can lead to weight loss, and to explore each component of diet and nutritional science in turn to elucidate how each section associates with research evidence and food consumption guidelines (in a light touch manner, designed to emphasise the evidence-based nature of the intervention). Reactive to the fact that men commonly dissociate themselves from dieting (Gough, 2007) and health service support (Räsänen and Hunt, 2014), all dietary sessions were personalised, held in one-to-one situations whenever possible, and included personalised, simplified and open nutritional suggestions to support engagement. Class based sessions were not used, instead group discussions were conducted in the changing room for around 30 minutes prior to the activity sessions to address any questions subjects raised and help the men realise that feedback given to them in individual sessions was not 'different' to that required by or given to the other men. To

enable personalisation of advice where needed, short, participant-led one-to-one dietary sessions were also held each week.

Theme 1: Routine

Research evidence highlights that chaotic meal consumption can lead to increases in cardiometabolic risk (Pot, Hardy and Stephen, 2014) and metabolic syndrome (Sierra-Johnson et al., 2008). Koopman et al., (2014) and other authors suggest that high frequency meal skipping for example, is independently associated with increased hepatic steatosis and abdominal fat (Marwaha and Tiwari, 2018; Huang et al., 2010). Whereas regular eating is associated with improved peak insulin concentrations and insulin response (Farshchi, Taylor and Macdonald, 2005) and improved glucose response (Alhussain, Macdonald and Taylor, 2016). Higher frequency meal intake is also associated with increased nutrient intake (Leech et al., 2016; Kerver et al., 2006). Consumption of breakfast culminates in increased feelings of fullness and decreased feelings of hunger during the mid-morning period, reducing lunchtime energy consumption by as much as 17% (Camire and Blackmore, 2007). A larger proportion of caloric intake within the morning meal similarly can lead to greater weight loss and fat-free mass loss when compared to the more traditional large meal at the end of the day (Keim et al., 1997). This programme was designed to be reactive to evidence like this, emphasising the importance of regular eating and inclusion of breakfast every day. Despite support of this amendments to typical patterns of eating by guidance offered by the NHS (NHS, 2017a) this is an acknowledged change in the typical pattern of eating seen typically across all consumers in the UK (Mills et al., 2018; Daniels et al., 2012) and hence was the first 'goal' set for the Alpha programme.

The goal to negate meal skipping is a core aspect of the intervention. Recommendations were made on when to eat (first) and what to eat (second) – the intention being that eating three main meals a day first will reduce desire to snack between meals.

Theme 2: Proportions in meals

Following on from this, a strong emphasis on ensuring consumption levels are adequate to meet metabolic requirements was then promoted. This is reactive to research evidence demonstrating that lower daily energy intakes will cause weight-loss plateau through metabolic adaptation (Royer and Chaput, 2013; Tremblay et al., 2012; Farshchi, Taylor and Macdonald, 2005). The procedure aims to support a move towards recommended macronutrient intake levels (30-35% energy intake from fat, no more than 10% from saturated fat, 0.8 g/kg protein intake and the remainder – approximately 50% energy intake – from carbohydrate sources). Alongside nutrient recommendations, goals outlined in food based dietary guidelines were also targeted (Scientific Advisory Committee on Nutrition (SACN), 2015; Committee on Medical Aspects of Food Policy (COMA), 1991). Recruits were advised on lean meat choices and fish consumption recommendations (Public Health England, 2018), at all times including

advice linked to dietary preferences expressed by the group (or individual). For those that preferred red meat for example, advice targeted education on selection of lean meats (e.g., venison) and cuts (e.g., loin), ideal cooking methods (stewing/ braising rather than fried) and the ideal to reduce intake – either in portions (with addition of more vegetables for satiation) or in frequency. By influencing meal proportions, this aimed to provide participants with an opportunity to influence their dietary quality positively, reducing consumption of free sugars, saturated fat and salt, and increasing intakes of fibre, fatty fish and vegetables for example.

The primary goal for each main meal was to include a third each (Figure 4.3) of their intakes from lean protein; fibre and vegetable sources. By elevating consumption of high-quality carbohydrates, vegetables and fibre-rich foods, vitamin and mineral intakes will concurrently be improved. The catchphrase ‘third, third, third’ will be repeated throughout the programme to simplify and reinforce this message.

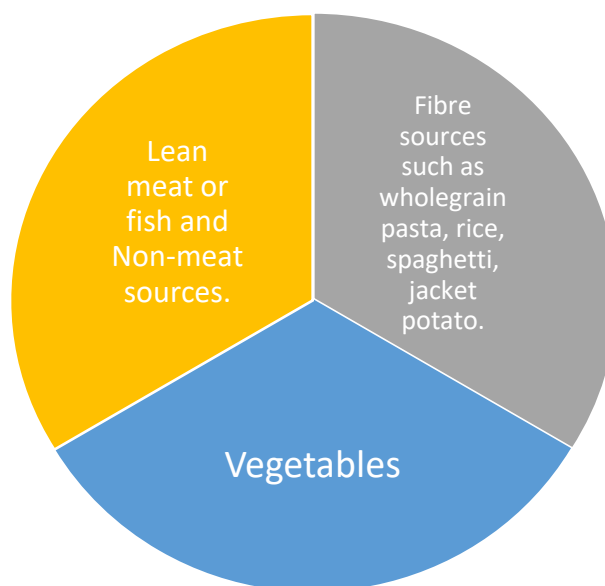


Figure 4.3: Makeup of the 'third, third, third' lunch and dinner recommendations.

Where snacks were required, recruits were advised to select a healthy option such as fruit (fresh, dried or canned), nuts (preferably unsalted, with pericarp/ skin intact) or raw vegetables (carrots, cucumber, celery).

Evidence from the literature suggests that breakfast will often consist of a low number of ingredients or single ingredient solutions. As such it was deemed unsuitable to segment this meal and though recommendations were made, a reliance was placed on the participant making his own breakfast choices reactive to the overall dietary recommendations outlined.

Lunchtime meals aimed to support a move away from refined bread and introduce alternatives such as wholegrain breads, flatbread, pitta or tortilla which have reduced amounts of salt and sugar, and a lower glycaemic response therefore increased index for satiation (Juanola-falgarona et al., 2014; Bornet et al., 2007). Increased intakes of salads and vegetables were encouraged at all opportunities, including a variety of different vegetables according to preference and/ or seasonality/ availability. Healthier choices such as leaner meats, soups and salad meals were recommended as an alternative to traditional 'sandwich lunches' to improve satiety through the afternoon period and nutrient levels in the diet overall. In recognition of the fact that the men would be training for two hours per week, muscle synthesis will require adequate levels of macronutrients. Any amendments considered necessary were outlined on an individual basis, with all recommendations – but particularly those made with regards to protein – designed to ensure intake levels reached and stayed within government guidelines (SACN, 2011). Use of supplements was not recommended as standard due to the risk of over consumption and intention that all dietary requirements could be met through the diet alone.

Theme 3: Quantity and quality

The dietary intervention aimed to provide men with the information needed to improve their diets using a structured, sequential approach. Reactive to concerns that necessitating a sudden and complete change to dietary habits could disengage recruits and not prove sustainable, they were instead asked to gradually transpose or adapt unhealthy eating practices, to make choices that conform more closely with recommendations such as regular eating (Farshchi, Taylor and Macdonald, 2005) and inclusion of a breakfast (Gibney et al., 2018). This enabled tailored of support provided to each recruit, reactive to their preferences, current patterns of intake, tastes and questions.

All dietary and nutritional advice offered focused on eating more rather than restriction to increase satiety and reduce cravings and hunger between meals (when 'poorer' quality food choices are more likely). Advice therefore centred on diet quality improvement. To support the intention to 'gender' nutritional prescriptions in the intervention, men were invited to select a 'treat' day once per week. Allowances such as alcohol, red meat and confectionary are permitted on that day, to help maintain adherence to overall dietary improvement advice and prevent attrition acknowledged in restrictive dietary regimes (Gray et al., 2009; Leishman and Dalziel, 2012), meal preparation times (Larson et al., 2009; Ortner Hadžiabdić et al., 2015), and where lack of autonomy is perceived (Archibald et al., 2015). Advice promoted avoidance of pre-packaged foods, included food shopping recommendations (e.g., shopping healthily on a budget), and was reactive to the potential for low level food preparation skills, necessity for cooking quick meals, simple recipes and cooking techniques and where to shop for example.

Information was shared / repeated via the changing room sessions and repeated through individual dietary feedback sessions.

Dietary quality improvements recommended were guided by research evidence. Lepicard et al., (2017) and Gibney et al., (2018) suggest that breakfast consumption is associated with higher energy intake but also more complete nutrient intakes for micronutrients including folic and ascorbic acids, fibre, calcium and iron. Breakfast advice typically focuses on a low number of ingredients or (where feasible) single ingredient solutions that support more complete micronutrient profiles, without a negative impact on weight. Promoted meals / ingredients therefore included dairy sources e.g., eggs and milk, with alternatives for vegans, encouraging the men to move away from often commercial solutions that contain large amounts of sugar and which lead to craving-induced snacking behaviour (Davis et al., 2011) to high quality carbohydrate, fat and protein content foods such as fish, side salad / vegetables and potatoes, chicken and vegetable curry with wholegrain rice.

Dinner and lunch provide an opportunity to increase dietary quality and reduce snacking behaviours in the afternoon (lunch) and evening (dinner). To achieve this, increases in vegetables and fruits were promoted in both meals, with a lean meat or fish source with salad or vegetables in accompaniment. Additional options for lunches were proposed, such as soups, which again can contribute to higher nutrient intake (Zhu and Hollis, 2014) while being low-cost if produced at home. Key health promotion messages around salt and sugar restriction for example were imparted for all meals. The focus for lunchtime meals supported movement away from refined, bread-based choices (e.g., 'meal deals'), introducing alternatives such as flatbread, pitta, tortilla which have reduced amounts of salt, sugar through education about alternatives that could be encouraged.

On a weekly basis, recruits were asked to keep a record of what they were consuming. Feedback could then be given in direct response to their submissions, and progress evaluated from food records (improvement in nutrient intakes and food choices compared to baseline, adherence to dietary improvement recommendations), weight and WC measurements and reactive to discussions where difficulties or concerns experienced are raised. This dietary manipulation procedure allowed for progressive and regressive changes in dietary habits, whilst supporting change by building participant knowledge around food choices and consumption patterns in a personalised, reactive and tailored educational process.

4.3.4 Participant-focused monitoring of progress

Successful dieters have shown great self-efficacy, successfully negotiating barriers to weight loss and maintenance, utilising skills such as regularity of eating, increased activity, regular food record keeping and frequent weighing (Nakade et al., 2012; Thomas et al., 2014). To attain this, recruits were asked to monitor dietary intakes using a food diary (record) method.

This method of recording food intake and has been shown to validate well against other methods (Rutishauser, 2006) but is dependent on the complexity of information targeted. Longer diaries can be more representative of typical intakes, but they can also be associated with respondent fatigue and reduced quality and completeness of included information (Gersovitz, Madden and Smiciklas-Wright, 1978). The NDNS Survey for example reduced recording time from 7 to 4 days with no discernible drop in recording accuracy (Lennox et al., 2008). Whichever number of recording days are chosen, it is acknowledged that the method can have a tendency to induce under-estimations of actual consumption levels (Gay, 2000), and/ or mis-reporting of items in particular high fat and/ or sugar foods (Lennox et al., 2011). To avoid under-estimation of intake, no requirement to determine quantity (weight, nutrient and calorific values) was requested. Recruits were asked to provide details on only three aspects: when they ate, meal constituents (ingredients) and a basic meal description; and for three-days only. This approach (aligned to a three-day food record method) was submitted on a weekly basis, facilitating 'turnaround' of advice. Ordinarily, one on one dietary prescriptions using a diary method are time consuming and highly specific therefore are and not a preferred method when working with large groups (Shim, Oh and Kim, 2014; Biró et al., 2002). Although completeness of dietary intake records was recognised, this method was designed to enhance simplicity – both for data capture and processing – and thus, effectiveness for feedback and improvement.

4.3.5 The behavioural component

Poor attendance and dissatisfaction with classroom-based sessions have been reported to impact weight loss programmes negatively (Wyke et al., 2015). To prevent this here, the focus of all interactions was either activity or nutrition. Football was viewed as the draw for recruits, so was included within all interactions. Educational elements linked to dietary manipulation were integrated during times used by the men to change, during weigh in's or pitch-side conversations. Nutritional prescriptions consider historical and contemporary participant food consumption and activity patterns and so factors that require large deviations from existing lifestyle were avoided or minimised to improve assimilation. Education and behavioural modification are paramount to the intervention design, and so attainment of dietary manipulations targeted had to be achievable through 'light touch' communication approaches, relying on 'negotiation' rather than one-way discourse to positively influence dietary preferences. All promoted dietary changes consisted of advice framed within each of the three themes (*Figure 4.2*) outlined, reactive to questions asked while remaining supportive of their choices/ decisions made, rather than pressuring them to make changes to induce weight loss.

Design of the pilot programme aimed to provide conditions that are conducive to generation of team cohesion, invoking a friendly, informal approach built on trust, a key facilitator for in-relationship development which encourages social bonding (Demjén, 2016; Boxer and Cortés-

Conde, 1997). Methods of socialisation, in particular humour and banter are well placed to help facilitate achievement of goals, through supporting development of engagement and solidarity (Robertson et al., 2013; Tremayne, 2013; van Nassau et al., 2016). The nature of the programme design, providing an opportunity for a group of men to meet regularly for lengthy periods provided an opportunity for these aspects to flourish. All trainers and researchers working with the recruits will be encouraged to use honesty, humour and banter in interactions, emphasising the benefits of natural communication over one that appears forced or scripted. The coach was tasked with telegraphing fun and enjoyment within all physical activity sessions.

4.3.6 Data collection and measurements

Recruits self-identified as being overweight ($\text{BMI} > 25 \text{ kg/m}^2$), however a baseline assessment was done for all subjects to ensure standardisation for later comparisons and enable discussion with any subjects who were 'normal' weight by this standard (to determine the utility of the programme for their needs) and also those at the highest levels of BMI to ensure their safety.

Height was measured at the first session of attendance using a Seca 213 portable stadiometer to the nearest 0.5cm and be taken in accordance with the International Society for the Advancement of Kinanthropometry (ISAK) (Stewart et al., 2011). Participant measurements were taken twice, and the average recorded. Weight measurements were taken on a set of class 3 digital weighing scales (Model Marsden M-430) to the nearest 0.1 of a Kg. BMI was then calculated for each subject using the standard formula: $\text{weight (kg)} / \text{height (m)}^2$.

Waist circumference (WC) measurements were taken at the umbilicus using non-stretch vinyl coated 150cm measurement tape. Measurements were taken in triplicate then averaged to the nearest 0.1 centimetre (cm).

BMI, weight and WC measurements were provided verbally at time of taking the measurements.

Recognising that individual interviews are a powerful method for providing insight into the thoughts, beliefs and experiences of individuals, semi-structured interviews were conducted pre- and post-programme. Pre-interview questions focused on the participants expectations, their impressions of food, diet and exercise history. Post-programme interviews centred on their impressions of the programme and diet and impact on lifestyle (Appendix B).

4.3.7 Goal setting

All advice provided was aligned to that communicated to the public in general, based on the research-led consensus promoted by the NHS for example. Current dietary guidance suggests that a 5% - 10% weight loss can lead to significant improvements in cardiovascular

health (Wing et al., 2011; Stegenga et al., 2014), while NICE clinical guidance (Coulton et al., 2017) suggests a weight loss of 0.5-1kg (1.1 – 2.2 lbs) per week is relatively safe (and sustainable). Reactive to the fact that all recruits can be expected to know these ideals, both aspects were utilised within the programme. Participants were informed of their targets at the first session, and discussion was initiated to determine whether they had any additional goals or needed support to enable interpretation of these details.

4.3.8 The process evaluation

Process evaluations are conducted to ascertain the level and impact of programme delivery in order to strengthen future provision (Moore et al., 2015; Carroll et al., 2007). This research will evolve during its length by correcting problems in implementation as they arise. Such an approach is consistent with MRC process evaluation of complex programme guidance (Moore et al., 2015).

4.3.9 Summary of programme concepts

Amalgamation of all details summarised above forms design of a pilot research programme known as The Alpha Programme (TAP). It comprises a football-based weight management programme for men. The pilot study utilised a convenience sampling method, a form of non-probability or non-random sampling where the sample were required to meet certain criteria, such as accessibility, proximity to the research and convenience (Etikan, 2016), to recruit as many men as possible onto the programme. The key, evidence-informed components of the programme are summarised in

Table 4.5.

Table 4.5: The Alpha programme design features.

Component	Detail
Length	12 weeks.
Recruitment	Word of mouth, leaflets and newspaper adverts.
Eligibility criteria	Self identifies as 'overweight' (BMI >25 kg/m ²) Ages >35 to 64 years. Male.
Registration	Participant Consent Form (PCF), Participant Information form (PIF), Registration form, Physical Activity Readiness Questionnaire (PARQ). Forms to be cross-checked by staff at induction.
Induction	Presentation on programme – questions and form filling.
Pre-taster football session	30-minute introduction to football at induction
Weight loss target (at 12 weeks)	5%-10% weight loss toward attainment of NHS derived BMI target (18.5 to 24.9 kg/m ²).
Coaching	Targeted football skills, match-play and fitness development. Qualified football coach and with first aid training. Researcher (Level 3 advanced personal trainer) providing physiological support and dietary advice.
Data collected	Weight and waist measurements taken for baseline and weekly thereafter. Height to be taken at induction for BMI estimations (baseline only). Pre-programme and post-programme individual semi-structured interviews conducted in accordance with Appendix B questions. Rate of Perceived Exertion (RPE) (every session).
Exercise/ Activity: Football	1 hour per session x 2 sessions per week. Moderate to vigorous intensity. Pre-session announcement detailing session aims. End of session chat regarding session achievements. Warm up and warm down.
Dietary approach	3 days recorded (2 week, 1 weekend days), submitted by email. Advice: <ul style="list-style-type: none"> - 3 meals/ day. - Third (lean protein), Third (vegetables), Third (high fibre foods). - Focus on diet quality improvement. Feedback weekly during weighing in sessions/ pitch-side. Changing room discussions around food/ behaviour/ lifestyle approaches.
Behaviour change	Maintain football attachments e.g. football related banter, team strip. Banter and humour led. Development of trust.
Process evaluation	Conducted throughout 12-week period.

The Alpha programme timeline details the tasks that will be included over the 12-week period (Figure 4.4).

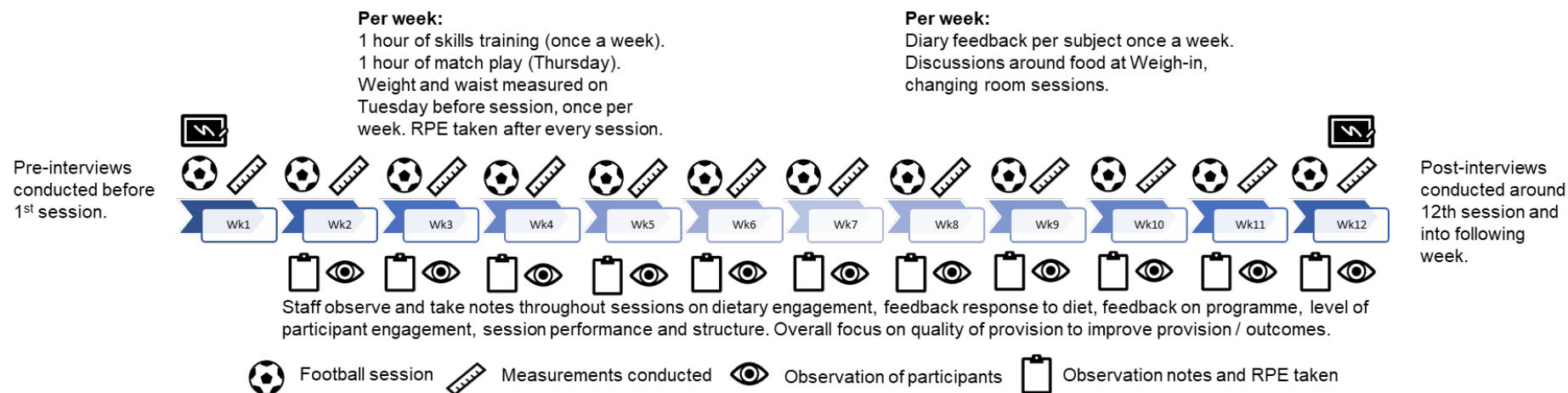


Figure 4.4: The Alpha programme timeline and scheduled tasks.

5 Methods

This chapter provides a rationale for the methods and procedures adopted in addressing the question posed in this study: to determine whether the design of an evidence informed football and weight management programme targeting males over 35 years can achieve significant weight and waist loss and facilitate maintenance of that loss through increased physical activity, improved dietary intake and the development of social cohesion. This question stems from the need to address the inequalities of male to female engagement with health services, high male overweight and obesity prevalence and the lack of male-gendered weight management provision. A purely quantitative approach would not be sufficient in providing the depth of insight required to uncover male experiences of the pilot programme and so a qualitative thread is used to facilitate wider interpretation of the quantitative outcomes. Both are explored in this section.

5.1 Ethics

Ethical principles 1 to 6 (ESRC, 2012) of the British Economic and Social Research Council were adhered to in all methods used in this study. The protocol outline was explained to the participants during the induction interview and participants were free to ask for clarification at any time. Stage 1 Ethical approval was sought from the Faculty Research Ethics Panel (FREP) on a single occasion. Approval was accepted from the date 23rd June 2015 for three years. Reference Number: 15/026 (Appendix C).

This research followed the best ethical guiding principles, specifically related to weight management programmes at the time. Research ethics in practice were aligned with Have et al., (2013) "*Ethical framework for the prevention of overweight and obesity*".

It is recognised that the researcher was in a position of authority and as such could exert strong influence on participants. Participant autonomy was preserved by ensuring that no pressure to implement recommendations were placed on the participant. The risk to health in relation to weight, overweight and obesity prevalence and health risk with certain age ranges were made clear to the men and at no time were health-related recommendations made that sat outside of the best research at the time. Both dietary and activity recommendations were left to the participant to make the decision as to whether those recommendations would be implemented to preserve autonomy. No undue pressure was exerted on the participant for not taking on recommendations. Though if the participant's alternative approach was considered to risk his health, the researcher and coach explained this. It was important that both the researcher and coach provided equal support and inclusiveness to the men to reduce likelihood of discrimination / stigmatisation of any who decided not to implement aspects of the dietary advice.

For storage and access of information, the researcher followed the regulations set out by the Data Protection Act, 1998. All online diary data and collected data was protected by a private password protected login to the study's website session. This data was encrypted and kept in an online database. All data was made available to participants to assess accuracy. Withdrawal from the research would result in collected participant data being destroyed.

5.2 Risk management

Analysis was conducted in accordance with the UK Health and Safety Executive Risk assessment framework (HSE, 2013) and focussed on aspects relating to training. Some risk was reduced by using the PARQ+ to determine the individual's suitability for exercise, though continuous monitoring was still undertaken to watch for signs of decreasing health e.g. fatigue, shortness of breath. Individuals were reminded that they were to speak to staff immediately with any concerns. Individuals flagged as a concern by the PARQ at induction were prevented from participating in training until they had received a GP's letter of permission to participate in exercise. Additional areas of risk had been outlined (Appendix D) and align with the six tenets outlined by the UK Health and Safety Executive.

The coach would bring along a register for each session. The coach, being a qualified first aider and defibrillator trained would bring along a first aid kit. The location of the premise defibrillator was noted, and it was the researcher's responsibility to retrieve the defibrillator whilst the first aider attended the patient.

All accidents were recorded in a safety booklet and notes added to the participants attendance sheet. The participant was also contacted later that night to check on his health and to ask if we could help him seek additional help/ support where needed. General advice on treatment was made if the injury was within the skill set of the coach and researcher.

Indemnity insurance to the value of £5 million was provided throughout the research period.

5.3 Phases and recruitment

The Alpha programme run for a period of 91 weeks, considerably longer than the initial plan of 12 weeks. This 12-week period is referred to as phase 1 (Table 5.1). Phase 1 included an induction session at week 1 (conducted on 28th January 2015). After the last session of phase 1 (8th April 2015), there was a rest period whilst the researcher conducted interviews and evaluated the collected data.

With several men requesting a continuation, with ethical approval to enable this in place, protocols were amended to enable this, collecting data for as long as possible to further support the men with sustaining weight loss. This period, Phase 2, began on the 5th May 2015, with 13 men continuing from phase 1 and an additional 9 men recruited.

Phase 2 consisted of an additional 80 weeks and ran until the 27th March 2017 when the programme ended. This provided an opportunity for men to enter onto the programme at any time (drop-on) and a further 9 men were recruited through word of mouth during phase 2 period. Dietary, behavioural and activity provision remained unchanged.

The venue was provided for included within the research budget during phase 1, however in phase 2, recruits were charged £3/ session to cover the pitch hire fee.

Table 5.1: The Alpha programme recruitment stages.

Phase	Participants (n)
Phase 1	17
Phase 1 continued with phase 2	13
Recruited for the start of phase 2	9
Additional recruits throughout phase 2	9
Total attendees	35

All participants completed the study induction and had baseline measurements taken. A total of 35 men attended the programme throughout the 91-week period.

For phase 1 recruitment; 60 leaflets were printed and distributed (Appendix: E). Ten leaflets were left at the reception of Baldock football club, the location for the sessions. The remaining leaflets were divided between the researcher and volunteer coach who distributed to friends, family, and acquaintances. Potential participants were able to contact the researcher directly via the contact details on the leaflet, register for attendance in person through the researcher or coach or register interest at the football venue.

For continuation of the programme (phase 2), starting on the 5th May 2015, 60 leaflets were printed and distributed to the football club as well as 3 local public houses and an additional local football venue (Shefford Football club, Bedfordshire). In addition, a free newspaper editorial (Appendix F) was commissioned to publicise the weight loss aspect of the programme and the benefits of football. An email and website address were placed in the editorial.

Eventually the planned phases were dropped from the programme and instead a rolling programme emerged through which participants could join at any time. This added no further administrative overheads other than the need to provide an induction and documentation check more often. In response, slides were moved to a tablet which provided greater flexibility. Registration documentation remained in paper format.

5.4 The induction session

All participants completed an induction session (Table 5.2) consisting of a presentation prior to commencement of training. This was conducted in a meeting room provided by the venue operators. The presentation was followed by the completion of documents; two Participant Consent Forms (PCF) and one Participant Information Sheet (PIS) a PARQ+ and the Registration forms (Appendix: G) which recorded personal contact details and next of kin details in case of emergency. All forms were checked for completeness and to ensure no health concerns were raised through the PARQ+ documentation prior to engagement with the exercise intervention. Anthropometrical baseline measurements (weight, waist and height) were collected using methods outlined in section 5.6.

Alongside written details outlined in the PIS, information about the study was presented to all participants during induction. The opportunity to ask (and address) questions continued throughout the session. Upon acceptance of the details included on the consent form and research protocol, recruits were asked to sign two copies of the PCF, with one copy handed back to the participant and the other retained by the researcher. All participants were provided with the PIF and encouraged to retain it.

Baseline measurements were taken and recorded on the participants registration document. Each registration form had a 'tear off' slip at the bottom, so that participants could retain a copy of their baseline measurements.

Table 5.2: Order and content of induction session.

<p>Induction session</p> <ol style="list-style-type: none"> 1. Introduction of Alpha staff who elucidate programme structure and aims, and induction session plan: <ul style="list-style-type: none"> - What to expect from the programme – meet weight loss targets - What we expect from participants – respect, honesty, commitment, regular attendance, effort, enjoyment and to make friends. 2. Ethical, risk and safety responsibilities acknowledged. <ul style="list-style-type: none"> - Any injuries that we should be made aware of? 3. Goals of programme outlined, with reference to prevalence of male obesity and opportunity to reduce co-morbidities and design focus on male help seeking and behavioural related risk. 4. Methods utilised in the programme explained: <ul style="list-style-type: none"> - Food diaries – approach, submission and feedback. - Theme 1 of the food procedure. - Weight (kg), waist (cm, umbilicus) and height measurement methods. - Exercise intervention and injury avoidance – pacing oneself for football. - Explanation of the RPE scale. 5. Question and Answer session. <p>Participant Information Form (PIF) provided to summarise details.</p>
<p>Completion of documentation/ Registration</p> <p>Prior to enrolment on the programme, all subjects were required to give informed consent and complete the following documents.</p> <ul style="list-style-type: none"> - Participant Consent Form (PCF). - 2014 PARQ+. - Registration document. <p>All forms were checked for completeness.</p>
<p>Measurements taken (method)^</p> <p>Baseline anthropometric measurements were taken on site by the lead researcher.</p> <ul style="list-style-type: none"> - Height - Weight - Waist circumference <p>Measurements were checked and a 5 - 10% weight loss goal calculated. BMI calculated, and weight target established. All details recorded for researcher and shared with the subject.</p>
<p>Football session</p> <p>Initial exercise intervention run to ascertain baseline fitness of subjects and highlight the collaborative and fun intention of the intervention design.</p> <ul style="list-style-type: none"> - 10-minute warm-up - 20-minute light-touch football sessions. - 10-minute warm-down.
<p>Post session</p> <p>Verbal feedback was collected on the session from all subjects.</p> <p>RPE data collection (recorded by coach) to enable planning of programme content*.</p>

^measurement methods outlined in sections 5.6.1 – 5.6.3.

*programme content was modified on a weekly basis reactive to fitness of attendees.

5.5 A typical weekly session

Football sessions were provided twice/ week on a Tuesday and Thursday for one hour each and began at 19:00 hours. Football skills and matches were pitched to be between moderate to vigorous intensity, sensitive to participant abilities. Each session combined a mixture of skills training and matches and consisted of a variety of football related skills and fitness development tasks. Injury, fitness, and weight were always taken into consideration and exercises were adapted in accordance with each individual's ability.

Participants had their weight (Kg) and waist (cm/ umbilicus) measurements collected in the changing room on the Tuesday of each week, prior to session commencement. The option for privacy was offered. If a participant was unable to make the first session each week, these measurements were taken at the subsequent (Thursday) session.

Food records were completed on a pre-prepared template (Appendix H) sent to the men via email after the induction (Microsoft word and excel format) so that they were able have them submitted to the researcher prior to the next session. These were analysed prior to each session. All dietary data was compared to prior submissions, weight and waist measurements and any conversations recorded (the researcher would often take notes) with the participant were checked to ensure feedback was personalised and targeted. All records were kept on file for reference.

Feedback was provided during the football training sessions by calling participants to one side during training. Depending on the level of participant engagement with the recommendations, feedback sessions lasted typically for approximately 5 minutes, though this varied. If the researcher was unable to talk to all participants during the session, discussions continued in the changing room, car park etc.

The researcher and coach monitored training motivation for any signs of injury. Issues would be discussed with the coach post session, and concerns were raised with the participant and appropriate advice/ solutions offered. Participants were also asked to raise concerns with staff at any time.

All participants were provided a warm-up and cooling down period, including incremental decreases / increases in intensity and stretching / flexibility activities.

At the end of every session, RPE was assessed and recorded by the coach. Participants were routinely asked for their opinions on the session to gauge and optimise provision.

After the Tuesday sessions, weight and waist data was reviewed. If weight was not decreasing, a review of the reason for this would result. Historical weight and waist data were compared to food diary submissions – cross referenced against the dietary procedure (section

4.3.3). Often the researcher would speak to the coach to compare notes on the participant's level of engagement in the football and their RPE scores. Overall attitude to the programme was also discussed to ascertain the behavioural approach to the programme and commitment of each recruit. Appropriately tailored responses would then be initiated with the participant to increase engagement.

5.6 Researcher relationship and responsibilities

The author of this thesis designed and implemented TAP, and throughout all aspects of the intervention, assumed a variety of roles and responsibilities. These roles have been outlined below (Table 5.3) to provide insight into the workload and variety of responsibilities, skills and characteristics required to provide a multi-component weight management intervention. Reflective of the need for help conducting the intervention, Stephen Morgan offered his services as (qualified) football coach voluntarily, supporting the men in development of football skills and gameplay while simultaneously promoting cardiovascular fitness through regular engagement with training. Stephen provided his services voluntarily; he was keen to further develop his experience working with men whilst being involved in a novel approach to addressing male weight. The research team was small ($n=2$), but this facilitated regular interactions to explore perceptions linked to engagement of the recruits and successes of the intervention. Separation of administrative, research-protocol aligned (the author) and more practical, banter-informed approaches (Stephen) enabled the author to focus on the empirical, data collection aspects outlined in the methodology, relying on the coach to reinforce recommendations voiced when mentioned within on-pitch interactions. Cohesion within the research team also provided an opportunity to hear and consider impressions from the coach on how the intervention was impacting performance and team-cohesion outcomes.

Table 5.3: Outline of researcher roles during programme provision.

Administrator	Designing, printing, and distribution of paperwork. Organising registration. Insurance and risk analysis. Marketing. Arrange pitch hire. Organising football events. Distributing information to coach and participants. Finances.
Nutritionist	Checking and providing solutions to improve food diaries. Organising submissions. Researching cooking and presentation methods. Answering participant enquiries. Choosing novel and enjoyable topics for discussion during participant meetings. Remaining apprised of latest nutritional research. Building on relational aspects, nutritional recommendations were further embraced. In addition, the personalised nature of the approach, built on trust, facilitated education and integration.
Researcher	Collection, organisation, and appraisal of data. Conducting and interpreting statistical analysis.
Confidant	Listen and provide solutions to participant grievances, concerns, and worries. Listen and address coach concerns. Be receptive and empathetic.
Leader	Reflecting on approaches and providing research informed solutions to both address issues and improve programme application. The researcher responded to coach and participant feedback in a positive manner, using an empathic and nurturing demeanour to further motivate and inspire. This was conducted alongside, the portrayals of professionalism and confidence, leadership qualities embrace informed decision making, and role-model behaviour to provide a standard for participant emulation.

5.7 Data collection detail

Both qualitative and quantitative methods have been employed throughout this research. Semi-structured interviews were conducted, while observation of weekly sessions and reflections on topics covered in conversations held on the field were summarised post-session to enable a continuing reflexive approach used to inform programme optimisation.

5.7.1 Height measurement

Height was taken at the first session of attendance using a Seca 213 portable stadiometer with subjects in bare feet. Body height was measured in accordance with the protocol outlined by the International Society for the Advancement of Kinanthropometry (ISAK) (Stewart et al.,

2011): participants were asked to stand upright, feet together, heels against the bottom of the stadiometer, buttocks and upper part of the back touching the stadiometer height stand, back of the head touching in the Frankfort horizontal plane (upper margin of the ear opening, and lower margin of the eye were horizontal to the floor). The point of measurement was taken at the highest point of the head, in duplicate, then the average recorded

5.7.2 Weight measurement

Weight was measured using a set of class 3 digital weighing scales (Model Marsden M-430). Participants were required to wear the minimum of suitable clothing (consistently for all measurements) to reduce the risk of introducing inaccuracies due to varying weights of clothing. Reminders focussed on participants wearing a t-shirt or training shirt, pants, shorts and football socks. Participants were asked to remove footwear and shin pads beforehand.

5.7.3 Waist measurement

A non-stretch vinyl coated 150cm measurement tape was used to take waist measurements. Participants were asked to stand upright and relax the stomach before measurements which were taken three times across the umbilicus, a fourth time if the first two measurements varied by 5mm. An average of collected measurements (three closest) was used.

Measurements were always taken to the side of the participant to ensure the researcher could look across both the front and behind of the subject and check that the tape was parallel to the ground and across the umbilicus. This also prevented the researcher from placing himself in front of the participant's groin area.

All measurements were taken in the changing room prior to training.

5.7.4 Body Mass Index

Using height (measured at baseline only) and weight (recorded weekly), BMI (kg/m^2) was calculated and made available to participants upon request. Each man was informed of the weight required to reach their BMI target (i.e., 24.9 kg/m^2), calculated using the NHS BMI calculator (NHS, 2018). Expressing weight loss as percentage of excess body weight required to reach the healthy BMI category ($< 25 \text{ kg/m}^2$) was used to evaluate post-programme BMI outcomes using Bray et al., (2009) formula for calculating excess body weight loss (EBWL).

The following formula were used for BMI calculations.

1. Baseline BMI was calculated by weight baseline / (height*height).
2. End BMI = weight (end) / (height*height).
3. Difference BMI = Baseline BMI – End BMI.

4. Percent change in BMI = Difference BMI / Baseline BMI *100.

5.7.5 Food records

Food records were submitted primarily by email on the provided food record template (Appendix G). If an issue presumed to be associated with dietary intake was not evident using this approach, an extended 7-day record was requested to ascertain if a relaxation of dietary recommendations was undertaken outside the three recorded days for example.

5.7.6 Semi-structured interviews

Interviews were recorded to help improve transcription accuracy. Each interview was digitally recorded using an Olympus WS-832 digital voice recorder. A further backup digital recorder, the Olympus DS-40 was used simultaneously in case of failure. Interviews were recorded in MP3 format and uploaded onto the online secure drive after recording. Recordings were transcribed against each question asked, with respondents identified by initials to protect anonymity. A quality control check was conducted, playing back the interviews whilst reading the transcripts to ensure completeness.

For the interviews with participants the semi structured approach used allowed the researcher to ask open ended questions such as “*What do you think you should be eating?*” and helped avoid imposing opinions and assumptions onto the interviewee (Britten, 1995). Participants had ‘free reign’ to respond how they wished. To avoid any leading or coercion, the researcher used brief questions with very little interruption once the participant was responding. If intervention was required, it was only to bring the interviewee back onto the question topic or to probe a little deeper into any aspects that the researcher found interesting and that he felt could add to the quality of the discourse.

Interviews ranged between 45 to 55 minutes in length, with one participant completing the interview in under 30 minutes despite the best attempts of the researcher to encourage expansion on the answers provided.

Two interview sessions were conducted. Pre-programme and post-programme for phase 1 (initial 12-week programme). Eight participants were interviewed pre-programme and ten post-programme (table **Error! Reference source not found.**4). A pre-developed question script was followed (Appendix B).

Table 5.4: Participant demographics and phase(s) when interviewed.

Name	Age	BMI (kg/m ²)	National Statistics Socio-economic Classification (NS-SEC)	Interview session attended by participant.
Mr C	40	32.9	Routine	Pre and post
Mr E	43	39.6	Routine	Pre and post
Mr B	50	44.7	Routine	Pre
Mr P	43	38.9	Intermediate	Pre and post
Mr R	35	32.1	Routine	Pre and post
Mr S	51	28.2	Routine	Pre and post
Mr F	58	29.1	Intermediate	Pre and post
Mr K	41	30.8	Routine	Pre
Mr W	53	34.6	Intermediate	Post
Mr H	42	38.0	Higher	Post
Mr G	35	30.4	Higher	Post
Mr T	35	49.8	Higher	Post

5.8 Qualitative analysis

Thematic content analysis was used for qualitative analysis of interview data, allowing for a rich, complex account of the interviews to be used to identify themes with detailed meanings (Vaismoradi, Turunen and Bondas, 2013). The method provides the means to explore experiences and feelings in separate specific accounts (in relation to questions). As outlined by Braun and Clarke, (2006), the ability of this method to reflect the reality of experiences shared and to '*unpick the surface of reality*' justifies its choice for use here. Responses generated by the semi-structured interviews held at baseline and at the end of the intervention were coded using a thematic approach.

Coding was conducted using Braun & Clarke's (2006) '*Phases of Analysis*', a six stage process that helped the researcher conceptualise the process of thematic analysis (

Table 5.5). Though recognised more as a guide than a set of rules, the researcher adhered closely to the guidance set out (Braun and Clarke, 2006).

Table 5.5: Phases of analysis used to develop themes (Braun & Clarke, 2006).

Phase	Process description
1	Transcribing of the data. Generation of ideas
2	Generation of codes. Process conducted across the entire data set as opposed to individual interviews.
3	Searching for themes.
4	Reviewing the themes. A review to ensure that the themes align to the codes.
5	Defining and naming of themes.
6	Producing a report based on the themes.

Adapted from '*Phases of Thematic Analysis*' (Braun and Clarke, 2006).

The coding procedure involved looking for key words that were within the boundaries of the research question. There was an expectation that the men would emphasise the football and their level of enjoyment so related discussion was drawn out. Impressions of the programme design were also targeted: although it was not expected that the men would see the benefits of the gendered nature of the diet (therefore no questions on this were included), however the approach of the intervention design, and the capacity for recruits to assimilate it and reflect on how it worked (or did not) for them was considered. The thematic analysis was conducted manually to enable the researcher to remain close to the data, gaining a thorough understanding of the interviews. Different coloured pens were used to identify and represent themes, providing a visual representation which facilitated a quick glance method of identifying theme development across large swathes of data. On completion of the interviews, the researcher had formed an idea of the types of themes that were present in the data and spent time uncovering as much detail on those as possible when conducting the analysis. Once a theme began to emerge, even vague references such as single words were highlighted, enabling analyses to recognise their contribution to the overall picture.

5.9 Intervention design

This overall design of this research study utilised a mixed methods approach. Using an evidence-informed approach to determine which components to design and include within the intervention protocol (outlined in Chapter 4), a sequential explanatory protocol was designed (Creswell and Plano Clark, 2007) to include use of empirical data to observe 'effects' on the outcomes of interest, and qualitative, interview-based, research methods to understand these results. Integration of experiences (research team and subjects) and quantitative results from phase one (the initial planned, 12-week intervention) enabled reflexive development of

protocols to adapt and improve programme provision. This integrated and continuous process evaluation enabled rapid inclusion of improvements highlighted as potentially beneficial to maximise results (see: Figure 5.1 and Table 5.6).

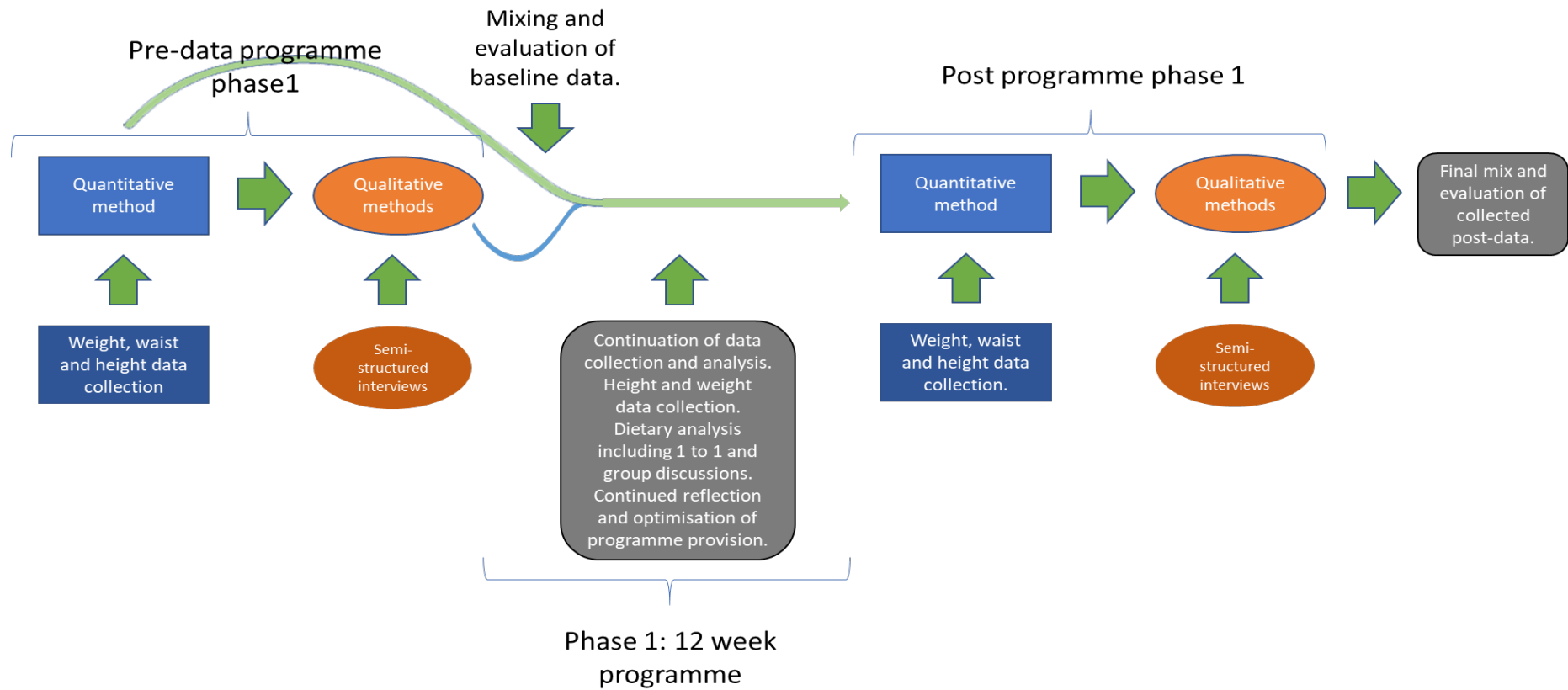


Figure 5.1: Sequential explanatory protocol as applied to the Alpha programme.

Table 5.6: Explanatory detail related to The Alpha programme Sequential explanatory protocol.

	Rationale	Protocol amendments/ Analyses	Evaluation
		Continuous optimisation	
Design	Evidence-informed protocol following review of literature.	Evaluate adjustments to ensure effectiveness of intervention (outcomes) contrasted with feedback from recruits.	Evaluation of empirical and qualitative results to ascertain programme effectiveness.
Analysis	Enabling empirical assessment of study outcomes; comparison with other studies.	<u>Data</u> : Analysis of impact in first 12 weeks on primary outcomes (i.e., BMI, WC and EBWL).	Evaluation of 'mixed' data to uncover principle components that facilitated engagement.
	Interviews to compliment empirical data.	Informal feedback collected alongside process data analysis to support optimisation.	
	Collection of quantitative data for empirical evaluation.		

6 Results

6.1 Baseline anthropometrical measurements

The average age of recruits was 43.5 (\pm 7.05) years. In line with recruitment targets, the average BMI was 33.4 (\pm 6.1) kg/m² (obese class 1) and most men (74%, n=26) were classified as obese (BMI \geq 30 kg/m²) at baseline. Three (8.5%) were placed within the obese class 3 category (\geq 40 kg/m²) and 27 (77.1%) exceeded the VHCWC (WHO, 2008) cut-off value ($>$ 102 cm), with an average WC of 112.3 (\pm 14.6) cm across the cohort. The predominant ethnic background of recruits was White British (n=30, 85.7%) with the remainder from Italian (n=2), Black- (n=1) or Asian-British (n=2) families. Social class status was classified using the three-class version of the National Statistics Socio-Economic Classification (NS-SEC) criteria (Office For National Statistics, 2018) as either routine/ manual occupations, intermediate roles or higher managerial, professional and administrative positions (full background characteristics are outlined in Table 6.1).

Table.6.1: Baseline characteristics of the trial population

Descriptor		Mean	SD	Min	Max
Age (years)		43.5	7.05	32	58
Weight (kg)		104.3	21.8	68.6	160.8
Height (m)		1.77	0.09	1.60	1.90
BMI (kg/m ²)		33.4	6.1	23.7	49.6
Waist circumference (cm)		112.3	14.6	87.0	150.0
		Count (n)	Frequency (%)		
BMI group (kg/m ²)	Normal (<25)	1	2.9		
	Overweight (25-29.9)	8	22.8		
	Obese class 1 (30-34.9)	17	48.5		
	Obese class 2 (35-39.9)	6	17.1		
	Obese class 3 (>40)	3	8.5		
Waist circumference (>102cm)		27	77.1		
Ethnicity	White British	30	85.7		
	Other	5	14.3		
Social class*	Routine	18	51.4		
	Intermediate	7	20.0		
	Higher	10	28.5		

[^]Data are presented as mean or % (n).

^{*}The National Statistics Socio-economic classification (NS-SEC) (Office For National Statistics, 2018).

Men were recruited onto the intervention at one of two recruitment drives (section 5.3). Of the 17 men recruited for phase 1, ten were recruited by the coach who whilst working with children

and providing grassroots football sessions, spoke to parents at his events and handed out leaflets. The additional seven heard about TAP through word of mouth and contacted us through either the venue or direct. No men were recruited via the leaflet method in this phase. In phase 2, one man was recruited via a leaflet left at a public house, nine via word of mouth, two via the coach and six via the editorial. With raised awareness, developed over time, word of mouth became the most dominant method of recruitment. The coach, having exhausted all contacts for phase 1 had been unable to achieve similar numbers of recruits as before.

The intervention was designed to last for 12 weeks, however engagement and requests from 13 (76.4%) subjects in interviews held at the end of phase one led to continuation of the intervention for 91 weeks. Those recruited in the first phase of recruitment engaged with the intervention for an average of 46 weeks (± 34.08), while those recruited in phase 2 (which was initiated 14 weeks later) completed an average of 39 weeks (± 26.17). Engagement ranged from 11 to 91 weeks in the complete cohort. Differences in engagement periods may reflect the option for phase 2 recruits to drop-on to the programme, which may have acted as a barrier to engagement.

Due to the personalised nature of interactions with recruits, a case-study approach is utilised to present some aspects in the results section. Individual details for all 35 recruits are therefore included in

Table 6.2 (background, demographic information) and 6.3 (summary results for the first 12 weeks of the intervention in all recruits) to facilitate data interpretation.

Various reasons were given by attendees to explain lack of engagement. Employment related issues was the largest recorded reason for non-attendance (reported by nine (26%) men). Reactive to the more personal recruitment method utilised in phase one, fewer of the early recruits failed to provide reasons for disengagement (two (12%) phase one and nine (53%) phase 2 recruits were not contactable).

Table 6.2: Summary of key details linked to participant demographics, recruitment, engagement and drop out.

Participant	Age	Sessions (Tuesday)	Ethnicity	NS-SEC class*	Method of recruitment	Recruited phase	Reason for leaving
1	42	12	Asian British	Higher	Coach	1	Employment
2	47	75	White British	Routine	Coach	1	Programme end
3	52	80	White British	Intermediate	Word of mouth	1	Programme end
4	43	14	White British	Intermediate	Word of mouth	1	Family
5	51	21	White British	Routine	Word of mouth	1	Employment (redundancy)
6	35	60	White British	Routine	Coach	1	Employment
7	41	60	White British	Routine	Word of mouth	1	Target met, went elsewhere
8	47	12	White British	Routine	Coach	1	No contact
9	47	48	White British	Higher	Coach	1	Divorce
10	35	12	White British	Routine	Coach	1	No contact
11	37	12	White British	Higher	Coach	1	Employment
12	35	12	White British	Intermediate	Coach	1	Employment / lifestyle
13	40	12	White British	Routine	Word of mouth	1	Employment
14	53	70	White British	Intermediate	Word of mouth	1	Programme end
15	43	57	White British	Higher	Coach	1	Programme end
16	39	50	Asian British	Higher	Word of mouth	1	Programme end
17	50	12	White British	Routine	Coach	1	Employment
18	58	55	White British	Intermediate	Word of mouth	2	Injury
19	36	12	White British	Higher	Coach	2	No contact
20	54	12	White British	Routine	Word of mouth	2	No contact
21	42	14	White British	Higher	Word of mouth	2	No contact
22	42	12	Italian	Routine	Word of mouth	2	No contact
23	41	36	White British	Higher	Leaflet	2	Target met, went elsewhere
24	46	48	Black British	Routine	Editorial	2	Programme end
25	52	27	White British	Higher	Editorial	2	Employment
26	48	9	Italian	Routine	Editorial	2	No contact
27	32	33	White British	Routine	Word of mouth	2	No contact
28	34	5	White British	Routine	Editorial	2	No contact
29	35	5	White British	Routine	Editorial	2	No contact
30	35	9	White British	Routine	Word of mouth	2	Employment
31	53	36	White British	Intermediate	Word of mouth	2	Travel
32	35	18	White British	Routine	Word of mouth	2	No contact
33	49	35	White British	Intermediate	Editorial	2	Programme end
34	50	10	White British	Routine	Coach	2	Programme end
35	42	13	White British	Higher	Word of mouth	2	Programme end

*The National Statistics Socio-economic classification (NS-SEC) (Office For National Statistics, 2018).

6.2 Changes in anthropometric markers

Three different anthropometric tools were used in this study, both to quantify 'size' at recruitment and to delineate progress and successes as the intervention continued. Table 6.3 depicts a summary of these measurements at baseline and through the 91 weeks of the intervention.

All men were guided individually on their weight loss target at recruitment (see section 5.4). Excess weight was calculated as difference from the upper end of 'normal' BMI (i.e., 25 kg/m²), then the weight loss needed to achieve this level was calculated. At baseline, to achieve their 'ideal' weight, the recruits (excluding the subject with an initial BMI below 25 kg/m²) needed to lose between 3.6 and 80.1 kg (mean 27.2 ± 19.0 kg). In their initial 12 weeks on the programme (i.e., the planned intervention length), recruits lost an average of 3.3 (± 2.6) kg (between a 3.6 kg gain and 14.2 kg loss in weight), 3.6 (± 2.9) cm in WC (between a 3.9 cm gain and 6.2 cm loss in WC) and 1.1 (± 0.9) kg/m² (between 0.9 units gain and 4.5 units loss) in BMI.

Over this first 12 weeks, 85.7% (n=30) of men attended at least 50%, and 62.9% (n=22) attended at least 75% of the timetabled sessions. Men who attended at least 50% of classes in the first 12 weeks lost significantly more weight (3.29 ± 2.48 compared to 0.52 ± 1.05 kg, $t = -2.815$, $p = <0.008$), WC (4.15 ± 2.80 compared to 0.30 ± 0.45 cm, $t = -7.024$, $p = <0.001$) and BMI (1.24 ± 0.85 compared to 0.18 ± 0.35 kg/m², $t = -2.728$, $p = 0.01$) than those who engaged less, but no greater proportion of their excess body weight (18.14 ± 23.73 compared to 2.40 ± 3.84 %, $t = -1.462$, $p = 0.153$). When compared to those who attended at least 75% of classes, results strengthened. Greater losses in all anthropometric measurements were observed in those who attended more sessions (weight loss: 4.09 ± 2.71 compared to 1.86 ± 1.63 kg, $t = -2.684$, $p = 0.011$; WC loss: 4.70 ± 2.66 compared to 1.73 ± 2.41 cm, $t = -3.303$, $p = <0.002$; BMI reduction: 1.35 ± 0.93 compared to 0.64 ± 0.56 kg/m², $t = -2.499$, $p = 0.018$; and proportion excess body weight lost: 21.26 ± 27.15 compared to 7.05 ± 6.56 %, $t = -2.292$, $p = 0.031$).

Only one attendee (subject 9) gained weight over the initial 12 weeks (Full results are presented in Table 6.3).

Over the complete duration of the intervention (up to 91 weeks), fluctuations in weights were seen in all subjects on a week-by-week basis – with some increases and some decreases observed. Overall, irrespective of the number of weeks engagement with the programme, a significant reduction in average weight was observed between baseline and the end of the follow up period for each of the three anthropometrical measurements. The largest mean difference was observed in WC (4.04 cm ($p = <0.001$, $t = -6.4$)) followed by weight (3.29 kg, $p =$

<0.001, $t=5.3$) and BMI (1.05 kg/m^2 , $p < 0.001$, $t=5.4$). Full results for 91 weeks are presented in (**Error! Reference source not found.**).

Over 91 weeks, 40.0% ($n=14$) attended 50% of timetabled sessions, and 26.0% ($n=10$) attended at least 75% of the timetabled sessions. There was no significant difference between men who had attended at least 50% of classes than those who engaged less for weight (2.91 ± 4.44 compared to $3.55 \pm 3.31 \text{ kg}$, $t = 0.499$, $p = 0.621$), WC (4.60 ± 3.41 compared to $3.66 \pm 3.91 \text{ cm}$, $t = -0.731$, $p = 0.470$), BMI reduction (0.96 ± 1.41 compared to $1.12 \pm .95 \text{ kg/m}^2$, $t = 0.384$, $p = 0.704$). There were differences in anthropometric measurements for men who had attended 75% of sessions to those who had not. However, they were not significant (weight: 3.66 ± 4.70 compared to $3.15 \pm 3.26 \text{ kg}$, $t = -0.365$, $p = 0.717$; WC 5.15 ± 3.80 compared to $3.60 \pm 3.64 \text{ cm}$, $t = -1.12$, $p = 0.269$; BMI reduction: 1.19 ± 1.48 compared to $1.00 \pm 1.00 \text{ kg/m}^2$, $t = -0.450$, $p = 0.656$; proportion excess body weight lost: 12.07 ± 24.05 compared to $17.40 \pm 23.49 \%$, $t = 0.602$, $p = 0.551$).

More than 88% of men enrolled ($n=31$) achieved decreases in all three anthropometric measurements before they dropped out or the intervention ended. Ten (28.6%) achieved in excess of 5% weight loss (compared to their baseline weight), and an additional three were close to achieving this, with losses in excess of 4%, but not quite attaining their 5% target. One man (participant 14) achieved 14.7% weight loss (14.2 kg). Four (11.4%) increased in WC (only one gained both weight and WC). **Error! Reference source not found.** summarises the differences in each marker over the full intervention period.

Several men had moved to a BMI classification below their baseline (Table 6.3). Two men from overweight (25.0 kg/m^2 to 29.9 kg/m^2) to healthy (18.5 kg/m^2 to 24.9 kg/m^2); four from obese (class 1) (30.0 kg/m^2 to 34.9 kg/m^2) to overweight; two from obese (class 2) (35.0 kg/m^2 to 39.9 kg/m^2) to obese (class 1) and one from obese (class 3) ($>40 \text{ kg/m}^2$) to obese (class 2).

One man (participant 31) joined the programme (Table 6.3) below eligibility criteria (25.0 kg/m^2 to 29.9 kg/m^2) and was enrolled in recognition of the preventative nature of the programme in reducing risk towards increasing weight as men get older (Conolly and Davies, 2018). Weight was carefully monitored to prevent decreases below the healthy BMI category (18.5 kg/m^2 to 24.9 kg/m^2). This participant lost 0.8 kg in weight and BMI decreased by 0.2 kg/m^2 . Waist circumference also decreased (2.0 cm) indicating a decrease in VAT and associated risk. Overall this indicates a general 'toning' of build where muscle hypertrophy is present in the face of adipose tissue loss.

Table 6.3: Anthropometric results for 91 weeks of intervention.

Ppt	Engagement (wks)	Height (m)	Baseline			Target losses		Loss (Gain)			
			Wgt (kg)	WC (cm)	BMI (kg/m ²)	Wgt (kg)	BMI (kg/m ²)	Wgt (kg)	WC (cm)	BMI (kg/m ²)	EBWL (%)
1	16	1.85	130.0	133.0	38.0	44.44	13.0	1.0	3.0	0.28	2.3
2	88	1.79	97.6	109.0	30.5	17.50	5.5	4.0	6.0	1.23	23.6
3	91	1.61	80.0	97.5	30.9	15.20	5.9	6.2	3.5	2.42	40.7
4	53	1.71	114.0	123.0	38.9	40.81	13.9	5.0	3.0	1.73	12.2
5	20	1.73	84.0	97.5	28.2	9.61	3.2	2.8	3.0	0.97	28.1
6	83	1.80	160.8	147.0	49.8	80.07	24.8	3.8	4.0	1.17	4.8
7	66	1.74	93.4	104.0	30.8	17.71	5.8	2.0	6.0	0.69	10.3
8	20	1.73	92.0	104.0	30.6	16.92	5.6	1.0	(-3.0)	0.35	5.4
9	80	1.87	93.0	97.0	26.6	5.58	1.6	(-2.0)	1.0	(-0.55)	(-37.5)
10	11	1.79	102.2	116.0	32.1	22.54	7.1	3.2	5.5	0.99	14.1
11	11	1.75	81.8	95.5	26.7	5.24	1.7	3.8	7.0	1.17	70.6
12	11	1.76	118.4	117.0	38.2	40.96	13.2	6.2	8.5	1.91	15.2
13	11	1.70	94.6	104.0	32.9	22.77	7.9	4.6	3.0	1.59	20.3
14	87	1.79	110.6	112.5	34.6	30.59	9.6	14.2	9.5	4.38	46.9
15	24	1.70	115.0	125.5	39.6	42.41	14.6	9.6	11.5	3.32	22.6
16	91	1.70	87.8	104.0	30.4	15.55	5.4	(-1.4)	2.0	(-0.48)	(-9.3)
17	24	1.74	134.0	135.0	44.5	58.74	19.5	1.8	3.0	0.62	2.1
18	90	1.75	89.0	109.0	29.1	12.52	4.1	1.2	9.0	0.42	9.8
19	20	1.92	144.4	129.5	39.1	52.14	14.1	5.0	1.5	1.39	9.2

Ppt	Engagement (wks)	Height (m)	Baseline			Target losses		Loss (Gain)			
			Wgt (kg)	WC (cm)	BMI (kg/m ²)	Wgt (kg)	BMI (kg/m ²)	Wgt (kg)	WC (cm)	BMI (kg/m ²)	EBWL (%)
20	12	1.62	85.4	103.0	32.4	19.55	7.4	1.6	(-1.0)	0.63	8.1
21	41	1.62	91.0	111.5	34.6	25.23	9.6	4.6	6.5	1.80	18.8
22	79	1.73	98.2	107.0	32.7	23.20	7.7	3.4	3.0	1.18	14.3
23	27	1.87	96.0	101.0	27.5	8.67	2.5	8.6	10.0	2.38	100.0
24	11	1.86	117.4	117.0	34.0	31.00	9.0	2.6	6.0	0.72	8.9
25	89	1.77	156.6	150.0	49.9	78.10	24.9	0.6	1.5	0.19	0.8
26	32	1.65	79.4	102.0	29.2	11.42	4.2	1.4	4.5	0.55	11.9
27	71	1.79	105.0	118.0	32.9	25.17	7.9	6.6	12.0	2.04	26.6
28	30	1.75	80.2	97.0	26.2	3.64	1.2	.8	2.0	0.25	25.0
29	34	1.90	113.2	113.0	31.5	23.42	6.5	1.0	1.0	0.28	4.6
30	47	1.84	90.8	101.5	26.8	6.16	1.8	.8	2.0	0.25	11.1
31*	37	1.68	68.6	87.0	24.4	-	-	1.0	2.0	0.35	0.0
32	23	1.86	116.8	120.0	33.9	30.59	8.9	9.8	6.5	2.71	32.6
33	48	1.76	98.8	108.0	31.8	21.18	6.8	(-3.6)	2.0	(-1.11)	(-17.6)
34	12	1.79	107.0	107.0	33.5	27.26	8.5	6.2	-1.0	1.91	22.4
35	14	1.83	122.4	124.0	36.6	38.77	11.6	(-2.0)	(-2.5)	(-0.62)	(-5.2)

*No target losses or % EBWL are calculated as subject was <25kg/m² at recruitment.

^Shaded cells (bracketed numbers) refer to increases in anthropometric marker

Table 6.4: Change in anthropometric markers from baseline to end of study.

Outcome	Time point	Mean	SD	Min*	Max
Weight (kg)	Baseline	104.2	21.8	68.6	160.8
	End of study	100.9	21.6	67.6	157.0
	Unit change	3.3	3.6	-3.6	14.2
	% change	3.2			
Waist circumference (cm)	Baseline	112.2	14.6	87.0	150.0
	End of study	108.2	14.8	85.0	108.2
	Unit change	4.0	3.7	-3.0	12.0
	% change	3.6	3.3	-2.8	10.1
BMI (kg/m ²)	Baseline	33.4	6.1	23.7	49.6
	End of study	32.2	6.1	23.4	48.5
	Unit change	1.06	1.14	-1.1	4.3
	% change	3.1	3.4	-3.6	12.8

*negative numbers infer weight gain.

To determine whether the significance of results presenting relative changes in each anthropometric marker studied was explained by the greater potential for weight loss in men at the highest BMI levels, sub-group analyses were conducted to check variance in patterns and volumes of weight loss. Initially, an assessment was made to determine how many subjects changed BMI classification during the intervention.

Next (Table 6.5), an attempt was made to gain insight into how the programme influenced excess body weight. For the total sample, an average of 14.3% of excess body weight was lost on the intervention. The single individual (participant 28) recruited who had a 'normal' weight (i.e., BMI lower than 25 kg/m² at recruitment) also lost weight, but the calculation method used here is inappropriate for anyone with a BMI below 25 kg/m², therefore his results are omitted from analyses presented here. The highest proportion of EBWL was with the overweight group and decreased in EBWL as total weight increased.

Table 6.5: EBWL percentage targets with BMI classifications.

Population subgroup (n)	Measurement	Mean	SD	Min	Max
Total sample (n=34)	Surplus weight (Baseline BMI – 25)	8.7	5.9	1.20	24.90
	Target weight loss (kg)	27.9	18.9	3.70	80.10
	Difference in weight with intervention (kg)	3.36	3.70	-3.60	14.20

	Proportion of EBWL	16.39	23.58	-35.70	98.50
Overweight (BMI 25 – 29.9 kg/m ²) (n=8)	Surplus weight (Baseline BMI – 25)	2.5	1.19	4.20	1.17
	Target weight loss (kg)	7.9	3.6	12.52	3.18
	Difference in weight with intervention (kg)	2.2	3.10	-2.0	8.60
	Proportion of EBWL	27.7	41.4	-35.86	99.18
Obese class 1 (BMI 30 – 34.9 kg/m ²) (n=17)	Surplus weight (Baseline BMI – 25)	7.4	1.4	5.38	9.59
	Target weight loss (kg)	22.7	5.2	15.20	31.00
	Difference in weight with intervention (kg)	3.9	4.1	-3.60	14.20
	Proportion of EBWL	15.9	16.0	-16.99	46.42
Obese, class 2 (BMI 35 – 29.9 kg/m ²) (n=6)	Surplus weight (Baseline BMI – 25)	13.4	1.1	11.59	14.61
	Target weight loss (kg)	43.3	4.7	38.77	52.14
	Difference in weight with intervention (kg)	4.1	4.1	-2.00	9.60
	Proportion of EBWL	9.5	9.8	-5.16	22.64
Obese class 3 (BMI ≥ 40 kg/m ²) (n=3)	Surplus weight (Baseline BMI – 25)	23.1	3.0	19.71	24.87
	Target weight loss (kg)	72.5	11.4	59.34	80.07
	Difference in weight with intervention (kg)	2.1	1.6	0.60	3.80
	Proportion of EBWL	2.8	2.0	0.77	4.75

NB., Negative results indicate weight gain. EBWL calculated using Bray et al., (2009).

Recognising that self-measurement of weight is typically used by individuals who determine a personal goal for weight loss, analyses were next conducted to determine whether weight trajectories over the length of their engagement highlighted a continual decline or fluctuated. Data summaries were presented by date, and therefore are separated first by phase of recruitment (Figure 6.1 and Figure 6.2). Presentation of data in a graphical, spaghetti-plot, format helps to highlight the variance in baseline weights for each recruit, and variance (with some increases and some decreases) in weight lost throughout the duration of the intervention. Although calculated as a general trend, numbers suggest a decline in weight over the programme length, with considerable variance in the successes of subjects observed – emphasising that weekly weigh in's may not be ideal. Similar findings were identified in subjects recruited for phases 1 (n=17, Figure 6.1) and 2 (n=18, Figure 6.2). Mean overall weight loss was significant in both cohorts. Those recruited in phase 1 lost an average of 3.30 ± 3.68 kg ($t = -3.70$, $p = <0.002$) while those in phase 2 lost 2.75 ± 3.48 kg ($t = -3.35$, $p = <0.004$), despite several men in both cohorts showing distinct increases in weight from week to week. These plots highlight that attainment of target weight loss can and should be expected

to fluctuate week by week and could highlight that weekly weigh-ins are potentially contrary to success for some.

Separation of trends in weight loss were then conducted by BMI classification to determine whether narrowing the variance in baseline weight enabled greater understanding of weight loss patterns to be observed in this cohort (Figure 6.3 to Figure 6.6). Varying lengths of engagement with the programme were observed in all BMI categories, some ceasing engagement having attained their target weight loss, others dropping out due to work commitments or injury for example (

Table 6.2). Men within the overweight category (25.0 to 29.9 kg/m²) would ordinarily lose weight at the beginning of the programme, but sustained losses were less consistent (Figure 6.3). Recognising that assimilation of the dietary advice can vary and is commonly not immediate (section 6.3), it can be assumed that weight losses for the initial weeks of participation are prompted by exercise and that dietary adaptations help continue weight control from thereon. Figure 6.5 and 6.6 supports this proposition, highlighting how most men lost weight at the beginning before seeing a plateau despite continued engagement with the programme. Men at the highest BMI sub-category (class 3 obesity, BMI ≥ 40 kg/m²) struggled most with engagement (Figure 6.6).

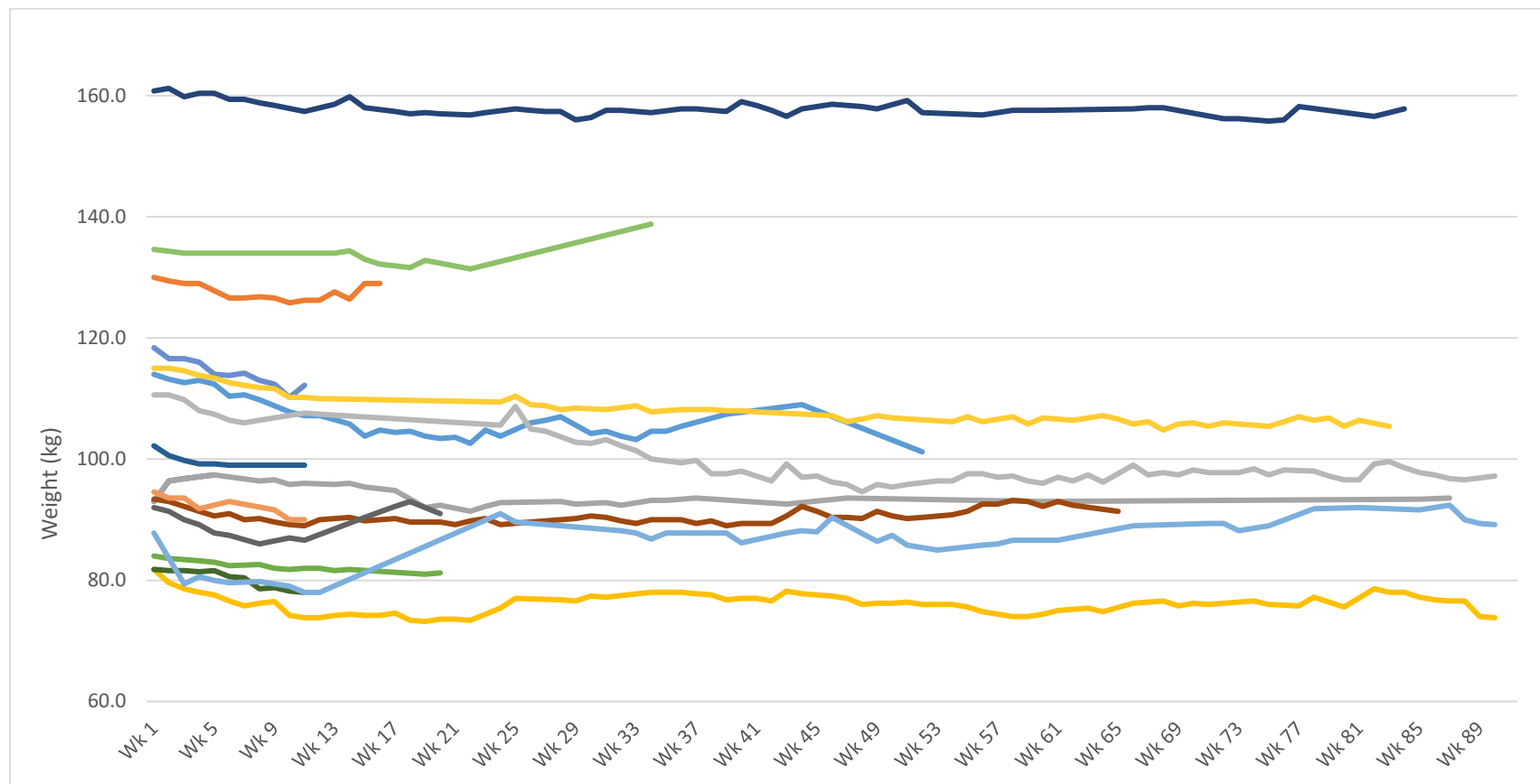


Figure 6.1: Participant weight trajectories over the 91-week period for (n=17) men on phase 1

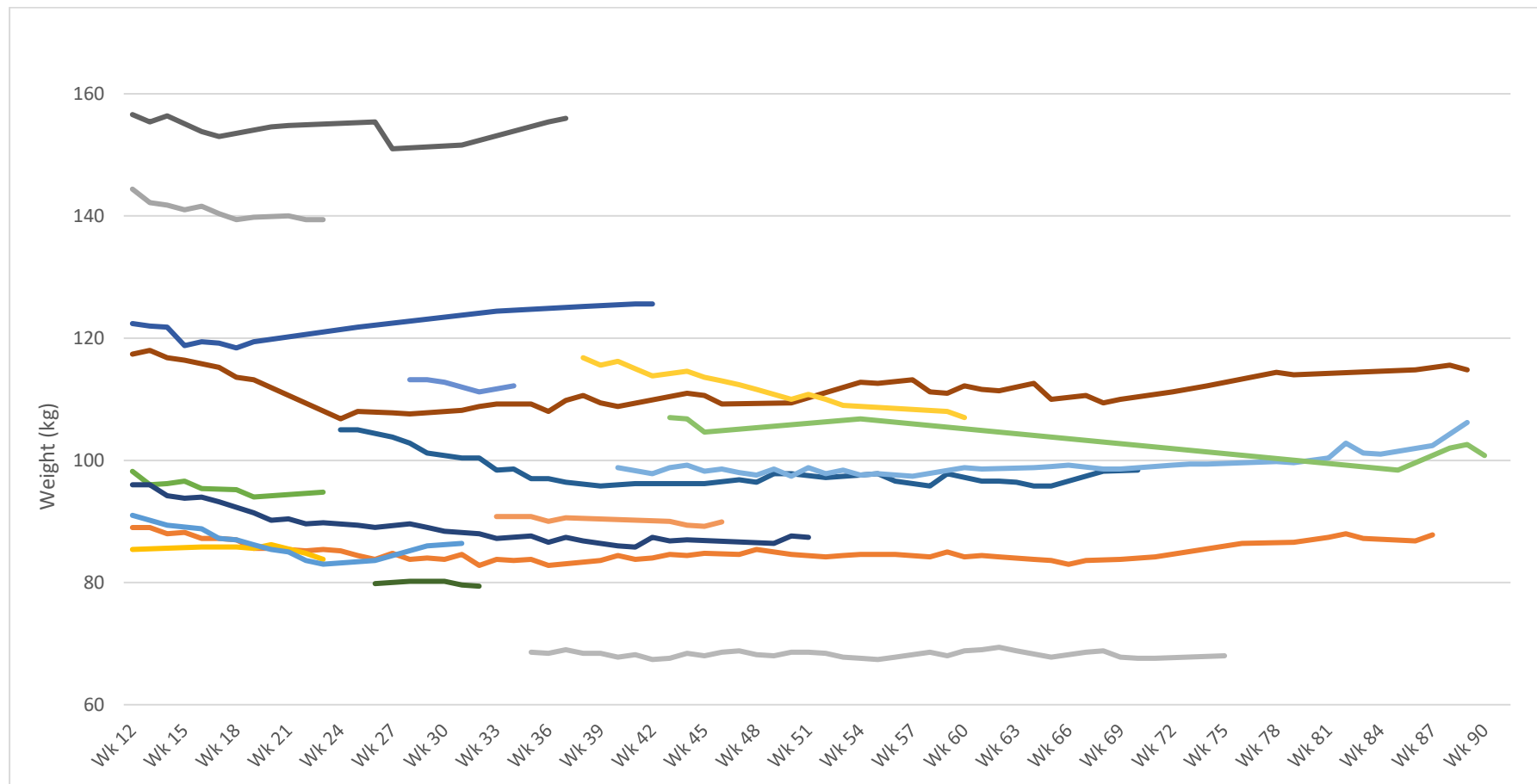


Figure 6.2: Participant weight trajectories over the 78-week period for (n=18) men on phase 2.

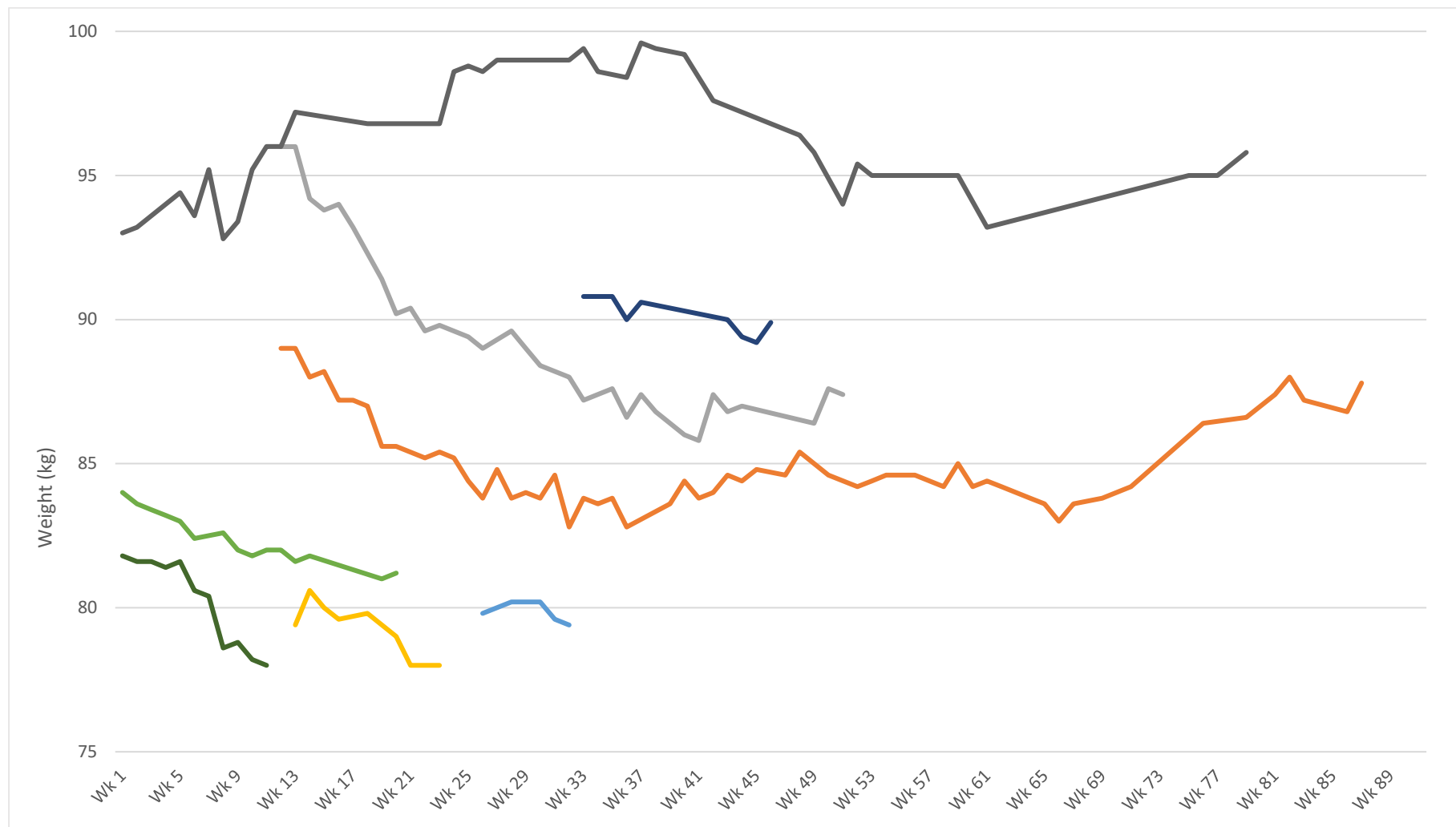


Figure 6.3: Overweight (n=8) classified (25.0 kg/m² to 29.9 kg/m²) men's weight trajectories over the full 91-week intervention length.

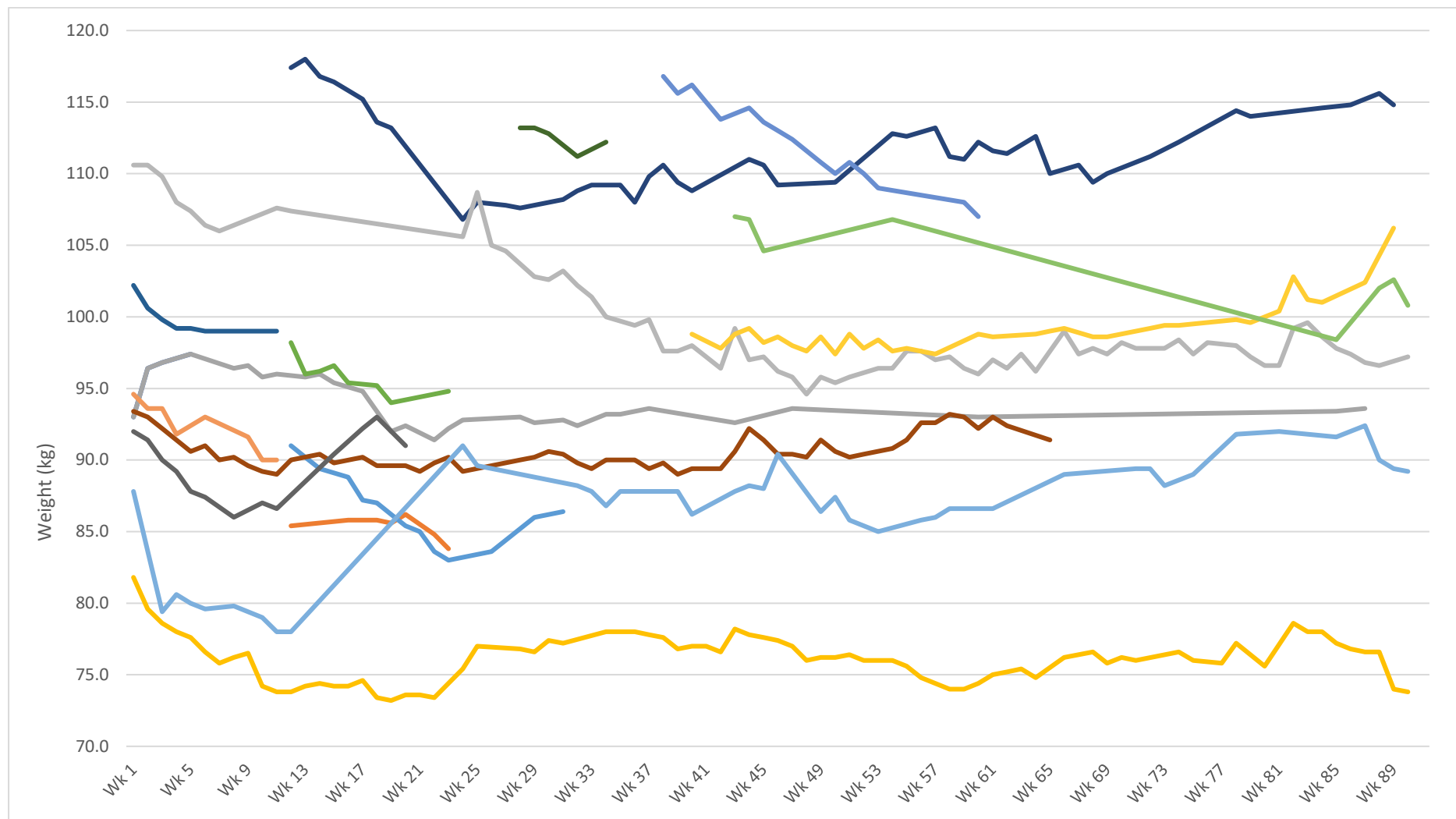


Figure 6.4: Obese class 1 (n=17) classified (30.0 kg/m² to 34.9 kg/m²) men's weight trajectories over the full 91-week intervention length.

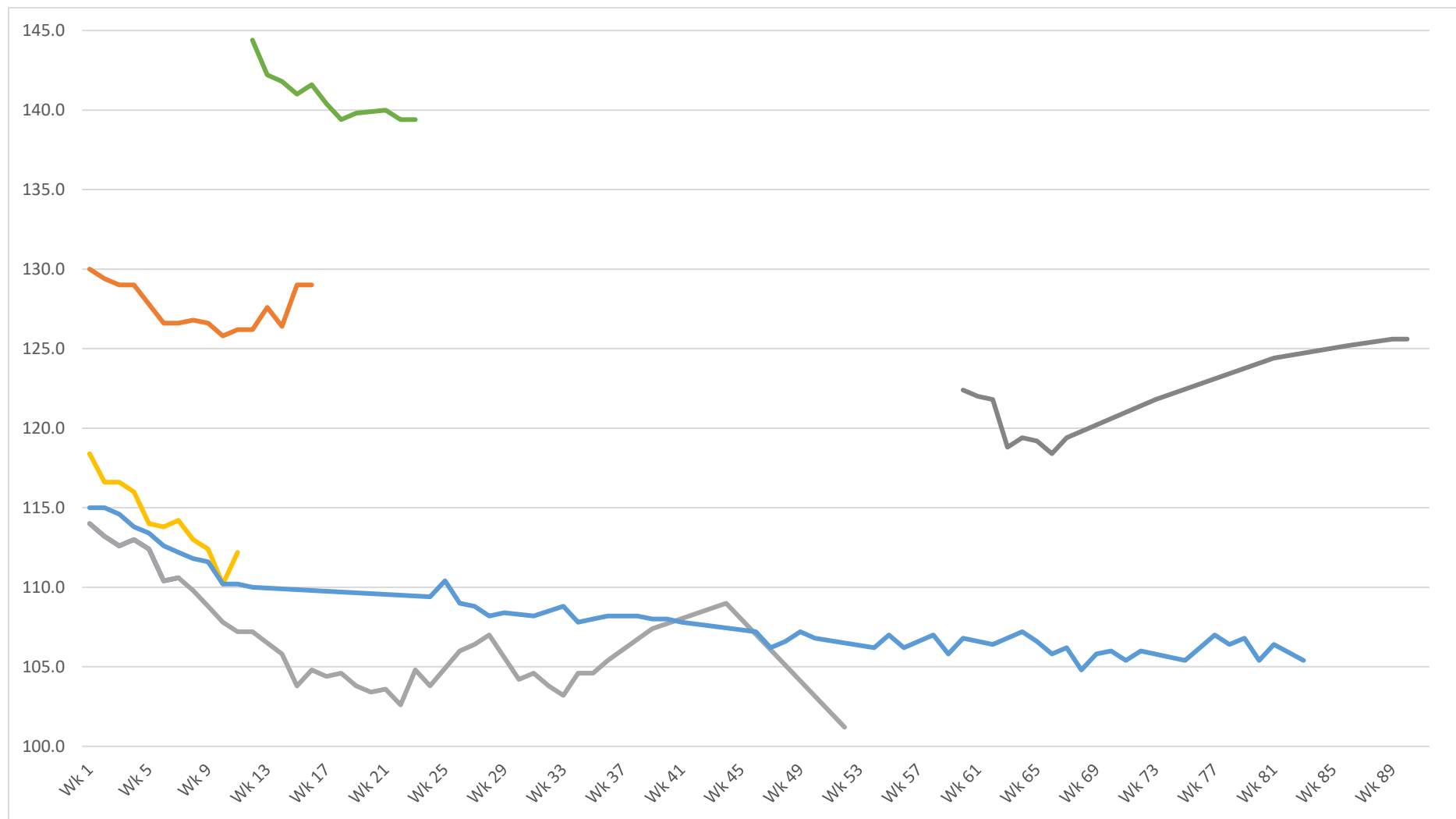


Figure 6.5: Obese class 2 (n=6) classified (35.0 kg/m² to 39.9 kg/m²) men's weight trajectories over the full 91-week intervention length.

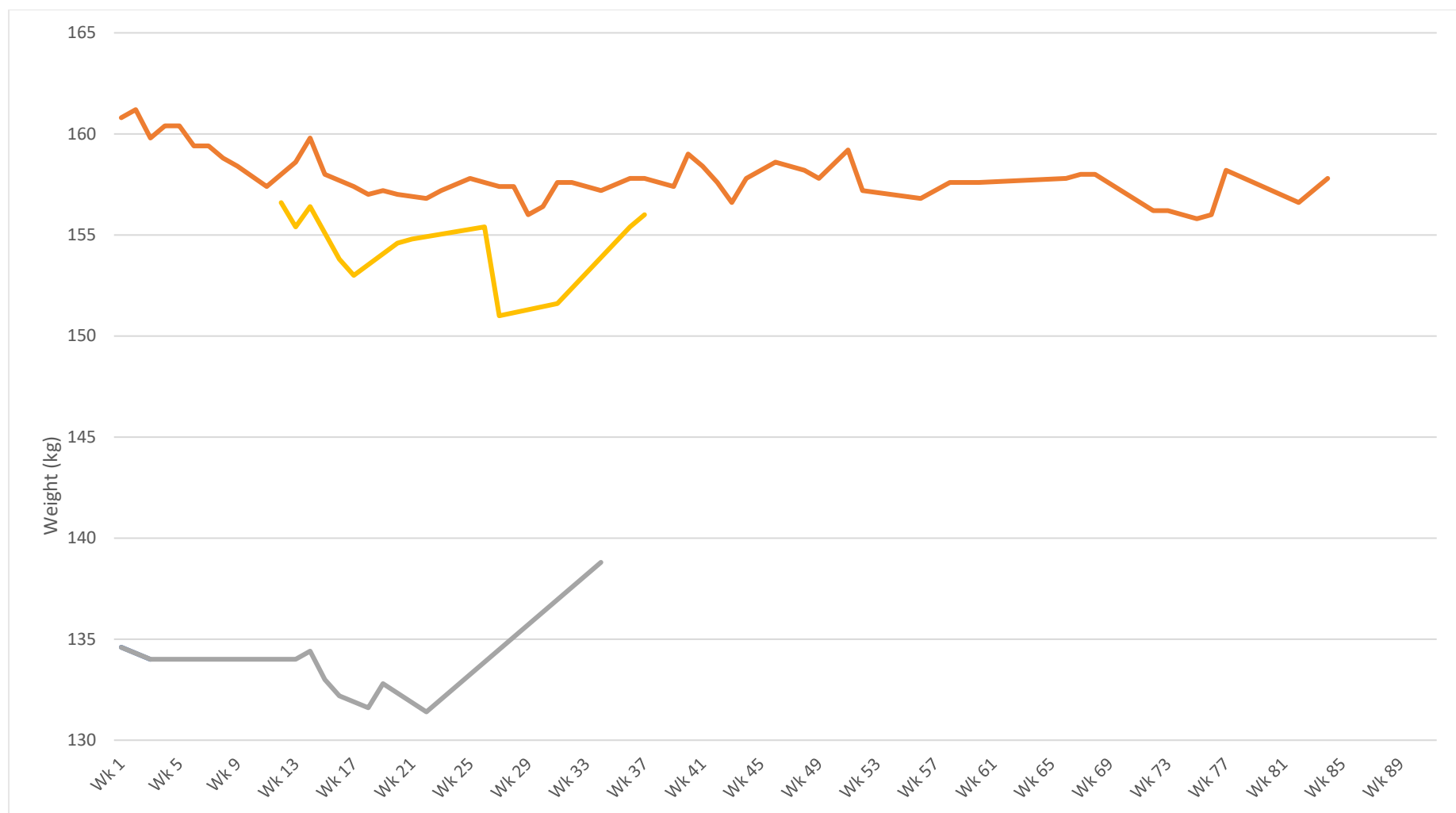


Figure 6.6: Obese class 3 (n=3) classified ($\text{BMI} \geq 40 \text{ kg/m}^2$) men's weight trajectories over the full 91-week intervention length.

6.2.1 Case-based analysis of weight changes

On a week-by-week basis, appraisal of weight changes observed in each subject were reviewed by the researcher and discussed with the client to encourage engagement and facilitate greater improvements where needed. Examples of the actions initiated (and the scientific rationale for each) are presented below.

Participant 15 (table 6.6) had a baseline weight of 115 kg and by his last measurement had achieved a weight loss of -9.6 kg (105.4 kg). Initially weight loss attained was high, but this slowly decreased to establish a steady state of gradual weight loss from week 10. Review of this temporal trend in weight loss required an assumption that since his weight had not stabilised, he remained within a negative energy balance state that continued until the end of his participation. The trend suggests that continuation on the programme could have led to continued weight loss until homeostasis for this recruit.

The largest weight loss over the course of the intervention was achieved by participant 14 who lost 14.2 kg in weight over the 91-week period. Like participant 15, initial weight loss was rapid but then reduced to a more sustained loss over the programme of around 1 kg per week. Losses were central, with a 9.5cm reduction in WC achieved suggesting a positive influence of the intervention on levels of VAT. Diary overview before intervention witnessed regular consumption of high fat foods. However, address of his regular alcohol consumption habits could lead to a larger waist circumference due to VAT accumulation (Vadstrup et al., 2003) and through dietary intervention, contributed to decreases observed.

Several men did not attend the intervention for prolonged periods, and this was often linked to an observation that their initial weight loss had arrested within a short period of time. Participant 17 for example attended 12 sessions over 34 weeks. He had achieved a loss of 3.2 kg by week 22 (10 sessions attended), then was absent for 11 weeks before attending one more session where an increase of 7.4kg was observed (Figure 6.6). Engagement, however inconsistent, can be assumed to benefit attainment of weight loss goals. Where men experience difficulties attending regularly, motivation to maintain engagement with protocols was reduced, highlighting the potential for virtual engagement or internet-based solutions. Such interventions, focussing on men have shown positive outcomes addressing male lifestyle behaviours (Morgan et al., 2010, 2011a). One participant decreased slowly in weight over the 12-week period and then intermittently attended thereafter. A period of several weeks elapsed until he returned, when weight gains were observed.

Results suggest that two subjects who had earlier shown persistent weight loss for several weeks may have entered into adaptive thermogenesis (AT) (Rosenbaum and Leibel, 2010; Camps, Verhoef and Westerterp, 2013), with one participant varying 0.2 kg over a 17-week

period (Table 6.6) despite engagement with the exercise intervention and dietary improvements (**Error! Reference source not found.**). Participant 3 and 7 attended 91 and 66 weeks respectively. It was recognised that AT had a substantial influence on participant morale as such regular motivational talks were given, especially focusing on the fact that although weight may not be decreasing as envisaged, regular exercise and dietary adaptations were continuing to have a positive influence on health.

Table 6.6: Anthropometric summary for weight and WC plateau observed a 17-19 week period of suspected AT experienced by two participants.

Ppt	Dates affected			Baseline		Range of losses/ gains	
	From	To	Wks	Weight (kg)	WC (cm)	Weight (kg)	WC (cm)
3	12/1/16	10/5/16	17	80	97.5	77.0 – 77.2	95.0 – 96.5
7	12/4/16	23/8/16	19	93.4	104	90.6 – 92.6	98.5 – 98.5

6.3 The dietary manipulation

The dietary manipulation procedures included in this intervention were designed to support development of positive dietary changes, prevent engagement with a hypocaloric diet, and achieve weight and waist loss. Three stages (detailed in Section 4.3.3) were initially planned; however this was increased to four (week 3 of intervention) to improve eating consistency with more direction on food types to select from at each eating occasion (Figure 6.7).

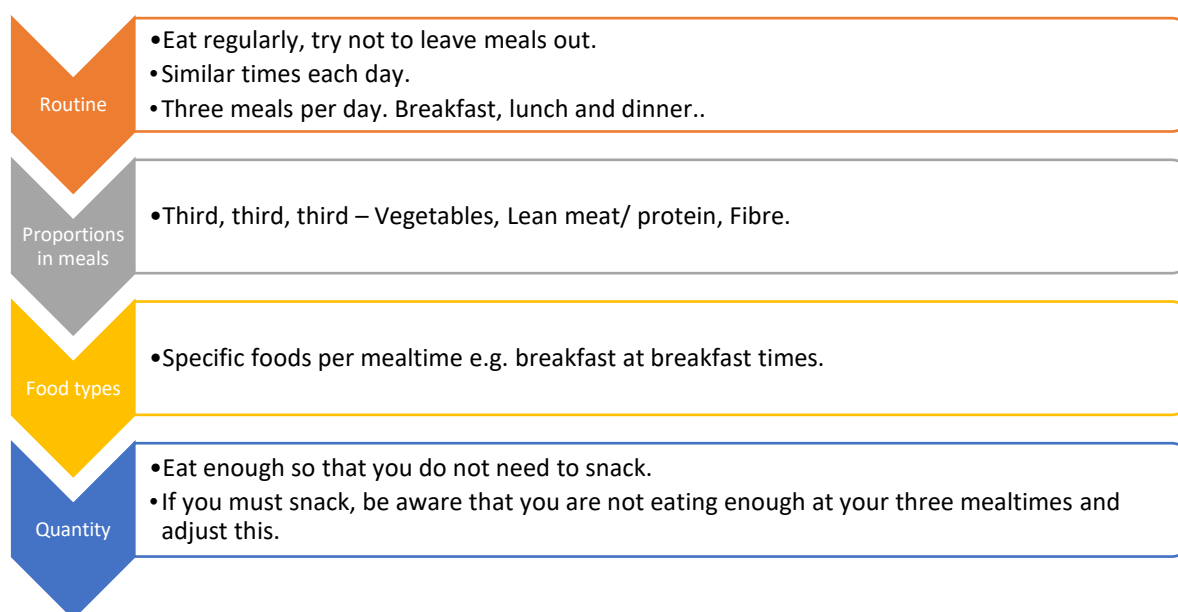


Figure 6.7: The revised Alpha programme nutritional procedure.

The procedure utilised a staged approach (Figure 6.7), including dietary education at its most simplistic level. Combined with a personalised approach for the provision of feedback on dietary habits, the intention was to see gradual and yet effective progression toward overall diet quality improvement and concurrent weight loss.

At baseline, all men were asked to submit (electronically) a simple three-day food diary, capturing intakes on one weekend and two weekdays. Amounts consumed were not requested to simplify data capture, reduce risk of under- and mis-reporting and to emphasise the intention of the intervention to focus on diet quality rather than dietary restriction. At enrolment, diaries were received from 15 men. Initial recruitment meetings were managed 1-2-1, and during this time the first goal of the dietary protocol was outlined: movement toward a three-meals per day pattern of eating. It was recommended that a breakfast meal was consumed each day and enough was eaten at mealtimes to prevent hunger (and therefore snacking) between meals. Meal suggestions were made, reactive to environmental features likely to influence practices e.g. during work hours. Following advice on this initial goal, men were asked to reflect on their diary submissions and to identify aspects (often around tastes and preferences) they needed to consider helping them apply this practice to their dietary intake routines. In the example presented in figure 6.9, the subject reflected primarily on his need to eat meals rather than snacks, and to stop drinking sweet drinks and alcohol. Initial food intake was of a convenience nature and so discussions on suitable replacements took place. In accordance with the procedure (Figure 6.7) recommendations on eating more were made and could be addressed through the consumption of a regular breakfast.

As the weeks of the intervention passed, men were asked to submit examples of their dietary intake using the same method, on a weekly basis. Annotations were made on dietary records, before and during face-to-face encounters, reactive to either from the researcher's thoughts at the time, field notes and/ or comments made by the recruit (see Figure 6.7).

a) Baseline:

Food Diary 2 weekdays and 1 weekend day		
Day	Food name / description	Quantity
Breakfast		
Thursday	Cup of tea with 2 sugars	
Saturday	Bowl of Shreddies	
Monday	Cup of tea with 2 sugars	
Mid morning snack		
Thursday	-	
Saturday	-	
Monday	Bacon and mushroom baguette	
Lunch		
Thursday	Tomato soup Ham egg and chips	
Saturday	-	
Monday	Can of fizzy pop	
Afternoon snack		
Thursday	Couple of pints lager	
Saturday	Couple of pints Lager	
Monday	n/a	
Dinner		
Thursday	Couple more pints of lager	
Saturday	Roast Dinner-Trifle -cheese and biscuits	
Monday	Cold meats and bubble and squeak	
Evening snack		
Thursday	1 hot cross bun Packet crisps Chocolate bar	
Saturday	Nibbles, crisps, peanuts etc	
Monday	Cheese and biscuits Cup of tea with 2 sugars	

b) Feedback notes:

Food Diary 2 weekdays and 1 weekend day		
Day	Food name / description	Quantity
Breakfast		
Fri 23/01/15	n/a	
Sun 25/01/15	2 slices of toast (wholemeal + butter)	
Mon 26/01/15	n/a	
Mid morning snack		
Fri 23/01/15	n/a	
Sun 25/01/15	n/a	
Mon 26/01/15	n/a	
Lunch		
Fri 23/01/15	Steak and cheese baguette (made and brought from shop)	
Sun 25/01/15	Roast chicken, potatoes, parsnips, white cabbage, stuffing, carrots, peas, cauliflower cheese, gravy	
Mon 26/01/15	Smoked ham and mustard sandwich, cheese and onion crisps, flake chocolate yogurt (all from Tesco)	
Afternoon snack		
Fri 23/01/15	Chocolate Flapjack	
Sun 25/01/15	n/a	
Mon 26/01/15	Whisper chocolate bar	
Dinner		
Fri 23/01/15	Cheeseburger with bacon + chips (Takeaway)	
Sun 25/01/15	2 x Tortilla wraps (filling = grated cheese, sliced German sausage, cucumber, grated carrot) + crisps (shared)	
Mon 26/01/15	Chicken, mushroom, cream + gnocchi	
Evening snack		
Fri 23/01/15	n/a	
Sun 25/01/15	Packet of hula hoop crisps	
Mon 26/01/15	n/a	

Figure 6.8: Examples of a completed food diary (a) received at recruitment and (b) detailing notes made by the researcher following interaction with the participant.

Throughout the intervention, review of subjects' engagement with dietary advice was conducted on a weekly basis, using diaries when these had been submitted and conversations when they had not. The procedure aimed to support dietary improvement using a defined approach, but with flexibility (i.e., no returns did not prevent discussions on dietary habits). No judgement was made on any dietary patterns or choices described by the recruits, instead

education was tailored based on the intentions outlined in the stepped-improvement programme, focusing on aspects the researcher identified as those which needed amendment. A summary of each stage of the dietary evaluation scheme is outlined below.

Submitted diaries were first appraised to determine whether three meals were being consumed each day, and to evaluate the reported frequency of snacking. Where meals were missed and/ or snacking was evident, an initial review of when food was consumed, and food choices reported at each eating occasion was initiated. Reactivity to observations including significant delays between waking and first eating, missed meals, a tendency to snack rather than eat prepared meals and replacement of food with drinks for example was discussed with subjects to elucidate whether there was an intention for the action and/ or awareness of the practice and why this needed amendment. Within these discussions, suggestions for changes were offered and an explanation for why these may benefit the subject were discussed.

Follow up meetings with each subject reviewed reactivity to previous advice and reflected on difficulties experienced by recruits (e.g., accessibility to food options discussed, time and skills needed to prepare items, taste preferences, hunger experienced) prior to offering additional solutions or options (where needed) or moving to the next 'theme' in dietary improvement (see Figure 6.9). With evidence of good food routines was evidenced by recruits, focus was moved to stage 2: the proportions of vegetables, lean protein sources and fibre within the foods reported at each eating occasion. Again, all advice offered was reactive to aspects including food preferences, economic and food skill constraints of recruits, and examples for replacement or improvement were provided in multiples, following discussion with each subject. Feedback on general dietary amendments recommended were returned to subjects to promote engagement using online annotations such as those included in the example (Figure 6.9).

An overlap with advice provided while tackling dietary theme 2 (proportions of vegetables, lean proteins and fibre) and 3 (types of foods to consume) was inevitable, however this was beneficial for most men – enabling focus first on the aspect most attainable within their typical dietary patterns. Ensuring engagement with the next change was easier to adopt once integrated within their dietary pattern.

Food Diary			
Day	Food name / description	Quantity	
2 weekdays and 1 weekend day			
2 February	Breakfast		
	Pastry	1	FAT + SALT
	Sunny flat white coffee	1	
	Bottle of still water	1	
	Mid morning snack		
	Espresso coffee	2	DUE TO INSUFFICIENT BREAKFAST
	Bottles of water	2	
	Egg and bacon muffin	2	
	Lunch		
	Ham and egg baguette	1	?
	Bottle of water	1	
	Banana	1	
	Afternoon snack		
	Cup of coffee	1	Veg?
	Bottle of water	1	
	Dinner		
	Moroccan chicken with couscous	1	Veg?
	Can of diet coke	1	
	Humus and pita bread	1	
	Evening snack		
	Green tea	1	This suggests that the meal was not sufficient.
	Bottles of water	2	

Figure 6.9: Example of feedback provided to enable improvements in the proportions of food.

6.3.1 Case-based analysis of dietary changes

During weekly reflections on weight changes, engagement with the dietary protocol was reviewed with each subject to congratulate subjects when dietary improvements (and their impacts on anthropometric measurements were observed) and to facilitate improvements where needed. Examples of the actions initiated (and the scientific rationale for each) are presented below.

Some participants displayed nutritionally poor dietary patterns at baseline with high consumption of convenience foods, alcohol consumed ad libitum, evidence of variance in eating patterns when ‘at home’ and ‘travelling with work’ for example. Research highlights that when alone, men can often make poor food choices (Sellaeg and Chapman, 2008), and this was seen routinely in some participants dietary logs, with second meals eaten cold (comprising of leftovers from previous meals), fast-food/ ‘grab and go’ options included routinely and sugary drinks replacing meals for example. With these subjects, discussions focused on explaining how current eating habits contributed to the weight problems experienced and how they would - most likely – impact future health. Complete changes to dietary patterns are unlikely to be sustainable over the long-term, and engagement with each individual step of the protocol (routine – proportion – type – amount; Figure 6.7) aimed to facilitate overall dietary improvements.

Habitual consumption of convenience food was a behavioural norm in several subjects' diets, particularly on occasions when they were eating alone and/or had skipped breakfast. Early engagement with initiation of a breakfast meal facilitated establishment of a regular eating pattern for several subjects, and despite continued difficulty improving the quality of meal choices, after approximately five weeks with a new, established, regular eating pattern, improved food choices became more attainable. Although no formal nutritional analysis of the dietary changes was conducted here, evidence suggests that this will concurrently improve nutrient profiles (Farshchi, Taylor and Macdonald, 2005; Sierra-Johnson et al., 2008), and the diversity and quantity of foods consumed – and subsequent reductions in snacking observed – suggest that this was the case here. Refeeding methods are a novel approach to improving weight maintenance through improvements in dietary restraint (Gripeteg et al., 2010). The method is effective after prolonged reduced calorific intake, and this was witnessed here (Figure 6.8). Refeeding takes many forms but in general relates to a gradual introduction of higher quality foods to fulfil a patient's metabolic requirements; whereas with a traditional weight loss diet an energy deficit is introduced. Tailored meal recommendations focussing on regular meals consumption and reduced snacking can support weight maintenance for up to 1 year for patients who refeed (Gripeteg et al., 2010). Whether this approach can prolong maintenance further is not yet certain. Higher quality food choices, particularly around main meal consumption will inevitably improve nutrient intake levels however (Leech et al., 2016). The dietary procedure (Figure 6.7), aligns with the refeeding approach in particular the introduction of regular meal consumption and improvements in meal quality that meet UK guidelines (SACN, 2015; COMA, 1991). Evaluation during and after the programme suggest many men were in negative energy state (Figure 6.8) prior to intervention and as witnessed, increases in volume and improvement in quality, alongside activity increases could induce weight loss, in particular through decreases in VAT (estimated via WC reduction).

6.4 Exercise intervention

Design of the exercise intervention (see section 4.3.2) required the football coach to take an assessment of RPE at the end of each session. The intention of capturing these data was to amend the content of the exercise sessions to ensure all men were working at 'moderate' to 'high' intensity for the duration of the session. It was also imperative that the men engaged in a prescribed level of activity that would improve fitness whilst decreasing risk. Analysis of the 282 collected RPE entries (n=15), perceived exertion was scored from 4 (moderate) to 10 (maximal), indicating that for some men and/ or sessions, this was not fully achieved.

The large majority of subjects scored consistently (78% of subjects providing repeat ratings that differed by a maximum of 3 points) within the range of 6 to 8 (87% of all scores submitted rating RPE as 'hard' to 'really hard'). Recognising health risk, the men being at least overweight but often also untrained, levels that exceed 8 required address by the coach due

to level of risk linked to achieving levels near maximum exertion. In response lessons were adapted to decrease training load. One approach used was to increase rest periods between drills, a recognised approach for increasing recovery time (Scott et al., 2013b) though there would often be 'step out' opportunities for men to take a period away from the drills or interspersed the harder drills with lighter intensity variants reactive also to varying intensities targeted within the attendees.

Four men provided a score of 4 (moderate) on at least one occasion and lessons were adapted to ensure men understood how to increase their effort on the pitch whilst avoiding injury. At no time were low scores repeated due the reactive nature of the lessons. Men would also adapt to exercise over time requiring continued monitoring to keep their RPE scores comfortably within the 6 to 8 RPE range. This regular evaluation formed part of the process evaluation (see section 4.3.8). Men who dropped onto the programme for phase 2 were typically less fit than those who had engaged with the programme for longer. To ensure engagement with advice about pace and reduce injury risk, the coach would divide the men into groups according to fitness levels whenever possible. When this incurred difficulties, newer (and less engaged) attendees were reminded to take rest periods and try not to compete with their colleagues.

Sessions outlined varied week-by-week. An example is included in Box 6.1 and Box 6.2 and highlight the reaction to RPE scores.

Box 6.1 Example 1: Session plan for 1 hour session incorporating fitness, skills improvements and flexibility around exertion levels.

Session 1:

- Brief players on tonight's plan.
- **Dribbling re-familiarising:** with a ball and moving at the same time. Remind them to go at their own pace and reassure that we are an inclusive programme that by the end, we will reach a common goal as a team.
- **Warm up:** Dribbling through gates (not timed); stopping for dynamic and static stretches when appropriate.
 - Each player dribbles with a ball anywhere in grid
 - When commanded to change ball, squash ball with sole and switch to new ball. This will increase heart rate and effort levels at lower intensity.
 - Add skills and turns to increase intensity and skills being practiced.
Demonstrate skills or use participant to do so and look for change of pace (within reason!) to increase intensity.
- **Incorporate coned (1m) gates:** Players dribble through as many gates as possible in 2 mins then rest. Reduce time to 1 min 45 secs - challenge them to beat target. score. Repeat a third time at same time goals.
- **Passing:**
 - Simple pass and follow in two lines of 4 (4 groups depending on numbers that show up).
 - Start two touch closer together giving more time for rest then further apart still two touch. Change to one touch again close together to begin with and then further apart again one touch.
- **Match based session (handball):**
 - Two teams split evenly pass with hands within appropriately sized grid based on numbers and aim for 5-10 passes in a row to score a goal (point) first team to 3 wins. Modify/ mix teams up to change dynamics whilst still not knowing all skill levels on show.
 - Play same game on floor with feet which becomes More demanding for a few minutes ready for next session.
- **Cool down:** Slow jog/ skips/ sidesteps adding in more static based stretching to improve flexibility and reduce aches (lactic acid build-up).
- **RPE's taken** (aim for most to score around 6 to ensure at session end, all will be physically able to train in 2 days).

6.2: Example 2: Session plan for 1-hour session incorporating fitness, skills improvements and response to RPE scores from the previous week.

Session 2: Recap and increase intensity and skill level slightly!

- **Warm up:** Dribbling through gates as session 1 and setting targets by coach once warmer, addressing skills/turns worked on during session one as well as dynamic movements to ensure ready to go.
- **Dribbling with partners in a grid.** Players pair up and one starts with ball dribbling in grid passing ball through partner and other partners who are standing with legs 1m apart and counting the nutmegs! Once time 1-2mins are finished, tell partner score and aim to beat. Adjust times and rest periods accordingly. Add jumping jacks for static player and partner must now use skill as well As timing to pass ball through legs.
- **Passing** (Same 4 lines as session 1):
 - Recap session one briefly again.
 - Coach technique/ first touch before creating competition between the two groups.
 - First team to complete 10 -30 passes in a row (one touch or two touch with no mistakes) wins
 - Play 3 times
- **Match** based 3 team handball (similar to session 1):
 - 4 defend against 8 (each 4 bibbed in same colour)
 - Team that gives ball away to defending team or that passes out of play becomes defending team. 8 passes gains point and increase or decrease passes dependant on success
 - Play same game on floor with feet and use four square grid in case tactical elements and spacing are required.
- **Cool down:** Dribbling a ball each movement similar to session one sometimes leaving all to sidestep/ open/close groins as well as static stretching.
- Record **RPE's:** 7/8's showing increase of intensity from session 1.

Box

6.5 Mapping of TAP against the Behaviour change taxonomy

No single behavioural method or theory was commissioned for use in design of the Alpha programme (TAP) at onset. Instead, the researchers experience as a practitioner and reflection on results and experiences reported by subjects obtained in real-time were utilised alongside a form of process evaluation to support programme optimisation. Following the protocol outlined in (section 3) for evaluation of previous interventions, the final TAP programme outline was appraised to determine how many behavioural change aspects included in Michie et al., (2013) behaviour change taxonomy were included in this intervention. This acts as a form of evaluation for the programme design, serving as a benchmark against which TAP can be compared to other behavioural interventions. Using 16 clusters used to sub-group each of the 93 techniques identified by Michie et al., (2013) as definitions to structure this outline, each aspect included in TAP is detailed below. First, a definition for the category (using details taken directly from the taxonomy) is included, then an outline (with examples) of how this was integrated within TAP is detailed. Finally, evidence of its impact and justification for exclusion of certain definitions were made.

6.5.1 Goals and Planning

Definition: Nine different definitions are included in the BCT in this category. The aspects included reflect on the capacity of the intervention to set or agree on a goal (defined in terms of the behaviour to be achieved) and linked to the outcome targeted. To achieve this overall target, aspects which influence behaviour, facilitate address of barriers encountered and/ or promote attainment of positive behaviours is then reviewed. This leads forward to how goals are agreed with subjects – prompting attainment of the desired behaviour change. Attainment of the target behaviour change goal next requires ‘planning of performance of the behaviour,’ providing either details on context, frequency, duration or intensity for the subject to enhance their understanding and therefore facilitate their success. Goals require monitoring, reflecting on achievements observed, and offering adjustments where necessary. Review of evidence highlighting behaviours reported and their variance compared to goals, aligned to education with regard how these may impact attainment of goals is then included as a pre-cursor to determining whether adjustment of the target is required. All details are provided in written format for the user, agreeing the behaviour changes required and their commitment to the outlined goal.

Application: The induction session used in TAP provided an overview of expectations. General weight loss goals were outlined and subsequently discussed in detail with each recruit individually. Anthropometric targets and feasibility of achieving them were discussed, barriers and facilitators and as such reducing discrepancy between current behaviour and the goal outlined. An agreement was reached as to how the programme would provide them regular

opportunities to train and develop their football skills, lose weight etc. in return for engagement. Weekly reviews of goals were included through the weekly dietary interviews and goal achievement/ non-achievement was discussed and re-framed as necessary.

Evaluation: Seven of the nine definitions were met from this group. The two remaining definitions; Behavioural contract and Commitment were assured verbally, recognising that the men were fully aware of the programme aims and their ability to engage with them and as such no written contract was required.

6.5.2 Feedback and monitoring

Definition: Seven different definitions are included in the BCT in this category, each of which is included as a means of informing the behaviour change process rather than as a means for data collection. Observations of behaviours is included, enabling use of these details to inform and/ or evaluate progress with or by subjects (this may be aligned with positive reinforcement/ rewards to promote engagement with behaviour changes required to achieve the desired outcome). Methods are included to monitor and record behaviours as part of the included behaviour change strategy, recording the outcomes and providing feedback.

Application: Discussions around setting goals were undertaken weekly with the full knowledge of the participant. Shortfall in performance would lead to discussions with the participant on how best to address them. 'Hard' records of outcomes would come through the food records, attendance and anthropometrical measurements. 'Soft' measurements such as RPE and visual observations were cross-referenced with earlier records to build a more complete picture of behaviours, from which tailored responses could be provided. Men were provided the opportunity to self-monitor using weekly measurements (recorded on small cards) and food records. Participants would often approach staff to discuss viable solutions.

Evaluation: Five of the seven behaviour definitions were achieved. Biofeedback, which suggests the use of monitoring devices for assessment of physiological / biochemical aspects were not. Though RPE was taken for to determine session effectiveness it was not used to support behavioural adaptation. It could be said that the food records were a form of self-monitoring that induced behaviour change; however, this was not part of an overall behavioural strategy, rather conducted to address behaviour specifically with diet and as such this definition was not met.

6.5.3 Social Support

Definition: Three BCT aspects are included in this category, each of which is included as a means of determining whether practical, emotional or another form of support is included to promote behaviour change.

Application: Regular communication was made with the men. Dietary discussions would often, due to the nature of diet, encompass conversations around lifestyle. Staff aimed to provide an atmosphere of informality ensuring the men felt able to discuss personal issues without judgement. Men were also encouraged to speak to each other and with several close friendships were observed to develop over the period of the intervention, with opportunities to access support improving over the programme's length.

To meet the definition of social support (practical), staff would be required to recruit friends and family to support participant change and though this was not explicitly sought, we know (from 1-2-1 discussions) that men would often ask a partner or family member for support and recognition that assimilation of the dietary guidelines was easier with another person/ persons input, especially one that co-habitated, was evident on several occasions.

Evaluation: This programme met all three definitions. Social development formed one of the pillars on which TAP was built. Providing the means for men to improve self-esteem by supporting skills development.

6.5.4 Shaping knowledge

Definition: Four aspects are included in the BCT in this category, each of which focuses on education. Development of skills needed to facilitate behaviour change and sharing of knowledge about antecedents (e.g. social and environmental situations or emotions) which may influence behaviours and means for re-attribution (i.e., exploring the probable causes of behaviours offering alternatives to counter negative practices) are included as a means to facilitate attainment of the desired behaviour change and ultimately goal attainment.

Application: Pitchside and in changing areas, men were provided food preparation advice such as recipes, cooking procedures etc. Discussions on which aspects to address in the diet were centred around how best to implement them and the participant's ability to address them. Dietary and exercise advice was educational in nature. Assimilation of the diet was a learning process, taken in small simple steps. Participant progression through each stage of the dietary procedure through to maintenance required the development of understanding alongside practice. Antecedents strongly influence lifestyle behaviours, particularly food choice (Bäckström, Pirttilä-Backman and Tuorila, 2004; Salvy et al., 2007) and by providing suggestions as how to best negotiate them, staff were able to help participant's develop awareness and solutions that were compatible with their own lifestyle.

Evaluation: TAP met three of these definitions. Behavioural experiments require hypothesis testing through regular experimentation and was not deemed a suitable ethical approach. For the men to develop skills important for self-maintenance they were encouraged to learn. TAP dietary and physical activity components were pedagogical in nature.

6.5.5 Natural consequences

Definition: Six aspects are included in the BCT in this category, each extending the potential for knowledge generation to inspire behaviour change and develop self-esteem. Making men aware of the salience associated with non-engagement can extend the effectiveness of such information. As such discussions would be linked to personal, family, environmental or emotional consequences to find viable solutions to maintain engagement. Such discussions required trust and would need to be established before in depth discussions of this nature could be explored.

Application: Men were made aware throughout the programme on the consequences of their behaviours on health. Anecdotes were often exchanged amongst the staff and men as to the consequences of ill health and the risk that the men were taking without intervention.

Evaluation: TAP met two of the definitions from this category. No information on consequences such as health warnings or pictures of patients suffering ill-health if they failed to engage with positive life improvements targeted in the programme were conducted in the belief that this could prevent engagement. Men were however made aware of consequences through normal discourse and when assessing their performance on the pitch, and this proved to be a strong motivator for improvement. Similarly, monitoring of emotional consequences was used here recognising that the intervention targeted a hard-to-reach and emotionally closeted demographic (Caperchione et al., 2017; O'Brien, Hunt and Hart, 2005) and asking for reflection was not considered conducive to the development of the targeted, masculinised environment. Anticipated regret was also not included since there was no ambition to encourage awareness of future regret if goals were not met since it was not the intention of the programme to 'shame' men for poor behaviours. The programme's focus was on the avoidance of introducing aspects that would stall progression and instead to support the development of an engaging and enjoyable environment that fostered self-esteem.

6.5.6 Comparison of behaviour

Definition: Three aspects are included in the BCT in this category. Modelling may be utilised to provide subjects with a goal to emulate, and social comparisons can be used to enable reflection on others attainment or perceptions on individuals' achievements to promote change.

Application: Staff acted as role models. Providing examples of good dietary behaviour, positiveness, emotional stability etc. drawing attention to another participant's performance to motivate, never to embarrass, ridicule or challenge (e.g., referring to the number of goals scored in a session, challenging a less engaged recruit to beat it).

Evaluation: Information on another's approval was not deemed suitable, for it was deemed divisive and undermined the development of solidarity. As to whether the participants viewed staff as role models was not made clear in feedback received, however, professional actions of the research teams aimed to show how adherence to advice could improve lifestyle in a way which was perceived positively by the men. TAP achieved two of these definitions.

6.5.7 Associations

Definition: Eight aspects are included in the BCT in this category which focuses on use of cues or prompts to define environmental or social stimulus which in turn inspire engagement with change.

Application: Fostering a stimulating environment was an important aspect in programme development, facilitating self-esteem. Having strong football affiliations and providing opportunities for men to immerse themselves in football both physically and emotionally enabled this within TAP. Stimulus for social development was facilitated through changing room sessions, banter etc. while aspects that were deemed to be obstructing individual progression e.g. work, family would often be explored through conversation.

Evaluation: Withdrawing privileges (remove access to reward) was not considered prudent for the development of engagement and was considered likely to erode the practitioner/ participant relationship. Furthermore, exposure to a feared stimulus was not used due to association with similar concerns. Instead, men were encouraged to address barriers within their own time and without pressure, though discussion to raise and resolve issues/ concerns, exchange views and solutions with staff – all of which was welcomed. Several behavioural approaches were considered akin to punishment and so incompatible with the programme's ethos. TAP met 3 of these definitions.

6.5.8 Repetition and substitution

Definition: Seven aspects are included in the BCT in this category, emphasising longer-term engagement with behaviour change required to increase engagement with new developed habits or skills. Where behaviour changes struggle to be attained, a stepped improvement model (small changes) may be introduced though graded in difficulty, and where changes evidence potential for a move toward new, but potentially harmful, behaviours, this definition facilitates moderation and address of such issues.

Application: Dietary recommendations were practical and simple. They would be shaped by the participant to suit the environment in which he lived rather than staff providing generic solutions that may be incompatible with their lifestyle. Practice was deemed necessary for assimilation, especially with skills such as cooking and shopping that were encouraged to become habitual practices. Daily routines aligned to football in the evening were utilised, so

that men could prepare accordingly. For instance, several men pre-prepared their meals so that they could be eaten after football, football kit was prepared so that they could travel to training straight from work. The establishment of a new routine would often be readily accommodated and could supplant earlier, unhealthy routines.

Evaluation: Graded tasks were not an aspect of the programme, since making things more difficult as the men progressed was likely to increase attrition. The dietary procedure was staged, but without addition of difficulty. Each aspect aimed to be simple and easily integrated into the participant's lifestyle (section 6.3). TAP met 6 of the repetition and substitution definitions.

6.5.9 Comparison of outcomes

Definition: Three aspects are included in the BCT in this category – ensuring behaviour change processes focus on attainable outcomes and enabling subjects to determine credibility of advice/ options offered elsewhere which may detract from the overall goal attainment if they are not evidence-based for example. Inclusion of opportunities to identify and compare reasons for wanting (pros) and not wanting to (cons) change their behaviour (and potential consequences of each) is included here.

Application: Staff members acted as a credible source of information, providing research and experience-based solutions and ideas. Support encompassed the exploration of behaviour and how they were/ were not developing. Suggestions on direction were bolstered by imagery of outcomes (messages perpetuated by staff) and realistic goal setting. Additional motivation would come through the exploration of prior and future achievements. Men were encouraged to identify goals and how they should approach them.

Evaluation: TAP met all three of these definitions which supported behaviour change by providing men the opportunity to tailor their approach to their own lifestyle. This reduced attribution and helped recruits take greater responsibility.

6.5.10 Reward and threat

Definition: Eleven aspects are included in the BCT in this category – each focusing on means to promote engagement with the behaviour change targeted using positive reinforcement and incentive-linked actions. Threats (linked to non-engagement) may also be included.

Application: Rewards come from the emotions tied to personal achievement and enjoyment from participating with friends. Verbal reward such as motivational support was commonplace and used by both staff and participants alike. Men were awarded medals for achievement of the 5% target though upon exploration these were discovered to have had little value (Appendices I). Men were encouraged to self-praise for achieving personal goals and not to

feel guilty if goals were not met. Self-reward to incentivise was conducted by the men but related more to performance, such as scoring a goal or running the full 60 minutes.

Evaluation: It was not the intention of staff to provide or withhold valued objects to encourage engagement. This was not seen as conducive to relationship development, potentially introducing inequality by placing the staff member in a position of power, negating the benefits observed here linked to the staff/ practitioner relationship through a more segregated/ hierarchal model for the intervention. TAP met 2 of these definitions, providing opportunities for social reward and self-incentive.

6.5.11 Regulation

Definition: Four aspects are included in the BCT in this category, each focusing on negative behaviours which need support (including medical or pharmacologic) to facilitate behaviour change. Means to reduce negative emotions that lead to poor behaviours and demands on mental resources required to attain those changes are included, in some interventions through use of paradoxical behavioural approaches designed to reduce desire to engage in that behaviour as a result.

Application: As covered previously, problem solving was a core aspect of the dietary support. Efforts to support memorisation (conserving mental resources) of key dietary aspects came through simple catchphrases such as 'third, third, third' and were supported by the simple, staged dietary procedure (Figure 6.7).

Evaluation: Pharmacological approaches were not considered and there was no intention to encourage men to engage in negative health behaviours (paradoxical instructions) to encourage engagement with positive behaviours (this was not considered ethical). Providing simple steps and messages was successful at developing memory and helped guide choices when support was unavailable. As such TAP met two of the four definitions.

6.5.12 Antecedents

Definition: Six aspects are included in this category, aiming to adapt physical, environmental and social aspects to prevent these acting as barriers to the desired behaviour change and create an environment which inspires engagement with the behaviour change.

Examples: By providing men with two opportunities per week to exercise with continual dietary intervention aiming to positively influence their lifestyle, TAP aimed to influence their immediate environment. The societal focus of the intervention, with men congregated and encouraged to enjoy each other's company, make new friends and share knowledge and experiences supported a re-structuring of their social environment, self-empowerment was promoted, bolstering the strength needed to avoid and/ or refuse negative health pursuits. Football acted as a distraction, providing a means to escape sedentary activities that may

have been pursued before the programme. Men would often buy football boots, bags and shirts to wear at sessions and which in turn would further motivate for they wished to display their new purchases and/ or not let them go to waste. Waist circumference losses proved to be a strong motivation aesthetically, often discussed and focussed on with regard trousers no longer fitting and new clothes being purchased to accommodate their new waist size. There was often masculine related banter exchanged including topics related to development of six-packs and physical prowess.

Evaluation: TAP met all six of these definitions. These aspects motivated men. Programme conditions ensured that a relaxed and enjoyable atmosphere supported solidarity and knowledge exchange and provided an escape from daily routine.

6.5.13 Identity

Definition: Five aspects are included in this category, in this case focusing on increasing the self-belief of the individual, to ensure they prioritise their own importance in attainment of their target goal. Such aspects include their identification as a role model to others, reframing the purpose of their decision to address target behaviours by viewing their journey to this goal as an example to others. Aspects of cognitive dissonance (addressing discrepancies between previous behaviours and self-image) and structuring (amending emotions associated with performing the target behaviour) align within this category as aspects to consider: achieving self-affirmation, increased realisation of self-importance.

Application: Although it was not explicitly mentioned, some men became role models for others. With achievements in weight loss or abilities on the pitch, it was easy to identify men whose successes motivated others, with cases observed to reframe their own environment to enjoy this success. A competitive edge with a strong role in motivational development was evident supporting the re-framing of a new identity (identity associated with changed behaviour) which was implicitly addressed, for the men were able to visualise a new view of themselves after weight loss, recognising and reflecting on how their old behaviours were detrimental to health.

Evaluation: TAP had no intention to induce discomfort (incompatible beliefs) and so this definition was not met due to the risk of dis-engagement. Similarly, introducing rating scales used for self-evaluation was not deemed viable considering the all-male cohort. TAP met three of these definitions.

6.5.14 Scheduled consequences

Definition: Ten aspects are included in the BCT in this category, each aligning to use of a different punishment or negative reinforcement process designed to encourage engagement with the health improvement behaviour.

Examples: The yellow card was introduced as a form of punishment for non-conformance but proved detrimental to relationship development, sowing distrust and resentment (section 6.7). Medals were awarded for 5% weight loss goals and the men used self-congratulatory methods for achievements such as exclamations of their happiness or a treat day celebration. Verbal encouragement for alternative (yet positive) behaviours were provided and methods (Participant 1 sourcing a portable porridge solution) that were deemed new and innovative would be passed onto other men for them to consider. Reflective behaviours were often used by staff and participants alike. Furthermore, participants were encouraged to focus on previous successes and how they could meet or achieve similar success next time.

Application: These definitions largely focus on punishment, particularly withdrawal of privileges. Although this was tried through the yellow card system synonymous with football, it introduced negative feelings towards staff and undermined relationship development and so was dropped from the programme outline. TAP had strengths in rewarding success and reflective development and as such used these approaches instead and as such met 4 of these definitions.

6.5.15 Self-belief

Definition: Four aspects are included in the BCT in this category, each emphasising the importance of the subject recognising their potential to attain the behaviour change being targeted.

Application: To develop self-esteem, positive feedback was used throughout the programme. It was important that each recruit felt empowered to meet their goals and this was achieved through visualisations of themselves once their aims had been met such as to how it would improve their health, capabilities on the pitch etc. Visualisations focussed on masculine characteristics (Courtenay, 2000; O'Brien, Hunt and Hart, 2005; Davies et al., 2000). Men were initially asked to reflect on past successes to help them to learn from and use them in future. Self-talk was mentioned as being a positive inducement rather than one suggesting mental decline (men on occasion would refer to this method as '*The first sign of madness*') and though encouraged it was unclear as to how many men used the approach.

Evaluation: TAP met all four of these definitions. Men would often comment on how happier they were and were often a consequence of weight loss and improvements in fitness and this further fuelled their desire to improve.

6.5.16 Covert learning

Definition: Three aspects are included in the BCT in this category, including hypothesised or imagined impacts of (dis)engagement with the targeted behaviour change. Social aspects may

be included if examples from public figures outlined in the media for example are used to enable realisation of consequences.

Examples: Men were encouraged to imagine the consequences of continuing their negative behaviour. Asking them to visualise themselves in uncomfortable situations because of pursuing negative behaviours was not encouraged, although the visualisation of positive situations was, since this helped frame the achievement and make it more tangible.

Evaluation: TAP met two of these definitions. Providing the means for the men to visualise themselves once their aims had been met and further motivated them to pursue their goals.

Overall TAP met 57 of Michie et al., (2013) 93 techniques and highlights the success of TAP in providing a large variety of incentives to support behavioural adaptation.

6.6 Semi structured interviews

For this section the lived experiences of men who participated in the Alpha programme are presented through themes identified related to health, football and diet. Ten themes were uncovered through thematic content analysis of the interview transcripts (Table 6.8).

Table 6.7: The Alpha programme pre-programme and post-programme interview themes.

Pre-intervention themes
Health and distrust
The draw of football
Weight attribution
When weight gain occurred
Food – resistance and comfort
The importance of exercise
Post-intervention themes
Camaraderie and humour
Programme induced food changes
Continuing support
Injuries affected engagement

The men provided insight as to how exercise is a primary means of controlling weight, despite evidence to suggest otherwise. The men openly discussed the period into which they began to gain weight and their feelings as to what it is like to be overweight. Habitual food practices were discussed, and we can see how employment restricts these practices through the day. As expected, football was the core reason for participation, with attendance for health not as important as expected. However, it was cited as a reason for attendance by some. Men attributed weight gain to external factors, providing insight suggesting that they deemed the condition to be out of their control. Injury was a concern and through which the researcher uncovered a preference by the men for football that if they were unable to participate, then the diet may be a casualty as well. Social integration was witnessed as having developed through the programme and was a primary influence on attendance and was proven to have led to wellbeing improvement. Finally, the dietary support proved effective and easily integrated.

6.6.1 Pre-intervention interviews

6.6.2 Health and distrust

Traditional masculine norms negatively ascribe help seeking behaviour with weakness, loss of control and autonomy (Mahalik, Burns and Syzdek, 2007; Vogel, et al. 2011). To seek help risks stigmatisation (see Vogel, Wade and Hackler, 2007) that if internalised can lead to further

feelings of negativity towards counselling (Vogel et al., 2011). Younger men are more inclined to engage in '*performative acts*' such as risk taking, violence and excessive drinking (Marcos et al., 2013). Whereas the older man, perceived to be more risk adverse (Chou, Lee and Ho, 2007) has a matured and more conservative perception towards lifestyle (Vroom and Pahl, 1971) where age related decline in strength, fitness and sexual prowess manifest into efforts to halt this decrease (Springer et al., 2014). For the older man, we describe a more tempered and rationale individual that is less concerned with stigmatisation, loss of masculine capital and more aware of their health.

Three participants mentioned health without the topic being directly addressed and outlined a possible maturing of perceptions and in contrast to suggestions that men have little concern for their health or take measures to seek help (Smith and Wiltner, 2006; O'Brien, Hunt and Hart, 2005). However, all three respondents had prior health concerns, which positively influenced their perceptions and motivations to address them. Research does suggest that men, post health 'scare' may be more receptive to intervention (Horwood et al., 2014; Mróz et al., 2011). Mr C worked as a factory worker and largely sedentary throughout the day, participating in little or no exercise at other times. Mr E worked in the Information Technology (IT) field as a consultant. His employment was sedentary and similarly to Mr C he had underlying health conditions in relation to his weight and yet had performed very little intervention to address them.

I: *What concerns do you have about being overweight?*

Mr C: *Well, my biggest concern is that after putting on a lot of weight I had a heart attack about 15 years ago so I don't want to go back into that situation again. I've had no problem since then but a lot of the problem was due to diabetes. My son in law suffers from diabetes so I watch him and he has to watch his food and his insulin level. I want to see my days out; I want to be single again and enjoy life instead of carrying on being fat.*

Mr E: *I need to lose weight to help with my blood pressure and get me off the tablets because I hate taking tablets at the best of times and I have to take a stupid amount now. What is it, four tablets I take a day... and if I lose weight there's no reason why I then have to take... you know or the doses come down you know? So, that was one bit of it, you know?*

The third man Mr B also worked in a routine classified occupation as a delivery driver and had had a battery of tests performed a year before joining the programme. Most of his daily routine was driving, taking cargo from one destination to another. He performed very little exercise prior to joining the programme. His cholesterol, blood pressure and resting heart rate were normal, and he had lost and regained five and a half stones, and which had culminated into concerns about diabetes due to this rapid weight gain. Despite his concerns, Mr B. attended intermittently (citing that work commitments prevented his regular attendance).

- Mr B: *Yeah, same with cholesterol as well, that was it, cholesterol test they did.*
- I: *Oh yes, cholesterol.*
- Mr B: *That was right in the middle, that was 5, fine.*
- I: *Oh right, so, sorry here, it dropped down to those levels when you... (Referring to when he had lost the weight).*
- Mr B: *No, no, that's before, that's before I started that's before I lost my 5½ stone last year they'll, because I put it all back on in less than a year...*
- Mr B: *You could say that my blood sugar level now may be a lot higher because I put it on so quickly, so again. So, I'm aware and conscious that there's health issues, if you know what I mean.*

The remaining men only discussed health when the topic was pursued by the researcher and answers focussed more around levels of fitness and age rather than the risk of disease associated with being overweight or obese. Other than for two men, preventative approaches to ill-health seemed of little concern, suggesting a disconnect between the benefits of exercise, good diet and reduced health risk. Mr P worked as a car salesman at the time of interview and had a mainly sedentary occupation and though he would take the occasional walk at the weekends, he remained sedentary in his spare time and recognised that his limited fitness motivated him to enrol on the programme. Mr R (35 years, BMI 32.1 kg/m², routine occupation) noted concerns over health risks as he got older and before joining the programme. However, he admitted to having done very little to address these concerns until recently.

- I: *Oh ok. Do you think there is any problems... what problem does being overweight cause for you? Anything at all?*
- Mr P: *No.*
- I: *Ok, fine. What concerns do you have about being overweight such as health for instance? Do you have any concerns that way?*
- Mr P: *Yeah, it is like short of breath probably if you are overweight and if you, do you know even because I'm always... I don't do any exercise in the winter. So, if you have to find anything out like a couple of months we were in London with my son and we had to go up the escalator in the underground and I was knackered. The same escalator as like eight years ago when I used to work there. I used to fly up and down and now it is like, ha, ha, so that's it. It was absolutely a killer. I was short of breath.*
- I: *Do you have any health concerns being overweight?*
- Mr R: *I suppose I've never really had any health concerns but I suppose as I'm getting older and you see everybody else that you know... it's slowly started to drift in the back of your mind your bodies sort of telling you you've got to start doing something.*

Although action was taken by some men to address health concerns, the majority appeared indifferent. Considering their age, reticence may be attributed to embarrassment and / or fear to express themselves (Fish et al., 2015). In addition distrust of the practitioner's health messages may exist (Gough and Conner, 2006; Davies et al., 2000) and thought of as a defensive posture, cultivated through masculine enforced stoicism, invulnerability and an unwillingness to admit weakness and relinquishment of self-control (Courtenay, 2000; O'Brien, Hunt and Hart, 2005; Davies et al., 2000). Gough, Seymour-Smith and Matthews (2016)

highlighted how something as simple as a discrepancy between recommended target levels of body weight and a participant's preferred weight can induce distrust and eventually scorn for health practitioner recommendations. A similar response was provided by the men of TAP, who when presented with derived BMI targets that would lead to them achieving a healthy weight category (18.5 - 24.9 kg/m²), the response was tinged with sarcasm and disbelief:

"I'll end up as skin 'n' bone".

"I was that weight when I was twelve".

"There'd be nothing left of me".

On several occasions, and dependant on the participant's weight at the time, a very large amount of weight loss was predicted (and considered necessary). One participant was expected to lose 51 kgs (112 lbs) to reach the middle of the BMI healthy category. Recognising male disengagement with health improving practices and advice (Gough, 2007; Gough and Conner, 2006), a core aim of TAP was to build trust, developing solidarity – with all working to single goal less concerned with achieving a defined numeric loss than any loss. One particular benefit of this this approach would be to reduce the distrust encountered by practitioners when attempting to relay health messages to men (Himmelstein and Sanchez, 2014; Martínez-Hernández et al., 2014; Gough, Seymour-Smith and Matthews, 2016). When men are presented with advice that they consider to be unrealistic or untrustworthy, this undermines trust development efforts (as was the case presented here). In response to feedback and reflection indicating that the targets may negatively affect trust and self-efficacy, the BMI target was removed (week 3).

6.6.3 The draw of football

Sport is viewed as a microcosm of society where you will find a broad expanse of social and political themes (Mangan and Hickey, 2014). Visualisations of the typical football fan, no longer conform to a white, working class, male demographic. Over the last few decades, the attraction of football appeals to a wide variety of identities across gender, ethnicity, class and age (Giulianotti, 2002). Filling the vacuum left by a decline in the working class associations, a 25 year and almost uninterrupted period of football-related violence culminating in the Hillsborough disaster, led to a change of stadium design of which one of the first aspects to be removed was the standing terraces, an area historically populated by the working classes (Williams, 2005). Movement away from grassroot associations, the football club is no longer a vestige of community life, having been transformed with huge potential for economic growth (King, 2016). As a consequence, throughout the 1990s increasing commercial investment coupled with ticket price increases, stadium redevelopment and player wage inflation facilitated the degradation of the cultural and societal attachment to the club by the traditional fan (Nash, 2001). A wider societal change took place, leading to a fan base that had distanced

itself from the traditional working classes and their associated behaviours. As a consequence, the modernisation of football began to appeal to the middle class (Nash, 2001) who - being more affluent - were able to afford the ticket prices whilst dictating a preference for a more comfortable, secure atmosphere. The NS-SEC distinctions for TAP spread across all three class distinctions (

Table 6.2) to support this hypothesis. Football had a strong draw on the men. Conversations throughout the programme centred around football and the men were provided an environment in which they could openly and continuously express their views. Throughout the football sessions, discussions would focus around recent football team news such as player transfers and match scores and banter would often relate to recent mistakes on the pitch – both during their own games and those viewed at club match events. Responses to events on the pitch were also football related, a ‘Gascoigne’ relating to an over celebration after scoring for example.

Football for the men had been followed religiously since a very young age and was made clear through the interviews as to how much passion they had for the sport.

Mr E: *I love football, that's my game as far as I'm concerned and so, I wouldn't ... unless I got hurt, I wouldn't give it up. I love playing football.*

Mr F: *I've always had some form of football. In my whole life I've done something but obviously, over thirty-five it got cut down quite dramatically.*

Mr E, mentioned reaching a very good standard of football leading up and into his early twenties. He had played as often as possible during this time and yet had not played since leaving the sport, yet he was passionate about Aston Villa and followed them online and through televised matches. Mr F. has been following football since he was a small boy and had become a professional footballer (Southampton FC) until retirement from the sport when his activity ceased altogether. Mentioning his sedentary occupation, he disclosed that he was an avid gamer playing for several hours at home after hours in a sedentary job. He watched football matches online, yet preferred gaming. He performed very little exercise before joining TAP.

For men who love football and yet, do not necessarily play the game TAP provided an opportunity to submerge themselves within a team dynamic which inspired engagement. Discussions outside of the interviews, suggest that one of the advantages of the programme was that it offered men an opportunity to play alongside men of a similar age. Within the local vicinity of the programme, no clubs or regular fixtures existed for men over 35 years. Despite the inclusiveness afforded men by football, participants mentioned the low number of opportunities for men who are middle aged who wished to participate in the game. Clubs that offered ‘turn up and play’ opportunities were mentioned as being populated by much younger men, where the pace and speed of the game was beyond their capabilities. Furthermore, the more physical nature of the game increased their risk of injury, especially being much older.

6.6.4 Weight attribution

It was made evident that lifestyle events decreased the opportunity to exercise. Conversations suggested two reasons for weight gain: lifestyle (including family commitments) and occupation leading to a decrease in activity (as described earlier). Often, the termination of exercise and the entrance into an alternative, often family-centred lifestyle happened simultaneously and the men would often view them as being incompatible by suggesting that a lifestyle event prevented exercise rather than integrating the two.

Mr R: *... I suppose since when the kids arrived. They're only little anyway but it's been... I've stopped doing... I've always been quite active, always played football, always done something and then the kids came along, that stopped so before you know it you're not younger I was eating the same sort of stuff because you're exercising it's going off.*

Mr P: *I suppose... I mean, there's more pressure at work now because I've got more of a high... more of a managerial role. So, it has... where work roles changed so there's more responsibility and more time there. So, there's less sort of I suppose flexibility in when you eat and stuff like that but I need something quick and get on with it.*

Mr C: *I have been putting on weight for years, Mark. I stopped playing football about the age of 35-40ish but because I run my own business, well, I can manage my work when I play football, training and stuff like that, and I wasn't eating as much, but when I stopped playing football and started to settle into life and with having my own business and taking clients out, as you do when you have clients, you take them out for a meal, or a drink and the easier life in relation to social events was like the big thing, so I started to put the weight on..*

Evidence from interviews and research literature highlights attribution where treatment response is influenced by individual perceptions of the condition and its causes (Brogan and Hevey, 2009). For the participants of TAP, attributions were more often externalised, placing the cause of their predicament out of their control. This was in contrast to research findings, where internalised causes are more typically dominant e.g. overeating to obesity (Brogan and Hevey, 2009; Weiner, Perry and Magnusson, 1988). External, less 'controllable' behaviours are likely to increase despondency and demotivation, presenting as repeated behaviours contributing to the condition (Wamsteker et al., 2009) for instance, weight cycling behaviours which has been shown to have a significant relationship with all-cause mortality (Rzehak et al., 2007). Evidence highlights that men are averse to diets which are embodied as a 'purely female' pursuit (Gough, 2007), with exercise preferred as a means to control weight (Kiefer, Rathmanner and Kunze., 2005; Robertson et al., 2014). Evidence suggests that men are more inclined to favour individualised, structured and fact-based dietary approaches (Robertson et al., 2014) and once engaged in weight loss, are shown to lose weight more quickly than women (Pagoto et al., 2012). With earlier evidence suggesting that men are risk averse and

more inclined to see help around health, their patterns of weight loss outline continued high-risk behaviour and a cyclic approach to dieting.

I: *Any previous weight loss attempts?*

Mr B: *Yeah, I did Slimming World probably 6 years ago. I lost 5 stone on that and put all that back on... I put all the weight back on after...yeah, 5½ stone, uh in 18 weeks.*

Mr C: *So, I started to put the weight on but I sort of 'yo-yo' dieted. I would go on a diet and lose about 3 stones and then I would put it all back on again*

Rapid and large gains in weight observed in some subjects over short periods of time are a reflection of high-risk behaviours seen within this group. Rapid regains are associated with reduced resting energy expenditure (REE) (Johannsen et al., 2012) and weight cyclers can develop poorer hormonal and metabolic profiles (Mason et al., 2013). The participants most affected by persistent weight cycling were unable to show restraint or recognise harm. Although this approach is not solely related to men, evidence does suggest that this is a masculinised health risk behaviour (Vandello and Bosson, 2013; Gough, 2013). Research literature on male weight cycling is limited and more commonly addressed in sporting related research (Fortes et al., 2017; Berkovich et al., 2016; Montani, Schutz and Dulloo, 2015) and yet we can see (above) that for these men losing weight it is referred to as an achievement and a natural approach to weight loss. Investigations in male weight cycling should be considered specifically for men outside of sporting circles.

6.6.5 When weight gain occurred

All participants were able to recall when they began to put on weight. The years spanning their thirties and forties were most common, although two men mentioned gaining weight in their late teens. None mentioned having been overweight from childhood, though question(s) did not attempt to uncover this aspect, instead focusing on aspects related to the suitability of the programme content to support attainment of targeted weight loss ideals.

I: *When do you think you started putting on weight?*

Mr C: *Probably... probably when I got into my forties*

Although research suggests that men feel that weight gain is an inevitable consequence of middle age, they perceive themselves to be more able to cope emotionally with this as they are perceived as being larger and more muscular than women (Ziebland et al., 2002). Interview data collected here suggests otherwise however, highlighting that deep, ingrained and suppressed emotional consequences are likely to be associated with male weights and which are steeped in traditional masculine behaviours (Sobal, 2005; O'Brien, Hunt and Hart, 2005; Jewkes et al., 2015).

Mr E: *I grew shoulders and then gave up football and gave up cycling and learnt to drive. That's the worst thing I ever done. I still say that to this day, I've become lazy and it's probably a mixture of that and didn't play football, yeah.*

Mr E was one of two participants who mentioned weight gain during his teen years. His interviews highlighted attribution of blame to externalised factors (in this case, lack of football) however internalised honest reflections that link to his awareness that he had become lazy highlights potential for engagement with the intervention.

Muscle mass and strength decline with age (sarcopenia) and whilst subcutaneous adipose tissue remain relatively stable, visceral fat is thought to increase (Visser et al., 2003). There is evidence to suggest that men can have an almost two fold greater decline of strength through loss of lean muscle mass than women (Goodpaster et al., 2006; Visser et al., 2003) supporting evidence that cardiovascular exercise undertaken alongside muscle improvement exercise into old age will help arrest decreasing muscle function (Larsson et al., 2019; Hairi et al., 2010).

Mr S: *So, probably when I got to my forties I suppose, I was probably eating more and putting the weight on and you don't really notice it and then after a while you find it's harder to get off, you know and I think it maybe because I'm less active.*

Mr S indicated his inability to lose the weight with increasing age, and in this extract brought into focus the opportunity lost by a lack of education around weight control. He reflects that exercise is the primary controller of weight. At 51 years, Mr S was working in a warehouse. He had an active position and mentioned being regularly on his feet yet gained weight. Like Mr P, this had led to body dissatisfaction. Several participants acknowledged weight gain but had little inclination to address it, supporting research consensus that a lack of motivation was a prime barrier to lifestyle modification (Schutzer and Graves, 2004; Chan et al., 2009; Reyes et al., 2012).

I: How does it feel to be overweight?

Mr S: I don't like it.

I: What sort of feelings does it give you...?

Mr S: I feel pretty crap... you know, I sort of like get up in the morning and whatever and walked past a mirror and I think, look at that gut... but I know I should do something about it. It makes you feel pretty down really to be totally honest.

Mr P: *I don't like it because I've never been overweight..... but it's more... I mean, I'm overweight I wouldn't say... I suppose technically I'm obese I would imagine from the way they do it now.*

I: *Yeah, I'd need to look at your chart.*

Mr P: *... but I don't feel huge when I'm walking around all day or anything like that..... but I notice it when I play five-a-side and my legs get tired like they never did before and I'm sure that must be as much weight as age.*

- I: *I was going to ask you what problems does overweight been... does being overweight cause you any problems?*
- Mr P: *It just makes me feel like a slug when I'm going on.*
- I: *It just makes you feel a bit depressed or whatever?*
- Mr P: *Yeah.*

These examples highlight the potential for mental health to be affected as a result, with feelings of depression openly mentioned and in contrast to the expected stoic response expected (Schrock and Schwalbe, 2009). On recruitment, none of the men in TAP were considered well placed to self-motivate and may have felt vulnerable and open to potential ridicule when joining the programme. Their decision to engage, however, appears to have contributed to levels of confidence and through participation with like-minded individuals in similar circumstances, appears to have helped foster the solidarity that was targeted by the intervention design.

6.6.6 Food - resistance and comfort

Bellisle (2014) and O'Connor et al., (2015) suggest that increases in overweight and obesity prevalence has coincided with the erosion of traditional eating patterns and the emergence of more modern behaviours such as watching TV whilst eating. There are strong associations between sedentary behaviour and obesity (Rogerson et al., 2016; Raynor et al., 2013) and the TAP men provided rare insight into how accessibility to convenience foods coupled with sedentary behaviour contributed to their gradual weight gain.

- Mr R: *Then you probably have a cup of tea with some biscuits although you didn't need it but they're there and you go down that slippery slope and possibly if there was a beer, you'd go and have a beer or something.*
- Mr E: *Crisps. If they're not in the house, it doesn't bother me but if they are in the house, I'll have to have a packet.*
- Mr C: *I think there may be something about starchy stuff that makes you sort of addicted, but I know for a fact that chocolate and crisps are one of my biggest fall-downs. I will be sitting there or might be driving somewhere, and I put a Mars Bar in my mouth rather than an orange or something like that.*

Recognition by participants that they do not need the food suggests that restraint was felt to be beyond them. Despite best intentions, the desire to eat tempting food, whether consciously or not overrides individuals intended behaviours. Regular consumption of treats promote a relationship between sensory signals and the feeling of satiety that the food presents. These feelings triggered by the opioidergic and dopaminergic combination resulting from regular exposure to such foods can lead to increases in overeating (Leigh Gibson, 2006).

- Mr E: *You know, I've just sat a bit in the evening you know, you're comfortable, you are relaxed, chilled watching the telly or something like that... my biggest downfall which I'm concentrating on at the moment is I like to pick in the evening. It wouldn't necessarily bother me if I don't eat during the day.*

Mr E provided insight into how his distracted eating supporting a continued consumption with no restraint. Distracted eating is thought to increase consumption amounts by up to 25% (Robinson et al., 2013) and distractions such as work that require some measure of mental focus could reduce opportunities to eat suppress his desire to pick unhealthy options. Furthermore, the repetitive nature of this eating pattern highlights that it has become habitual.

I: *So, what foods do you know you shouldn't eat but find hard to resist?*

Mr S: *Probably crisps... probably savouries more than sweets you know. You know, if somebody said to me in the evening, sitting down do you want a bar of chocolate or a tub of Pringles, I'll go for Pringles.*

This emphasises the potential for convenience to overwrite intentions. Over consumption of regular meals was not a focus of blame, rather confectionary items were. Evening inactivity is unlikely to be not the primary reason for daily positive energy, rather a combination of Total Daily Energy Expenditure (TDEE) exceeded through a combination of high fat and high sugar consumption and sedentary behaviours explains this. Research outlines how sedentary aspects can influence poor food choices (Griffith, Wooley and Allen, 2013) with suggestions that a combination of reward cues such as stress, boredom and habit are responsible (Pool et al., 2015; Koball et al., 2012; Ridder et al., 2009) and may outline the reasons as to why these men engage in these snacking activities after work.

6.6.7 The importance of exercise

Despite evidence to show that men benefit from physical activity more than women can with regard weight loss (Westerterp et al., 2017), exercise alone is not comparable to the amount of weight lost through 'dieting only' over a similar period of time (Pritchard, Nowson and Wark, 1997) and associations with body fat percentage reductions are greater for women than men (Westerp and Hoed, 2008). Despite such messages, the men of Alpha viewed exercise as the primary driver for weight loss.

Mr E: *... which is probably... and when like this time of year comes, I do a lot more exercise. I do cycling, I do walking and jogging. So, I lose from ninety-five, ninety-six kilo, I go down to eighty-nine, ninety. So, it's not like a massive weight loss, the weight I put on. If I want to lose it, I lose it... I just do more exercise...*

I: *Yeah but your back into it now though aren't you? What things do you think have led you to put on weight?*

Mr F: *Probably lots of things but the thing I notice is the lack of exercise because I've always been doing it and I miss it when I don't do it. I've always had some form of football. In my whole life I've done something but obviously, over thirty-five it got cut down quite dramatically.*

Mr K: *It was... yeah, after I stopped playing regularly because up until I was about thirty-two, I was still playing twice a weekend, training twice week...*

Mr K was 41 years of age when interviewed and was working in a routine occupation. All exercise completed prior to enrolment on TAP was conducted outside of work, and when he stopped exercising, weight gain occurred. Without diminishing the important role that exercise has in helping to engage men on weight loss programmes (Robertson et al., 2014; Pagoto et al., 2012; Kiefer, Rathmanner and Kunze, 2013) and in the prevention of weight gain (King et al., 2010), it has been suggested that physical inactivity alone is unlikely to explain the current obesity epidemic (Martins, Morgan and Truby, 2008) and that improved diet and nutrition are vital (Luke and Cooper, 2013). Men (when compared with women) gain additional psychological benefits from exercise, possibly through heightened hormonal responses which lighten mood (Kiernan et al., 2001). There is also the mood enhancement, that can be gained through the opportunity to play in a sport that the majority of men have been avidly following since childhood as opposed to a generic exercise component that does not evoke the induce the same emotional attachments as football (Wyke, Hunt and Treweek, 2014; Rutherford et al., 2014). Its importance in any weight-loss intervention is clear therefore.

6.6.8 Post-intervention interviews

6.6.9 Camaraderie and humour

Within the correct environmental conditions, mutual recognition and collective identification can develop (Wenger, 2010; Renger and Simon, 2011). The men in this intervention were keen to mention the camaraderie achieved on the programme and in contrast to interviews held at the beginning of the programme, referred to themselves as being part of a team.

Mr C: *I am not being funny but you could eat better anyway and you could play football with your mates but to meet a good bunch of guys at the end of it and from where we were twelve weeks ago and seeing how everybody has performed at the end of it, everyone is a lot fitter and a lot more involved and everybody knows where everybody is coming from. I feel tonnes better. A thousand percent better than what I did before.*

Mr S: *I have enjoyed all of it. I have enjoyed the physical side and the camaraderie and everybody is really supportive of each other and normally a guy would get a whack on the shin and he is hurting and you would say 'get up you wus', these guys are all saying to each other 'are you alright, do you want to take it easy, do you want to go in goal, have a little sit out' so everybody does support each other as well and I think that is quite good.*

Mr P: *Football and fitness, it's all of those things but meeting the guys and the banter I enjoy that as well.*

Interviews highlighted trust development. Mr S reflected on the response to his injury, reflecting on the caring nature of his colleagues. This is collective identification, where a bond of solidarity ensures each participant looks after the other fosters strong relationships that facilitate learning and generation of positive experiences (Wenger, 2010). Research literature suggests that humour provides varied and diverse benefits, providing both social and

wellbeing support. It has the potential to relieve tension, reduce embarrassment (Demjén, 2016; Tanay, Roberts and Ream, 2013) and to establish solidarity with others (Williams, 2009). Acting as a form of social management, Mr S's comments highlight how a humorous, bantered comment motivates an individual to shake off injury and continue playing. Demjén, (2016) referred to humour as a means to 'defuse unpleasant situations' recognising its benefits when applied within the healthcare context to improve patient outcomes. Staff were quick to use banter and humour in the form of comical anecdotes, on pitch antics and jokes. Within the intervention, it was imperative for the development of trust that a team dynamic was created that encompassed both staff and participants. Humour was used to refer to weight gain and lack of engagement with diary submissions etc. and feedback from these interviews highlight its effectiveness imparting health messages (Foster, 2012; Demjén, 2016).

Another respondent, Mr W (53 years, worked in management for an energy company, mainly sedentary occupation) reflected on the wide variety of foods offered by his employer and their contribution to his weight gain. Previously a semi-professional footballer, he described difficulty returning to the game due to the younger, fitter and more physical players these groups now included. The Alpha programme provided him the opportunity to train at his pace and mix with men of a similar age and with similar motivations. He was particularly well-liked by the other men, with his regular participation, good natured approach and his humour.

Mr W: *I enjoy the crack, for me it was trying to get back into that state of mind. Just having a crack and everybody's in the same boat and it's good, it's good fun.*

The FFIT programme (Hunt et al., 2014a) recognised the importance of team work but did not mention its significance in engagement to promote health and or reduction of the practitioner/participant barrier. Morgan et al., (2011) outlined the importance of humour in communication but did not address how important humour was in trust development. As health practitioners, social cohesion, humour, shared responsibility and trust must be considered to ensure health messages and educational strategies hard to reach groups.

6.6.10 Programme induced food changes

This section will evidence how the nutritional routine led to enhanced education around food and supported dietary changes. Each aspect of the procedure was addressed by the men in interviews. This was not intentional, suggesting the importance of these changes. The need for personalisation is also highlighted, since each man had a different opinion with regard which aspect was important to them.

Mr R outlines how support around food choice was important to him and how small changes from his previous approach had a major influence on his daily routine. He admits to consuming a large amount of fruit at lunchtime in the belief it would support his healthier regime. However due to the low amount of sustainable sugars he was soon becoming hungry to the point of

reaching home with fatigue and hunger, which in turn would lead to gorging 'like a man possessed' due to a loss of self-control through intense hunger and provides us with insight into how overwhelming such feelings can be.

Mr R: *I was getting a box out every lunchtime. My lunch would consist of a large box of fruit because I was on the understanding that that would help healthy way because if you're having fruit every day you can't be do much wrong. Ermm but actually what I was doing was meaning that when I did come to eat, I had no carbs in me some sort of going and make up for the fact that I wasn't balanced during the lunchtime. I'm still getting my fruit fix, because I did like my fruit but actually afterwards to sit there and I'm really satisfied. Which wasn't there before. Although I was full, I hadn't eaten a lot in quantity, it wasn't given me that that sense of contentment. So, from you saying just have a wholemeal sandwich with plenty of salad in it and you'll feel fuller and your feel better. And I do and I've carried on doing that. And so that has really helped actually because and now like you're talking about you will naturally feel hungry when you should. I was almost sort of starving myself thinking that I was being really good and then getting towards the end of day and having to, like a man possessed got to have something to eat because I'm going to keel over (laughter).*

Mr R, with his comment in regards carbohydrate rather than blood glucose levels suggests that he still lacks a clear understanding of the metabolic aspects around physiology and diet. This is a limitation of the nutritional procedure since the focus here was on education in diet and procedural dietary changes, not nutrition. There is confidence however that the routine helped some men find 'balance' in their diets. Mr R alludes to this, underlining how the dietary support led to a clearer understanding of what should be present in his meals and when he should eat them. Although it would not be wise to prohibit fruit consumption, the comment about how Mr R continues to eat large amounts of fruit does show how the intended flexibility of the diet to allow men to retain their food choices had been achieved.

Mr E provided similar insight into how coming home from work with an intense hunger, leading to undisciplined consumption. It also highlights how the workplace environment can prohibit eating, even when hungry. Whether the workplace constraint around eating is perceived or tangible is not clear, yet we still gain insight into how Mr E endured lengthy periods of hunger and that once home he was afforded the flexibility to eat, beyond physiological requirements.

Mr E: *err no I was feeling hungry but I was suppressing it. I wasn't eating before but then when I did get home it was even worse. I would just start snacking as soon as I got into the door. And I'd be like I've not eaten all day. I do it to myself, it's a bit strange why was thinking that. I didn't really think, then I cannot pick something to eat and not pick a little bit more, thinking I didn't have much to eat this afternoon.*

Mr G (35 years, BMI 30.4 kg/m² at enrolment, financial director/ sedentary role with long commute) was confident of his abilities and direct in expressing them. He suggested that he found the advice was at times patronising but was able to implement the recommendations

leading to a 9.8 kg weight loss and 6.0 cm waist circumference decrease (Participant 16, Table 6.3). He had a fascination for sweets and sugar sweetened beverages (SSB) and believed that these were the cause of his weight gain. There was no recognition of the impact of his sedentary lifestyle contributing to the weight increase observed prior to joining.

Mr G: *In terms of the food. I think it is good to be aware and I think that deep down every individual knows what is not good for them and what is good for them. It was a little bit patronising at times if I am honest but it's completely taken in the spirit that it was intended so I understand that. I think though turning that on its head the one thing that I took as a positive was I traditionally skipped breakfast and skipped lunch and it taught me that actually you need to eat more and you certainly need to eat more often and that actually helps kick start your metabolism, so it was trying to change that mind set to eating more frequently without having to change too much of your diet, just to get your metabolism going.*

Mr G mentioned the impact of eating more food (which came primarily from the consumption of a regular breakfast and lunch). The impact of this was more evident in Mr W's comments which explored how the (larger) quantities of food consumed at set times reduced his snacking behaviour and improved constituents of the main meal, a primary goal of the dietary approach.

I: *In regards to your lifestyle, how has the programme affected you?*

Mr W: *It's given me a bit more structure, a bit more discipline to be honest.*

I: *Has the routine helped? So, do you find that in regards to the dietary thing that works for you, that structure?*

Mr W: *Yes that really works for me. It's the three meals and that is it and the thing that really works for me is that I'm not snacking. It's just stopped, whereas before, I wouldn't think twice about walking into the kitchen and grabbing a biscuit to have with a cup of coffee*

I: *Why has it stopped, do you think?*

Mr W: *I don't know, it's just the discipline about it all and the fact that you know all along that it's a third, a third, a third.*

Reflection on the 'third, third, third' terminology used pitch side underlines how the key messages became second nature to him. His responses highlight refusal to be influenced by external influences such as tempting treats. His motivations and self-control came through the dietary approach which had inadvertently (for him) reduced his snacking and outlines how the dietary procedure contains aspects that support behavioural change.

The choice of foods for some men improved, underlining the capacity for a 'light touch' programme to achieve dietary improvement. The constituent/ proportion advice was designed to be simple to understand and applied to enable this. Individual food preferences (including for take-aways) enhanced engagement with flexibility promoting individuals to make their own food choices as long as they conformed to the recommendations e.g. third, third, third. In this

instance Mr F is referring to eating out and how the advice the researcher provided on making healthier choices from the menu were deemed useful.

Mr F: *I ended up with a strange diet depending where I ended up at a place to eat. We used to eat takeaways quite a lot and it is trying to find something that is actually good. You pointed me towards the Indian stuff where you get more vegetables and stuff like that and I have been doing that and I have found that works quite well.*

Engagement with food preferences was considered pivotal to success. Mr R described dislike of vegetables and was advised to hide them within 'wet' meals such as curries made using 'healthy' sauces. This enabled him to meet his vegetable/ nutrient intakes without conflicting with his entrenched beliefs. In this case, Mr R had been avoiding vegetables most of his life, with his upbringing having a strong influence on his current choices. Negotiation and exploration of ideas led to acceptance of recommendations. Advice was not firm and with an 'exit' integrated to promote engagement, the transformational approach used here (section 7) was successful. The conversation below outlines both his dislike for vegetables and his attempts to introduce vegetables into his diet.

Mr R: *If you ask at a takeaway you end up with a big bowl of onions and god knows. I just won't eat it, I just want a basic salad so more a side salad to go with something else and it was you who just said 'well you get vegetables that you won't be able to taste if you get them in a curry type thing' so that is what I did.*

I: *And that worked for you did it, disguising certain foods?*

Mr R: *I don't know that there was any disguised in there but there were certainly vegetables in there. I mean the ones that I wouldn't eat as a kid I don't suppose I would eat them if they were disguised.*

Both Mr R and Mr C sensed improvements in their well-being to the point where Mr C mentions outwardly noticeable improvements.

I: *Do you feel now that you eat more veg, I know that you said that you have got more energy but do you feel better in yourself a little bit?*

Mr R: *Yes, a lot better. I don't know if it's because I am eating more things that I should but I am certainly eating less things that I shouldn't. The really stodgy stuff.*

I: *How has the programme affected your lifestyle?*

Mr C: *Very positively. I mean if you ask my wife she will tell you I am a lot happier because before.*

I: *When you say happier how has it improved your mood?*

Mr C: *The whole wellbeing. And I feel a bit more positive.*

For a few men, integration of the dietary regime varied (section 6.3) and was dependant on the level of motivation and desire to lose weight, change lifestyle etc. One hurdle was convincing men to eat more to lose weight, which was deemed counter-intuitive due to it's separation from 'normal' dietary recommendations. There were varying degrees of difficulty experienced convincing the men to make these changes as some had deeply entrenched eating beliefs which required innovative solutions to overcome.

I: *How did the fact that you were asked to eat more, how did that feel to you initially?*

Mr W: *It took me about three or four weeks which I think you probably remember from the food diaries for me just to get into doing that, I was trying to do it. I couldn't do it every day and then eventually your body adapts and then it tells you when it's hungry.*

I: *Is it counter intuitive to eat more?*

Mr W: *Yes, it did initially feel like that, yes.*

For these men to adopt changes that contradict previously held beliefs, trust in the practitioner was crucial. Regular face to face contact increased knowledge of a participant's history, tastes, preferences and concerns, helping to personalise recommendations.

Mr E: *A two- or three-minute conversation, that goes a long way more than someone just sending out e-mails, because you think "well, you don't know me". You don't know what I have gone through or anything like that.*

Mr E's concerns about not trusting advice from a remote source or stranger underlines the importance of relationship development. 'Stranger phenomenon' in which text or voice based communications hamper trust development have been highlighted as a particular weakness of online weight management programmes (Chang et al., 2013). In addition to trust development the researcher often had to draw on experience and knowledge around nutrition to provide additional recommendations that would further help the men integrate the procedural recommendations. With several men having attempted previous dietary regimes with no indication of success, disillusionment may be such that an alternative, however counter-intuitive (such as eating more) would be worth pursuing. Questions around this aspect included to ascertain the sources of motivation for pursuing the TAP diet would have provided further insight into this issue.

6.6.11 Continuing support

The method of collection of dietary data and continual oversight on intakes was outlined by several men as being important for their progression and maintenance.

- I: *In regard to the nutrition support do you think that you would be able to continue without it?*
- Mr P: *Having someone looking at what you are eating helps. I was well overweight originally; I've lost nearly two stone. I am eleven something now and with my diabetes, my sugar rating is pretty much normal now.*
- Mr R: *I think it would be hard to do it without as it does help and if you weren't doing the records it would just be a football thing.*

Though the nutritional support achieved its desired aims, to help the men lose weight and maintain, it did introduce other problems, for instance, a reliance on receiving oversight. Mr H outlined his doubts over whether he could continue without someone supporting him. Working as a lawyer at the time of interviews, commuting regularly into London, he often mentioned rushing between meetings yet had a sedentary form of employment and food habits focused on convenience. He often mentioned having little or no thought as to quality, focusing solely on the taste. Although he could now see the benefit of the programme, comments suggest that post programme sustainability of lifestyle improvements were unlikely.

- I: *Do you think you would be able to continue without the support?*
- Mr H: *Erm.. Yes yes I could probably continue but with that aspect there knowing that it is there I think it wouldn't be as effective with the two parts of it.*
- I: *Which parts, what is it?*
- Mr H: *With the feedback and the food diaries. So you constantly know the right okay I need to watch what I am doing and also note down what bits I am so that I am not treble double eating the same thing.*
- I: *Is it the fact that someone is there?*
- Mr H: *Yes. Yes.*
- I: *Is that key to it or is that just part of it?*
- Mr H: *That is key to it because then you do have someone that says right okay you may be having too much of that or not enough of that such as vegetables and maybe not having enough vegetables but too much of something else so which might be high salt.*

Motivations and/ or skills had not developed sufficiently to enable Mr H and Mr P to confidently maintain the regime independently. Mr E focussed on the face-to-face nature of the support, regarding it as more meaningful than remote support. There is also a suggestion that because of the physical presence of the researcher and the informal nature of the discussions, a greater awareness of the participants' history will develop. 79, 91 and 90 weeks of attendance were completed by each participant respectively and suggest that face to face support may have been a contributing factor for engagement.

Mr E: *A two or three minute conversation, that goes a long way more than someone just sending out e-mails, because you think "well, you don't know me". You don't know what I have gone through or anything like that.*

6.6.12 Injuries affected engagement

Injury was a major concern for several men. Despite attempts to control the level of exertion, performance for the first couple of sessions often exceeded their capabilities. This finding replicates one observed in FFIT (Wyke et al., 2015) who recognised the impact that resultant injury could have on performance. In TAP, men were observed to attempt to play to a similar level they had prior to injury, such was their enthusiasm. Despite warnings and on pitch provision being adapted, men would often overexert themselves. Mr R was elated that he progressed through the last stages of the programme relatively unscathed.

Mr R: *I mean touch wood I was quite lucky I didn't get injured until the ninth or tenth week*

Disengagement with exercise imposed by injury led for some men to detachment from the nutrition aspects also. Attempts to keep the men engaged, such as asking that they still attend weigh-in and/ or assigning less-physical positions on the pitch helped to some extent. However, de-motivation persisted in the absence of uninhibited game play. Inability to engage with the nutrition whilst injured was commonplace, highlighting the importance of football to recruits.

Mr P: *(in regards to the food) I mean I was out with injury and stuff and I feel that if I had been able to come for the whole twelve weeks it would have made more of a difference.*

Mr T: *I have tried really hard with what I am eating or I have tried really hard with what I am doing physically but it is only the combination of the two that is ever going to work for you and when I have had a bit of a rest from the football over the past five or six weeks because of my injury I think psychologically part of the nutrition has switched off in my head as well, no consciously but you kind of think 'well I am not doing the football so I can have a portion of chips or something' instead of previously where I would say 'I can't have chips' and I would have rice or something like that.*

Although participants did not equate dietary improvements or nutrition as a fundamental component for weight loss, they relied on football as a motivator to weight loss linked to reasons such as fitness. Mr T highlighted in his interview awareness of the importance of both activity and nutrition in combination and yet when injured he did not continue with the diet, suggesting that he viewed the programme less holistically than the researcher. Football was the major aspect of the programme and for the men, nutrition appeared to be viewed as an aid to weight loss that may not be not worth pursuing if the opportunity to attend football was

not presented. In short, the enjoyment aligned to engagement with football was impossible to replicate with the nutritional provision, irrespective of rewards observed in weight loss.

6.6.13 Summary

Patterns of eating, exercise, self-image and weight loss were contextualised within the lifestyle behaviours of the men and perceptions of vulnerability to ill health were identified. Personal characteristics and experiences shared provided variable levels of emotional insight, highlighting how low self-esteem and lack of self-control and knowledge culminated in the practice of high-risk behaviours: facilitating persistent, yet gradual weight gain. Improvements in food knowledge have been shown to improve self-efficacy by enabling the individual to make informed choices (Gittelsohn et al., 2006; Beydoun and Wang, 2008) and social support derived through regular engagement in sport is also proven to be effective in developing self-esteem (Carless and Douglas, 2008) - both of which are utilised with this programme. However, research suggests that participation in exercise for image improvements may exacerbate feelings of self-objectification (Strelan and Hargreaves, 2005) and should be used with caution when used for motivational development. Theories around masculinity however suggest that engagement in exercise for performance and aesthetic improvement is an inducement for male participation (Visser, Richard and McDonnell, 2013; Gough, 2006). The approach used here concentrated on health improvement through a combined diet and fitness approach since although aesthetic improvements and on pitch performance will (hopefully) improve as a result, the protocol was designed to ensure these were not overtly addressed to avoid arresting self-esteem development.

Experiences shared after the intervention highlighted that the Alpha programme engaged men both with integral parts of the programme (dietary and activity interventions), but also with each other (the social components). Inspiring development of a rehabilitative environment culminated in positive mental development and weight loss goals: outcomes are in accordance with research suggesting that improved social integration develops wellbeing (Mccrea, Walton and Leonard, 2016; Appau, Churchill and Farrell, 2019). The modes of delivery – including banter which has been shown to facilitate development of solidarity within the football environment (Lubans, 2014) was outlined by recruits as a dominant form of communication, further supporting its potential for use in development of community and continued enthusiasm in accordance to the aims of this research.

Although fear of injury plagued several men and was associated with reduced levels of engagement observed once injured, inclusion of measures used to avoid injury did little to reduce apprehension (or modify behaviours with regard engagement with the physical activity elements of this intervention). The dietary approach was considered easier to adapt than that expected, and yet inspiration to engage was lower with regard dietary changes than with

exercise engagement. In short, the components of this intervention which promoted social cohesion were considered most likely (by the recruits) to inspire engagement with the protocol as a whole.

6.7 The process evaluation

Within weight-loss interventions, relapse (or regain of weight lost) is a common consequence that can be associated with both societal and personal negative consequences. The process of relapse is typically evident with returns to pre-intervention behaviours (e.g., sedentary practices, binge eating or selection of unhealthy foodstuffs) and this may be observed (e.g., refusal to attend a gym class) or hidden (e.g., return to poor eating habits while alone). Identification and recognition of early warning signs can help manage the extent of any relapse, and the long-term success of interventions therefore require address of such risk factors within their design to ensure inclusion of processes which help recruits identify and acknowledge their negative actions. Since little is known in the literature about the long-term implementation of weight loss interventions in males, a process evaluation was used here, running parallel to the intervention to provide valuable data on the feasibility of the intervention, and enable real-time method improvements to facilitate positive change.

Pre-programme interviews were conducted to gain insight into the lifestyle factors associated with weight gain in this cohort, and the motivations men could reflect on as their rationale for joining. The mid-trial interviews were initially designed as post intervention interviews as a form of evaluation to help determine and gain insight into impressions of the programme to use alongside a more traditional, quantitative assessment of its effects on the outcome. The initial design however was extended beyond the first (12 weeks) phase of this intervention. The 'post intervention' interviews were therefore used to evaluate the early programme design from a user perspective, prior to its continuation for a longer (91 week) period of follow up.

Within the pre-programme interviews, participant expectations were considered pivotal to the design of the intervention. Although the protocol was already developed (following a critical review of existing interventions outlined in sections 4.1, 4.2), the intention was to affirm the acceptability of those aspects included (e.g., provision of a 'sport' or football theme to engage attendance rather than exercise in a more generic way). Results from these interviews (outlined below) enhance appreciation for why individual design characteristics benefit male engagement. Details shared within the pre-interviews for example highlighted that men would attempt to engage at a similar level of exertion prior to injury and outlined continued risk taking, despite advice to the contrary. Staff were sensitive to such events and reacted accordingly (example 7).

Both mid-intervention (12-13 weeks into the trial) and post-programme interviews confirmed that what had taken place in the initial TAP design met the participants needs and gave the opportunity to address the research aims (empirical data is outlined in section 6.2). In all interviews, the importance of enjoyment was key. When the intervention was a struggle (e.g., with dietary change), engagement with the protocol was difficult. Cohesive delivery of all three aspects central to design of this intervention was key – but without football, the key benefit of this design over others attempted by the men was reduced significantly.

A central tenet of the process evaluation (Moore et al., 2015) focuses on the quality of provision within the intervention. Design centred on inclusion of only evidence-based aspects within the protocol, however with limited evidence to support their combination for use within this context, a continual process of evaluation was necessitated. This enabled any required changes to be made either to improve individual aspects, or their combination; focusing on efficiency, fairness and means to address the stated aims of this research. To this end, the process evaluation described here consisted of simultaneous and continual data collection and evaluation of impact to enable ongoing modification and improvement (where necessary) of the programme. Personalisation of the intervention required flexibility to be included as a core aspect of the design, and this method further enabled recognition and management of improvements as they happened. As such, there was no requirement to commission a pilot programme to determine whether programme modifications were required in response to 'lessons learnt', instead changes were trialled on a continual basis throughout the programme. Similarly, a staged evaluation process was not required. Instead, a continued assessment process, evaluating the capacity of the intervention to attain gradual and sustained weight loss throughout the length of the programme through engagement with the dietary and exercise recommendations was reviewed. Engagement with the behavioural aspects of the design was reviewed as required (often on a case-by-case basis), with means of address amended as necessary to promote engagement with the intervention components. This flexibility enabled modifications to the protocol to be made within a week of evaluation of impact.

Like the MRC recommendations around the process evaluation (Moore et al., 2015) (section 4.3.8), both qualitative and quantitative data were collected, with informal interviews utilised for collection of the latter. Discussions with both participants and staff were conducted continuously throughout the programme utilising a simplistic, feedback to feed forward process that enabled adjustments in real time. Direct phrases including *“what do you think of the programme?”* and *“what do you think we should do?”* prompted inclusive, collaborative and open discussions which focused on issues that had arisen over the preceding weeks and which needed to be rectified and informed basic enquiries to determine how the programme was progressing. These were conducted through general conversation and feedback was

received both in individual and group settings. The informal nature of these discussions meant that notes were typically recorded after the discussion had taken place and therefore actions were perhaps not as inclusive as they could have been. Despite this, information on programme effectiveness was gathered from participant stakeholders, providing a sense of involvement with the programme design and therefore outcomes achieved. All decisions however were ultimately sanctioned by the author.

Optimisation of the programme delivery was a result of reflection on the discussions with participants, data analysis, discussions with the coach and observation. Adaptations impacted each aspect of the delivery, although the basic model for delivery was unchanged. Adaptations to dietary advice for example were typically the result of observations made by the researcher after review of subject responsiveness to advice and its impact on their engagement and/ or anthropometric results leading to revisiting research evidence, reflecting on attainment by other recruits and remodelling the likelihood of effectiveness and/ or impact of recommendations on the participants commitment and outcomes.

Some examples of how TAP was optimised due to actions inspired by this process evaluation are provided below. Recognising problems almost from programme onset, the process evaluation described here was initiated in week 2.

Example 1: Feedback from the men suggested unhappiness with food discussions being held in the changing room before their exercise session, due to the fact this encroached upon their game time. After determining that all participants felt frustrated by this, despite welcoming the information received, a series of 'quick tips' was created to reduce the time used on 'food' discussions, reinforce key tips to utilise following the sessions and simplified the approach. Feedback suggested that the men continued to learn from this amended approach and gained more football time (and therefore opportunity for energy expenditure) as a result.

Example 2: One programme goal was for all men to train at current fitness levels and not to over train. Despite this intention, several men became injured during the first few weeks of training due to over-exertion (often exacerbating previous injuries). To reduce the potential for this to impact engagement with football and therefore all other aspects of the intervention, greater emphasis was outlined weekly about the importance of warm-up, cool-down and reacting to any indication of an injury. Movement of position was used to minimise risk where necessary. This helped prevent a barrier to engagement over the longer-term.

Example 3: Engagement with completion of food diaries was problematic for several men, yet it was quickly apparent that this could indicate problems with food choices (and therefore poorer anthropometric results). A 'two strikes' rule, based on the red and yellow cards used in football, was introduced to encourage comprehensive engagement across the cohort with

this aspect of the intervention (section 6.5.14). A yellow card was given as a warning for lack of submission, while the red card was potential removal from the programme. The Alpha programme was first and foremost a weight loss programme, not just an opportunity for like-minded men to play football together, and this system provided a timely reminder. The draw of football explored previously was conducive to success of this amendment, and after notification of the approach and a single week to adapt, only one yellow card was issued over the subsequent weeks and diary submissions improved across the entire cohort.

Example 4: Emailed diaries would often have no name, meal type or days of the week included within them, despite an electronic template being sent out to the participants with instructions on how to complete them and completed examples. Upgrades to the basic website enabled the players to submit their food diaries online (either on a website or mobile phone) with inclusion of automatic identification details on a pre-loaded template. This enabled a more efficient 'cut and paste' entry system for foods consumed directly into the website, improving both quality and speed of food logs for review. This also facilitated pitch-side evaluation of and reflection on the diaries and minimised the associated data burden for both the researcher and recruits.

Example 5: Weight and waist progress graphs were added to the website to act as a further motivator as men reported difficulties recalling their attained weight and WC values. Visualisation was an effective motivator for weight improvement, and when the option to integrate a card that could be printed off to enable recording of results each week, this was a welcome addition. Eventually, cards were handed out to all men which enabled them to graph their results and retain them in their training kit bags as a motivator for engagement.

Example 6: One query received from several men linked to the time spent at weigh-in, and their desire to prevent this impacting on their pitch time. Reframing of the protocol required trial of several new options before an efficient procedure was implemented. This involved a staged queuing procedure, and whoever was ready first could get weighed and complete food discussions/ tips before the match sessions. The addition of competition to this aspect of the intervention was a highlight of the weekly sessions, and enhanced the camaraderie attained during weigh-ins.

Example 7: Response to injury concerns led to mid-programme modifications including more stringent measures to reduce newcomer levels of exertion, pressure to attend despite injury (to maintain engagement) and gradual integration after injury (usually entailing a movement of positions from goalkeeping and towards the forward position over a period of weeks).

7 Discussion

7.1 Promoting long term success

Initiation of the Alpha programme was inspired by growing evidence within the literature of increases in weight-related risk for males, and a dearth of interventions designed to facilitate change within this group (Wyke et al., 2015; Pringle et al., 2013b; Rutherford et al., 2014). Although research evidence highlighted several similarly-themed programmes conducted for the same purpose i.e., weight loss (Gray et al., 2013), notable exclusion of aspects highlighted from a targeted review of literature (section 1.2 and 4.1) to be vital to achieving the desired weight loss outcomes in this group were omitted: inclusion of sport (or football) rather than a generic exercise component (Rutherford et al., 2014), gendering of the included dietary approach and comprehensive integration of tools evidenced to positively impact behaviour change (Rutherford et al., 2014; Wyke et al., 2015). The complexity of questions surrounding how best obesity can or should be tackled is comprehensively reported in the Obesity System Atlas and is presented visually in the Obesity Systems Map (which encompasses themes related to media, social, psychological, economic, food, activity, infrastructure, developmental, biological and medical aspects) (Foresight, 2007). Each theme and the overlaps between them are complex, necessitating personalisation to address the inherent heterogeneity within any single group studied. This highlights a need for reflexive and reactive approaches. The Alpha programme aimed to utilise the best evidence-based methodologies currently known for weight loss. It reinforced public health messages communicated by the most commonly recognised and respected medical institutions within the UK (NICE, 2014; PHE, 2016; NHS, 2017), and included tailored approaches shown within research literature to increase the relevance of the intervention design to the group targeted here – overweight men. Research into health behaviours within humans typically highlight problems experienced with subjectivity in interpretation to questions asked and variance in effects which cannot always be accounted for by reported behaviours (this can be improved by more invasive, biomarker research (Bingham and Cummings, 1985). This project was not designed to test a protocol, however. It aimed to achieve an outcome (weight loss) through supporting integration of relatively straightforward concepts promoted by public health messaging and included within its design. This required flexibility to modify intended methods in response to (or on the request of) feedback received from attendees on aspects of design, thereby increasing their engagement (e.g. the extension from 12 to 91 weeks to satisfy participant requests to continue and in through which supported mean engagement of 46 and 39 weeks for phases 1 and 2 of recruitment respectively). In short, the primary aim of the Alpha programme was to test the hypothesis that an intensive male-gendered programme including nutrition education, football and supported behavioural modifications could achieve significant weight and WC loss and facilitate maintenance of that loss through physical activity, improved dietary intake and the

development of social cohesion. These aims were met and have been outlined previously (Section 6.2), with significant weight ($-3.3, \pm 3.60$ kg), Waist ($-4.0\text{cm}, \pm 3.70$ cm) and BMI ($-1.06 \text{ kg/m}^2 \pm 1.14 \text{ kg/m}^2$) losses achieved.

Several transformation leadership (TL) methods were utilised within the intervention design in line with the four transformational leader characteristics outlined by Bass (1990). This constitutes an empathic response to the needs of individuals to bring about change (Bass, 1990), with TL elevating the interests of the target beyond the leader's self-interest, facilitating a more cooperative and motivated environment. Traditionally, research suggests that TL is more feminine (due to portrayals of charisma, empathy etc.) yet this is distinctly androgynous, displayed by both genders alike (Kark, Waismel-Manor and Shamir, 2012) and integrating ethical and moral components (Avolio, Walumbwa and Weber, 2009) deemed compatible with TAP's tenets of collaborative working and mutual aims contributed to the successes observed and presented here. In this study, this approach telegraphed self-control and professionalism, whilst remaining flexible to participant requests and supportive of development opportunities for self-efficacy and solidarity aligned with masculine perceptions such as displays of effort, motivation and achievement. Announcing positive messages within earshot of others helped bolster confidence in the individual and encouraged effort in others. It was also pivotal that any failures encountered were positively supported, since these often relate to the level of effort, therefore recommendations to try again and/ or explore new opportunities were required.

The four elements of TL have a direct relationship with the dietary method utilised here, since it required both the practitioner and participant to be receptive to recommendations through negotiation around a shared vision. The dietary procedure aimed to support progressive and regressive movement, embodying flexibility and avoiding restrictions or constraints (Ramchandran et al., 2016; Choi et al., 2016). Trust, a key component for participant progress is based on interpersonal exchanges and frequency of contact and the quality of exchanges (Thom and Campbell, 1997) and with the researcher attending every session, relationship development was expedited. Aims and food preferences were discussed, and social influences reflected on. Family, habitual intake and work constraints were often found to have significant impact on consumption, and this required careful negotiation for successful address. For the researcher, this process required the ability to draw on any aspect of their background nutritional knowledge required by a subject's questions, and the interpersonal skills needed to negotiate outcomes since barriers varied between participants (due to differing approaches and influences on lifestyle shaped by societal and individual circumstances). Aims would be discussed, with the practitioner focusing on ensuring that they left the participant feeling positive about achieving them.

Creation of community of practice (COP), or a social learning system whereby individuals with a common interest participate to share knowledge and experiences and so define their place in society (Wenger, 2010) benefited attainment of the results presented here. Wenger's (2010) learning system contains three modes of identification, each of which is required to achieve this: imagination, alignment and engagement. The former two categories require development of staff and participants to provide the environment in which engagement could take place. Engagement is the act of participation required to achieve the targeted outcome, and tackling the problem together was facilitated here through an integration of the 'staff' and 'team'. This interplay helped build a clearer understand for how the staff could help the team, and how the team could help one another – or a mutual '*coordination of perspectives*' (Wenger, 2010) combined to achieve a higher goal: weight loss for all. Using a theme, in this case football acted as a recruitment driver and specifically appealed to men who had an interest in the sport (every participant was a football fan). This shared interest supported early engagement. Discussions around the topic were easier to enter into with the theme of football acting as a conduit through which to exchange knowledge whilst further improving belonging and engagement which in turn positively impacted on the community development. Attendance levels were a good indicator of engagement, for regular attendance showed a keenness to participate and men would often arrive early ready before the sessions started spending more time in the changing rooms talking. Messages of apology would be sent out for non-attendance, indicating a genuine concern not to let their colleagues down and to be part of the programme. Topics discussed would commonly remain within the constraints of the programme's concepts namely weight loss, food and football. Wenger (2010) terms this process of exchange '*meaning making*', outlining the social process of developing a new interpretation of one's experiences. Discussions around nutrition for example providing an opportunity to reframe the meaning of currently held views (Krauss and Putra, 2005).

Banter was used throughout: always humorous and respectful yet tinged with friendly sarcasm often around football club performance. This is considered particularly relevant when diverting attention away from situations that are embarrassing and for reducing tension (Williams, 2009; Mesmer-Magnus, Glew and Viswesvaran, 2012). Humour is also key to male relationship development (Kehily and Nayak, 2006) and was well placed to help facilitate goal achievement as it further supported development of engagement and solidarity (Robertson et al., 2013; Sharp et al., 2018). This approach was recognised by the coach who used banter as a vehicle to further relate to the men within training sessions.

For the participants, discussion around a topic of interest to them provided a means to exchange knowledge in the form of anecdotes and stories through which a sense of belonging and community developed. The community of practice (COP) provided a means to communicate key messages for both TL and COP have shared values in that they both

facilitate trust, an antecedent of knowledge sharing (Lin, 2014; Usoro et al., 2007). The interviews suggest that the men felt that they were part of this community and centred around both the level of enjoyment they had experienced and their desire to join in with the other men (section 6.6.9). Furthermore, conversations throughout the sessions were littered with banter and further entrenched feelings of solidarity.

7.2 Long-term engagement with weight loss

Discussions with participants outlined a gradual increase in weight over the life course (section 6.6.5), attributed to lifestyle events such as family, employment etc. rather than themselves. Despondency came from the realisation of their predicament and the lack of means to address it and provides a rationale as to why rapid weight loss methods satiate, for they can provide early gratification (Malik and Hu, 2007) and yet have poor long term maintenance effects (Wing and Phelan, 2005; Elfhag and Rössner, 2005). Combined behavioural and weight management programmes can lead to increased weight loss over a 12 to 48 month period when compared to control arms (Foster-Schubert et al., 2012; Wadden et al., 2011; Fitzgibbon et al., 2010) and achieved through a comprehensive approach that include physiological and psychological components (section 4). Montesi et al., (2016) and Elfhag and Rössner, (2005) state that relapse risk is increased in the absence of social support, behavioural modification and an education that supports a migration away from negative dietary behaviours such as binge eating and weight cycling whilst providing practical alternatives (section 6.3).

Anthropometric measurements offer a quick, easy approach to determining ‘success’ of weight loss interventions, whether managed alone or in a program. Natural variance in weight during a day and/ or over longer time periods can be explained by variance in sleep, exercise, eating and drinking habits for example, with higher weights expected at the start compared to the end of each week (Orsama et al., 2014). Although research evidence suggests greater potential to lose weight if we weigh ourselves every day (Zheng et al., 2018), and many individuals seeking weight loss may practice this habit, the potential for swings in weight to negate engagement with positive health behaviour changes must be acknowledged. This aligns to problems outlined with BMI measurement outlined in section 6.6.2. This marker is an established, useful place to start when assessing the amount of weight an individual may want (or need) to lose. It fails to account for positive variance in lean/ fat mass ratios however, and with men carrying an average of 12 kg more skeletal muscle mass than women (Janssen et al., 2000) this automatically leads to a greater expected BMI in males, and an expectation that attaining a goal of below 25 kg/m² is unobtainable. This was expected here to link to an established and typical frustration if BMI was used to track weight changes, therefore although its use was retained to assess eligibility for the intervention and to evaluate impact of the

intervention in a height-standardised manner and with findings reported in other literature, this was not used with the recruits.

Within this intervention, engagement with exercise, or more specifically in this case with football was deemed by the recruits to be pivotal to weight loss success, and this presumably links to the male goal of muscle mass elevations (which substituted for fat gram for gram, would lead to a weight gain rather than loss). Without intervention, men in their forties can experience a 2% decline in FFM per year up and until their eighties due to sarcopenia (Hughes et al., 2002) with this loss including between 20% to 30% of FFM (Cava, Yeat and Mittendorfer, 2017). One Danish longitudinal study suggested that FFM losses accounted for 41% of total weight loss and just 24% of weight gain (Heitmann and Garby, 2002), adding further support (i.e., beyond the positive engagement results shown here to be linked to this) for inclusion of an exercise component in all weight loss interventions that target subjects over 40 years. Weight percentage targets should take the potential for muscle hypertrophy into account due to the risk associated with attenuation of weight loss demotivating individuals who find targets set unachievable. Pétré et al., (2018) highlighted in a study of 3,916 participants that unrealistic weight loss goals not only increased a sense of despondancy but also related to a history of overweight, and a dis-engagement with activity designed to target weight loss and a lower quality of life. In contrast however, De Vet et al., (2013) found higher targets for weight loss led to greater motivation and better outcomes in their study of 447 participants. Within the Alpha programme, targets aligned to a 5-10% reduction from baseline weight, and was calculated for men as the proportion of excess body weight lost (calculated to achieve a BMI of 25 kg/m²) making this a much more achievable – and therefore sustainable – goal. Establishing weight change targets against generic criteria intended for population level application (e.g., BMI) is potentially damaging to engagement, and therefore tailoring – as used here against the percentage EBWL target devised by Bray et al., (2009) – facilitates a more reactive, and attainable target, while still maintaining a direct relationship with health risk. Post intervention evaluation suggests attrition was attributed more to employment (Table 6.2) than any other condition, whereas before commencement, injury was expected to be the most likely cause following strong support within the literature for this effect (Robertson et al., 2017; Donnachie et al., 2017; Wyke et al., 2015). Though there is often flexibility within the individual's lifestyle to make meaningful improvements, this research found that the rigidity of employment can often frustrate efforts to support change which can override all other priorities (Table 6.2) despite the best efforts to support them. There has been some success with programmes that accommodate employees within specific occupations and that have provided activity outside of traditional working hours (Pringle et al., 2013a; White et al., 2014) and as such may be a viable solution to address increases in attrition.

Diet and exercise are acknowledged to be the predominant modifiable risk factors impacting energy balance and therefore risk of weight gain and potential for weight loss. Engagement with exercise in this intervention was consistently acknowledged by recruits to be the single aspect they prioritised to achieve this goal and disengagement imposed by injury for example led to weight gain and detachment from any dietary improvements achieved by this stage. Effective interventions require address of how weight loss is achieved (whether weight is lost through reductions in fat or lean tissues), whether the location of fat stores is amended (i.e., central or peripheral losses), how physical performance measures are impacted by these results (including muscular strength and cardiovascular fitness for example, but linked more predominantly to capacity for daily activities) and how that intervention impacts health outcomes, including risk of disease and mental health. A predominant feature identified in baseline interviews linked to concerns over health (in particular, type 2 diabetes risk), and yet in the early stages of the intervention, either a disregard for health effects linked to consumption of certain foods or patterns of eating were evident. The food diaries submitted (section 6.3.1) provide a glimpse of the typical diet followed by recruits before engagement with this intervention and outlined a consistent tendency to eat focused on convenience around a work-imposed lifestyle. Food was consumed to refuel (Wandel and Roos, 2005) and indulge, satisfying an often urgent need for satiety while simultaneously neglecting any reflection on the quality of choices made, or their associated risks to health. This emphasised the need to educate recruits about positive dietary choices, removing any likelihood for restriction (and therefore hunger) to lead to engorgement without thought, and motivation to encourage healthier choices where beforehand convenience foods were deemed necessary, or the only option available. An authoritarian style of education or guidance was avoided, and all engagement aimed to be sensitive to possible gendered preferences to ensure recommendations were open enough not to be dismissed by the men (Gough and Conner, 2006; Roos, Prättälä and Koski, 2001). In contrast to reports from other research groups, salads for example were popular in this cohort, despite a reported association with femininity (Sobal, 2005) and associations with pressure to select these inspired by partners rather than a self-directed choice (Calasanti et al., 2013). The capacity for novel salad ingredients (e.g., inclusion of grated carrot, cold potatoes, nuts or grapes, and use of lemon juice, herbs and spices rather than salad dressings) were often described by the men, with the opportunity for diversity within their ingredient choices facilitating gendering of the food according to their preferences.

Take-away meals emphasised a wide cultural variety of foods consumed, with a strong preference for Asian foods such as Indian and Thai which led the researcher to develop guidelines to promote healthier choices that met their desires for such food types and flavours. The main contrast reflected on by recruits linked to advice to eat more and of improved quality

(Benton and Young, 2017; Lucan and Dinicolantonio, 2015). Queries related to previous 'dieting' experiences typically reflected on restriction and hunger, while this dietary-quality improvement focus complemented a masculinised nature of eating within this diet, promoting a stereotypically masculinised perception that hearty meals accrue masculine capital enabling over-indulgence through improved food choices (Arganini et al., 2012; Gough, 2007).

Some dietary practices were more difficult to change than others. Consumption of red meat for example persisted throughout the intervention, albeit with the inclusion of leaner meats and fish. Research suggests that men have a high preference for red meat that will overwhelm a desire for other options (Gough and Conner, 2006; Rothgerber, 2013), however with options available, changes observed here were positive. Intakes of alcohol reduced across the group, with those who continued drinking being the minority. Occasional 'recreational' consumption was observed at weekends, whole prolonged periods of consumption related to special occasions such as weddings or birthdays. Three men celebrated reaching 50 years during the programme for example consumed alcohol over extended periods. Likewise, holiday periods were typically associated with weight gains, but these gains reduced after the basics of the dietary procedure were habituated, with men often able to maintain their weight in holidays enjoyed in the later stages of the intervention. Restraint may have been further endorsed through the need to preserve body composition and maintain fitness levels (Sloan, Gough and Conner, 2010; Gough, Seymour-Smith and Matthews, 2016).

The dietary intervention provided the leniency to balance unhealthy and healthy intake in that gendered dietary concessions were made, such as permission to consume alcohol and occasional fast food varieties within the specified 'treat day', providing a break from the regime in order to reduce the risk of compensatory behaviours (da Luz et al., 2018; Wansink, Cheney and Chan, 2003; Palavras et al., 2015). This approach also addressed concerns that some men may mistrust health professionals (Gough and Conner, 2006; Davies et al., 2000) and as such developed trust in order to bolster engagement with programme concepts (Robertson et al., 2013). The dietary manipulation provided a framework within which men could operate without the constraints imposed through other dietary approaches such as calorie counting (Jolly et al., 2011; Ahern et al., 2011) and was practical in nature with advice attuned to day to day issues that the men may encounter and further shaped by the men themselves. Furthermore, the procedure was receptive to individual lifestyle behaviour because each of the four procedural rules as depicted in the diagram are broad enough (Figure 6.7) to afford some manoeuvrability. However, misinterpretation of the rules was avoided due to clarity being provided through the 1-to-1 personalised nutritional support. An approach that is shown to be successful in supporting lasting dietary change (Ordovas et al., 2018; Stewart-Knox et al., 2013).

7.3 Key design considerations

Challenging current strategies used currently to promote weight loss by (NICE, 2014a; c), design of this research was facilitated by creation of a conceptual framework focused primarily on behavioural approaches shown in the literature to support engagement with lifestyle-focused interventions (see sections 4.1, 4.2). An in-depth review of literature highlighting reasons why overweight and obese men fail to engage with existing services and/ or to maintain losses achieved, it integrated a personalised, evidence-based approach designed to complement engagement of the target group (males ages 35 – 64 years) and positively influence achievement of current public health guidance. A core intention was to evidence effectiveness through weight and waist circumference reductions, engagement of recruits and long-term sustenance of results, and these successes were realised. To inform future research and (hopefully) inspire updates tailored to meet the needs of sub-groups in our diverse UK population, the aspects identified within the literature and assumed to be 'key' to attaining success and findings from the Alpha programme evidencing that effect are summarised for clarity in Table 7.1.

Table 7.1: Comparison of similarities and differences of key design considerations pre and post programme.

Literature findings	TAP findings
Football club loyalty aids recruitment (Wyke et al., 2015; Hargreaves and Pringle, 2019).	The football club brand was found to be both a draw for recruitment and to provides support for development of engagement in recruits. Consistency in use of football as an activity and discussion topic bolster engagement with all concepts included in the programme (Sections 6.2, 6.6.9).
Activity component effective for engaging men with weight loss (Robertson et al., 2017; Archibald et al., 2015; Pagoto et al., 2012).	Engagement with football enhanced physiological improvement and adherence to programme incentives (Section 6.6.3). Adaptations required to motivate engagement were improved by increasing focused on the centrality of football to the 'team' culture/ approaches to the intervention. This was shown to extend beyond inclusion as 'a form of exercise'; creating cohesive engagement in members through football-focused collaborative engagement (and discussions).
Socialising, and relationship development characteristics banter and humour are important concepts for engagement (Robertson et al., 2013; McGlashan et al., 2018).	Cohesion of the team spirit was facilitated by football-focused discussions which promoted socialising and led to supportive (within the intervention team and recruits) engagement development. Banter and humour were central to this (on pitch and off). (Sections 6.2, 6.6.9, 6.6.3).
Hypocaloric diets are a main feature of weight loss interventions (Ahern et al., 2014; Hunt et al., 2014b; Wadden et al., 2009).	Contrary to this typical design concept, a reverse dieting/ refeeding methodology was shown here to support weight loss in the face of hypertrophy (Section 6.3). Dietary transition focused on quality improvement to reduce burden on recruits and mitigated cyclic behaviours. The 'light-touch' manipulation of entrenched dietary habits and 'eat more' protocols were difficult to understand by recruits, but – where football engagement was retained – led to healthier intakes. Hypocaloric diets were not required to induce significant weight loss (Section 6.2) and so avoided reliance on calorific values. Behavioural methodology to address habitual and dietary structure where integrated into the dietary procedure, allowing for easier assimilation and steps to completion. 1 to 1 – personalised dietary support

Literature findings	TAP findings
	further bolstered engagement and showed compatibility with Transformational Leadership and Social approaches.
No evidence was found to highlight the benefit of combined dietary education and behavioural methodologies to promote weight loss.	<p>Diverse use of behavioural components integrated throughout the intervention had beneficial effects. For dietary provision, these supported a reduction in adverse behaviours such as snacking and the suppression of hunger (sections 6.3, 6.6.10, 6.6.11). Knowledge development was attained with a simple stepped-change procedure accompanied by key messages.</p> <p>Enhanced food knowledge was associated with improved self-esteem, and evidence of informed choices (rather than restraint then disengagement). This intervention highlights the potential for a behavioural methodology to be successfully integrated using informal, short and targeted group (and individual where necessary) discussions. Behavioural strategies and short, clear messaging facilitated attainment of result success: merging concepts more typically provided independently.</p>
No defined leadership strategy was evident in existing weight management programmes.	Transformational leadership was evidenced as a strong motivator for engagement with weight loss and management concepts (section 7.1).
Research interventions are typically evaluated using a pilot design prior to a commissioned programme. The process evaluation is conducted post-pilot with very little modification when 'live' (Craig et al., 2008; Moore et al., 2015).	An iterative process evaluation, integrating collaborative improvements recommended by the practitioners/ researchers and recruits and allowing 'real time' optimisation proved to increase programme effectiveness (Section 6.7). This method was highly effective (potentially a more useful alternative approach) for interventions (and is recommended when not afforded the opportunity to conduct a pilot/ commissioned programme design; and as a means of routine evaluation even when this is feasible e.g., in small programmes with limit resources).

7.4 Conclusion

This study was set out to explore the concepts necessary to support construction of an optimised, male-gendered weight loss programme that engages men enabling sustained weight reductions. Reasons for poor engagement were outlined following a targeted review of published literature, and findings were used in the design of a football-based weight management programme. Theoretical literature exploring males seeking help for weight loss is limited and as such several vital questions remain unanswered, however. This study aimed to answer two of them. First, to elucidate which concepts are required in weight management programmes to ensure engagement of men and second, to determine whether the design of an evidence-informed, gendered weight management intervention could evidence adequate engagement to enable achievement and sustenance of significant long-term weight loss. The main findings summarised previously and synthesised here, highlighting seven key findings:

- A strong male-only communal environment facilitates engagement with programme interventions through aspects including enjoyment and mutual support.
- A transformational leadership approach supports relationship-development with men, facilitating protocol attainment.
- Simplified guidelines on dietary goals, deviating from dietary approaches which focus on hypocaloric intakes can induce significant weight loss, in a manner deemed easier to engage with by men; and
- Exploitation of a football theme encourages success through enhancing enjoyment, developing motivation and induction of solidarity.
- Not just dietary but physical goals were considered strong motivators for success.
- Feedback, particularly with the dietary aspect proved to be pivotal in relationship development, engagement, and trust.
- Personalised nutritional support encouraged engagement with dietary recommendations.

Having a strong community was identified as a key programme aspect. Participant to participant exposure led to meaningful relationships which in turn led to a community of practice where knowledge exchange and a reframing of perceptions, especially around diet took place. All male groups with a shared interest (i.e., football) helped reduce the impact of barriers known to prevent engagement and supported inclusion. Banter served as common method of communication and further entrenched feelings of community and emotional attachment to the programme.

A transformational method of leadership cemented an effective practitioner/ participant relationship, helping to motivate engagement with guidelines. Characteristics such as empathy reduced stoicism commonly experienced with men, building trust and eliciting an

environment where sensitive topics could be discussed, allowing for effective, tailored, and effective lifestyle solutions to be integrated into every-day life.

Design of a dietary ideal which deviated from calorie counting and restriction did not reduce the effectiveness at improving anthropometric markers. Structured class-based education was removed entirely, being observed to demote engagement. Results presented here highlight that a simplified dietary procedure led to integrating a flexible, personalised dietary approach worked to ease transition towards healthier lifestyle choices which showed benefits in attainment of long-term weight maintenance.

The football focus of the activity component in this programme was vital for engagement in all aspects of the intervention. Changes initiated to maximise time spent playing football led to less time available for dietary advice, and yet the change led to recommendations on intakes being more readily accepted as long as 'advice' did not impact on capacity to engage with football. Contrary to NICE guidelines which promote calorific restriction to induce weight loss (NICE, 2017, 2006), the significant weight and waist losses observed here suggest that an alternative dietary approach designed to shift intakes towards healthier choices (rather than less intake) may be preferable over the longer term. Integration of behavioural approaches with both the dietary and activity interventions were shown to facilitate success: development of a community of practice which promoted and engaged recruits to this programme was a central thread in all interviews with recruits. These successes emphasise a need to reframe perceptions and application of public health guidelines, to design and promote new approaches to improve engagement with diet, exercise and other lifestyle choices in hard-to-reach populations.

In outlining the need for this research and its amended protocols/ design, results suggest that current weight management strategies require adjustment. Understanding the reasons that specific population subgroups fail to see benefit with existing strategies requires careful review, including address of the social, psychological, and biological reasons which interplay to help understand this. Unless this is done, risks observed in groups presented as more susceptible to health inequalities due to their disengagement from health services are unlikely to change. It is hoped that this research will foster more consistent mergers of leadership strategies, social, behavioural, and nutritional theories to identify features that are overlooked or considered individually (rather than cohesively) within existing health interventions. It is hypothesised that this could lend further insight into amendments needed in intervention designs to enable greater achievements, more engaged groups and – hopefully – greater impacts on current UK health statistics.

7.5 Strength of this research

This study highlights that targeted, concise delivery of the fundamental components (dietary advice) required to successfully induce significant long-term weight loss can engage men in interventions that contain an engaging theme (football) and strong social element. Two key concepts are proposed to explain these effects. The intervention design was evidence-led; however, its delivery was collaborative, inviting feedback from recruits to inspire developments within the protocol which facilitated their achievements. Alignment of a group of individuals with a common set of problems (weight-related) and interests (football) within an intervention designed to utilise transformational leadership strategies facilitated success for both the intervention and those recruited to achieve its' goals (weight loss) through the community of practice which resulted.

The process evaluation highlighted that 'real time' reactivity to amendments suggested by members improved programme effectiveness. Removal of ineffectual approaches streamlined provision, allowing greater focus on aspects that were enjoyed and ownership of the protocols by the recruits.

7.6 Limitations of this research

Despite believing that football would be a strong motivator for enrolment, recruitment was difficult and time consuming, outlined the depth of aversion to accessing health services in (overweight) men. The editorial produced several responses but recruitment through the coach was the most effective method of recruitment. Once men were recruited, long term engagement was observed. Leaflets proved ineffective, though one man was recruited through a public house suggesting that wider distribution of literature into establishments more associated with male lifestyle such a betting shops and sports events may have increased their utility. Research to date has suggested otherwise however (Witty and White, 2011) highlighting some urgency to find alternative methods of recruitment for this target group.

BMI proved ineffective at estimating weight loss targets and disengaged men. More sensitive methods for evaluating weight loss are necessary and must focus on achievable outcomes to prevent despondency and distrust of other messages. Using BMI as an eligibility criterion was sufficient here, but this to had limitations for many men were uncertain of the BMI before attendance and so had little idea as to whether they were eligible for joining. Target weights should consider the %EBWL method suggested by Bray et al., (2009) once men are enrolled. Given the probability for increased health risks as we age (Conolly and Davies, 2018), eligibility criteria could be extended to all men, regardless of weight however streamlining according to levels of fitness may be required to ensure engagement of all through a preventative approach.

An important limitation of this research relates to the drop-on method. This approach deviated attention away from the importance of commitment, a quality that had been successfully communicated to men on the first phase and provided opportunities for men to attend for short periods of time before going absent and then re-enrolling.

7.7 Recommendations for future research

The Alpha programme is one of the very few sport-based male weight management programmes available. This research has shown that a male-gendered, optimised approach can support engagement. Future research should build on the results presented here by exploring as to whether this approach can be upscaled whilst maintaining quality of provision. Without this capacity, numerous successful interventions such as this will not be recognised for adoption into the wider public health setting.

Researchers should consider whether these approaches are applicable within other health care disciplines and for a similar period. Furthermore, there are no known restrictions as to why researchers could not determine the effectiveness of this approach across other sports and hobbies.

It is the responsibility of all weight management service providers to ensure their interventions are effective and provide service users with the best chance of success. For several years, the Lifestyle and Wellbeing strategy (NICE, 2014c) has remained consistent, yet overweight and obesity prevalence has increased highlighting a need for more effective solutions. Strategic guidance must therefore be broadened to encompass innovative approaches such as this. Projects that push our boundaries of understanding of lifestyle behaviour and that would introduce impetus into what is currently a stagnant field.

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9 Appendices

A. Example search term checklist

Database	Scopus (1970 – present)
Search terms	
male sports weight loss programme(s)	
sport(s) and weight loss for men	
sport lifestyle programme(s) for men	
sport lifestyle programme(s)	
weight loss and sport	
sport overweight men	
sport obese men	
football programme	
weight loss football	
sport(s) themed weight loss	
sport themed programmes	
rugby weight loss	
cricket weight loss	
hockey weight loss	
hockey programme	
cricket programme	
rugby programme	
sport overweight male / men	
sport obese male / men	
sport(s) and weight loss	
sport overweight	
sport obese	
male weight loss	

B. Alpha programme pre and post interview questions script

Pre-interview questions

1	What interested you about the Alpha programme?
2	What do you expect from the Alpha programme?
3	Do you have any concerns about the programme?
Food	
4	What do you think you should be eating?
5	What are you eating?
6	What foods do you know you shouldn't be eating but find hard to resist?
Diets / weight	
7	Can you tell me a little bit about your history with food? So, for instance; when did you feel you were putting on weight?
8	Can you tell me a little bit about your history with food?
9	What things do you think have led you to put on weight?
10	Any previous weight loss attempts (if not then why not)?
11	What was the effect of these attempts?
12	How does it feel to be overweight?
13	What problems does being overweight cause?
Exercise	
14	Do you feel you exercise enough?
15	What sort of exercise do you enjoy?

Post interview questions

1	How has the programme affected you?
2	Did the programme meet your expectations? Why did it / Why didn't it?
3	What did you enjoy about the programme the most?
4	Was there anything that you did not enjoy?
5	Do you have any recommendations that will help improve the programme?
6	How has this programme differed from your other weight loss attempts?
7	What part of the programme has had the most effect on your lifestyle?
8	Which other aspects of the programme have been key to helping you improve your lifestyle?
9	How important do you think the nutritional support has been? Do you think you would be able to continue without it?

	If not, why not?
10	Which things do you feel you require to help you maintain your weight? Please give me examples
11	How do you feel about your weight and fitness now that the programme has come to an end?
12	Is it a 'diet' or 'football'? What term do you use to refer to the programme?
13	I've only discussed your weight and waist data with yourself. Several commercial programmes announce the participants weight to the group. how do you feel about this?

C. Anglia Ruskin University Ethical approval documentation



Cambridge Chelmsford Peterborough

Ref: NS/jc/FMSFREP/15-026
Enquiries: Joanne Comey
Direct Line: 01245 684779
Date: 23rd June 2015

Chelmsford Campus
Bishop Hall Lane
Chelmsford
CM1 1SQ

T: 0845 196 4779
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www.anglia.ac.uk

Mr Mark Cortnage

Dear Mark

Re: Application for Ethical Approval

Principal Investigator: Mark Cortnage

FREP number: 15/026

Project Title: The Alpha programme: A gender-sensitised dietary and sports based pilot intervention for men between 35 and 64 years of age.

Thank you for your application for ethical approval which has now been considered by the Faculty (of Medical Science) Research Ethics Panel (FREP).

I am pleased to inform you that your application has been approved by the Faculty Research Ethics Panel Chair under the terms of Anglia Ruskin University's Research Ethics Policy (Dated 23/6/14, Version 1).

Ethical approval is given for a period of 3 years from Tuesday 23rd June 2015.

It is your responsibility to ensure that you comply with the Research Ethics Policy and Code of Practice for Applying for Ethical Approval at Anglia Ruskin University and specifically:

- The procedure for submitting substantial amendments to the committee, should there be any changes to your research. You cannot implement these changes until you have received approval from FREP for them.
- The procedure for reporting adverse events and incidents.
- The Data Protection Act (1998) and any other legislation relevant to your research. You must also ensure that you are aware of any emerging legislation relating to your research and make any changes to your study (which you will need to obtain ethical approval for) to comply with this.
- Obtaining any further ethical approval required from the organisation or country (if not carrying out research in the UK) where you will be carrying the research out. Please ensure that you send the FREP copies of this documentation if required, prior to starting your research.

- Any laws of the country where you are carrying the research and obtaining any other approvals or permissions that are required.
- Any professional codes of conduct relating to research or research or requirements from your funding body (please note that for externally funded research, a Project Risk Assessment must have been carried out prior to starting the research).
- Completing a Risk Assessment (Health and Safety) if required and updating this annually or if any aspects of your study change which affect this.
- Notifying the FREP Secretary when your study has ended.

Information about the above can be obtained on our website at:

<http://web.anglia.ac.uk/anet/rdcs/ethics/index.phtml>

Please also note that your research may be subject to random monitoring by the Panel.

Should you have any queries, please do not hesitate to contact my office. May I wish you the best of luck with your research.

Yours sincerely,



Dr Nigel Sansom
Director of Research
 For the Faculty (of Medical Science) Research Ethics Panel

D. Alpha programme risk analysis for conducted sessions.

What are the hazards?	Who might be harmed and how?	What are you already doing to control the risks?	What further action do you need to take to control the risks?	Who needs to carry out the action?	When is the action needed by?
Injury	Participants. Injury through over exertion.	<p>Coach and researcher developed staggered incremental increase in activity exertion over programme length.</p> <p>Participants reminded of the risk and the need to pace themselves.</p> <p>Specific warm-up, warm down and stretching in accordance with American College of Sports Medicine (ACSM) guidelines (Sharp, 1993).</p>	Continuous monitoring.	Coach and researcher.	Throughout programme. Continues monitoring
Injury	Participants. Physical contact.	<p>Coach and researcher established non-contact activity provision. Threat of being tackled used as primary for of 'attack' rather than physical contact.</p> <p>Participants reminded weekly of the risk and the rules.</p>	Continuous monitoring.	Coach and researcher.	Throughout programme. Continues monitoring.

Injury	Participants. Hazards on pitch	Checking pitch before session commencement.	Continuous monitoring.	Coach and researcher.	Throughout programme. Continues monitoring.
Fatigue	Participants	<p>Weekly reminders in regards hydration, pace and rest.</p> <p>Coaches introduced rest periods.</p> <p>Sports nutrition tips to maintain energy and metabolic demands during training.</p> <p>Participants provided recipes on homemade sports drinks.</p> <p>Participants reminded to speak to staff and raise any concerns.</p>	Continuous monitoring.	Coach, researcher and participant.	Throughout programme. Continues monitoring.

Health	Participants. Feelings of ill health. Covers a multitude of health issues.	<p>Participants reminded to speak to staff and raise any concerns.</p> <p>Coaches and researcher to watch for signs of decreasing levels of attention, exertion, cognition etc.</p> <p>Participants reminded weekly to contact staff with any concerns.</p>	Continuous monitoring.	Coach, researcher and participant.	Throughout programme. Continues monitoring.
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E. The Alpha programme leaflet.



The leaflet is a recruitment poster for 'THE ALPHA PROGRAMME'. It features a red header with the title in large white letters, followed by a white section with a red 'WANTED' heading and target demographic. A red box at the bottom contains details about a free induction session and contact information.

**THE
ALPHA
PROGRAMME**

are now recruiting onto their FREE football programme

WANTED

Men aged between 35 - 64
who love football

An innovative research led 12 week football and
nutritional programme for men with a BMI over 25.

A free induction session will be held at the Arena football
ground, Norton Road, Baldock on the 24th June at 7:30pm.

Please register your interest using the contact details below
in order to attend the induction day.

mark.cortnage@anglia.ac.uk
07960 954332

Comet reporter Layth Yousif visits a revolutionary football-led scheme which is helping men lose weight

Shed a few pounds on a football diet

Men who are looking to shift a few pounds are eagerly taking part in a revolutionary new programme.

The Alpha Programme, a free weight loss and football pilot scheme aimed at men aged between 35 and 65 has started at The Arena in Baldock.

University lecturer and Alpha Programme lead Mark Cortnage said: "The Alpha Programme is an innovative weight loss programme which is different to traditional schemes because we don't offer a replacement diet – but we do offer them a diet of football!

"We don't tell our members to change their diet. The fact is if you drink five pints on a Friday night, or have three fry-ups a week for example, we aren't going to tell you to cut it out completely, because over the long-term such a dramatic change to someone who enjoys a beer, or a 'full English' is simply not going to work.

"What we do is get them to cut down. We aren't saying you'll never be able to drink a pint again



■ Alpha Programme's Mark Cortnage says the focus is on making cut backs.

because it's not realistic for the majority of people – it wouldn't be much fun either. What we're saying is instead of having five pints, cut it down to one or two. And if you like a fry-up or a curry then cut them down too.

"Research has shown current weight loss regimes don't tend to work for men. Alpha has been developed specifically for men's weight loss and maintenance. The



■ Steve Morgan, third from right, with members taking part in the Alpha Programme in Baldock.

Picture: ED CLAYDON DA VINCI CREATIVE

success of Alpha is due to a personalised nutrition and football programme which doesn't require a calorie controlled dietary regime, or the removal of foods men often prefer such as beer and curry.

Alpha Programme co-lead and football coach Steve Morgan said: "It's going really well. We use football as part of the programme and also plan to get our lads to

join Sky Sports pundit Guillem Balague's over 40s five-a-side league at The Arena.

"I do a lot of kids football coaching, and the feedback we get from dads is they are too busy concentrating on taking their sons and daughters to their football clubs, and focusing on their own kids' needs, so often neglect themselves – meaning they're too busy to concentrate on

their own health, fitness, diet and nutrition requirements."

Member Colin Roberson added: "I enjoy it. I've lost nearly a stone since I started last month. I can't recommend it highly enough and would urge anyone who likes football, and is thinking of trying to lose a few pounds in a fun way to try it."

Call 01462 659491 or email info@footballs-future.com for more.

G. Participant registration documents



PARTICIPANT CONSENT FORM



NAME OF PARTICIPANT:

Title of the project: **The Alpha programme: Football based weight management**

Main investigator and contact details: **Mark Cortnage Email: mark.cortnage@anglia.ac.uk**

Members of the research team: **Mark Cortnage**

1. I agree to take part in the above research. I have read the Participant Information Sheet for the study. I understand what my role will be in this research, and all my questions have been answered to my satisfaction.
2. I understand that I am free to withdraw from the research at any time, for any reason and without prejudice.
3. I have been informed that the confidentiality of the information I provide will be safeguarded.
4. I consent to being interviewed before and at the end of the programme. I understand that these sessions will be audio recorded.
5. I am free to ask any questions at any time before and during the study.
6. I have been provided with a copy of this form and the Participant Information Sheet.

Data Protection: I agree to the University¹ processing personal data which I have supplied. I agree to the processing of such data for any purposes connected with the Research Project as outlined to me*

Name of participant (print).....Signed.....Date.....

YOU WILL BE GIVEN A COPY OF THIS FORM TO KEEP

If you wish to withdraw from the research, please complete the form below and return to the main investigator named above.

Title of Project:

I WISH TO WITHDRAW FROM THIS STUDY

Signed: _____ Date: _____

¹ "The University" includes Anglia Ruskin University and its partner colleges

PARTICIPANT INFORMATION SHEET

PARTICIPANT INFORMATION SHEET

Section A: The Research Project

1. Title of project: The Alpha programme: data collection and evaluation.
2. Purpose and value of study: To determine the effectiveness of a male only, football themed weight loss programme.
3. We would like to collect data from you during your participation on the Alpha programme.
4. Who is organising the research: Mark Cortnage, Lecturer in Public Health at Anglia Ruskin University.
5. What will happen to the results of the study: Used for Mark's PhD.
6. Contact for further information: mark.cortnage@anglia.ac.uk.

Section B: Your Participation in the Research Project

1. You are eligible because you are: Male with a BMI over 25 and within the ages of 35 - 65 years. Within this age range over 39% of men have been classified as overweight and over 25% classified as obese.
2. You are free to refuse participation in the data collection at any time.
3. You are able to drop out of the programme at any time. Please notify the organiser Mark Cortnage via email.
4. If you take part, the organisers would like to measure your height, weight and waist circumference. The research would like to measure both your weight and waist circumference on a weekly basis.
5. We would like to analyse the food diaries you will be completing for the Alpha programme. We would also like to analyse your exercise related data such as your intensity levels from training.
6. Both at the start and at the end of the programme we would like to interview you. We would like to know things such as your current food habits and what you are expecting from the programme. These sessions will be recorded and your identity will remain anonymous. From these interviews we can understand what you thought of the programme, why you participated and how it has helped you. We would also like to ask about your weight and exercise.

We understand that for some individuals these topics can be of a sensitive nature despite us doing our best to make the questions as non-intrusive as possible. If you wish not to answer certain questions, then please let the researcher know during the session.

If you prefer not to participate in these session then please let us know beforehand and you will be withdrawn from the interviews.

6. Agreement to participate in this research should not compromise your legal rights should something go wrong.
7. Once you have provided your consent we would advise you to make contact with your GP to inform them that you are taking part in the study.
8. We would like specific personal information from you before commencement of the programme. This will allow us to make contact with you to arrange measurements and interview sessions. We would like your Name, Age, email address, mobile phone number. Though we will keep records of this information. We do not make those details available to any third parties and all information will be handled in accordance with the Data Protection Act (1998). The data will be digitally encrypted, anonymised and stored at Anglia Ruskin University on a password protected computer.
9. If we decide to publish the results of the programme we will make sure that your identity remains anonymous. You will be notified of all publications.
10. Adverse effects that may materialise as a consequence of the screening session are extremely remote. However, if you feel anxious during this session such as due to an issue of modesty. Then please speak to the researcher who can arrange for you to be seen in private.
11. It is important that you notify the researchers if you have an ongoing medical condition that you feel could affect your ability to participate in this research.
12. If you have any questions then please free to ask.
13. Stephen Morgan is a qualified first Aider. Stephen has also received training in CPR.

YOU WILL BE GIVEN A COPY OF THIS TO KEEP,
TOGETHER WITH A COPY OF YOUR CONSENT FORM



The Alpha Programme

Football and Weight Loss

Football and weight management programme registration form			
Could you please fully complete this form and use block capitals.			
Participant Details			
Title:	Date of birth:		
First name:	Age:		
Surname:	Ethnicity		
Address			
Postcode			
Do you have physical or learning disability (please specify)?			
Email address:			
Mobile phone number:			
Named contact (in case of emergency):			
Phone number:			
Relationship:			

The staff at the Alpha programme would like to use your data (postcode, age, occupation, ethnicity, weight, waist, height and any indication a long-term condition as highlighted in the PAR-Q form) to gauge your progress and level of completion on the programme. We will not be sharing your personal information with any other party. Your name will not feature in our progress data. Your address details will be used to contact you in an emergency. Your email address will be used to send and receive food diaries and to make direct contact. This data will not be shared with anyone else or used other than for the purposes outlined above. You have the right to withdraw consent at any time by contacting mark.cortnage@anglia.ac.uk.

I the Participant (insert name) give my consent for any relevant clinical details about my health to be given to the Alpha programme for the use in this programme.

Signed:

Date:

.....Tear here and take your measurements home with you

Measurements					
Height (m):		Weight (kg):		Waist (cm):	

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The Physical Activity Readiness Questionnaire for Everyone

The health benefits of regular physical activity are clear; more people should engage in physical activity every day of the week. Participating in physical activity is very safe for MOST people. This questionnaire will tell you whether it is necessary for you to seek further advice from your doctor OR a qualified exercise professional before becoming more physically active.

GENERAL HEALTH QUESTIONS




Please read the 7 questions below carefully and answer each one honestly: check YES or NO.	YES	NO
1) Has your doctor ever said that you have a heart condition <input type="checkbox"/> OR high blood pressure <input type="checkbox"/> .	<input type="checkbox"/>	<input type="checkbox"/>
2) Do you feel pain in your chest at rest, during your daily activities of living, OR when you do physical activity?	<input type="checkbox"/>	<input type="checkbox"/>
3) Do you lose balance because of dizziness OR have you lost consciousness in the last 12 months? Please answer NO if your dizziness was associated with over-breathing (including during vigorous exercise).	<input type="checkbox"/>	<input type="checkbox"/>
4) Have you ever been diagnosed with another chronic medical condition (other than heart disease or high blood pressure)? PLEASE LIST CONDITION(S) HERE: _____	<input type="checkbox"/>	<input type="checkbox"/>
5) Are you currently taking prescribed medications for a chronic medical condition? PLEASE LIST CONDITION(S) AND MEDICATIONS HERE: _____	<input type="checkbox"/>	<input type="checkbox"/>
6) Do you currently have (or have had within the past 12 months) a bone, joint, or soft tissue (muscle, ligament, or tendon) problem that could be made worse by becoming more physically active? Please answer NO if you had a problem in the past, but it <i>does not limit your current ability</i> to be physically active. PLEASE LIST CONDITION(S) HERE: _____	<input type="checkbox"/>	<input type="checkbox"/>
7) Has your doctor ever said that you should only do medically supervised physical activity?	<input type="checkbox"/>	<input type="checkbox"/>

 **If you answered NO to all of the questions above, you are cleared for physical activity. Go to Page 4 to sign the PARTICIPANT DECLARATION. You do not need to complete Pages 2 and 3.**

-  Start becoming much more physically active – start slowly and build up gradually.
-  Follow International Physical Activity Guidelines for your age (www.who.int/dietphysicalactivity/en/).
-  You may take part in a health and fitness appraisal.
-  If you are over the age of 45 yr and **NOT** accustomed to regular vigorous to maximal effort exercise, consult a qualified exercise professional before engaging in this intensity of exercise.
-  If you have any further questions, contact a qualified exercise professional.

 **If you answered YES to one or more of the questions above, COMPLETE PAGES 2 AND 3.**

Delay becoming more active if:

-  You have a temporary illness such as a cold or fever; it is best to wait until you feel better.
-  You are pregnant - talk to your health care practitioner, your physician, a qualified exercise professional, and/or complete the ePARmed-X+ at www.eparmedx.com before becoming more physically active.
-  Your health changes - answer the questions on Pages 2 and 3 of this document and/or talk to your doctor or a qualified exercise professional before continuing with any physical activity program.



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FOLLOW-UP QUESTIONS ABOUT YOUR MEDICAL CONDITION(S)

1.	Do you have Arthritis, Osteoporosis, or Back Problems? If the above condition(s) is/are present, answer questions 1a-1c	If NO <input type="checkbox"/> go to question 2
1a.	Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? (Answer NO if you are not currently taking medications or other treatments)	YES <input type="checkbox"/> NO <input type="checkbox"/>
1b.	Do you have joint problems causing pain, a recent fracture or fracture caused by osteoporosis or cancer, displaced vertebra (e.g., spondylolisthesis), and/or spondylolysis/pars defect (a crack in the bony ring on the back of the spinal column)?	YES <input type="checkbox"/> NO <input type="checkbox"/>
1c.	Have you had steroid injections or taken steroid tablets regularly for more than 3 months?	YES <input type="checkbox"/> NO <input type="checkbox"/>
2.	Do you have Cancer of any kind? If the above condition(s) is/are present, answer questions 2a-2b	If NO <input type="checkbox"/> go to question 3
2a.	Does your cancer diagnosis include any of the following types: lung/bronchogenic, multiple myeloma (cancer of plasma cells), head, and neck?	YES <input type="checkbox"/> NO <input type="checkbox"/>
2b.	Are you currently receiving cancer therapy (such as chemotherapy or radiotherapy)?	YES <input type="checkbox"/> NO <input type="checkbox"/>
3.	Do you have a Heart or Cardiovascular Condition? This includes Coronary Artery Disease, Heart Failure, Diagnosed Abnormality of Heart Rhythm If the above condition(s) is/are present, answer questions 3a-3d	If NO <input type="checkbox"/> go to question 4
3a.	Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? (Answer NO if you are not currently taking medications or other treatments)	YES <input type="checkbox"/> NO <input type="checkbox"/>
3b.	Do you have an irregular heart beat that requires medical management? (e.g., atrial fibrillation, premature ventricular contraction)	YES <input type="checkbox"/> NO <input type="checkbox"/>
3c.	Do you have chronic heart failure?	YES <input type="checkbox"/> NO <input type="checkbox"/>
3d.	Do you have diagnosed coronary artery (cardiovascular) disease and have not participated in regular physical activity in the last 2 months?	YES <input type="checkbox"/> NO <input type="checkbox"/>
4.	Do you have High Blood Pressure? If the above condition(s) is/are present, answer questions 4a-4b	If NO <input type="checkbox"/> go to question 5
4a.	Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? (Answer NO if you are not currently taking medications or other treatments)	YES <input type="checkbox"/> NO <input type="checkbox"/>
4b.	Do you have a resting blood pressure equal to or greater than 160/90 mmHg with or without medication? (Answer YES if you do not know your resting blood pressure)	YES <input type="checkbox"/> NO <input type="checkbox"/>
5.	Do you have any Metabolic Conditions? This includes Type 1 Diabetes, Type 2 Diabetes, Pre-Diabetes If the above condition(s) is/are present, answer questions 5a-5e	If NO <input type="checkbox"/> go to question 6
5a.	Do you often have difficulty controlling your blood sugar levels with foods, medications, or other physician-prescribed therapies?	YES <input type="checkbox"/> NO <input type="checkbox"/>
5b.	Do you often suffer from signs and symptoms of low blood sugar (hypoglycemia) following exercise and/or during activities of daily living? Signs of hypoglycemia may include shakiness, nervousness, unusual irritability, abnormal sweating, dizziness or light-headedness, mental confusion, difficulty speaking, weakness, or sleepiness.	YES <input type="checkbox"/> NO <input type="checkbox"/>
5c.	Do you have any signs or symptoms of diabetes complications such as heart or vascular disease and/or complications affecting your eyes, kidneys, OR the sensation in your toes and feet?	YES <input type="checkbox"/> NO <input type="checkbox"/>
5d.	Do you have other metabolic conditions (such as current pregnancy-related diabetes, chronic kidney disease, or liver problems)?	YES <input type="checkbox"/> NO <input type="checkbox"/>
5e.	Are you planning to engage in what for you is unusually high (or vigorous) intensity exercise in the near future?	YES <input type="checkbox"/> NO <input type="checkbox"/>



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6. **Do you have any Mental Health Problems or Learning Difficulties?** *This includes Alzheimer's, Dementia, Depression, Anxiety Disorder, Eating Disorder, Psychotic Disorder, Intellectual Disability, Down Syndrome*
If the above condition(s) is/are present, answer questions 6a-6b If **NO** ☐ go to question 7
- 6a. Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? (Answer **NO** if you are not currently taking medications or other treatments) YES ☐ NO ☐
- 6b. Do you **ALSO** have back problems affecting nerves or muscles? YES ☐ NO ☐
-
7. **Do you have a Respiratory Disease?** *This includes Chronic Obstructive Pulmonary Disease, Asthma, Pulmonary High Blood Pressure*
If the above condition(s) is/are present, answer questions 7a-7d If **NO** ☐ go to question 8
- 7a. Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? (Answer **NO** if you are not currently taking medications or other treatments) YES ☐ NO ☐
- 7b. Has your doctor ever said your blood oxygen level is low at rest or during exercise and/or that you require supplemental oxygen therapy? YES ☐ NO ☐
- 7c. If asthmatic, do you currently have symptoms of chest tightness, wheezing, laboured breathing, consistent cough (more than 2 days/week), or have you used your rescue medication more than twice in the last week? YES ☐ NO ☐
- 7d. Has your doctor ever said you have high blood pressure in the blood vessels of your lungs? YES ☐ NO ☐
-
8. **Do you have a Spinal Cord Injury?** *This includes Tetraplegia and Paraplegia*
If the above condition(s) is/are present, answer questions 8a-8c If **NO** ☐ go to question 9
- 8a. Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? (Answer **NO** if you are not currently taking medications or other treatments) YES ☐ NO ☐
- 8b. Do you commonly exhibit low resting blood pressure significant enough to cause dizziness, light-headedness, and/or fainting? YES ☐ NO ☐
- 8c. Has your physician indicated that you exhibit sudden bouts of high blood pressure (known as Autonomic Dysreflexia)? YES ☐ NO ☐
-
9. **Have you had a Stroke?** *This includes Transient Ischemic Attack (TIA) or Cerebrovascular Event*
If the above condition(s) is/are present, answer questions 9a-9c If **NO** ☐ go to question 10
- 9a. Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? (Answer **NO** if you are not currently taking medications or other treatments) YES ☐ NO ☐
- 9b. Do you have any impairment in walking or mobility? YES ☐ NO ☐
- 9c. Have you experienced a stroke or impairment in nerves or muscles in the past 6 months? YES ☐ NO ☐
-
10. **Do you have any other medical condition not listed above or do you have two or more medical conditions?**
If you have other medical conditions, answer questions 10a-10c If **NO** ☐ read the Page 4 recommendations
- 10a. Have you experienced a blackout, fainted, or lost consciousness as a result of a head injury within the last 12 months **OR** have you had a diagnosed concussion within the last 12 months? YES ☐ NO ☐
- 10b. Do you have a medical condition that is not listed (such as epilepsy, neurological conditions, kidney problems)? YES ☐ NO ☐
- 10c. Do you currently live with two or more medical conditions? YES ☐ NO ☐

PLEASE LIST YOUR MEDICAL CONDITION(S)
AND ANY RELATED MEDICATIONS HERE:





GO to Page 4 for recommendations about your current medical condition(s) and sign the PARTICIPANT DECLARATION.



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 **If you answered NO to all of the follow-up questions about your medical condition, you are ready to become more physically active - sign the PARTICIPANT DECLARATION below:**

-  It is advised that you consult a qualified exercise professional to help you develop a safe and effective physical activity plan to meet your health needs.
-  You are encouraged to start slowly and build up gradually - 20 to 60 minutes of low to moderate intensity exercise, 3-5 days per week including aerobic and muscle strengthening exercises.
-  As you progress, you should aim to accumulate 150 minutes or more of moderate intensity physical activity per week.
-  If you are over the age of 45 yr and **NOT** accustomed to regular vigorous to maximal effort exercise, consult a qualified exercise professional before engaging in this intensity of exercise.

 **If you answered YES to one or more of the follow-up questions about your medical condition:**

You should seek further information before becoming more physically active or engaging in a fitness appraisal. You should complete the specially designed online screening and exercise recommendations program - the **ePARmed-X+** at www.eparmedx.com and/or visit a qualified exercise professional to work through the ePARmed-X+ and for further information.

 **Delay becoming more active if:**

-  You have a temporary illness such as a cold or fever; it is best to wait until you feel better.
-  You are pregnant - talk to your health care practitioner, your physician, a qualified exercise professional, and/or complete the ePARmed-X+ at www.eparmedx.com before becoming more physically active.
-  Your health changes - talk to your doctor or qualified exercise professional before continuing with any physical activity program.

- You are encouraged to photocopy the PAR-Q+. You must use the entire questionnaire and NO changes are permitted.
- The authors, the PAR-Q+ Collaboration, partner organizations, and their agents assume no liability for persons who undertake physical activity and/or make use of the PAR-Q+ or ePARmed-X+. If in doubt after completing the questionnaire, consult your doctor prior to physical activity.

PARTICIPANT DECLARATION

- All persons who have completed the PAR-Q+ please read and sign the declaration below.
- If you are less than the legal age required for consent or require the assent of a care provider, your parent, guardian or care provider must also sign this form.

I, the undersigned, have read, understood to my full satisfaction and completed this questionnaire. I acknowledge that this physical activity clearance is valid for a maximum of 12 months from the date it is completed and becomes invalid if my condition changes. I also acknowledge that a Trustee (such as my employer, community/fitness centre, health care provider, or other designate) may retain a copy of this form for their records. In these instances, the Trustee will be required to adhere to local, national, and international guidelines regarding the storage of personal health information ensuring that the Trustee maintains the privacy of the information and does not misuse or wrongfully disclose such information.

NAME _____ DATE _____

SIGNATURE _____ WITNESS _____

SIGNATURE OF PARENT/GUARDIAN/CARE PROVIDER _____

For more information, please contact

www.eparmedx.com
Email: eparmedx@gmail.com

Citation for PAR-Q+
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The Physical Activity Readiness Questionnaire for Everyone (PAR-Q+) and Electronic Physical Activity Readiness Medical Examination (ePARmed-X+). *Health & Fitness Journal of Canada* 4(2):3-23, 2011.

Key References

1. Jamnik VK, Warburton DER, Makarski J, McKenzie DC, Shephard RJ, Stone J, and Gledhill N. Enhancing the effectiveness of clearance for physical activity participation; background and overall process. *APNM* 36(S1):S3-S13, 2011.
2. Warburton DER, Gledhill N, Jamnik VK, Bredin SSD, McKenzie DC, Stone J, Charlesworth S, and Shephard RJ. Evidence-based risk assessment and recommendations for physical activity clearance; Consensus Document. *APNM* 36(S1):S266-S298, 2011.

The PAR-Q+ was created using the evidence-based AGREE process (1) by the PAR-Q+ Collaboration chaired by Dr. Darren E. R. Warburton with Dr. Norman Gledhill, Dr. Veronica Jamnik, and Dr. Donald C. McKenzie (2). Production of this document has been made possible through financial contributions from the Public Health Agency of Canada and the BC Ministry of Health Services. The views expressed herein do not necessarily represent the views of the Public Health Agency of Canada or the BC Ministry of Health Services.



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H. Food record template consistent with dietary manipulation procedure.

Food Diary	
Two weekdays and One weekend day - diary@shifftimber.com	
Day	Food name / description
	Breakfast
	Mid morning snack
	Lunch
	Afternoon snack
	Dinner
	Evening snack

I. TAP participants with their percentage target medals



J. Adapted Borg, (2001) scale to include football terminology

0	Rest / nothing
1	Very easy / very weak
2	Easy / weak
3	Moderate
4	Moderate to hard - feeling a sweat. A mix of running, jogging and sprints.
5	Harder but still comfortable - getting a good sweat through continuous movements and getting up and down pitch.
6	Tough but coping - still able to track runners, make tackles and get forward on counter attack.
7	Finding it quite tough - stopping to get my breath and unable to track players and get forward when needed.
8	Just about coping - Having to walk more than run and take up a deeper defensive role or GK position.
9	Extremely hard/ very difficult - Gasping for air, of little use to the team and only able to walk around the pitch.
10	Maximum exertion - Nothing left in the tank, stopping regularly and unable to contribute to team.

Adapted from Borg's CR10 (2001)