

**Are we there yet?**

**Factors associated with, and experiences of, weight maintenance in the Adult  
Weight Management Programme in the Waikato**

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## **Abstract**

Sustained weight loss maintenance is a constant challenge, especially for morbidly obese individuals who have tried and failed repeatedly. Why is it then, that some individuals are successful whilst others are not so successful? International literature identifies several factors associated with success but there is little research that examines what factors are relevant to the New Zealand context. This two-phase, sequential, mixed-methods study sought to identify and gain insight into the factors associated with successful weight loss maintenance for participants in an adult weight management programme in the Waikato. In phase one a retrospective Diabetes Service database and chart review was performed of the 190 participants who completed the Adult Weight Management Programme in 2008/2009. 21 of the 190 participants (11%) lost more than 10% of their total initial body weight at 6 months and maintained this loss at 2 years. Success appeared to be independent of age, gender, ethnicity, domicile, employment status and the presence of comorbidities. In phase two a convenience sample of 6 participants agreed to participate in an interview, of approximately 1 hour, to explore their experiences of weight maintenance. General inductive analysis was utilised to identify 4 major themes. In “actions speak louder than words – just do it” participants described following a lower energy diet, having higher levels of physical activity, regular self weighing, and vigilance in adjusting their behaviours based on the results. Routines were also important in supporting the changed behaviours. In “I can’t do this on my own” support from a variety of sources was identified as being critical to success. The third theme was “what’s this worth to me”. Here, valuing the changes that had occurred and not wanting to return to the previous state were described. In “put it all together and what have you got?” the concept of capacity building was identified as an ability to bring together the diverse threads of knowledge and to apply them effectively in order to manage long-term weight maintenance. Having a more internal locus of control and less dichotomous thinking were also associated with successful maintenance in the longer-term. The need to build capacity was discussed as being an area for further development for the weight management programme. Success is, therefore, not related to a particular factor but rather to the individual’s capacity to draw together the myriad factors necessary for sustained success.

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## **Chapter 1**

### **Introduction**

## **Introduction**

During the last twenty years, rates of obesity in New Zealand have been steadily increasing, with one in four adults (25%) in 2006/2007 being obese (Ministry of Health, 2008b). Obesity disproportionately affects Māori and Pacific populations with approximately 43% percent of Māori adults and 65% of Pacific adults being obese in 2006/2007, compared to 23% of New Zealand European and Other adults (Ministry of Health, 2008b). Although Māori and Pacific represent 14.6% and 6.9% of the total New Zealand population in 2006 (Ministry of Social Development, 2007), they represent respectively 24% and 17% of people with a body mass index (BMI) of greater than  $30 \text{ kg/m}^2$  and 26% and 23% of people with a BMI greater than  $35 \text{ kg/m}^2$ .

These increasing rates of overweight and obesity are a major concern for the continued health and well-being of the population. Being overweight or obese increases the risk of death from cardiovascular disease and some cancers, and increases the risk of developing type 2 diabetes. Excess body weight is also associated with sleep apnoea, asthma, insulin resistance, non-alcoholic fatty liver disease, gout, polycystic ovaries, impaired fertility, musculoskeletal problems, as well as other morbidities (James et al., 2004; Willett, Dietz, & Colditz, 1999).

As a nation, can we afford the cost of obesity and its associated complications? Will the health system cope or be overwhelmed? Evidence suggest that the direct costs of obesity to the New Zealand health system are in excess of \$135 million dollars annually and are likely to increase (Ministry of Health and the University of Auckland, 2003). Successive governments have identified the need to reduce these costs and the impact of obesity on the population. The New Zealand Health Strategy (Ministry of Health, 2000) outlined three objectives relating to obesity management; improve nutrition, increase physical activity and reduce obesity overall. The present government continues

to support these key objectives, although in a less direct and explicit manner than its predecessor. The drive has been very much towards encouraging individuals to take personal responsibility rather than using legislation to bring about change. Reducing the impact of obesity will result in improvements in the incidence and impact of diabetes and cardiovascular disease, one of the current government's key health targets. A variety of methods will need to be employed to achieve them.

There is evidence that weight reduction interventions can result in important health benefits. Quite modest weight loss can reduce blood pressure. The Trial of Hypertension Prevention found a 2 kg weight loss over a six month period resulted in a fall of about 4 mmHg in systolic and 3 mmHg in diastolic blood pressure (V. J. Stevens et al., 2001). A weight loss of between 5 - 10 % of the total weight is known to produce health benefit. Modest weight loss (5-10 kg) can prevent the onset of type 2 diabetes (Knowler et al., 2002) and also reduce blood glucose and low-density lipo-protein (LDL) cholesterol (Avenell et al., 2004). Intentional weight loss in adults with type 2 diabetes also appears to reduce the risk of mortality by 25% (Poobalan et al., 2007). Significant weight loss in obese persons has resulted in improvements or resolution of co-morbidities, such as diabetes, hypertension, and sleep apnoea (Grunstein et al., 2007; Sjostrom et al., 2004).

There is a perception that losing weight is easy and that if the obese individual "put his or her mind to it" he/she could lose weight. The converse side of this is a belief that all fat people are inherently lazy and that any weight loss is doomed to failure and that weight regain is an inevitable outcome. If weight loss was so easy, why have we seen the proliferation of weight loss programmes and diet plans? In actuality, weight *loss* is easy; it is weight *maintenance* that is the challenging aspect. Many obese individuals are able to lose weight and some

even manage to maintain the new weight. For some, especially the morbidly obese, that is those with a BMI of more than 35 kg/m<sup>2</sup>, it can be even harder. Many have tried losing weight, but have failed to keep the weight off in the long-term. Repeated attempts and failures reinforce a sense of failure, making further attempts even harder. These are the people who may participate in specialised weight management programmes. Some do succeed in losing weight and in maintaining this loss whilst others do not. Why are some more successful than others? What are they doing that makes them different? Are there key characteristics for successful weight loss maintenance that are unique to the New Zealand context?

This portfolio will attempt to identify key characteristics of successful weight loss maintainers from the Adult Weight Management Programme (AWMP) in the Waikato. Defining these characteristics within the local context will enable the education programme to be appropriately informed as well as identify potential areas for further research. To achieve this aim, this portfolio will first examine the literature and look at how success in weight maintenance is defined, and examine the key characteristics of success identified from international literature and experiences. The major part of the portfolio will involve a two-phase, sequential, mixed methods study to define and explore the factors associated with successful weight maintenance from the AWMP in the Waikato region. In the first, quantitative, phase a retrospective database and chart review will be used to identify and describe correlates associated with success and to identify two cohorts for the second phase of the study. In the second phase, a convenience sample of the extremes from each cohort, that is those most and those least successful, will be invited to participate in an interview. The interview will seek to explore the individuals' experience of weight maintenance. Inductive analysis will be utilised to identify themes that will add richness and

understanding to the other data. Finally, there will be some discussion about the relevance of the findings from the two studies and how they relate to the AWMP education programme. Recommendations will be made to the AWMP programme team and areas for future research will be identified.

## **Chapter 2**

### **Background and Literature Review**

## **The Practice Context**

The Waikato Regional Diabetes Service is a regional secondary care service offering specialist diabetes advice to people living with diabetes across the life-span. Individuals are supported within their own community and the Service offers specialist support to the primary care sector and secondary health services across the Waikato District Health Board (DHB) region, and to the tertiary base hospital, Waikato Hospital, based in Hamilton. The clinic is located in a central city office building within easy walking distance of the central business district and less than a ten minute drive from the hospital.

The Service serves a diabetes population of approximately 12,000 people. At Census 2006 the Waikato DHB served a population of 39,195. Some 67.1% of the population identified as European and 19.9% identified as Māori, which is higher than the national average of 13.6%. Approximately 10% were from other ethnic groups such as Pacific peoples, Asian, Middle Eastern and African. There are issues relating to this cultural diversity, rural isolation, low income and high deprivation throughout the region (Waikato District Health Board, 2007). These issues include access to health service, costs of delivery of health service, and higher morbidity rates for conditions such as diabetes and renal disease.

If one applies the age-adjusted rates of obesity across the region then it would be reasonable to assume that obesity is a significant issue within the local population. Multiple approaches are required to address the issue. These include: interventions at the level of primary care, especially in relation to lifestyle changes; commercial programmes such as Weight Watchers, Jenny Craig, Herbal Life and SureSlim; and specialist programmes, aimed at those that have not been successful with any of the aforementioned options.

The AWMP team is one of the specialist programmes and is a unique service in New Zealand in terms of its team structure and the way in which education is delivered. No other centre provides a similar programme. The team is multidisciplinary in nature and includes a physician and dietitian along with a nurse specialist. The positions for both physiotherapist and Clinical Psychologist are vacant at present. The programme is geared toward helping people with an obesity-related disorder to achieve and maintain a minimum of 10% body weight loss to improve their health. The Diabetes Service gained the funding and developed the programme as a strategy that was consistent with the goal of reducing the incidence and impact of diabetes, as stated in the New Zealand Health Strategy (Ministry of Health, 2000) and the Primary Health Care Strategy (Ministry of Health, 2001). It remains consistent with the direction outlined in the Waikato District Health Board's District Annual Plan - 2009/2010 (Waikato District Health Board, 2009) and contributes to the achievement of a key health target.

The programme utilises group education methods and Optifast™, a commercial, very low energy meal replacement, to achieve this goal. The critical criteria for acceptance onto the programme include a BMI of at least 35 or more, at least one obesity-related co-morbidity, a desire to lose weight and make permanent changes to achieve sustained weight loss, and to have seriously attempted weight loss in the past, through either diet and/or exercise, without success. Having diabetes is not an absolute criterion, but many of the participants on the programme either have diabetes or an impaired glucose state. The population demographics are diverse in relation to age, gender, ethnicity, domicile, and health needs.

The participants on this programme are morbidly obese, that is they have a BMI of at least 35 or more. These people have often tried and failed a range of

diets with varying degrees of success in the past. Many have significant multiple obesity related co-morbidities, including but not limited to, diabetes (both type 1 and type 2), metabolic syndrome, hypertension, dyslipidaemia, polycystic ovary syndrome, obesity related hypoventilation syndrome or obstructive sleep apnoea and non-alcoholic fatty liver disease and arthritis. As such, they present a clinical challenge in terms of assessment and management long-term. They are with the programme for a maximum of 2 years. The first 6 months is the intensive part of the programme, where they undergo rapid weight loss using Optifast™ as a meal replacement for a maximum of 10 weeks, before returning to real food. They attend an intensive fortnightly group education programme that incorporates aspects of nutrition, behaviour change, activity and health. The second phase is an eighteen month follow-up phase focussed primarily on weight maintenance and the prevention of weight regain. Participants attend individual appointments with the dietitian at 1, 3, 6, 12 and 18 months after the completion of the first phase. The nature of this follow-up has changed in recent times, initially to include individual appointments with the nurse specialist and latterly to become monthly group education. Programme outcomes, including anthropomorphic measurements and laboratory data, are monitored throughout the programme but it is not known what behaviours and practices are utilised by participants to enable success with maintenance.

## **Literature Review**

The most frequently used terms to describe participants in weight loss programmes include overweight and obese. These terms are defined by the World Health Organisation (2009) as “abnormal or excessive fat accumulation that presents a risk to health”, with overweight individuals having a body mass index of 25 to 30 and the obese having a body mass index of 30 or greater.

Obesity is defined as having a body mass index (BMI) greater than or equal to 30 kg/m<sup>2</sup> (for all ethnic groups). In 2006/2007 the age-standardised obesity prevalence rates for the whole population age 15 years and over was 25%. That is, one in four New Zealand adults was obese. There are large differences in the rates of obesity by ethnicity. In Pacific peoples the rate was 65%, in Māori the rate was 43% and in European/Other the rate was 23%. For Māori, there had been no changes in the prevalence of obesity, adjusted for age and gender, from 1997 to 2006/2007 (Ministry of Social Development, 2007).

A search of CINAHL, Medline, The Cochrane Library and PubMed databases was performed using the subject phrases weight control, risk factors, success factors, behaviour and behaviour mechanisms, obesity, morbid obesity, barriers to weight maintenance, and successful weight loss / control / maintenance. The search was limited to articles in English from 1990 to 2009. In addition, a manual search of the journals Obesity Review and the International Journal of Obesity for the years 1990 to 2009 was undertaken to identify any relevant articles. Articles were chosen to give an overview of the issues, including definitions of weight loss and maintenance, analyses of programmes that had also attempted to identify successful maintenance strategies and papers that discussed some of these strategies in greater detail. The purpose was to attempt to identify key success characteristics and how these were measured.

The adult obesity literature is made up of research from all health disciplines. Obesity is a multi-faceted problem, so each discipline has an important contribution to make, whether it is to understanding the causes of obesity, prevention of obesity, assessment techniques, how to help people with obesity who are seeking treatment, and, importantly, weight maintenance and prevention of weight regain.

### **Anthropomorphic measures**

Height, weight and waist circumference are the three most commonly used anthropometric measures (Ministry of Health, 2008a; Ministry of Social Development, 2007) and can be used with confidence to predict metabolic abnormalities in severe obesity (Ledoux et al., 2010). Height and weight are used to calculate BMI, an independent, surrogate measure of obesity (Ko & Tang, 2007). There are, however, issues with using BMI as a generalised tool for defining obesity. A recently published systematic review and meta-analysis of the performance of BMI in identifying obesity (Okorodudu et al., 2010) identified that BMI had a low sensitivity (0.42 – 0.50) in identifying adiposity but a high specificity (0.90 – 0.97). Thus, BMI is not an especially reliable tool in identifying adiposity but when it does, it is highly likely to be correct. It is, therefore, possible to have central adiposity, a marker of increased cardiovascular risk, without having an elevated BMI. Likewise, those with a high musculature, such as body-builders, may have a raised BMI and be deemed overweight or even obese but in fact have a very low body fat ratio. It may underestimate adiposity in some ethnic groups, especially those groups with higher musculature or smaller stature (Ministry of Health and Clinical Trials Research Unit, 2010; Scottish Intercollegiate Guidelines Network, 2010). In these groups it is suggested that

BMI cut-off points and, therefore, treatment thresholds should be moved up or down slightly to compensate.

Despite its limitations, BMI is the most commonly used measure of excess body weight (Ministry of Health, 2004), and is the most useful population indicator. BMI is a height adjusted measure calculated by dividing weight in kilograms by the square of height in meters and is usually expressed as kg/m<sup>2</sup>. BMI takes into account differences in weights of adults of different heights, but the values are independent of age and gender (Scottish Intercollegiate Guidelines Network, 2010). The World Health Organisation (WHO) defines a BMI of 18.5 to 24.9 kg/m<sup>2</sup> as being normal, 25 kg/m<sup>2</sup> to 29.9 kg/m<sup>2</sup> as being overweight and greater than 30 kg/m<sup>2</sup> as being obese (Ni Mhurchu, Bennett et al., 2004). However, given that the higher the BMI the greater the risk of co-morbidities, obesity can be further stratified according to the associated risk as shown in Table 2.1.

**Table 2.1:** BMI and relative risk for co-morbidities (Ministry of Health and Clinical Trials Research Unit, 2010).

Classification	Body mass index kg/m <sup>2</sup>	Disease risk	
		Waist Male 94–102 cm Female 80–88 cm	Waist Male > 102 cm Female > 88 cm
Normal	18.5–24.9	–	–
Overweight	25.0–29.9	+	++
Obese I	30.0–34.9	++	+++
Obese II	35.0–39.9	+++	+++
Obese III	40.0+	++++	++++

+ Increased risk; ++ High risk; +++ Very high risk; +++++ Extremely high risk. BMI may not be as accurate in highly muscular people or in ethnic groups with smaller body stature. (Therefore, in South Asians, for example, consider lowering the treatment threshold in the presence of central fatness or additional risk factors.)

Fat distribution rather than the total quantity of fat is the major determinant of cardiovascular risk in the overweight and obese population (Ledoux et al., 2010). Therefore, waist circumference is another good measure of total body fat and is the “best anthropometric predictor of visceral fat” (Scottish Intercollegiate Guidelines Network, 2010). The greater the waist circumference, the greater the risk of obesity related health problems, including metabolic syndrome, cardiovascular disease, insulin resistance and type 2 diabetes (International Diabetes Federation, 2006).

The cut-off points for waist circumference, as presented in Table 2.1, are contentious. The range represents criteria from both the WHO (World Health Organisation, 1999), and the National Cholesterol Education Program (National Cholesterol Education Program (NCEP) Expert Panel, 2001), specifically the Adult Treatment Panel III criteria. Both of these groups have erred towards the upper end of the range. The American Diabetes Association (2010) have always erred towards the lower end of the range, asserting that this is more in line with an ideal BMI. Because of the differences between groups there has long been a lack of clarity and agreement on ideal waist circumference as it relates to those with metabolic syndrome and diabetes. The International Diabetes Federation (IDF) (2006) brought unity to the definition by redefining waist circumferences, above which the risk of metabolic syndrome increases, in its worldwide consensus definition on the metabolic syndrome. In men and women of European origin, it is a waist circumference of greater than 94 cm and 80 cm respectively. The same measurements probably apply to Māori and Pacific Peoples in New Zealand (personal communication, Dr P Dunn, Endocrinologist, Clinical Director, Waikato Diabetes Service, April 2010). For all other ethnic groups the cut-off point is lower, at greater than 90 cm for men and 80 cm for women. This is reflective of the increased risk of central adiposity and insulin

resistance at lower weights in other ethnic groups (Ministry of Health and Clinical Trials Research Unit, 2010). These measurements are thought to correlate more closely to a normal BMI of 22 kg/m<sup>2</sup>. In the Waikato, the local Diabetes Service has adopted the IDF definitions for waist circumferences and so these have been applied in this study. This is also consistent with the measures used by the Ministry of Health in the 2006/2007 Health Survey (Ministry of Health, 2008b).

Whatever the measurements used to define obesity, the population in this study and in the programme are at the extreme end of the weight continuum. To enter the programme participants must have a BMI of at least 35 kg/m<sup>2</sup>, putting them in the Obese Class II category or above. They must also have at least one obesity related co-morbidity. It is likely, however, that the majority of programme participants will have more than one co-morbidity and the risks of developing further co-morbidities associated with that weight are very high. Reductions in waist circumference and BMI are, therefore, independent measures of reduced risk for illness and improved health outcomes

As discussed earlier, being overweight or obese increases the risk of death from cardiovascular disease and some cancers, and increases the risk of developing type 2 diabetes (James et al., 2004; Willett et al., 1999). Excess body weight is also associated with sleep apnoea, asthma, insulin resistance, non-alcoholic fatty liver disease, gout, polycystic ovaries, impaired fertility, musculoskeletal problems as well as other morbidities (James et al., 2004; Willett et al., 1999). In New Zealand, obesity accounts for approximately 4.7 percent of the disability-adjusted life years (a population health measure incorporating fatal and non-fatal outcomes) (Wilson, Wilson, & Russell, 2001) whilst internationally obesity places fourth at 7%, as a leading cause of loss of healthy life, behind tobacco (12%), high blood pressure (11%), alcohol (9%), and high cholesterol (8%) (Ni Mhurchu, Bennett et al., 2004).

Evidence has also been presented about the health benefits associated with weight loss. These benefits included:

- reductions in both systolic and diastolic blood pressure with modest weight loss of only 2 -3 kg (V. J. Stevens et al., 2001).
- preventing the onset of type 2 diabetes (Knowler et al., 2002)
- reducing blood glucose and low-density lipoprotein (LDL) cholesterol (Avenell et al., 2004)
- reducing the mortality risk in those with type 2 diabetes by 25% (Poobalan et al., 2007)
- improvements in, or resolution of, diabetes, hypertension and sleep apnoea (Grunstein et al., 2007; Sjostrom et al., 2004).

In addition to changes in anthropometric measures, participants in the weight management programme have their blood pressure measured at each visit throughout the six-month group education phase of the programme and have blood tests done regularly over the 2 years. Cardiovascular disease and diabetes are associated with both central adiposity and obesity (American Diabetes Association, 2010). Both conditions are readily modifiable through weight loss. Cholesterol profiles, fasting plasma glucose and glycoslated haemoglobin A1c (HbA1c) levels are surrogate measures of cardiovascular disease and diabetes. These are easily measured and compared across time as independent measures of change. Therefore, changes in blood pressure readings and blood values can be utilised to measure improvements or reduction in risk. There are target values for each of these values, as outlined in Table 2.2.

**Table 2.2:** Target values. (New Zealand Guidelines Group, 2003)

Parameter	Target value
Total cholesterol	<4 mmol/L
Triglycerides	<1.7 mmol/L
LDL cholesterol	<2.5 mmol/L
HDL cholesterol	>1 mmol/L
Blood pressure - systolic	<130 mmHg
Blood pressure – diastolic	<80 mmHg
Fasting plasma glucose	<6.5 mmol/L
HbA1c	<7.0%

With weight loss one would expect there to be reductions in almost all of the relevant measures. Blood pressure should decrease with relatively small weight losses. With significant changes to dietary intake, especially with a lower fat, lower carbohydrate intake, there should be a reduction in total cholesterol, triglycerides and LDL cholesterol. There should be an increase in the high density lipoprotein (HDL) cholesterol associated with the dietary differences and with increased physical activity. Fasting plasma glucose and HbA1c should also come down as a correlate of the diet and activity. For those who are successful with longer-term weight maintenance it would be reasonable to assume that these reductions will be sustained over time. For those who are not successful it is likely that values in all the measured parameters will swing back towards their baseline values.

### Defining Programme Success

Surprisingly, there is still a great deal of debate about what constitutes successful weight loss and maintenance. Wing and Hill (2001) proposed that successful weight loss be defined as losing 10% of the initial body weight and successful maintenance was keeping this off for 1 year. Stevens, Trusdale, McClain and Cai (2006) argue that this definition fails to take into account normal

variations in weight and errors in measurement and define maintenance as being a weight change of less than 3% of body weight. Elfhag and Rössner (2005) use the definition of intentional weight loss, with no mention of how much weight, which is maintained for at least six months. The AWMP defines weight loss as a 10% loss from baseline and maintenance as sustaining this loss for the 2 years of follow-up. All authors generally agree that weight loss sustained beyond 2 years is likely to result in permanent changes.

The most frequent measurement of weight loss success documented in research literature is change in body weight, particularly loss of a percentage of initial body weight (Jeffery et al., 2000). Studies typically report a 5-10% loss as indicative of weight loss success, due to the physical benefits and reduced health risk that this affords, even among people who are obese (Jeffery et al., 2000; Lang & Froelicher, 2006; Powell, Calvin, & Calvin, 2007; Riebe et al., 2005). The AWMP population has a higher average weight than many of the populations studied in international literature and there is little research available about heavier populations. However, it is thought that in this population a loss of 5-10%, whilst significant in terms of possible health gain, may not be seen as significant for the individual. There may be a threshold for each individual at which they feel they have lost weight such that it makes a difference and they are more inclined to maintain the new weight. What this weight threshold may be is unknown.

Six months is a common time-frame for an initial intervention phase during which maximum weight loss occurs, (Blue & Black, 2005) with weight loss typically reaching a plateau following this time period. Follow-up trends are usually assessed by a researcher between 18 to 30 months after therapy commences in the weight loss maintenance phase of treatment (Jeffery et al., 2000; Riebe et al., 2005).

Setting and achieving a realistic weight loss goal is associated with successful long-term weight maintenance (S. M. Byrne, 2002; Cooper & Fairburn, 2001). This is because an inability to achieve and maintain a preferred weight may result in disappointment and a belief that further attempts are futile (Wadden et al., 2003).

Group treatment appears to result in greater weight losses than individual treatment, even when participants were matched with their intervention preferences (Ash et al., 2006; Renjilian et al., 2001). Group interventions allow individuals to receive support from professionals and learn from other group members who may be facing similar challenges (Milsom, Perri, & Rejeski, 2007). Social support has been identified as beneficial for weight loss and maintenance, with participants who attended a weight loss behavioural intervention that included a social support component with three friends maintaining 66% of their weight loss at 10-month follow-up, compared to 24% who attended alone and received a standard behavioural intervention (Wing & Jeffery, 1999)

## **Weight Loss**

Many weight loss programmes involve a combination of dietary modification and physical activity and are associated with moderate levels of weight loss (Franz et al., 2007). This meta-analysis found that participants using very low energy diets lost significantly more weight than those in control groups. Stenius-Aarniala et al., (2000) also found those in the very low energy diet group lost significantly more weight than those in the control group. In looking at dietary modification, the AWMP uses a very low calorie (energy) meal replacement product (Optifast™), to replace all three meals of the day, in order to obtain rapid weight loss initially. This is then replaced with a lower energy diet, with real food,

based on the individuals' actual energy needs, established by measuring resting metabolic rate in each participant.

Tsai and Wadden (2005), in a systematic review of commercial weight loss programs in the United States found that patients in very-low-calorie diet programs, who completed treatment lost approximately 15% to 25% of their initial weight. However, the programs were associated with high costs, high attrition rates and a strong probability of regaining 50% or more of the lost weight within 1 to 2 years. Even with this sort of regain these patients would still be under the agreed threshold of 5-10% weight loss for health benefit. However, the authors believe that the evidence supporting the use of major commercial and self-help programs was suboptimal and that further research was required.

Behavioural intervention strategies focus on assisting individuals to identify the practices that support excessive food consumption (typically measured in kilojoules or kilocalories) or physical inactivity, alter these behaviours, and modify their environment to support new behaviour. The most successful weight-loss programmes appear to be those that jointly incorporate diet, exercise and behaviour modification (Lang & Froelicher, 2006; Latner & Wilson, 2007; Miller & Dunstan, 2004).

## **Weight Maintenance**

The National Weight Control Registry (NWCR) in the United States was established in 1994 for the purpose of tracking successful weight loss maintainers. Recent data from the registry suggests that successful weight loss maintenance requires adherence to a low-fat, high-carbohydrate diet, consistent self monitoring of weight, food intake and physical activity and high levels of physical activity (Van Dorsten & Lindley, 2008; Wing & Hill, 2001). Anderson,

Konz, Friederich & Wood (2001) conducted a meta-analysis of United States studies looking at long-term weight maintenance. Again very low energy diets and high levels of activity are significantly associated with weight-loss maintenance. Franz, et al. (2007) in a meta-analysis and systematic review, describe the outcomes from clinical weight loss trials with a minimum 1 year follow-up. The conclusion was that reduced energy diets and exercise were associated with weight loss and maintenance. Vogels & Westerterp-Plantenga (2007) concluded that the ability to increase and maintain a high level of dietary restraint was a critical factor associated with successful weight maintenance. Giel, Binkele, Becker, Stubler, Zipfel & Enck (2008), in their study of weight loss and maintenance in a specialized outpatient center, concluded that a programme that emphasised diet, exercise and behavioural changes along with the frequency of attendance at actual education sessions was correlated with weight loss, but not necessarily with maintenance.

Another study examined the relationship between the method of weight loss and long-term maintenance for a group of adults who had been successful with weight loss in the 2 years prior to entering the study (Pinto et al., 2008). Participants were 186 adults with a mean BMI of just  $28 \text{ kg/m}^2$  who had lost at least 10% of their body weight using a Very Low Calorie Diet (VLCD), a commercial programme or a self-guided approach. Whilst those that had used a VLCD had achieved a larger weight loss (24%) than those using either of the other approaches (17%) they also regained a significant amount of weight. Six months into this study there were no significant differences in weight between the groups. This implies that the large losses achieved by the VLCD group were not sustainable over time.

Turk et al (2009) conducted a review of 42 randomized clinical trials of weight loss maintenance from 1984 to 2007. These trials suggested that the use of

pharmacotherapy, such as orlistat or sibutramine, combined with a lower fat diet, adherence to physical activity routines, prolonged contact with participants, problem-solving therapy and alternative treatments such as acupressure were beneficial in reducing weight regain. The use of orlistat or subtramine is common in much of the international literature and is included in the recently published New Zealand Guidelines for Weight Management in Adults (Ministry of Health and Clinical Trials Research Unit, 2010). These guidelines recommend the use of pharmacotherapy in addition to dietary modifications and increased physical activity as an adjunct to weight loss and maintenance. However, the guidelines fail to take into account that these therapies are not funded and the patient has to pay for treatment. Given that obesity is more prevalent in lower-socio economic groups it would seem unrealistic to expect them to be able to fund medication in the long term, unless the aim of this guideline is to encourage the funding authorities to fully subsidise the treatment, in which case the therapies would be more widely used in New Zealand.

Maintenance of weight loss among formerly obese people has been associated with continuation of a low fat diet (Leser, Yanovski, & Yanovski, 2002) and vigilance with regard to control of energy intake and expenditure (S. M. Byrne, 2002; Franz et al., 2007). Physical activity combined with diet modification may increase weight loss by increasing total energy expenditure. A review by Votruba, Horvitz & Schoeller, (2000) found that some weight loss also occurs with exercise alone. A review completed by Miller and Dunstan (2004) suggested that physical exercise may also slow weight regain among overweight or obese adults. This was also demonstrated in a study completed by Leser, et al (2002) who found that women with a higher activity level, who participated in a weight-loss programme and who were followed up three years later, had an average weight loss twice that of less active participants, and weight regain was

slowed. Exercise programmes appear effective for people with obesity whether they comprise structured periods of activity or are integrated into lifestyle activities, (e.g. walking rather than driving a car) (Lang & Froelicher, 2006).

It would be reasonable to expect that those who have undergone bariatric surgery would be more successful at weight loss and maintenance. However, a study of surgical and non-surgical patients from the NWCR found that there was little difference between the two groups (Bond, Phelan, Leahey, Hill, & Wing, 2009). Clearly there is a need for further research into this aspect but the findings are especially significant in light of the increased move in New Zealand to funding bariatric surgery in the public health system as a means of “curing” the obesity epidemic.

### **Preventing Weight Re-gain**

Two trials investigated the effect of different approaches to preventing regain following initial weight loss (Svetkey et al., 2008; Wing et al., 2007). Both compared face to face support with internet based support and an information only control arm. Wing et al., (2007) found face to face support was more effective at preventing regain. Svetkey et al., (2008) found brief 5-15 minute monthly face to face contact was more effective than either an interactive internet and automated telephone system or an information only control group. Common to both studies was that successful participants in the face to face groups continued to adhere to a lower energy dietary intake, kept records of food eaten, self-monitored their weight and maintained a higher frequency of physical activity as compared to those in the control groups. Participants were also able to review progress against commitments made at previous contacts, making

them accountable for their decisions and actions, and had opportunities to discuss barriers to weight loss and plans for overcoming those barriers.

### **Factors in the Maintenance of Gains**

Short-term weight-loss interventions have been more successful than long-term maintenance (Jeffery et al., 2000). Individuals who have successfully lost weight are likely to almost completely regain the weight within five years (Leser et al., 2002). The weight gain is typically attributed to patients' inability to continue with recommended eating and exercise behaviours. What are not well understood are the reasons *why* patients do not continue with these behaviours.

Attempts have been made to improve long-term weight maintenance by increasing the intensity of initial treatment by implementing a very low energy diet, which may facilitate initial weight-loss (Franz et al., 2007; Rohrer & Takahashi, 2008). Continuation of a low-energy, low-fat diet and exercise programme has also been highlighted as a key component in successful weight-loss maintenance (Mei Shick, Wing, Klem, McGuire, & Hill, 1998; Powell et al., 2007). However, a review conducted by Lang and Froelicher (2006) indicated that as individuals lost weight rapidly rather than as a result of gradual changes in eating behaviours, very low energy diets have been unsuccessful in maintaining weight loss in the long term.

Extending treatment length to provide individuals with additional support has also been implemented, and shown some success with a food-based structured programme monitored by dieticians, (Cleanthous, Noakes, Keogh, Mohr, & Clifton, 2007). On the other hand, some studies have found that treatment outcome was not improved by ongoing contact between client and clinician (Leibrand & Fichter, 2002; Leser et al., 2002). A review completed by Powell

et.al.,(2007) indicated that fortnightly or monthly follow-up contact maintained 60-80% of weight loss that participants' achieved during the intensive stage of treatment. This finding was supported by a review conducted by Milsom et.al., (2007) who found that lifestyle interventions with guided group support that were extended 1-year beyond the initial intervention improved long-term outcome, with participants who received ongoing contact maintaining a higher percentage of their initial weight loss. Despite this finding attendance may decrease in long-term follow-up (Jeffery et al., 2000), and individuals may neglect to implement weight maintenance behaviour, returning to prior eating habits and subsequently regaining lost weight (Cooper & Fairburn, 2001). Reaching a weight plateau or a decrease in the rate of weight loss, which often occurs at the cessation of a formal intervention, may result in a loss of reinforcement and discouragement, which may trigger abandonment of weight loss behaviour (Milsom et al., 2007).

Self-efficacy alone, which is the individual's ability and desire to take control and responsibility for actions and outcomes, did not predict weight maintenance (Linde, Rothman, Baldwin, & Jeffery, 2006). The authors suggest that once a new set of behaviours have been implemented, self-efficacy may be less important than a person's perceived satisfaction. This is consistent with the findings from a qualitative study comparing women formerly in the obese range for weight with women who were currently obese (S. Byrne, Cooper, & Fairburn, 2003). They found a range of cognitive and emotional factors that differentiated between people who maintained weight loss, and those who did not. People who maintained weight status were more likely to be satisfied with their achievement of weight loss goals, and related personal goals. Self-concept was less influenced by their weight and shape for this group. They also tended to believe that the benefits of being vigilant to weight re-gain outweighed the cost. People who returned to an obese weight were more likely to habitually overeat when

faced with a life stressor. This group was more likely to report eating to regulate mood. In terms of cognitive characteristics, those who regained weight demonstrated a dichotomous (black and white, all or nothing) way of thinking about weight and shape.

A prospective study was conducted with adults undergoing a weight loss intervention to further investigate the role of these variables (S. M. Byrne, Cooper, & Fairburn, 2004). Patients were grouped as “maintainers”, “regainers” and “reducers” depending on how their weight at the end of treatment compared to their weight 12-months later. During the intervention both the maintainer and regainer groups lost the same percentage of weight, but as the regainers had a significantly higher start weight they were further away from their “goal weight” at the end of the intervention. The only other variable that discriminated between the two groups was dichotomous thinking, which was significantly more prevalent for the regainer group. Greater dichotomous thinking at the time of ten percent weight loss significantly predicted weight gain 12 months later. Of note is that this cognitive style is strongly associated with mood and anxiety difficulties.

Whilst every study will report on gender and ethnic demographics in the results, only a few focus on the role of gender and ethnicity in weight loss or weight maintenance. Peate (2005) discusses a gender-specific approach to male obesity. Whilst the issues facing obese men are the same as for women, in terms of socioeconomic inequalities and access to health services, the author believes that men require a different focus to women. Men were more likely to engage more fully with weight loss strategies that included a sporting perspective and improved performance rather than an emphasis on improved health outcomes. Taking such an approach would be consistent with the New Zealand Weight Management Guidelines (Ministry of Health and Clinical Trials Research Unit, 2010), where the focus of lifestyle changes is in engaging people in weight

management strategies that were mana-enhancing and in keeping with the lived realities of the participants. Davis, Clark, Carrese, Gary and Cooper (2005) used focus groups stratified by race and socioeconomic status to examine the experience of weight loss of obese women in the United States. They found that weight management programmes should be tailored to account for the socioeconomic status, and should incorporate strategies for cultural and spiritual principles, and family attitudes and behaviours. This study has direct meaning to weight management strategies for Māori and Pacific peoples, looking especially at the role of women in these racial groups and the role of the family and the church (in the broadest sense of the word as it relates to spirituality), as integral aspects of the individual.

If gender, ethnicity, and cultural values play a role in success, what about other social supports? What of the role of friends and family? If an individual engages with successful weight maintenance then is there a change in social support that enables change to occur? Only one study (Elfhag & Rössner, 2005) has looked at the social structures that exist which enable the individual to be successful. Self-efficacy, or the individual's desire and ability to take control, is only one part of success and there must be some degree of support from family and friends that enables an individual to make changes. To be able to eat a lower energy diet may require a whole family change in eating patterns. To maintain higher levels of physical activity there has to be a degree of support from partners, family and friends to enable this. Conversely, for those that are less successful, are there barriers, either real or perceived, that hinders them from engaging in successful maintenance practices?

## **Conclusion**

So, from the literature, successful weight-loss maintainers eat a low-fat and high-carbohydrate diet, have high levels of physical activity and regularly self-monitor their dietary intake and weight. Recent literature would contend that it is not so much the actual diet as an overall reduction in energy that is more important. Sacks et al. (2009) writes that fewer calories eaten equals an energy gap leading to weight loss regardless of the carbohydrate, fat or protein content of the diet. Hill, Thompson & Wyatt (2005) discuss how difficult it is to maintain an energy gap indefinitely and propose that successful people increase activity in order to create the energy gap so that they can eat more normally. It is unclear what dietary patterns successful maintainers follow.

Regular physical activity is reported in many studies as being associated with weight loss maintenance (Elfhag & Rössner, 2005; Hill & Wing, 2003; Wing & Hill, 2001). This involves at least one hour a day of moderate intensity activity. In the local context it is unknown what strategies successful maintainers use to achieve this level of activity. Furthermore, it is unknown if and how the involvement of third party providers, such as Sport Waikato, the local Sport and Recreation Council provider, makes any difference to successful maintenance?

Research has consistently identified self-monitoring as an important and effective component in the treatment of obesity (Lang & Froelicher, 2006). A review undertaken by Smith-West, Gore and Leuders (2007) suggested that self-monitoring may assist individuals to maintain weight loss in the long-term, through monitoring dietary intake and physical activity. The accuracy, consistency and timeliness of self-monitoring practices is also an important factor and correlates with improved weight loss (Burke et al., 2008; Helsel, Jakicic, & Otto, 2007). Self-monitoring may also serve as a reminder of weight-loss goals,

encourage individuals to pay attention to what they consume, and provide an objective measure of current dietary behaviour for the individual or support person to examine for the purpose of goal setting and evaluation (Smith-West et al., 2007).

Baker and Kirschenbaum (1993) also discuss the importance of self-monitoring. This is further investigated by Wing & Hill (2001) and Elfag & Rössner (2005) who showed that tracking what, when and how much is eaten and monitoring levels of activity and tracking of weight on a daily or weekly basis were significantly associated with success. Self-weighing is seen as a vital component. Butryn, Phelan, Hill & Wing (2007) describe a study where self-weighing allowed individuals to identify gains early and implement appropriate management strategies to prevent further gain. This was supported in a study by VanWormer et al., (2009) that demonstrated weekly self-weighing may be beneficial in weight loss and maintenance but also identified its potential for negative impact. Is there a limit to how much monitoring individuals do before its value is reduced? Dionne and Yeudall (2005) raise the possibility of self-monitoring having both positive and negative impacts and discuss the concept of burn-out in self-monitoring. What self-monitoring practices do successful maintainers utilise?

If you weigh more than the upper limit of standard scales, about 150 kg, how do you self-monitor your weight? Do you use two scales, standing on both, and adding the values together? Do you use commercial scales at laundries, local hospitals or even the local vet? How would the need to do this impact on the individuals' self-esteem and the likelihood of them being able to maintain the behaviours? If the weight of the population is increasing significantly and even hospitals are purchasing beds capable of holding 150 kg as a mean weight, why is it that primary care does not have scales capable of weighing all patients?

The aim then of this portfolio is to attempt to identify if there are any key characteristics associated with successful weight maintenance and explore the experience of weight loss and maintenance with participants. It is hoped that through this exploration answers to the questions posed will be found. The next chapter will look at factors associated with successful weight loss and maintenance, through a retrospective database and chart review of participants of the AWMP.

## **Chapter 3**

### **A quantitative study of who is successful at weight maintenance**

## **Introduction**

The previous chapter overviewed the Adult Weight Management programme in the Waikato. Research literature that identified and discussed features associated with successful weight maintenance was presented. Whilst successful weight maintenance is multi-factorial, there are some features consistent to all those who were successful and had voluntarily submitted their details to the National Weight Control Registry. From this registry, the main factors associated with success were a lower energy diet, consistent self-monitoring of weight, food and physical activity, high levels of physical activity (Hill & Wing, 2003), along with some degree of social change in the form of support from friends and family/whanau (Elfhag & Rössner, 2005). Furthermore, it is generally accepted that a weight loss of 5 – 10% will result in health benefits to the individual. Weight loss sustained at 2 years is also more likely to be sustained in the longer term. The chapter concluded with the research proposal and posed several questions that this study will seek to answer.

This chapter will present the outcomes of the first phase of the project; a quantitative study to identify specific characteristics, factors and correlates associated with success. Specifically, this part of the study is to try to identify who is successful and who is not. In this phase, a retrospective review of the participants Diabetes Service database data and clinical record was carried out, looking at 190 past participants of the weight management programme from 2006 and 2007. These participants completed the programme in 2008 and 2009. This cohort was selected as the researcher was not directly involved with the care and management of these groups. Data were analysed and descriptive statistics were generated. The results for the whole population, along with those from the cohort achieving at least 10% loss at 6 months which is maintained at

two years, and the cohort achieving less than 5% loss at 6 months and maintained at 2 years, are presented and discussed.

## **Method and Sample**

A retrospective Diabetes Service database and medical chart review was carried out on the 190 men and women who entered the Adult Weight Management Programme in 2006 and 2007, completing 2 years of follow-up in 2008 and 2009. 101 participants commenced during 2006 and 89 commenced during 2007. Participants had been referred to the programme by their general practitioner or specialist and had been medically assessed as suitable for the programme and safe to undergo rapid weight loss. All participants provided written informed consent for the programme. Men and women over 18 years of age, who wished to lose weight, had tried and failed at least one other weight loss attempt, had a BMI of at least 35, and at least one obesity related comorbidity were included. Exclusion criteria for the programme included those under the age of 18 years; pregnancy or lactation; end stage liver or renal disease; active alcohol or illicit drug use; unstable mental illness; active bulimia; serious interpersonal issues; significant intellectual impairment; and those with a history of repeated failure to attend appointments.

The study was approved by the Northern Y Ethics Committee and this phase was carried out during February and March 2010

All descriptive statistical analyses were conducted using STATA for Windows statistics/data analysis software. Scores were not adjusted for any confounding factors such as age, gender, ethnicity, domicile or co-morbidities. Assistance with analyses was obtained through the Waikato Clinical School. Other data analysis was performed in Microsoft Excel 2003. P-values were established using parametric methods of paired sample t-test at time one (T1 = baseline), time two (T2 = 6months) and finally at time three (T3 = 2 years). Mean scores are used to compare results between T1 and T2 and T1 and T3

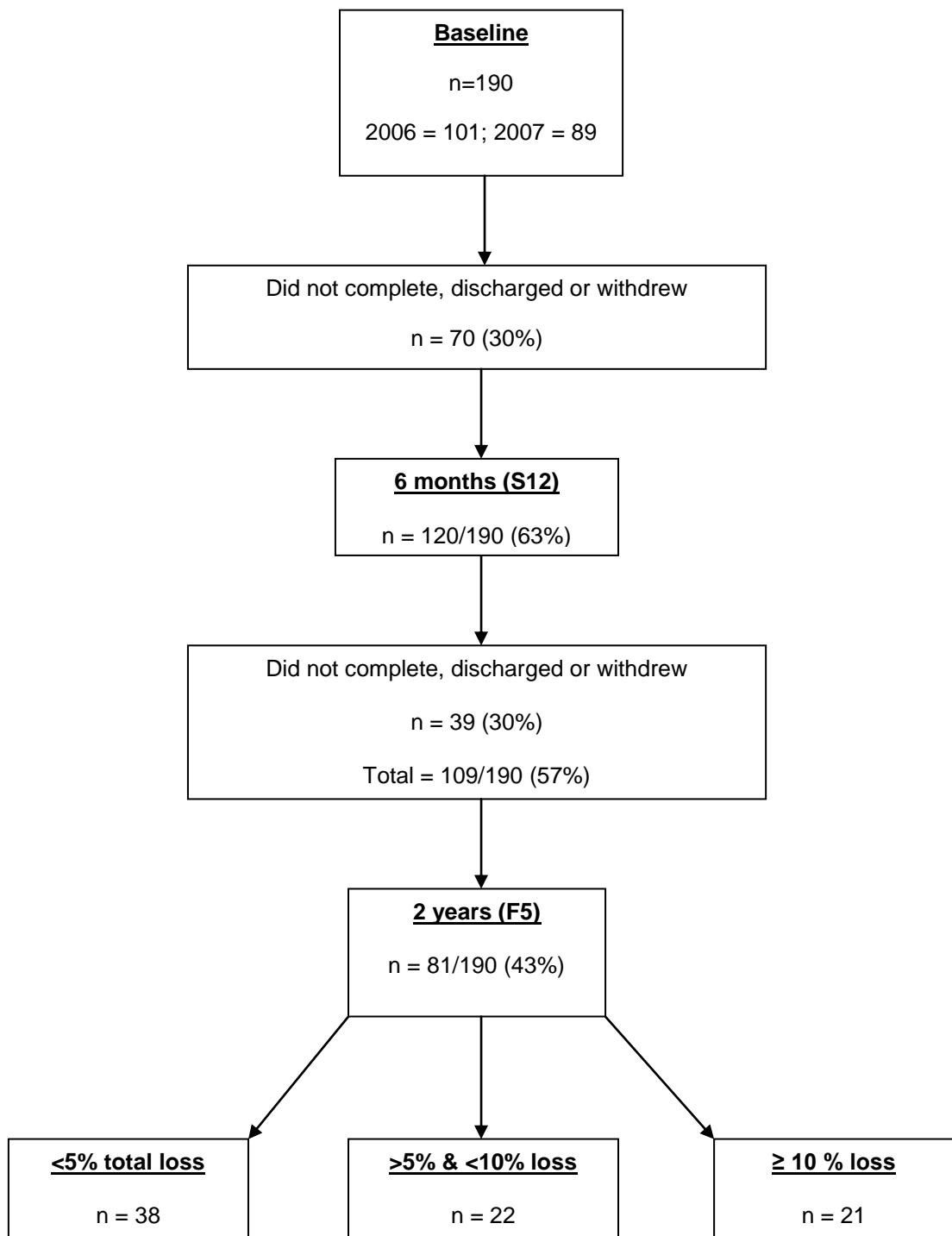
## **Results**

There were 190 individuals who commenced in the Adult Weight Management Programme in the two years - 2006 and 2007. 101 participants commenced in 2006, completing in 2008, and 89 commenced in 2007, completing in 2009. Measurements were not available from 70 individuals (37%) at the 6-month time point. This was because they did not attend the session, had been discharged from the programme for failing to attend for more than 3 consecutive sessions, or had withdrawn from the programme for health or personal reasons. Exiting from the programme may have occurred at any time point in the 6 months. 120 participants continued to the 18-month follow-up phase of the programme. During this time period a further 39 individuals (20%) did not complete to the end of 2 years. Hence a total of 109 of the original 190 participants (57%) did not complete the programme, whilst 81 participants (43%) completed to the end of two years. Of these, 38 (20%) achieved less than 5% weight loss, 22 (11.6%) achieved between 5 and 10% weight loss and 21 (11%) achieved a weight loss of at least 10%. Figure 3.1 describes the progress of participants through the programme.

## **Participant Characteristics**

The 190 study participants had a mean age of 48 years, 110 (58%) were female and 80 (42%) were male. Sixty percent classified their ethnicity as New Zealand European, and the remainder were Māori (37%), Pacific Peoples (2%) or Other ethnicities (<1%). Ninety six percent had one or more co-morbidities (doctor-diagnosed conditions such as diabetes, obstructive sleep apnoea, hypertension, dyslipidaemia, arthritis, gout, ischaemic heart disease, thyroid disease, renal disease, liver dysfunction with enzyme abnormalities, or depression), other than

**Figure 3.1:** Flowchart describing participant progress through the programme



obesity, with 100 (52%) having three or more. 103 lived within the Hamilton City boundary whilst the remainder (46%) lived rurally within the greater Waikato

**Table 3.1:** Baseline demographics and metabolic measurements of study participants

Characteristic (n = 190)	Value (range)
<b>Age</b>	48 years 19 - 78
<b>Gender</b>	
Female	110 (58%)
Male	80 (42%)
<b>Domicile</b>	
Hamilton City	103 (54%),
Rural	87 (46%)
<b>Employment Status (n=177)</b>	
Employed	113 (64%)
Unemployed	64 (36%)
<b>Ethnicity</b>	
New Zealand European	115 (60%)
Māori	70 (37%)
Pacific Peoples	4 (2%)
Other	1 (<1%)
<b>Number of diagnosed co-morbidities</b>	
0	7 (3.6%)
1	14 (7.3%)
2	32 (16.8%)
3	37 (19.4%)
>3	100 (52.6%)
<b>Diabetes, IGT, IFG</b>	124 (65%)
<b>Obstructive Sleep Apnoea</b>	50 (26%)
<b>Weight (kg)</b>	133 (80.3 – 277.3)
<b>BMI (kg/m<sup>2</sup>)</b>	47 (30 – 83)
<b>Waist Circumference (cm)</b>	135 (101 – 190)
<b>BP Systolic (mmHg)</b>	136 (100 – 180)
<b>BP diastolic (mmHg)</b>	82 (50 – 120)
<b>Total Cholesterol (mmol/L)</b>	4.67 (2.03 – 8.43)
<b>Triglycerides (mmol/L)</b>	2.05 (0.63 – 8.12)
<b>LDL (mmol/L)</b>	2.59 (0.31 – 5.22)
<b>HDL (mmol/L)</b>	1.17 (0.58 – 1.94)
<b>FPG (mmol/L)</b>	8.5 (2.8 – 21)
<b>HbA1c (%)</b>	
>8.1%	60 (32%)
7.1 – 8.0%	22 (12%)
6.1 – 7.0%	46 (24%)
<6.0%	60 (32%)

region. 113 (64%) were employed in some form of work. The remainder (36%) were unemployed (this included those on sickness or invalid's benefits, unemployment benefits, superannuation, widow's benefit, and student

allowances). Sixty five percent had either diagnosed type 2 diabetes, or an impaired glucose state, such as impaired glucose tolerance (IGT) or impaired fasting glucose (IFG). Mean fasting plasma glucose was 8.5 mmol/L (2.8-21 mmol/L), and forty four percent had an HbA1c of greater than 7.1%.

The mean weight at baseline was 133 kg (80.3-277.3 kg), mean BMI was 47 kg/m<sup>2</sup> (30-83 kg/m<sup>2</sup>), and the mean waist circumference was 135 cm (101-190cm). Table 3.1 describes the baseline characteristics of the population.

### **Results at 6 months**

At 6 months 120/190 (63%) remained in the programme. Comparison of the baseline measurements with those taken at 6 months (Table 3.2) shows there was an initial excellent weight loss, down from a baseline mean of 130 kg to 118.3 kg. The weight ranged from 69.7 kg to 252.1 kg. The mean loss was 15.6 kg (11.5%), but across the group there was anything from a 12.5 kg (10%) weight gain to a 42.5 kg (24.9%) loss. 69/190 (36.3%) achieved a loss of at least 10%. The mean BMI at 6 months was now 41 kg/m<sup>2</sup>. Mean waist circumference had reduced to 122 cm and both systolic and diastolic blood pressure had decreased to 128 mmHg and 74 mmHg respectively. There were clinically significant improvements in most of the metabolic parameters. Total cholesterol decreased to 4.3 mmol/L, triglycerides to 1.6 mmol/L, and LDL to 2.4 mmol/L. HDL cholesterol remained stable at a mean of 1.2 mmol/L. Fasting plasma glucose decreased to 6.6 mmol/L and the mean HbA1c had also reduced to 6.5%. P-values were less than 0.0001 for all parameters, except for LDL cholesterol ( $p = <0.01$ ) and HDL cholesterol, which were not statistically significant.

**Table 3.2:** Comparison of measures at each time-point – whole study population.

Measure	Baseline n=190	6 months n=120	2 years n=81
Weight (kg)	133	118.3	127.3
BMI (kg/m <sup>2</sup> )	47	41	45
Waist Circumference (cm)	135	122	Not measured
BP systolic (mmHg)	136	128	Not measured
BP diastolic (mmHg)	82	74	Not measured
Total Cholesterol (mmol/L)	4.7	4.3	4.6
Triglycerides (mmol/L)	2.1	1.6	1.6
LDL (mmol/L)	2.6	2.4	2.9
HDL (mmol/L)	1.2	1.2	1.0
FPG (mmol/L)	8.5	6.6	7.3
HbA1c (%)	7.4	6.5	7.3

## Results at 2 years

At 2 years, 81/190 (43%) remained with the programme (Table 3.2). During the 18-month follow-up phase there was a general drift upwards in most parameters, back towards baseline. Mean weight at this time point across the whole group was 127 kg ( $p = <0.0001$ ), with a range from 70.6 to 274.5 kg. The average loss was 8.7 kg but across the group there was anything from a 60 kg (11%) gain in weight to a 17.3 kg (33%) loss. Mean BMI at 2 years had decreased to 33 kg/m<sup>2</sup> ( $p = <0.0001$ ). Waist circumference and blood pressure were not measured consistently at this time point and so have not been included in the analysis. There was also a drift, back towards baseline, in the metabolic indicators. Of note is that triglycerides, at 1.6 mmol/L ( $p = <0.0005$ ), and HDL cholesterol, at 1.0 ( $p = <0.0001$ ) were still reasonably good, perhaps indicative of a lower fat diet across the population. Fasting plasma glucose was better at 7.3 mmol/L and HbA1c was much the same at baseline (7.4%) and 2 years (7.3%), although there had been an improvement at 6 months, down to 6.5%. This data includes those without diagnosed diabetes or glucose impairment and so the results may be skewed downwards.

The definition of success in the AWMP, and for this study, is a weight loss of at least 10% at 6 months that is maintained at 2 years. At 6 months 69 of the original 190 participants (36.3%) had lost at least 10%. At 2 years 21 participants (11%) had maintained a loss of at least 10%. However it is interesting to compare how many participants lost 10% at 2 years, but had not lost that amount at 6 months. If approached in this way then 24 of the original 190 participants (12.6%) lost 10% of their weight at the end of 2 years. This implies that whilst some individuals did not achieve the milestone in the initial time period they were able to continue to achieve the goal over time. This in itself is a significant achievement for both the individual and for the AWMP.

### **Successful Cohort**

Of the 21 successful participants, that is those who achieved at least 10% weight loss at 6 months and maintained the loss to 2 years, 10 (48%) were female and 11 (52%) were male (Table 3.3). The mean age was 49 years with a

**Table 3.3:** Demographics of the successful cohort

Characteristic (n = 21)	Value (range)
<b>Age</b>	49 (27 – 65)
<b>Gender</b>	
Female	10 (48%)
Male	11 (52%)
<b>Domicile</b>	
Hamilton City	9 (43%)
Rural	12 (57%)
<b>Employment Status</b>	
Employed	8 (38%)
Unemployed	13 (62%)
<b>Ethnicity</b>	
NZ European	12 (52%)
Māori	8 (38%)
Pacific Peoples	1 (5%)
<b>Diabetes</b>	12 (57%)

range from 27 to 65 years. 12 participants (52%) identified as New Zealand European, 8 (38%) as Māori and 1 (5%) as Pacific peoples. 12 (52%) lived rurally and 9 (43%) lived within Hamilton city. 13 (62%) were unemployed. 12 (57%) had diabetes.

At baseline the mean weight was 136 kg, but this dropped to 110 kg at 6 months and was maintained at 2 years. Whilst the mean weight at 2 years was the same as at 6 months the range of weight was reduced, from 81–171 kg at 6 months to 70-152 kg at 2 years, perhaps indicative of continued reduction in overall weight for some individuals. BMI also reduced from 48 kg/m<sup>2</sup> at baseline to 38 kg/m<sup>2</sup> at both 6 months and 2 years. Again the range of BMI across the intervening 18 months reduced from 29-62 kg/m<sup>2</sup> to 28-58 kg/m<sup>2</sup>. Whilst waist circumference, systolic and diastolic blood pressure were clinically significantly reduced at 6 months these were not consistently re-measured at 2 years so there is no final analysis of these indices.

As one would expect, there were clinically significant improvements in most of the laboratory values at 6 months but these were not necessarily maintained at 2 years (Table 3.4).

Total cholesterol decreased to 4.3 mmol/L but then rose again to 4.6 mmol/L; triglycerides decreased to 1.2 mmol/L then rose only very slightly to 1.3 mmol/L at 2 years; LDL cholesterol decreased from 2.9 mmol/L to 2.5 mmol/L then rose significantly, at least from a clinical point of view, to 3.02 mmol/L. HDL cholesterol rose from 1.13 mmol/L to 1.17 mmol/L and then decreased again to 1.02 mmol/L at 2 years. Fasting plasma glucose decreased from 7.6 mmol/L at baseline to 6.6 mmol/L at 2 years, and the HbA1c decreased from 6.8% at baseline to 6.4% at 2 years. Again these values included those without diabetes, which may skew the results down.

**Table 3.4:** Comparison of metabolic measures at each time-point for the successful cohort

Measure n=21	Baseline (range)	6 months	2 years
<b>Weight (kg)</b>	136 (105 – 212)	110 (81 – 171)	110 (70 – 152)
<b>BMI (kg/m<sup>2</sup>)</b>	48 (34 – 77)	38 (29 – 62)	38 (28 – 58)
<b>Waist Circumference (cm)</b>	135 (113 – 160)	116 (90 – 140)	Not measured
<b>BP systolic (mmHg)</b>	140 (108 – 180)	124 (102 – 150)	Not measured
<b>BP diastolic (mmHg)</b>	85 (60 – 120)	74 (60 – 98)	Not measured
<b>Total Cholesterol (mmol/L)</b>	4.9	4.2	4.6
<b>Triglycerides (mmol/L)</b>	2.04	1.2	1.3
<b>LDL (mmol/L)</b>	2.9	2.5	3.02
<b>HDL (mmol/L)</b>	1.13	1.17	1.02
<b>FPG (mmol/L)</b>	7.6	6.1	6.6
<b>HbA1c (%)</b>	6.8	5.9	6.4

### Unsuccessful cohort

The other aspect of this study was to identify an unsuccessful cohort: those that lost less than 5% of their total body weight at 6 months and sustained this at 2 years. Of the 38 (20%) unsuccessful participants, 22 (58%) were female and 16 (42%) were male. The mean age was 52 years but the range was from 19 to 67 years. 31 participants (81%) identified as New Zealand European, 7 (19%) as Māori; 20 (53%) lived rurally and 18 (47%) lived within Hamilton city; 23 (70%) were unemployed; 25 (66%) had diabetes (Table 3.5).

At baseline the mean weight was 135.8 kg. This dropped to 120.3 kg at 6 months and then rose to 136.5 kg at 2 years. The weight range was from 69.7 kg – 252.1 kg at 6 months, and increased to 80 kg – 274.8 kg at 2 years. BMI was the same, 47 kg/m<sup>2</sup>, at 2 years as at baseline, with only a small drop to 42 kg/m<sup>2</sup> at 6 months. There was little difference in either waist circumference or blood pressure between baseline and 6 months. This was perhaps indicative of many participants returning to their baseline weight, whilst some clearly weighed more at 2 years than they had at baseline.

**Table 3.5:** Demographics of the unsuccessful cohort

Characteristic (n = 38)	Value (range)
<b>Age</b>	52 (19 - 67)
<b>Gender</b>	
Female	22 (58%)
Male	16 (42%)
<b>Domicile</b>	
Hamilton City	18 (47%)
Rural	20 (53%)
<b>Employment Status</b>	
Employed	10 (30%)
Unemployed	23 (70%)
<b>Ethnicity</b>	
NZ European	31 (81%)
Māori	7 (19%)
<b>Diabetes</b>	25 (66%)

As could be expected, given that there was little change in overall weight, there was also little improvement in the laboratory values across the time period. The only parameters of note are that triglyceride levels decreased from 1.9 mmol/L at baseline to 1.7 mmol/L at 2 years. This may relate to changes in dietary intake but is more likely secondary to the increased use and adherence to lipid modifying agents by participants during this time frame. HDL cholesterol improved from 1.12 mmol/L at baseline to 1.18 mmol/L at 6 months, but then decreased, below target, to 0.9 mmol/L at 2 years. This may reflect increased activity during the group education phase of the programme that was not sustained during the maintenance phase, with resulting weight gain. Fasting plasma glucose improved from 7.8 mmol/L at baseline to 6.8 mmol/L at 6 months, but then deteriorated to 7.8 mmol/L at 2 years. Likewise, mean HbA1c showed some improvement from 7.2% at baseline to 6.7% at 6 months, but then deteriorated again to be 7.7% at 2 years. (Table 3.6)

**Table 3.6:** Comparison of metabolic measures at each time-point for the unsuccessful cohort

Measure n=38	Baseline	6 months	2 years
<b>Weight (kg)</b>	135.8 (80–277.3)	120.3 (69.7–252.1)	136.5 (80–274.8)
<b>BMI (kg/m<sup>2</sup>)</b>	47	42	47
<b>Waist Circumference (cm)</b>	136 (108 – 190)	125 (97 – 170)	Not measured
<b>BP systolic (mmHg)</b>	133	131	Not measured
<b>BP diastolic (mmHg)</b>	76	73	Not measured
<b>Total Cholesterol (mmol/L)</b>	4.6	4.3	4.5
<b>Triglycerides (mmol/L)</b>	1.9	1.6	1.7
<b>LDL (mmol/L)</b>	2.6	2.4	2.7
<b>HDL (mmol/L)</b>	1.12	1.18	0.9
<b>FPG (mmol/L)</b>	7.8 (2.8 – 21)	6.7 (4 – 10.5)	7.8 (4.5 – 18)
<b>HbA1c (%)</b>	7.2	6.7	7.7
<b>Range (%)</b>	5.0 – 13.1	5.1 – 10.5	5.2 – 12.4
<b>&gt;8%</b>	13	6	11
<b>7.1 – 8.0%</b>	3	6	2
<b>6.1 – 7.0%</b>	10	3	5
<b>&lt;6%</b>	12	15	6

### Impact of Co-morbidity

Those in the unsuccessful cohort had a greater percentage of people with more than 3 co-morbidities (68.4%) than those in the success cohort (42.8%). As shown in the earlier tables both cohorts achieved reasonable weight loss at 6 months (120kg, p = <0.0001 vs 110 kg, p = <0.0001) but this was not sustained at 2 years (136 kg, p = 0.003 vs 110 kg, p = <0.0001). However, the unsuccessful cohort did not achieve the same degree of improvements in metabolic parameters either. The only significant improvements at 6 months were in the HbA1c (6.7%, p = 0.02) and in triglycerides (1.6 mmol/L, p = 0.01). This is as compared to the greater range of improvements in the success cohort at the same time point. At 2 years the unsuccessful cohort had drifted back to baseline or worse in all parameters, whereas the success group sustained their weight change. Although there was a drift upwards in all the metabolic

parameters only the changes in fasting plasma glucose ( $p = 0.007$ ) and triglycerides ( $p = 0.02$ ) had statistical significance.

Whilst the range, number and percentages of co-morbidities are considerable in both groups there are differences between both groups. The unsuccessful cohort had a greater percentage of co-morbidities, namely hypertension (68.4%); osteoarthritis (29%); obstructive sleep apnoea (26.3%); non-alcoholic fatty liver disease (10.5%); neuropathy (18.4%) depression (13.1%) and atrial fibrillation (10.5%).

## **Discussion**

The medical record and the Diabetes Service database were the major sources of data (Gearing, Main, Barber, & Ickowicz, 2006; Hess, 2004). This meant the data was readily accessible to the researcher and, though time consuming, was a relatively inexpensive method. However, consistent with the literature there were issues with data collection. Not all medical files were able to be accessed. Files for participants who had completed the programme in 2008, and did who not have any further follow-up with the wider Diabetes Service, had been culled and sent to storage. Access to these files was cost-prohibitive. In other files, data was missing, or was present in the hard copy but not in the electronic Diabetes database. The same applied in reverse, where data was in the database but not present in the hard-copy file, or different data was recorded in each of the data sources for the same event and time point. This made cross-checking of data, to ensure it was both accurate and complete, challenging. The researcher acknowledges the points raised by Hess (2004) of being unable to control bias and confounders as the files are chosen by the researcher and there is no randomization or blinding. As a result raw data has been analysed and

incomplete data sets have been either clearly identified or have not been included in the final analysis.

Concerns about establishing a direct causal relationship between the intervention and the outcome (Thompson & Panacek, 2007) are reduced through having several observation time points to analyse and compare against. The methodology has enabled the identification of cohorts of relevant patients, a successful and unsuccessful cohort, for further study in the second phase of this portfolio (D'Agostino & Kwan, 1995; Earle & Ayanian, 2006).

## **Summary**

21 of the original 190 participants (11%) lost at least 10% of their body weight at 6 months and maintained this loss at 2 years. Analysis of this cohort fails to identify any clear factor or combination of factors that would enable the researcher to state with confidence “who” it is that is successful. Success does not appear to be related to age, gender, ethnicity, employment status, domicile or the presence of diabetes. The sample is small and so further analysis has not been done. There is little to be gained in searching for correlations of factors to find a statistically significant relationship with a p-value of less than 0.05.

38 of the original 190 participants (20%) were not successful. Thus they achieved less than 5% weight loss in the first 6 months and remained at less than 5% at 2 years. The only factor that stands out in this group is in relation to their employment status, where 70% were unemployed. Initially this appeared to be possibly significant, that perhaps the unemployed were more likely to be unsuccessful. However, in the success cohort, 62% of the participants were unemployed, so perhaps there is little significance to this after all.

However, the number of co-morbidities does appear to have some significance. It appears that having a greater number of co-morbidities has a negative impact on long-term weight loss and maintenance. It may be that, although able to lose weight, those in the unsuccessful cohort did not perhaps feel physically better. There may have been an increase in pain associated with osteoarthritis or neuropathy, decreased mood associated with depression, and tiredness and low mood associated with obstructive sleep apnoea. The effect of liver enzyme abnormalities on physical health is unknown in this cohort but would appear to be negatively correlated with success. That is, if individuals had liver enzyme abnormalities, especially non-alcoholic fatty liver disease (NAFLD) they were less likely to be successful with weight loss and maintenance. This has significant implications for the management of this condition, where weight loss is the primary treatment method. If those with NAFLD are less likely to be successful then does the way they are assessed prior to commencing in the programme need to change in order to ensure the individual understands the significance of weight loss to their treatment and long term management? Likewise, does the AWMP team need to ensure that changes in liver enzymes and other metabolic improvements are highlighted more than at present to these individuals to try to improve success rates in this particular group? In both cases, a prospective study would be required for clarification. One must also ask if some other change is needed within the programme to ensure greater success for those with more than three co-morbidities.

The changes in weight and other anthropomorphic measures are self evident in both groups. In comparing the metabolic measures across the successful and unsuccessful cohorts there is little to relate. There are improvements in triglycerides in both groups, with the greatest improvement being seen in the unsuccessful cohort. This may be related to diet but, as stated, is more likely

perhaps to relate to the use of, and improved adherence to, lipid modifying agents. HDL cholesterol is better in the successful cohort than the unsuccessful as could be expected. This is perhaps most likely related to the maintenance of higher levels of physical activity in the successful group, consistent with the literature, whilst the unsuccessful group have perhaps been less active.

Improvements in glycaemic control were seen more clearly in the successful group than the unsuccessful. Improvements in fasting plasma glucose and HbA1c were clinically significant in the success group and were sustained at 2 years, whilst values deteriorated to be the same or worse than baseline in the unsuccessful cohort. Those with diabetes in the success group may have been able to see the improvements in their glycaemic control and relate these to their reduced weight. This may have resulted in improved motivation to maintain the improvements. In the unsuccessful cohort, the improvements may not have been so clinically significant and with the lower weight loss overall this was not sufficient motivation for them to make sustained change. As previously mentioned it is not known what impact the use of lipid modifying agents has had on lipid profiles. The same argument can be applied when viewing glycaemic control. At the commencement of the programme sulphonylurea drugs, such as Glipizide and Gliclazide, are stopped and insulin doses, for those using insulin, are generally halved. This is due to the increased risk of hypoglycaemia associated with low-energy diets if normal doses of anti-hyperglycaemic agents are maintained. It is feasible then that some individuals in the unsuccessful cohort, as they started to fail and regain weight, did not attend follow-up appointments as regularly. Therefore, medications were not re-adjusted in order to achieve improved glycaemic control.

## **Success by Year**

Analysing success according to the starting year reveals an interesting picture. As discussed, 101 participants started in the programme in 2006 and 89 started in 2007. 16 of the successful 21 (16/101, 15.8%) and 20 of the unsuccessful 38 (20/101, 19.8%) came from the 2006 starters. 5 of the successful 21 (5/89, 5.6%) and 18 of the unsuccessful (18/89, 20.2%) came from the 2007 starters (Table 3.7)

**Table 3.7:** Success by starting year

	<b>2006 n=101</b>	<b>2007 n=89</b>
<b>Successful n=21</b>	16 (15.8%)	5 (5.6%)
<b>Unsuccessful n=38</b>	20(19.8%)	18 (20.2%)

Why did the cohort from the 2006 starters have a much better success rate than the 2007 group? Percentages for the unsuccessful cohorts are similar for both years but are clearly different for the successful cohorts. In 2006 the programme team consisted of a nurse, dietitian, medical officer and physiotherapist. In 2007 a psychologist was added to the team.

A number of questions arise:

- what was the impact of the physiotherapist on the 2006 group?
- what was the impact of the introduction of the psychologist to the 2007 group and the change to the structure and content of the education programme in that year?
- why is success at 6 months so much better than at 2 years?
- if most benefit is seen at 6 months how do we support clients for the following 18 months in order to improve success?

- why was there a 57% drop-out rate across the 2 groups over the 3 years being looked at?
- what, if anything, needs to be done to maintain engagement with the programme?
- is there a role for primary care to support follow-up? If so, what does this need to be?

Perhaps the most important question to be answered, and the focus of this project, is - what are the successful few doing that is different to the rest?

## **Conclusion**

In this chapter the results of a quantitative retrospective review to find who is successful in weight loss and maintenance were presented. The study demonstrates that 11% of the participants coming into the programme in 2006/07 were successful in losing at least 10% of their initial body weight at 6 months and maintaining this loss at 2 years. However, there was no clear single factor or combination of factors correlated with success. Success did not appear to be related to age, gender, ethnicity, employment status, or domicile or the presence or absence of diabetes. There does, however, appear to be significance in relation to the number of co-morbidities and lack of success. Those in the unsuccessful cohort had a greater percentage of participants with more than 3 co-morbidities (68.4%) than those in the successful cohort (42.8%). Further research is required to establish if this is a repeatable finding in other groups.

If there is no clear single factor or combination of factors that appears to be correlated with success, then what is it that makes some successful where others are not? The successful person appears to be just the average person, so

their success has to relate to some other factor. Perhaps it is in the way they applied the information given in the programme, the way they engaged with the programme, or the type and degree of support from family/whanau, that enabled them to be successful. Or was it that they were applying all the known factors associated with success identified from the literature?

The other side of this is what, other than the presence of multiple comorbidities, hinders the unsuccessful from being more successful? Did their failure to succeed relate to not losing enough weight in the initial phase of the programme for them to notice any improvement? Were there health issues that impinged on success? What, if any, was the difference in support from others?

These are some of the questions that the second phase of the study will explore and seek to answer.

## **Chapter 4**

### **Health-Related Quality of Life**

## **Introduction**

In the previous chapter a retrospective quantitative study demonstrated that there was no single factor or combination of factors associated with successful weight loss and maintenance. However, there did appear to be a correlation between the numbers of co-morbidities a participant has and success. It would appear that if participants have more than 3 co-morbidities then they are more likely to be unsuccessful.

The focus of the quantitative study was on defining success by way of changes in physiological parameters, such as body weight, blood pressure and glycaemic control. But physiology is not the only parameter that is impacted upon by obesity. There is an increasing body of evidence that the morbidly obese experience significant problems with reduced quality of life. Obesity has been shown to have negative effects on mood, perceived health and self-image. Many obese people report higher levels of pain, which also impacts on the individuals' quality of life. Measures of health-related quality of life (HRQoL) can be used to assess the patient's perception of whether the obesity treatment has enhanced their functioning and general well-being. Even small amounts of weight loss can bring about improvements in HRQoL. Therefore any obesity treatment programme should assess HRQoL (Fontaine & Bartlett, 1998). Given that long-term weight maintenance remains a challenge for many it is worthwhile looking at whether there were positive changes in HRQoL for participants. Whilst there are a number of tools available for assessing quality of life, in the Adult Weight Management Programme the Short Form-36 Health Survey (SF-36), one of the most widely used and validated measures, is utilised. Results from the quality of life analysis will be presented and discussed.

## **Health-Related Quality of Life**

If overweight and obese people suffer a greater burden of disease then it would be fair to say that they also suffer a greater impairment of health related quality of life. “The impairment in an obese individual’s capacity to live as fully and actively as he or she desires may be as serious a consequence of obesity as are its adverse effects on morbidity and mortality” (Fontaine & Bartlett, 1998, p. 225)

Health-related quality of life (HRQoL), as a distinct sub-set of general quality of life, can be seen as a means of assessing “patients’ limitations in physical, emotional, social, or vocational functioning” (Wadden & Phelan, 2002, p. p50S). There are a number of tools available for measuring quality of life, but the most commonly used tool is the Short Form-36 Health Survey Questionnaire (SF-36). It is recommended because of its brevity, ease of administration and coverage of both physical and psycho-social domains (Kolotkin, Meter, & Williams, 2001; Wadden & Phelan, 2002). The SF-36 is a self administered questionnaire that assesses eight domains of perceived health over the previous month. These domains are physical functioning (PF), role limitations related to physical problems (RL), bodily pain (BP), general health perception (GHP), vitality, energy and fatigue (VEF), social functioning (SF), role limitations related to emotional problems (P), and general mental health (GMH). In the SF-36 version 2, a web-based version (Svirbely, Sriram, & The Medical Algorithm Project (MEDAL), 1999) utilised in the weight management programme, a ninth domain is added; perceived health compared to last year (HCLY). In addition, two summary component scores can be calculated: the physical health component score and mental health component score. Each score is drawn from 4 domains. The physical health summary score is drawn from physical functioning, role limitation-physical, bodily pain and general health perception. The mental health summary

score is drawn from social functioning, vitality, energy and fatigue, role limitation-emotional and general mental health.

In each domain, scores range from 0, the lowest possible score, to 100, the highest possible score. The higher the score, the less the individual perceives any limitation in that domain. However, in three domains, general health perception, vitality, energy and fatigue, and general mental health, a score of 50 implies the absence of any health related problems and a score of more than 50 indicates that health is viewed positively. Scores of less than 50 imply that the participant perceives the domain as a problem. The closer the score is to zero, the greater the perceived problem in that domain.

Kolotkin et al, (2001) reviewed the use of the SF-36 with obese populations and found the tool to be both reliable and valid. The authors assert that HRQoL varies directly with the severity of obesity, with the most obese having the poorest quality of life. Increasing BMI was associated with poorer physical functioning but not with emotional well being. Even modest weight loss resulted in improved health-related quality of life, as measured by the SF-36. In particular there were improvements in the physical aspects, especially in terms of energy and vitality, role limitations due to physical problems and general health perception.

The SF-36 was also utilised in a large, multisite clinical trial in the United States of America. The Look AHEAD (Action for Health in Diabetes) trial evaluated the long-term effects of a weight loss intervention on participants with type 2 diabetes (Williamson et al., 2009). This trial showed improved HRQoL especially in the physical component scores in the intervention arm compared to the control group.

Quality of life was measured in the Nurses' Health Study, a 4-year prospective observational study between 1992 and 1996, (Fine et al., 1999), using the SF-36

questionnaire. Analysis of the data showed that weight loss was associated with improved physical function and vitality as well as decreased bodily pain. Weight change was associated with improvement in physical rather than mental health

Mean SF-36 scores for a normative New Zealand population were established in a study by Scott, Tobias, Sarfati & Haslett (1999). This study validated the SF-36 HRQoL questionnaire to the New Zealand population. There were small differences noted in relation to higher scores for New Zealand Europeans than those for Māori or Pacific peoples. This difference may represent clinical and social significance, however “cultural influences on definitions and expectations of health mean that ethnic differences in self-reported health may reflect a number of factors besides objective health status” (Scott et al., 1999, p. p406). The domain of “health compared to last year (HCLY)” was not included in the normative study.

Validity in the New Zealand context was further demonstrated in a study looking at the effect of a dietary supplement, Chitosan, on body weight (Ni Mhurchu, Poppitt et al., 2004). Measuring health-related quality of life was a secondary end point of the study and this outcome was published separately (Ni Mhurchu, Bennett et al., 2004). Whilst small reductions in weight had no significant impact on the HRQoL in the study population, the SF-36 was shown to be a valid and reliable tool in the New Zealand context.

## **Method**

All participants in the Adult Weight Management Programme are asked to complete the SF-36 HRQoL questionnaire at baseline. It was repeated at 12 weeks and again at 6 months, the end of the intensive group education phase. Data analysis was conducted using parametric methods of paired sample t-tests

at time one (T1 = baseline) and again at time-two (T2 = 6 months). Mean scores are used to compare results between the two time points. All HRQoL data analysis was performed using Microsoft Office Excel 2003. Scores are not adjusted for variables such as age, gender, or co-morbidities

## Results

Quality of life was measured at baseline and at 6 months only. It was not measured at the end of the 2 years. It must be noted, however, that the SF-36 tool was not implemented until part way through the 2006 calendar year, following the recruitment of the psychologist. Some of the 2006 cohort did not, therefore, have the opportunity to complete the questionnaire. Data is missing for a number of groups in both calendar cohorts. The results may therefore be skewed towards the 2007 cohort.

There were complete SF-36 questionnaires available from 119 participants (65.6%) at baseline (T1) and 56 (29%) at 6 months (T2). Paired data at both time points is available from 41 (21.5%) of the total 190 participants. Of this 41, 27 (66%) are female and 14 (34%) male.

Results in both table (Table 4.1) and graph form (Figure 4.1) are presented as mean scores with standard deviation (SD) for each domain, at both time points. T-test scores with p-values are also presented

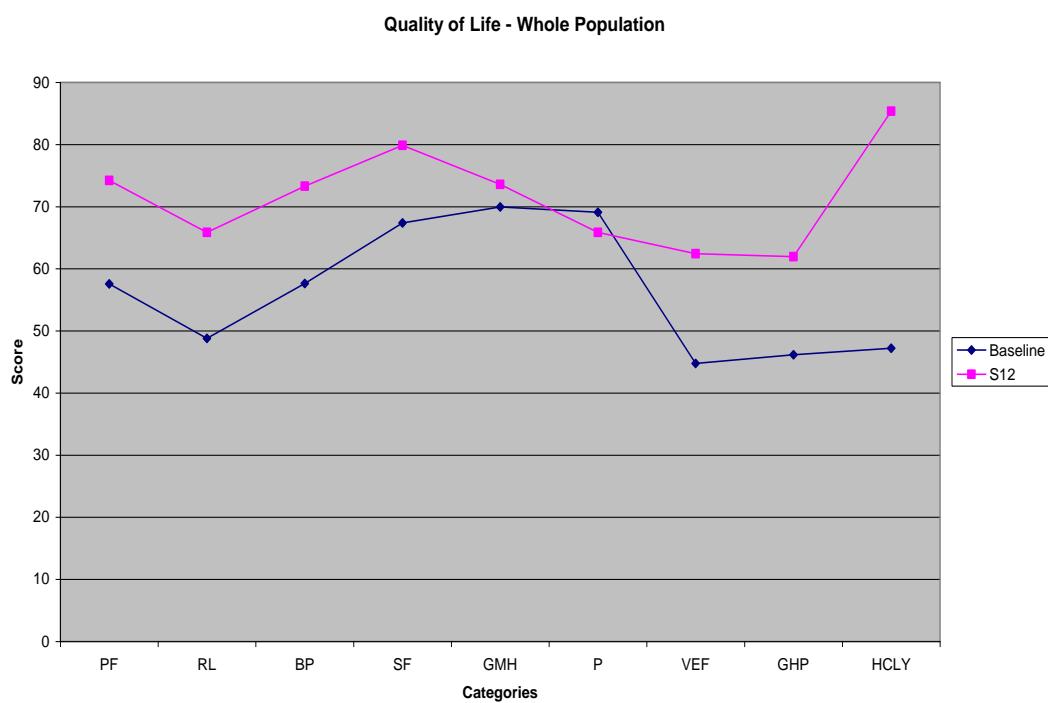
At 6 months there is improvement in all domains except role limitation related to emotional problems (P). There is statistical improvement in physical functioning (PF,  $p=<0.00002$ ), general health perception (GHP), vitality energy and fatigue (VEF) and health compared to last year (HCLY,  $p=<0.00001$ ). There is a smaller statistical improvement in bodily pain (BP,  $p=<0.001$ ), role limitation related to physical problems (RL,  $p=<0.02$ ) and social functioning (SF,  $p=<0.01$ ).

As a result of the improved physical functioning there is a subsequent improvement in the physical health component summary score ( $p=<0.00001$ ).

**Table 4.1:** Quality of life scores for the whole study population.

n = 41	Mean Score (SD)		
	Baseline	6 months	p-values
<b>PF</b>	57.55 (27.4)	74.12 (25.5)	<0.00002
<b>RL</b>	48.78 (39.5)	65.85 (41.0)	
<b>BP</b>	57.62 (29.0)	73.29 (24.4)	<0.001
<b>GHP</b>	46.16 (21.6)	61.95 (23.6)	<0.00001
<b>SF</b>	67.37 (26.9)	79.87 (24.7)	
<b>GMH</b>	69.95 (19.2)	73.56 (21.5)	
<b>P</b>	69.09 (39.0)	65.84 (42.5)	
<b>VEF</b>	44.75 (21.6)	62.44 (23.6)	<0.00001
<b>HCLY</b>	47.19 (22.6)	85.36 (20.9)	<0.00001
<b>Physical</b>	52.53	68.80	<0.00001
<b>Mental Health</b>	62.79	70.43	

**Figure 4.1:** Graph of Quality of Life scores – whole population.



Further analysis of the quality of life data is not relevant. As discussed, there may be some skewing of the data in favour of the 2007 cohort. Breaking the data down further to enable comparison based, for example, on ethnicity or number of

co-morbidities, is not feasible. Likewise, it is not feasible to undertake further analysis to compare the successful and unsuccessful cohorts. The group sizes are different, with paired data from 11 participants in the unsuccessful cohort and from just 5 participants in the successful cohort. Whilst data can be paired and therefore compared at the two time-points, one cannot make any correlations between the two groups. The numbers are so small that no comparison of any statistical validity or reliability can be made.

## **Discussion**

The SF-36 was used to measure changes in health-related quality of life in the participants attending the programme. Whilst there is limited data available for the participants there is a positive trend evident, with improvements seen between baseline and 6 months. This is consistent with the literature where weight loss resulted in improvements in perceived physical health but not mental health (Kolotkin et al., 2001).

It is interesting to note that the mean score for role limitation related to emotional problems (P) is lower at 6 months than at baseline. The reasons for this are not known but may relate to the individual's ability or inability to perceive changes in their emotional lives. Anecdotally, for some participants in the programme, there have been issues with sexual abuse in the past. Participants have stated that deliberate weight gain has been a strategy they have used to defend themselves from unwanted attention. Weight loss has brought unsolicited and unwelcomed attention that they were not prepared to manage. Similarly, some have spoken of relationship issues with partners and weight gain has been a method of hiding from the real issues. With weight loss has come a realisation that the relationship was not strong and they therefore perceive their emotional

life to have deteriorated. Further research into this in conjunction with a psychologist would be necessary to elicit the true picture.

The improvements in the other parameters are as expected. As a result of the weight loss participants find it easier to carry out their activities of daily living. The decrease in pain at this time means they have more energy to be more active which contributes to further weight loss and to an improvement in self-esteem. The improvement in perceived bodily pain (BP) is not as significant ( $p = <0.001$ ) as some other parameters. This may be related to a loss of fat padding around the weight bearing joints that may result in an increase in the perceived pain over time. Nevertheless participants perceive that their general health is better and that their health compared to the previous year is also significantly improved. With the decreased pain and improved function there is a corresponding improvement in social functioning. This may relate to the individual feeling a more active part of their family and community and with a decrease in social isolation related to obesity.

Mean SF-36 scores for a normative New Zealand population were validated in a study by Scott, Tobias, Sarfati & Haslett (1999). The SF-36 questionnaire was used to measure HRQoL in another New Zealand weight loss trial (Ni Mhurchu, Bennett et al., 2004). Baseline scores for those in the highest obesity tertile, that is those with a BMI of more than  $37 \text{ kg/m}^2$ , were lower in all domains than those in the 1999 normative study. However, when comparing the results from those two studies with those from this project, it is clear that the baseline scores for this population were lower in all domains (Table 4.2).

The scores at the completion of 6 months were still lower in all domains, except the two summary domains, in this study population when compared to the normative study.

**Table 4.2:** Comparison of baseline mean SF-36 scores in this study with Ni Mhurchu et al., (2004) and Scott et al., (1999)

Domain	Gibbison - baseline	Ni Mhurchu et al., (2004)	Scott et al., (1999)	Gibbison – 6 months
<b>PF</b>	57.55	69.6	86.0	74.1
<b>RL</b>	48.78	71.3	80.7	65.9
<b>BP</b>	57.62	66.2	77.9	73.3
<b>GHP</b>	46.16	60.6	73.8	61.2
<b>SF</b>	67.37	77.8	86.6	79.8
<b>GMH</b>	69.95	74.2	78.0	73.6
<b>P</b>	69.09	79.2	85.0	65.8
<b>VEF</b>	44.75	48.5	65.6	62.4
<b>HCLY</b>	47.19			85.4
<b>Physical</b>	52.53	44.1	50.1	68.8
<b>Mental Health</b>	62.79	45.8	50.0	70.4

There are several possible reasons why the scores in this study are so much lower, even though there is improvement at 6 months. The prevalence of being overweight and obese in New Zealand has increased over time. New Zealand is now the third fattest nation in the world, lagging behind only the United States of America and Mexico (Organisation of Economic Co-operation and Development, 2009). Therefore the average weight of the general population is greater now than in 1999 when the initial normative study was conducted. It is feasible then that the norms for perceived quality of life may be lower now than they were in 1999. In addition the participants in this study are large, with an average BMI of 47 kg/m<sup>2</sup>. They have tried and failed repeatedly at weight loss in the past. They have significant health problems with 96% having at least one obesity related co-morbidity and more than half (52%) having more than 3 co-morbidities. Whilst they perceive their general health to be poor they also perceive improvements in their health associated with weight loss. It would be speculative to draw any further conclusions. However, it does demonstrate improvement in health-related quality of life across time. It is unfortunate that quality of life was not re-measured again at 2 years as it would have been interesting to be able to compare data to see if the improvements were sustained or even further improved. It would also

have been interesting to have been able to compare data for both the successful and unsuccessful cohorts at each time point. This is an area in which the programme could do better.

The study population represents those at the extreme end of the overweight obese continuum and may therefore be reflective of a population with greater health issues. The sample size is small and again may provide an inaccurate reflection. The findings would be strengthened by having a greater number of paired responses and having results more evenly distributed across both calendar cohorts. It would have been beneficial to have data at 2 years to enable comparison and to determine if positive changes in HRQoL are sustained over time.

## **Conclusion**

Elevated BMI associated with being overweight and obese is strongly correlated with poorer quality of life. However, obesity is a modifiable risk factor and as this study demonstrates weight loss brings about positive improvements in perceived health status and subsequent quality of life. The improvements in HRQoL at 6 months are most notable in the physical components but there is sustained improvement across most of the measured parameters. This study demonstrates the validity of the SF-36 Health Survey Questionnaire in the New Zealand population. In addition this study demonstrates the significant negative impact that obesity has on HRQoL and the positive improvements resulting from weight loss.

## **Chapter 5**

### **Qualitative Study**

## **Introduction**

Chapter 3 of this portfolio was a retrospective study of AWMP participants from 2006 and 2007. The aim of the study was to identify if there were any specific characteristics that could be associated with successful weight maintenance. The results showed that there was no clear single or combination of factors associated with success. Therefore, if it is not about “who” is successful, then is success related to “what” it is that successful individuals do and “how” they apply information? Are there any particular habits, practices or behaviours that successful people are able to implement more successfully than those that are not successful?

This is the background to the second phase of this portfolio. Having identified a successful and unsuccessful cohort, the aim of this phase is seek information that will help answer the research question. In-depth qualitative interviews will be carried out on a purposive sample from each cohort. The interview will seek to identify “what” it is that people who are successful at weight loss maintenance do that enables that success in the long-term. Analysis of the interviews will be carried out using the general inductive approach (D. R. Thomas, 2006) and themes identified and discussed.

The final chapter of this portfolio will seek to bring together the two parts of the study and to make recommendations for practice and suggestions for future research.

## **Review of the Literature**

Whilst there is a wealth of literature relating to weight loss and maintenance that comes from a quantitative methodology, there is less that comes from a qualitative point of view. A small study in the United Kingdom was carried out to increase the understanding of why people volunteer to participate in weight loss trials (Herriot, Thomas, Hart, Warren, & Truby, 2008). Subjects ( $n = 59$ ) were drawn from the University of Surrey “Diet Trials” study. Focus group interviews were conducted and data analysed for themes. In this study, reducing health risks was not the main motivator for people deciding to lose weight. Instead success appeared to be related to an increase in the individuals intrinsic sense of worth gained by losing weight, such as looking good for a photograph, looking younger and feeling better or being physically able to do more, and the subsequent motivation to continue that this improvement engendered.

Another small study of 76 previously obese women was carried out in the United Kingdom (S. Byrne et al., 2003). In-depth individual interviews and group interviews were used to assess the characteristics of successful weight maintainers, as compared to weight regainers and healthy-weight women. The authors found that a number of psychological factors contributed to regain but not to maintenance. These factors included a failure to achieve weight goals and dissatisfaction with weight achieved; use of eating to regulate mood, and a dichotomous (black and white) thinking style.

A further small study, this time of 76 people living with obesity, was carried out in Australia in 2006/2007 (S. L. Thomas, Hyde, Karunaratne, Kausman, & Komesaroff, 2008). Individuals with a BMI of 30 or more were invited to participate in open-ended interviews to explore their attitudes towards dieting, physical exercise and weight loss solutions, why their weight loss attempts have

failed and their opinions about what would be beneficial to them in their future struggle with their weight. The authors found that most had used commercial diets but few had used physical activity. Whilst most were very good at losing weight, few were able to sustain the loss. Individuals were given plenty of instructions about loss but few were given appropriate long term guidance or support with which to follow through on those instructions. The role of social networks is explored as a possible positive social support for those trying to lose weight and maintain the loss.

This study is interesting in that the individuals felt they were told what to do and the lack of success was related to a perception that they did not receive sufficient instruction or support long-term. This relates to whether the individual is willing to accept responsibility for their own actions and thoughts, an internalised locus of control, or whether they believe that it is someone else's role to support and guide them to be successful. A lack of success is, therefore, the fault of the provider, not the individual; an externalised locus of control.

This internal motivation to lose weight and assume responsibility in life was a key finding in a paper from Sweden (Elfhag & Rössner, 2005). The authors looked at conceptual factors associated with weight loss maintenance. They found a number of factors, including reaching a self-determined goal weight, a physically active lifestyle, control of over-eating, and self-monitoring of behaviours. Social support, better coping strategies and greater psychological strength and stability were also correlated with success. Passive reactions to problems, binge eating and eating in response to stress and negative emotions were among the factors identified as risks for weight regain.

From these studies it is clear that an internalised locus of control, a clear and realistic weight loss goal, physical activity and support are factors associated with successful maintenance.

## **Sample**

The two cohorts (successful = 21; unsuccessful = 38) form a convenience sample of 49 subjects. One subject from the successful cohort had emigrated to Australia and so was not available. From this convenience sample a purposive sample was selected. Invitation letters and participant information sheets (Appendices C and A respectively) were sent out to five selected participants from each cohort, at weekly intervals. A total of 10 responses were received from the 48 invitations, a response rate of 20.8%. Of those that responded 2 (4.2%) were not interested in further participation. However, 3 (6.25%) from each cohort, a total of 6 (12.5%), indicated they were interested in taking part. A further subject responded positively but the response was received after the data collection phase had taken place and so was excluded. Normally in qualitative research sampling would continue until saturation occurs (Schneider, Whitehead, Elliott, Lobiondo-Wood, & Haber, 2007), that is, until no more new data comes to light. However, given the timeframes and nature of this study it was felt by the researcher that 3 subjects from each cohort was manageable and, as they were purposively selected, should be sufficient to enable themes to be developed.

The six subjects were contacted by phone to confirm their availability and to arrange a time for the interview.

Choosing those from whom the researcher could learn the most was critical to the purpose of this study (Luborsky & Rubinstein, 1995; Patton, 1990). Purposive sampling enables the selection of information-rich cases for further in-depth

study (Schneider et al., 2007). The researcher was trying to explore the experience of success in weight maintenance in order to create meaning. It was, therefore, critical that the participants were able to articulate their experience and thus enhance understanding (Appleton, 1995).

### **Data Collection Method**

At the time of the interview the researcher again explained the purpose of the study and gained the subjects informed consent (Appendix B).

All participants were interviewed by the researcher for between 50 and 60 minutes. All interviews were recorded with the permission of the subjects being interviewed. The aim of the interview is to identify what it is that people who are successful at weight loss maintenance do that enables long-term maintenance. The interview structure (Appendix D) sought to uncover how the key characteristics of success, including adherence to a lower energy diet, consistent self-monitoring of weight, food intake and physical activity, and the maintenance of high levels of physical activity, were evidenced by the subject. In addition the researcher was looking at what social or family factors are utilised that enable success. Findings from both cohorts will be analysed and compared to identify any significant differences.

After the interviews the recordings were transcribed into computer files. Hard copies of the interviews were printed for data analysis purposes. Electronic copies of the interviews, both the voice file and transcript, were downloaded to a computer disk and stored in a locked filing cabinet in the researcher's office. The initial recordings were deleted from the data-recorder. Interviews were assigned an individual identifier. Verbatim responses may form part of the findings but these will be identified by the assigned code and no one will be individually

identifiable. Following analysis the hard copies were destroyed. Electronic copies of the voice files and transcripts will be held for 10 years and then destroyed.

As the study involves Māori, consultation with the Waikato District Health Board's Kaumātua Kaunihera Research Sub-Committee and Māori Health Unit, Te Puna Oranga, was undertaken to ensure the rights of Māori are respected and protected throughout the study. Whānau/family were invited to participate in the interview if requested by the individual. There was a working partnership between the researcher and Māori participants in the decision-making. Māori participants were given the opportunity to speak with a representative from Te Puna Oranga to facilitate issues relevant to Māori and to resolve any concerns. Participants reserved the right to withdraw from the interview process at any time.

Approval for the study was received from the Waikato DHB's Kaumātua Kaunihera Research Sub-Committee, along with approval from the Northern Y Regional Ethics Committee (Appendices E and F).

### **Data Analysis Method**

All of the interview transcripts were read on multiple occasions by the researcher and analysed for themes, using the general inductive approach (D. R. Thomas, 2006). Inductive analysis is achieved through repeated readings to identify concepts and meanings that are inherent in the text. These are categorised and conceptualised into broad themes. The outcome of the process is to create a small number of categories, not more than eight, that capture the key aspects of the themes identified in the raw data and that are the most important themes as they relate to the research question (Creswell, 2003).

A summary of the findings was presented back to the interview participants. Each cohort was invited to return separately for the feedback session. Those that were unable to attend were sent the findings summary and invited to respond directly by telephone or mail. Participants from both cohorts agreed completely with the interpretation of the findings and no changes were required. Undertaking this process of checking back with the participants as key stakeholders in the process has helped to build the trustworthiness and credibility of the findings. This in turn strengthens the validity of the findings and the overall study itself (Johnson & Onwuegbuzie, 2004).

## **Findings**

### *Characteristics of the participants*

A total of six participants were interviewed, 3 from each of the cohorts. Table 5.1 describes the participant characteristics. Participants 1 to 3 formed the successful cohort and participants 4 to 6 were the unsuccessful cohort.

**Table 5.1:** Participant Characteristics

Subject	Start Year	Age	Gender	Ethnicity	Domicile	Weight / BMI - baseline	Weight / BMI – 2 years
P1	2006	46	F	NZE	City	107.3 / 39	93.9 / 34
P2	2007	58	M	NZE	City	117.3 / 34	104.9 / 31
P3	2006	27	F	Māori	Rural	105.8 / 41	70.6 / 28
P4	2007	66	M	NZE	City	116.3 / 39	111.5 / 37
P5	2006	49	F	NZE	Rural	106.0 / 32	116.2 / 35
P6	2006	61	F	NZE	Rural	109.3 / 42	114.5 / 44

Participants were aged between 27 and 66 years of age, (average age was 44 years), were mainly women (n=4, 67%), and most identified as being of New Zealand European ethnicity (n=5, 83%). The range of weights across all participants was 105.8 kg – 117.3 kg (average was 110.3 kg). At 2 years the

weight range was from 70.6 kg – 114.5 kg (average of 101.9 kg). The average BMI at baseline was 38 kg/m<sup>2</sup> (range was 32 – 42 kg/m<sup>2</sup>) and at 2 years was 35 kg/m<sup>2</sup> (range was 28 – 44 kg/m<sup>2</sup>).

#### *What motivated participants to join the AWMP*

All the participants' had attempted to lose weight in the past with varying degrees of success. The full range of weight lose options had been utilised including, but not limited to; commercial programmes, such as Weight Watchers, SureSlim and Jenny Craig; 'fad' diets, such as the Atkins diet and the Blood Group diet; and medications, including Orlistat (Xenical), Sibutramine (Reductil) and Phenteremine (Duramine). All had been able to lose some weight but they had not been able to sustain this weight loss for any length of time. Whilst weight loss was a deliberate goal for all participants coming into the programme, some also wanted to avoid or reduce the impact of obesity related health issues.

"diabetes was the catalyst...don't want diabetes to get the better of me". (P1)

"...on cartia...metformin and insulin just too much for me. Something is wrong with this picture and I just got scared. I don't want to die". (P3)

"I was a bit ill...and thought it would be a really great idea to try and get rid of some weight". (P4)

Other reasons for coming into the programme included advice from a specialist, and wanting to be able to participate more fully in their own lives and in the lives of their children and wider family.

Fear of complications from existing health conditions appeared to be a major motivator for coming into the programme but did not appear to have a correlation with success. Participants from both cohorts had major health concerns and

wanted to lose weight in order to reduce the impact of these conditions. This echoes the findings of the study by S. L. Thomas et al., (2008) where improving overall health was a major motivating factor. Conversely, in a study by Herriot et al., (2008), the authors found that “reducing health risks were not a main motivator for people deciding to lose weight” (p.72). Therefore health concerns may or may not be perceived by some as being motivators for change, but they are nevertheless drivers. Whether they are strong enough drivers for sustained change is open to debate.

## Themes

Analysis of the interviews revealed multiple themes covering a wide range of issues. However, these could be reduced and grouped together as four broad themes. Theme one is “*actions speak louder than words – just do it!*” and relates to the behaviours and actions necessary for sustained weight maintenance. Theme two is “*I can't do this on my own*” and refers to the support required from the wider group, family and friends. Theme three is “*what's this worth to me?*” and refers to the value successful participants place on the change. Theme four is “*put it all together and what have you got?*” This relates to the capacity of the individual to draw together the concepts and apply them effectively. In addition, the concepts of locus of control and dichotomous thinking are interwoven throughout the four themes. Whilst these will be discussed as individual themes and concepts they are, in fact, inter-related in sometimes quite complex relationships and cannot be separated easily. The successful individual is able to bring all the threads together in a cohesive whole and utilise them effectively in managing their weight. Verbatim comments from participants are presented to demonstrate how this is achieved.

### ***Theme 1: Actions speak louder than words – just do it!***

This theme relates to the behaviours and actions that contribute to weight maintenance. As discussed in earlier chapters these include consumption of a lower energy diet, consistent self-monitoring of weight, food and physical activity, and high levels of physical activity (Hill & Wing, 2003). A review of participants (n=2708) on the National Weight Control Register in 2006 showed that the variables associated with long-term maintenance of weight loss were a low-calorie diet with moderate fat intake, limited fast foods and high levels of physical activity (Phelan, Wyatt, Hill, & Wing, 2006). One must be mindful, however, that this register uses self-reported data that is not validated with the actual participant submitting the data.

Consistent with the literature, those from the successful cohort reported that they utilised the same behaviours and factors to help them maintain their weight loss. In addition, they were also able to adjust their behaviours and actions based on the results of self-weighing. Examples of how this was achieved and demonstrated follow.

#### *Diet*

There are no foods that participants will not be able to go back to eating on completion of the intensive Optifast™ phase of the AWMP. The aim is to encourage people to eat widely but to be mindful of quantities and to limit the higher energy foods that will contribute to weight gain.

Overall, participants who were successful showed that they were eating a varied diet but were mindful of the fat content and of the quantity of what they were eating. They were also mindful of making sure that water was a part of their

diet. In addition they felt that they were eating a lower energy diet than previously and were much more mindful of what and how much they were eating:

“...eat sorbet rather than ice-cream which is probably less fat ...drink a lot of water though...”. (P2)

“...everything in moderation”. (P3)

Unsuccessful participants found it harder to manage this aspect:

“[despite decreased activity associated with a deterioration in health status]...I eat the same as before”. (P4)

“the fact that the information they were giving everyone didn’t apply to me as a vegetarian, and so again I wasn’t getting the information I needed to help me...I had to come up with my own eating plans and work it all out myself...which I just found difficult, but I did succeed in losing 20kg still but that was basically by not eating and just eating Opti bars...[My weight started to track back up after a few months]...they never gave me any maintenance advice at all which was a problem...”. (P5).

### *Activity*

Maintaining higher levels of activity is an important aspect of long term weight maintenance. The aim is for at least 150 minutes of moderate intensity activity spread across most days of the week. This equates to about 30 minutes a day (Miller & Dunstan, 2004). To help participants understand the role and importance of activity in weight loss and maintenance, the concept of energy expenditure needing to be higher than energy intake is a key concept in the AWMP:

“...biggest thing that clicked in my head was energy in and energy out...that is so simple...If you are going to eat that then move your body.” (P3)

“going for a walk instead of taking the car everywhere.” (P2)

“[I will go for a walk]...five days a week, about half an hour, more if I can get it...”. (P3)

The successful participants were able to find ways of getting this activity into their day. This may require a different approach to routines, or even novel approaches, that demonstrate an ability to problem solve effectively. In this discussion the participant was talking about how unsafe it can be walking on rural roads, especially in the winter or if it is foggy:

“...it’s not particularly safe...[if it’s too bad or foggy, I] have a concrete brick...in my shed...and I’ll just do steps for half an hour, up and down, up and down, if that’s what I have to do...just anything to try and keep moving.” (P3)

Health concerns were a major contributor to lower levels of activity in the unsuccessful cohort. Deteriorating chronic health problems often led to a reduced ability to be active:

“...but it is the lack of exercise, and I have not been able to walk. ...everything hurts [secondary to a fall]. Exercise gets a bit of a miss.” (P4)

“...I think I must have arthritis or something in my hips because my leg is getting very, very tired...my energy levels have been very, very low.

So I am taking vitamin B...four a day and it has zapped it up a bit for me." (P6)

Embarrassment about body image and how this may be perceived by others also plays a part in reduced activity, especially for women. Water based activity can be beneficial for those with arthritis as the weight-less environment allows resistance exercise without pain. In this discussion the participant explains that she used to swim frequently but has stopped going. When asked what has stopped her:

"My size! I am like a beached whale in togs. I look bloody terrible. I do! I look like a blimp. There is no way, unless it was a private pool. My daughter has a swimming pool and I have been up there a couple of times but I mean it is not a heated pool now. The summer's gone...No! I don't like the way I am full stop. So you won't get me in togs". (P6)

### *Self-weighing*

Possibly the easiest method of tracking progress is through self-weighing. Most people will have a set of bathroom scales at home, but for the obese it can be challenging to find scales that will weigh to more than 150 kg. Anecdotally this is an issue even in the primary care setting where the general practitioners scales do not go above 150 kg.

All participants weighed themselves at some stage. What they did with the information varied depending on whether they had been successful losers or not:

"Well if you don't weigh yourself on a regular basis how else are you going to keep track of your weight?...I've got scales...good scales

which I have bought since I've been on the programme...try and weigh myself the same time every morning...". (P2)

Some had developed a relationship with their primary care setting to allow them to use the scales in the surgery, an excellent example of collaborative problem solving and relationship building with primary care:

"...my scales are broken...once a fortnight I will stop at my local medical centre because I like to use the same one". (P3)

Use of scales was not the only method of tracking used:

"...once I got to a certain point I knew from my clothes and everything that I was putting it on." (P5)

If the individual had gained weight then this influenced the continued use of scales:

[weigh] every day, sometimes once a week...it depended...found it helpful but [got] disheartened as I was seeing it go up all the time..." (P4)

"I got quite depressed about how it went up very quickly so I stopped weighing myself." (P5)

### *Routines*

The importance of having routines is mentioned in the literature (S. Byrne et al., 2003; Elfhag & Rössner, 2005; Herriot et al., 2008). Routines relate to eating breakfast, eating at regular times and being organised. The importance of routine is demonstrated in these statements:

"I know I need to eat breakfast. It kick-starts things for me and I feel good...if I put off eating...further into the day, that is when I eat further and further into the night...Packing something [to take with me], even if its carrots or rice crackers, stops me from ...stopping and buying a pie on the way...". (P3)

Lack of routine was evident in the unsuccessful cohort. Eating on the run, skipping breakfast and missing meals were all mentioned. This often resulted in eating later in the day and eating bigger portions. These behaviours are associated with weight regain.

### *Vigilance*

Vigilance relates to what one does with information, especially in how one adjusts ones behaviours and actions:

"...doing your belt up you think oh yeah, gosh, that's gone out another notch...you think crikey, I better do something about that...". (P2)

Whilst self-weighing is an important method of tracking progress it does come down to what the individual does with that information. Self weighing provides instant feedback that can then be used to adjust behaviours. Furthermore it has been associated with greater weight loss and has a positive effect on the prevention of weight regain (Lombard, Deeks, Jolley, Ball, & Teede, 2010). The authors felt that women perhaps applied intervention skills more effectively when they self-weighed, but this may be related to the fact that in most studies women outnumber the men. Successful weight loss maintainers are more likely to exhibit a higher degree of vigilance than those that were not successful (S. Byrne et al., 2003).

There has been little actual research that examines whether self-weighing reinforces behaviour change. In this study the sample size is too small to draw any conclusion but it would appear that the successful individuals were able to self-weigh and use the information to modify their behaviour more effectively than those from the unsuccessful cohort.

### ***Theme 2: I can't do this on my own***

The second major theme relates to support. This was identified by every participant as being important to them. Support came from a range of sources, including the group, the clinical team, family/whānau and friends and colleagues. In particular it is the support from the group that they found most helpful. Participants found it helpful that others in the group had the same issues.

“...having the support...people had the same problem as me”. (P1)

“...with a group is far more rewarding than doing it individually...”. (P2)

This group support was often at odds with previous experiences for some, as clearly described in this statement:

“...I went to a [commercial programme] meeting...I don't know why but I just felt really uncomfortable sitting round with, in my eyes a bunch of fat women moaning about how fat they were, and it was like “I don't like this”...it does sound cheesy but when I went to [commercial programme] it just did not feel right. It was really vain...in wanting to be size 12 and they wanted to wear pretty clothes and be able to go to Glasson's and buy size 8. When I went to Optifast those people just wanted to live - the same as me.” (P3)

Participants felt that there was something different about the weight management programme as compared to other commercial programmes they had tried. This difference appeared to be both in terms of the team members and the programme itself:

“...[the AWMP team] got us down to ground level and then started us from scratch and then built up from that sort of thing...it was the way it had been run, you know, it was good, you know, a good programme. You got stuck into it straight away, sort of thing.” (P2)

“...it was the hands-on approach of the people.” (P4)

The group situation also generated a degree of competition between programme participants. Again, this competition was experienced in both cohorts and was perceived as being of a light-hearted, healthy nature as opposed to being something more destructive. It was not necessarily about trying to outdo others in terms of weight loss, although some did see it in this light as a means of achieving their own goals, but rather of not wanting to let the group down:

“...didn't want to let the team down...”. (P2)

“...heard about each other's successes and failures and you encourage each other...looked forward to seeing them and celebrating...Yahoo – you lost a kilo – well done...OK! – such and such lost this – I am going to top that...”. (P3)

“...I am actually quite a competitive person so if I am in a group where I am competing with other people it helps me a lot...it was all very good natured competition...and I like to do well in a group situation...I don't like to be the one who is making excuses and failing and I like to be the one that is up there achieving something.” (P5)

### ***Theme 3: What's this worth to me?***

The third theme is that of valuing. In this context valuing relates to how the individual feels as a result of the weight loss experience. Do they notice the change and appreciate that for what it is? If they had more energy, greater flexibility, were more able to carry out their own activities of daily living, or, as in the case of one successful individual, were able to fall pregnant and carry that pregnancy to full term and delivery, then you were more likely to value that and not want to return to the start point, that is, the previous weight.

The achievement of personal goals is one way in which the individual may value the change. Expressions or positive comments from others, such as friends and family, are another:

“You know when people start saying “God - you are looking fantastic and your husband starts saying to you God - you are looking bloody good now. That was hugely important. Before you never got the comments...” (P1)

“...work colleagues say Oh you look fabulous, you must feel great...”  
(P3)

Valuing and being valued therefore made it easier for these participants to seek support from others:

“We get together a couple of times week and do zumba. I need that. I need that from other people...answering to myself but having someone else to bounce off.” (P3).

So, whereas the successful were able to find support elsewhere, those in the unsuccessful cohort felt that the group support ended too soon for them. They

wanted the support to continue for longer as they felt that coming to group helped to keep them in check. Without the group they felt alone and abandoned:

I couldn't get anyone else to take an interest...so I was just left on the scrap heap" (P5)

"...lack of contact with anybody really [contributed to weight regain]".  
(P4)

Initially they were able to maintain things for a time but eventually gave up and returned to previous habits. Weight regain was the inevitable outcome. This was seen as a fault of the programme in letting them down:

"the programme stops too quickly...it needs to sort of slowly go out...monthly [sessions]...for 12 months after the programme...I think you need the physio and that to put you through your paces to see how you are getting on with the exercise and things like that. Making sure you are doing it correctly and that sort of thing. Because it is very easy to slip out of doing your exercises when there is nobody there to sort of keep an eye on you and I think you also need the dietitian to keep you on the straight and narrow as far as food is concerned...[to] make sure you are eating the right foods...". (P4)

This was not necessarily anything new as they had been let down by other weight management programmes in the past, so why should this programme be any different? This reinforced feelings of failure and perhaps, therefore, lessened any sense of value associated with the experience. This ability to rationalise and externalise may relate to the individual's locus of control and the degree of dichotomous thinking associated with this.

Two additional concepts were found that are closely interwoven through all the themes. These concepts were locus of control, and dichotomous thinking. These are discussed here in relation to their impact on the successful and unsuccessful participants

### *Locus of Control*

Locus of control is a psychological construct that refers to an individual's perception about the underlying causes for events in his/her life (Rotter, 1966). People can be categorised as having either an internal or external locus of control. "A locus of control orientation is a belief about whether the outcomes of our actions are contingent on what we do (internal control orientation) or on events outside our personal control (external control orientation)" (Neill, 2006). People with an internal locus generally believe that their behaviour is guided by their own decisions. People with an external locus believe that their behaviour is guided by forces and influences outside their control.

Participants who were successful did display a tendency to be more internal:

"I like to start a project and finish it all the way through...and that's me... I just wanted to do it for myself". (P3),

whilst those who were less successful tended to attribute that to factors outside their control (an external orientation). For example a lack of continued contact was perceived as having a direct relationship to weight regain by one participant. Family stresses, emotional issues and the death of several family members and friends over a comparatively short timeframe negatively impacted on another.

The literature on locus of control and weight loss and maintenance demonstrates that people with a greater internal locus of control are more likely to be successful, as they are more self-directed and take personal responsibility for their behaviours and actions (Chambliss & Murray, 1979; Wallston &

Wallston, 1978). Those with an external locus tend to be less self-directed and may, therefore, be less successful when left to their own devices. It is suggested that a programme that offers a greater degree of support for these people will result in them being more successful. This is expressed by one of the unsuccessful participants:

“If I could have had access to someone who could give me weekly advice on how to maintain it, what I might be doing right and wrong and that, like we did with the weight loss”. (P5).

There is a point at which the individual needs to accept personal responsibility for their actions. Likewise there needs to be an end point for the programme. It is defining the right degree of support and follow-up for each individual that is the challenge. Doing this would help to build the capacity for the individual to manage more independently.

### *Dichotomous Thinking*

Following on from the concept of locus of control is that of dichotomous thinking. This is the tendency to see things as black and white, right or wrong, good or bad. As discussed in earlier chapters a dichotomous thinking style is associated with a lack of success in weight loss and maintenance (S. Byrne et al., 2003; Elfhag & Rössner, 2005)

In weight loss we tend to see people that display an “all or nothing” approach to managing their weight. They are either on a diet or off it altogether. There appears to be little room to find middle ground that would enable them to be successful. This all or nothing approach is not unique to those that were not successful”

“If I put on weight I beat myself up...”. (P1)

“...either I eat nothing or I eat vast quantities to make up for the fact that I have eaten nothing”. (P3)

Some participants felt that they have to be very strict with their intake:

“...you just got to restrict yourself really...”. (P1).

“...I am not a big fatty sort of girl. I just try to stay away from lollies and chocolates etc, etc because they were the thing when I was younger. I like them so there goes that all or nothing thing again. When I have them it is like OK we will just stay right away.” (P3)

whilst others felt that the information could not be taken and applied to a particular dietary habit:

“...the information they gave everyone didn't apply to me as a vegetarian and so I wasn't getting the information I needed to help me personally...”. (P5)

This type of belief and subsequent actions may result in over-eating and weight gain if the individual feels too restricted or has received insufficient information.

Weight gain is also associated with a tendency to use food to regulate mood (S. Byrne et al., 2003; Elfhag & Rössner, 2005). This may consist of simply eating more when feeling tired or stressed, or in not achieving a (self-imposed) weight goal:

“because I am a really slow loser and then you get despondent, because you think why the bloody hell am I doing it. I may as well go and eat a pile of junk and make it worthwhile because I have done nothing really wrong all week...” (P1)

However, the successful individuals are able to turn this around and get back on track. This may relate to valuing the changes achieved:

“...OK, that’s it – back on track. Stop shovelling it in your mouth and just look at what you are doing to yourself again, because at the end of the day, I want to live my life...” (P1)

One of the functions of the AWMP is to help participants find and value the middle ground that will in turn enable them to be successful. This is an area in which the psychologist can be of assistance. It is interesting to note that in terms of the year each participant started there were two from each cohort that started in the programme prior to the psychologist joining the programme. It is not known what impact the addition of the psychologist had on participants from the 2007 cohort and the sample size in this study is too small to draw any conclusion. The two participants interviewed in this study both stated that they saw the psychologist prior to starting in the programme but there was no further follow-up from that point. Neither had any diagnosed mental health issues or other psychological issues that would have precluded them from starting in the programme. This may indicate that it really comes down to what the individual wants to achieve and their own personal capacity to achieve it.

#### ***Theme Four: “Put it all together and what have you got?”***

The final theme relates to the capacity of the individual to draw together all the concepts into a coherent and meaningful whole and to apply the concepts effectively.

Capacity is a concept that is well known in human resource development and it relates to the ability to grow and develop people to be better at their work or to

take on new roles or functions. In the context of this portfolio capacity relates the individual's ability to manage their life: themselves, their family, issues, and others. It encompasses' the ability to clearly express their own wants and needs and to gain support from those around them. It also includes the concept of resilience, which can be defined as the ability to manage adversity in a positive manner. Some authors (Elfhag & Rössner, 2005; Herriot et al., 2008; S. L. Thomas et al., 2008) see support as being an important part of successful weight loss maintenance but there is little research that defines what that support should look like or from where it should come. There is also a relationship between support and locus of control as those with a clear sense of self are more likely to be able to ask for support than those who tend to see their life as being influenced by fate or other external circumstances. Critical life events, such as family relations, are associated with weight regain unless the individual has a way of managing these events effectively. In the weight management programme support from the group and from the clinical team during the group education phase was seen as one way of managing events, but once these supports were no longer available earlier patterns of coping reasserted themselves and an individual would regain weight. Some individuals were then able to regain control and turn things around whilst others simply let events take their turn.

Therefore, building the capacity of the individual to better manage their weight is a key concept for the weight management programme. Building capacity can be defined as follows:

*"capacity building can be characterized as the approach to community development that raises people's knowledge, awareness and skills to use their own capacity and that from available support systems, to resolve the more underlying causes of mal-development; capacity building helps them*

*better understand the decision-making process; to communicate more effectively at different levels; and to take decisions, eventually instilling in them a sense of confidence to manage their own destinies”* (Schuftan, 1996, p. 261).

Whilst this definition may be in relation to community development the same principles can be applied to individuals. Teaching the individual the behaviours and actions associated with successful weight loss maintenance, helping them to identify and resolve the underlying causes for their weight, helping them to identify and develop effective support networks, encouraging them to communicate effectively within their own community, and helping them to adjust their behaviours based on the results of self monitoring and weighing, will result in some having greater confidence to manage their weight in the long-term. This then transforms the individual from a passive recipient of services to an active participant in the process of weight management.

An example of this was the discussion with P3. She was the only Māori participant in the interviews and we talked about her relationship with food in light of the place of food in the Māori culture. As is known, Māori have higher rates of obesity and are over-represented in negative health outcomes associated with obesity related conditions. The challenge can be for Māori to engage successfully with the programme and then apply the concepts without compromising their place within the whānau or on the marae. She sums up her experiences:

“...[during the Optifast™ phase]...I was excluded from just about everything, because everything involves food. Church meeting - food. Tangi – food. Wedding – food. Hanging out with mates – food...It is a hearty thing to do, to sit down and share a big meal together, to eat until you just want to lie

down. And so when I was doing Optifast I would have a salad and everyone was eating and then going for their second plate and their third and then moving on to pudding so I was like "Oh! you don't get that feeling from salad". I don't know how much salad I would have to eat to feel like that but that is a good thing...When I first lost weight my husband...thought like everyone else did, that I looked sick. So having had her [a baby] and putting on a bit more beef, he and his brothers and my mother in law think that is fabulous."Oh look – there you are. That is the [name] we know".

I live close to the marae and so...I make myself available for a tangi or whatever [to work in the kitchen]. When we moved into the phase of bringing food back it meant that if I can't eat it then you can't, so I was making salads and we were having cold meats and we were having, take the fat off the brisket...it was a big change...and I saw aunties and uncles saying "Oh well that is not too bad, that is not too bad bub, replacing butter in a cake". I do the baking down there and just doing little changes and I know they thought it was going to be yuk, you know, everyone eating healthy is yuk! But it was awesome and even now it still happens, not gone back the way it was, it is healthy and it is done in the kitchen. You don't leave all the fat, you take it off...people are more aware now I think".

This demonstrates the capacity for one person to influence change at many levels. The confidence gained from the group situation and the value attached to successful weight loss enabled this individual to take charge of situations that could have been potentially difficult to manage and in the past may have

contributed to weight gain. As a result she was able to influence change that brought about an ideal solution for her and improved the food choices for her family and extended whānau, without compromising her position and role.

Whilst this experience can in no way be generalised to all Māori, it does sum up the ability for one individual to engage successfully with the weight management programme, to take the concepts and apply them in her own life, to communicate effectively her needs to different levels within her family and whānau and to become confident in managing her own destiny.

The researcher would propose that the concept of building capacity with patients is an implied feature of advanced nursing practice. The nurse practitioner scope of practice states that the nurse practises both independently and collaboratively to promote health, prevent disease and to manage people's health needs (Nursing Council of New Zealand, 2009). Assisting individuals to manage their health requires the nurse to work collaboratively with the individual and other members of the health care team. Teaching, guiding, explaining, working together and evaluating outcomes are not only features of clinical leadership and nursing care management but also of capacity building.

### **Limitations of the Study**

There are risks attached with conducting "insider research" (Asselin, 2003), that is research within the researcher's work setting. To help reduce bias, the study population was drawn from the years prior to the researcher starting work with the AWMP, and were therefore no longer active participants in the programme itself. It is also acknowledged that given the retrospective nature of the study, the results are subject to recall bias (S. Byrne et al., 2003).

Other limitations relate to the sample itself. The sample size is small and therefore any findings cannot be said to be representative of the whole cohort and should not be generalised to the whole population. Generalisation is not, of course, the purpose of qualitative research. The purpose was to add a level of richness to the quantitative data, as demonstrated by the use of verbatim quotes, but it is not the whole picture. A larger sample would have been beneficial as this would have allowed interviews to continue until saturation occurred, thereby improving the reliability of the data. Furthermore, the sampling method created some problems. A convenience sample resulted in some participants, especially from the unsuccessful cohort, responding as they had something they wanted to say and have heard. They had a personal agenda they wanted to air and this consequently coloured their responses.

The researcher's inexperience with qualitative interviewing also had an impact on the study. The researcher acknowledges that there were some leading questions asked in order to obtain an answer that fitted a pre-determined plan. The researcher also found it challenging to ask questions that would draw out answers from participants in a way that would allow them to fully and freely express their views. As a result, it is possible that the findings were negatively influenced in a direction that suited the purpose of the researcher.

## **Conclusion**

This chapter of the portfolio has presented the findings of qualitative interviews with six past participants of the weight management programme. Three participants from both the successful and unsuccessful cohorts agreed to be interviewed. This study cannot hope to present a full and exhaustive review of the findings. What it can do though is demonstrate what participants thought

were factors associated with successful weight loss and maintenance and to express what their experiences had been.

Analysis of the interviews revealed multiple themes covering a wide range of issues. However, these could be reduced and grouped under four broad themes. Theme one, “*actions speak louder than words – just do it*” related to behaviours and actions, that is adherence to a lower energy diet, regular exercise or activity and regular self-weighing and monitoring of progress. The successful participants were also able to adjust their behaviours and actions based on the results of self-weighing. Theme two, “*I can't do this on my own*”, related to support. Group support was shown to be of critical importance not only in the early part of the programme, but for much longer in the follow-up maintenance phase. Regular monthly support would have been sufficient for most, but some felt that more was warranted. In addition, establishing routines that supported the behaviours and actions was another important aspect of success. Theme three, “*what's this worth to me*”, referred to the idea of valuing. This relates to holding on to the changes, remembering from where the individual had come, cherishing where they had come to, and a desire to continue on the journey and of not wanting to return to the start point.

Locus of control and dichotomous thinking were discussed as additional factors that influenced success. Successful people tended to have a more internal locus of control and displayed less dichotomous thinking than the unsuccessful participants.

It is interesting to note, however, that those in the unsuccessful cohort appear to use the same or similar factors of success as those from the successful cohort. Their statements from the interviews would suggest that they endeavour to follow the same behaviours and actions in terms of a lower energy diet, more physical activity, self-weighing and routines, at least in the early stages of their

journey. However, as their journey continued, they found it difficult to maintain these new behaviours. Support, or the lack thereof, appears to be a central concept that leads to the loss of these behaviours. Coupled with this was a more external locus of control and greater dichotomous thinking. The result was a reduced capacity to manage their weight successfully in the medium to long-term.

Whilst these three themes were discussed as individual themes and concepts, they are, in fact, inter-related in sometimes quite complex relationships and cannot be separated easily. The successful individual has the capacity to bring all the threads together in a cohesive whole and utilise them effectively in managing their weight. The concept of capacity was the fourth theme – “*put it all together and what have you got?*” Capacity can be defined in many ways. In human resource development, for example, capacity can relate to building the ability of the workforce to better do the job. Individuals, organisations and communities can build capacity in order to better manage their situation or environment. The researcher believes that building capacity in individuals’ to better manage their weight is a vital function of the weight management programme.

## **Chapter 6**

### **Conclusion**

## **Introduction**

This purpose of this portfolio was to describe the factors associated with successful weight loss maintenance in the Waikato. International literature was reviewed and the common factors of success, such as a lower energy diet, higher levels of physical activity and regular self-monitoring and weighing were discussed. In addition, there was some discussion about the social factors that have been associated with success. The aim was to establish if these factors were the same in the local context and to further define the social support that must exist to enable success.

In seeking to uncover these factors this portfolio has used a mixed-methods, sequential, explanatory strategy, with an initial quantitative phase and a second qualitative phase. The emphasis of the strategy was not on the first phase, as discussed by Creswell (2003), with the second phase being to simply add detail to the “numbers”. Instead the emphasis was on the second phase. It was here that the depth and detail was to be found. The first phase identified “who” was successful, whilst the second phase identified “why” and “how” they were successful.

Whilst the chapters could be viewed as separate studies, the purpose of this final chapter is to integrate the findings from the two studies to give greater meaning and to contextualise the findings, an approach utilised by other authors (Creswell, 2003; Steckler, McLeroy, Goodman, Bird, & McCormick, 1992). There are several reasons for integration in mixed-methods research including triangulation, credibility, validity, reliability, completeness, and utilisation of the qualitative data to illustrate or put the “meat on the bones” of the quantitative findings (Bryman, 2006, p. 106). Using both qualitative and quantitative methods can be seen as a “valuable means of discovering the truth” (Carr, 1994), and “the

methodological pluralism frequently results in superior research" (Johnson & Onwuegbuzie, 2004).

This final chapter will therefore seek to bring together the threads from the previous chapters into one coherent piece. How the findings relate to the Adult Weight Management Programme will be explored and some recommendations for the programme will be suggested. Furthermore, how the weight management programme compares to other programmes will also be explored. Finally, an overall conclusion about what constitutes factors associated with success will be presented and discussed.

## **Summary of the Portfolio**

In chapter 3 a retrospective review of the Diabetes Service database and medical chart was carried out, looking at 190 past participants from the Waikato Adult Weight Management Programme from 2006 and 2007. The outcome of this study was that there was no clear single factor, or combination of factors, associated with success. Success did not appear to be related to age, gender, ethnicity, employment status, domicile or the presence or absence of diabetes. There did appear to be a relationship between a greater number of co-morbidities and being unsuccessful at longer-term weight maintenance. Those in the unsuccessful cohort had a greater percentage of participants with more than 3 co-morbidities (68.4%) than those in the successful cohort (42.8%). The two cohorts then formed the sample for the second study in this portfolio.

In chapter 5, qualitative interviews were carried out with 3 participants from each cohort. The purpose of the interviews was to explore their experiences of the AWMP and what they perceived were the factors associated with success. Analysis of the interviews revealed multiple themes covering a range of issues. These were grouped and reduced to four broad themes – “actions speak louder than words – just do it”, “I can’t do this on my own”, “what’s this worth to me” and “put it all together and what have you got?” The successful participants were able to apply the concepts known to be associated with successful weight maintenance in a consistent fashion. They also appeared able to problem-solve effectively in order to find appropriate solutions to issues around food and activity. They weighed themselves on a regular basis and were able to adjust their behaviours based on the results. Furthermore, they appeared to have good social networks with friends and family that supported and enabled them to make sustained change. In addition they valued the changes, where they had come from and what it meant for them. Finally they also had the capacity to bring

together diverse threads of knowledge and apply them effectively in order to manage their weight. Successful people had a more internal locus of control and displayed less dichotomous thinking. This ability to bring together diverse threads of knowledge and apply them effectively in order to manage their weight was defined as capacity.

Those that were unsuccessful with long-term weight maintenance appeared to have a greater number of health issues but these were not perceived to be strong enough drivers for change. They tended to have a more external locus of control and a greater tendency towards dichotomous thinking. Although they had received the same or very similar information to those from the successful cohort, they appeared to be less able to apply the concepts regularly or to adjust their behaviours in response to a weight gain or deterioration in general health. They also appeared to have less social support or perhaps were less able to mobilise this support for positive gain. They, therefore, appeared to have less capacity to manage their weight.

## **Discussion**

At the close of chapter 3 several questions were posed. If there is no clear single factor or combination of factors that appears to be correlated with success, then what is it that makes some successful where others are not? Was there something in the way they applied the information given in the programme, the way they engaged with the programme, or the type and degree of support from family/whānau that enabled them to be successful? Was it some other factor or was it that they were applying all the known factors associated with success identified from the international literature?

The other side of this is, what, other than the presence of multiple comorbidities, hinders the unsuccessful from being more successful? Did their failure to succeed relate to not losing enough weight in the initial phase of the programme for them to notice any improvement? Were there health issues that impinged on success? What, if any, was the difference in support from others?

As has been demonstrated in chapter 5, the successful individual applied all the known factors associated with success in a consistent fashion. They had good social support networks and were able to mobilise support effectively. They had the desire, ability and capacity to be successful with weight maintenance. Those that were unsuccessful may have used the same behaviours and actions but did not have the same degree of support available to them that would have enabled them to continue to be successful. They did not have the same capacity to draw together the concepts, threads and factors associated with success into a coherent whole that would have enabled them to successfully manage their weight in the long-term.

Several other questions were raised in chapter 3. These included trying to establish the link between success and the presence of the physiotherapist and psychologist, why success was so much better at 6 months than at two years and how does the AWMP best support and engage participants to improve outcomes at 2 years, why there was such a high drop-out rate from the 2006/2007 participants, and whether there was a role for primary care to support follow-up.

Some of these questions can be answered, whilst others require further research. The role and impact of the physiotherapist and psychologist on these two groups is unknown and was not established as a result of this study. From the findings of the project it would appear that success at 6 months is much

higher than at 2 years as a result of the consistent input from the clinical team and from the group participants themselves. Group support was seen as an important factor for success. The AWMP is not a static programme. Whilst the team has lost the services of both the physiotherapist and psychologist, the programme content, delivery methods and evaluation processes have been reviewed and developed. These changes have been implemented over the last 3 years and as a result there have been significant improvements in terms of success rates at 6 months and reduced attrition rates from the programme. On average more than 45% of the participants entering the programme achieve at least 10% weight loss at 6 months. Furthermore less than 20% of those coming into the programme fail to complete to the 6 month time point. Data at 2 years from the 2008 participants is not yet available for comparison as they have not yet fully completed the 2 years of the programme. In the last few months the programme has been further adjusted in response to participant demand, to include monthly follow-up group sessions for an additional 12 months beyond the first 6 months, with the frequency of sessions decreasing over the remaining 6 months. Prior to this, participants were seen at months 1, 3, 6, 12 and 18, after the initial 6 month group phase. However, participants requested, and the clinical team concurred, that more frequent contact was necessary to facilitate consolidation of knowledge, to reinforce key messages and allow discussion around problem areas within the group environment. This change has only recently been implemented and the decision to change was made independently from the findings of this study. A further area in which the programme could be strengthened could be to explicitly include other dietary examples to allow for those with different dietary habits. For example, as participants return to real food after the Optifast™ phase, examples of meal plans could include vegetarian options, culturally appropriate options, and options for those with food intolerances or allergies. This inclusive approach then makes it easier for

participants to relate to the examples being given and allows for greater meal variation.

There is a role for primary care to assist and support those in the follow-up, maintenance phase. Reinforcing the key messages of the programme, assisting with healthy lifestyle choices and facilitating access to activity are just some of the areas where this would be helpful. There is an emerging wealth of literature on the role of primary care in weight management and determining how this could be achieved within the local community context would constitute another research portfolio. However, one area in which primary care could easily assist relates to access to suitable scales. Self-weighing is strongly associated with success. Some participants have access to scales that will weigh in excess of 120 – 160 kg, but for others this option is not available. Either they are unable to buy a set as the cost can be prohibitive or they are unable to access scales. This is an issue for people living rurally who are not able to travel to the main centre on a weekly basis to check their weight. One of the successful participants has developed an excellent collaborative relationship with her primary care provider to enable her to use the scales at the surgery. This individual weighs within a normal weight range for the scales and so has little problem, but it does highlight the gap in service provision. Many surgeries have scales that do not weigh beyond 150kg with any accuracy. With the increasing rates of obesity within the community, primary care providers should invest in a set of good quality electronic scales that will enable them to weigh up to 300 kg with accuracy. Access to scales could then be offered to people who are actively managing their weight, including current participants of the AWMP. This should be offered as a cost neutral option so that participants were not incurring any personal costs. How this was funded and managed will need to be explored with the primary health care providers and Primary Health Organisations.

Chapter 4 of the portfolio explored health related quality of life for the participants of the programme. The findings showed very clearly the significant negative impact of obesity on HRQoL. There were significant improvements at 6 months, most notably in the physical components, but there were sustained improvements across all measured parameters. What was disappointing was the missing data. There were insufficient data to enable comparisons of HRQoL between the successful and unsuccessful cohorts. Additionally, there was no data to enable comparison at 2 years to see if the changes had been sustained. This is an area in which the AWMP can do better. Collecting HRQoL data should be continued at regular intervals across the 2 years of the programme. Most importantly it should be collected again at 6, 12 and 18 months following completion of the initial 6 month phase. This equates to 1 year, 18 months, and 2 years from entry to the programme. Having this data would facilitate comparison across time, and would enhance the reputation and standing of the programme in terms of being able to demonstrate health improvement across several different parameters.

## **Recommendations**

To summarise, as a result of this portfolio, 4 recommendations for the Adult Weight Management Programme are suggested. These are:

1. That following the initial 6-month group education phase, group follow-up sessions continue at least monthly for a further 6 months and then at less regular intervals through to the end of the 2 year programme.
2. That more inclusive and explicit dietary plans, including vegetarian, food intolerant and allergic, and culturally appropriate options are

included during the reintroduction to real food and during the maintenance phase.

3. That the concept of capacity building be developed as a core concept in the weight management programme.
4. That HRQoL data be collected at all review points during the maintenance phase across the full two years of the programme.
5. That an approach is made to the Primary Health Organisations regarding access to appropriate scales in the Primary Care setting to facilitate self-weighing for weight management.

It is important to bear in mind, in relation to the concept of capacity, that whilst some development work could be done, it is suggested that this wait until the service has been able to recruit a psychologist who will be able to assist with full development, implementation and evaluation.

### **Comparing success with other programmes**

So, is this programme any better than the other options for weight management, such as the commercial programmes?

Tsai and Wadden (2005) conducted a systematic review of major commercial weight loss programs in the United States. These included programs such as Jenny Craig™, Weight Watchers™, Optifast™ under physician supervision, web-based self-help programs and e-diets. In their review they found 3 randomized controlled trials of Weight Watchers™. From the largest of these trials there was a reported loss of 3.2% of initial body weight at 2 years. Very Low Calorie Diet programs, using Optifast™, reported losses of 15% to 25%, but there were

issues associated with high attrition rates, high costs and a high probability of regaining 50% or more of the lost weight at 2 years. Web-based self-help programs and e-diets had limited success.

A randomized trial to compare 4 weight loss diets was carried out in the United States, between 2003 and 2005, with 311 overweight/obese non-diabetic, premenopausal women (Gardner et al., 2007). Participants were randomly assigned to follow either the Atkins, Zone, LEARN or Ornish diet. They were seen weekly for 2 months then followed up 10 months later for effects on weight loss and related metabolic variables. These diets were selected as they covered the range of low to high carbohydrate intake. Women in the Atkins diet group lost more weight (-4.7 kg) than those in the other diet programmes (Zone, -1.6 kg; LEARN, -2.6 kg; Ornish, -2.2 kg). Metabolic variables were also better in this group when compared to the others. The authors suggested that it is possible that a low carbohydrate, high protein, high fat diet is a feasible alternative for weight loss.

Another study evaluated retention rates and weight loss in a Jenny Craig™ programme in 2001/02 (Finley et al., 2007). In this study, 60164 men and women commenced in the program, but only 6.6% were retained in the program at 1 year. People who left in the first month lost 1.1% of their initial weight, whereas those at 52 weeks had lost 15.6%. The authors concluded that retention was associated with a greater loss of weight.

A further study compared weight loss and health benefits through either a self-help or structured weight loss programme (Heshka et al., 2003). In this study, 424 men (n=65) and women (n=358) were randomly assigned to either a self help program or to a structured commercial weight loss program. At 2 years, those in the commercial program had lost 2.9 kg versus a 0.2 kg loss for those in

the self-help program. Waist circumference and BMI decreased more in the commercial group. Changes in blood pressure, lipids, and glucose levels were related to weight change regardless of the intervention used, however differences between the groups were largely insignificant at 2 years.

A systematic review of controlled trials of lifestyle interventions in obese adults with at least 2 years follow-up was published in 2009 (Brown et al., 2009). Effective interventions were found to include Very Low Calorie diets, low-calorie diets, Weight Watcher's diets, low-fat diets, and diet, exercise and behaviour therapy either alone or in combination.

Locally, a New Zealand study looked at the efficacy of Chitosan as a dietary supplement for assisting weight loss.(Ni Mhurchu, Poppitt et al., 2004). Chitosan reportedly assists with weight loss through gastrointestinal fat binding. This was a 24 week randomised, double-blind, placebo-controlled trial with 250 overweight and obese adults. The intervention group lost 0.4 kg compared to a 0.2 kg weight gain in the control group. The authors felt that chitosan offered little benefit compared to placebo.

So how does the Waikato Adult Weight Management programme compare? Participants in the 2006/2007 programmes had, at 2 years, a mean weight loss of 8.7 kg and the mean BMI had reduced from  $47 \text{ kg/m}^2$  to  $33 \text{ kg/m}^2$ . 21 participants (11%) had achieved a weight loss of at least 10% of their total weight and had maintained this for 2 years. It is reasonable, therefore, to state that the results from the Adult Weight Management Programme are better than placebo and are as good as, if not better than, commercial programmes. However, just as importantly, it provides another option in the constellation of weight management tools and programmes for a select population for whom other options have failed.

## **Overall Conclusion**

This study is the first evaluation of the Waikato Adult Weight Management Programme that has sought to link quantitative data and qualitative findings in order to create a coherent and complete picture of factors associated with success. It has clearly demonstrated that successful participants in the AWMP apply the same behaviours and actions as those identified in the international literature. That is, adherence to a lower energy diet, regular exercise or activity and regular self-weighing and monitoring of progress. They were also able to adjust their behaviours and actions based on the results of self-weighing. In relation to the type and nature of support necessary for success, group support was shown to be of critical importance not only in the early part of the programme, but for much longer in the follow-up maintenance phase. Regular monthly support would have been sufficient for most, but some felt that more was warranted. In addition, establishing routines that supported the behaviours and actions was another important aspect of success. Valuing the achievements associated with a lesser weight was seen as another important factor of success. Locus of control and dichotomous thinking were additional factors that influenced success. Successful people tended to have a more internal locus of control and displayed less dichotomous thinking than the unsuccessful interviewees. Finally, success appeared to be related to the capacity of the individual to grasp the ideas and concepts and apply it within their own context.

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## **Appendices**

## **Appendix A: Participant Information Sheet**



## INFORMATION SHEET

**Title:** Are we there yet? Factors associated with, and experiences of, successful weight maintenance in the Adult Weight Management Programme in the Waikato.

**Principal investigator:**

Bryan Gibbison  
Clinical Nurse Specialist – Diabetes  
Adult Weight Management Programme  
Waikato Regional Diabetes Service  
Private Bag 3200  
Hamilton  
Phone: (07) 859 9180

Masters of Nursing candidate  
School of Nursing  
Faculty of Medicine and Health Science  
University of Auckland

**Academic Supervisor:**

Kathy Shaw  
Academic Advisor  
Waikato Clinical School/University of Auckland  
Phone: 0274575019

**Introduction:**

My name is Bryan Gibbison and I am a Masters of Nursing Student with the School of Nursing at the University of Auckland. I am carrying out research about what makes people successful at weight maintenance and would like to talk with you about your experiences of the Adult Weight Management Programme and of your weight journey since that time.

You are invited to take part in this study which is to try and find out more about what makes people successful at weight maintenance. You do not have to take part in this study and your current care will not be affected if you decide not to take part. I ask that you read this information sheet and ask any questions that you may have before agreeing to participate. You may take as long as you wish to decide to come to a decision. If you decide to take part you will be asked to read and sign an informed consent form.

## **Participation**

Your involvement in this study is entirely voluntary (your choice). You do not have to take part in this study and if you choose not to, your decision will not affect any current or future care or treatment.

If you do agree to take part you are free to withdraw from the study at any time without having to give a reason. This will in no way affect your current or future care or treatment.

Participation in this study will be stopped should any harmful effects appear or if I feel that it is not in your best interest to continue.

## **About the Study**

### **What are the aims of this study?**

This study will involve past participants of the Adult Weight Management Programme at the Waikato Diabetes Service. Selected participants will be invited to take part in an interview with me.

The main aims of this study are to find out what factors make a person successful, or prevent them from being successful, at weight maintenance, and to explore the experience of weight maintenance. I am looking to see if there are particular habits or practices, including social structures and functions, such as family structures, that enable success.

### **Who can be in the study?**

- Anybody who has completed the weight management programme, and
- is able to give informed consent for themselves

You will not be able to participate in this study

- if you have had gastric bypass surgery since completing the programme,
- are unable to travel to the clinic, and/or
- you are unable to give informed consent yourself.

### **How many people will be involved in the study?**

Interviews will be carried out with a total of six (6) or eight (8) people.

### **Where will the study be held?**

This study will be held at the Waikato Regional Diabetes Service, located at 26 Clarence Street, Hamilton.

### **What is the time span of the study?**

If you agree to participate in the study, this will involve one visit to the Diabetes Service for an interview lasting up to two (2) hours. This study is planned to start in November 2009, with interviews being conducted between April and August 2010, and the final report will be completed in December 2010.

### **What will I be expected to do?**

If you agree to take part in the study you will be asked to come to the Diabetes Service for a visit lasting up to two hours.

You will be given the chance to discuss the study and this information sheet with me. The consent form will then be signed and dated and you will be given a copy.

The interview may take up to two (2) hours and will ask you to describe your experience of weight maintenance. The interview will be recorded and transcribed at a later time. You do not have to answer all the questions and you may stop the interview at any time. The transcribed interview will be analysed for common themes by the principal investigator.

### **Benefits and Risks of the study?**

#### **What are the benefits of the study?**

Participating in this study will contribute important information about the characteristics of successful weight maintenance in the Waikato. It will contribute to the existing knowledge about weight management in New Zealand and will support the on-going development of the Adult Weight Management Programme, which will in turn help others to be more successful.

#### **What are the risks and/or inconveniences of the study?**

The major inconvenience of the study is the time spent attending the Clinic for the interview.

There is no therapy involved with this study. As the interview is asking you about your experiences it is not expected to pose any risk to you.

#### **Will it cost me anything to be part of the study? Will I be paid for this study?**

You will not receive any payment for your involvement with this study. The only cost may involve your travel to and from, and parking at, the clinic for the interview, for which you will receive a petrol voucher.

### **Confidentiality**

All information collected from you will be treated as highly confidential. Once the interview has been transcribed and checked for completeness the recording will be erased. All data and copies of the transcribed interviews will be kept in a locked cabinet in the principal investigator's office in the Diabetes Clinic. No one, other than the principal investigator, will have access to these. All data, including transcripts, will be kept for ten (10) years after completion of the study and will then be destroyed.

No data which could personally identify you will be used in any reports about this study. All electronic data will be tracked by your NHI number and/or date of birth. However all data will be pooled for analysis purposes so no individual will be identified as a result. A separate code will be attached to the interview transcripts so that if verbatim statements are used in the final report they will be coded in a way such that no individual will be able to be identified. No personal identification information will be used in any publications or presentations about this study.

### **Results**

The results of this study will be presented in a research portfolio to the University of Auckland in partial fulfilment of the requirements of the degree of Masters of Nursing. The results will be presented to the Waikato Clinical School Biennial Research conference and also be published in a relevant journal. If you wish to receive a copy of the final report then this will be sent to you. There may be a delay between your interview and the publication of the final report.

## **General**

### **Where can I get more information about this study?**

For more information about the study please do not hesitate to contact the principal investigator:

Bryan Gibbison – (07) 859 9180 or 021 549 845

If you need an interpreter one can be provided.

You may have a friend, family or whanau support to help you understand the risks and/or benefits of this study, to come to the interview with you for support and for any other explanations you may require.

If you have any queries or concerns regarding your rights as a participant in this study, you may wish to contact an independent health and disability advocate:

- Free phone: 0800 555 050
- Free fax: 0800 2 SUPPORT (0800 2787 7678)
- Email: [advocacy@hdc.org.nz](mailto:advocacy@hdc.org.nz)

For Maori health support, or to discuss concerns or issues regarding this study please contact (07) 834 3644

## **Statement of Approval**

This study has received ethical approval from the Northern Y Regional Ethics Committee, ethics reference number NTY/09/10/097.

**Thank you for reading about this study.**

**Please feel free to contact the researcher if you have any questions about this study**

## **Appendix B: Consent Form**



## CONSENT FORM

**Study Title: Are we there yet? Factors associated with, and experiences of, successful weight maintenance in the Adult Weight Management Programme in the Waikato.**

**Request for interpreter (to be included on all consent forms)**

English	I wish to have an interpreter	Yes	No
Māori	E hiahia ana ahau ki tetahi kaiwhaka Māori/kaiwhaka pakeha korero	Ae	Kao
Cook Island Māori	Ka inangaro au i tetai tangata uri reo	Ae	Kare
Fijian	Au gadreva me dua e vakadewa vosa vei au	Io	Sega
Sāmoan	Ou te mana'o ia i ai se fa'amatala upu	loe	Leai

- 1 I have read and I understand the information sheet dated 15 November 2009 for volunteers taking part in the study designed to establish factors associated with, and experiences of, successful weight maintenance. I have had the opportunity to discuss this study. I am satisfied with the answers I have been given.
  
- 2 I have had the opportunity to use whānau support or a friend to help me ask questions and understand the study.
  
- 3 I understand that taking part in this study is voluntary (my choice), and that I may withdraw from the study at any time, and this will in no way affect my continuing health care
  
- 4 I have had this project explained to me by Bryan Gibbison (Principal Investigator).
  
- 5 I understand that my participation in this study is confidential and that no material that could identify me will be used in any reports on this study.
  
- 6 I have had time to consider whether to take part in the study.
  
- 7 I know to contact Bryan Gibbison (Principal Investigator) if I have any questions about this study.
  
- 8 I consent to my interview being audio-taped. Yes/No
  
- 9 I wish to receive a copy of the results. Yes/No

I (full name) hereby consent to take part in this study.

Date:

Signature:

Full names of researchers: Bryan David Gibbison

Contact phone number for researchers: (07) 859 9180 or 021 549 845

Project explained by:

Project role: Principal Investigator

Signature:

Date:

## **Appendix C: Invitation Letter**



## INVITATION LETTER

Dear

I am writing to ask if you might like to take part in a study to try and find out what makes some people more successful than others at weight maintenance.

I am a student with the University of Auckland and am completing my Masters of Nursing degree. I am carrying out research on what makes people successful at weight maintenance. I would like to carry out an interview with 6 to 8 people who completed the Adult Weight Management Programme two or more years ago, to explore the experience of weight maintenance and to look at what strategies are used that enable or hinder success. The outcomes of this study will help us understand what things help with successful weight maintenance.

If you agree to take part you will need to come to the Diabetes Clinic for an interview lasting for up to 2 hours. The interview will be recorded and transcribed so that it can be analysed for themes. I will try to be flexible with the time for the interview so you can still meet your work and other commitments. Participation in this study is voluntary and there is no payment for participation but you will be offered petrol vouchers to cover the costs of travel expenses incurred to and from the diabetes clinic. Please see the enclosed information sheet and consent form for specific details.

The Northern Y Ethics Committee has approved this study.

Your participation is entirely voluntary (your choice). You do not have to take part in this study, and if you choose not to take part this will not affect you current or future care. You are free to withdraw from the study at any time for any reason. While there is little risk of harm in this study, your participation will be stopped should any harmful effects appear or if I, as the principal investigator, feel it is not in your best interest to continue.

Please don't hesitate to phone me if you have any questions about the study or want to know more information. If you are interested, and would like to take part please contact me at the Diabetes Clinic on 07 859 9180 or 021 549 845.

Thank you for your consideration of this request.

Yours faithfully

Bryan Gibbison

Having read the invitation letter and the information in the Information Sheet, dated 15 November 2009, about the study to find out what makes people successful at weight maintenance,

YES, I am interested in taking part in this study

OR

NO, I am not interested in taking part in this study

(please delete the line that does not apply)

If you have indicated that you are interested in this study, or would like further information, please provide contact telephone numbers:

Name: \_\_\_\_\_

Home: \_\_\_\_\_

Work: \_\_\_\_\_

Mobile: \_\_\_\_\_

Please return in the envelope provided – thank you.

## **Appendix D: Interview Schedule**

## **Interview Schedule**

These questions form the basis of the interview with participants, but may not be limited to only these questions.

**When did you complete the group education / intensive phase of the programme?**

**Did you miss any sessions of the education programme?**

**If so which one(s) did you miss and do you think missing them has had any impact on your present weight or success?**

**What was your weight:**

- **on coming into the programme?**
- **at the end of the first 6 months?**
- **at the end of the programme (2 years after commencing)?**
- **now?**

**Tell me about your experiences with weight maintenance since your time with the programme?**

**What things do you think have contributed to your success / lack of success with weight maintenance?**

- Looking for things such as adherence to a lower energy diet, consistent self-monitoring of weight food intake and physical activity and high levels of physical activity (> 60mins/day, most days of the week)

**Tell me more about these?**

- Interested here in particular in what self-monitoring is helpful. May ask additional questions about the self-recording that was done during the group education phase

**How do your family / whanau / significant other help you to be successful, or hinder you from being more successful?**

- Looking here to see if there are any social or family structures or practices that enable the individual to be successful. How is this expressed and provided?

**Appendix E: Letter of Approval from Te Puna Oranga**



*Te Puna Oranga (Māori Health)*  
Waikato District Health Board  
P.O.Box 934,  
HAMILTON 3240  
Phone: (07)834 3644  
Fax: (07) 834 3619

Date: 15 September 2009

Bryan Gibbison  
Clinical Nurse Specialist – Diabetes  
Waikato Regional Diabetes Service  
26 Clarence St,  
Hamilton

Tena koe Bryan,

Re: **Are we there yet? Factors associated with the experiences of successful weight maintenance in the Adult Weight Management Programme in the Waikato**

On behalf of the Kaumatua Kaunihera Research Subcommittee thank you for submitting research material for comment. The subcommittee has considered your research proposal and is pleased to provide you with their support subject to:

1. The Kaumātua Kaunihera receiving a copy of the results being forwarded to the subcommittee at the completion of the study, and
2. A report is provided at the end of the study on the total amount of Māori participants vs total participants.

Thank you for submitting your research to the subcommittee and should you have any further queries please contact me.

Noho ora mai

Jonas Hapuku  
Manager - Te Puna Oranga  
On behalf of Kaumātua Kaunihera Research Sub-committee

**Appendix F: Letter of Approval from Northern Y Regional Ethics Committee**

**Health  
and  
Disability  
Ethics  
Committees**

24 December 2009

**Mr Bryan Gibbison**  
Waikato Regional Diabetes Service  
Private Bag 3200  
Hamilton.

**Northern Y Regional Ethics Committee**

Ministry of Health  
3rd Floor, BNZ Building  
354 Victoria Street  
PO Box 1031  
Hamilton  
Phone (07) 858 7021  
Fax (07) 858 7070

Email: northerny\_ethicscommittee@moh.govt.nz

Dear Bryan

**What are the factors associated with, and the experiences of, successful weight maintenance in the Adult Weight Management Programme in the Waikato region.**

*Investigators:* Bryan Gibbison. *Supervisor:* Kathy Shaw.

*Ethics ref:* NTY/09/10/097

*Locations:* WDHB

The above study has been given ethical approval by the **Northern Y Regional Ethics Committee**.

**Approved Documents**

- Draft Interview schedule version 1 dated 27 August 2009.
- Information Sheet and Consent Form version 2 dated 15 November 2009.
- Patient invitation letter version 2 dated 15 November 2009.

**Accreditation**

The Committee involved in the approval of this study is accredited by the Health Research Council and is constituted and operates in accordance with the Operational Standard for Ethics Committees, April 2006.

**Final Report**

The study is approved until **30 December 2010**. A final report is required at the end of the study and a form to assist with this is available at <http://www.ethicscommittees.health.govt.nz>. If the study will not be completed as advised, please forward a progress report and an application for extension of ethical approval one month before the above date.

**Amendments**

It is also a condition of approval that the Committee is advised of any adverse events, if the study does not commence, or the study is altered in any way, including all documentation eg advertisements, letters to prospective participants.

**Please quote the above ethics committee reference number in all correspondence.**

It should be noted that Ethics Committee approval does not imply any resource commitment or administrative facilitation by any healthcare provider within whose facility the research is to be carried out. Where applicable, authority for this must be obtained separately from the appropriate manager within the organisation.

We wish you well with your study.

Yours sincerely



Amrita Kuruvilla  
Administrator - Northern Y Ethics Committee  
Email: amrita\_kuruvilla@moh.govt.nz