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Declaration

This work is original and has not been submitted previously in support of a degree qualification or other course.

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Abstract

An evaluation of the adult weight management programme – “Weight No More”.

Author: Angela Martin

Purpose: The aim of this study is to provide an evaluation of the “Weight No More”, adult weight management programme which is part of the “Active Lifestyles” service.

Method: This evaluation is a retrospective study, analysing before and after data of male and female participants (n = 154) who took part in the “Weight No More” programme during January 2011 to August 2013. Participants attended circuit based exercise classes and received additional weight management support. Height, weight and BMI were all recorded at the participant’s initial visit and then weight and BMI repeated frequently. Sessions were open access and participants chose which venue to attend, attendance ranged from one to 66 weeks, however for the purpose of this study repeat measurements were investigated at 4 (n = 30), 8 (n = 20) and 12 (n = 13) weeks.

Results: There were statistically significant decreases in weight at baseline and 4 weeks (P= 0.010) of -1.2kg, baseline and 8 weeks (P= 0.003) of -1.88kg and baseline and 12 weeks of -2.9kg (P= 0.010). Those involved in the programme were predominantly of white

ethnicity (64.9%), female (94%) with a mean age of 47 years. 8.9% of the participants involved were from the top 10% most deprived wards in Manchester.

Conclusions: Providing a physical opportunity for weight management in Manchester can attract those who are overweight and obese and is effective at reducing weight. Further support is available for participants to continue to be active and maintain weight loss by accessing further physical activity sessions through the “Active Lifestyles” service.

Physical activity, obesity, weight loss, community setting.

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Abbreviations

BBC British Broadcasting Corporation

BDA British Dietetic Association

BMI Body Mass Index

CRB Criminal Record Bureau Check

MCC Manchester City Council

MHWS Manchester's Healthy Weight Strategy

NHF National Heart Forum

NICE National Institute for Health and Care Excellence (NICE)

NOO National Obesity Observatory

NWCR National Weight Control Registry

ONS	Office for National Statistics
PHO	Public Health Observatory
SW	Slimming World
UK	United Kingdom
US	United States
WEMWBS	Warwick-Edinburgh Mental Well-being Scale
WHO	World Health Organisation
WMC	Weight Management Centre
WW	Weight Watchers

Chapter 1. Introduction

Obesity is reported to affect 26.1% of the adult population in the UK and rates of obesity are growing ahead of those in Europe (National Obesity Observatory [NOO], 2011).

Being overweight has become the norm as rates of obesity continue to grow. Obesity is not an easy problem to tackle - certainly we are being encouraged to be less active by labour saving devices in the home, the increasing use of the car and the types of sedentary jobs we now do compared to the manually physically intensive work people did 50 years ago. Food is everywhere, cheap and readily available - especially high-energy dense foods. Portion sizes have increased, it is very easy to consume more calories than our bodies require leading to an imbalance of energy intake and expenditure leading to weight gain over time. Ultimately obesity is caused by the environment around us changing dramatically but the cost of this is the threat to our health – being unable to manage a healthy weight - and the impact this has on society.

1.1 Obesity classification

Body mass index (BMI) is used to define obesity in adults regardless of gender and age; the definition is weight in kilograms divided by the square of the height in metres (kg/m^2).

A healthy weight is classified as a BMI of 18.5 to 24.99kg/m², overweight 25 to 29.99kg/m² and obese is 30kg/m² and above (World Health Organisation [WHO], 2012).

1.2 A Public Health Epidemic

Obesity is one of the critical public health issues facing the UK today; it causes multiple problems for both an individual and at a population level and is threatening advances made in medicine and treatment of health conditions (Lean et al., 2006; Weight Management Centre [WMC], 2010). Lean (1998) suggests nearly all obese people will develop a chronic illness by the age of 40 years, with most by the age of 60 years requiring medical intervention for disease associated with obesity.

The Marmot Review (2010) calls for health inequalities to be addressed in order to improve health; this requires health behaviours to be tackled and investment in the prevention of ill health. Those with a higher socioeconomic position have better health – those with access to education and jobs are less likely to have unhealthy behaviours. This is highlighted in Figure 1 which shows how those living in the least favourable environmental conditions are affected the most.

Figure 1. Populations living in areas with, in relative terms, the least favourable environmental conditions (river water and air quality, green space, habitat favourable to bio-diversity, flood risk, litter, housing conditions, road accidents, landfill sites. Source: Marmot Review, 2010

1.3 Health consequences

A number of conditions as illustrated in Figure 2 are associated with obesity including chronic illnesses such as diabetes, coronary heart disease, stroke and some cancers.

Carrying excess weight also affects the knee and hip joints, causes back pain and breathing

problems such as sleep apnoea and those who are overweight can suffer social and psychological issues as well (Bray, 2000).

Figure 2. Conditions associated with Obesity. Source: Bray, 2000.

1.3.1 Cancer

Many types of cancer are more common in overweight and obese people, in women there is an increased risk of breast, reproductive and gallbladder cancers; in men it is cancers of the colon, rectum and prostate (Bray, 2000). Most recently cancer of the gullet has been linked to obesity, affecting men more than women with 8,500 new cases of the cancer every year, a fifty percent rise in the last twenty five years. Researchers link this dramatic increase which is affecting the UK more than any other nation to severe heartburn which

causes adenocarcinoma – cancer which affects the base of the oesophagus. This is linked to severe reflux which is more common in men as they are more likely to carry excess weight around their waist than hips (Laurance, 2013).

Bianchini et al. (2002) suggest avoidance of weight gain should be the main priority in cancer prevention and should start in early years. In addition a healthy BMI (18.5 – 24.99kg/m²) for adults should be maintained. Those already overweight should aim for a 5 – 10% reduction in weight; those who are a healthy weight should ensure weight gain in their lifetime is no more than 5 kilograms (kg).

1.3.2 Diabetes

From the co-morbidities listed in figure 2, diabetes is most closely linked with an increase in adiposity and such are the dramatic increases of obesity and diabetes in the world populations some are calling this effect “diabesity” (Barnett & Kumar, 2004). Brought on by the uptake of diets high in saturated fats and sugars and the reduction in physical activity, obesity causes the body to become resistance to insulin, this is in proportion to the amount and storage of fat stores in the body, therefore the larger the fat stores the higher the likelihood of insulin resistance (Zimmet, 2004).

1.3.3 Metabolic Syndrome

Central obesity is linked to metabolic syndrome, this collection of medical symptoms as described in Table 1 was first described in the 1980s; the presence of a variety of symptoms raises the risk of heart disease, stroke and other circulatory problems (McTernan & Kumar, 2004; NHS, 2012).

Table 1. Metabolic syndrome risk factors.

Metabolic syndrome (presence of 3 or more of the following symptoms)
• Obesity, especially central obesity
• Insulin resistance (type 2 diabetes)
• High Blood Pressure (above 140/85)
• High plasma triglyceride levels
• Low levels of high density lipoproteins (HDL or “good” cholesterol)

Source: NHS, 2012.

1.4 Obesity and life expectancy

Dent and Swanston (2010) in their summary of a large collection of studies found the higher the BMI the increased reduction of life expectancy. Those on average with a BMI 30 – 35kg/m² were likely to see a reduction of three years, with those with a BMI 40 – 50kg/m² a reduction of eight to ten years. The study excluded those with a BMI over 50kg/m² so it is unknown what the impact of life expectancy in those who have extreme obesity is.

In the Government's obesity strategy 'Healthy Weight, Healthy Lives' (2008), the estimates are higher, "Severely obese individuals are likely to die on average 11 years earlier (13 years for a severely obese man between 20 to 30 years of age) than those with a healthy weight". In this description severely obese is defined as a BMI over 45kg/m².

1.5 Obesity and ethnicity

The relationship between obesity and ethnicity is not straightforward and varies between ethnic groups. Some ethnic groups have been found to be at an increased risk of co-morbidities because of their BMI, different body shapes and storage of fat (Gatineau & Mathrani, 2011).

The data available for adults is limited although it has been reported obesity is more prevalent amongst Black African women (38%) and least prevalent in Chinese and Bangladeshi men (6%) (NHS Information Centre, 2006).

The Marmot Review (2010) confirms obesity is linked to ethnicity and Gatineau and Mathrani (2011) expand on the factors increasing obesity risk in ethnic groups in addition to an increased BMI which include differences in diet, participation in physical activity, socioeconomic status, environmental conditions and perceptions of body image all contributing to a greater risk of obesity in ethnic minorities.

In 2013, BMI levels were re-classified for British Asian populations by the National Institute for Health and Care Excellence (NICE), setting lower BMI classifications for Asian people, although these guidelines have existed for some time by the WHO (2004). General guidelines state that adults are considered a 'healthy weight' with a BMI up to $25\text{kg}/\text{m}^2$, for Asians this is now lowered to a BMI of no more than $23\text{kg}/\text{m}^2$. In addition black and other minority populations would also benefit from a BMI less than $23\text{kg}/\text{m}^2$ due to the fact these ethnic groups are prone to co-morbidities at a lower BMI threshold than the white population (NICE, 2013).

1.6 Obesity and gender

In England more men are overweight and obese than women, the Health Survey for England (2012) states that 65% of men compared to 58% of women were overweight or obese in England.

Gender determines where body fat is stored on the body. In men excess weight is typically carried around the abdominal area, referred to as “apple-shaped” or central obesity in comparison to women who tend to carry excess weight around the hips and thighs known as “pear-shaped”. Wardle & Johnson (2002) found overweight individuals are not always even aware that they are carrying too much weight, in their study analysing self-reported weight, most obese adults perceived themselves as overweight, although men’s awareness was lower than women’s and more women than men reported trying to lose weight at the current time.

1.7 Health benefits of losing excess weight

National guidelines and studies suggest a weight loss of 5 – 10% of body weight in people who are obese can reduce the risk of co-morbidities and benefit general health (Mertens & Van Gaal, 2000). In its report ‘Lightening the Load’ the National Heart Forum (NHF)

[2007] lists the health benefits (see Table 2). In addition weight-loss in obese people can improve overall mental health such as confidence and self-esteem.

Table 2. The benefits of a 10kg weight loss

Condition	Benefit
Mortality	<ul style="list-style-type: none"> • More than 20% fall in total mortality • More than 30% fall in diabetes-related deaths • More than 40% fall in obesity-related cancer deaths
Blood Pressure (in hypertensive people)	<ul style="list-style-type: none"> • Fall of 10mmHg systolic blood pressure • Fall of 20mmHg systolic blood pressure
Diabetes (in newly diagnosed people)	<ul style="list-style-type: none"> • Fall of 50% in fasting glucose
Lipids	<ul style="list-style-type: none"> • Fall of 10% of total cholesterol • Fall of 15% of low density lipoprotein (LDL) cholesterol • Fall of 30% of triglycerides • Increase of 8% of high density lipoprotein (HDL) cholesterol

<p>Table 2. cont.</p> <p>Other benefits</p>	<ul style="list-style-type: none"> • Improved lung function, and reduced back and joint pain, breathlessness, and frequency of sleep apnoea. • Improved insulin sensitivity and ovarian function
---------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Source: NHF, 2007.

1.8 Physical activity in the management of obesity

Low levels of fitness are common in overweight and obese adults. Universally the standard weight management offer is often a combination of diet and exercise.

Some studies suggest physical activity is not the main driver for weight loss – those which have examined the impact of exercise on weight loss, found researchers came to the conclusion that exercise alone had no or a modest impact on weight loss (Church et al., 2007; Van Etten et al., 1997).

However there are many supporters for including physical activity in a weight loss programme as Professor Paul Gately of the Carneige Weight Management Institute sums up.

In people who have lost weight and kept weight off, physical activity is almost always involved. And those people who just do diet are more likely to fail, as are those who just do exercise. You need a combination of the two, because we're talking about human beings, not machines. We know dietary behaviour is quite negative behaviour – we're having to deny ourselves something. There aren't any diets out there that people enjoy. But people do enjoy being physically active.

(Gately, 2010)

Although dietary changes may have the greatest impact on body weight over the short-term, exercise has been shown to be a predictor of long-term maintenance for weight loss (Jakicic & Gallagher, 2002; Volek, VanHeest & Forsythe, 2005). Campbell and Haslam (2005) confirm this is the main role of physical activity in weight management, being active on a regular basis has many benefits for the obese person; increasing muscle mass which in turn provides an increased metabolic rate, increasing fitness and a reduction in waist circumference whilst reducing the risk of developing co-morbidities.

In addition, some studies have looked at the impact that exercise suppresses appetite but these have not provided conclusive proof that it does (Wood Baker & Brownell, 2000). Campbell and Haslam (2005) suggest fitness levels help to regulate appetite, those who are fit have better control of their appetite compared to unfit people who have lost control, perhaps because they rely on feeling full before they can tell they have had

enough. Regardless of weight loss, the NOO (2010) and others state exercise improves overall general health and prevents unhealthy weight gain (Erlichman et al., 2002; Warbuton et al., 2006).

1.9 Purpose of study

For the purpose of this study the focus is on a local based adult weight management intervention within a physical activity service in Manchester.

1.10 Manchester

Manchester is a city and metropolitan borough in Greater Manchester with an estimated population of just over 503,000 (Office of National Statistics [ONS], 2012).

The health of Manchester residents is poor - deprivation, childhood obesity, smoking and life expectancy are of particular concern (Public Health Observatory [PHO], 2012). Using the Foresight Report's (2007) projections for obesity levels, the estimated population who are obese in Manchester is 90,000 adults and 14,000 children with an increase expected by 2015 (Manchester Healthy Weight Strategy, 2010).

In general, the areas with the worst health in the city are strongly related to the areas with the highest deprivation. These are large parts of the North and East and parts of Wythenshawe. These also tend to be the areas with the highest obesity levels and mortality rates, lowest life expectancy and are areas with a high proportion of benefit claimants, part-time workers, people who have never worked or long-term unemployed, or have no qualifications. Manchester is the fourth most deprived local authority in England (Manchester City Council [MCC], 2010). Levels of deprivation are displayed in Figure 3.

Figure 3.

Indices of Multiple Deprivation in Manchester.

Launched in 2010, Manchester's first Healthy Weight Strategy 2010 - 2013 set out the challenges Manchester faces as a city with an increasingly unhealthy population with aims and visions about how to tackle the complex issues. As a strategy it aims to halt the rise of obesity in Manchester and tackle the environment and culture to support residents to achieve and maintain a healthy weight (Manchester's Healthy Weight Strategy [MHWS], 2010) and the strategy highlights predicated financial costs for NHS Manchester of treating diseases for which elevated BMI is a risk factor is £75.5 million by 2015 (MHWS, 2010).

The strategy is supported by "Manchester's Healthy Weight Resource Pack", a directory of services for health professionals to access to help support overweight and obese patients. The pack includes all services which can contribute to weight management not only physical activity and nutrition but health trainer support and specialist services including for adults with learning disabilities.

Manchester's care pathway for overweight and obese adults outlines the referral routes an obese patient should take and which services are most suitable. The pathway can be seen in Appendix 1.

1.12 Active Lifestyles

“Active Lifestyles” is Manchester’s strategic lead for instructor led activity, the service launched in 2011 and is commissioned by Public Health Manchester (now based in Manchester City Council but originally based within NHS Manchester) to provide a physical activity offer to residents across Manchester, all ages, to improve health and increase physical activity levels.

Over 150 weekly “Active Lifestyles” sessions operate city-wide including weight management programmes for adults and families.

1.13 “Weight No More” Adult Weight Management Programme

The “Weight No More” programme was developed as a physical activity for obese residents in Manchester; as well as offering suitable physical activity sessions it would offer additional support to aid weight loss. The programme was developed from national guidelines around community based weight management services. Evidence suggests multi-component programmes which offer physical activity, nutritional advice and encourage sensible weight loss are most effective (NICE, 2006).

The sessions offer a circuit based exercise class and additional support around healthy eating and goal setting. In 2011 the programme offered a “Weight No More” pack which included eight hand-outs (see examples in Appendix 2), on various topics including:-

- Food diaries and Goal setting
- The Eatwell Plate
 - 5-a-day
 - Meat, fish and alternatives
 - Dairy
 - Fats and Sugar
- Salt
- The benefits of being physically active and maintaining a healthy weight

In 2012 the advice and support materials were revised and the programme offered an additional “Kick Start” plan which included healthy weekly meal planners with three options for main meals – breakfast, lunch, dinner and snacks. In addition a weekly hand-out was provided to those who attended sessions on a range of topics including recipes, healthy eating and motivational advice (see examples in Appendix 3).

The programme operates at community venues across the city, twice a week; generally there are around seven programmes/ venues in use weekly spread across the city.

“Weight No More” targets Manchester residents who have a BMI over 25kg/m² and no co-morbidities. Participants are recruited to the programme via word of mouth, advertising and marketing and a small number of participants are referred by GPs, other health professionals and partners from the healthy weight stakeholders. The only exclusion criteria are pregnant women or children (under the age of 16 years).

“Weight No More” aims to increase participants’ physical activity levels, enable participants to lose weight, improve participants’ knowledge of healthy eating, to offer a method of monitoring food/ drink intake and to offer the service in local community facilities.

The sessions are delivered by “Active Lifestyles” Instructors who are suitably qualified and meet minimum standards such as First Aid, a Disclosure and Barring Service (DBS) check, a minimum of Level 2 Gym Instructor and/ or Exercise to Music, Level 2 Nutrition qualifications plus additional qualifications such as motivational interviewing and brief intervention. In addition Instructors delivering “Weight No More” were selected because they have experience and are interested in weight management and have suitable personalities to be able to motivate participants who may have low self-esteem, confidence and are new to exercise.

“Weight No More” launched in January 2011 and is still in operation to date, once clients have lost weight and maintained weight loss they can continue to attend the sessions or access other weekly “Active Lifestyles” activities ranging from aqua, outdoor and fitness based classes. This offers participants a pathway to maintain their activity levels and improve their fitness by accessing different types of activity in their local area.

1.14 Other weight management programmes operated by “Active Lifestyles”

“Active Lifestyles” has also developed a family weight management intervention “Fit Families” for families with an overweight child who needs additional support to be able to lead a healthy lifestyle. This provides a physical activity offer plus additional behavioural and nutritional advice.

“CounterWeight” is a weight management programme in primary care for adults. A family programme was developed - “CounterWeight Families” and staff from “Active Lifestyles” were trained and delivered family intervention sessions as part of a pilot in 2011 to 2012. This did not offer a physical activity intervention but provided advice and goal setting sessions on a range of subjects including physical activity.

Chapter 2. Literature Review

2.1 Obesity treatment

Jain (2005) summarises the treatment of obesity for individuals ranging from surgery to dietary aids and supplements, see Table 3.

Table 3. Summary of obesity treatments

- Suggest obesity surgery for severely obese patients and coordinate referrals to experienced centres
- Inform obese patients that 3 – 5kg is average weight loss from diets, exercise and drugs
- Focus on outcomes important to patients such as quality of life and ability to function
- Discuss the validity of popular diets, dietary aids, and supplements
- Use real success stories to design effective, individualised treatments

This literature review looks at multi-component weight management programmes. It does not cover dietary supplements, pharmacological or surgical treatments of obesity.

2.2 Government policy for treating obesity through multi-component interventions

The management of body weight can be very complex. At a simple level it requires an individual balancing energy intake and energy expenditure. This appears to be easy; however, this requires someone to have the knowledge and skills to understand how to manage this balance and often this will require additional support for the individual.

In addition weight maintenance in the long-term is difficult, a combination of diet and exercise can have a major effect on energy balance and produce weight loss but when this stops, weight is regained therefore management of weight is the major challenge.

NICE (2006) suggests primary care and local authorities should implement initiatives to tackle obesity including self-help, commercial and community weight management programmes on the condition they follow best practice guidelines. Guidelines for the prevention and management of obesity in adults and children published in 2006 include reducing barriers such as accessibility, cost, behaviour change, improving the environment to increase walking and cycling and providing clear health messages about weight management.

For those providing community weight-loss programmes they should incorporate a range of actions – setting realistic targets, with sensible weight loss (0.5 – 1kg per week),

focusing on lifestyle changes; addressing and promoting a balanced diet, offer behaviour change techniques and provide or be able to recommend on-going support (NICE, 2006). Sourcing the original scientific research for these suggestions is difficult, yet they are often quoted in national guidelines and policy in the UK. The National Obesity Observatory (NOO) [2010] commissioning guidelines for treating adult obesity through lifestyle interventions confirm multi-component interventions focusing on diet and physical activity and including behaviour change strategies should be standard for weight management interventions which are commissioned in public health and suggests an individual should set a target of a 5 – 10 % weight loss as a goal. There is supporting evidence for this guideline which comes from a review of studies which looked at weight loss in obese subjects with co-morbidities who had lost 10 % or less of their original body weight. Modest weight loss correlated with improvements to cholesterol and blood pressure levels and provided positive health benefits (Wing et al., 2001).

2.3 Dietary Interventions

At a population level dietary surveys and food data are consistent in demonstrating calorie intake has increased over the past 20 years (Lean et al., 2006). One US study looked at energy intake trends over two decades from 1977 to 1996 and found across all age groups of children and adults total energy intake had increased by approximately 200 kcal/ day/ person as dietary behaviour had changed and energy intake was found to be greater from

snacks, soft drinks and fast food than before (Nielsen, Siega-Riz & Popkin, 2002). Although it is difficult to be exact about the total amount of energy we are consuming, it is clear that consumption of high energy dense foods and alcohol intake has increased in the last thirty years, providing additional calories and an excess of our daily energy intake requirement (Campbell & Haslam, 2005).

Weight loss can be achieved in a number of ways and this is true of dietary methods. For years low-fat diets have been recommended for weight-loss, however more recent studies by Volek et al. (2004) discussed below have shown low-carbohydrate diets are more effective in the short term and are growing in popularity.

In one study, volunteers (n = 28) were recruited and after screening were either provided with a very low-carbohydrate ketogenic (VLCK) diet or a low-fat (LF) diet, both offered the same daily reduction in calories (-500 kcal/ day). Participants were asked to complete one diet period and then follow this with the opposite diet for the same length of time and were asked to complete detailed food diaries for at least 21 days of each diet; men completed each diet for 50 days whilst women completed the diets for 30 days and the researchers reported compliance to the diets was very good, with participants adhering to instructions and food plans. The results in participants who only consumed one of the diets showed there were more significant differences in body mass, total fat mass and trunk fat mass after the VLCK diet than the LF diet for men, in women there was a

reduction in trunk fat and total fat after the VLCK diet compared to the LF diet but this was not significant. For participants who took part in both diets there were significant differences for both men and women with reductions in body mass, total fat mass, and trunk fat mass. In men weight loss was seen in 73% of male subjects with one third losing more than 10 pounds, in women 61% of subjects lost weight. Individually 25% (n= 7) of participants who consumed both diets but did the VLCK diet first actually regained body and fat mass after switching to the LF diet, no subjects regained weight or fat mass after switching to the VLCK diet (Volek et al., 2004).

2.3.1 Commercial slimming groups

One popular method to lose weight through diet is to access a commercial slimming group, meeting or on-line support.

There are a number of well-known popular commercial slimming organisations in the UK. The British Dietetic Association (BDA [2013]) lists commercial slimming organisations as one approach for overweight people to find support in losing weight. The three listed are WeightWatchers, Slimming World and Rosemary Conley – all charge a fee to attend, the BDA suggests attendance at a group environment can be supportive as they offer regular weighing, education around diet and physical activity, structure, support, skills and strategies and can lead to successful weight loss. There are still new commercial slimming

organisations coming to fruition the latest include Jenny Craig and LighterLife, however the most popular commercial slimming organisation is estimated to be WeightWatchers with 1.3 million members worldwide (Ruxton, 2011) .

In a randomised controlled trial of four commercial weight loss programmes in the UK researchers found all four diets resulted in significant reductions in body fat and weight over six months. Overweight and obese participants were recruited via a BBC advertising campaign and were accepted in to the study if they were in general good health with no co-morbidities, they were randomly assigned to either the Dr Atkins diet, Slim-Fast meal replacement plan, two commercial group slimming organisations either Weight Watchers (WW) or Rosemary Conley (RC) or a control group. For the group based programmes participants accessed a local group meeting weekly. Participants attending either commercial slimming groups had similar results, monthly weight loss was initially high but then slowed (WW 4.7kg weight loss between 0 – 2 months attendance, 2.2kg weight loss between 2 – 6 month attendance; RC 4.0kg weight loss between 0 – 2 months attendance, 2.4kg weight loss between 2 – 6 month attendance.) After six months diets resulted in a significant mean reduction in percentage body weight; WW 9.0% and RC 9.9% with reported attendance similar at both groups; WW 66% and RC 79%. The researchers concluded participants on the commercial group diet plans were more likely to continue compared to the unsupported programmes and the control group who were offered one of the four diets after the study also preferred the group based approach as just over 50%

chose to go to WW. In summary the researchers found the commercial group programmes were successful in treating people with uncomplicated obesity (Truby et al., 2009). Jebb et al. (2011) also confirm commercial weight loss programmes are useful as a large scale intervention for weight management.

Bye, Avery and Lavin (2005) set out to evaluate male only groups within Slimming World as men did not make up a large percentage of members (5%) and their previous research highlighted men had reported being uncomfortable in a mixed group. New male-only groups were set up providing weekly meetings offering support and advice and members were given personal weight goals. Those included in the study (n = 67) had attended one of 13 men-only groups set up, for at least 8 weeks and the majority of members had joining BMIs in the obese and morbidly obese categories. These single sex sessions showed overweight men were successful at losing weight through this method with 5% weight loss achieved in 90% of the members (n = 53) at week 12. At 24 weeks members (n = 16) had lost on average 11.4% (range 5.0 to 17.9%) weight loss. The conclusions drawn from the study were that targeting obese men with single sex sessions was a supportive environment for weight loss.

2.3.2 Environmental factors on diet

It is worth noting that there are many environmental influences on diet – access to high quality, affordable healthy food for those who live in areas of deprivation is not always available and accessible, also known as ‘food deserts’. Yet unhealthy ‘fast food’ and drink may be much more accessible (WMC, 2010).

2.4 Physical activity interventions

The increase in weight gain and obesity has been linked to physical inactivity and the increase in sedentary lifestyles. Following a review of physical activity guidelines in the UK, the recommendations are that although physical activity is important in managing a healthy weight, it is difficult to specify how much physical activity should be undertaken although the general population advice to undertake 150 minutes of moderate intensity activity per week will still bring beneficial health benefits to an overweight or obese person although this level of activity has not been supported in weight loss literature (Volek et al., 2005). The difficulty in recommending a specific amount, frequency or intensity is due to the balance of energy intake and expenditure for an individual (Bull et al., 2010) and there is still no “one size fits all” prescription for achieving weight loss and reducing body fat through physical activity (Stockunas, Polo & Walberg-Rankin, 2000) .

One strong piece of research which assessed the effects of physical activity on weight maintenance showed around 80 minutes per day of moderate or 35 minutes of vigorous activity would prevent weight gain. The study only recruited female subjects who had maintained weight loss within 1kg between one and three months, with an existing BMI of 20 – 30kg/m². In this one year study 97% of subjects completed the study, taking part in visits to a research centre; two visits at the start and one at 3, 6, 9 and 12 months. Subjects were asked to recall the amount of time they had taken part in moderate and high intensity activities over a weekly period, wear heart rate monitors to establish physical activity levels and any differences in recorded activity and record food diaries including descriptions and amounts of food and drink consumed which were reviewed by a dietitian and calculated for energy intake. Although this was a small US study (n = 32) over a one year period with women participants only, it does provide a measure of physical activity levels required for weight control (Schoeller et al., 1997).

Coakley et al. (1998) conducted a 4 year study observing weight trends in nearly 20,000 men during 1988 – 1992. Activity levels were determined via a questionnaire that focused on vigorous activity and television viewing habits. The trend of a reduction in activity by 1.5 hours/ week was significant and indicated an average weight gain of 0.6kg (95% confidence intervals [CI] 0.3 to .08kg), whilst a trend of increased activity to above 1.5 hours/ week would predict a weight loss of 0.9kg (95% CI -1.2 to -0.6kg). Increases to the sedentary behaviour of television viewing to above 14 hours/ week indicated a weight

gain on average 1.2kg (95% CI 0.4 to 2.0kg) demonstrating that sedentary behaviour leads to weight gain.

Another large US study (n = 20,000) in workplaces showed that high-intensity activity in both men and women was a strong inverse predictor of BMI. Sports in group settings and job activity were not significant predictors however walking and high-intensity activity were significant predictors of weight maintenance (French et al., 1994).

There are a variety of factors when advising an obese individual to increase physical activity levels to aid weight loss, the components - type, duration and intensity of activity can all be altered to the individual to provide different outcomes. Lifestyle activities have been shown to offer a suitable alternative to structured activity, in their study Anderson et al. (1999), obese female subjects (n = 40) either took part in three weekly aerobics classes or were advised how to increase their daily activity levels by 30 minutes per day and to maintain a physical activity diary whilst wearing an accelerometer. At the end of the 16-week intervention mean weight loss for the aerobic group was 8.3kg and for the lifestyle group was 7.9kg (between groups, $p = .08$), the lifestyle group lost significantly more fat-free mass (1.4kg; $p = .03$) compared to a loss of 0.5kg for the aerobic group and at the one year follow up the aerobic group regained on average 1.6kg compared to the lifestyle group (mean weight gain at one year of 0.08kg). This study is important as obese people

often report time is a barrier to being active so encouraging them to increase daily activities would support weight loss without major lifestyle changes.

At the other end of the scale to lifestyle activities, resistance training is becoming more popular as a tool to aid weight loss for physical activity interventions, increasing fat-free mass and improving resting energy expenditure with additional benefits such as improving strength which in turn can increase an obese person's ability to carry out day to day tasks and increase the likelihood of weight loss and adherence to physical activity (Volek et al., 2005; Macfarlane & Thomas, 2010).

2.5 Combining exercise and diet for weight loss

Although there is a general consensus that an increase in physical activity and modifications to diet will aid weight loss there are certainly a range of opinions as to which are the most successful and with so many options available it is no wonder.

Stockunas et al. (2000) found in their study combining moderate and high intensity interval exercise with moderate dietary restriction and weekly group nutrition education sessions that the sample (n = 13) of obese men who took part in exercise three days per

week over a nine week period had similar results regardless of the intensity of exercise. The group who had taken part in moderate intensity activity lost 2.4% of body weight and the high intensity group 2.8%. The results show either intensity would offer a successful exercise programme for weight loss and potentially could have been greater had the energy intake been reduced as the dietary analysis of the sample showed there were no significant changes in energy intake over the time of the study even though participants were provided with an individual calorie controlled diet ranging from 1800 to 2800 calories which provided a deficit of -500 calories per day. The combination of increased physical activity and diet modification for improved weight loss results is supported by other studies.

The National Weight Control Registry (NWCR) is the largest long-term weight loss maintenance investigation, tracking over 10,000 individuals who have successfully lost and maintained weight (NWCR, 2013). Phelan et al. (2006) evaluated the behaviours of members of the NWCR over an eight year period, using questionnaires to establish dietary and physical activity habits. Participants were included if they had maintained a weight loss of 13.6kg (30 lb) for at least one year. For the research they completed two questionnaires on entry to the NWCR and then repeated this one year later. Researchers found those who were successful at maintaining weight had significant changes in the composition of their diets over the eight year period the research took place. The

percentage of calories from fat (including saturated fat) increased over time, although it was still within the nationally recommended levels of fat intake. The percentage of calories from carbohydrate decreased; both shifts were suggested by researchers to be due to the rise in new but popular low-carbohydrate/ high-fat diet plans. In terms of physical activity, levels remained high, equivalent to 2000 kcal/ wk per year or 60 minutes of moderate intensity level activity per day. In conclusion maintenance of high activity levels and a reduced caloric intake were long-term predictors of successful weight loss and maintenance.

Shadley (2012) concludes that weight loss approaches and reducing body fat can be most easily achieved through particular exercises; weight training, anaerobic and short-medium duration aerobic exercise. In terms of dietary changes achievements can be made from decreasing saturated, transfat, and high glycemic foods - weight management is not simply about calories in and out.

For the individual struggling with obesity Lean et al. (2006) agree achieving an energy balance is the way forward, making changes to diet and physical activity but most importantly making sustainable changes by incorporating new behaviour patterns. Table 4 (below) lists the practical strategies used by individuals which research suggests are effective and combine both healthy eating and physical activity.

Table 4. Strategies used by individuals to control weight problems

- Decrease dietary fat consumption
- Skip meals or don't skip meals
- Decrease fizzy drinks or replace them with low sugar drinks
- Avoid sugary foods and processed high-fat meat products
- Increase low energy foods (such as fruits and vegetables)
- Choose natural foods if possible, but if buying manufactured or packaged foods, buy those low in energy density
- Eat off small plates; avoid large portions (never "super size")
- Never eat with fingers
- Only eat when sitting down
- Join a gym, use a gym and walk to the gym
- Walk more and do not bother with the gym
- Get a pedometer and use it to monitor increased walking

Source: Lean et al., 2006

2.6 Weight management in primary care

“Counterweight” is a weight management programme in a primary care setting; indeed it has been delivered in Manchester by Health Care Assistants and Practice Nurses since 2011.

In the two year evaluation of the national “Counterweight” programme (Ross et al., 2008), sixty-five general practices were recruited with the programme delivered by practice nurses and healthcare assistants in their practice who were trained and mentored by dietitians who specialised in obesity management. Overweight patients who took part were assessed for readiness to change and if deemed suitable for the programme were then offered nine appointments spanning 12 months. The intervention offered goal-setting, and aimed at reducing energy intake by 500 kcal/ day with a prescribed eating plan. The appointments offered were either individual or group sessions with follow up at 6, 9, 12 and 24 months and primary outcome measures were weight change at 12 and 24 months and percentage of patients achieving and maintaining a 5% weight loss or more. The results were mean weight change of -3.0kg (n = 642) at 12 months and -2.3kg (n = 357) at 24 months. Male patients (n= 171) on average lost slightly more weight at 12 months (3.4kg) than female patients (n = 471) who on average lost 2.8kg. Those aged 35 – 44 years were most successful at losing weight at 12 months with an average weight loss of -4.18kg. The best results were seen by those who attended the most, a weight loss of -

7.82kg on average for those who made over 21 visits in 12 months (n = 33). The study demonstrated that a weight management programme can be delivered in a primary care setting by practice nurses and achieves significant patient weight loss.

Participants in the “Counterweight” study were recruited during normal appointments, which relied on patients attending the GP surgery rather than the surgery targeting obese patients they were aware of. In their study examining levels of weight concern in British adults, Wardle and Johnson (2002) found only one in five overweight and obese men and women could recall receiving advice from a health care professional, even though most of the participants themselves were aware they had a weight issue. The confidence of raising the issue of weight with patients by primary care professionals may be an issue but the “Counter Weight” research has shown how professionals can be trained to deliver an effective programme.

Pharmacies are potentially another place where the public could access weight management advice. Many are ideally placed in local venues, often offering long opening hours, providing weight management products and drugs and have equipment to weigh and measure people as well as consultation areas. However one study (Krska, Lovelady, Connolly, Parmar & Davies, 2010) in Sefton, Merseyside found public awareness and expectation for weight management services in pharmacies was low and there was a

preference to access leisure centres for this type of advice. Interestingly the pharmacists located in areas of highest deprivation reported dispensing the highest frequency of prescription weight loss products. The researchers concluded that further research was required and that public awareness needed to be raised about the types of weight management services available through pharmacies.

2.7 Weight management in communities

There is a larger picture here, one in which communities are affected by obesity on many levels. Obesity often focuses on the individual and how that individual needs to take action (eg. eat less, exercise more and make lifestyle changes) however there are many social and economic influences on communities which act as barriers to individuals improving their health and tackling their weight and the Marmot Review (2010) suggests population-wide interventions should be used to tackle obesity.

In tackling obesity effectively in communities Cohen et al. (2005) raise a number of consequences if we do not consider broader actions to tackle obesity.

- Focusing on weight instead of nutrition leads to individuals to adopt popular weight-loss diets rather than eating nutritious food.

- Focusing on weight alone has serious consequences for mental health.
- Distorted cultural norms for “healthy weight” can lead to eating disorders.
- The obesity stigma may affect preventive health care.
- The emphasis on obesity keeps the focus away from creating healthy lifestyles.

In their study regarding levels of weight concern in British adults, Wardle and Johnson (2002) found most obese adults (n = 110 women, 84 men) were aware they were obese and 66.4% of women and 56% of men were “trying to lose” weight, however the perception of being overweight did not appear to encourage subjects to take action to lose weight. Women were more likely to make attempts to lose weight than men citing various methods including their own diet plan or popular diet plans, commercial slimming groups, meal replacements plans, diet pills and advice from a professional.

Chapter 3. Hypothesis and Rationale

3.1 Research Question

Can the physical activity adult weight management programme, “Weight No More” support residents to lose weight?

3.2 Rationale

To tackle obesity in Manchester through physical activity, the “Weight No More” programme was developed for overweight and obese adult residents, as well as offering suitable physical activity sessions it would offer additional support to aid weight loss.

The programme was developed from NICE guidelines around community weight management services. Evidence suggests multi-component programmes which offer physical activity, nutritional advice, behaviour change and encourage sensible weight loss are most effective (NICE, 2006).

3.3 Characteristics of participants

The characteristics of the participants will be described, these include age, gender, ethnicity, weight, BMI, indices of multiple deprivation score, geographical area and well-being scores. These variables have been collected and will be used for secondary analysis.

3.4 Null Hypotheses 1 - 4

Null Hypothesis 1 - From taking part in the “Weight No More” programme there will be no difference in the participant’s baseline weight and BMI measurement and their final repeat measurements.

Null Hypothesis 2 - From taking part in the “Weight No More” programme there will be no difference in weight and BMI at baseline and at 4 weeks.

Null Hypothesis 3 - From taking part in the “Weight No More” programme there will be no difference in weight and BMI at baseline and at 8 weeks.

Null Hypothesis 4 - From taking part in the “Weight No More” programme there will be no difference in weight and BMI at baseline and at 12 weeks.

Chapter 4. Method

This evaluation is a retrospective study, analysing before and after analysis of participants who took part in the “Weight No More” adult weight management programme.

4.1 Study Design

Dependant Variables: Weight, Height and BMI.

Independent variable: Geographical area of session and attendance.

Participants in the study have accessed the “Active Lifestyles” service and attended the “Weight No More” programme. There was no control group for the study.

The primary outcome measures of the study are weight and BMI changes at 4, 8 and 12 weeks. The study will make known the characteristics of the participants’ who attended such as age, gender, ethnicity, indices of multiple deprivation, wellbeing score, baseline weight, BMI and attendance on the programme and “Active Lifestyles” sessions.

4.2 Ethical considerations

Ethical approval for the study was granted by University of Chester, Faculty of Applied Sciences Research Ethics Committee on 11th June 2013, reference 823/13/AM/CSN (see Appendix 4).

Personal data concerning the sample used in the study was stored on a password protected computer, with all data anonymised. All participants were allocated a unique coding number so they were not identifiable. Coding numbers were allocated in order of how the data was processed, a cross reference of the coding number was kept in a separate document as a record which only the lead researcher had access to.

4.3 Procedures

Participants attended as many “Weight No More” sessions as they wanted (they also had access to other “Active Lifestyles” sessions), generally two sessions per week were offered at a local venue, it was hoped a participant would attend both sessions every week to improve the opportunity for weight loss and fitness. There was no requirement to pre-book, sessions were open access.

At the first session participants were required to complete an “Active Lifestyles” registration form (individual or family). This includes a disclaimer that the participant signed to confirm they were physically fit to exercise and they understand they were taking part at their own risk.

The completed registration form was returned by the Instructor to the main team and inputted into a database, generating an “Active Lifestyles” membership number and a membership card was sent to the participant for them to present at future sessions where an electronic register was taken and this allowed the service to track participation at sessions.

Participants who attended but did not complete or return a registration form to the Instructor were registered as a “trial” member and could not be tracked for participation or weight measurements until a registration form had been completed and inputted.

4.4 Measurements

Participants were subject to measurements of body weight, height, BMI and well-being.

Initial measurements and repeat measurements were completed by the Instructor, returned to the team and inputted against the participant’s record on the database. After

initial measurements were taken participants were offered weekly weigh-ins by their Instructor. If the participant chose not to be weighed weekly they were asked to be weighed monthly as a minimum. The Instructor also informed the participants of their measurements and kept a record of the measurements so they were available to the participant.

4.4.1 Weight

Weight measurements were recorded by Instructors at sessions. Weight was measured in kilograms to one decimal place using SECA electronic scales, these measure up to 200 kilograms. Participants were asked to remove their shoes and any bulky clothing when being weighed.

Repeat weight measurements were reliant on the participant attending future sessions.

4.4.2 Height

Height measurements were recorded to the nearest half centimetre at the first session using the Leicester Height Measure, a portable free standing height measure. Again participants are asked to remove their shoes and told how to stand correctly against the height measure.

Height was only recorded once and not repeated at future sessions.

4.4.3 Body Mass Index (BMI)

The participant's BMI was calculated from height and weight measurements. The database automatically calculated this when the measurements were inputted.

4.4.4 Well-being and the Warwick-Edinburgh Mental Well-being Scale (WEMWBS)

WEMWBS is a tool for measuring mental well-being at a population level; it has been validated for use in the UK with those aged 16 and over. The validated scale (see Appendix 5) uses fourteen statements about thoughts and feelings with five responses to select from. To complete the scale participants were expected to read the statements and select a statement which they felt best described their thoughts and feelings over the previous two weeks (Tennant et al., 2007; NHS Health Scotland, 2013).

Participants were required to complete the WEMWBS questionnaire on the registration form (see Appendix 6); they were asked to self-complete this section which is a tick-box exercise, without guidance from the Instructor, the form was only completed once. When the registration form was inputted on to the database, if the WEMWBS section was completed correctly eg. there was no missing data, then a WEMWBS score was

automatically calculated by the database from the participant's response to the questions and a score ranging from 33 to 70 was added to the participant's personal record on the database.

The WEMWBS scores are grouped together and categorised for example a score between the range of 33 to 40 demonstrates a well-being score of 'below average', a score of 40 to 59 is 'average' and a score of 60 to 70 is 'above average'. For the purpose of this study individual scores were analysed.

4.4.5 Indices of Multiple Deprivations (IMD)

The IMD in England is used to identify areas of deprivation, using a combination of indicators such as economic, social, health and housing data to produce a score for each small area in England which can then be used to analyse and target areas for regeneration or specific initiatives (Department of Communities and Local Government, 2013). For the purpose of this study the participant's post code data was used to gain an IMD score.

4.4.6 Attendance

Participant's attendance at sessions was tracked electronically by an Instructor using a hand held mobile device with a bar code scanner. As participants had membership cards

with a unique barcode these would be scanned by the Instructor using the device on entry to the session, a participant without a card (as long as they were registered on the database) could still be added to the register manually on the device by searching for their name, postcode or membership number. Anyone not registered or not found on the system was registered as a 'trial' member, their attendance was registered and the device would prompt the Instructor to record the gender of the person but no other details were recorded.

4.5 Other monitoring support

Participants were also provided with other support materials or packs of information and guidance to support them on the programme. These included Food Diaries to record food and drink intake. Those who took part in sessions in 2011 were provided with a "Weight No More" pack of advice notes, in addition those who took part in 2012 were provided with the "Kick Start" pack – weekly meal plans. Instructors were briefed and could provide advice on the resources they provided to participants.

In this research the other methods of support are not being evaluated. Research suggests food diaries are not always valid as there are issues with them being completed correctly and this weakens their validity (Johnson, 2002).

4.6 Population and subjects.

Participants took part in the “Weight No More” sessions of their own free will and heard about the open access sessions through word of mouth, advertising and marketing; a small number of participants were referred by GPs, Physiotherapists, Health Trainers and other health care professionals. The sessions were marketed to Manchester residents, ages 16 – 65 years who had a BMI over 25.00kg/m². For all “Active Lifestyles” sessions, 51% of members report hearing about the service through word of mouth (Active Lifestyles, 2013).

As this is predominantly a physical activity opportunity, participants had to be physically fit enough to take part in a moderate intensity aerobic circuit session. The one hour exercise session was designed by the “Active Lifestyles” Instructor; however there is no record of the type of session which was delivered on any particular occasion. Participants were encouraged to increase their levels of physical activity in addition to the “Weight No More” sessions; this could be through accessing other “Active Lifestyles” sessions or building further activity into their daily life.

Participants paid £1.00 to attend sessions; this fee applies to all “Active Lifestyles” sessions not just the “Weight No More” programme.

Sample population and recruitment procedures for this evaluation are pre-determined due to the retrospective nature of this study. The age, ethnicity and gender distribution can not be controlled due to the nature of the recruitment of the participants.

Recruitment was continuous and data capture for the study was from the 1st January 2011 to 1st August 2013.

4.7 Data

“Active Lifestyles” uses a secure external database to record data on members. At the time of this evaluation (1st August 2013) the database showed 275 members with weight measurements recorded (see Appendix 7).

4.7.1 Database

Exclusions from this study were non-Manchester residents (n = 25), this has been determined from postcode data. Members with a BMI < 24.99kg/m² at their initial measurement (n = 23). Adults and children (under 16 years) who had taken part in a family weight management intervention “Fit Families” (n = 69) were not included in this study. Members who had taken part in new pilot “Weight Advice sessions” which offered no physical activity element (n = 3) were removed. There was one member who had a

duplicate record on the database, so their measurements were recorded on one record only.

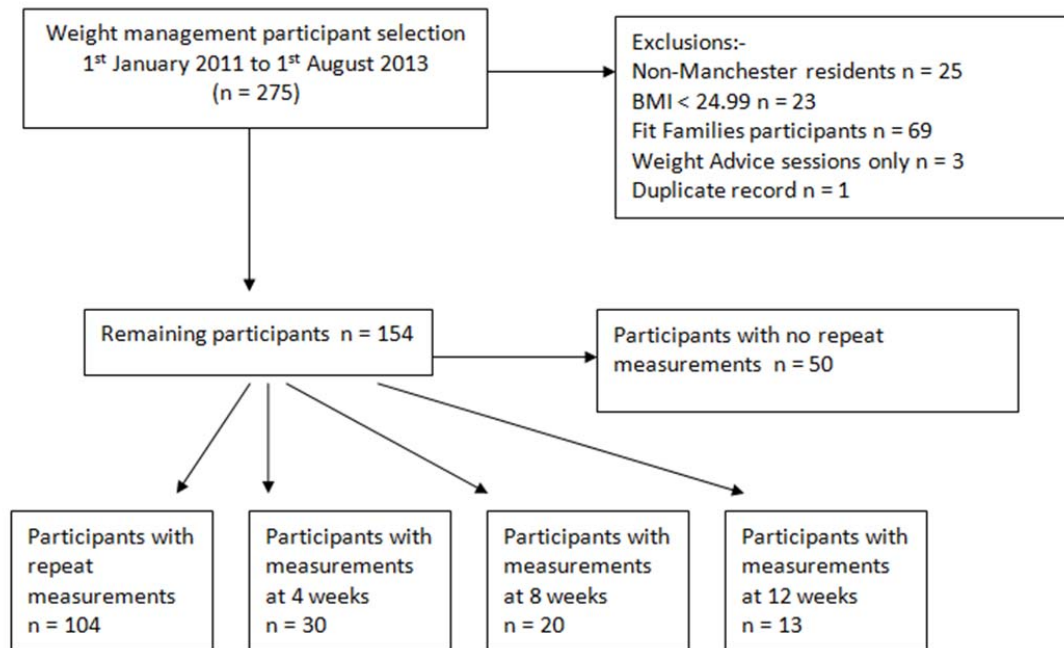


Figure 4. Data selection for study

The total sample recruited (n = 154) were overweight adults (over the age of 16 years), Manchester residents, who had accessed the “Weight No More” sessions across the city and had recorded weight and BMI measurements. All participants remain anonymous and unidentifiable.

4.7.2 Geographical and Strategic Regeneration Framework (SRF) areas

The participants have been allocated into geographical areas called SRF areas. Manchester City Council uses SRF areas to divide the city into five areas; North, East, Central, South and Wythenshawe, a map of these areas can be seen in Appendix 8. As the venues of some of the sessions have relocated for various reasons the venues have been grouped under their respective SRF area. Most participants will access a venue local to where they live and a breakdown of where participants accessed the sessions can be seen in Table 5.

Table 5. Breakdown of where participants accessed “Weight No More” sessions by SRF areas.

Breakdown of where participants accessed “Weight No More” sessions by SRF areas	
North	n = 44
East	n = 12
Central	n = 54
South	n = 26
Wythenshawe	n = 18
Total	n = 154

4.8 Data Analysis

Data was analysed using SPSS Version 20.0 for Windows and all data was tested for normality of distribution using either the Kolmogorov-Smirnov test when the sample size was over one hundred or the Shapiro-Wilk test when the sample was smaller (Coakes, 2013).

Characteristics of the participants involved in the study

Descriptive analysis were applied to the sample and reported using the mean, minimum, maximum and range figures. The variables collected included age, gender, ethnicity, weight, BMI, indices of multiple deprivation score, geographical area and well-being scores.

Null Hypotheses 1 - 4

Null Hypothesis 1 - From taking part in the “Weight No More” programme there will be no difference in the participant’s baseline weight and BMI measurement and their final repeat measurements.

After assessing the data for normality the baseline weight, BMI and repeat measurements were not normally distributed (all values $p = 0.000$), the non-parametric test the Wilcoxon Signed Ranks Tests was used.

Null Hypothesis 2 - From taking part in the “Weight No More” programme there will be no difference in weight and BMI at baseline and at 4 weeks.

The sample ($n = 30$) did not pass tests for normality for baseline BMI ($p = 0.000$), BMI at 4 weeks ($p = 0.000$) and baseline weight ($p = 0.002$) and weight at 4 wks ($p = 0.002$). The non-parametric test the Wilcoxon tests were conducted.

Null Hypothesis 3 - From taking part in the “Weight No More” programme there will be no difference in weight and BMI at baseline and at 8 weeks.

The sample ($n = 20$) passed tests for normality for baseline weight ($p = 0.232$) and weight at 8 weeks ($p = 0.180$). The parametric test, a paired t-test was conducted.

Tests for normality were also passed for baseline BMI ($p = 0.022$) and BMI at 8 weeks ($p = 0.014$). Again a paired t-test was conducted.

Null Hypothesis 4 - From taking part in the “Weight No More” programme there will be no difference in weight and BMI at baseline and at 12 weeks.

The sample (n = 13) passed tests for normality for baseline weight ($p = 0.539$) and weight at 12 weeks ($p = 0.531$), the paired t-test was conducted.

However the sample did not pass tests for normality, P values of 0.051 and 0.036 for baseline BMI and week 12 respectively. The non-parametric test the Wilcoxon Signed Ranks Test was used for analysis.

Chapter 5. Results

The sample size at the beginning of the study was 154. Due to the nature of the open access sessions participants were able to attend sessions as they wished and they were also able to choose to have monthly as opposed to weekly measurements taken. The dates between measurements were calculated and those who had measurements at weeks 4, 8 and 12 were studied.

Almost two-thirds of the sample ($n = 104$) had repeat measurements taken at some point ranging from one week to 66 weeks after their initial measurement, however 30 participants had repeat measurements at 4 weeks, 20 participants had repeat measurements at 8 weeks but only 13 participants had repeat measurements at 12 weeks.

5.1. Characteristics of participants.

The participants ($n = 154$) were analysed for characteristics. A breakdown of characteristics for all subjects can be seen in Table 6.

Table 6. Characteristics of participants at baseline and during study

Participants	Eligible for study, n	Total Sample		Repeated measures		4 weeks		8 weeks		12 weeks	
		n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Gender	Male, n (%)	9	(6)	6	(5.8)	2	(6.7)	0	(0)	0	(0)
	Female, n (%)	145	(94)	98	(94.2)	28	(93.3)	20	(100)	13	(100)
Ethnicity	Asian, n (%)	14	(9.1)	10	(9.6)	5	(16.7)	2	(10)	0	
	Black, n (%)	22	(14.3)	16	(15.4)	1	(3.3)	3	(15)	4	(30.8)
	Chinese, n (%)	1	(0.6)	1	(1.0)	0	(0)	1	(5)	0	
	Mixed, n (%)	6	(3.9)	5	(4.8)	1	(3.3)	1	(5)	1	(7.7)
	White, n (%)	100	(64.9)	66	(63.5)	19	(63.3)	12	(60)	8	(61.5)
	Other, n (%)	3	(1.9)	2	(1.9)	2	(6.7)	0	(0)	0	
	Not Given, n (%)	8	(5.2)	4	(3.8)	2	(6.7)	1	(5)	0	
Age, in years	mean(SD)	46.6	(14.4)	48.5	(13.6)	44.8	(13.9)	48.0		50.7	(15.0)
Indices of Multiple Deprivation Score	Mean(SD)	44.2	(15.8)	41.2	(15.4)	40.7	(12.6)	33.98		28.4	(13.6)
	n	144		97		29		16		12	
SRF Area	North, n (%)	44	(28.6)	23	(22.1)	6	(20)	7	(35)	2	(15.4)
	East, n (%)	12	(7.8)	5	(4.8)	0		0		0	
	Central, n (%)	54	(35.1)	42	(40.4)	11	(36.7)	9	(45)	7	(53.8)
	South, n (%)	26	(16.9)	21	(20.2)	6	(20)	4	(20)	3	(23.1)
	Wythenshawe, n (%)	18	(11.7)	13	(12.5)	7	(23.3)	0		1	(7.7)
WEMWBS score	Mean(SD)	49.5	(8.3)	50.7	(8.7)	55.2	(7.4)	49.2	(10.1)	51	(9.3)
Attendance to AL, Mean	WNM, Mean	-----		-----		4.4		8.5		8.6	
	AL, Mean	-----		-----		6.3		11.45		12.6	
Weight (kg)	Pre, mean(SD)	88.7	(20.2)	89.1	(20.3)	88.9	(22.7)	88.8	(20.1)	91.5	(17.9)
	Post, mean(SD)	87.2	(19.0)	87.2	(19.0)	87.8	(22.3)	86.9	(18.8)	88.6	(15.7)
Weight loss (kg)	Mean	-----		-----		-1.2		-1.8		-2.8	
BMI	Pre, mean(SD)	34.2	(7.7)	34.5	(7.7)	35.0	(9.4)	34.4		35.0	(7.3)
	Post, mean(SD)	33.7	(7.1)	33.7	(7.1)	34.6	(9.2)	33.7		33.9	(6.5)

5.1.1 Age

One of the suitability criteria for “Weight No More” is an age range from 16 to 65 years. The participants who accessed “Weight No More” had a mean age of 46.6 at joining the programme. There was one participant with missing data recorded for this category. The youngest participant was 17 years of age and the oldest 85 years of age. The distribution of the age of participants on joining the programme can be seen in Figure 5.

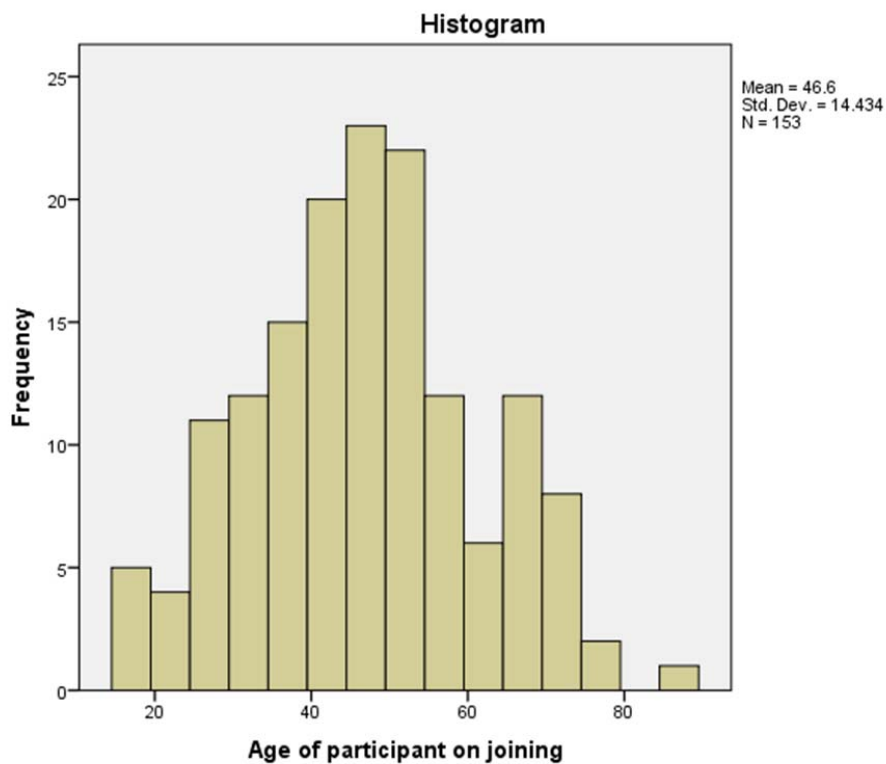


Figure 5. Age range of subjects included in the study.

5.1.2 Gender

From the sample size (n = 154), 94% were female participants (n = 145) and 6% male (n = 9) at joining the programme. At week 4 this barely changed (93.3% female/ 6.7% male); however at 8 and 12 weeks participants in the study were solely female.

5.1.3 Ethnicity

Manchester has a diverse population and continues to have a growing ethnic minority population - ethnic minority groups White Irish, Black Caribbean and Mixed White grew from just under a fifth of the population in 2001 to over 22% in 2009 whilst Black Caribbean, Mixed White and Black African showed a decrease (MCC, 2011).

The majority of participants in the study (64.9%) were White, the smallest ethnic group to access "Weight No More" were Chinese (0.6%) and Mixed (3.8%). A small number (5%) did not declare their ethnicity on the registration form.

In comparison to Manchester's recorded population from the last census results the programme attracted higher numbers of Black residents (14.30%) compared to the borough's average of 8.63%. Lower numbers of the Asian population (9.10%) accessed the programme compared to the borough's average of 17.06%.

White participants remained the main ethnic group and this was fairly consistent across the study (Baseline 64.9%, 4 weeks 63.3%, 8 weeks 60% and 12 weeks 61.5%). At 12 weeks only White (61.5%, n = 8), Black (30.8%, n = 4) and Mixed (7.7%, n = 1) ethnic group participants had repeat measurements.

5.1.4 Geographical SRF areas

More participants in the sample took part in “Weight No More” sessions in the Central SRF area (31%) and least took part in East SRF area (5%). This is reflective of the number of sessions held at venues in these areas, there have been sessions held in Central since January 2011, however a programme only began in East in September 2012.

5.1.5 WEMWBS Scores

Those who did not complete the questionnaire or did not complete all fourteen questions were excluded and did not have a score on the database, this applied to 62% of the sample (n = 95).

The remaining participants with scores, 38% (n = 59), had total scores ranging from 33 – 70, the mean score for the sample (n = 54) is 49.53. This shows on average a participant in the study with a WEMWBS score, scored ‘average’ on the scale for well-being. At 4 weeks

the mean WEMEBS score was 55.2 (n = 30) this dropped to 49.2 (n = 20) at 8 weeks and at 12 weeks the mean was a score of 51, all scores are representative of an 'average' score on the WEMWBS scale.

5.1.6 Indices of Multiple Deprivation score

At baseline the mean IMD score was 44.2 (there were 20 participants with missing data in the sample of 154), the Manchester rank of IMD 2010 scores range from 1 to 259, where 1 is the most deprived and 259 the least deprived, a score of 44.2 is ranked as 121. 8.9% of participants at baseline were from the 10% most deprived Manchester wards. The lowest IMD score at baseline was 13.08 (ranked 253 out of 259) this is in the least 10% deprived wards in Manchester. The highest IMD score was 74.35 (ranked 4 out of 259) this is in the top 10% most deprived Manchester wards and in the top 1% most deprived wards in England.

By week 12 the mean score was considerably lower at 28.4 which shows participants adhering to the programme at this stage were from areas which were not as deprived, a mean score of 28.4 is ranked 186 out of 259. The lowest IMD score in the sample (n = 13) did not change compared to baseline at 13.08 whilst the highest score was 53.5 (ranked 66 out of 259).

5.1.7 Weight

The overall mean weight (kg) at baseline measurement from those who accessed the programme was 88.7kg, the minimum weight was 60.1kg and the maximum 163.6kg.

Initial weight measurement of male participants was 95.0kg (mean) and female participants 88.3kg (mean).

5.1.8 Body Mass Index

As “Weight No More” is a physical activity opportunity for overweight residents it is aimed at those with a BMI over 25.0kg/m². From the sample of overweight participants accessing the programme, the minimum BMI was 25.5kg/m² and the maximum 70.8kg/m². The mean BMI is 34.23kg/m² this would categorise the average participant as “obese” according to the WHO BMI classification (WHO, 2012).

5.1.9 Attendance

The programme generally offered two weekly sessions per week at a community venue (except at the venue in the South SRF area). Over a 4 week period this would allow a participant to access up to 8 sessions in 4 weeks, over 8 weeks a potential 16 sessions and

over 12 weeks up to 24 sessions (the only allowances for this would be if there were cancelled sessions or venues were closed for bank holidays or events).

Average attendance at 4 weeks was 4.4 sessions on the programme, averaging once per week and 6.3 at all “Active Lifestyles” sessions “ (including “Weight No More”), this shows on average participants tried two other “Active Lifestyles” sessions in the first month and did not necessarily only attend the programme.

At 8 weeks, mean attendance on the programme was 8.5 sessions, again averaging once per week and 11.45 total “Active Lifestyles” sessions, on average 74.2% of the attendance was on the programme but the remaining 25.8% attendances were on other sessions.

The attendance at 12 weeks did not increase much further and remained at similar levels to attendance at 8 weeks with mean attendance on the programme 8.6 sessions over 12 weeks and 12.6 visits to all sessions. From the sample (n = 13) the lowest number of visits by a participant was 4 and the highest number 21 over the 12 week period.

These figures could potentially be higher due to the procedures to register participants, there could be on average a two week turnaround from the participant attending their first session, completing a registration form and the participant being allocated a membership number and receiving a card which they would then present at the sessions

where electronic registers were taken. Any new participants would be registered as a trial member so it is possible in the first couple of weeks these participants did attend sessions but were recorded as trials and their participation is not tracked from the start date.

5.2 Hypotheses 1 - 4

Hypothesis 1 - From taking part in the “Weight No More” programme there will be no difference in the participant’s baseline weight and BMI measurement and their final repeat measurements.

There was a significant difference ($P = 0.000$) between baseline weight and the final recorded weight measurement. In the sample the analysis shows 71 participants lost weight, 27 increased weight and 6 had the same weight recorded at baseline and their last repeat measurement. The median value for baseline weight was 84.1kg which reduced to 81.1kg at last weight recorded, a 3.57% reduction in weight. The lowest weight recorded in the sample at 60.1kg did not reduce, however the highest weight recorded at 153.5kg did reduce to 150kg.

A significant difference was found ($P = 0.000$) between baseline BMI and last recorded BMI in the sample ($n = 104$) with repeat measures. The median BMI at baseline was 32.3kg/m^2 reducing to 31.1kg/m^2 at the last recorded measure. The lowest and highest

BMI levels reduced from 25.6kg/m² to 24.9kg/m² at the lowest level to 63.0kg/m² to 61.6kg/m² at the highest level.

Hypothesis 2 - From taking part in the “Weight No More” programme there will be no difference in weight and BMI at baseline and at 4 weeks.

There was a significant difference (P = 0.010) between baseline weight and at 4 weeks. In the sample (n = 30), 21 participants had lost weight at 4 weeks, 7 had recorded a weight gain and 2 had no change in weight during this time. The median value for baseline weight was 81.2kg, reducing to 78.6kg, a 3.21% reduction in body weight. The highest weight recorded in the sample was 153.5kg which reduced to 147kg at 4 weeks, there was an insignificant change to the lowest weight recorded (60.1kg at baseline, 60.0kg at 4 weeks).

Median BMI values from baseline to 4 weeks reduced from 30.5kg/m² to 30.3kg/m², there was a significant difference between BMI reductions (P = 0.010). Although there was a minimal reduction in the lowest BMI values recorded (Baseline 26.5 kg/m² and 4 weeks 26.4 kg/m²), the highest BMI values recorded reduced from 63.0kg/m² to 60.4kg/m² at 4 weeks.

Mean weight loss at 4 weeks was 1.2kg, the largest weight loss in the sample was 8.0kg and the smallest was a weight gain of 2.0kg

Hypothesis 3 - From taking part in the “Weight No More” programme there will be no difference in weight and BMI at baseline and at 8 weeks.

Differences in the mean weight values between baseline and at 8 weeks were found to be significant ($P = 0.003$). The mean weight at baseline was 88.8kg reducing to 86.9kg at 8 weeks, equivalent to a 2.14% reduction in body weight. There was a 0.1kg increase in the minimum weight recorded (baseline 61.5kg to 61.6kg at 8 weeks) but a reduction in the highest weight recorded (baseline 138kg to 137kg at 8 weeks).

The reduction in BMI values for participants at 8 weeks was found to be statistically significant ($P = 0.002$). In the sample ($n = 20$) the mean BMI at baseline ($34.4\text{kg}/\text{m}^2$) reduced at 8 weeks ($33.7\text{kg}/\text{m}^2$). There were reductions in the lowest (from $26.3\text{kg}/\text{m}^2$ to $26.2\text{kg}/\text{m}^2$) and highest (from $54.5\text{kg}/\text{m}^2$ to $54.1\text{kg}/\text{m}^2$) BMI values recorded at baseline and at 8 weeks.

The average weight loss (kg) at 8 weeks in the sample was 1.8kg, the largest weight loss was 8.0kg and the lowest was a weight gain of 2.3kg.

Hypothesis 4 - From taking part in the “Weight No More” programme there will be no difference in weight and BMI at baseline and at 12 weeks.

A significant difference ($p = 0.010$) between baseline and 12 week weight measurements was found. Mean baseline weight at 91.5kg reduced to 88.6kg at 12 weeks, a 3.17% body weight reduction. The highest weight recorded reduced from 130.9kg at baseline to 123.6kg at 12 weeks, whilst the lowest recorded weight saw a slight increase from 67.0kg to 68.0kg at 12 weeks.

There was a significant difference between the two BMI values at baseline and 12 weeks ($P = 0.014$). The median value for BMI at baseline is $31.6\text{kg}/\text{m}^2$ compared to $31.2\text{kg}/\text{m}^2$ at week 12. From the sample ($n = 13$), 11 participants lost weight and 2 gained weight over the 12 weeks whilst participating. The lowest BMI levels were similar at baseline and at week 12 ($27.5\text{kg}/\text{m}^2$ and $27.2\text{kg}/\text{m}^2$ respectively) however the highest BMI levels reduced from $52.7\text{kg}/\text{m}^2$ to $49.7\text{kg}/\text{m}^2$.

The mean weight loss (kg) at 12 weeks was 2.8kg, the largest weight loss was 8.8kg and the lowest was a weight gain of 1.9kg.

Chapter 6. Discussion and Conclusion

The results from the study indicate that a physical activity opportunity for overweight and obese residents resulted in significant decreases in body weight and BMI.

6.1 Hypotheses 1 – 4

Hypothesis One – The null hypothesis was rejected as a significant difference in baseline weight and BMI measurements and final repeat measurements was found.

Hypotheses Two to Four – All null hypotheses were rejected as significant differences were found between baseline measurements and measurements at 4, 8 and 12 weeks.

6.2 Discussions of results

6.2.1 Weight and BMI

There was a greater rate of weight loss between baseline and 4 weeks (-1.2kg), average weight loss slowed down between 4 and 8 weeks (-0.6kg) but increased between 8 to 12 weeks (-1.0kg), many weight management interventions show initial weight loss in the early stages is followed by a plateau (Shadley, 2012). The weight loss results are slower than national guidelines (NICE, 2006) which suggest a weight loss of 0.5 – 1kg per week is

a sensible goal. The “Weight No More” results are at a lower rate than this at 0.23kg per week, although weight loss between baseline and 4 weeks was slightly higher at 0.3kg.

Although the programme has short-term success in weight loss, it would be useful to carry out a longer study, unfortunately although there are weight measurements recorded for some participants up to one year after joining the programme the sample numbers are too small, although as more data is collected this may be possible in the future.

There is also a possibility that participants were undertaking other healthy lifestyle changes which could have affected their weight loss results – these could range from stopping smoking which can lead to weight gain (Sherman, 2005) or adhering to a diet plan.

It would be interesting to compare the results from this study to another weight management programme which has been delivered by “Active Lifestyles” – “Fit Families” a 10 week family intervention. This involved parents and obese children over a 10 week physical activity programme, the adults attended a weekly circuit based class whilst the children attended a separate physical activity session and then both attended a weekly family activity session as well. Again additional support was offered with up to four classroom-based nutrition and goal setting sessions for the adults delivered by either a

dietitian or nutritionist. There would be limitations with this study due to the small size of the sample that would be involved.

It is difficult to compare weight change results with other studies because conditions vary from study to study. Longer term studies for treatment of obesity present poor results with initial weight lost often regained (Mertens & Van Gaal, 2000).

“Weight No More” was designed for overweight and obese residents, interestingly there were a number of participants (n=23) excluded from the study who had a healthy weight BMI $<24.99\text{kg/m}^2$, due to the open access style of the sessions they were able to join although at the first visit they should have been advised by the Instructor that they were within a healthy weight range and advised of other more suitable sessions. The other possibility is that participants brought a family member or friend with them for support when attending the session.

The largest BMI recorded in the sample was 70.8kg/m^2 , according to the Manchester Care Pathway for obese adults (see appendix 1), anyone with a BMI $>35.0\text{kg/m}^2$ with co-morbidities or a BMI $>40.0\text{kg/m}^2$, should be offered the specialist weight management service; participants on the programme should have been made aware of this service, at baseline 19.5% (n= 30) of participants had a BMI $>35.0\text{kg/m}^2$ (it may not have been known to “Active Lifestyles” if the participant had a co-morbidity unless the participant

themselves declared this) and an additional 16.9% (n = 26) had a BMI >40.0kg/m². In the sample at week 12 only 2 participants (15% of sample) still had a BMI >40.0kg/m².

6.3 Characteristics of participants

6.3.1. Age

The mean age of the participants at joining (46.6 years) is not surprising, as aging is associated with increasing fat stores and a reduction in lean body mass (Poirier & Eckel, 2000). The mean age at 4 weeks is 40.7 years, 8 weeks is 48 years and 12 weeks is 50.7 years. It appears those who are older adhere to the programme for longer. This may also be a reflection of when sessions were delivered either daytime or evening times which may have appealed to different age groups.

6.3.2. Gender

Participants were predominantly female (baseline 94%, 4 weeks 93.3%, 8 and 12 weeks, 100%). To attract such a high percentage of women to a weight management programme is expected, women typically carry a higher percentage of body fat than men. In addition men are less likely to be aware of being obese and the health risks associated with this; are less likely to be bothered about their body image and less likely to seek support to lose

weight (Campbell & Haslam, 2005). There is evidence to suggest male-only environment weight management interventions are successful (Bye et al., 2005) and this is one area which needs to be acted on further.

6.3.3. Geographical area

With a larger sample further analysis could have been carried out to examine if there were differences between the groups attending different venues, at baseline there was data for each of the five SRF areas where “Weight No More” was held, however by week 12 there was only data for North (n= 2), Central (n= 7) and Wythenshawe (n = 1) areas and the sample sizes too small to make significant comparisons, again as more data is collected this may be possible in a further study.

6.3.4 Well-being and WEMWBS

Obesity has been found to be associated with decreasing levels of physical and emotional well-being (Doll et al., 2000). The requirement to measure well-being using the validated tool WEMWBS was a condition of the commissioning specification for the “Active Lifestyles” service therefore it was included in the registration process. However the feedback from the Instructors who took receipt of completed registration forms from participants was that the well-being section in particular was not being completed

correctly and therefore the data was invalid as a score could not be inputted on to the database, this is apparent from the sample (n= 154) in this study, only 38% had a valid WEMWBS score recorded in data collection. The mean WEMWBS score was 49.5 which falls in to the well-being score of 'average' for scores between 40 – 59, the average mean WEMWBS score changed at 4, 8 and 12 weeks but the scores still remained as an 'average' well-being score. Considering the participants were required to complete the WEMWBS scale as part of the registration form at the point of joining it is disappointing that the completion rate of the sample was only 38%.

6.3.5. Attendance

Participants attendance to the programme was varied perhaps because of the nature of the open access style programme so subjects attended in some cases intermittently and for this research their measurements were not at the times of 4, 8 and 12 weeks when data was captured and which this research analysed. There were 104 participants with repeat measurements however there were only a small number (n = 13) who had a repeat measurement at 12 weeks after their initial measurements. Although participation at "Weight No More" averaged out at once per week from baseline to 4 and 8 weeks, this could have been improved as the majority of venues offered two weekly sessions; therefore one would expect this to be almost double the levels of attendance found.

Attendance on the programme at 12 weeks (8.6 visits to programme) remains at a similar level to that of the 8 week attendance levels (8.5 visits to programme), for some reason there is a drop off rate at this point – even if participants only accessed one of the two weekly sessions on offer one would expect an average of 12 visits over 12 weeks. There could be a number of reasons for this; the motivation levels of this client group may have reduced after the initial enthusiasm to join “Weight No More”; seasonal changes could have affected participation, there are various closures during the year for bank holidays and a two week closure in December for the holidays which would reduce the opportunity to access a class if it fell during these times. In terms of successful long-term weight loss it is important that obese individuals develop sustained healthy behaviours including developing habitual exercise habits (Lean et al., 2006) and this is one area the programme needs to consider further action around.

The findings showed participants accessed other sessions, a further analysis of the sample with repeat measures (n = 104) found 50% had accessed “Active Choices” (adult fitness based sessions), 22.7% had accessed “Easy Rhythms” (over 50s gentle exercise), 20.4% had accessed aqua based sessions, 2.2% had accessed “Walk 2 Run” (a beginners running programme) and 4.5% had accessed “Health Pathways” (these are closed sessions for participants who have been referred by the GP exercise on referral scheme). The largest preference was for “Active Choices” – these include Zumba, Boxercise, Bootcamp and

others types of fitness sessions, participants may have accessed these as well as the programme to gain additional variety.

6.4 Other conclusions from the study

If a further study were to be undertaken another area of research could be to evaluate the effectiveness of the Instructors involved, there has been a turnover of staffing during the 2 years the intervention has taken place. It is difficult to recruit Instructors who are interested in the area of weight management and due to the casual nature of their employment there is always the risk an Instructor will leave a short notice which can disrupt a session as participants build up a relationship with an Instructor. Researchers have found exercise professionals have negative associations towards obese people (Chambliss, Finley & Blair, 2004), which is a concern when this group of professionals are required for effective exercise interventions, although most exercise professionals report they are knowledgeable in the area of obesity with knowledge gained from books, workshops, training and previous experience (Hare, Price, Flynn & King, 2000).

In a pilot which started before “Weight No More” was launched, three weekly sessions were offered; two circuit classes and a health walk, however the feedback from participants at that time is that they felt they could walk in their own time so when the programme launched in 2011 the walk activity was not offered.

From the data of the attendance to sessions it is apparent that participants are accessing other activities on offer through “Active Lifestyles” and a consideration may be to offer different activities twice per week at the same venue or to offer weight management support at general “Active Lifestyles” sessions such as the opportunity to be weighed and measured – this is a strategy which has been reported by people who have successfully lost weight and maintained their weight (NWCR, 2013) and could also be offered to a wider audience of Manchester residents accessing all sessions. There are typically around 150 – 175 “Active Lifestyles” weekly sessions held across Manchester (season dependant) in comparison to a maximum of 10 weekly “Weight No More” sessions across the city at its peak, discounting those which are only for children and young people this is a large number of sessions (around 100) and could not only target overweight and obese adults who are accessing the mainstream sessions but also support those who are at the tipping point of becoming overweight or obese.

6.5 Limitations

There are several limitations with this study. As the study was retrospective in nature the accuracy and timings of data collection meant that some data was missing or measurements were not carried out at key times such as the 4, 8 and 12 week dates and this has provided a small sample to analyse. One of the reasons for this could be a

consequence of providing an open access session which meant participants attendance and adherence was intermittent as they accessed the programme when they were able to rather than insisting on compulsory attendance. In addition there was a degree of turnover in staffing during the time of the study. New instructors who delivered the sessions were briefed on the programme and the support materials and instructed to take measurements with a requirement to return them; however there could have been occasions where the handover of a session from one instructor to another may have affected when measurements were taken. Finally although rare, there were occasions when sessions were cancelled (either by the service due to staffing issues or because of public holidays or closures at venues), again this may have disrupted the collection of measurements.

In terms of recording attendance at sessions, new unregistered participants were recorded as 'trial' members until they received their membership card and number, this may have affected the accurate recording of attendance at sessions and there is the possibility of instructor error in recording attendance through the existing technology used.

As there was no control group for the study and recruitment to the programme was not controlled it is impossible to know if the overweight participants attending had a previous weight and dieting history as this was not recorded at registration. It is likely that

participants will have made attempts to lose weight in the past – qualitative feedback from participants suggests this. There are also possibilities that participants may have either been under another healthy lifestyle or weight management service (eg. GP referral scheme, community nutrition scheme or specialist weight management service), commercial slimming group or attempting a well-known diet or their own diet plan whilst on the programme although this was not formally recorded.

Chapter 7. Recommendations

The study has provided useful analysis of the “Weight No More” programme and from the findings the following recommendations should be considered.

Improve attendance and adherence levels

In order to improve future evaluations it would be preferable to have a larger sample size to analyse, attendance is one area which needs to be improved, the analysis has shown adherence does not improve between 8 and 12 weeks, additional support could be provided at this point to motivate participants who are at risk of not attending and therefore at risk of weight gain.

Workforce Development

There are two areas to consider around the workforce. The first is attracting suitable Instructors who are capable of delivering a physical activity weight management intervention. In the past recruitment procedures have been restricted due to the barriers in being able to advertise jobs and the lack of permanent job contracts on offer. These barriers need to be addressed in order to attract and retain suitably qualified and experienced staff. Secondly the Instructors were responsible for collecting data on all variables and improvements to record keeping and data collection are possible – this would allow future evaluations to be more robust and significant. The use of new

technology could improve data collection also by prompting Instructors when measurements are expected or missing.

Male participation

The study has demonstrated that men were in the minority in attending the programme. A recommendation is to consider further analysis as to why men did not participate; this may involve speaking to male obese residents in Manchester about barriers to them addressing their weight and to consider implementing a male only weight management intervention.

Consider additional support in areas of highest deprivation

Many people have or perceive there are a number of barriers to them being active and managing a healthy weight. "Active Lifestyles" has tried to address some of these barriers by providing low-cost and local based activity sessions. However participants who attended the programme the longest were from areas which were not as deprived. Further investigations are required to find out if residents in the most deprived areas require additional support.

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