Strategies and Factors Influencing Weight Management in Malaysia

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Declaration

I hereby declare that this thesis has been composed by myself and it has not been accepted in any previous application for a degree. The work has been done by me alone. All quotations have been distinguished by quotation marks, the sources of information specifically acknowledged and help provided by other people has been acknowledged.

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Abstract

This thesis addresses challenges Malaysia faced in weight management. Issues, aims, objectives and thesis layout were explored and explained in chapter one. Chapter two delves on technical details of overweight and obesity; its cause, consequence and measures with past studies and relevant theories critically evaluated. Chapter three explored experiences of 46 selected individuals that previously engaged in weight loss/maintenance and cultural impact as barrier through a semi-structured interview. Although most have good knowledge on obesity, they lack motivation and self-regulatory skills. Challenges included societal norms and peer pressure; with time and commitment were most difficult to overcome. Malays and Indians ethnicities mentioned need of family members to be present at meal times. Family, work or social gatherings required participants to join in and eat together to avoid causing offense. Chapter four explored weight management experiences of 4971 individuals using a survey and model predictors of weight loss success. Majority attempted weight loss at least once, are minimally active, few sought professional help and most wishing for more weight loss success but very few were successful. The first predicting model revealed *sex, physical activity level* and *treatment control* as strongest predictor but having 2.3% variance predictability. The second model predictors were *physical activity level, treatment control, emotional representations, timeline cyclical, high caloric food score, identity* and *timeline* with a higher variance of 31.7%. Chapter five analysed Body Image Scale's (BIS) potential as a proxy measure for BMI in a Malaysian population. Individuals presently engaging either on weight loss attempts or maintenance can match their BMI correctly to corresponding image on BIS. Participants with BMI<25.0 tend to overestimate their position on the BIS and vice-versa for those with BMI $\geq$25.0. Chapter six concluded in proposing some key ideas for intervention development and use of results in existing programmes the MoH is implementing.

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BMI	–	Body Mass Index
B-IPQ	–	Brief Illness Perception Questionnaire
BIS	–	Body Image Scale
CPG	–	Clinical Practice Guidelines
CSSRM	–	Common Sense Self-Regulation Model
IHBR	–	Institute for Health Behavioural Research
IPH	–	Institute for Public Health
MANS	–	Malaysian Adult Nutrition Survey
MoH	–	Ministry of Health
MREC	–	Medical Research and Ethics Committee
MSHS	–	Malaysian school-based Student Health Survey
NHMS	–	National Health and Morbidity Survey
NHS	–	National Health System
SCT	–	Social Cognitive Theory
WHO	–	World Health Organization
WLA	–	Weight Loss Attempt
YBRFS	–	Youth Behavioural Risk Factor Surveillance

Chapter 1. Introduction

1.1 Overweight and Obesity

1.1.1 *Epidemiological studies on obesity*

The World Health Organization reported obesity and overweight has more than doubled since the 1980's: around 39% of adults (39% men and 40% women) in 2014 were overweight (BMI $\geq$25kg/m^2) and 13% of adults (11% men and 15% women) were obese (BMI $\geq$30kg/m^2). Data on obesity prevalence was highest in the World Health Organization (WHO) regions of the Americas (61% for overweight in both sexes, and 27% for obesity) and lowest in the South East Asian Region (22% for overweight in both sexes, and 5% for obesity) (WHO, 2016).

Global age-standardized mean BMI for men has increased from 21.7kg/m^2 in 1975 to 24.2kg/m^2 in 2014, and in women from 22.1kg/m^2 in 1975 to 24.4kg/m^2 in 2014 with an increase of 0.63 kg/m^2 per decade. However, a dramatic increase in BMI trend was observed for men in central and Eastern Europe, east and southeast Asia, and most countries in Latin America and the Caribbean after the year 2000 (NCD-Risc, 2016).

Epidemiological data demonstrated that, in the past 15 years, Malaysia has seen a stark increase in the levels of overweight and obesity in the South East Asian Region. By 2012, Malaysia emerged as the country in the South East Asian region with the highest percentage of its population categorized as being overweight or obese (Khambalia and Seen, 2010). These increases in the average weight of the population were reflected clearly in data emerging from the National Health and Morbidity Surveys (NHMS) of 1996, 2006 and 2011.

Population data in Malaysia shows a substantial increase in the proportion of people classified as overweight from 20.7% in 1996 (Lim et al., 2000), to 29.1% in 2006 (Omar et al., 2006) and 33.3% in 2011 (IPH, 2012b). Obesity prevalence has also increased from 5.5% (Lim et al., 2000), to 14.0% (Omar et al., 2006) with the most recent survey revealing a steep jump to 27.2% (IPH, 2012b). This upwards trajectory coincides with increases in rates of cardiovascular conditions and with a reduction in reported healthy lifestyle practices, as observed on the data obtained from the 2011 NHMS (IPH, 2012b).

The Malaysian Ministry of Health (MoH) and its staff, as the custodian of health, are not immune to these trends and face similar problems. The most recent available data used the lowered Asian cut-off point (Barba et al., 2004) for overweight (BMI>23.0) and obesity (BMI>27.5). The results revealed that 65.4% of the MoH workforce falls within the overweight and obese categories. The Asian cut of point is based on the Malaysian Clinical Practice Guideline (CPG) Management of Obesity (MoH, 2004, MoH, 2009). Although these percentages are inflated, due to the lower cut-off point they are not that distant from the nationwide data mentioned earlier. Using the WHO cut-off point the results would be lower (49.4% for overweight and obesity) but still places Malaysia on the top of South East Asia Rankings and high in the world ranks (Chan, et al., 2017).

Health professionals of normal weight are more likely to be more confident in their weight management practice, perceive fewer barriers to weight management and have more positive outcome expectations, have stronger role identity and more negative attitudes towards obese individuals than health professionals who are overweight or obese (Zhu et al., 2011). Although not all these descriptors are desirable (e.g. having negative attitudes towards obese individuals) they seem to indicate that those working for the healthcare system and with weight issues, either as front line providers, or not, can experience more barriers when tasked with implementing and/or representing interventions provided by the ministry through the on-going healthy lifestyle campaigns. This, if not amended, will continue to hamper existing efforts in the country.

1.1.2 *How Malaysia dealt with weight challenges in the past*

Since 1991 even before the results of the NHMS survey in 1996, the MoH in Malaysia has been engaging in national public health campaigns (1991-2005) run by the Health Ministry's Health Promotion Division. The overall aims were to educate the public to live a healthy lifestyle through various yearly campaigns targeting different themes. These campaigns involved media interventions targeting healthy lifestyle changes including encouraging healthy eating (consuming more vegetables and fruits, and less sugar, salt and fat, etc), increases in moderate to vigorous physical activity (promoting the guideline of 10,000 daily steps), and, as a result, maintaining a healthy weight. The results of these campaigns seem to have led to a slower but still increasing population BMI (Ibrahim et al., 2009). This seems to indicate that further efforts need to be made in terms of understanding the factors leading to this increase.

Food and Nutrition corporations also started to involve themselves in dealing with the weight challenge by doing their own health promotional activities in conjunction with the Ministry of Health. In recent years, Nestlé™ Malaysia developed and issued healthy cooking practices booklets. Nestlé™ Malaysia often collaborated with the Ministry of Health in supporting the implementation of Healthy Lifestyle campaigns and studies in collaboration with the Malaysian Association for the Study of Obesity that produced the first National Dietary Guidelines (MoH, 2010).

Actual weight loss interventions by the Ministry of Health are not available on a nationwide scale. Most interventions have a small reach and are conducted in local clinics or hospital settings by existing healthcare professionals (such as Medical Doctors, nurses, nutritionists and psychologists?) with the support of the local setting administration. Most interventions are incentive based to encourage enrolment and participant success and often are one-off rather than continuous without post intervention monitoring to support weight maintenance efforts. To date, however, most results from these interventions have not been published.

Private companies offering weight management services have been available for quite some time in Malaysia although collaborations between these companies and the Ministry of Health have not been established. These companies includes Marie France®, Mayfair Bodyline® and Dorra Slimming Malaysia®. These companies are profit driven and the issue of profit is what limits the collaboration between the MoH and these companies. Considering the current average salary of a Malay family attending interventions provided by these companies would be prohibitive for some due the low minimum wage in Malaysia (MYR1000.00 ~ GBP188.18 per month compared to the UK of GBP1, 378 per month) (IECONOMICS INC, 2017).

1.2 Issues on Weight Loss and Weight Management: from the world to Malaysia

Overweight and obesity; and its related non-communicable diseases are mainly preventable. Weight loss and weight management is the most effective method to reduce and manage weight and in turn, reduce the morbidity and mortality emerging as a result of non-communicable diseases. In many developed countries including the United States and the United Kingdom a large proportion there has been an effort by both governmental institutions and population to support research and interventions around weight loss (Truby, et al., 2006). The private sector has also

contributed as there are many available commercial weight loss and weight management programmes available and there have been studies published assessing some of these as well as key systematic reviews published on these programmes. Results seem to range from a reported loss of 3.2% of weight at the initial weight in Weight Watchers® type of interventions (lasting 2 years) and a loss of between 15-25% of weight through medically supervised very low calorie diet (VLCD). These programmes however are also associated with high costs, high attrition rates and a high 50% or more of weight regain one or two years after the intervention has ended (Tsai and Wadden, 2005, Truby et al., 2006).

An updated systematic review reported an achievement of at least 2.6% weight loss at 12 months compared to a control or health education only programme by Weight Watchers, Jenny Craig® reported a 4.9% greater weight loss of the same duration compared to a control, health education or counselling only programme, VLCD programmes resulted in at least 4.0% greater short term results compared to counselling and Atkins reported 0.1-2.9% higher results at 12 months compared to counselling (Gudzune, et al., 2015).

Another systematic review of multiple randomized interventions stated that effectiveness of weight loss management programmes are not effective between three to six months (–0.62 kg; 95% CI –1.67 to 0.44) but is effective at 12 months (–1.72 kg; 95% CI –2.80 to –0.64) with a combination of behavioural weight management programmes (BWMP) and diet only programmes while combine BWMP with physical activity only programs showed a greater weight loss effect at both three to six month (–5.33 kg; 95% CI –7.61 to –3.04) and 12 to 18 months (–6.29 kg; 95% CI –7.33 to –5.25). A combination of both diet and physical activity showed greater promise at the long run (Johns, Hartmann-Boyce, Jebb, & Aveyard, 2014).

Another systematic review and meta-analyses of randomized control trials on long term maintenance of weight loss with non-surgical interventions in 45 trials (1984-2013) conducted on 7788 obese individuals revealed that behaviour based interventions focused on both food intake and physical activity resulted in an average difference of -1.56kg (95%CI – 2.27 to -.86kg; 25 comparisons, 2429 participants) in weight regain compared to control at 12 months. Orlistat combined with behavioural interventions resulted in a −1.80 kg (−2.54 to −1.06; eight comparisons, 1738 participants) difference compared with placebo at 12 months. All orlistat studies reported higher frequencies of adverse gastrointestinal events in the experimental compared with placebo

control groups. A dose-response relation for orlistat treatment was found, with 120 mg doses three times a day leading to greater weight loss maintenance (−2.34 kg, −3.03 to −1.65) compared with 60 mg and 30 mg three times a day (−0.70 kg, 95% confidence interval −1.92 to 0.52), p=0.02. It showed that both diet and physical activity based behaviour interventions have a small yet significant reduction in weight loss maintenance but combined with Orlistat will increase the efficacy of weight loss (Dombrowski, Knittle, Avenell, Araujo-Soares, & Sniehotta, 2014).

From the aforementioned systematic reviews it follows that many of the structured weight loss and weight management programs are conducted both by the public sector (e.g. NHS in the UK) as well as by companies in the private sector (e.g. Weight Watchers®). The common goal seems to be to contribute to stop the increase observed in the current BMI across the years and across the world (NCD-Risc, 2016) in an attempt to encourage weight loss among the overweight and obese population. This is however a different scenario in Malaysia.

Compared to the more successful commercially supported weight loss interventions in the United Kingdom than the less successful National Health System (NHS) in-house interventions (Jolly, et al., 2011), Malaysian weight loss activities are more often individualized or done in small groups; and often go unrecorded and are not evaluated. The only known non-commercial interventions for overweight and obesity delivered by the Ministry of Health (MoH) are those tailored to the clinically and severely obese (BMI>35.0), taking place at the Hospital Putrajaya. Part of the intervention can include behavioural interventions targeting diet and physical activity, pharmacological interventions and, in the more extreme cases gastric bypass (HospitalPutrajaya, 2013). What is done in this service is equally harder to track as there is no National registry to track interventions and its success stories when it comes to weight loss attempt(s).

With the increasing trend of obesity in Malaysia, and given the lack of services available it seems that the population might not have a heightened sense of the implications of overweight and obesity. Aside from individual beliefs and practices, cultural factors may also play a role in affecting some of these health related behaviours (Lim et al., 2000, IPH, 2012a, Chan et al., 2012). More research is needed in this area in order to fully understand what services could be provided, how and how would they work.

1.3 Definition of Problem

Weight management has not been widely investigated in Malaysia despite the issue of overweight and obesity being discussed in the media as well as in some published studies that are mainly epidemiological (Cheng, 2013, Khambalia and Seen, 2010, NST, 2014). Weight management companies such as Marie France® and London Weight Management® have existed in Malaysia since the year 2000 and although slowly gaining attention from the public, Malaysian rates of overweight and obesity keep on climbing. Studies that aim on understanding the factors, psychological, social and cultural, involved in weight management are very limited. Understanding these factors is crucial. So far interventions implemented in Malaysia do not seem to have made an effort -no peer review papers, or grey literature ones have been found - to understand the specific drivers that fuel the obesity epidemic in Malaysia. The work described in this thesis aims to explore and understand issues surrounding the drivers of weight loss and weight maintenance in a Malaysian population. The aim is to understand what is happening in terms of weight loss and maintenance in Malaysia; explore drivers, barriers and facilitators as well as the impact culture has on this. The final goal is to collect evidence statements that can be used in the future to develop a weight management strategy that can be adapted by the country and effectively support people managing their weight.

The study is divided into two phases:

1. Phase one: using a qualitative methodology with the aim of exploring an under researched area; weight management, beliefs and feelings associated with it, targeting facilitators and barriers including a foci on the role of culture.
2. Phase two: using a quantitative methodology (survey) with the aim of describing what is happening in the Malaysian Society in terms of weight management focusing on weight loss and maintenance experiences and assessing potential social and cognitive predictors of these behaviours.

1.4 Aims and Objectives of the Study

1.4.1 *Aims of the study*

This exploratory study aims to investigate theory and evidenced based predictors of weight loss and weight maintenance (in general weight management) behaviours amongst Malaysians within the Ministry of Health (MoH).

1.4.2 *Objectives of the study*

The objectives of the study are presented in three main chapters:

a. Barriers, facilitators and the role of culture for weight management in Malaysia (Chapter 3):
    i. perceived facilitators and barriers to weight management,
    ii. key determinants of success or failure in weight management; and
    iii. cultural influences on weight management.
b. Theory based cross sectional survey targeting predictors of weight management in Malaysia (Chapter 4):
    i. past and present weight lost practices, perceptions and beliefs about weight loss and weight maintenance.
    ii. the role of BMI (overweight and obesity) on past and present weight management practices.
    iii. theory based predictors of weight loss success (perceived weight loss and actual weight loss).
c. Pilot of a Body Image Scale (BIS) (Chapter 5):
    i. the Body Image Scale (BIS) as a proxy for BMI: a mixed-methods study

1.5 Population of the Study

The Malaysian Government workforce represents 10% of the total workforce population and the Ministry of Health (MoH) workforce represents the third largest workforce population within the Government with a total manpower nearing 270,000 people (MalaysiaKini, 2017). The MoH will be the population of the study based on the increasing obesity rates within the ministry itself. The MoH, serving as the custodian of health towards the Malaysian population faces scrutiny from the public that it tries to serve. Serving all 13 States and 2 Federal Territories, the estimated 80,000 total workforce was targeted in this study according to the required sampling method and inclusion criteria set for each phase of this work.

1.5.1 *The Malaysian job ranking system VS. UK standards*

The Malaysian Civil Service ranking system was established and amended according to the needs and requirements of the Civil Service Department of Malaysia (Jabatan Perkhidmatan Awam (JPA) Malaysia) as the service evolved through time. The current ranking system evolved from the old UK standards and is defined as follows:

Job Classification	Coding within Malaysian Service	Category & size of service population
Top Management	TURUS I, II & III JUSA A, B & C	4,024
Management and Professionals	Grade 41 – 54	501,953
Support group with Diploma/STPM qualifications	Grade 27 – 40	762,781
Support group with SPM qualifications	Grade 17 – 26	(Non-Professionals)
Support group with PMR/SRP qualifications and lower	Grade 1 – 16	

Table 1: Job Ranking system within Malaysia Civil Service Department (JPA, 2014)

The current ranking system applies to all jobs within the civil service. Within the Malaysia's MoH, the majority of Nurses, Medical Assistance, Lab Technicians falls within the Support group (Grade 40 and below) (JPA, 2014) as they are diploma holders rather than a university degree. Professionals are those of graduate degree that includes Medical Doctors, Surgeons, Pharmacist, Science Officers, Health Education Officers, Dietitians, Nutritionists, Physiotherapists etc. This is different from the UK system where the defined non-professionals in Malaysia fall within the professional group, as the entry point is degree holders rather than diploma.

The purpose of this explanation of the job ranking system is to provide a better understanding of how the public service is structured. This will have an impact on the way the sampling framework is devised for each part of this thesis. The aim is to enrol participants from both groups – professionals and non-professionals.

1.6 Importance of the study

Considering the paucity of evidence in this area in Malaysia, as well as the magnitude of overweight and obesity, this thesis will, undoubtedly, increase our understanding on the issue. Chapter 3 will give us an in-depth knowledge on the personal journey of identifying a weight problem, embarking on a solution by confronting and resolving barriers whilst seizing facilitators in order to optimize the ability to keep the weight off. Chapter 4 will enable the identification of not only of the magnitude of the problem (overweight and obesity) in a sample that is representative of the Malaysian population, but will also allow the precise description of what is happening in terms of weight management: attempts to lose weight, methods used, and the social, cultural and psychological factors associated with these behaviours. The quantitative data will also provide an overarching view of the MoH population that was explored earlier in the qualitative chapter. Another important component of the study is the pilot of the Body Image Scale (BIS) used in this

study – the BIS has never been used for any study in the region and has been proven successful in the western countries as a proxy to the Body Mass Index (BMI). This pilot study of the BIS will allow me to understand if this tool can be used in a Malaysian population and for a similar purpose: as a proxy for BMI.

In sum, the work presented in this thesis will contribute in unveiling situations and opportunities for improvements of the care offered for those who are overweight and obese with the potential to lead to the development of distinct pathways of care and even theory and evidence based interventions that could be either individually tailored or focused on the general population (via public health campaigns). The work presented in this thesis could and should be used for future research and in intervention applications in Malaysia.

1.7 Layout of Thesis Report

For the purpose of the reader of this thesis, it is best made known that this thesis report was designed to be written in specific chapters. The opening chapters (chapter 1 & 2) were written to introduce the overall thesis and the underlying past studies and related literature. Chapters 3 focused on the methodology, findings and discussions emerging from the qualitative work aiming at answering objectives in a (i, ii and iii). Chapter 4 focused on the methodology, findings and discussions of the cross-sectional survey study, answering objectives in b (i, ii and iii). Chapter 5 presents data based on mixed methods study – the pilot of the Body Image Scale, answering objective c. Chapter 6 discusses the results that emerged across all the studies conducted across this thesis including conclusions, strengths and limitations as well as suggestions for future research.

Chapter 2. Literature Review

2.1 Introduction

Chapter 1 introduced the key ideas on overweight and obesity and the prevalence of the issues across the world and in Malaysia. With the increase of overweight and obesity worldwide and multiple actions taken to overcome it; as unsuccessful of a global state as it is; studies have proven that it is not impossible to overcome the overweight and obesity epidemic. However, factors surrounding overweight and obesity have not yet been discussed in detail and this chapter aims at exploring the scientific nature of overweight and obesity – its causes, consequence, how cultural factors have impacted overweight and obesity, measurement tools used to measure weight and related studies exploring overweight and obesity.

2.2 Energy Imbalance as a cause of Overweight and Obesity

Overweight and obesity has long been described as the result of an energy imbalance in terms of intake and expenditure. Energy balance is defined as the same amount of energy consumed and energy used on a daily basis (NIH, 2012). Imbalance is generally caused due to excessive intake of energy-dense foods that are high in fat and high levels of sedentary behaviours and/or physical inactivity on a daily basis. These higher levels of sedentary behaviour or lower levels of physical activity can occur as a result of changes in the work place, from heavily active to less active, changes in the chosen mode of transportation and can also be related to urbanization and climate change, leaving people with less opportunities to engage in physical activity. This energetic imbalance can be a consequence of observed changes in different areas: environmental, behavioural and societal. Often these changes are associated with a lack of policies to support better health (WHO, 2016).

2.2.1 *Behavioural factors associated with overweight and obesity*

Changes in physical activity patterns are seen as one of the root causes of overweight and obesity. Most individuals present high levels of sedentary behaviour and engage in lower levels of physical activity. Research has linked overweight and obesity to TV viewing more than 2 hours per day (NIH, 2012). In Malaysia, only 64.8% of adults have been reported as physically active (being moderately active) (IPH, 2012b). A decade old study revealed that 15% of men and 20% of women from 51 countries are at risk for chronic disease due to lack of physical activity that lead to a higher level of overweight and obesity (Guthold et al., 2008). Studies seem to indicate that people spend

more time doing work sat in front of their computer, watching TV, using their tablets and smart phones, and engaging in less active leisure time activities, which in turn seems to be fuelling successive increases in BMI (IPH, 2012b).

Changes in dietary patterns are also seen as the second root cause for obesity. People nowadays consume more high energy-dense food that is high in fat rather than healthier food options such as vegetables and fruits while being less active than recommended – leading to energy imbalance (WHO, 2015). In developed countries, there is a lack of the daily-required intake of fruit and vegetable. In a study of 52 low and middle-income countries, 77.6% of men and 78.4% of women consumed less than the recommended daily servings of fruit and vegetables (Hall et al., 2009). In fact, 92.5% of adults in Malaysia (18 years or more) did not meet their daily 5 servings of fruit and vegetables per day (IPH, 2012b). This is spurred by the increase of cheaper high energy-dense foods against the increase in the prices of healthier food options prompting the public to save on short term cost rather than on long term health (Science, 2007).

Aside from dietary patterns and food options, food portion changes are also linked to overweight and obesity rates. Increase in food portion size is a direct result of increase in the practice of eating out at restaurants. An increased demand by consumers over economic value have pushed the increase of portion sizes in food served (Ledikwe et al., 2005). In Malaysia, although there are recommendations for food portion size (MoH, 2010), these are rarely adhered to due to business concerns over the potential to loss of costumers that will search for higher value for money options (larger portions at a similar price).

Increase in soft drink consumptions is also part of the dietary change in overweight and obesity. Although the consumption of soft drinks does not lead to satiety, combined with food, the high calorie present in the drinks add up to existing calories in the food consumed and causes weight gain. A systematic review on 15 cross-sectional studies, 10 prospective studies and 5 experimental studies revealed a positive association between consumption of sugar-sweetened beverages and weight increase (Malik et al., 2006). A meta-analysis of 88 studies also revealed an increase of energy intake and body weight (Vartanian et al., 2007) while a systematic review of 38 studies revealed an increase in excess intake of energy drinks amongst children and young people (Visram, Cheetam, Riby, Lake, & Crossley, 2015).

Systematic reviews on behaviour determinants have been conducted for specific behaviours. A systematic review and meta-analysis on 22 selected papers found 23 habit to behaviour correlations with strongest habit were reported in relation to physical (in)activity and active travel; and nine habit to intention interactions with the impact of intention on behaviour diminished as habit strength increased. The results highlighted the importance of integrating habit into behaviour change theory and practice (Gardner, de Bruijn, & Lally, 2011).

Another systematic review explored the self-regulator mediators that lead to successful behaviour change in adult obesity interventions. This systematic review explored 35 studies with 10 using formal mediation analysis, 28 were randomized control trials aimed at weight loss or maintenance. 13 trials were rated as "strong", 15 as "moderate" and 7 as "weak". Identified mediators for medium to long-term weight control were higher levels of autonomous motivation, self-efficacy or barriers, self-regulation skills, flexible eating restraints, and positive body image (Teixeira, et al., 2015).

2.2.2 *Genetic factors*

Scientifically genetics have been proven to play a role in obesity. Genes that are directly linked to obesity are present in disorders such as the Bardet-Biedl syndrome and Prader-Willi syndrome (CDC, 2013). Genetics however, are not always predictive of overweight and obesity. Majority of cases of families with many of its members with obesity also have other family members without normal weight (Gonçalves, et al., 2012). Current knowledge seems to indicate that familial patterns of obesity are more due to other factors (nurture) like over-accessibility of food and reduced physical activity then to genetic issues (Ells, Demaio, & Farpour-Lambert, 2018). Genetics however, is perceived by most people with obesity as one key issue (Gonçalves, et al., 2012) and this factor could potentially become a barrier in weight loss, leading people to accept overweight and obesity status as something over which they have no control rather than to focus on how to change their behaviour or take action to influence environment causes (CDC, 2013).

2.2.3 *Environmental factors*

Environmental changes can play a significant part in overweight and obesity as they can impact individual behavioural choices (Holands, et al., 2017). Environmental changes include lack of physical environment to facilitate better physical activity where there is a lack of parks, trails, sidewalks and affordable gyms making it hard for people to be physically active (WHO, 2018). Difficult work schedules are also often noted as causes as people often commute longer to and from

work and work for longer hours (NIH, 2012). There are also many cases of lack in access to healthier foods where people do not have access to supermarkets selling cheaper, healthy foods such as fruits and vegetables (NIH, 2012).

One systematic review explored the environmental determinants of fruits and vegetables consumptions amongst adults. The SR explored 41 specific articles on fruit and vegetable consumptions as well as on fat and/or energy intake as outcome variables. Most studies in the systematic review reported that household income was the most prevalent factor for fruit and vegetable consumption with those in lower income households consuming less. Married people showed higher intake compared to singles while parents with children had mixed results. Good positive availability seemed to affect increase of intake (Kamphius, Giskes, de Bruijn, Wendel-Vos, Brug, & van Lenthe, 2006).

2.3 Consequences of Overweight and Obesity

Medically, increase in the Body Mass Index (BMI) is a major risk factor for the development of non-communicable diseases. A global report stated that cardiovascular diseases (mainly heart disease and stroke) were the leading cause of death in 2012, followed closely by diabetes, musculoskeletal disorders (specifically osteoarthritis) and some forms of cancers (WHO, 2014). In Malaysia, 35.1% of adults suffer from hypercholesterolemia, 32.7% suffer from hypertension and 15.2% suffer from type II diabetes as linked to increases in BMI (IPH, 2012b).

As the number of people categorized as overweight and obese increased the burden of diseases faced by the countries also augmented and translated into actual economic burden associated with the costs of managing diseases (CDC, 2013). There are direct and indirect medical costs associated with overweight and obesity (Wolf and Colditz, 1998). Direct medical costs may include preventive, diagnostic, and treatment services related to obesity. Indirect costs relate to morbidity and mortality costs including productivity (CDC, 2013).

The Malaysian government has placed efforts to fight this trend by conducting healthy lifestyle campaigns but with limited success (IPH, 2012b). If the issue is not tackled, co-morbidities of obesity including cardiovascular and metabolic diseases, will incur immense financial health cost (Ismail, 2002). Such demands in Malaysia will impose a huge burden on the human and economic resources and are liable to disturb priorities in health care and other sectors including production,

service, hospitality and human resources more generally (Ismail, 2002). The paradoxical reality of healthcare providers experiencing the same issues as the public they have to serve can become a barrier to adherence to interventions provided by the ministry through the on-going healthy lifestyle campaigns (MoH, 2013). This, if not amended, will continue to hamper existing efforts in the country.

2.4 The Malaysian Eating Culture

Malaysia is a melting pot of culinary cuisines. Adopting many types of cuisines brought into the country since colonial times, locals tend to fuse them with local cooking methods and come out with their own unique flavours. This is why Malaysia is known to be one of the food heavens in South East Asia.

Food in Malaysia is not only ethnic but also geographically driven. Cooking methods of the Malay ethnicity in the North of Peninsular Malaysia is very much different to the East, Central or South Peninsular Malaysia and is even different to East Malaysia. These variations affect the ingredients used within the different geographical locations. Important ingredients brought by the trade of spice from the 15th century further expands the list of mixtures of cooking methods and ingredients used (Sim, 2017).

Malaysian culture follows a general patriarchal system where the husband is the home income provider while the wife or mother is the head cook in the house. Cooking during festivities however, is a communal task where everyone in the family would participate as the task itself is massive and involves the makings of many, rich dishes (Abdul Raji, Ab Karim, Che Ishak, & Arshad, 2017). With the changes currently observed in society, more women enter the workforce and more men tend to pick up culinary skills, the gender bias observed in home food production will probably change. At this moment the old general principles still rule in the average household (Cultural Atlas, 2018).

The standard eating culture in Malaysia is generally communal especially during family gatherings or festivities. Malaysia has strong familial and communal ties within their society and this is reflected in their way of eating. During gatherings or festivities, the first phrase that comes out of the host to the guest would be “dah makan?” or “have you eaten yet?” Food becomes central in

Malaysian eating culture, despite ethnical differences, and the common eating behaviour is often communal or family driven (Kok, 2011).

Malaysia has a practice known as the "rumah terbuka" or "open house" where the general public regardless if you are known to the host or not are invited to join in the gathering or festivities. This practice usually done during festival seasons is also a tourist attraction method for exposure to the Malaysian culture. In a more closed version of the "open house" in which guests who are host familiar, the practice of bringing gifts (usually in the form of food) is common as a gesture of thanks for the invitation (Muhammad, Ramli, Mat Yusoff, & Tuan Ismail, 2016).

In the past Malays, Indians and other minorities, would use their fingers to eat but currently most begin to adopt the use of spoons and forks as urbanization creeps in with Westerns influences. Chinese eating methods of using chopsticks are still prevalent as the Chinese ethnicity is still strong in Malaysia although it's no longer exclusive (Asian Inspirations, 2017).

Culture in itself is a major driver of determining which types of food we eat (Fieldhouse, 1995) and because culture is not static (Khare and Rao, 1986) the eating habits and patterns change over time. With increasing urbanization and greater access to food in Malaysia, limitations to dining ethnic specific dishes have diminished where Malaysians have access to a variety and mixture of ethnic menus; and there is even a greater movement for fusion food while trying to retain their ethnic specific origins. Gone are exclusive dishes for each ethnicity (Sananmuang, 1992) as now although most people retain their unique specificity of cultural born dishes (Bakar, Wan Mohamed Radzi, & Shah Abd., 2010), it does not stop them from enjoying dishes from a different culture.

Eating culture also changed for Malaysia. What used to be a traditional family dining experience now is more of a self-serving dining experience according to time and needs. Although the traditional family dining is still present, urbanization and its time demands have brought about changes. In a more urbanized setting most of the younger generation tend to favour modern food 'on the go' or modernized traditional food that saves time rather than cooking and eating at home (Bakar, Wan Mohamed Radzi, & Shah Abd., 2010). These changes are gradually becoming the norm despite older generation insisting on family-dining experiences (Ali and Abdullah, 2012).

The practice of eating out in Malaysia is also on the increase and more so in urban settings (Ali et al., 2008). The practice of eating out is not only limited to singles or young generations but also to families with limited time to prepare a proper meal at home whereby they also take the opportunity as family bonding time outside their home. Nowadays there is also a trend for Muslims in breaking fast at cafés, restaurants or hotels and this can lead to excessive eating (and is overly expensive) (Ali and Abdullah, 2012).

Changes in eating behaviour and also reduction in physical activity levels have led to an increase in body weight and obesity rates. Changes in cooking methods from healthy to unhealthy have also contributed to these changes. Increased fat intake, with greater access to high density, high fat and high processed foods across all ethnicities also leads to an increase of obesity rates in Malaysia (Ismail et al., 2002). Indians tend to have the highest fat intake followed by Malays and other ethnicities (Ismail et al., 2002) and this is concurrent with the National Health and Morbidity Survey NHMS data (IPH, 2012b).

2.5 Measures of Overweight and Obesity

There are currently several measures used to assess for overweight and obesity. Body Mass Index has been the most commonly used method for the determination of weight status. The standard calculation method is as follows:

$$BMI = \frac{weight\ (kg)}{(height\ x\ height)(m)}$$

The BMI calculation was developed as an easy tool to allow anyone to be able to determine weight status: underweight, normal weight, overweight or obese. This standard equation is used by the Ministry of Health (MoH) in Malaysia (MoH, 2004, MoH, 2009) to equip the public with a simple way of knowing their healthy weight range and is also taught in schools during Physical Education classes.

However, this standard equation, which is used worldwide, has been placed under scrutiny many times before and has been reviewed to cater a specific group - Asians. The Asian cut off points for overweight and obesity are significantly lower than the standard cut-off point – less than 18.5 (underweight), 18.5-23.0 (normal weight), 23.0-27.5 (overweight) and more than 27.5 (obese) (Barba et al., 2004). In Malaysia, this Asian cut-off point is used only for medical purposes (MoH, 2004, MoH, 2009). For public health and epidemiological studies on overweight and obesity the

same standard cut-off points used across the world are used – less than 18.5 (underweight), 18.5-24.9 (normal weight), 25.0-29.9 (overweight) and more than 30.0 (obese) (WHO, 2016).

BMI itself has been contested on a global scale as it is argued that its use is not adequate for categorizing individuals with increased muscle density or pregnant women (Nordqvist, 2013). Since BMI emerged several other methods have been introduced (or re-introduced because of the validity argument) including the waist-hip circumference measurement, body fat measurements, body composition analysis and the more recent Body Image Scale. Each method has its advantages and limitations.

2.5.1 *Manual body fat measurement*

Body-fat measurement assesses fat content at specific points of the body, where the accumulation of fat is measured using a specific measuring tool known as callipers. Measurements for men and women differ. For men, the measuring sites are the chest, abdomen and thigh. For women the measuring sites are triceps, waist and thigh. The measurements are taken in triplicate to get an average reading and are then compared to a standard reading chart (Jackson and Pollock, 1978, Jackson et al., 1980). This method requires experience and the right tools; and cannot be used easily by the public as it is not simple to execute and interpretation of the results is complicated (Biss, 2016).

The waist-hip ratio (WHR) measurement is a newer method developed in response to the criticisms towards BMI calculations (Consultation, 2008). The circumferences of the waist and hip are measured using a simple tape measure and compared to a standard ratio – women with ratio of more than 0.85 and men more than 0.90 are considered obese. However, this method has also been contested due to the realization that there is a wide range of body shapes among normal weight individuals (National Academy of Sports Medicine, 2016). Hence, this method of measuring was also placed under scrutiny, as it is not easy to execute, requiring, much as the method described before, trained individuals. On top of this both the body fat measurements as well as the WHR measures are more invasive methods and some people might not want to engage in these.

2.5.2 *Automated body fat measurement – Body Composition Analysis (BCA)*

Body composition analysis (BCA) is a more advanced method to measure body content (Cohn, 1987). Nowadays, this functionality is incorporated into complex scales that examine key body components producing a detailed report on fat and lean mass composition, percentage of water, basal metabolic rate (BMR) and BMI (Marple, 2017). However, the equipment used to measure these components is very expensive and impossible to use in a broad public health survey**.** These complex machines are often used by profit-based organizations (e.g. fitness centres) or research organizations to assess body mass (fat and muscle), water mass, bone mineral density and basal metabolic rate. Height and weight are inputted separately into the machine before BMI is calculated along with the rest of the readings. The main advantage of this method is the accuracy of the readings that it produces; however the BCA machine itself is not cheap (Marple, 2017).

2.5.3 *The Body Image Scale*

The Body Image Scale (BIS) is composed of body images that match different BMI ranges (underweight, normal weight, overweight and obesity) (Thompson and Gray, 1995). It is the result of an on-going development that attempts to find a system that matches the BMI calculation, in terms of ease of access and practicality, and adds to it by giving the public a visual representation of a given BMI. Each image on the BIS is a representation of an individual with a different weight status – underweight, normal weight, overweight and obese. The BIS has underwent various incarnations from the original drawing scale to photographic figure rating scale for body image (Swami, et al., 2012) both for adults. Other BIS developed are for children (Truby & Paxton, The Children's Body Image Scale: Reliability and use with international standards for body mass index, 2008) Body image scales of known weight status for 4-5 and 10-11 year old children (Jones, et al., 2017), breast cancer patients (Khang, Rim, & Woo, 2013), young adult females (Moeen, Muazzam, & Zubair, 2013) and others. Survey type studies could benefit from using BIS as a form of assessing weight status. In Malaysia not many families have a balance in the house to measure their weight, so surveys may be using estimates of weight instead of real weights of people. In Malaysia no study has, thus far, used the BIS. It would be important to understand if the currently available BIS (Swami, et al., 2012) is well acceptable and feasible to use in a Malaysian sample and how do people relate to it.

2.6 Weight Management Studies in Malaysia

Research linked to weight management in Malaysia is scarce. However, there are several quantitative survey studies that directly or indirectly focus on overweight and obesity. Most found studies aimed at testing interventions and are of small scale (Moy et al., 2006).

One particular study of interest, a survey, was conducted in Kuala Lumpur almost 15 years ago (Kong et al., 2002). The study employed a convenience sampling procedure with data collection conducted in seven shopping centres using a structured questionnaire to assess weight loss practices by the general public. Out of the 1032 participants, 37.7% said they have tried to lose weight before, 50.4% had the wrong perception about their weight and 39.1% had thought their BMI was lower than what it really was; meaning their weight was underestimated based on self-report. Participants stated that the most common method used for weight loss was dieting (89.5%), followed by exercise (81.0%) and drinking slimming teas (24.9%). Exercise (79.0%) was perceived as the most effective method for losing weight, followed by dieting (71.6%). Convenience (42.9%) was the main factor for choosing their preferred weight loss method. This was followed by safety (35.2%), proven method (21.9%), fastest (20.3%) and cheapest (13.5%) form to lose weight available. Although the purpose of the study was to understand if weight loss methods were conducted with or without proper medical advice or support, the results give an early indication of what the weight management practices among Malaysians were and of the inaccuracy of self-reported measurements for weight.

2.6.1 *In-depth studies on obesity in Malaysia and the need for a qualitative study*

A systematic review was conducted to ascertain the trends of overweight and obesity in Malaysia (Khambalia and Seen, 2010). This systematic review compiled 44 studies; 28 were reported on obesity prevalence among adults in Malaysia. The data includes studies such as the NHMS and the Malaysian Adult Nutrition Survey (MANS) conducted in 2003 and other smaller scale studies. A quality assessment of 1 (best quality studies) was just given to 4 studies, national representative surveys that employed random selection techniques. The majority received a poor quality assessment score. As an add-on from the results of the NHMS the trend for overweight and obesity in Malaysia is on a steady increase for overweight and dramatic increase for obesity. After the 2011 NHMS report came out in the end 2012, the results on the staggering increase of obesity rates and its related diseases was heavily sensationalized by the media (Cheng, 2013). More recently, the

rising prevalence has been reinforced in a report by Oxfam International published in the local media (NST, 2014).

Even with the systematic review conducted, there seems to be a lack of evidence about the reasons associated to the observed increases in weight issues. Throughout the limited conducted studies about overweight and obesity in Malaysia there is no data about methods used for weight loss attempts and reasons for these attempts, there is also very little on barriers and facilitators. This lack of evidence is a major gap area in weight management in Malaysia.

In Malaysia, research using qualitative methodologies to study weight management is even more limited than quantitative research. Only one published qualitative study has been identified. This study aimed to understand people's perceptions of overweight and obesity and how this links to weight management (Chang et al., 2009). This study was conducted in Kota Samarahan, Sarawak, on the eastern side of Malaysia. The study applied a theoretical framework; the Trans-Theoretical Model (TTM) (Prochaska and DiClemente, 1983) and was conducted using focus group interviews. The six-gender-and-ethnic specific focus groups were comprised of 38 overweight and obese individuals purposefully selected (an average of 6 people per focus group). Participants were adults and interviewed using an unstructured topic guide developed on the afore-mentioned model. The study explored mainly the perceptions of what is overweight and obesity in a small indigenous population and reactions when participants faced with weight issues. No discussions about weight loss experiences occurred. The results mainly described their self-perception as being ugly, ashamed of their body size and frustrations because they did not desired to be overweight. The use of the TTM, a discredited model of behaviour change (West, 2005) because of the lack of supporting empirical evidence, decreased the likelihood of identifying relevant themes that will add to our understanding. The use of focus groups is also not without its own problems. To investigate something as personal and so prone to social desirability, as weight management, using a focus group, can lead to systematic biases. Future research in the area of weight management will perhaps need to start off by using a qualitative methodology to explore people's views of weight management. Relying on a theoretical framework that could indicate key themes that have been previously identified in the literature as relevant whilst still allowing for the coding of new themes emerging (mixed deductive and inductive approach). In areas where little research has occurred it is often common to start with a qualitative methodology.

2.7 Understanding Weight Management: The role of theory

Theory driven research is perceived as the gold standard in most research conduct. This type of research is conducted and revolves around an existing theory or theories and their predictive constructs/variables and is used as an overall process in running the study (Michie, Webb, & Sniehotta, The importance of making explicit links between theroretical constructs and behavioir change techniques, 2010). Data driven research obtains as much data as possible and creates a rational conclusion using the data potentially ignoring data previously connected that could potentially support in results interpretation. Unlike data driven research, theory driven research builds on knowledge previously collected and accumulates knowledge creation while logically reasoning the outcome with theory (Cybulskie, 2014). This allows a more reasonable logical outcome of data built on the platform of a theory while eliminating unreasonable confounders that are explainable by specific used theory (Michie, Webb, & Sniehotta, The importance of making explicit links between theroretical constructs and behavioir change techniques, 2010).

The use of a specific theory is imperative to create a fair ground that enables the study to extend beyond the breadth of data and explore further in detail using the theory as a guide (Cybulskie, 2014). This method of grounding the study to a theory allows the creation of a conceptual framework that will data analysis (MacFarlane and O'Reilly-de Brún, 2012). This also allows for a more informed choice on the key variables to assess, potentially decreasing participant burden.
It is crucial to understand how people engage in behaviour and behaviour change in order to better support individual efforts on weight management. Thinking about overweight and obesity when a person first acknowledges that this is an issue, a potential health threat that needs to be looked into, only after this, will a person be prepared to act. There are a multitude of theories and models available to understand threat appraisal leading to behaviour change. Theories on behaviour appraisals and behaviour change have been in existence since the early 20th century, these are based on evidence and aim at parsimoniously explaining human behaviour.

The Health Belief Model (HBM) was developed with the intentions to focus on efforts in understanding why people failed to adopt a preventive health measure. Created by Hochbaum, Rosenstock and Kegels in the 1950s, the model was developed in response to the failure of a free Tuberculosis (TB) health-screening program by the US Public Health Services. Since then, the HBM was adapted to explore a variety of short-term and long-term health behaviours. The HBM

was built around 4 key constructs – perceived susceptibility (one's opinion of chances of getting a condition), perceived severity (one's opinion of how serious a condition and its consequences are), perceived benefits (one's belief in the efficacy of the advised action to reduce risk or seriousness of impact) and perceived barriers (one's opinion of the tangible and the psychological cost of the advised action) (Rosenstock, 1974). Cues to action (strategies to activate readiness) was an added concept later and the last construct Self-Efficacy (confidence in one's ability to take action) was added in 1988 to increase the HBM's fit with challenges of changing habitual unhealthy behaviour (Glanz et al., 1997). A meta-analysis was conducted on 18 studies published between 1982 and 2007 with a combined sample of 2,702 people to assess the effectiveness of the HBM variables in predicting behaviour. The outcome of the study revealed that the HBM constructs vary in effectiveness as predictors of behaviour. Benefits and barriers are the constant strongest predictors while susceptibility and severity were the weakest. It was proposed that the HBM should be abandoned given its lack of predictive ability.

The Trans-Theoretical Model (TTM) of behaviour change was developed by Prochaska & DiClemente to conceptualize intentional behaviour change (often used in smoking cessation). This intentional behaviour change is characterized in stages and, in the TTM, there are 5 stages of behaviour change – a temporal construct and the changes imply phenomena occurring over time. The 5 stages are pre-contemplation (a stage of not being ready for any change and is characterized within a time frame of zero to six months), contemplation (a stage in which people intend to change within a period of the next six months), preparation (a stage in which people intend to take action in the immediate future, measured typically as the next month), action (a stage which people have made overt modifications in their lifestyles in the past six months) and maintenance (a stage which people attempt to maintain their overt modifications in their lifestyle to prevent relapse) (Prochaska and DiClemente, 1983). This model however has been abandoned after multiple studies revealed major flaws of the TTM. The first major flaw is the concept of "stage" proposed by Prochaska and DiClemente, which are arbitrarily defined frames as changes occur differently in every individual. The second flaw is associated with the fact that the TTM assumes that individuals will make coherent and stable plans but this was not the case for many as reported considerable instability in intentions in many domains (De Nooijer et al., 2005). The third reported flaw was the stages definitions. To define these a mixture of constructs was used that do not fit together coherently. The fourth flaw is that the model focuses on conscious decision-making that ignores the drive of

motivation and the roles of rewards and punishment often outside the realm of conscious thinking (West, 2005).

Theories changed across time when older theories were superseded by better; newer more comprehensive theories such as the Social Cognitive Theory (SCT) (Bandura, 2001) and the Common Sense Self-Regulation Model (CSSRM) (Leventhal et al., 1997). Given the evidence found in support of these two models, these models have informed the studies presented in this thesis. The way these two models integrate in this study is simple and synergistic: the CSSRM acts as the explanatory theory of what does an individual go through when confronted with a health issue – their lay perceptions of what is happen and why and how do they cope with it. The SCT provides key details that will allow us to understand why people engage or not in behaviour change, and, if so, on what behaviour.

2.7.1 *The Common Sense Self-Regulation Model*

The Common Sense of Self-Regulation Model (CSSRM) is a model aimed at explaining how people think about health conditions and the impact this has on the way they self-manage or cope with threats that they face. It originates from an earlier parallel model that studied responses to fear-based communication (Leventhal et al., 1997). Similar to Leventhal's parallel model, the CSSRM postulates that when a threat is perceived (e.g. changes in physical symptoms or function), the individual would develop two parallel, yet interrelated representations of the stimulus; cognitive and emotional (Leventhal et al., 1997). These representations and their content specify the actions (i.e. behaviours) in which individuals engage to remove the health threat. The CSSRM proposes that the processes involved in the self-regulation of health threats are regulated by a TOTE (Test-Operate-Test-Exit) system with both feedback and feed-forward loops (Miller et al., 1960). The CSSRM is divided into three stages.

The first is the Perceptual Stage where a health threat is detected (i.e., health threat). In this stage there are 3 main elements. The first is the Somatic Changes Dysfunction - the initial reaction to the health threat stimuli, which triggers awareness leading the individual to realize that there is an existing issue/problem. In the second element the person engages in is Interpretation of the Symptoms that can then lead to enactment Functions that should lead to adaptation (Evaluation Tool). When dealing with health threats the person continuously appraises the situation. Information used to conduct this analysis is heavily influenced by current knowledge or newly

acquired knowledge on the situation. The individual at this stage would develop a common sense illness representation of the potential health threat. Five sub-elements of Illness representations are proposed. The first is Identity (Label & Symptoms) where the individual would give a label or name to the condition and the symptoms that 'appear' to go with it. The second is Timeline (Delay/Years & Perceived Time) where the individual makes the predictive belief about how long the condition might last for and these beliefs will be re-evaluated as time progresses. The third is Consequences (Physical, Social or Imagined) where individual beliefs about the consequences of the condition and how this will impact on them physically and socially are expressed. These representations may develop into more realistic beliefs over time. The fourth is Cause (Labelled, Seen or Felt) where the individual ideas about the perceived cause of the condition, which may not be completely (biomedically) accurate, emerge and are considered by the person. These representations are based on information gathered from personal experience as well as on the opinions and discourses of significant others, health professionals and media sources, reflecting issues such as stress, environmental pollution and others like pathogens (bacteria, virus) and potential genes. The last sub element is Control (Self/Expert or Felt). This reflects the belief about whether the condition can be cured or kept under control and the degree to which the individual plays a part in achieving this (Leventhal et al., 1997).

The second stage is the *Response Stage* where the person selects and performs an action (i.e. coping procedure) to balance out the discrepancy between the current state and desired state. The development of the illness representation during the perceptual stage determines what type of coping procedure the individual would use during the response stage. This stage includes 2 elements. The first are procedures and action plans to cope with identified threats. In this element it is the outcome of illness representation that leads to the selection of processes and procedures to eliminate and/or control potential or on-going illness threats. The second element is based on emotional coping procedures. This element is based on the psychological/emotional reactions taken to face health threats and can potentially have a great influence of behaviour. These emotional coping procedures are directly linked to Illness Representations (Leventhal et al., 1997).

The third stage is the *Appraisal* where the outcomes of the action/s (i.e. self-management) taken are evaluated assessing its impact on resolving the observed discrepancy between current state and desired state. If the action is substantial enough, the loop ends, or else, a reassessment is done to

take a different course of action that would eliminate the discrepancy completely or put it under control (Leventhal et al., 1997).

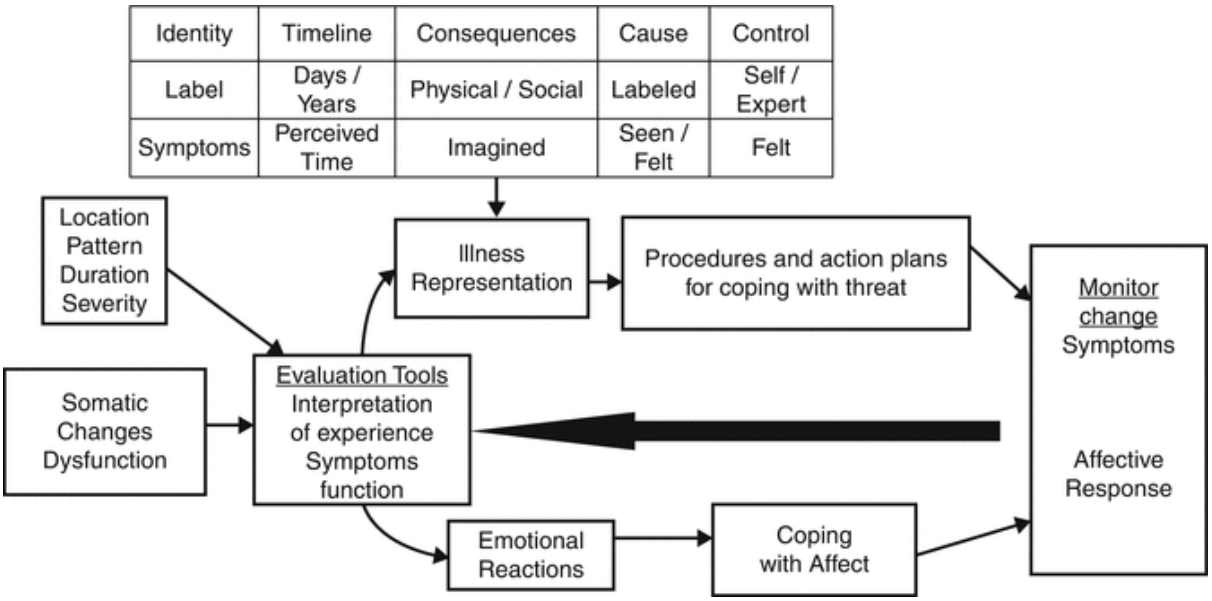


Figure 1: Common Sense Model for Self-Regulation (Leventhal et al., 1997)

In terms of this model it is important to highlight the fact that the lay/common sense views people have of their overweight and obesity might have an impact on efforts made to engage in behaviour change in the pursue of weight management (e.g. if this person perceives a complete lack of personal control (control) because it attributes this to an external cause (cause), behaviour change efforts will be hard to enact and potentially condemn to failure). Within this study, assessment of the common sense representation of overweight and obesity in its various constructs: identity, timeline, consequences, cause, control, emotional reactions and coherence were conducted. Using this model as a background to this study allowed the assessment of associations between these constructs (and how they reflect/describe the individual perceptions of weight issues) and behaviours (both engagement in physical activity and diet control). This increased the understanding of how common sense overweight and obesity representations influenced coping with these conditions. Illness representations (Moss-Morris et al., 2002) were assessed within both phases of the study. The CSSRM acted as the explanatory model of what does an individual go through upon an event – their perceptions and beliefs of what goes on and how do they deal with it. The CSSRM cannot explain the exact behaviours and processes the individuals go through and worked in compliment to the SCT.

The Common Sense Self-Regulation Model (CSSRM) is divided into three stages (Leventhal et al., 1997) – the Perceptual stage, the Response stage and the Appraisal stage. Each stage is built of elements and sub elements. The Perceptual stage consists of 3 elements – the Somatic Changes Dysfunctions, Interpretation of the Symptoms and Illness Representations (consisting of 5 sub-elements – Identity, Timeline, Consequences, Cause and Control). The Response stage consists of 2 elements – the procedures and action plans to cope with identified threats, and emotional coping procedures, this is one of the reasons why this model is called a dual process model. The Appraisal stage is the stage where evaluation takes place in assessing the impact of the observed discrepancy between current state and desired state (Leventhal et al., 1997).

In terms of this model it is important to highlight the fact that the lay/common sense views people have of their overweight and obesity might have an impact on efforts made to engage in behaviour change in the pursue of weight management (e.g. if this person perceives a complete lack of personal control (*control*) because it attributes this to an external or genetic cause (*cause*), behaviour change efforts will be hard to enact and potentially condemn to failure). The CSSRM has been used extensively to determine how illness representations influence coping and outcome of various chronic diseases such as multiple sclerosis (Vaughan et al., 2003), rheumatoid arthritis (Scharloo et al., 1999, Treharne et al., 2007), type 2 diabetes (Breland et al., 2013) and psoriasis (Fortune et al., 2000). However, in these studies, there was no clear-cut relations between how coping-responses could influence illness representations which may then influence the actual choice of coping strategy (Weinman et al., 1996). The CSSRM on its own cannot explain the exact behaviours a person decides to enact or change and the implementation of these (Hagger & Orbell, 2003).

2.7.2 *The Social Cognitive Theory*

Albert Bandura's Social Cognitive Theory (SCT) is the most used in health promotion today. The SCT acts as the explanatory theory of what behaviours do the individuals actual engage in in order to manage weight. The SCT is a theory that aims at explaining the elements that affect behaviour, behaviour change and decision making processes whilst the CSSRM allows to contextualize the global perceptions that the individual has on their condition, the lay beliefs and emotional components, and the impact that this can have on behavioural choices. The SCT has 4 key constructs.

The first is Self-Efficacy, which is the belief in one's capabilities to organize and execute the courses of action required for managing prospective situations, to perform a given behaviour. Self-efficacy is task-specific, meaning that self-efficacy can increase or decrease based on the specific task at hand, even in related areas and considering the same person. Self-efficacy is influenced by a person's specific capabilities and other individual factors, as well as by environmental factors (perceived and actual barriers and facilitators) (Bandura, 2001).

The second key construct to this theory is Outcome Expectations. These can be physical, social and self-evaluative. Outcome Expectations are individuals' beliefs about what consequences are most likely to ensue if particular behaviours are performed or not. Outcome Expectations shape the decisions people make about what actions to take and which behaviours to suppress. Frequency of behaviour should increase when the outcomes expected are valued, whereas behaviours associated with unfavourable or irrelevant outcomes will be avoided (Bandura, 2001).

The third key construct represents the Socio-Structural Factors (Environment) that can act either as a facilitator or as an impediment. This refers to the factors that can affect a person's behaviour – social and physical environment. Social environment include family members, friends and colleagues (Bandura, 2001).

The fourth key construct is related to goals. Goals reflect cognitive representations of anticipated, desired, or preferred outcomes. Goals are an important prerequisite for self-regulation because they provide objectives people are trying to achieve and benchmarks against which to judge progress.

The outcome that this theory aims at explaining is behaviour per se. The person will enact a specific behaviour if all the previous four key constructs facilitate this: there is an actual ability and skills to perform a desired goal for which expected outcomes are favourable and enough facilitators are present in the environment that enable its enactment (Bandura, 2001).

In this study, the SCT was used to assess determinants of behaviours (diet and physical activity) connecting to weight loss and maintenance (self-efficacy, outcome expectations such as physical, social and self-evaluative, and socio-cultural factors such as facilitators and impediments). For this study, the SCT acted as the explanatory theory of what behaviours do the individuals engage and its processes. The SCT was able to explain the elements that affect the behaviours and decision

making processes but presents limited power to ascertain individual beliefs and emotional components. The SCT worked in compliment with the Common Sense of Self-Regulation Model (CSSRM).

The SCT acts as the explanatory theory of what behaviours do the individuals actual engage in in order to manage weight. In the studies presented in this thesis the SCT is used as a theory that aims at explaining the elements that affect behaviour, behaviour change and decision making processes whilst the CSSRM is used as a form of contextualizing the global perceptions that the individual has on their condition (overweight and obesity), the lay beliefs and emotional components, and the impact that this can have indirectly on personal behavioural choices.

The SCT has also been used extensively to predict behaviours in diseases and conditions such diabetes (Glasgow et al., 1992), exercise behaviour (Haider et al., 2012) and safe sex behaviours (Kanekar and Sharma, 2009). A review of the SCT, that included 13 studies on diabetes, concluded that the SCT predicted exercise behaviour in relation to self-efficacy but there was a mixed results between outcome expectancies for the exercise behaviour itself (Allen, 2004). The limitation of the SCT on its own can be improved by using a combination of both models that in turn will allow a development of the study and collect better data for analysis to obtain a better overall understanding on overweight and obesity and particularly how people engage in the management of these issues.

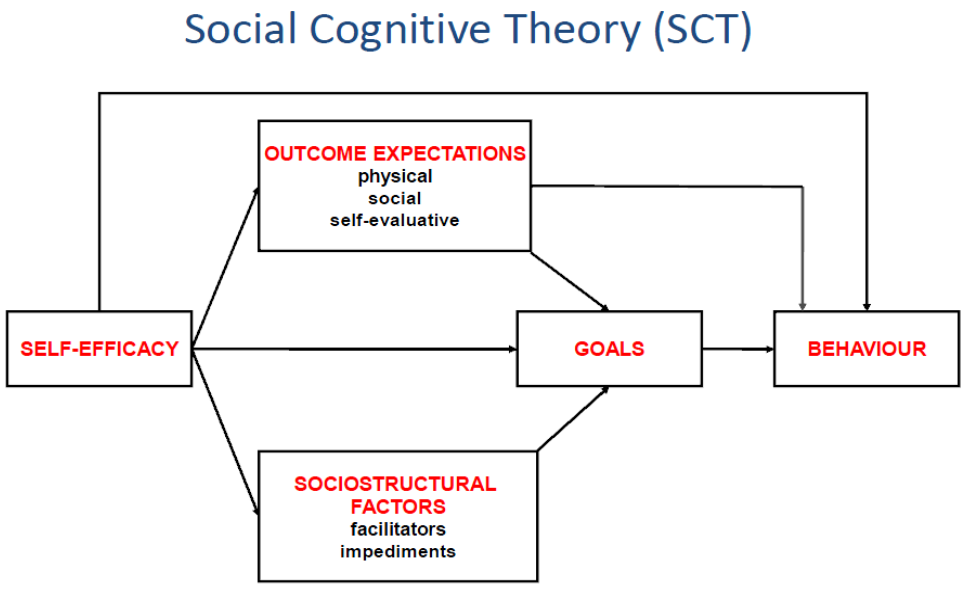


Figure 2: Social Cognitive Theory (Bandura, 2001)

2.8 Natural History of Weight Management

In order to organise phase one and two of this study a pragmatic heuristic descriptive model was devised. Based on an integration of the CSSRM and the SCT the aim was to increase the understanding of the processes an individual goes through when engaging in weight loss or weight maintenance (Fig. 3). The CSSRM and the SCT are incorporated into the model by injecting the elements of both models as part of the question development. This was to ensure that all elements of the two models are answered within the heuristics model. This model used in the Qualitative phase to develop the interview questions and is also used for the development of the e-survey in the Quantitative phase.

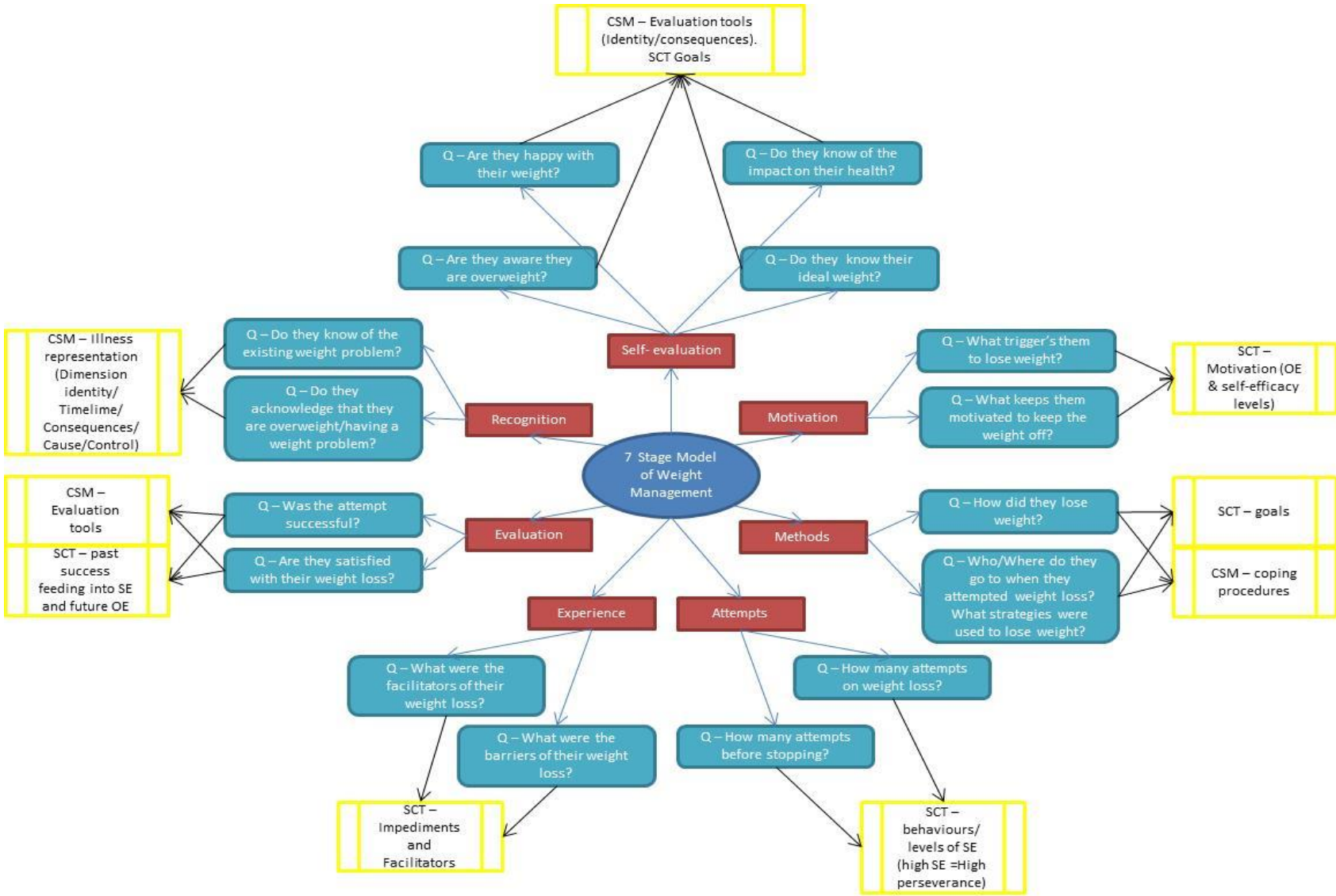


Figure 3: The 7-steps model for Weight Management integrated with SCT & CSSRM

Chapter 3. Explorations of Perceptions and Beliefs related to Weight Management: a Qualitative Study

3.1 Introduction and Aims

The overall aim of this chapter is to further the knowledge and experience on weight loss and maintenance behaviours and thoughts in a MoH Malaysian sample. This phase of the study also aims to fill in the existing gaps due to the lack of qualitative studies on weight management (weight loss and weight maintenance) in Malaysia and across the world a qualitative study will help. Qualitative studies can provide rich data that will bring new ideas and themes that cannot be mined through set quantitative procedures. The emerging deductive (theory based) and inductive themes will allow refinement of the next stage of the study (hence, and within the mixed methods terminology, we can describe this current study as exploratory sequential (Ivankova et al., 2006).

The specific objectives for this current empirical chapter are to:

- Explore perceptions on overweight and obesity
- Explore past and current experiences of weight management (loss and maintenance) focusing on strategies used
- Explore personal beliefs (motivation, success, facilitators, barriers) in relation to weight management (weight loss and maintenance)
- Explore socio-cultural beliefs (ethnic or socio-environment) in relation to weight management practice
- Explore how culture impacts eating behaviours, cooking choices and in the end, weight management behaviours.

3.2 Study Design

Qualitative method, using individual semi-structured interviews.

3.3 Philosophical Assumptions

In qualitative research, to identify philosophical assumptions or stance of the qualitative researcher is imperative to produce rigorous meaningful research due to the intimate bond between philosophy (philosophical assumptions: the ideas and beliefs that inform research), methodology (a theory of how research will proceed), and methods (the way the research study is conducted) (Nicholls, 2009,

Creswell, 2013). The researchers' philosophical assumptions of qualitative methodologies depend on how they view reality (ontology) and truth (epistemology).

Ontology is the nature of reality (Denzin and Lincoln, 2011, Creswell, 2013). It has two extreme stances: realism and idealism. Realism is the belief that the reality is entirely independent of the researcher perception and of the research process with no interconnection between them. Idealism is the belief that the reality is only dependent on the researcher perception and it cannot be separated from the researcher or the research process. In between these two stances, there are numerous ontological stances one of which is subtle realism, which attempts to represent reality rather than to reproduce it (Mays and Pope, 2000).

Epistemology is the theory of knowledge that deals with the nature and status of knowledge (how we know what we know) (Mays and Pope, 1995, Creswell, 2013). It has also two extremes: positivism and interpretivism. Positivism is the belief in single objective reality; that is, reality exists without human involvement and that objects have their own real 'essence' or 'entity' regardless of individual experience or social conventions which is the philosophical basis of the quantitative research (Nicholls, 2009, Creswell, 2013). Interpretivism is the belief in multiple realities; that is, reality related to individual 'unique' experience and personal and social relations, which is one of the philosophical bases of the qualitative research (van Manen, 1990).

In this qualitative study, the ontological stance taken was subtle realism and epistemological stance is interpretivism. It is acknowledged that the researcher starter the study with broad knowledge in the field and that this may impact on the interpretation of the study data to some extent and, therefore, every attempt was made to minimize it.

3.4 Methods and Criteria for Sampling

The design of this qualitative study used a sampling matrix based on the following criteria:

- Gender (Male and Female)
- Ethnicity (Malay, Chinese, Indian and other ethnicities)
- Grade of Employment (Professional – Grade 41 to TURUS III; or non-professional – Grade 1 to 40)
- Locality: rural and urban areas.

Ethnicity	Professional		Non-professional		Locality
	Male	Female	Male	Female	
Malay & other Bumiputras	2-4	2-4	2-4	2-4	Equality distributed by urban and rural area
Chinese	2-4	2-4	2-4	2-4	Equality distributed by urban and rural area
Indian	2-4	2-4	2-4	2-4	Equality distributed by urban and rural area
No. to achieve across ethnicity	6-12	6-12	6-12	6-12	
Total					**Min = 24, Max =48**

Table 2: Ideal Sample Matrix

The purpose of the sampling matrix was to allow diversity across informants. Based on the sampling matrix the minimum number of participants required was 24 and the maximum 48. Based on a paper where the issue of data saturation was discussed (Francis et al., 2010) on qualitative studies, using a theory based topic guide , the suggestion was that the minimum number of participants within a main subgroup was 10 and potentially plus another three (if data saturation was not reached). With this justification, the optimum sample size was estimated to be roughly 24 to 48 participants depending on data saturation.

Western Peninsular Malaysia; namely the areas of Wilayah Persekutuan Kuala Lumpur, Selangor, Negeri Sembilan and Malacca were chosen to represent the urban area and the population from the States of Pahang, Kelantan, Terengganu Sabah and Sarawak represented the rural zone. Participants were divided equally between ethnicity, gender and grade of employment with new participants enrolled where data saturation were not met. The sampling process was dynamic.

The selection of participants utilizes purposive sampling based on the following criteria:

- Participants were once overweight or are still overweight or obese
- Participants attempted weight loss activities in the past or were still engaged with weight management efforts.

Exclusion criteria for this study included:

- Unintended weight loss experiences and pregnancy.

3.5 Pilot Studies

A pilot study was carried to assess the feasibility of the tools prior to the actual data collection. This was conducted with the assistance of IHBR because the researcher has yet to return to

Malaysia pending ethics approval. IHBR conducted the pilot especially in regards to language issues and understanding.

The researcher had translated the tools from English to Malay (forward translation) and a researcher at IHBR who was a certified translator conducted the backward translation from Malay to English. Discrepancies were noted and revisions were made and a second backward-forward translation session was conducted again two weeks later and discrepancies were significantly reduced.

The tools then underwent further testing with 10 individuals conducted by IHBR to ensure the tools were asking the correct questions. Participants selected were from various backgrounds and were asked the questions individually on what they think about the questions. Each interview recorded the recall-ability of the questions, comprehension to the questions asked, synthesis-capability of the expected answers and timing taken to answer the questions in measuring the complexity of the questions. Subsequent modifications were made to the interview questions to ensure participants would be able to understand and answer the tools better.

3.6 Participants

In terms of final numbers 46 participants were recruited, see general characteristics explained in Table 3. What is obvious, from analysing this table is the lack of Chinese participants in the study. In fact, none of the Chinese Malays on the different targeted locations fulfilled the inclusion criteria. Based on the multiple findings of the National Health and Morbidity Survey (IPH, 2012b); the Chinese population in Malaysia presents the lowest levels of overweight and obesity; with Indians presenting the highest rates, followed by Malays. This was reflected on the final sample of this study.

ID	Sex	Age	Ethnicity	Locality	Past WLA?	Last WLA	No. of past WLA	Details of past WLA Intervention	On current WLA or maintenance?	No of current WLA	Details of Current WLA Intervention
P1S1	M	31	MLY	U	Y	2 months	1	Atkins Diet	Y	1	Atkins Diet
P2S1	M	32	MLY	U	N	Current	1	NA	Y	1	Hospital Diet Programme
P3S1	M	29	MLY	U	Y	7 months	1	Hospital Diet Programme	N	0	NA
P4S1	M	30	MLY	U	N	Early 2014	1	NA	Y	1	Hospital Diet Programme
P5S1	F	31	MLY	U	Y	3 months	1	HTAR Star Programme	Y	1	Hospital Diet Programme
P6S1	F	35	MLY	U	Y	2 months	Many	Multiple Diet Products	Y	1	Hospital Diet Programme
P7S1	M	42	MLY	U	Y	2 months	2	1. HTAR i-Sihat 2. Hospital Diet Programme	N	1	Hospital Diet Programme
P1S2	F	33	I	U	Y	4 months	1	Hospital Director Programme	Y	1	NCD Programme
P2S2	M	33	I	U	N	4 months	0	NA	Y	1	NCD Programme
P3S2	M	32	MLY	U	Y	2013	0	NAV	N	0	NA
P4S2	M	29	I	U	N	4 months	0	NA	Y	2	1. NCD Programme 2. Gym
P5S2	F	54	MLY	U	Y	4 months	Many	1. Multiple Private Diet Programmes 2. Laxatives 3. Multiple Diet Products	Y	1	NCD Programme

ID	Sex	Age	Ethnicity	Locality	Past WLA?	Last WLA	No. of past WLA	Details of past WLA Intervention	On current WLA or maintenance?	No of current WLA	Details of Current WLA Intervention
P1S3	F	40	MLY	R	Y	2013	2	Trim & Fit (2 generations)	Y	1	Trim & Fit (3rd generation)
P2S3	M	32	MLY	R	Y	2 months	2	1. Gym 2. Internet sourced activity	N	0	NA
P3S3	F	40	MLY	R	Y	2012	1	Private Slimming Programme - Mayfair	N	0	NA
P4S3	F	39	MLY	R	Y	3 weeks	1	Self-managed diet	Y	1	Self-managed diet
P5S3	M	29	MLY	R	Y	NAV	1	Gym	N	1	NA
P6S3	F	31	MLY	R	Y	2013	0	NA	N	0	NA
P1S4	F	50	I	U	Y	1 month	1	The Biggest Loser	Y	2	1. Self-managed diet 2. Home-exercise
P2S4	F	58	MLY	U	Y	2013	1	The Biggest Loser	Y	2	1. Self-Dietary Management 2. Weekly Self-Weighing
P3S4	M	41	MLY	U	Y	2013	1	The Biggest Loser	N	1	Self-managed diet
P4S4	M	30	MLY	U	Y	2013	1	The Biggest Loser	N	0	NA
P5S4	F	38	I	U	Y	2013	1	Multiple Diet Products	N	0	NA
P6S4	F	49	MLY	U	Y	2012	1	The Biggest Loser	N	0	NA
P1S5	F	59	MLY	U	Y	2012	1	Exercise Programme	N	0	NA
P2S5	F	39	MLY	U	Y	2013	3	1. Exercise Programme 2. Gym 3. Multiple Diet Products	N	0	NA
P3S5	M	35	I	U	Y	2011	1	Weight Loss Programme	Y	1	Self-managed diet
P4S5	F	46	MLY	U	Y	2012	Many	1. Weight Loss Challenge Programme 2. Multiple Diet Products 3. Pharmaceutical Drugs with weight loss side effects	N	0	NA
P5S5	M	37	MLY	U	Y	6 months	0	NA	Y	2	1. Exercise 2. Self-managed diet

ID	Sex	Age	Ethnicity	Locality	Past WLA?	Last WLA	No. of past WLA	Details of past WLA Intervention	On current WLA or maintenance?	No of current WLA	Details of Current WLA Intervention
P6S5	F	35	MLY	U	Y	10 months	2	1. Fasting 2. Self-managed diet	Y	1	Self-Modified Atkins Diet (Phase 4)
P1S6	M	24	BPR	U	Y	2 months	Many	Diet Products	Y	2	1. Self-managed diet 2. Exercise with supplements (booster)
P2S6	F	28	BPR	R	Y	2013	Many	Multiple Diet Products	Y	2	1. Exercise 2. Self-managed diet
P3S6	F	34	BPR	U	Y	After 2nd pregnancy	2	1. Exercise 2. Self-managed diet	Y	2	1. Exercise 2. Self-managed diet
P4S6	F	29	BPR	U	Y	3 months	Many	Multiple Diet Products	Y	2	1. Zumba exercise 2. Self-managed diet
P1S7	F	34	MLY	R	Y	2013	1	Weight Loss Programme	Y	1	Futsal
P2S7	F	23	I	U	Y	1 month	1	Senamrobik Programme	Y	1	Zumba exercise
P3S7	F	41	BPR	R	Y	5 months	2	1. Private Slimming Programme – London Slimming Management 2. Slimming Tea	Y	1	Senamrobik Programme (defaulter)
P4S7	M	38	MLY	R	Y	6 months	Many	Multiple Diet Products	Y	1	Zumba exercise
P5S7	F	37	MLY	R	Y	NAV	1	Senamrobik Programme	Y	1	Zumba exercise
P6S7	M	37	MLY	U	Y	2011	1	Army Training	N	0	NA
P1S8	F	36	MLY	U	Y	2013	1	COMEL Programme	N	1	Self-managed diet
P2S8	F	35	MLY	U	Y	After 4th pregnancy	Many	1. Multiple Diet Products 2. Atkins Diet	N	1	Self-managed diet
P3S8	F	43	MLY	U	Y	2012	1	Fit And Slim Training (FAST)	Y	2	1. Exercise 2. Self-managed diet
P4S8	M	23	MLY	U	Y	2012	1	COMEL Programme	N	0	NA
P5S8	F	29	MLY	U	Y	2 months	1	Atkins Diet	N	0	NA
P6S8	F	45	MLY	U	Y	2012	1	Fit And Slim Training (FAST)	N	0	NA

Key: 1. Sex: M – Male; F – Female; 2. Ethnicity: MLY – Malay; BPR – Bumiputra; I – Indian; 3. Locality: U – Urban; R – Rural; 4. Previous/Current Weight Loss Attempt (WLA) : Y – Yes; N – No.

Table 3: Participant basic characteristics and Weight Loss Attempt (WLA) history

Table 3 presented the characteristics of the participants and the details of the weight loss history. As presented in the table, different people in each locality attempted distinct methods of weight loss across time. Some rely on organized services provided to them while others are more self-initiated. Weight management intervention programmes provided by the MoH to their staff are initiated and developed by healthcare professionals in the MoH (Medical Doctors, Dietitians, Health Education Officers). Some of the intervention programmes MoH staff engaged with were diet only (Hospital Diet Programme), other physical activity only (Senamrobik programme) or combinations of both physical activity and diet management (HTAR i-Sihat, The Biggest Loser, COMEL programme, Weight Loss programme, etc). However, there are also participants who engaged in self-initiated weight loss by conducting their own physical activity programmes or joining others outside the organization (Zumba exercise, private weight loss programmes – London Slimming Management) by virtue of unavailability to access others offered within the MoH or as an add-on. Some have taken on dietary products and fasting as a method to lose weight. Some programmes have follow ups (more than 1 generation) (Trim & Fit Programme) while most do not. There does not seem to be coherence between programmes in each location as each location were conducting their activities on their own (individualistic activities) and no analysis of the success of these activities was ever published.

3.7 Ethics for Study

Ethical approval for the study was sought from the Newcastle University Ethics Committee and the Medical Research and Ethics Committee (MREC) in Malaysia sequentially. Newcastle University Ethics Committee granted approval for Phase 1 on May 16th 2014 (Approval number – 00879_1 2014) and The Medical Research Ethics Committee granted Phase 1 application on May 7th 2014 (NMRR-14-196-19848). Participation was voluntary and participants received a participant information sheet informing them on the specific characteristics of the study. To be part of the study participants needed to sign a consent form. The interviews were recorded on an audio recorder for the purpose of transcription and analysis; and participants had to agree to this before joining. Anonymity was kept via the use of participant ID codes. The anonymized transcribed data was accessible to the researcher and the supervisory team for the purpose of analysis and publication. Participants that have chosen to be informed of study outcomes will receive it.

3.8 Implementation Plan

After obtaining approval from both ethical committees, data collection phase for the study was initiated. For this the researcher returned to Malaysia in early March 2014 to begin preparations for meeting with the relevant officers and healthcare professionals. This process was lengthy as it involved officers (Gatekeepers) from multiple States.

3.8.1 *Data collection: Preparatory actions and procedures*

Prior to the data collection, the researcher conducted the following activities:

a. 2 meetings with the institution supporting this research – The Institute for Health Behavioural Research (IHBR) were briefed on the study; purpose, aims, methods and how the institute could support the research. The first meeting was directly with the IHBR Director and the second for those involved in the study:
    - IHBR provided the avenue for several consequential meetings and discussions between the researcher and the healthcare professionals from the selected States in Malaysia (representing a good spread in terms of urban vs rural as well as ethnicity).
    - Secretarial support staff at IHBR helped is assisting logistical preparations prior to the data collection.
    - IHBR provided equipment for data collection: calibrated height & weight scales and audio recorder.

b. One meeting with the healthcare professionals (Gatekeepers) from the identified States in Malaysia with the purpose of briefing them on the study; purpose, aims, methods and how they could contribute to the research:
    - These professionals supported the researcher in identifying potential participants based on the inclusion criteria of the study. They provided the list of potentials to IHBR secretarial support staff.
    - The researcher does not have access to participants' records during the course of the study.

c. The secretarial support staff were tasked with the following, prior to the data collection, once the list of potential candidates were obtained:
    - They selected the participants that best fit the inclusion criteria from the potential list of participants.

- They sent out invitation letters previously prepared by the researcher, to the selected participants. The letter of invitation contained included a participant information sheet detailing what is required from the participants as well as a consent form for the participants to sign and methods of contacting the researcher.

d. The researcher was be tasked with the following, prior to the data collection:
    - Contacting the healthcare professionals about setting up dates, time and locations for the interview; preferably within the place of work of the participants (e.g. health clinics and hospitals) to avoid them having to travel and reduce potential security risks by conducting it in a secure and private place in their own familiar environment.
    - Setting up the logistical requirements to conduct the research: commuting methods for closer sites, car rental for driving distance sites, airline tickets for long distance travels, accommodations wherever applicable.
    - When all of the appointments have been laid out and the logistics were settled, the researcher conducted the interviews with the participants at the appointed dates, time and location. Each interview roughly lasted between 35 minutes to an hour.

3.8.2 *Interview procedures*

This phase of the study employed a face-to-face semi-structured interview using a series of open-ended questions. This allowed naturalistic enquiry and exploration of information. The interview script contained 15 basic questions on history of weight and 24 questions on the participants weight management experience.

The development of the topic guide for the semi-structured interview was based on a simple heuristic model that aimed at understanding the processes involved in initiating and maintaining Weight Management using core elements from the Social Cognitive Theory (SCT) by Bandura (Bandura, 1998) and the Common Sense Self-Regulation Model (CSSRM) by Leventhal (Leventhal et al., 1997). The interview questions underwent variations and evolution as it underwent forward and backward translation to comply with language and cultural specificity (refer Appendix A for final interview version in English & Appendix B in Malay).

The interview procedures followed a protocol to gain consistent data across interviews allowing for cross comparison. Prior to the interview, the participants were informed of the purpose of the study and were ensured that the researchers were interested in their weight loss experience and

were not there to make any judgments on weight loss achievements or attempts. The principle of anonymity was also referred to as paramount. Participants were referred to as "Mister" or "Miss" or "Madam" in compliance to the way people are referred to in these circumstances in the Malay language. Participants were encouraged to speak freely and provide answers that reflected their own experiences and thoughts.

Interviews began by gathering basic information on participants' demographic characteristics, their work history and history of weight loss attempts (past and present). The interview progressed by gathering data on past and present weight loss experiences, views on their success or otherwise, what drove them to attempt weight loss and what stopped them to progress further or possibly restart an attempt. The interviews also attempted to gain people's views and basic knowledge about overweight and obesity and how they thought this could/should be tackled. The conception of the questions was guided from the theories and prompts were used to keep probing more in depth participants statements and to support them to keep focussed on the topic.

All interviews were conducted in a secure and private location prepared by the Gatekeepers within the premises of the participants working location. This was to avoid interruptions (although some interruptions were unavoidable – phone calls, organizational announcements, etc). In total, 46 interviews (an average of 6 interviews per site; for 8 sites) were conducted after excluding two participants that, in fact, did not fit all the necessary inclusion criteria. A total time of 16 hours, 55 minutes and 42 seconds was recorded with an average interview time of 22.06 minutes. All interviews were recorded using an audio recorder after obtaining consent from the participants. All transcripts were transcribed and translated from Malay to English by the researcher to avoid breach of anonymity. The audio recordings were securely deleted from the device after completion. No reimbursements were provided to the participants, as they were interview during their working hours at their work place.

3.9 Qualitative Data Analysis

This study employed a deductive analysis in which an existing framework developed from theories was used as a basis. The theories used to design the topic guide were based on the Social Cognitive Theory (SCT) by Bandura (Bandura, 1998) and the Common Sense Self-Regulation Model (CSSRM) by Leventhal (Leventhal et al., 1997). However, during data collection, transcription and translation, additional information emerged from the interviews including extra themes that

were not completely explained further by the SCT and the CSSRM. These extra information will be coded individually using inductive thematic analysis. The interview transcripts were analysed taking a 5-step approach as recommended for thematic analysis. Below each step will be described.

Stage 1- Familiarisation

The first three transcripts were read and re-read several times and their audiotapes were listened to by me (MZJ) to obtain a general sense of the information provided and for familiarisation with the raw data.

Stage 2- Coding Interview Transcripts Using The Theoretical Domains

A theoretical coding framework based on the Social Cognitive Theory (SCT) by Bandura (Bandura, 1998) and the Common Sense Self-Regulation Model (CSSRM) by Leventhal (Leventhal et al., 1997) was used to guide data analysis. NVivo 10 for Macintosh was used to facilitate the coding of the data into relevant nodes and themes from the SCT and CSSRM thereby allowing immediate extraction of data.

Any new emerging theme emerging inductively from participant quotes and that did not fit the SCT and CSSRM were coded and placed under a category named 'additional' themes for further analysis. What emerged from here will be presented in chapter 3.

All the interview transcripts were coded by the researcher using line-by-line coding, which is the most intensive and productive manner to code the data (Strauss and Corbin, 1990). The first three coded interviews were reviewed independently by two coders to crosscheck the validity of the used codes. Thereafter, the researcher coded all the interviews guided by the SCT and CSSRM for subsequent analyses.

After further analysis, the codes used in the additional themes were merged with the theoretical constructs. To avoid data misrepresentation, the researcher referred back to the psychological definitions of the constructs and factors within it. This process helped to refine the working definitions to describe each theme for this study as detailed in sections 2.3.1 and 2.3.2.

Stage 3- Generating The Coding Theoretical Framework

The initial framework developed was guided by the SCT and the CSSRM. The reliability of the coding framework was crosschecked independently for consistency in coding the representative quotations within and across theoretical constructs. Thereafter, the theoretical framework was refined for subsequent analyses. The completed framework was examined to make sure the coded data were allocated appropriately into the constructs. Successive meetings and discussion with the supervisory team achieved consensus on framework and its representative data. The finalized framework involved 10 theoretical themes and their relevant constructs adapted from the SCT and CSSRM, with some additions of new coding.

3.9.1 *Qualitative Coding Framework – Part 1*

Leventhaal et. al. (1997) Common Sense Self-Regulation Model (CSSRM)

Theoretical Elements	Examples of theoretical elements	Elements within the Data
1. Somatic Changes Dysfunction	• Initial reaction from health threat stimuli that triggers awareness in the individual.	• The individual realizes that they are having changes within themselves – weight change. • Point in time when participant realizes there is a problem.
2. Interpretation of Symptoms and adaptation Functions (Evaluation Tool)	a. Analysis made by the person at the beginning stages of dealing with health threat or a continuous appraisal of current situation. b. Information used to conduct this analysis is heavily influence by current knowledge or newly acquired knowledge of the situation.	• The individual seeks information about what has led to the current situation. • The individual assess current information in preparation to take action with coping procedures and emotions taken into account within the evaluation. • The individual assess situation and makes adjustments to eliminate actual or potential threats.

3. Illness Representation	a. Identity (Label & Symptoms)
	b. Timeline (Delay/Years & Perceived Time)
	c. Consequences (Physical, Social or Imagined)
	d. Cause (Labelled, Seen or Felt)
	e. Control (Self/Expert or Felt)
		• Identity (Label & Symptoms)
		  ○ Knowledge (*including knowledge of condition*)
		  ○ Procedural knowledge (*knowledge how to engage in weight loss/maintenance*)
		  ○ Knowledge about BMI and its relation to weight issues.
		• Timeline (Delay/Years & Perceived Time)
		  ○ The notion that this can be a cyclical condition with occasions of higher symptomatology/weight associated with specific situations/context/life events. The concept that this is a chronic condition that will need to be processed across the lifespan. The notion that this is an acute situation and that it will pass.
		• Consequences (Physical, Social or Imagined)
		  ○ Beliefs (*the perceived value of a statement to be true by the individual*)
		• Cause (Labelled, Seen or Felt)
		• Control (Self/Expert or Felt)

4. Procedures and action plans for coping with threats	a. Outcome of illness representation that leads to selection of processes and procedures to eliminate and control potential or ongoing illness threats.	• Self-monitoring (*method used in behavioural management in which individuals keep a record of their behaviour, especially in connection with efforts to change or regulate the self; a personality trait reflecting an ability to modify one's behaviour in response to situation*) • Action planning (*action or process of forming a plan to achieve a specific purpose)* • Generating alternatives • Feedback • Coping strategies • Other self-regulatory actions

Theoretical Elements	Examples of theoretical elements	Elements within the Data
5. Emotional Reactions/ Coping with affect	a. Psychological/emotional reactions taken to face health threats. b. The greater influencer of behaviour that strongly links to behaviour inhibition. c. Is directly linked to Illness Representation.	• Fear (*intense emotion aroused by the detection of imminent threat, involving an immediate alarm reaction that mobilises the organism by triggering a set of physiological changes*) • Anxiety (*mood state characterised by apprehension and somatic symptoms of tension in which an individual anticipates impending danger, catastrophe or misfortune*) • Affect (*experience or feeling of emotion, ranging from suffering to elation, from the simplest to the most complex sensations of feelings, and from the most normal to the most pathological emotional reactions*) • Stress (*state of physiological or psychological response to internal or external stressors*) • Depression (*mental state that presents with depressed mood, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, low energy, and poor concentration*) • Positive/negative affect (*internal feeling/state that occurs when a goal has/has not been attained, a source of threat has/has not been avoided, or the individual is/is not satisfied with the present state of affairs*) • Burn-out (*physical, emotional or mental exhaustion, especially in one's job or career, accompanied by decreased motivation, lowered performance and negative attitudes towards oneself and others*) • Cognitive overload/tiredness (*condition of lethargy caused by mental work greater than a person's mental abilities*) • Anticipated regret (*state of foreseen negative outcome envisioned prior to executing action/behaviour*) Threat (*perceived danger caused by belief or action taken/not taken*)

Table 4: Common Sense Self-Regulation Model (CSSRM) Coding Framework

3.9.2 *Qualitative Coding Framework – Part 2*

Bandura (1998) Social Cognitive Theory (SCT)

Theoretical Elements	Examples of Theoretical Elements	Elements within the Data
1. Self-Efficacy	a. The belief in one's capabilities to organize and execute the courses of action required for managing prospective situations. b. Confidence or belief in one's ability to perform a given behaviour. c. Self-efficacy is task-specific, meaning that self-efficacy can increase or decrease based on the specific task at hand, even in related areas. d. Self-efficacy is influenced by a person's specific capabilities and other individual factors, as well as by environmental factors (perceived and actual barriers and facilitators).	• Self-Confidence (*ability to trust in self-judgment, capabilities and abilities*) • Self-efficacy (*self-capacity to act effectively in obtaining desired results, based on one's self-perceived ability*) • Self-esteem (*degree of accepted qualities or characteristics of the self that are accepted by others*) • Empowerment (*transfer of knowledge, skills and confidence to increase control within the individual's life for positive prospects*)
2. Outcome Expectations a. Physical b. Social c. Self-evaluative	a. Individuals' beliefs about what consequences are most likely to ensue if particular behaviours are performed b. OE shape the decisions people make about what actions to take and which behaviours to suppress. c. Frequency of behaviour should increase when the outcomes expected are valued, whereas behaviours associated with unfavourable or irrelevant outcomes will be avoided.	• Outcome expectancies (*Cognitive, emotional, behavioural, and affective outcomes that are assumed to be associated with future or intended behaviours. These assumed outcomes can either promote or inhibit future behaviours*) • Characteristics of outcome expectancies (*Characteristics of the cognitive, emotional and behavioural outcomes that individuals believe are associated with future or intended behaviours and that are believed to either promote or inhibit these behaviours. These include whether they are sanctions/rewards, proximal/distal, valued/not valued, probable/improbable, salient/not salient, perceived risks or threats*)
3. Socio-Structural Factors (Environment) a. Facilitators b. Impediments	a. Refers to the factors that can affect a person's behaviour – social and physical environment. b. Social environment include family members, friends and colleagues	• Environmental stressors (*external factors in the environment that cause stress)* • Resources / material resources (availability and management) (*commodities and human resources used in enacting a behaviour*) • Salient events/critical Incidents (*occurrences that one judges to be distinctive, prominent or otherwise significant*) • Person x environment interaction (*interplay between the individual and their surroundings*)
4. Goals	a. Goals reflect cognitive representations of anticipated, desired, or preferred outcomes. *b.* Goals are important prerequisite for self-regulation because they provide objectives people are trying to	• Goals: distal/proximal (*desired outcome of an planned action/behaviour, may be closer (proximal) or further away (distal)*)

Theoretical Elements	Examples of Theoretical Elements	Elements within the Data
	achieve and benchmarks against which to judge progress.	• Goal priority (*order of importance or urgency of end states toward which one is striving*) • Goal/target setting (*a process that establishes specific time based behaviour targets that are measurable, achievable and realistic*) • Goals: autonomous/controlled (*desired outcome in which one is striving: purpose of an activity/endeavour. Identified by observing that a person ceases or changes its behaviour upon attaining this state; proficiency in a task to be achieved within a set period of time*) • Intention (*conscious decision to perform a behaviour or a resolve to act in a certain way*)
5. Behaviours	a. Refers to a person's actual ability to perform a behaviour through essential knowledge and skills.	• Presence or absence of automatic behaviours or sequence of situation-specific behaviours related to weight management. • Discontinuation of situation-specific automatically activated behaviours relevant to the weight management. • Direct experience gained through immediate sense perception or description of past behaviours • Engaging in a specific action or sets of action

Table 5: Social Cognitive Theory (SCT) Coding Framework

Stage 4- Identifying relevant theoretical constructs

Constructs with greater significance will likely to have a greater impact on participants weight loss success or failure. The relevance of the constructs was identified through consensus discussion between the student and the Supervisory team in qualitative surgeries. The team provided assess to two specialists in health psychology (VAS & FFS) and a topic expert (EF).

Stage 5- Data Interpretation

This is the final step in data analysis in which the data were summarized and the findings were reported. Representative data from the transcripts were used to support the discussed findings.

Data in this chapter were shared and examined in qualitative analysis surgeries by all supervisors (VAS, FFS, EF & RM) at various stages of data analysis and the analysis findings were reviewed, discussed, revised, and agreed. This is conducted using 3 analysis concepts – trustworthiness, triangulation and reflexivity. Trustworthiness practice and transparency will present the data clearly and in a focused manner to demonstrate the clarity of idea the researcher is presenting (Sinkovics and Alfoldi, 2012). Triangulation approach will be applied by having the data analysed by more than one person (Farmer et al., 2006). In effect supervisors reviewed the coding after the first coding were completed. Any epistemological commitments will be kept as a log throughout the research (Braun and Clarke, 2006).

3.10 Results And Discussion

3.10.1 *Introduction*

As per usual practice of Qualitative data analysis, the data is presented and discussed simultaneously. Throughout this section, the findings from the analysed data will be discussed alongside supporting quotes to further strengthen the claim of the data. The presented quotes are representative of the qualitative data. The quotes are edited as to account for Malay-English translation. At the end of each quote, acronyms in parenthesis are used to refer to each participant noting location (group); sex, age, marital status, ethnicity and living locality. An example of this is explained in Figure 4 below:

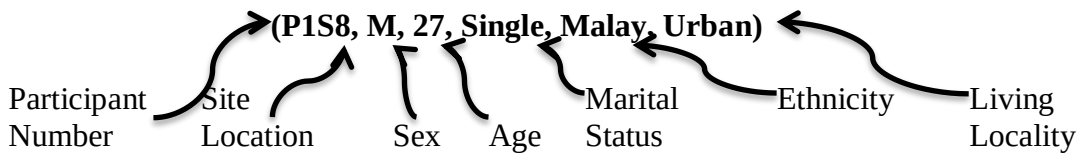


Figure 4: Description of participants' acronym (presented in parenthesis after quotes)

The findings of the Qualitative study will be discusses based on the following key ideas; developed from the Theoretical Framework presented in the introductory chapter the framework, 7 key ideas on weight management will be explored as follows:

Sub-header 3.10.2: Lay perceptions of overweight and obesity

Sub-header 3.10.3: Motivations to engage in weight loss attempts

Sub-header 3.10.4: Reasons for success/failure of weight loss attempts

Sub-header 3.10.5: Perceived facilitators to success

Sub-header 3.10.6: Perceived barriers to success

Sub-header 3.10.7: Personal consequences of weight loss

Sub-header 3.10.8: Impact of weight concerns on past and current behaviour

Sub-header 3.10.9: Ethnic specific impact on weight management

Sub-header 3.10.10: Cultural impact on weight management from a geographical perspective

Sub-header 3.10.11: Impact of food management practices on weight management

Sub-header 3.10.12: Cultural social behaviours' impact on weight management

Within each sub-header analysis will be presented based on three main grouping of participants:

- normal weight participants who were previously overweight or obese (NW)
- overweight or obese participants currently actively engaged in weight loss (O^1)
- overweight or obese group that engaged in previous weight loss but failed to maintain it and regained the weight (O^2)

3.10.2 *Lay perceptions of overweight and obesity*

The qualitative coding framework developed to analyse the data presented here was based on the Social Cognitive Theory (SCT) by Bandura (Bandura, 1998) and the Common Sense Self-Regulation Model (CSSRM) by Leventhal (Leventhal et al., 1997).

Under this sub-header, 2 significant ideas stood out in regards to the key illness perceptions participants referred to about overweight and obesity across the 3 groups. The focus seems to be around label and symptoms and on causes for overweight and obesity.

A. The definition of obesity: label and symptoms

It is noticeable that across all three groups – Normal Weighted (NW), Overweight and still losing Weight (O^1) & Overweight and failed to maintain Weight Loss (O^2); regardless of the interview sites there are communalities in the definitions of obesity presented. The majority is able to define obesity as a condition where the BMI exceeds the normal values. This study uses

the standard BMI values of <18 as underweight, 18-25 as normal weighted, 25-30 as overweight and >30 as obese. Although in some cases, some of the participants were not completely clear about what defined overweight and obesity.

"Obesity I define using the BMI formula – when we calculate our weight using the formula and it's over the standard we are considered having obesity. I just follow that formula (BMI). But there are times even if we follow the formula, people perceive us as too thin. Sometimes the BMI makes us look overly thin but to me it ok but it's more to what I feel. Even if I put on a little weight it won't change the BMI too much or make we look too fat. What's important is we know the basic for the formula – if our ideal is 64kg then 65kg is a no no." **P6S5, NW, F, 35, Malay, Married, Urban**

"Obesity is the body weight or BMI is more than 28… I think that right isn't it?" **P4S3,** O^1**, F, 39, Malay, Married, Rural**

"Obesity is when your BMI is more than normal. For example normal is 24. So if the BMI is 31 or 35 then you're obese. Like me I'm 39 <laughs>" **P6S4,** O^2**, F, 49, Malay, Married, Urban**

Some participants, however, defined obesity as a consequence of doing (or not doing) an action – reflecting more on the causes of obesity than on the definition. Some participants seem to bring together what causes obesity and what defines it. Some quotes can seem prejudiced.

From a NW Participant:
"Firstly to me obesity is not doing sports, being fat… then lazy…" **P1S1, M, 31, Married, Malay, Urban**

From an O^2 Participant:
"Obesity is being fat because of poor timing and eating habits and not doing enough exercise. Time to me is the biggest problem in both exercise and eating." **P5S2, F, 54, Malay, Married, Urban**

Others have a definition of obesity as a condition that can be identified via visual cues and link it to specific emotional and other health and mental health consequences.

From a NW Participant:

"Obesity to me is a person when you don't fully utilize your body because of the size and the self-esteem in an obese person is going down (low)." **P1S6, M, 24, Single, Bumiputra, Urban**

From an O^1 Participant:

"To me obesity is excessive weight in comparison to height that is not normal or nice so when we are obese, we will get diseases that we do not expect to get…" **P3S8, F, 43, Malay, Married, Urban**

From an O^2 Participant:

"Obesity is overweight, being overly fat and high BMI." **P4S7, M, 38, Malay, Single, Rural**

B. Causes of overweight and obesity

In general, obesity is caused by lack of body energy expenditure versus energy intake. This means, if you burn less energy than you consume, the body will store this energy in a physical form commonly referred to as fat – the cause of body weight increase.

Lack of physical activity is another major component cause of obesity. If a person is lacking in energy expenditure, the retained food consumed turns is stored as fat. While there are some genetic traits that cause obesity, research proves that there is no reason why a person cannot lose weight (CDC, 2013, Obesity, n.d.).

In this sample participants are able to identify all the major causes of obesity – uncontrolled eating behaviours and lack of physical activity. This is due to their nature of work and their own experience in dealing with patients having similar conditions

From a NW participant:

"Excessive food intake especially those that are full of fat, fried too much carbs because we know there a limit of what we should eat and when we eat too much is the cause why we become fat. Also is lack of physical activities and after we eat, we sleep – of course we get fat! <laughs> Right? For me in the mornings I take a little carb <room phone ringing> but if I do I make sure I have activities (to burn the carb) so make sure if you take carbs you must have activities if not don't take it. Don't eat and sleep immediately after. For sure you'll end up fat." **P6S5, F, 35, Malay, Married, Urban**

From an O^1 Participant:

"Obesity is because of excessive eating, you can't control what you eat and no exercise." **P4S6, F, 29, Bumiputra, Single, Urban**

From an O^2 Participant:

"No exercise and uncontrolled eating habits." **P4S7, M, 38, Malay, Single, Rural**

There are also participants who gave distinct reasons for their weight gain – genetics and medical based reasons. The participants are from the O^2 group:

"Well according to the doctor it's because of the hyperthyroidism" **P6S4, F, 49, Malay, Married, Urban**

"Eating habits and genetics for me and also exercise. When you exercise less you gain weight" **P6S4, F, 49, Malay, Married, Urban**

There is also one participant who blamed socializing (as part of the environment) as a cause of obesity. This NW participant believes that socializing with people may lead to similar behaviours:

"Environment? If you mingle with people who are… <trails> most of them are obese then you night be joining the group" **P3S6, F, 34, Bumiputra, Married, Urban**

3.10.3 *Motivations to engage in weight loss attempts*

Weight loss motivation is often driven by a goal. These goals are either self-driven (intrinsic motivation) through self-awareness of the need to lose weight or driven by others (extrinsic motivation) through modelling (inspired by another to look thinner) or guided towards it (advised by a health professional to lose weight). The drive is often unique to each individual. The way participants described their motivation for weight loss was aligned with mainstream theoretical conceptualizations of motivation by the self-determination theory (Deci and Ryan, 2000). This was not a theoretical framework we had departed from, but emerged from the data naturally.

The main characteristic of Autonomous motivation (intrinsic motivation- the prototypical for of autonomous motivation; identified regulation; for more details see Deci and Ryan, 2002) is the feeling and notion of choice, volition, free from any outside pressure. People that are autonomously motivated engage in behaviours that they believe they should for personal reasons. Per contrast controlled motivation (external regulation-the prototype of controlled regulation; introjected regulation; for more details see Deci and Ryan, 2002) described an action that aims for external rewards, addresses demands, or concedes to coercion. Individuals acting based on controlled motivation do so for externally referenced reasons (Deci and Ryan, 2002).

Participants spoke about two main reasons to lose weight. The first reason was rooted on appearance – wanting to look more attractive or go back to a previous body image. Below are examples of autonomous forms of motivation:

From an O^1 Participant:
"Yeah, I think I need to lose some more because my body below my hip is ok but here, my tummy is big lah, so I need to reduce." **P4S2, M, 29, Indian, Married, Urban**

From an O^2 Participant:
"I was happier when I was thinner. I want to lose weight." **P6S4, F, 49, Malay, Married, Urban**

One participant from the NW group spoke of wanting to look good in clothing and kept it as a goal to lose weight:
"For me, if I like this one particular dress, there is no extra large size for it, there's only available in one size, which is S or the worst XS because it's Korean size; so the S or M size will not be available in the market. So it's just the motivation! You want to fit into that dress, that beautiful dress, then you must motivate yourself: you want to lose weight, the healthy way so you can fit into that dress." **P3S6, F, 34, Bumiputra, Married, Urban**

One participant from the O^1 group spoke of being inspired to look better after seeing others:
"It all started after the SEA Games in Myanmar. I was in the official support team appointed by MOM (Malaysian Olympic Committee). When I was there I was inspired to lose weight." **P5S5, M, 37, Malay, Married, Urban**

The second main reason participants have expressed was related to health – they were made aware (e.g. GP) that they needed to lose weight for health reasons a form of introjected motivation.

From a NW participant:
"I remembered the calculations made for me is if my weight goes more than 66 I would be overweight or worse obese. So if I hit 65kg then I know I am already overweight." **P6S5, F, 35, Malay, Married, Urban**

From an O^1 Participant:
"I wanted to lose weight because I don't want to be sicker than I already am. I wanted to cut that down." **P2S4, F, 58, Malay, Married, Urban**

From an O^2 Participant:
"My husband kept on telling me to reduce my weight because I have joint pain maybe it's much to his concern… So the doctors also kept on telling me "lose your weight… well, what to do… I've been trying…" **P5S2, F, 54, Malay, Married, Urban**

3.10.4 *Reasons for success/failure of weight loss attempts*

A. Reasons for weight loss success/failure in the past

The data seems to indicate that weight loss success is defined by the amount of weight actually lost. Reasons for the success are often attributed to high levels of adherence to recommended activities. The reasons for failure were often attributed to failures in adherence to recommend activities.
Participants who had experienced success in past weight loss attempts were able to provide data on the amount of weight loss as well as the reasons for success in this loss.

From a NW participant:
"Well during my previous attempt I actually reached my target weight of 57kg of 11 years ago." **P1S6, M, 24, Single, Bumiputra, Urban**

From an O^1 Participant:
"(My previous reason for success) Is exercise. I do daily aerobics at home because during the programme, their aerobic session runs during certain days only so I do it at home too. (But after reaching ideal weight, weight has increased) I think because I didn't do enough exercise. As

for eating, I try to manage it but it's more because of exercise. **P3S8, F, 43, Malay, Married, Urban**

From an O^2 Participant:
"I think it (The Biggest Loser) was successful because of my friends and myself. I really wanted to lose weight as I feel myself moving slowly compared to others." **P6S4, F, 49, Malay, Married, Urban**

Across all 3 groups participants were able to define the behaviours that lead to failure on past weight loss attempts. A participant from the NW group spoke of complacency, after achieving the target weight, as the cause of weight loss failure:

"When I reached that weight I felt comfortable. After that I stopped my workout, I stopped my supplements because I think "ok, no need to do anymore" because I was almost at my goal. So it's actually totally wrong because after that, I gained weight – after 57, it goes up to 60, 61, 62 and then the highest weight I got was 64.2kg; which was one month and a half before this (interview?)." **P1S6, M, 24, Single, Bumiputra, Urban**

Participants from the O^1 group mainly spoke of a lack of commitment and a decrease on the levels of motivation, topped by other factors such as high stress, as the reasons for their weight loss attempt failure.

From O^1 Participants:
I think it's because of stress and I can't control my weight and maintain my weight. I have so much work… It's just that… I tried many times to lose weight but it's because of stress… I think its stress. **P4S6, F, 29, Bumiputra, Single, Urban**

"I failed before because I didn't really have the drive to lose weight. I wanted it but I didn't really have the will to do it. Secondly, I didn't really know how to go about it correctly. I tried jogging, but after a while I had knee pain. Then I stopped. And thirdly is the asthma attack. I didn't ask the doctor why when I jog the asthma would come around. After talking to the doctor and dietitian and joined the aerobic team, then I learned how to do it correctly." **P1S3, F, 40, Malay, Married, Rural**

Participants from O^2 group mainly spoke of the lack of weight loss after programme and continuation after:

"The last attempt was kind like an on-off thing. So my weight didn't change much – assuming my weight is 138(kg) it will go up to 140(kg) or drops back to 138(kg). It maintains around that much." **P4S7, M, 38, Malay, Single, Rural**

"After that 6 months (programme), they stopped monitoring us; before this they weighed us weekly so it's a motivation for us to go on. So when they stopped the monitoring, and people start asking us to join and eat we would do so on the pre-tense "once is ok". That causes the weight to go up further." **P1S4, F, 50, Indian, Married, Urban**

B. Reasons for weight loss success/failure in the present

Participants from the NW group mainly spoke of their adherence to what had been recommended and how this lead to success in weight loss:

"The main reason (for success) I feel is the food intake control that Mr. Din gave us. I feel before this I never knew of these things… So when I joined Mr. Din's programme he explained to us the quantities of carbohydrates, protein within a food before we buy them, also the amount of calories in them. Before this, I never really cared…" **P4S1, M, 30, Malay, Married, Urban**

"I know basically how many calories a normal person can take in one whole day. So I try to balance it back by exercising in the afternoon, or the evening something like that." **P3S6, F, 34, Bumiputra, Married, Urban**

Participants from the O^1 group mainly spoke of their achievements in weight loss and their future targets since they are still in the weight loss process. Part of what they stated was very much related to the changes observed in the way their clothes fitted or not and how that reflected weight change.

"I think it was successful because I can see the actual weight loss. You can see the looseness in your clothes, going down from triple to double and now XL. Insya Allah will try to get L." **P1S3, F, 40, Malay, Married, Rural**

"Yeah, because if compared to previous is 105kg and now is 87, I think already if I'm not mistaken is already 20 plus… 20 plus kg that means for me it's a big achievement but I still got 7kg to reduce." **P4S2, M, 29, Indian, Married, Urban**

"It is definitely successful. If you see me now the shirt I'm wearing is excessively lose and my pants I'm wearing them high because I refuse to change them until I reach my target." **P5S5, M, 37, Malay, Married, Urban**

Participants from O^2 group used lack of commitment as the reason for failure and indicated that they knew what should've been done to lose weight but did not take action.

"No, because I defaulted. Even after my pregnancy they continued to call me asking when will I join again. It's hard because I have a small baby and now she's two so I have to see if I can make arrangements for it – if I have the time" **P3S3, F, 40, Malay, Married, Rural**

"…if we really want it to work, it could work. It's actually contradicting. We really want to follow it but we are also eating so we're actually putting on more weight." **P2S3, M, 32, Malay, Married, Rural**

"I don't see it as successful yet because I am targeting to reduce my weight to 70(kg)." **P4S3, F, 39, Malay, Married, Rural**

3.10.5 *Perceived facilitators to success*

A. Perceived facilitator to success (Individual)

The belief that success is due to oneself is the main idea presented by many participants across groups. Participants believed that a strong self-belief and a good sense of self-efficacy are related to higher levels of motivation, which in turn, supports goal achievement.

From a NW participant:
"Uhm <thinks for a while> for me in terms for losing weight, the real important thing is yourself; you can't be too dependent on others. Other people can comment saying "you can't do this or do that" but it all depends on yourself. To me any kind of diet you want to do will not work if you don't have a strong will to do it. Throw any diet and it will only work if you really want to do it. The person who wants to lose weight is you and nobody else's business. Other

people can say what they want and most of the time it doesn't help us. That's what I believe so we need to have a strong will to do it." **P6S5, F, 35, Malay, Married, Urban**

From an O^1 Participant:
"In my own perspective, for me the most important support is yourself – not from other people. Support yourself, increase the self-confidence, and love yourself first. Only then something will happen. You can't rely on other people. When other people say "you can't do it" you yourself will also say "it can't be done". If you depend on yourself, you know you can do it. External support is important too but it should only act as a supplementary support; not the main." **P5S5, M, 37, Malay, Married, Urban**

From an O^2 Participant:
"I think it has to come out from the heart also lah… If you have strong will to lose weight then you go for it and do it. But if you don't have a strong will, no matter how good the programme is, you won't achieve it; especially when there are no participants who really want to do it." **P5S2, F, 54, Malay, Married, Urban**

B. Perceived facilitators to success (Social)

The idea of success propelled by support is often addressed in research. In behaviour, change can occur with the aid of social support. Support comes through various channels (family, peers, work colleagues, healthcare professionals) and through various methods (spoken advise, group discussions, training of skills, behaviour modelling, amongst others) (Bandura, 1998. Some support may take a negative approach to change behaviour – by discouraging the participant from engaging in particular behaviours or activities. This is the basis of negative reinforcement in the Operant Conditioning Theory (Skinner, 1953) seemed to be apparent in the feedback given by the participants.

From a NW participant:
"The senior members of the club mostly helped with the diet and what not through online discussions. They have the most experience. Some who are very much obese have lost a lot of weight. That's where I get my advises from." **P6S5, F, 35, Malay, Married, Urban**

From an O^1 Participant:

"Yes I did. From my wife and friends. When I say friends not my office friends but friends who exercise with me – those who jog, swim with me and the athletes." **P5S5, M, 37, Malay, Married, Urban**

From an O^2 Participant:

"When there a "makan-makan" event (eating gathering/party) I need someone to tell me to stop; my friends especially." **P6S4, F, 49, Malay, Married, Urban**

3.10.6 *Perceived barriers to success*

A. Perceived barriers to success (Individual)

A personal belief that limits the success to weight loss is the general idea within the construct of Barriers to Success that was spoken by all participants across groups. Many spoke of the behaviour that they could not give up (bad eating habits) or that they had stop engaging in (physical activity) as issues that limited success.

From a NW participant:

"After my 2nd pregnancy I started going to the gym and dieting but my diet was easily destroyed whenever I travel with my husband because we tend to relax and eat all the time." **P3S6, F, 34, Bumiputra, Married, Urban**

From an O^1 Participant:

"Sometimes I don't have control of it. When you are used to eating, suddenly you put control over what you eat, at most you will be able to do it is within a week, then you start eating normally again, then you start putting the control on again. I think maybe that's why my weight is kind of stable <thinks participant refers to stagnant weight>." **P2S2, M, 33, Indian, Single, Urban**

From an O^2 Participant:

"Last time I used to stock a lot of salad. We were taught to eat more salad and less rice so I tend to buy a lot of it. Now I am lazy to do so." **P6S4, F, 49, Malay, Married, Urban**

B. Perceived barriers to success (Social)

As success in weight loss can be driven by social support, social barriers can also hinder it. Participants have expressed that while some families and peers came to their support in weight loss, some have also hinder their success. These hindrances may come in negative comments about appearance and capabilities or making justifications to not do anything about their weight. Sometimes, the presence or behaviours of the peers or family members, by itself, becomes a hindrance to the participants attempt to lose weight – this may tie closely with the environment the participants are in.

From a NW participant:
"…Second is maybe influence by your surrounding – if your friends of family never go for workout; you never learn, you never see what the workout is all about and you gain weight lah" **P1S6, M, 24, Bumiputra, Single, Urban**

From an O^1 Participant:
"Yes, my wife. She always comments that I am overweight; condemn me, saying, "why do you always keep your body like this?" Then she feels shy, when I bring her out, I wear my shirt, tummy will be seen." **P4S2, M, 29, Indian, Married, Urban**

From an O^2 Participant:
"I face temptations mostly from my children. They love to eat because they are growing up but they don't put on weight. Sometimes they say "Mama, I want to eat this" or "Mama I want to eat KFC" so I have to give them what they want. I join them but I try not to eat too much. Just like that" **P4S3, F, 39, Malay, Married, Rural**

C. Perceived barriers to success (Environment)

Environment can play a strong role in weight loss success. Environment can limit or encourage a person to lose or gain weight. None of the participants mentioned environment as a facilitator but a number mentioned it as a barrier to success. Many mentioned living in a limiting environment. This is especially due to the limitation of that particular environment and behaviours of the people within it – this is closely tied with social barriers.

From a NW participant:

"…before this I was posted in Sabah (Borneo)… Before my weight is what it's like now… I am a trainer, a football trainer. So my weight was okay until I started working here and stopped doing sports…" **P4S1, M, 30, Malay, Married, Urban**

From an O^1 Participant:

"If I go back home to the village <laughs> when I go back to the village all you do is eat." **P3S7, F, 41, Bumiputra, Married, Rural**

From an O^2 Participant:

"I think working in the wards (in HKL) and in the clinic here is very different. Working in the wards in HKL you will walk a lot. I walked from the wards to the main block to send blood samples several times per day so you will sweat a lot and burn lots of calories. Here I don't do much walking. If I need to send samples, I will hop on a ride with the driver and have them sent to Malacca Hospital." **P6S3, F, 31, Malay, Married, Rural**

3.10.7 *Consequences of weight loss*

Weight loss can have a positive or negative effect on an individual. Some may see it positively by having positive reactions and emotions when thinking back to the weight that has been lost . This in turn may have further positive consequences on the individual or others (e.g. family).

From a NW participant:

"At home with my wife mentioned to me "eh, you used to be big" and after seeing my results (herself) she started to do it too…" **P4S1, M, 30, Malay, Married, Urban**

From an O^1 Participant:

"Sometimes… because when I look myself in the mirror I see myself "Why do I have extra (flab)?" <chuckles> but then I compare myself to my older self [reflections on previous weight in the past] and look at my husband then I say to myself "its ok" <laughs>" **P1S2, F, 33, Indian, Married, Urban**

Some face negative reactions that seem to have a negative impact on their emotional balance. These impacts may lead to further positive or negative change such as weight gain.

From O^2 participants:

"Just a bit because it annoys me that people keep on asking me repeatedly the same question. It makes me uncomfortable. For example yesterday, the same question from several people on the same day. It feels like if you are overweight is a problem or if you are thin is also a problem." **P5S5, M, 32, Malay, Married, Urban**

I don't feel sad and what not; but it's like I feel like <thinks for a while> unsatisfied… **P4S2, M, 29, Indian, Married, Urban**

Negative internal perception to weight loss failures is generally perceived as limiter to success. Often participants seem to make personal causal attributions to failure. Some of these are psychological and may lead to hindrances in future weight loss attempts:

From O^2 participants:

"I just feel ashamed at myself seeing other people are thinner than I am." **P1S5, F, 50, Malay, Married, Urban**

"When you are big sized, I feel distanced from other people. So far my friends are all accepting of me it's just myself that feels insecure and what not." **P5S7, F, 37, Malay, Single, Rural**

3.10.8 *Impact of weight concerns on past and current behaviour*

Weight changes across time seem to have a strong impact on how individuals see themselves at the present or in comparison to their past. For those who have successfully lost weight the need to maintain weight loss is paramount. Fear and anxiety emerge as are emotions that impact strongly across groups and seem to drive some to maintain or further engage in weight loss. Some participants seem to become particularly focused in avoiding gaining weight.

From a NW participant:

"As a woman of course! I would always worry if I gain weight. How would I fit into my clothes???" **P3S6, F, 34, Bumiputra, Married, Urban**

From an O^2 Participant:
"Yes the clothes that don't fit and I'm afraid it might go up again. Last year my weight hit the 100 (kg) mark and this year it just keeps going up. Although it's gradual, it's worrying." **P2S3, M, 32, Malay, Married, Rural**

Some in fact, take weight changes positively and believe that it is a positive change that they have gone through.

From a NW participant:
"It does (affect me emotionally), a bit. Because every morning I get up I would weigh myself at home. I have a scale at home. It's a routine for me. I was overweight previously so I am afraid to gain weight." **P6S5, F, 35, Malay, Married, Urban**

From an O^1 Participant:
"Before I was stressed with my weight but now I am much happier, lighter. I feel easier when I move during prayers" **P1S3, F, 40, Malay, Married, Rural**

3.10.9 *Ethnic specific impact on weight management*

The majority of the population in Malaysia was Malay and Bumiputra, and is also the majority of the participants. However the Indian participants of the interviews were those that expressed a specific ethnic impact on weight management. The Indian participants expressed that their ethnic heritage was a barrier that could possibly hinder the success of weight management.

"We Indian we have a culture; I don't know about other races (ethnicity), we have to wait for our husbands to come back from work. It's different if I have on-call or shifts but when at home, we will always sit and eat together." **P1S2, F, 33, Indian, Married, Urban**

"But if there is a feast at night, you know what that means: you know Indians love mutton and how can you not eat mutton during a feast?" **P2S2, M, 33, Indian, Single, Urban**

The majority of the participants also spoke of communal eating within the family. Communal eating is not limited to those living in the rural area only but is also still practiced in the urban area and it is also not limited to eating at home but also when eating out. The main difference is the working hours of the participants or timing that actually limit the communal eating time.

"Usually when I go back home, lunch and dinner we always eat together, with all my 4 siblings on the same table…" **P3S1, M, 29, Malay, Single, Urban**

"There's no such thing as eating together… My mom would cook and serve, you eat on your own… no eating together or eating at the same time…" **P4S1, M, 30, Malay, Married, Urban**

"At home or at the end of the month we always eat together outside" **P2S3, M, 32, Malay, Married, Rural**

"Yes we eat together" **P3S7, F, 41, Bumiputra, Married, Rural**

3.10.10 *Cultural impact on weight management from different geographical*

Geographical reference on food preference is prevalent amongst participants. Geographical reference is not limited to a particular location but also over a larger scope including States. The participants convey preference and variety that causes weight management problems.

"We are from Negeri Sembilan and you know Negeri Sembilan people love super spicy food and rich use of coconut milk in "masak lemak pedas" (creamy, spicy cooking). So I think the use of fatty food plays a strong role in the cooking style. And maybe one more thing, I like to pour a lot of gravy when I eat. I think that is my problem lah…" **P5S2, F, 54, Malay, Married, Urban**

"…other reasons I think is the food here is way much better <laughs> compared to Sabah (?rural area?), the food is not so good... and also when I'm here, I see all my siblings, my parents, we eat… and we really eat…" **P4S1, M, 30, Malay, Married, Urban**

"I am from the village, so village cooking people say well, aaa, my family don't really care about the content… village people just don't care…" **P1S1, M, 31, Malay, Married, Urban**

3.10.11 *Impact of food management practices on weight management*

Cultural practices of food waste avoidance and fear of insult caused by food refusal are strong contributors in affecting the behaviours of participants in weight management. Due the practice of the older generation of the 1950's where Malaysia had suffered some levels of food limitation access, the general populace behaves by avoiding food wastages irrespective of the current situation of overabundance of food. The second contributor is elderly respect where family members are expected to eat what is prepared for them by the matriarch or the older member of the family. Refusal of eating the prepared food may lead to insult or probable confrontation that is by all means avoided. Participants conveyed these practices that they cannot avoid as it is the norm of the populace.

"Another is we tend to eat with our kids. If they don't finish their food, we end up eating it. That's why it's a problem. It's a problem if the food is not eaten and getting fat is another problem because you don't want to waste the food." **P2S3, M, 32, Malay, Married, Rural**

"My husband tends to buy food or rice at night even though I tell him not to. Not wanting to insult him I would eat because usually at night I would eat biscuits or oats or oat-fibre or oat-coco biscuit." **P6S3, F, 31, Malay, Married, Rural**

"She prepares is normally but after I realized and I did research about weight loss, I have to eat clean. So, have to choose food without oil, less salt, less sweet. But my sister's cooking is something like oily and salty. I don't need to eat my sister's cooking but I have to eat what she makes" **P1S6, M, 24, Bumiputra, Single, Urban**

3.10.12 *Cultural social behaviours impact on weight management*

The way people behave around each other impacts on individuals to a large degree – more commonly known as peer impact; the effect it has can greatly aid the individual to lose weight or severely impede the success. Participants have expressed the impact of peers quite clearly on the success or failure of their weight loss attempts. It is mentioned that negative comments reduces the motivation to lose weight. Peer pressure also leads to a greater limitation to weight loss success especially when emotional attachments or anchoring is strong on the participant – mothers and children. Peer pressure can also increase the success of weight loss especially when expressed in a positive manner. The instance of barriers of social behaviours are shown below:

"Second thing is people's perception of me. If they haven't seen you for a long time they will definitely comments "You certainly have put on weight", "You look chubby"… something like that." **P1S6, M, 24, Bumiputra, Single, Urban**

"People would question my motive – why suddenly wanting to lose weight? People would also say "You look sick if you're thin. You don't look pretty/handsome. You look pale". Some of the things said. Its normal actually because they're envious." **P5S5, M, 32, Malay, Married, Urban**

"I face temptations mostly from my children. They love to eat because they are growing up but they don't put on weight. Sometimes they say "Mama, I want to eat this" or "Mama I want to eat KFC" so I have to give them what they want. I join them but I try not to eat too much." **P4S3, F, 39, Malay, Married, Rural**

The instances of success caused by peers support behaviours are express below:

"I am actually happy after I've gone through the process; losing weight my friends been commenting, "you have lost weight" or "you're slim now" "not flabby"" **P1S6, M, 24, Bumiputra, Single, Urban**

"At home with my wife I would say "eh, you used to be big" and after seeing the results she started to do it too…" **P4S1, M, 30, Malay, Married, Urban**

There are also instances where the individuals have expressed that peer impact makes no difference to them as one participants mentioned below:

"In my position, people will never say it honestly to my face "you're fat" and what not, so I rely more to my husband and just myself." **P3S6, F, 34, Bumiputra, Married, Urban**

3.11 Further Discussions on Findings

This study has extracted past and present experiences of weight loss faced by the participants. To summarize the findings, we will present them using the coding framework presented earlier and combining this with the main findings presented. Please note that one key theme that emerged across the interviews was culture. This key theme will be explored on a separate chapter.

3.11.1 *Knowledge (linked to CSSRM- identity/labels and causes)*

The participants have a general idea of how obesity is defined and what causes it. While most are able to provide a general definition and causes; some are well versed in the technical knowledge as well. This is due to the fact that some of the participants have more technical knowledge in the field of obesity or have investigated the technical terms themselves. Most are able to link their knowledge to the label correctly and provide the correct definitions, explore accurate causes reveal good level of personal control over it. Lack of knowledge does not seem to be an issue for the participants.

3.11.2 *Timeline in overweight and obesity*

Participants seem able to scale the timeline of their weight gain in detail – after pregnancies when moving job, locations. Some believed that they have known about their weight issues since childhood and this is tied closely to their family physical appearance – linking the obesity issue and its timeline with genetic causes. Most state the lack of time as one of the factors associated with weight loss failures, as they cannot commit to weight loss activities due to poor timing.

3.11.3 *Consequences of overweight and obesity*

Participants are generally aware of the consequences of obesity and their lack of action to prevent it. They are also aware of the consequences of weight loss but are not necessarily ready for the reactions that they face after losing weight especially negative reactions from peers or family members.

3.11.4 *Cause of overweight and obesity*

Participants have the necessary knowledge on the causes of obesity because of their past experiences and even because of their professional roles (position as MoH staff). However having knowledge on causes can have a mixed effect on weight loss, depending on the type of belief (genes, thyroid malfunction, vs energy in and energy out).

3.11.5 *Control of overweight and obesity*

Participants mostly acknowledged being incapable of controlling weight loss and state various reasons for their inability to do so. Many state time and commitment issues as causes for their failure of control their weight.

3.11.6 *Emotional reactions to overweight and obesity*

Positive feedback on weight loss increased positive reactions that in turn lead to better weight loss maintenance or simply to weight loss. However, participants also faced negative reactions from peers and families that seemed to hinder their success in weight loss, if not overcome.

3.11.7 *Self efficacy*

Many participants cited that a strong sense of self-efficacy is important in losing weight. Although peer support is important, many believed that, a strong self-efficacy will lead to a successful change (lose weight) and is greater than the support of peers and the most important motivating factor of weight loss.

3.11.8 *Outcome expectations*

For those that experienced success when engaging in weight loss there seems to be a strong association with the expectation to go back to their previous weight as this is often defined as their target. Those successful on weight loss are often willing to go further in losing more weight. Those currently on the path seem positive that they will be able to achieve this loss and those who failed seem to engage in reassessing their weight issues and reaching the conclusion that their weight condition is not that serious as to warrant action (perhaps as a way to resolve some cognitive dissonance; or of protecting their self-esteem).

3.11.9 *Socio-structural factors*

Environment played a strong role. Those interviewed believed the environment and people within it affect them strongly. They believed that working in a large organization allows them to move more. They also believed that the working environment either makes them sedentary or more active but this is subjective to the nature of their work. If their previous work allows them to move more and the newer one limits their movement, they perceived that the working environment limits their movement. They also perceived that having a good environment helps in making their weight loss success easier. Some of the environmental characteristics that were referred, as having a positive effect on weight loss were things like access to physical activity infrastructures, organized events and tools. This in most sense do aid in increasing the success rate of weight management if the environment is positively reinforced (NIH, 2012). This factor is closely tied to social support. Success in activities is often observed increasing when done in numbers as opposed to individual success. Social supports acts in increasing the effect of the overall group in success and can work for the benefit of the entire group in a lesser time frame

rather than individualistic success that could take more time. This however is also governed by goals and motivation.

3.11.10 *Goals and motivation*

Many had clear goals on how much they want to lose and what key target they aimed for. These goals are generally quantifiable and are supported by autonomous or controlled motivations levels of motivations. Having a goal seems to serve as a conducting line, leading the person to the main aim. Goals itself are driven by motivation and motivation comes in varying form. More often than not the motivation conveyed that governs the goals are introjected and controlled rather than autonomous and intrinsic.

3.11.11 *Cultural impact*

Cultural expressions of ethnic values are often expressed to emphasis uniqueness of that specific culture. During the interviews, most Malay participants were not really expressive in regards to the values related to their ethnicity. It is possible that as the researcher was Malay the Malay participants could have assumed that the researcher already knew the ethnic values for Malays. This was in contrast with Indian participants where they were more expressive in explaining their ethnic values and how it affected their weight management.

Home practice for mothers to avoiding food wastage by eating their children's leftovers was expressed clearly. In general, food wastages among children are considerably lower than adults because of this practice and the quality of food provided to children are often regulated because of the sensitivity of their gastric system and also to encourage the children to eat when they are no so inclined to do so.

In the Malaysian context of social and cultural norms, the Malays often overshadow other ethnicities being 2/3rds of the majority population. Other ethnicities often adopt their cultural norms and the general population is expected to adhere to it. At any point when an individual goes off the cultural and social norms, it would be common to see that their actions are often questioned or criticized (positively or negatively). As was the case of participants who underwent physical changes in weight loss who often received comments about their changes. If these changes were not made known to the community of the community (in this case the MoH), the individual may be questioned on their condition of changes and motives. However, how the community members asked the individual also has an effect on the individual behave towards the community. For an individual who are in the middle of a weight loss attempt and

is currently losing weight, to be questions as “are you sick?” is perceived as a negative feedback could cause a reduced motivation to lose weight.

Malaysia is a country divided into West Malaysia, made up of 10 States and 2 Federal territories, and East Malaysia, made of 2 States and 1 Federal territory. The division is due to the South China Sea and this division gives diversity in cultural practices. The diversity extends not only to the East and West Malaysia but also on a State level, district and even ethnicity within that district. Such diversity can cause preferential eating habits and affect weight. To be more selective in eating due to unavailability of the preferred dishes in one State may cause an individual to lose or maintain weight as opposed to the individual living in his or her own State or District. Being deprived of their preferred food choices after a long while will probably cause the individual to overeat upon returning to their original State or District or simply between East and West Malaysia.

Division among ranks is another reason for changes in behaviour. Culturally, Malaysians are very respectful of individuals of a higher rank and may be afraid to say anything negative towards him or her. This division can cause a barrier in communication compromising honesty in favour of respect. Thus a higher-ranking individual who gained weight may never have their weight gain commented on by others, whereas a lower ranking individual most likely will.

Chapter 4. Beliefs of overweight, obesity and, weight management (weight loss and weight maintenance): a survey study.

4.1 Aims

As per mentioned earlier in the introductory chapter, the quantitative phase will explore the general population, using a sample of employees from the Malaysian Ministry of Health (MoH), beliefs of overweight, obesity and weight management (weight loss and weight maintenance). The aims are:

- To explore people's past and present weight loss practices:
    - Weight history
    - History of weight loss attempts and strategies
    - Physical Activity levels and diet history
    - Self-weighing behaviour
- To explore beliefs about overweight, obesity as well as weight management (loss and maintenance):
    - Beliefs on how overweight and obesity is perceived
    - Beliefs on diet
    - Beliefs on weight management (weight loss and maintenance)
    - Differences in beliefs amongst those actively attempting weight loss and those not
- Investigate key theoretical predictors of weight loss.
- Understand the theoretical predictors of weight loss success using two distinct outcomes:
    - Actual weight loss achieved (self-reported in in kgs)
    - Perceived weight loss

4.2 Methodology

This survey study had an open approach to sampling; all the population of the MoH with registered official email was invited to participate in the study (N = 80,000). This huge work force could have provided a varied sample (from all walks of life) to join the study and this variety was necessary to this phase of the study. To answer the research questions above it would be important to include in the study, those:

- Currently active on Weight Loss Attempts (WLA)
    - Group A: those who were currently in the normal weight range. This included those who were overweight or obese before their WLA attempts (they will answer all questions except question 17 & 18, see appendix J & K).
    - Group B: those who were still overweight and obese but currently attempting to lose weight (active in WLA). This category of individuals included those on a perpetual cycle of WLA or newly started on WLA (they will answer all questions in the survey, see appendix J & K).
- Not on active WLA
    - Group C: those who were underweight or normal weight individuals who had not experienced overweight issues. This group will answer a limited number of questions (they will answer all questions except questions 16 to 18, 20 to 30, 34 to 38, see appendix J & K).
    - Those who were overweight and obese. These comprise of individuals who have a weight issue but have never acted upon it (they will answer all questions except questions 16 to 18, 21 to 30, 34 to 36 see appendix J & K).

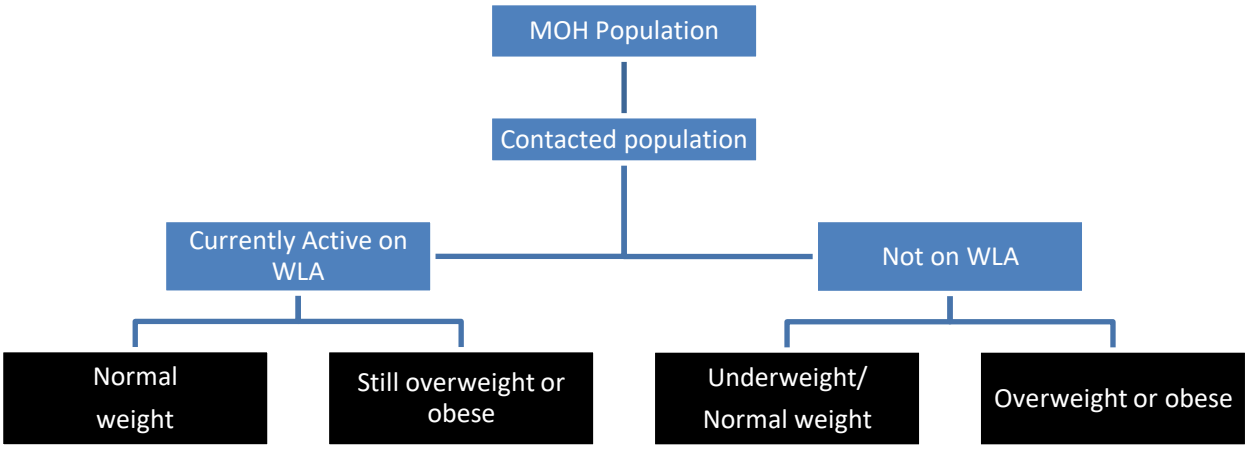


Figure 5: Quantitative survey participants

Since this Quantitative study used an electronic survey (e-survey, Qualtrics™), all of the MoH staff with registered official MoH email (80,000) was invited into the study.

4.2.1 *Tool for the study - Know Your Weight Survey* (e-SURVEY)

The e-survey (APPENDIX J – English & APPENDIX K - Malay) was originally based on several existing tools that had been developed used, tested and published in the past (add references). The e-Survey consisted of a 7-part questionnaire. Each questionnaire incorporated was culturally adapted to the Malay population without changing its core. The theories

described in Chapter II and that informed Chapter III was used to develop and refine this questionnaire. Elements from the Social Cognitive Theory (SCT) by Bandura (Bandura, 1998) were assessed such as Goals, Self-Efficacy, Outcome Expectations and socio-structural factors and elements of the Common Sense Self-Regulation Model (CSSRM) by Leventhal (Leventhal et al., 1997) such as illness representations (identity, timeline, cause, control, etc) and emotional representations are present throughout the e-survey.

Part 1 of the e-survey targeted basic weight information of the participants and comprised of 9 questions. Questions included present height (in cm), weight (in kilograms), highest weight achieved (in kilograms) and least weight achieved (in kilograms). There were also questions about perceived reasons for gaining or losing weight, and description of current weight situation (underweight, normal weight, overweight, obese). These questions were modelled from the "Have you lost it?" survey of Newcastle University (2012). Within this part Body Image Scale (BIS) (refer to section 4.2.2 for details) was also included to assess where participants place themselves in the present moment in terms of body image.

Part 2 of the e-survey revolved around current physical activity using the adapted International Physical Activity Questionnaire (short version) (iPAQ) (iPAQ, 2004). In this section participants answered 4 questions on physical activities conducted in a typical week by providing the number of days and time of those activities conducted – low, moderate or high-level activities.

Part 3 and 4 of the e-survey was also adapted after the "Have you lost it?" survey (2012). Part 3 was designed to explore the attempts conducted by the participants in regards to weight loss in the past and present. Elements of Goals, Socio-structural Factors and Outcome Expectations from the Social Cognitive Theory (SCT) (Bandura, 1998) are present. The 19-questions on part 3 of this questionnaire include questions on time of weight loss attempt, how much weight was lost at the last attempt, number of attempts, reasons for weight loss attempts and views of their attempts on weight loss. Part 4 explored information's on weight loss strategies used by the participants during weight loss attempts. This 8-question section asked for methods used to achieve weight loss, health seeking behaviours in relation to weight loss, methods of weight maintenance and self-weighing behaviours.

Part 5 of the e-survey was adapted from the DIET-Self-Efficacy (SE) scale (Stich et al., 2009) and is comprised of 11 questions. This section explored the level of self-efficacy of the

participants in dealing with food through situational questions. The scale is divided in sub-scales: self-efficacy associated with high caloric food (HCF) temptations; self-efficacy associated with the management of social and internal factors (SIF), and; self-efficacy associated with negative emotional events (NEE). High caloric food (HCF) temptations consist of four items describing situations in which the exposure to tempting high caloric food (e.g., cake or ice cream) might make it difficult to resist. Social and internal factors (SIF) consists of four items describing situations in which social or internal factors, such as being with friends or feeling tired, might make it difficult to resist eating. Negative emotional events (NEE) consists of three items that describe situations in which negative emotional events might make it difficult to resist eating, for example, having had an upsetting argument with a romantic partner. All sub-scales of the original tool had a Cronbach Alpha (α) values of more than .90 (Stich et al., 2009).

Part 6 of the e-survey was modelled directly from the Psychometrically-shortened version of the Illness Perception Questionnaire (IPQ-PS) (Sniehotta et al., 2010). This part of the questionnaire is comprised of 24 questions exploring constructs like – identity, timeline, consequence, personal control, treatment control, illness coherence, and emotional representations (associated with overweight or obesity). Identity domain explores the symptoms that are related to the specific condition the participant faces – whether the symptoms have been experienced and/or are related to the Condition (overweight or obesity). The timeline domain explored the perception of the participants in regards to the effects of time on their condition. The consequence domain explored the perception of consequences that the participants face because of their condition. The personal control domain explored the perception of control the participant have over their condition. Treatment control domains explored the expressive perception of the effect of the treatment received on their condition. Illness coherence domain explored the understanding participants have about their condition. Emotional representations domain explored the emotional impact of the condition on the participants. Each question was derived from the IPQ-R (add Moss Morris Reference from the paper published in Psychology & Health) and was selected based on the highest inter item correlation with the subscale (Sniehotta et al., 2010). All sections of the psychometrically shorted version of the IPQ-R had Cronbach Alpha (α) values of more than .80 (Sniehotta et al., 2010).

Part 7 of the e-survey targeted demographical questions – age, sex, marital status, residential State, academic level and ethnicity. All together there are 96 questions for the survey.

The logic for using an e-survey rather than a paper-based survey was to reduce implementation costs, time, environmental impact and to decrease barriers for questionnaire return. This method is quicker, however very much rely on Internet connectivity and current computer updates. Thus the questionnaire was designed as simple as possible and avoided complex designs. Qualtrics™ was used to deploy the survey and logic rules were built into the survey to make sure people would only answer relevant questions given their weight condition (calculated by a built in algorithm in the survey that would use their stated weight and height to calculate BMI) as well as previous/current weight management experiences. Although the number of items in the e-survey is large, the design of the e-survey itself, with logic rules, allowed only specific questions to be asked to participants belonging to a particular sub-group. The logic rules embedded allowed that only specific questions based on BMI of the participant as well as on previous engagement with weight management were asked of each participant.

4.2.2 *Measuring weight and height*

Based on the findings of the semi-structured interview study, it was clear that only those who were actively managing weight issues, i.e. currently on a weight management programme or having their weight monitored by a healthcare provider, were able to provide their weight and height accurately (or within an acceptable range of difference). The implication of this is that the accuracy level of self-reported height and weight can potentially be low. In order to circumvent this issue we have asked participants on this survey to seek accurate measurements of height and weight at their local staff clinic before answering the e-survey.

The MoH structure provides for the healthcare of its own staff by hosting a staff clinic within each of the MoH service areas. The purpose of this staff clinic is to oversee the health of the MoH staff within its catchment area and each staff clinic runs complete with basic requirements for health checks and operates at specific times of the day. Prior to the survey launch, all professionals at the several staff clinics in Malaysia were contacted and briefed on study requirements – the request that they collaborate by measuring weight and height of the participants upon as a preparatory action (before answering the questionnaire).

Participant instructions were delivered using staff emails with clear information on the study (participant information sheet) as well as the link for the survey and one reminder was sent out to all participants 4 months after the first email (although more reminders were initially planned only one was sent due to changes in the rules to access staff email by the MoH midway through the study).

4.2.3 *Pre-testing of the e-SURVEY*

With the exception of the International Physical Activity Questionnaire (short version) (iPAQ) (iPAQ, 2004), part 2 of the e-survey, that had already been adapted to the Malay population, the entire survey was completely translated, retro versed and culturally adapted to Malay from their English versions. The iPAQ questions were re-structured given experience on the use of the scale in other studies in Malaysia and this was raised in a systematic review (Lee, Macfarlane, Lam, & Stewart, 2011). This restructuring aimed at simplifying the terms used.

All the other items in the survey were translated from the English to Malay, and then back to the English again. A team of experts looked into it to make sure that the formulation of the items kept construct/variable essence (English-Malay-English). After this, new refinements were made and the final Malay version of the e-survey was sent to the MoH, more precisely to the Institute for Health Behaviour Research (IHBR), in order to test it with 30 members of the public. Testing for the e-survey followed the standard pilot testing methods for a questionnaire – the survey was tested for readability, comprehension, understandability, recollection, timing for decision-making and acceptability in think aloud exercises (Center for Evaluation and Research, University of California Davis, 2011). Minor modifications were made from the feedback given as long as upon retroversion these would not change the intention of the original developed question.

4.2.4 *Ethics for study*

Ethical approval for the study was sought from the Newcastle University Research Ethics Committee and the Medical Research and Ethics Committee (MREC) in Malaysia sequentially. Newcastle University Ethics Committee granted approval for Phase 2 on July 8th 2015 (Approval number – 00879_1 2015) and The Medical Research Ethics Committee granted Phase 2 application as an amendment of Phase 1 application (as recommended by this committee) on July 13th 2015 (NMRR-14-196-19848). Participation was voluntary and all participants had the opportunity to read a participant information sheet informing them of the specific characteristics of the study. Consent was assumed as soon as the person would select the link to enter the survey. All data was collected anonymously via the e-survey (no personal identifiers taken).

4.2.5 *Data collection procedure*

Data collection commenced in August 2015 with a reminder sent late in December (due to rule changes midway through the project). The survey was closed at the end of January 2016. The

dates were selected to make sure they would not coincide with Ramadan as behaviours associated with eating and physical activity are substantially different during this period. The aim was to investigate the research questions presented above during the majority of the year and not during the special time of Ramadan.

Official letters, sent by Institute for Health Behavioural Research admin were sent out 2 months before the starting of the data collection with the intention of informing potential participants about the study. E-mails were then sent one month before the data collection through the Information Management Division of the MoH and suggesting them to them to take accurate measures of height and weight using the available services at the staff clinic.

Both official letter and email detailed the study information (participant information sheet) and provided the Qualtrics™ link for the survey. Further reminders were initially planned (monthly) but changes in the top administration of the MoH in September 2015 caused changes in the rules of using the MoH official email for research purposes. During a large period the rules were not fully understood by the division in charge of sending those reminders, Information Management Division of the MoH. This caused a delay on data collection of 4 months. One single reminder was sent out in late December 2015. All together 5,549 participants responded to the survey and 4,971 completed the survey.

4.2.6 *Data analysis procedure*

A. Descriptive Data

All data were collected automatically from the Qualtrics™ software and transferred to SPSS v23 for analysis. During the development of the e-survey, internal algorithms were added for specific purposes; including the auto calculation of BMI and logic rules for answering questions according to sub-groups of BMI (normal weight, overweight and obese).

Ratios and internal-level data were examined for the assumptions for parametric analysis through visual inspections of histogram and Kolmogorov-Smirnov calculations. In most cases, assumptions of normality were not met, and therefore non-parametric analyses were used. Descriptive statistics (median, range, interquartile range; IQR) were used to summarize continuous and ordinal data; nominal data was described using frequency counts. A series of Spearman's correlations, chi-square analyses, Mann Whitney U tests, Wilcoxon signed ranks tests and Cramer's V were conducted to determine how gender, age, BMI, and comorbidities

varied with a range of other variables, including previous weight expectations, weight loss attempts, perceived importance, confidence, and success, barriers, physical activity.

Certain parts of the e-survey used validated tools such as those derived from the brief iPAQ to get the Physical Activity Level (PAL) for which the scoring protocol was used. The scoring protocol allows for the calculation of Metabolic Equivalent (MET) Minutes scored and categorized the individuals as Inactive, Minimally Active or Health Enhancing Physical Activity (HEPA) Active (iPAQ, 2004). The DIET-SE scale (Part 5) was coded according in 3 sub-scales – High Caloric Food Temptations (HCF), Social and Internal Factors (SIF) and Negative Emotional Events (NEE). Scoring for each subscale was obtained by adding the scores for each statement within each sub-scale. A higher score indicated a better control of food temptations, self and social control, and better emotional control during stressful situations (Stich et al., 2009). Part 6 of the e-survey contains the Psychometrically Shortened Illness Perception Questionnaire (IPQ-PS) and contains 8 domains – Identity, Timeline, Consequence, Personal Control, Treatment Control, Illness Coherence, Timeline Cyclical and Emotional Representations. Scores for each domain are obtained by adding the scores for each statement within that domain. For the identity domain scores are obtained by adding the yes statement for answers "yes" on each item that has an effect to the individual. Negative statements were reverse coded (Sniehotta et al., 2010).

To avoid the risk of type I errors, in analyses that involved multiple between-group comparisons, a *p* value threshold significance of 0.01 was set a priori. In all other cases, the standard significance level of 0.05 was used.

Missing data was dealt with using pairwise deletion as appropriate, on an analysis-by-analysis basis. There was some evidence of non-plausible height and weight data having been reported (e.g., heights of over 2 meters and weights or under 30kg or more than 200kg resulting in BMIs of less than 10 or more than 100). In these cases, a filter was applied to exclude implausible values from analyses involving affected variables. Both the number of previous weight loss attempts and physical activity questions required participants to write a discrete number – despite this, a proportion of the sample used descriptors such as 'too many to count' or 'I do it every time I come to the clinic', which could not be included in calculations and were also excluded.

In addition, the reliability/plausibility of some of the data was questionable (e.g., 270 previous weight loss attempts; 19 hours per day spent walking or engaging in moderate/vigorous activity). The decision was therefore made to exclude or dichotomise the data, so as to aid interpretation; depending on suitability. For weight loss attempts, respondents were classified as having lost the reported amount of weight on at least one occasion vs. never; and for physical activity, respondents were classified as meeting or not meeting guidelines for moderate/vigorous activity.

Further analysis on the differences of perceptions towards diet management using the DIET-SE scores and views of obesity are analysed between those who are currently involved in weight loss and compared to those who are not on any weight loss attempts. Normality of data was assessed and analyses were conducted – Independent Sample T-test or the Mann-Whitney test; wherever appropriate.

B. Modelling of data

On this section of data analysis the aim was to model the predictors to weight loss. Existing predictors evident from literature reviews and based on distinct theory and models were assessed and analysed using modelling techniques to investigate relevant predictors.

Prior to analysis, tests for normality were conducted on all variables. This was achieved through visual inspections of histogram and Kolmogorov-Smirnov calculations. Some predictive variables were not normally distributed, but considering the quantity of available data (n=4971) and the fact that the most data were normally distributed, the overall assumption of normality can be assumed (Mordkoff, 2016).

The first step of the analysis was to measure the strength of association between variables relevant for the analysis. This was achieved through the use of Pearson's Correlation (or Spearman Rho if the assumption of linearity and homoscedasticity were violated) through the assessment of scatterplot diagrams for each predictor and outcome. The variables used for this analysis include questions from the socio-demographic section of the questionnaire (age, sex, academic qualifications, marital status & state/location where participant lives), the Body Mass Index (BMI) obtained from the algorithm built into the survey and run via Qualtrics™ when the participants input their self-reported weight and height, the physical activity level (PAL) obtained from the calculation of MET Minutes from the iPAQ survey component, the sub-scale scores from the DIET-Self-Efficacy (SE) component, and the domain scores from the Illness

Perception Questionnaire (IPQ). The variables just mentioned were analysed as potential predictors of two outcome variables: actual weight loss achieved in the most recent weight loss attempt (in kilograms) and individually perceived weight loss in the most recent weight loss attempt (in kilograms). Cronbach Alpha (CA) analyses were also conducted for all the relevant predictors.

After this correlational analysis, weaker predictors were excluded from the modelling process. In the modelling the process, predictor variables were divided into 4 different types of variables: socio-demographic variables that made up the basic characteristics of the population (sex, age, academic qualification, residential State, marital status and ethnicity); actual behaviours contributing to weight loss – physical activity levels (PAL); sub-scales from the DIET-Self-Efficacy (SE) scale, more precisely the High Caloric Food (HCF) Temptations, Social & Internal Factors (SIF) and Negative Emotional Events (NEE), as well as the domains from the Illness Perception Questionnaire (IPQ) sub-scales/ domains – identity, consequence, personal control (PC), Illness Treatment Control (ITC), Illness Coherence (IC), Timeline Cyclical (TC) and Emotional Representations (ER). The fourth factor included ethnicity in order to acknowledge the role of culture.

Analysis using these predictors against the 2 main outcome variables were done using multiple regressions with backwards-stepwise regression (MRA). This was conducted to remove the weaker predictors and obtain a stronger predictor model. In MRA, the assumptions, which must be satisfied when the MRA model is fitted, are about the residual's normality: here the residual is the difference between the dependent variable (DV in this case the outcome) and the value predicted by the model:

1. The errors should have expected value of zero
2. The errors should be independently distributed
3. The errors should have a constant variance (be homoscedastic)
4. The errors should have a normal distribution

Assumption (4) is not important when the sample size is large e.g. 100 or more. Normality assumption for the DV was tested but it is more relevant to test the normality assumption for the residuals. In the case of the current data the conclusion was that the linear regression model could be fitted to the logged DV. Multiple iterations of the MRA may occur at each stage of the

group analysis to remove weaker predictors and data with Mahalanobis value greater than the critical Chi-Square (χ^2) value. This will ensure a fitter end model.

4.3 Results – Descriptive Data

In this section the sample of participants that answered the e-survey questions will be characterized and described : their weight management experiences, their BMI, the way they engage in physical activity, the ways implemented to manage their weight, levels of success when doing this and the results obtained on the predictive variables assessed: personal expectations, self-efficacy, and weight condition representations.

4.3.1 *Socio-demographic characteristics of the sample*

Table 6 presents the general characteristics of the sample. The majority of the participants were females; the median age is of 33 years for males and 32 years for females: the majority has a University Degree or an equivalent qualification (37.2%) or an Institutional Diploma equivalent qualification (35.1%). Participant's distribution by State in the e-survey was comparable to the actual census data with the only exception of Putrajaya. The majority of the participants are married (Male 69.2%; Female 71.1%) or single (Male 29.4%; Female 24.6%) and the Malay ethnicity makes up most of the participants (Male 72.7%; Female 76.3%).

	Male			Female		
	Median	**IQR**	**Range**	**Median**	**IQR**	**Range**
Age (years)	33.0	11.0-39.0	20.0-59.0	32.0	10.0-41.0	18.0-59.0
Education Qualification	**n**	**%**		**n**	**%**	
UPSR (Highest Primary school qualifications) or equivalent	1	.1		2	.1	
PMR/SRP (Middle Secondary school qualifications) or equivalent	1	.1		5	.2	
SPM (V) (Higher Secondary school qualifications) or equivalent	77	11.0		377	14.4	
STPM (V) (Highest Secondary school qualifications) or equivalent	43	6.2		182	6.9	
Institutional Diploma equivalent	263	37.6		906	34.5	
University Degree equivalent	257	36.8		981	37.3	
Master Degree or higher	57	8.2		174	6.6	
Total (n)	**699**	**100.0**		**2627**	**100.0**	
Missing from (N)	**1645**		**Response Rate (Total)**		**66.9**	
Distribution by State						
Johor	44	6.3		178	6.8	
Kedah	52	7.5		178	6.8	
Kelantan	45	6.5		126	4.8	
Melaka	16	2.3		94	3.6	
Negeri Sembilan	42	6.0		103	3.9	
Pahang	29	4.2		140	5.4	
Penang	29	4.2		82	3.1	
Perak	46	6.6		214	8.2	
Perlis	9	1.3		32	1.2	
Selangor	98	14.1		440	16.8	
Terengganu	39	5.6		121	4.6	
Sabah	69	9.9		249	9.5	
Sarawak	68	9.8		252	9.6	
Kuala Lumpur	40	5.7		161	6.2	
Labuan	15	2.2		17	.7	
Putrajaya	55	7.9		226	8.6	
Total (n)	**696**	**100.0**		**2613**	**100.0**	
Missing from N	**1662**		**Response Rate (Total)**		**66.6**	
Personal Circumstance						
Single	205	29.4		644	24.6	
Married	482	69.2		1861	71.1	
Divorced	3	.4		50	1.9	
Widowed	2	.3		41	1.6	
Co-habiting	4	.6		10	.4	
Separated	1	.1		13	.5	
Total (n)	**697**	**100.0**		**2619**	**100.0**	
Missing from N	**1655**		**Response Rate (Total)**		**66.7**	
Ethnicity						
Malay	507	72.7		1997	76.3	
Chinese	44	6.3		172	6.6	
Indian	42	6.0		74	2.8	
Bumiputra Sarawak	39	5.6		127	4.8	
Bumiputra Sabah	59	8.5		218	8.3	
Others	6	.9		31	1.2	
Total (n)	**697**	**100.0**		**2619**	**100.0**	
Missing from N	**1655**		**Response Rate (Total)**		**66.7**	

IQR = Interquartile range

Table 6: Participants' Socio Demographic variables (N=4971)

4.3.2 *Weight history*

Table 7 below shows the median current weight of participants, highest weight (excluding pregnancies for women), lowest weight and corresponding BMI by sex. On average, the population has an overweight BMI but close to normal. Males have a higher current weight (median = 72.0, p <.001) but current BMI is only slightly different, with women having the higher BMI (median = 25.6, p =.248). Men also have a higher "highest weight" (median = 75.8, p <.001) while women have a better "lowest weight" (median = 51.0, p <.001) and "lowest BMI" (median = 20.8, p <.001) but there is almost no difference in highest BMI with women being slightly higher than men (median = 26.7, p =.114).

	Male			Female		
	Median	IQR	Range	Median	IQR	Range
Current Weight (kg)	72.0	72.0	47.0-131.0	63.0	63.0	43.0-133.5
Current BMI	25.4	25.4	15.9-50.0	25.6	25.6	16.8-51.4
Highest Weight (kg)	75.8	75.8	50.0-171.0	65.0	65.0	60.0-164.0
Highest BMI	26.6	26.6	16.8-64.1	26.7	26.7	17.3-68.0
Lowest weight (kg)	63.0	63.0	40.0-120.0	51.0	51.0	40.0-149.0
Lowest BMI	22.2	22.2	13.3-50.0	20.8	20.8	14.2-64.5

IQR = Interquartile range

Table 7: Weight History (N=4334)

Table 8 describes the current weight status of the participants. Although most participants know their ideal weight, a big majority have gained their weight without even trying or without realizing it, Cramer's Φ (1, n = 4334) = .14, p <.001. Over half of the participants who have lost weight stated to have lost their weight with some kind of effort. More than half of the participants perceived that they are in the overweight and obese category and over half of the participants stated that their weight stayed the same or increased in the past 12 months.

Data/Questions	Characteristics	Male		Female	
		n	%	n	%
Know Ideal Weight	Yes	471	67.4	1775	67.6
	No	228	32.6	852	32.4
	Total	**699**	**100.0**	**2627**	**100.0**
	Total (n)/Response Rate from N (%)	**3326**	**66.9**		
Perceived current BMI on Body Image Scale (BIS) (please refer to Chapter 5 for details on BIS)	A- Underweight	18	2.6	26	1.0
	B- Underweight	84	12.0	190	7.2
	C- Normal Weight	127	18.2	471	17.9
	D- Normal Weight	181	25.9	565	21.5
	E- Overweight	186	26.6	640	24.4
	E- Overweight	63	9.0	397	15.1
	G- Obese	26	3.7	204	7.8
	H- Obese	9	1.3	97	3.7
	I - Obese	5	.7	37	1.4
	Total	**699**	**100.0**	**2627**	**100**
	Total (n)/Response Rate from N (%)	**3326**	**66.9**		
Reasons for weight gain	Weight gain on purpose	101	16.0	197	8.1
	Weight gain without trying	264	41.8	1210	49.9
	Weight gain without realization	267	42.2	1020	42.0
	Total	**632**	**100.0**	**2427**	**100.0**

Data/Questions	Characteristics	Male		Female	
	Response Rate from N	**3059**	**61.5**		
Reasons for weight loss	Weight loss with effort	146	52.5	503	54.6
	Losing weight without effort	61	21.9	196	21.3
	Unknown weight loss	71	25.5	222	24.1
	Total	**279**	**100.0**	**1200**	**100.0**
	Response Rate from N (%)	**1479**	**29.8**		
Weight on the past 12 months	Weight stayed about the same	322	46.1	1001	38.1
	Increased weight	149	21.3	711	27.1
	Reduced weight	61	8.7	211	8.0
	Weight fluctuated often	167	23.9	704	26.8
	Total	**699**	**100.0**	**2627**	**100.0**
	Response Rate from N (%)	**3326**	**66.9**		

Table 8: Description of current weight status (N = 4971)

4.3.2 *Weight loss attempts*

		Male		Female		Total	
Question	Answer	n	%	n	%	n	%
Ever attempted weight loss	Yes	432	61.8	1995	75.9	2427	73.0
	No	267	38.2	632	24.1	899	27.0
	Total	**699**	**100**	**2627**	**100**	**3326**	**100**
	Response Rate from N (%)						**66.9**
Currently attempting weight loss	Yes	312	72.2	1519	76.1	1831	75.4
	No	120	27.8	476	23.9	596	24.6
	Total	**432**	**100**	**1995**	**100**	**2427**	**100**
	Response Rate from N (%)						**48.8**
Reasons for weight loss attempts	to lose weight	223	71.5	1161	76.4	1384	75.6
	to maintain weight	89	28.5	358	23.6	447	24.4
	Total	**312**	**100**	**1519**	**100**	**1831**	**100**
	Response Rate from N (%)						**36.8**
If not on weight loss activities, ever been on one the past 12 months?	Yes	114	77.6	530	82.5	644	82.5
	No	33	22.4	104	17.5	137	17.5
	Total	**147**	**100**	**634**	**100**	**781**	**100**
	Response Rate from N (%)						**15.7**

Table 9: Weight loss attempt (N=4971)

From Table 9, it was indicated that 73.0% have attempted weight loss and currently 75.4% are currently attempting weight loss, with similar percentages between sexes. The majority also cited the aim to lose weight as the reason for their weight loss attempts and 82.5% cited that they had been on a weight loss attempt in the past 12 months.

	Sex	n	Mean Rank	Sum of Ranks
Length of current weight loss attempt (weeks)	Male	283	841.1	238024.5
	Female	1346	809.5	1089610.5
Test Statistic				
Mann-Whitney U	183079.5			
Z	- 1.034			
Assmp. Sig. (2-tailed)	.301			

Table 10: Ranks and Mann-Whitney test for length of current weight loss attempts between sexes

The Mann-Whitney (Table 10) test above indicated that although the length of current weight

loss attempts in male participants (mean rank = 841.1, n = 283) were higher than of the female participants (mean rank = 809.5, n = 1346), there is actually no difference U = 183079.5, z = -1.034 (corrected for ties), p = .301, two tailed.

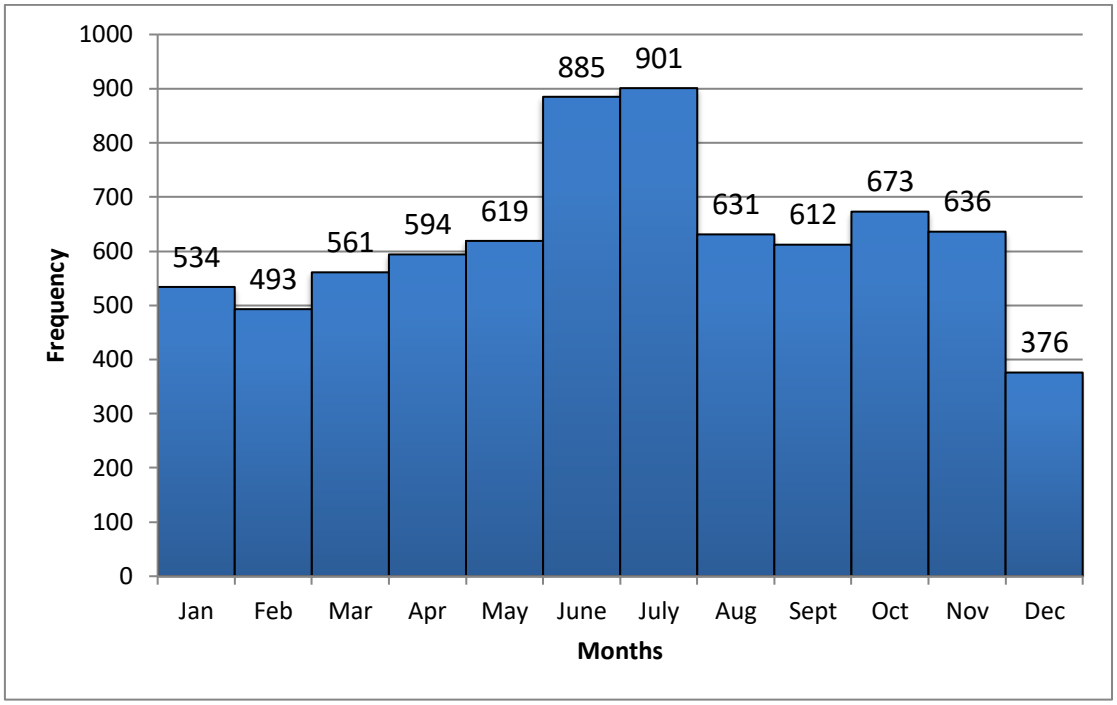


Figure 6: Frequency of weight loss attempts in particular months

Figure 6 explained the number of weight lost attempts undertaken by participants in particular months. June and July were the months that presented the highest numbers of attempts. This might be due to the fact that these months are associated with the fasting period in which the majority of the population engages with given that the vast majority is Muslim. During this time participants seemed to have taken the opportunity to attempt weight loss. The month with the lowest number of attempts was December. December is seen as the holiday period of the year.

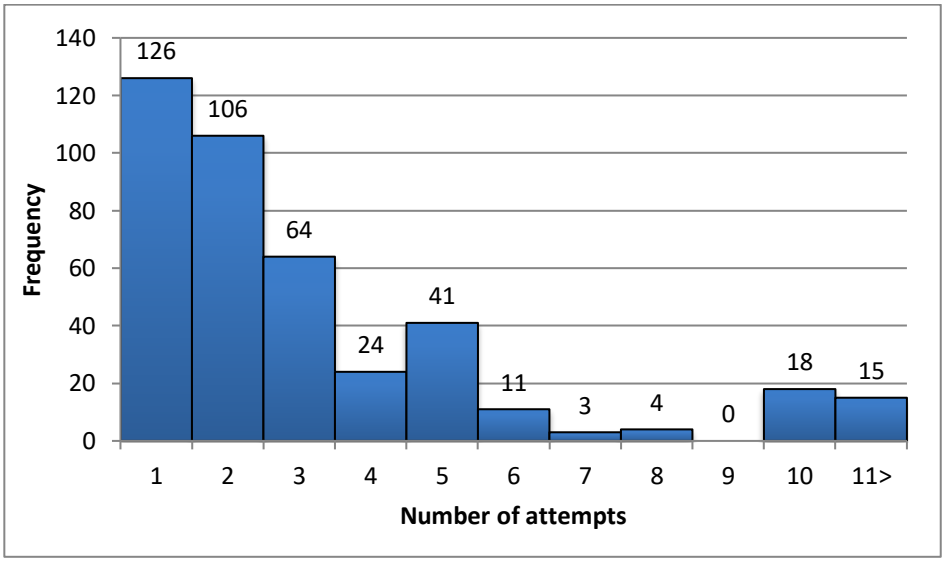


Figure 7: Number of attempts losing less than 1kg in the last 12 months

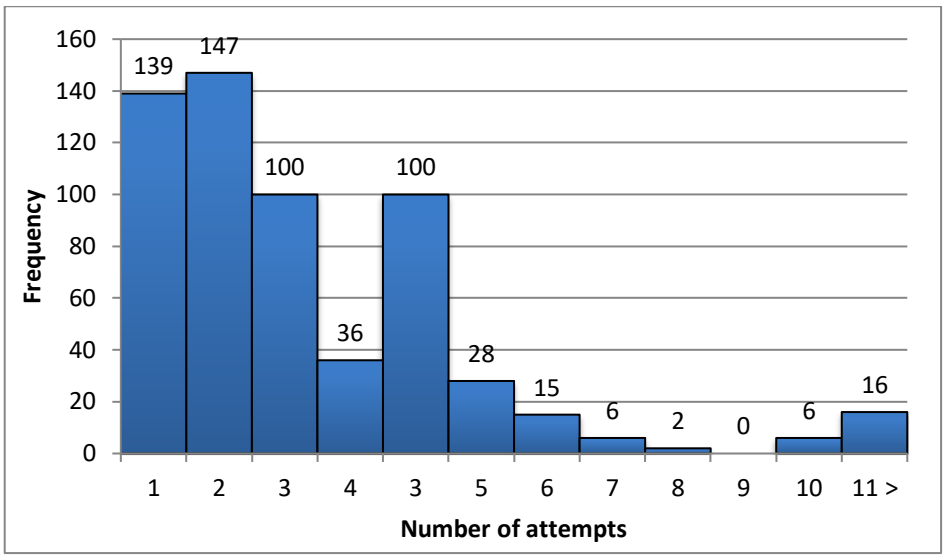


Figure 8: Number of attempts losing between 1.0-4.9kg in the last 12 months

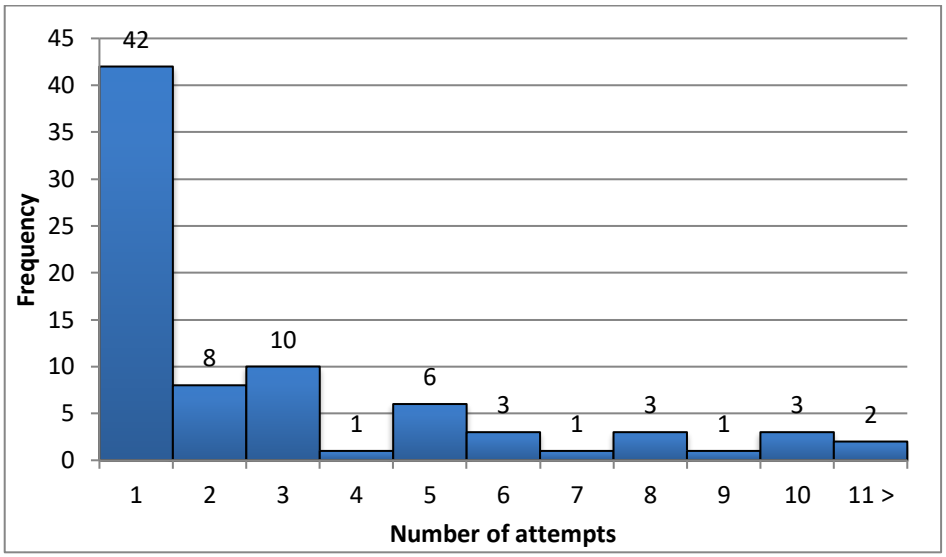


Figure 9: Number of attempts losing between 5.0-9.9kg in the last 12 months

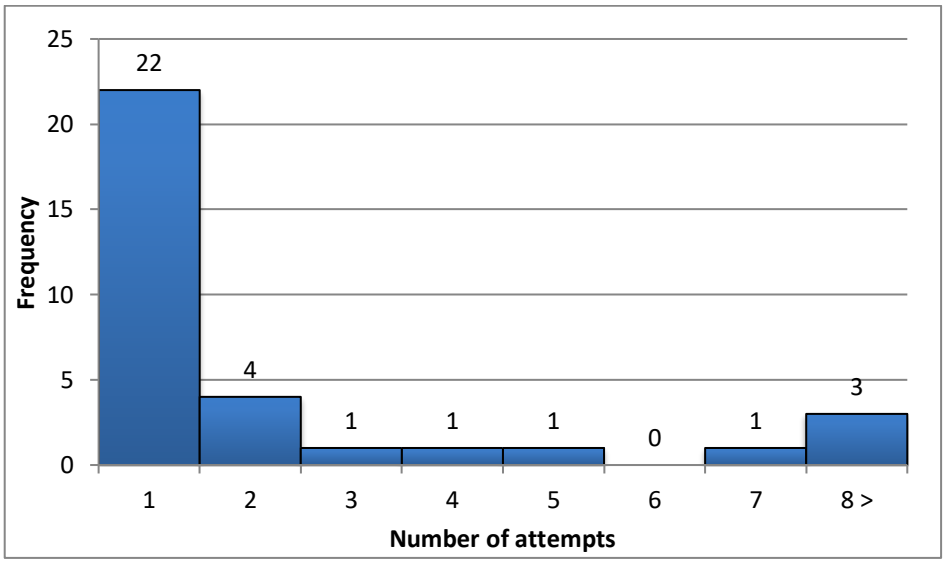


Figure 10: Number of attempts losing more than 10kg in the last 12 months

Figure 7-10 describes the number of attempts within the past 12 months in comparison to the amount of weight lost. There are a higher number of attempts for the lower amount of weight lost in kg and the number reduces with higher number of attempts. For example, in Figure 7, the frequency of a single (or first) attempt is 126 for weight loss of less than 1kg and the frequency reduces as the number of attempts increases. This trend applies to all groups of weight loss for the past 12 months.

Question	Answer	Male	%	Female	%	Total	%
Best description of trigger to weight loss attempts in the past 12 months	I wanted to increase my fitness level	101	42.4	268	25.6	369	28.8
	I can no longer fit into my clothes	23	9.7	180	17.2	203	15.8
	Comments about my weight from friends and/or family	27	11.3	126	12.1	153	11.9
	I saw a picture of myself and was unhappy about the way I looked	26	10.9	125	12.0	151	11.8
	I reached a lifetime high weight	11	4.6	108	10.3	119	9.3
	I have been advised by a health professional to lose weight	10	4.2	58	5.6	68	5.3
	I had health complications	11	4.6	51	4.9	62	4.8
	I was inspired to lose weight by someone	5	2.1	34	3.3	39	3.0
	I wanted to lose weight for a particular event	4	1.7	17	1.6	21	1.6
	I was offered an incentive	2	.8	7	.7	9	.7
	Others	18	7.6	71	6.8	89	6.9
	Total	**238**	**100.0**	**1045**	**100.0**	**1283**	**100.0**
	Response Rate from N						**25.8**

Table 11: Trigger to weight loss in the past 12 months (N=4971)

As described in Table 11, the majority of the participants who engaged in weight loss in the past 12 months cited the wish for a better fitness level as the best trigger (29.7%) followed by being unable to fit into their clothes (16.1%), acting on weight comments from friends and family (11.6%) and looking at their own picture and feeling unhappy (11.3%). Less than 1% stated engaging in weight loss as a result of a financial incentive.

Table 12 below describes participants' behaviour change approach when considering losing weight. Part of the strategies used where to eat less food (15.3%), drink lots of water (15.1%), change eating habits (13.3%), eating more fruits and vegetables (12.6%) and eating less junk food (8.0%). 11.9% cited exercising or doing more physical activity as a method of choice to lose weight. Very few cited joining a weight loss programme or going for a special diet or taking diet pills.

	Male	%	Female	%	Total	%
Ate less food	325	17.9	1490	82.1	2068	15.3
Drank lots of water	303	16.9	1494	83.1	2048	15.1
Changed eating habits (e.g. avoid late night eating, smaller portions)	290	18.1	1312	81.9	1803	13.3
Ate more fruit, vegetables	277	18.6	1214	81.4	1700	12.6
Exercise; do physical activity	333	23.2	1104	76.8	1614	11.9
Switched to lower calorie foods	230	18.4	1023	81.6	1418	10.5
Ate less junk food (including fast foods)	168	17.5	790	82.5	1089	8.0
Ate “diet” food or products	65	15.9	345	84.1	480	3.5
Joined a weight loss programme	77	19.3	322	80.7	459	3.4
Followed a special diet (e.g. Atkins Diet)	52	16.2	269	83.8	360	2.7
Taking traditional & complimentary medicine	23	12.5	161	87.5	203	1.5
Others	32	26.7	88	73.3	132	1.0
Took other pills/supplements without prescription	11	12.1	80	87.9	101	0.7
Took diet pills prescribed by my doctor	9	17.3	43	82.7	57	0.4
Bariatric surgery (e.g. gastric band, sleeve)	1	14.3	6	85.7	10	0.1

***Breakdown excludes missing data for gender**

Table 12: Action taken to lose weight (people can tick more than one answer)

	Male	%	Female	%	Total	%
I did it on my own	379	18.1	1711	81.9	2387	81.0
Dietician	21	15.3	116	84.7	156	5.3
Others	21	18.6	92	81.4	127	4.3
Personal Trainer	16	18.4	71	81.6	100	3.4
Nutritionist	13	15.7	70	84.3	93	3.2
Medical Doctor/Consultant	18	24.7	55	75.3	84	2.9

***Breakdown excludes missing data for gender**

Table 13: Health seeking behaviour (people can tick more than one answer)

It is clear from table 13 that the majority of participants cited that their weight loss attempt was self-initiated (81%) rather than seeking help from a professional.

Variables	Male	%	Female	%	Total	%
Any known attempt to avoid weight gain (past 12 months)?						
Yes	349	18.4	1548	81.6	2149	77.7
No	83	15.7	447	84.3	618	22.3
Action taken to avoid weight regain:						
Ate less food	330	17.6	1542	82.4	2104	16.6
Drank lots of water	296	16.4	1505	83.6	2010	15.8
Ate more fruit, vegetables	277	18.0	1259	82.0	1719	13.6
Changed eating habits (e.g. avoid late night eating, smaller portions)	239	16.9	1177	83.1	1557	12.3
Exercise; do physical activity	320	23.4	1045	76.6	1498	11.8
Switched to lower calorie foods	222	18.9	954	81.1	1313	10.4
Ate less junk food (including fast foods)	179	18.2	806	81.1	1108	8.7
Ate “diet” food or products	45	14.6	264	85.4	354	2.8
Joined a weight loss programme	48	16.1	250	83.9	336	2.6
Followed a special diet (e.g. Atkins Diet)	41	15.9	217	84.1	286	2.3
Taking traditional & complimentary medicine	18	11.7	138	88.3	171	1.3
Others	19	21.8	68	78.2	98	0.8
Took other pills/supplements without prescription	11	14.7	64	85.3	84	0.7
Took diet pills prescribed by my doctor	7	25.0	21	75.0	33	0.3
Bariatric surgery (e.g. gastric band, sleeve)	3	33.3	6	66.7	12	0.1

***Breakdown excludes missing data for gender**

Table 14: Attempt & action taken to avoid weight regain (people can tick more than one answer)

As shown in Table 14, the majority of participants stated that they have attempted to avoid gaining weight in the past 12 months. Similar to the findings pertaining to weight loss, participants preferred a food based behaviour approach to prevent weight gain such as: eating less food (16.6%), drinking lots of water (15.8%), eating more fruits and vegetables (13.6%), changing eating habits (12.3%). This time however, there is an increase in switching to lower calorie foods (10.4%). The findings pertaining individual strategies used to maintain weight previously lost are rather similar to the finding on the strategies used for weight loss (Table 12).

Multiple choice answer:	Male	%	Female	%	Total	%
I have no time	81	20.3	318	79.7	514	24.9
I have no motivation	72	20.7	276	79.3	442	21.4
The weight loss activity is too complicated to do	51	16.9	250	83.1	390	18.9
I need help to do weight loss activity again	41	17.4	195	82.6	304	14.7
I don't need to do the weight loss activity	31	19.7	126	80.3	193	9.3
I can't continue if my family is doing the exact opposite	20	15.2	112	84.8	166	8.0
The weight loss activity is expensive	11	26.8	30	73.2	59	2.9

***Breakdown excludes missing data for gender**

Table 15: Barriers in re-starting Weight Loss Attempt

In Table 15, participants who are not currently attempting to lose weight were asked about the barriers to re-engage in weight loss. The most frequently pointed barrier was "having no time" followed closely by "having no motivation" and the "weight loss activity being too complicated to do". Only 2.9% of participants mentioned high cost as a barrier to re-start their weight loss attempt, probably because the majority of the weight loss activities reported were self-initiated and not relying on professional support.

4.3.3 *Self-weighing behaviour*

		Male		Female	
		n	%	n	%
Frequency for self-weighing	Never	47	6.7	107	4.1
	Everyday	70	10.0	376	14.3
	Once a week	174	24.9	699	26.6
	Once every two weeks	163	23.3	565	21.5
	Others (please see description below)	245	35.1	880	33.5
Place of weighing self	At home	204	29.2	947	36.0
	At work	295	42.2	1137	43.3
	At a local clinic/staff clinic	122	17.5	403	15.3
	Other	54	7.7	104	4.0
	I never weighed myself	24	3.4	36	1.4
Weighing scale ownership	Yes	277	39.6	1273	48.5
	No	422	60.4	1354	51.5

Table 16: Self-weighing behaviour (Total (n) = 3326, N=4971, Response Rate = 66.9%)

Table 16 above described the self-weighing behaviour of participants. Regardless of sex, most weigh themselves once a week or once every two weeks. A bigger majority cited "other" frequencies of self-weighing where the answers tend to veer towards "whenever I can" or "when there is a scale present". The majority also weigh themselves at work given the easy availability

of weighing scales. Only 1.4% has never weighed themselves. Only 48.5% of the participants of both sexes have a weighing scale at home.

4.3.4 *Perceived success, confidence and satisfaction*

	Male	Female			
Perceived statement	**Median**	**Median**	**Mean Rank**	**U**	**Z**
Success in weight maintenance*	4	4	1329.34	381093.5	-3.84
Success in weight loss*	4	3	1378.23	374626.5	-4.33
Confidence in weight loss**	5	4	1359.55	359971.0	- 5.46
Confidence in maintaining weight**	4	4	1184.98	368041.5	- 4.85
Current weight satisfaction***	3	3	1868.15	775084.0	- 6.44
Current body shape satisfaction***	3	2	1833.47	799326.0	- 5.36

*** 1 – least successful to 7 – very successful**
**** 1 – least confidence to 7 – very confidence**
***** 1 – least satisfied to 7 – very satisfied**
All significant values are *p* <.001

Table 17: Weight expectations and Mann-Whitney Test (n = 2427)

The table above described perceived levels of success and confidence in weight loss and maintenance, as well as weight and body shape satisfaction. Both males and females have similar medians for success in weight maintenance, confidence in maintaining weight and a current weight satisfaction.. Males have higher medians in success in weight loss, confidence in weight loss and satisfaction in body shape (*p* <.001).

4.3.5 *Physical activity level*

The calculation of Metabolic Equivalent (MET) Minutes per week determines the level of physical activity the person is at. Participants accumulating less than 600 MET minutes per week are considered physically inactive. Participants achieving at least 600 MET minutes per week are considered as sufficiently active. Participants achieving at least 1500 MET minutes per week are considered as HEPA active.

MET Minutes Per Week	**N**	**%**
<600	252	13.1
600-1499	1245	64.6
≥1500	429	22.3
Total	1925	
Percentiles division:		
25	777	
50	1095	
75	1413	

Table 18: MET Minutes per Week

Table 18 explored the achievement of MET Minutes per week self-reported by participants. Although the majority falls within the sufficiently active category (64.6%), the 75th percentile still did not achieve the HEPA active requirement and only 22.3% actually do fall within the HEPA active category. A small number of participants are considered inactive (13.1%).

4.3.6 *Diet-self efficacy (SE)*

The DIET-SE component will be presented in its 3 sub-scales – High Caloric Food Temptations (HCF), Social and Internal Factors (SIF) and the Negative Emotional Events (NEE) factors. Scoring for each factor item will be presented. Responses vary between 1 – Not all confident to 5 – Very confident.

A. High Caloric Food (HCF) Temptations

As presented in Table 19, according to analysis by statements, male participants are slightly more confident than females at turning down a cake offered by their friend at a party at work (Q44) and refusing a pastry offered by a friend at their house (Q48). Participants currently on weight loss attempts (CWLA) are more confident than participants not on weight loss (NOWLA) to not overeat at dinner where their friend is an excellent cook (Q46) and choosing fruits over cakes (Q47).

Q	A	Overall (n)	%	Male	%	Female	%	CWLA	%	NOWLA	%
44	1	839	23.3	116	16.6	669	25.5	427	21.3	172	26.0
	2	907	25.2	170	24.3	667	25.4	493	24.6	161	24.3
	3	985	27.3	204	29.2	702	26.7	590	29.4	164	24.8
	4	491	13.6	103	14.7	338	12.9	269	13.4	88	13.3
	5	383	10.6	106	15.2	251	9.6	229	11.4	77	11.6
46	1	452	12.7	90	12.9	330	12.6	218	11.0	112	17.1
	2	770	21.6	138	19.7	581	22.1	418	21.0	167	25.5
	3	1139	31.9	225	32.2	826	31.4	666	33.5	200	30.6
	4	769	21.5	156	22.3	563	21.4	462	23.2	117	17.9
	5	439	12.3	90	12.9	327	12.4	225	11.3	58	8.9
47	1	203	5.7	37	5.3	149	5.7	97	4.9	48	7.3
	2	426	11.9	82	11.7	317	12.1	227	11.4	91	13.9
	3	931	26.1	195	27.9	665	25.3	517	26.0	170	26.0
	4	911	25.5	164	23.5	687	26.2	529	26.6	169	25.8
	5	1098	30.8	221	30.8	809	30.8	619	31.1	176	26.9
48	1	539	15.1	92	13.2	412	15.7	255	12.8	120	18.3
	2	843	23.6	159	22.7	634	24.1	448	22.5	171	26.1
	3	1391	39.0	258	36.9	1024	39.0	806	40.5	237	36.2
	4	568	15.9	124	17.7	406	15.5	345	17.3	90	13.8
	5	228	6.4	66	9.4	151	5.7	135	6.8	36	5.5

44. There is a party at work for a co-worker and someone offers you a piece of cake. How confident are you that you would turn it down?
46. You are invited to someone's house for dinner and your host is an excellent cook. You often overeat because the food tastes so good. How confident are you that you would not overeat as a dinner guest?
47. You finished your meal and you still feel hungry. There are cakes and fruits available. How confident are you that you would choose the fruits?
48. You are at a friend's house and your friend offers you a delicious looking pastry. How confident are you that you would refuse this offer?
Q = Question, A = Answer (Range (1 =Not at all confident to 5 = Very Confident), CWLA = Currently on Weight Loss Attempt, NOWLA = Not on Weight Loss Attempt, Cronbach alpha of the sub-scale, α= .743
***Breakdown excludes missing data for gender and weight loss status**

Table 19: High-Caloric Food (HCF) Temptations scores for each statement with overall scores, by gender and weight loss attempt (WLA) status

B. Social and Internal Factors (SIF)

As presented in Table 20, analysis by statement showed that participants currently on weight loss attempts (CWLA) are more confident than those not on weight loss attempt (NOWLA) at turning down a second helping (Q42), to not overeat at supper (Q43), celebrating without overeating (Q50), and resisting temptations (Q51). Male participants are more confident in celebrating without overeating (Q50) and resisting temptations (Q51) but female participants are more confident at not overeating at supper (Q43).

Q	A	Overall (n)	%	Male	%	Female	%	CWLA	%	NOWLA	%
42	1	340	9.4	61	8.7	253	9.6	174	8.7	85	12.8
	2	589	19.1	134	19.2	503	19.1	383	19.1	152	23.0
	3	1142	23.0	227	32.5	816	31.1	629	31.3	205	31.0
	4	789	15.9	149	21.3	582	22.2	461	23.0	124	18.7
	5	645	13.0	128	18.3	473	18.0	361	18.0	96	14.5
43	1	305	8.5	63	9.0	215	8.2	148	7.4	77	11.6
	2	753	20.9	153	21.9	535	20.4	394	19.6	165	24.9
	3	1087	59.5	229	32.8	761	29.0	616	30.7	198	29.9
	4	886	24.6	159	22.7	672	25.6	522	26.0	137	20.7
	5	574	15.9	95	13.6	444	16.9	328	16.3	85	12.8
50	1	332	9.4	64	9.2	250	9.5	163	8.3	81	12.5
	2	690	19.6	115	16.5	532	20.3	384	19.5	159	24.5
	3	1286	36.4	246	35.2	957	36.4	753	38.3	229	35.2
	4	773	21.9	152	21.7	584	22.2	434	22.1	125	19.2
	5	448	12.7	122	17.5	304	11.6	232	11.8	56	8.6
51	1	527	14.9	74	10.6	429	16.3	238	12.1	125	19.2
	2	696	19.7	127	18.2	530	20.2	361	18.4	145	22.3
	3	1059	30.0	204	29.2	788	30.0	612	31.1	184	28.3
	4	623	17.7	136	19.5	451	17.2	389	19.8	103	15.8
	5	621	17.6	158	22.6	429	16.3	366	18.6	93	14.3

42. You are having dinner with your family and your favourite meal has been prepared. You finish the first helping and someone says, "Why don't you have some more?" How confident are you that you would turn down a second helping?

43. You often overeat at supper because you are tired and hungry when you get home. How confident are you that you would not overeat at supper?

50. You feel like celebrating. You are going out with friends to a good restaurant. How confident are you that you would celebrate without overeating?

51. You are out with a friend at lunchtime and your friend suggests that you stop and get some ice cream. How confident are you that you would resist the temptation?

Q = Question, A = Answer (Range (1 =Not at all confident to 5 = Very Confident), CWLA = Currently on Weight Loss Attempt, NOWLA = Not on Weight Loss Attempt, Cronbach alpha, α=.685

***Breakdown excludes missing data for gender and weight loss status**

Table 20: Social and Internal Factors (SIF) scores for each statement with overall scores, by gender and weight loss attempt (WLA) status

C. Negative Emotional Events (NEE)

By analysis per statement in Table 21 revealed that males and participants on weight loss attempts (WLA) are better finding ways of making themselves feel better (Q45), finding more constructive ways to calm down (Q49), and talking with someone else or walking instead of eating (Q52) compared to females and participants not on weight loss attempts (NoWLA).

Q	A	Overall (n)	%	Male	%	Female	%	CWLA	%	NOWLA	%
45	1	242	6.8	41	5.9	182	6.9	125	6.3	45	6.9
	2	390	10.9	63	9.0	294	11.2	209	10.5	89	13.6
	3	857	24.0	148	21.2	638	24.3	486	24.4	166	25.4
	4	887	24.9	181	25.9	650	24.7	502	25.2	154	23.5
	5	1193	33.4	266	38.1	863	32.9	667	33.5	200	30.6
49	1	309	8.8	40	5.7	253	9.6	145	7.4	82	12.6
	2	546	15.5	72	10.3	443	16.9	306	15.6	106	16.3
	3	1061	30.1	194	27.8	792	30.1	624	31.7	184	28.3
	4	801	22.7	160	22.9	602	22.9	453	23.0	144	22.2
	5	809	22.9	233	33.3	537	20.4	438	22.3	134	20.6
52	1	239	6.8	36	5.2	188	7.2	112	5.7	63	9.7
	2	458	13.0	76	10.9	356	13.6	253	12.9	105	16.2
	3	1060	30.1	205	29.3	775	29.5	577	29.3	196	30.2
	4	820	23.3	168	24.0	612	23.3	479	24.4	134	20.6
	5	949	26.9	214	30.6	696	26.5	545	27.7	152	23.4

45. You just had an upsetting argument with a family member. You are standing in front of the refrigerator and you feel like eating everything in sight. How confident are you that you would find some other way to make yourself feel better?

49. You are having a hard day at work and you are anxious and upset. You feel like getting a candy bar. How confident are you that you would find a more constructive way to calm down and cope with your feelings?

52. You just had an argument with your boyfriend or girlfriend. You are upset, angry, and you feel like eating something. How confident are you that you would talk the situation over with someone or go for a walk instead of eating?

Q = Question, A = Answer (Range (1 =Not at all confident to 5 = Very Confident), CWLA = Currently on Weight Loss Attempt, NOWLA = Not on Weight Loss Attempt, Cronbach alpha, α= .759
***Breakdown excludes missing data for gender and weight loss status**

Table 21: Negative Emotional Events (NEE) scores for each statement with overall scores, by gender and weight loss attempt (WLA) status

D. Differences in scoring of DIET-SE between those who were currently on Weight Loss Attempts (CWLA) and those who were not currently on Weight Loss Attempts (NOWLA)

The Levene's test for equality of variances revealed that p>0.05 indicating that the variances for each DIET-SE sections are assumed. The Independent sample t-test revealed that there are differences of scores for each between those on weight loss attempts as opposed to those not on weight loss attempts (p<.001) with a mean difference of .92 for HCF score (95% CI [.62, 1.23]), .40 for SIF score (95% CI [.15, .65]) and .59 for NEE score (95% CI [.34, .85]) on each dimensions of the DIET-SE. The difference however is not large due to the small mean difference in each dimension.

Are you, at present, on any kind of weight loss attempt?		n	Mean	Std. Dev	Std. Error Mean
HCF Score	Yes	1966	13.06	3.45	.08
	No	650	12.14	3.48	.14
SIF Score	Yes	1966	11.76	2.79	.06
	No	650	11.36	2.83	.11
NEE Score	Yes	1966	8.67	2.87	.06
	No	650	8.07	2.86	.11

Table 22: Group Statistics for DIET-SE based on WLA status

		Levene's Test		t-test for Equality of Means						
		F	*p*-value	t	df	*p*-value	Mean diff	SE Diff.	95% CI	
									Lower	Upper
HCF Score	EVA	.001	.98	5.89	2614	*p*<.001	.92	.16	.62	1.23
SIF Score	EVA	.38	.54	3.16	2614	.002	.40	.13	.15	.65
NEE Score	EVA	.02	.89	4.61	2614	*p*<.001	.59	013	.34	.85

***EVA - Equal variances assumed**

Table 23: Independent sample t-test based on WLA status

4.3.7 *Illness Perception Questionnaire (IPQ-PS)*

The Psychometrically Shortened Illness Perception Questionnaire (IPQ-PS) (Sniehotta, Growski & Araujo-Soares, 2009) is built of six constructs – identity, timeline, consequence, personal control, Illness Treatment Control, illness coherence, timeline cyclical and emotional representations. Scoring for each construct item will be presented.

A. Identity

Symptoms	**I have experienced this symptom *since I gained weight***				**This symptom is specifically *related to my weight***			
	Yes		No		Yes		No	
	n	%	n	%	N	%	n	%
Pain	1571	57.9	1141	42.1	1304	48.1	1408	51.9
Sore Throat	366	13.5	2346	86.5	226	8.3	2486	91.7
Nausea	356	13.1	2356	86.9	275	10.1	2437	89.9
Breathlessness	860	31.7	1852	68.3	767	28.3	1945	71.7
Fatigue	2149	79.2	563	20.8	1827	67.4	885	32.6
Stiff Joints	1509	55.6	1203	44.4	1329	49.0	1383	51.0
Sore Eyes	228	8.4	2484	91.6	182	6.7	2530	93.3
Wheeziness	1048	38.6	1664	61.4	933	34.4	1779	65.6
Headaches	1102	40.7	1609	59.3	840	31.0	1872	69.0
Upset Stomach	625	23.0	2087	77.0	471	17.4	2241	82.6
Sleep Difficulties	621	22.9	2091	77.1	503	18.5	2209	81.5
Dizziness	708	26.1	2004	73.9	581	21.4	2131	78.6
Loss of Strength	1486	54.8	1226	45.2	1319	48.6	1393	51.4
Weight change	2169	80.0	543	20.0	1921	70.8	791	29.2

Table 24: Identity Scoring

Based on the scoring system in the methodology section, only answers for the yes column in the right part of the table are taken into account (specifically related) as shown in Table 24. Based on results, participants reported weight change impacts most on their weight problem (70.8%). This is followed by fatigue (67.4%), stiff joints (49.0%), Loss of strength (48.6%) and pain (48.1%). In general the participants are able to identify the associating symptoms to increased weight.

B. Timeline

As presented in Table 25, female participant lean more towards agreeing to their weight being permanently the same rather than changing (Q78) and expecting to have the same weight their whole life (Q86) while male participants tend to have a perception that their weight may not remain after a long time (Q68). Participants not on weight loss attempt (NOWLA) tend to agree to all three statements (Q68, Q78 and Q86) while participants currently on weight loss attempts (CWLA) are more on the opposing side.

Q	A	Overall (n)	%	Male	%	Female	%	CWLA	%	NOWLA	%
68	1	137	5.3	36	7.3	99	4.8	92	5.0	30	5.0
	2	514	19.8	96	19.5	412	19.8	399	21.6	87	14.5
	3	756	29.1	129	26.2	620	29.8	545	29.6	175	29.1
	4	1013	29.0	193	39.1	814	39.1	691	37.5	257	42.7
	5	178	6.9	39	7.9	138	6.6	117	6.3	53	8.8
78	1	190	7.3	51	10.3	138	6.6	126	6.8	47	7.8
	2	667	25.7	121	24.5	541	26.0	496	26.9	134	22.3
	3	831	32.0	135	27.4	685	32.9	611	33.1	178	29.6
	4	764	29.4	157	31.8	602	28.9	521	28.3	199	33.1
	5	146	5.6	29	5.9	117	5.6	90	4.9	44	7.3
86	1	339	13.0	93	18.9	245	11.8	258	14.0	55	9.1
	2	677	26.1	130	26.4	540	25.9	510	27.7	141	23.4
	3	919	35.4	168	34.1	741	35.6	649	35.2	219	36.4
	4	498	14.2	81	16.4	413	19.8	323	17.5	135	22.4
	5	165	6.4	21	4.3	144	6.9	104	5.6	52	8.6

68. My weight will remain the same for a long time
86. I expect to have this weight the rest of my life
Q = Question, A = Answer (Range (1 – Strongly disagree to 5 – Strongly agree), CWLA = Currently on Weight Loss Attempt, NOWLA = Not on Weight Loss Attempt, Cronbach alpha, α =.528
***Breakdown excludes missing data for gender and weight loss status**

Table 25: Timeline scoring for each statement with overall scores, by gender and weight loss attempt (WLA) status

C. Consequence

Q	A	Overall (n)	%	Male	%	Female	%	CWLA	%	NOWLA	%
70	1	118	4.5	40	8.1	77	3.7	63	3.4	32	5.3
	2	398	15.3	88	17.8	304	14.6	235	12.7	129	21.4
	3	332	12.8	74	15.0	254	12.2	212	11.5	92	15.3
	4	1202	46.3	222	45.0	971	46.6	903	49.0	246	40.9
	5	548	21.2	69	14.0	477	22.9	431	23.4	103	17.1
79	1	693	26.7	142	28.8	546	26.2	473	25.7	174	28.9
	2	960	37.0	180	36.5	773	37.1	690	37.4	216	35.9
	3	585	22.5	92	18.7	484	23.2	415	22.5	135	22.4
	4	273	10.5	63	12.8	209	10.0	205	11.1	57	9.5
	5	87	3.3	16	3.2	71	3.4	61	3.3	20	3.3
82	1	245	9.4	57	11.6	186	8.9	152	8.2	66	11.0
	2	463	17.8	89	18.1	368	17.7	306	16.6	126	20.9
	3	782	30.1	147	29.8	628	30.1	554	30.0	179	29.7
	4	797	30.7	153	31.0	639	30.7	605	32.8	158	26.2
	5	311	12.0	47	9.5	262	12.6	227	12.3	73	12.1

70. My weight has major consequences on my life
79. My weight causes difficulties for those who are close to me
82. My weight strongly affects the way others see me
Q = Question, A = Answer (Range (1 – Strongly disagree to 5 – Strongly agree), CWLA = Currently on Weight Loss Attempt, NOWLA = Not on Weight Loss Attempt, Cronbach alpha, α =.615
***Breakdown excludes missing data for gender and weight loss status**

Table 26: Consequence scoring for each statement with overall scores, by gender and weight loss attempt (WLA) status

Table 26 presented the scores for the consequence construct. Within this construct female and participants currently on weight loss attempts (CWLA)are leaning more towards agreeing to all three statements (Q70, Q79 and Q82) while males and participants not on weight loss attempts (NOWLA) are leaning more on the opposite side.

D. Personal Control

Q	A	Overall (n)	%	Male	%	Female	%	CWLA	%	NOWLA	%
73	1	125	4.8	15	3.0	109	5.2	82	4.4	36	6.0
	2	340	13.1	66	13.4	272	13.1	227	12.3	86	14.3
	3	749	28.8	141	28.6	599	28.8	515	27.9	189	31.4
	4	1006	38.7	179	36.3	819	39.3	749	40.6	209	34.7
	5	378	14.5	92	18.7	284	13.6	271	14.7	82	13.6
80	1	158	6.1	31	6.3	126	6.0	106	5.7	39	6.5
	2	215	8.3	38	7.7	176	8.4	143	7.8	59	9.8
	3	508	19.6	70	14.2	427	20.5	348	18.9	136	22.6
	4	1042	40.1	215	43.6	824	39.6	743	40.3	224	37.2
	5	675	26	139	28.2	530	25.4	504	27.3	144	23.9
87	1	381	14.7	15	3.0	122	5.9	91	4.9	38	6.3
	2	795	30.6	83	16.8	361	17.3	296	16.1	121	20.1
	3	836	32.2	134	27.2	693	33.3	586	31.8	194	32.2
	4	447	17.2	160	32.5	627	30.1	581	31.5	178	29.6
	5	139	5.4	101	20.5	280	13.4	290	15.7	71	11.8

73. Nothing I do will affect my weight*
80. I have the power to influence my weight
87. My actions will have no effect on my weight outcomes*
Q = Question, A = Answer (Range (1 – Strongly disagree to 5 – Strongly agree), OWLA = on Weight Loss Attempt, NOWLA = Not on Weight Loss Attempt, Cronbach alpha, α =.498
***Scores are reversed for these statements**
***Breakdown excludes missing data for gender and weight loss status**

Table 27: Personal Control scoring for each statement with overall scores, by gender and weight loss attempt (WLA) status

As presented in Table 27, males participants lean towards agreeing to all three statements (Q73, Q80, Q87) having a positive perceptions towards them compared to female participants. The same scenario is present for participants currently on weight loss attempts (CWLA) as opposed to participants not on weight loss attempts (NOWLA) having a more negative perceptions towards all three statements.

E. Treatment Control

Table 28 presented the scores for Treatment Control construct. Male participants have a more agreeable towards statements Q71 and Q83 but seeing almost no difference with female participants upon agreeing with statement Q75. Participants currently on weight loss attempts (CWLA) have a more agreeable tendency towards all three participants compared to participants not on weight loss attempts (NOWLA).

Q	A	Overall (n)	%	Male	%	Female	%	CWLA	%	NOWLA	%
71	1	187	7.2	32	6.5	154	7.4	105	5.7	62	10.3
	2	465	17.9	79	16.0	383	18.4	304	16.5	137	22.8
	3	979	37.7	170	34.5	801	38.5	672	36.4	237	39.4
	4	770	29.6	159	32.3	601	28.9	607	32.9	134	22.3
	5	197	7.6	53	10.8	144	6.9	156	8.5	32	5.3
75	1	103	4.0	22	4.5	80	3.8	53	2.9	41	6.8
	2	205	7.9	42	8.5	160	7.7	132	7.2	54	9.0
	3	569	21.9	101	20.5	462	22.2	371	20.1	164	27.2
	4	1212	46.7	214	43.4	988	47.4	893	48.4	251	41.7
	5	509	19.6	114	23.1	393	18.9	395	21.4	92	15.3
83	1	99	3.8	19	3.9	79	3.8	48	2.6	41	6.8
	2	202	7.8	43	8.7	157	7.5	133	7.2	56	9.3
	3	845	32.5	143	29.0	693	33.3	547	29.7	238	39.5
	4	1171	45.1	220	44.6	943	45.3	890	48.3	225	37.4
	5	280	10.8	68	13.8	211	10.1	226	12.3	42	7.0

71. The weight loss attempt I'm doing now will be effective in reducing my weight
75. The negative effects of my weight can be prevented by the weight loss attempt I'm doing now
83. The weight loss attempt I'm doing now can control my weight
Q = Question, A = Answer (Range (1 – Strongly disagree to 5 – Strongly agree), CWLA = Currently on Weight Loss Attempt, NOWLA = Not on Weight Loss Attempt, Cronbach alpha, α =.566

***Breakdown excludes missing data for gender and weight loss status**

Table 28: Treatment Control scoring for each statement with overall scores, by gender and weight loss attempt (WLA) status

F. Illness Coherence

Q	A	Overall (n)	%	Male	%	Female	%	CWLA	%	NOWLA	%
67	1	140	5.4	23	4.7	116	5.6	102	5.5	33	5.5
	2	578	22.2	93	18.9	483	23.2	427	23.2	121	20.1
	3	609	23.4	92	18.7	508	24.4	414	22.5	153	25.4
	4	861	33.1	179	36.3	672	32.3	606	32.9	201	33.4
	5	410	15.8	106	21.5	304	14.6	295	16.0	94	15.6
74	1	468	18.0	21	4.3	144	6.9	120	6.5	40	6.6
	2	913	35.1	61	12.4	376	18.1	331	18.0	84	14.0
	3	613	23.6	96	19.5	507	24.3	447	24.2	130	21.6
	4	438	16.9	193	39.1	714	34.3	646	35.0	217	36.0
	5	166	6.4	122	24.7	342	16.4	300	16.3	131	21.8
77	1	119	4.6	18	3.7	100	4.8	92	5.0	22	3.7
	2	376	14.5	56	11.4	318	15.3	283	15.3	77	12.8
	3	697	26.8	115	23.3	577	27.7	487	26.4	166	27.6
	4	854	32.9	166	33.7	676	32.5	600	32.5	207	34.4
	5	552	21.2	138	28.0	412	19.8	382	20.7	130	21.6

67. I do not understand my weight*
74. My weight doesn't make sense to me*
77. My weight is a mystery to me*
Q = Question, A = Answer (Range (1 – Strongly disagree to 5 – Strongly agree), CWLA = Currently on Weight Loss Attempt, NOWLA = Not on Weight Loss Attempt, Cronbach alpha, α =.694
***Scores are reversed for these statements**
****Breakdown excludes missing data for gender and weight loss status**

Table 29: Illness Coherence scoring for each statement with overall scores, by gender and weight loss attempt (WLA) status

As presented in Table 29, male participants are leaning more positively towards all three statements (Q67, Q74, Q77) as opposed to female participants being more agreeable towards the negativity for all three statements. There are no differences in perceptions between participants currently on weight loss attempts (CWLA) compared to participants not on weight loss attempts (NOWLA).

G. Timeline Cyclical

Q	A	Overall (n)	%	Male	%	Female	%	CWLA	%	NOWLA	%
76	1	240	9.2	66	13.4	173	8.3	156	8.5	69	11.5
	2	677	26.1	153	31.0	519	24.9	473	25.7	162	26.9
	3	649	25.0	130	26.4	512	24.6	465	25.2	143	23.8
	4	841	32.4	126	25.6	708	34.0	604	32.8	188	31.2
	5	191	7.4	18	3.7	171	8.2	146	7.9	40	6.6
81	1	223	8.6	66	13.4	157	7.5	131	7.1	68	11.3
	2	461	17.7	95	19.3	362	17.4	309	16.8	127	21.1
	3	928	35.7	182	36.9	737	35.4	659	35.7	215	35.7
	4	826	31.8	121	24.5	698	33.5	619	33.6	164	27.2
	5	160	6.2	29	5.9	129	6.2	126	6.8	28	4.7
84	1	156	6.0	40	8.1	116	5.6	87	4.7	55	9.1
	2	524	20.2	118	23.9	402	19.3	327	17.7	161	26.7
	3	504	19.4	100	20.3	397	19.1	329	17.8	134	22.3
	4	1121	22.6	186	37.7	927	44.5	875	47.5	197	32.7
	5	293	5.9	49	9.9	241	11.6	226	12.3	55	9.1

76. My weight is unpredictable
81. The symptoms related to my weight come and go in cycles
84. I go through cycles where my weight would go up and down
Q = Question, A = Answer (Range (1 – Strongly disagree to 5 – Strongly agree), OWLA = on Weight Loss Attempt, NOWLA = Not on Weight Loss Attempt, Cronbach alpha, α=.615
***Breakdown excludes missing data for gender and weight loss status**

Table 30: Timeline Cyclical scoring for each statement with overall scores, by gender and weight loss attempt (WLA) status

Table 30 presented the scores for timeline cyclical construct. Female participants are more agreeable towards all three statements (Q76, Q81, Q84) as opposed to male participants while participants currently on weight loss attempt (CWLA) are more agreeable to the statement of their weight going up and down cycles (Q84) while both CWLA and NOWLA participants are agreeable towards statements Q76 & Q81.

H. Emotional Representations

Table 31 presented the scores for emotional representations construct. Female participants tend to be more agreeable on the perceptions mentioned in statements Q69, Q72 & Q85 while male participants are more towards opposing them. Participants currently on weight loss attempts (CWLA) seemed to have a more similar view to female participants on all three statements compared to participants not on weight loss attempts (NOWLA).

Q	A	Overall (n)	%	Male	%	Female	%	CWLA	%	NOWLA	%
69	1	159	6.1	50	10.1	109	5.2	84	4.6	52	8.6
	2	587	22.6	160	32.5	420	20.2	369	20.0	161	26.7
	3	390	15.0	100	20.3	284	13.6	272	14.8	95	15.8
	4	1019	39.2	148	30.0	865	41.5	768	41.6	214	35.5
	5	443	17.1	35	7.1	405	19.4	351	19.0	80	13.3
81	1	124	4.8	33	6.7	91	4.4	55	3.0	49	8.1
	2	388	14.9	110	22.3	272	13.1	231	12.5	121	20.1
	3	303	11.7	75	15.2	225	10.8	194	10.5	85	14.1
	4	1242	47.8	207	42.0	1024	49.2	955	51.8	234	38.9
	5	541	20.8	68	13.8	471	22.6	409	22.2	113	18.8
84	1	220	8.5	73	14.8	146	7.0	120	6.5	72	12.0
	2	629	24.2	169	34.3	456	21.9	415	22.5	166	27.6
	3	449	17.3	88	17.8	350	16.8	308	16.7	109	18.1
	4	899	34.6	122	24.7	775	37.2	696	37.7	169	28.1
	5	401	15.4	41	8.3	356	17.1	305	16.5	86	14.3

69. I get depressed thinking about my weight
72. Having this weight makes me feel anxious
85. When I think about my weight I get upset
Q = Question, A = Answer (Range (1 – Strongly disagree to 5 – Strongly agree), CWLA = currently on Weight Loss Attempt, NOWLA = Not on Weight Loss Attempt, Cronbach alpha, α=.845
***Breakdown excludes missing data for gender and weight loss status**

Table 31: Emotional Representations scoring for each statement with overall scores, by gender and weight loss attempt (WLA) status

I. Differences in scoring of Illness Perception Questionnaire between those who were Currently on Weight Loss Attempts (CWLA) and those who were On Weight Loss Attempts (NOWLA)

Are you, at present, on any kind of weight loss activity?		n	Mean	Std. Dev	Std. Error Mean
Identity	Yes	1920	4.78	3.51	.08
	No	633	4.32	3.43	.14
Timeline	Yes	1844	8.89	2.15	.05
	No	602	9.44	2.35	.10
Consequence	Yes	1844	9.30	2.42	.06
	No	602	8.73	2.58	.11
Personal Control	Yes	1844	9.88	1.55	.04
	No	602	9.78	1.69	.07
Treatment Control	Yes	1844	10.61	2.07	.05
	No	602	9.68	2.17	.09
Illness Coherence	Yes	1844	9.43	1.68	.04
	No	602	9.39	1.56	.06
Timeline Cyclical	Yes	1844	9.67	2.37	.06
	No	602	8.94	2.59	.11
Emotional Representations	Yes	1844	10.64	2.88	.07
	No	602	9.63	3.33	.14

Table 32: Group Statistics for IPQ-PS based on WLA status

		Levene's Test		t-test for Equality of Means						
		F	*p*-value	t	df	*p*-value	Mean diff	SE Diff.	95% CI	
									Lower	Upper
1	EVA	.12	.734	2.86	2551.0	.004	.46	.16	.14	.77
2	EVNA	10.19	.001	-5.04	950.2	*p*<.001	-.55	.11	-.76	-.33
3	EVNA	4.44	.035	4.74	971.2	*p*<.001	.56	.12	.33	.80
4	EVNA	7.14	.008	1.28	955.1	.202	.10	.08	-.05	.25
5	EVA	1.09	.298	9.46	2444.0	*p*<.001	.93	.10	.74	1.12
6	EVNA	4.03	.045	.53	1092.0	.594	.04	.07	-.11	.19
7	EVNA	6.63	.010	6.18	951.9	*p*<.001	.74	.12	.50	.97
8	EVNA	35.17	*p*<.001	6.62	911.6	*p*<.001	1.00	.16	.71	1.30

***EVA - Equal variances assumed, EVNA – Equal variances not assumed**
1. Identity, 2. Timeline, 3. Consequence, 4. Personal Control, 5. Treatment Control, 6. Illness Coherence, 7. Timeline Cyclical, 8. Emotional Representations

Table 33: Leven's Test for Equality & Independent sample t-test based on WLA status

The Levene's test for equality of variances revealed that only the dimensions of Identity (*p*=.734) and Treatment Control (*p*=.298) have the variances equally assumed (EVA). The remainder of the IPQ dimensions has their variances not equally assumed (EVNA). The Independent sample t-test revealed that Identity (95% CI [.14,.77]), Timeline (95% CI [-.76,-.33]), Consequence (95% CI [.33,.80]), Treatment Control (95% CI [.74,1.12]), Timeline Cyclical (95% CI [.50,.97]) and Emotional Representations (95% CI [.71,1.30]) are significantly different (p <.05) between participants who reported to currently on weight loss attempts (CWLA) VS. those not on weight loss attempts (NOWLA). Comparing the significantly different dimensions, it is showed that participants currently on weight loss attempts scored higher in Identity, Consequence, Treatment Control Illness, Timeline Cyclical and Emotional Representations dimensions while participants not on weight loss attempts scored higher in the Timeline dimension.

4.4 Modelling Results

4.4.1 *Strength of associations between Actual Weight Loss and Predictors (AWL)*

	1	2	3	4	5	6	7	8	9	10
1. AWL	-									
2. BMI	-.086**	-								
3. PAL	.073**	-.051*	-							
4. HCF	.083**	-.122**	.092**	-						
5. SIF	.052**	-.105**	.077**	.634**	-					
6. NEE	.071**	-.007	.093**	.596**	.473**	-				
7. Identity	.016	.284**	-.062*	-.113**	-.127**	-.071**	-			
8. Timeline	-.074**	.060**	.024	-.058**	-.058**	-.046*	.058**	-		
9. Consequence	.046*	.259**	-.026	-.133**	-.158**	-.065**	.312**	.219**	-	
10. PC	.160**	-.174**	.041	.245**	.222**	.125**	-.120**	-.339**	-.225**	-
11. ITC	.198**	-.037	.142**	.227**	.180**	.163**	.011	.009	.133**	.316**
12. IC	.093**	-.290**	.062*	.208**	.221**	.142**	-.248**	-.284**	-.455**	.485**
13. TC	-.006	.185**	-.027	-.116**	-.120**	-.069**	.289**	.120**	.425**	-.227**
14. ER	-.054**	.256**	-.056*	-.181**	-.191**	-.135**	.330**	.188**	.642**	-.272**
15. Sex	-.054**	-.040*	-.002	-.006	-.094**	-.105**	.085**	.037	.067**	-.072**
16. Age	-.011	.239**	.000	.160**	.130**	.169**	-.015	-.011	-.109**	.036
17. HQ	-.037*	-.085**	-.035	.007	-.014	-.046*	-.135**	-.068**	-.075**	.213**
18. Ethnicity	.015	-.050	.033	.037*	.012	.054**	.022	-.033	.010	-.017
19. MS	-.310	.134**	.009	.053*	.059**	.055**	.080**	.035	-.014	-.052*
20. State	.018	-.021	.039	-.019	-.017	.000	.016	-.024	.001	-.001
CA	n/a	n/a	n/a	.743	.685	.759	n/a	.528	.615	.498
	11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
11. ITC	-									
12. IC	.091**	-								
13. TC	.119**	-.536**	-							
14. ER	.051**	-.492**	.456**	-						
15. Sex	-.043*	-.123**	.120**	.201**	-					
16. Age	-.004	.159**	-.120**	-.182**	-.022	-				
17. HQ	.038	.174**	-.155**	-.089**	-.028	.009	-			
18. Ethnicity	.016	.067**	-.068**	-.043*	-.031	.003	-.001	-		
19. MS	-.021	.015	-.025	-.023	.063**	.433**	-.100**	-.113**	-	
20. State	-.019	-.031	-.026	.006	.003	-.041*	-.004	.282**	-.045*	-
CA	.566	.694	.615	.845	n/a	n/a	n/a	n/a	n/a	n/a

*** Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed). AWL = Actual Weight Loss (outcome variable). BMI = Body Mass Index. PAL = Physical Activity Level. HCF = High Caloric Food Temptations. SIF = Social and Internal Factors. NEE = Negative Emotional Events. PC = Personal Control. ITC = Illness Treatment Control. IC = Illness Coherence. TC = Timeline Cyclical. ER = Emotional Representations. HQ = Highest Qualification. MS = Marital Status. CA = Cronbach Alpha**

Table 34: Bivariate Correlation between predictors of weight management and Actual Weight Loss (AWL)

4.4.2 *Strength of associations between Perceived Weight Loss and Predictors (PWL)*

	1	2	3	4	5	6	7	8	9	10
1. PWL	-									
2. BMI	-.342**	-								
3. PAL	.223**	-.051*	-							
4. HCF	.322**	-.122**	.092**	-						
5. SIF	.266**	-.105**	.077**	.634**	-					
6. NEE	.274**	.007	.093**	.596**	.473**	-				
7. Identity	-.208**	.284**	-.062*	-.113**	-.127**	-.071**	-			
8. Timeline	-.126**	.060**	.024	-.058**	-.058**	-.046*	.058**	-		
9. Consequence	-.186**	.259**	-.026	-.133**	-.158**	-.065**	.312**	.219**	-	
10. PC	.339**	-.174**	.041	.245**	.222**	.125**	-.120**	-.339**	-.225**	-
11. ITC	.350**	-.037	.142**	.227**	.180**	.163**	.011	-.009	.133**	.316**
12. IC	.337**	-.290**	.062*	.208**	.221**	.142**	-.248**	-.284**	-.455**	.485**
13. TC	-.192**	.185**	-.027	-.116**	-.120**	-.069**	.289**	.120**	.425**	-.227**
14. ER	-.304**	.256**	-.056	-.181**	-.191**	-.135**	.330**	.188**	.642**	-.272**
15. Sex	-.088**	-.040*	-.002	-.006	-.094**	-.105**	.085**	.037	.067**	-.072**
16. Age	.043*	.239**	.000	.160**	.130**	.169**	.015	-.011	-.109**	.036
17. HQ	.067**	-.085**	-.035	.007	-.014	-.046**	-.135**	-.068**	-.075**	.213**
18. Ethnicity	.040**	-.050**	.033	.037*	.012	.054**	-.022	-.033	-.010	.017
19. MS	-.024	.134**	.009	.053**	.059**	.055**	.080**	.035	-.014	-.052**
20. State	.015	-.021	.039	-.019	-.017	.000	.016	-.024	-.003	-.006
CA	n/a	n/a	n/a	.743	.685	.759	n/a	.528	.615	.498
	11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
11. ITC	-									
12. IC	.091**	-								
13. TC	.119**	-.536**	-							
14. ER	.051**	-.492**	.456**	-						
15. Sex	-.043*	-.123**	.120**	.201**	-					
16. Age	-.004	.159**	-.120**	-.182**	-.022	-				
17. HQ	.038	.174**	-.155**	-.089**	-.028	.009	-			
18. Ethnicity	.016	.067**	-.068**	-.043*	-.031	.003	.001	-		
19. MS	-.021	.015	-.025	-.023	.063**	.433**	-.100**	-.113**	-	
20. State	-.019	-.031	-.026	.006	.003	-.046**	-.004	.282**	-.045*	-
CA	.566	.694	.615	.845	n/a	n/a	n/a	n/a	n/a	n/a

*** Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed). PWL = Perceived Weight Loss. BMI = Body Mass Index. PAL = Physical Activity Level. HCF = High Caloric Food Temptations. SIF = Social and Internal Factors. NEE = Negative Emotional Events. PC = Personal Control. ITC = Illness Treatment Control. IC = Illness Coherence. TC = Timeline Cyclical. ER = Emotional Representations. HQ = Highest Qualification. MS = Marital Status**

Table 35: Bivariate Correlation between predictors of weight management and Perceived Weight Loss (PWL)

From the Spearman's Rho (Bivariate) Correlation analysis in Table 34, Body Mass Index (BMI), Physical Activity Level (PAL), High Caloric Food (HCF) Temptations, Social and Internal Factors (SIF) & Negative Emotional Events (NEE) scores as well as Timeline, Consequence, Personal Control (PC), Illness Treatment Control (ITC), Illness Coherence (IC), Emotional Representations (ER), Sex and Highest Qualification (HQ) strongly correlate with Actual Weight Loss (AWL). These predictors were found suitable to be included in the next stage of analysis. From the Spearman's Rho (Bivariate) Correlation analysis in Table 35, only Marital Status (MS) and State living in are not strongly correlated to Perceived Weight Loss (PWL). The rest of the predictors were found suitable to be included in the next stage of analysis.

4.4.3 *Modelling weight loss success with Actual Weight Loss (AWL)*

Prior to conducting this analysis, the non-significant variables in Table 34 were excluded. In this analysis further removal of non-significant variables were conducted in 4 iterations. The final model presented is the 5th iteration and in this iteration, the regression process removed further non-significant variables in 6 steps. After the sixth step the only variables remaining were Physical Activity Level (PAL), Sex and Illness Treatment Control (ITC).

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Step 6	.151	.023	.020	9.72906

Predictors: (Constant), PAL = Physical Activity Level, Sex, ITC = Illness Treatment Control. Dependent Variable: AWL = Actual Weight Loss

Table 36: Model Summary for 5th Iteration AWL Model

In Table 36 the R^2 represents the proportion of variance in the DV that can be accounted for by the predictor variables in combination. Here, after the fifth step, only 2.3% of the variance in weight loss can be explained with Physical Activity Level (PAL), Sex and Illness Treatment Control (ITC). The adjusted R^2 provides a more accurate estimate of the true extent of relationship between the predictor variables and the DV. In other words it offers a better estimate of the population R^2.

Model		Sum of Squares	df	Mean Square	F	Sig.
Step 6	Regression	2410.405	3	803.468	8.488	p <.001
	Residual	103836.049	1097	94.655		
	Total	106246.455	1100			

Dependent Variable: AWL = Actual Weight Loss. Predictors: (Constant), PAL = Physical Activity Level, Sex, ITC = Illness Treatment Control

Table 37: ANOVA for 5th Iteration AWL Model

In Table 37, the ANOVA analysis showed whether or not the full regression model has predictive utility. Here the ANOVA is significant (p<.001) at the sixth step; indicating that R^2 does differ significantly from zero. In other words; the combination of Physical Activity Level (PAL), Sex and Illness Treatment Control (ITC) does account for more of the variance in weight loss than expected by chance.

Model		Unstd. Coefficients		Std. Coefficients	t	Sig.	95.0% CI for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tol.	VIF
Step 6	(Constant)	.603	2.003		.301	.764	-3.328	4.533					
	Sex	-1.662	.660	-.075	-2.518	.012	-2.956	-.367	-.079	-.076	-.075	.998	1.002
	PAL	.001	.001	.054	1.791	.074	.000	.002	.072	.054	.053	.972	1.029
	ITC	.510	.144	.108	3.549	p <.001	.228	.792	.120	.107	.106	.971	1.030

Dependent Variable: AWL = Actual Weight Loss. PAL = Physical Activity Level. ITC = Illness Treatment Control

Table 38: Coefficient table for 5th Iteration AWL Model

In Table 38 the Unstandardized Coefficients or B weights indicate the predicted change in the DV associated with 1-unit of change in the relevant predictor, after controlling for the effects of all the other predictors in the model. The Standardized Coefficients of Beta (β) weights indicated the predicted change – in Standard Deviations (*SD*) – in the DV associated a 1 *SD* change in the relevant predictor, after controlling for the effects of the remaining predictors in the model. The *t* statistics (and the corresponding Sig levels) indicate whether or not each predictor accounts for a significant proportion of unique variances in the DV. At the sixth step, Sex is a significant predictor, t (1097) = -2.52, p = .012. Illness Treatment Control is also a significant predictor, t (1097) = 3.55, p <.001. Physical Activity Level (PAL) is not a significant predictor, t (1097) = 1.79, p = .074. We can be 95% confident that the interval between the Lower Bound and Upper Bound contains the true population of *B*.

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-.3461	9.1716	4.4412	1.48030	1101
Std. Predicted Value	-3.234	3.196	.000	1.000	1101
Std. Error of Predicted Value	.347	1.173	.564	.160	1101
Adj. Predicted Value	-.4067	9.1374	4.4409	1.48043	1101
Residual	-45.46589	106.20963	.00000	9.71578	1101
Std. Residual	-4.673	10.917	.000	.999	1101
Stud. Residual	-4.680	10.926	.000	1.001	1101
Deleted Residual	-45.59194	106.38492	.00030	9.75449	1101
Stud. Deleted Residual	-4.725	11.568	.003	1.034	1101
Mahal. Distance	.399	14.999	2.997	2.373	1101
Cook's Distance	.000	.186	.001	.009	1101
Centred Leverage Value	.000	.014	.003	.002	1101

Dependent Variable: AWL = Actual Weight Loss

Table 39: Residual Statistics for 5th Iteration AWL Model

A Maximum Mahalanobis Distance larger than the critical Chi-Square (χ^2) value for df = *k* at α = .001 indicates the presence of one or more multivariate outliers. In this analysis at the fifth step (Table 39) the Mahalanobis Distance did exceed the critical χ^2 value of 16.266. Cases with Mahalanobis values greater than the critical χ^2 value were excluded from the analysis. The analysis was repeated twice.

Follow Up Analysis – Effect Size

Although R^2, defined as the proportion of variance in the DV that can be accounted for by the predictors in combination, in an adequate index of effect size for multiple regression, calculation of the Cohen's f^2 is necessary:

$$f^2 = \frac{R^2}{1 - R^2}$$

R^2 can be read directly off Table 36, so:

$$f^2 = \frac{.023}{1 - .023}$$

$$= .024$$

This is a small effect.

Prior to interpreting the results of the MRA, several assumptions were evaluated. First, the normality assessment for each variable was inspected to be normally distributed and free from univariate outliers. Unfortunately, this was not the case. While the data differ from the assumptions these differences are not substantial. In this case, the distribution is not normal but at least it can be considered as uni-modal and broadly symmetric. Thus considering the large (n how many) sample size, using parametric tests will be likely to be adequate.

Secondly, Mahalanobis distance did not exceed the critical χ^2 for $df = 2$ (at $\alpha = .001$) of 16.266 for any cases in the data file after repeating the analysis a third time, indicating that multivariate outliers were not of concern. Thirdly, relatively high tolerances for both predictors in the regression model at the fifth backward stepwise regression indicated that multicollinearity would not interfere in the ability to interpret the outcome of the MRA.

In combination at the fifth step of the Backward Stepwise Regression, Sex and Marital Status accounted for a small but significant 2.3% of the variability in weight loss with $R^2 = .023$, $F(3,1097) = 8.488$, $p < .001$. Unstandardized (B) and standardized (β) regression coefficients, and squared semi-partial (or 'part') correlations (sr^2) for each predictor of the Socio-Demographic factor in the regression model are reported in Table 40.

Variable	*B* [95% CI]	β	sr^2
Sex	-1.662[-2.956,-.367]*	-.075	.006
PAL	.001[.000,.002]	.054	.003
ITC	.150[.228,.792]***	-.108	.011

***Note:* N = 2957. CI = Confidence Interval. *p <.05. **p <.01. ***p <.001. PAL = Physical Activity Level. ITC = Illness Treatment Control**

Table 40: Regression model for AWL Model

By incorporating all the relevant predictors found from each type of predictor variable, the final model for Actual Weight Loss incorporated only Sex, Physical Activity Level (PAL) and Illness Treatment Control (ITC) as predictors for weight loss success (WLS). The formula is as below:

$$WLS = .603 - 1.622(Sex) + .001(Physical\ Activity\ Level) + .510(Treatment\ Control\ Illness)$$

4.4.4 *Modelling predictors with Perceived Weight Loss (PWL)*

Prior to conducting this analysis, the non-significant variables in table 35 were excluded. In this analysis further removal of non-significant variables were conducted in 4 iterations. The final model presented is the 5th iteration and in this iteration, the regression process removed further non-significant variables in 5 steps. At the fifth step the only variables remaining were SIF Score, Physical Activity Level (PAL), Personal Control (PC), Timeline, Identity, Illness Treatment Control (ITC), Timeline Cyclical (TC), Emotional Representations (ER), Negative Emotional Events (NEE) Score and High Caloric Food (HCF) Temptations Score. The rest of the variables were removed from the analysis.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Step 5	.563[e]	.317	.310	1.360

Predictors: (Constant), SIF = Social & Internal Factors, PAL = Physical Activity Level, PC = Personal Control, Timeline, Identity, ITC = Illness Treatment Control, TC = Timeline Cyclical, ER = Emotional Representations, NEE = Negative Emotional Events, HCF = High Caloric Food Temptations. Dependent Variable: PWL = Perceived Weight Loss

Table 41: Model Summary for 5th Iteration PWL Model

In Table 41, the R^2 represents the proportion of variance in the DV that can be accounted for by the predictor variables in combination. Here, after the fifth step, 31.7% of the variance in weight loss can be explained with SIF Score, Physical Activity Level (PAL), Personal Control (PC), Timeline, Identity, Illness Treatment Control (ITC), Timeline Cyclical (TC), Emotional Representations (ER), NEE Score and HCF Score. The adjusted R^2 provides a more accurate estimate of the true extent of the relationship between the predictor variables and the DV. In other words it offers a better estimate of the population R^2.

Model		Sum of Squares	df	Mean Square	F	Sig.
Step 5	Regression	918.731	10	91.873	49.661	p <.001[f]
	Residual	1983.208	1072	1.850		
	Total	2901.939	1082			

Dependent Variable: PWL = Perceived Weight Loss. Predictors: (Constant), SIF = Social & Internal Factors, PAL = Physical Activity Level, PC = Personal Control, Timeline, Identity, ITC = Illness Treatment Control, TC = Timeline Cyclical, ER = Emotional Representations, NEE = Negative Emotional Events, HCF = High Caloric Food Temptations

Table 42: ANOVA for Final PWL Model

In Table 42 the ANOVA analysis showed whether or not the full regression model has predictive utility. Here the ANOVA is significant (p<.001) after the fifth step; indicating that the R^2 does depart significantly from zero. In other words; the combination of SIF Score, Physical Activity Level (PAL), Personal Control (PC), Timeline, Identity, Illness Treatment Control (ITC), Timeline Cyclical (TC), Emotional Representations (ER), NEE Score and HCF Score does account for more of the variance in perceived weight loss than expected by chance.

Model		Unstd. Coefficients		Std. Coefficients	t	Sig.	95.0% CI for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	B	Std. Error	Beta	VIF
STEP 5	**(Constant)**	1.115	.409		2.723	.007	.312	1.919					
	PAL	.001	.000	.154	5.978	*p* <.001	.000	.001	.247	.180	.151	.959	1.043
	HCF Score	.050	.019	.104	2.605	.009	.012	.088	.317	.079	.066	.397	2.520
	SIF Score	.026	.021	.044	1.267	.206	-.014	.067	.280	.039	.032	.520	1.923
	NEE Score	.025	.019	.045	1.295	.196	-.013	.063	.241	.040	.033	.529	1.891
	Identity	-.033	.013	-.070	-2.570	.010	-.059	-.008	-.166	-.078	-.065	.872	1.147
	Timeline	-.047	.019	-.063	-2.448	.015	-.084	-.009	-.088	-.075	-.062	.967	1.034
	PC	.034	.028	.032	1.205	.229	-.021	.089	.119	.037	.030	.920	1.087
	ITC	.259	.022	.334	12.038	*p* <.001	.217	.302	.387	.345	.304	.829	1.206
	TC	-.062	.019	-.095	-3.284	.001	-.099	-.025	-.220	-.100	-.083	.763	1.311
	ER	-.103	.016	-.192	-6.538	*p* <.001	-.134	-.072	-.267	-.196	-.165	.743	1.346

Dependent Variable: PWL = Perceived Weight Loss. PAL = Physical Activity Level. HCF = High Caloric Food Temptations. SIF = Social & Internal Factors. NEE = Negative Emotional Events .PC = Personal Control. Identity. Timeline. PC = Personal Control. ITC = Illness Treatment Control, TC = Timeline Cyclical, ER = Emotional Representations

Table 43: Coefficient table for Final PWL Model

In Table 43 the Unstandardized Coefficients or B weights indicate the predicted change in the DV associated with 1-unit of change in the relevant predictor, after controlling for the effects of all the other predictors in the model. The Standardized Coefficients of Beta (β) weights indicated the predicted change – in Standard Deviations (*SD*) – in the DV associated a 1 *SD* change in the relevant predictor, after controlling for the effects of the remaining predictors in the model. The *t* statistics (and the corresponding Sig levels) indicated whether or not each predictor accounts for a significant proportion of unique variances in the DV. At the fifth step, Physical Activity Level (PAL) *t* (1072) = 5.98, *p* <.001, Illness Treatment Control *t* (1072) = 12.038, *p* <.001, Emotional Representations *t* (1072) = -6.538, *p* <.001, Timeline Cyclical *t* (1072) = -3.248, *p* =.001, HCF Score *t* (1072) = 2.605, *p* =.009, Identity *t* (1072) = -2.57, *p* =.010, and Timeline *t* (1072) = -2.448, *p* =.015 are significant predictors of perceived success in weight loss. SIF Score *t* (1097) = 1.267, *p* = .206, NEE Score *t* (1072) = 1.295, *p* =.196, and Personal Control *t* (1072) = 1.205, *p* =.229. We can be 95% confident that the interval between the Lower Bound and Upper Bound contains the true population of B.

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	.18	7.11	3.84	.921	1101
Std. Predicted Value	-3.974	3.540	-.002	.999	1101
Standard Error of Predicted Value	.061	.268	.133	.034	1101
Adjusted Predicted Value	.16	7.11	3.84	.921	1101
Residual	-3.809	4.645	.006	1.357	1101
Std. Residual	-2.801	3.415	.004	.998	1101
Stud. Residual	-2.824	3.463	.004	1.003	1101
Deleted Residual	-3.874	4.777	.006	1.373	1101
Stud. Deleted Residual	-2.833	3.481	.004	1.004	1101
Mahal. Distance	1.209	20.852	10.005	5.870	1101
Cook's Distance	.000	.033	.001	.002	1101
Centred Leverage Value	.001	.038	.009	.005	1101

Dependent Variable: PWL = Perceived Weight Loss

Table 44: Residual Statistics for Final PWL Model

A Maximum Mahalanobis Distance larger than the critical Chi-Square (χ^2) value for df = *k* at α = .001 indicates the presence of one or more multivariate outliers. In this analysis at the fifth step the Mahalanobis Distance did exceed the critical χ^2 value of 29.558. Cases with Mahalanobis values greater than the critical χ^2 value were excluded from the analysis. The analysis was repeated twice.

Follow Up Analysis – Effect Size

Although R^2, defined as the proportion of variance in the DV that can be accounted for by the predictors in combination, in an adequate index of effect size for multiple regression, calculation of the Cohen's f^2 is necessary:

$$f^2 = \frac{R^2}{1 - R^2}$$

R^2 can be read directly off Table 5.16, so:

$$f^2 = \frac{.317}{1 - .317}$$

$$= .464$$

This is a large effect.

Prior to interpreting the results of the MRA, several assumptions were evaluated. First, normality for each variable was inspected as well as and univariate outliers. The data was not normally distributed. While the data differs from the assumptions these differences are not substantial and the statistical power of this sample is large. In this case, the distribution can be considered as uni-modal and broadly symmetric. Secondly, Mahalanobis distance did not exceed the critical χ^2 for *df* = 10 (at α = .001) of 29.558 for any cases in the data file after

repeating the analysis a third time, indicating that multivariate outliers were not of concern. Thirdly, relatively high tolerances for both predictors in the regression model at the fifth backward stepwise regression indicated that multicollinearity would not interfere in the ability to interpret the outcome of the MRA.

In combination at the fifth step of the Backward Stepwise Regression, Physical Activity Level (PAL), Illness Treatment Control, Emotional Representations, Timeline Cyclical, HCF Score, Identity, and Timeline accounted for a significant 31.7% of the variability in weight loss with R^2 = .31, F (10,1072) = 49.661, p < .001. Unstandardized (B) and standardized (β) regression coefficients, and squared semi-partial (or 'part') correlations (sr^2) for each predictor of the Socio-Demographic factor in the regression model are reported in Table 45.

Variable	*B* [95% CI]	β	sr^2
PAL	.001[.000, .001]***	.154	.023
ITC	.259[.217,.302]***	.334	.092
ER	-.103[-.134.-.072]***	-.192	.027
TC	-.062[-.099, -.025]**	-.095	.007
HCF Score	.050[.012, .088]**	.104	.006
Identity	-.033[-.059, -.008]*	-.070	.006
Timeline	-.047[-.084, -.009]*	-.063	.006

***Note:* N = 1101. CI = Confidence Interval. *p <.05. **p <.01. ***p <.001. PAL = Physical Activity Level. ITC = Illness Treatment Control. ER = Emotional Representations. TC = Timeline Cyclical. HCF = High Caloric Food Temptations**

Table 45: Residual Model for Final PWL Model

By incorporating all the relevant predictors found from each type of predictor variables, the final Perceived Weight Loss model incorporated only Physical Activity Level (PAL), Illness Treatment Control, Emotional Representations, Timeline Cyclical, HCF Score, Identity, and Timeline as predictors for weight loss success (WLS). The formula is as below:

$$WLS = 1.115 + .001(Physical\ Activity\ Level) + .259(Treatment\ Control\ Illness) - .103(Emotional\ Representations) - .062\ (Treatment\ Control) + .05(High\ Caloric\ Food\ Temptation\ Score) - .033(Identity) - .047(Timeline)$$

4.5 Summary Of Main Findings

This chapter explored the characteristics of the participants of the Know Your Weight e-Survey – their weight history and attempts; methods used to regulate weight and beliefs – as well as perceptions.

Participants were generally on the overweight side with minor differences between sexes such as BMI or current weight loss attempts. Most attempts for weight loss occur between the months of June and July; corresponding with Ramadhan. It seems that participants on the survey, the majority Muslims as this is the prominent religious group in Malaysia, took the opportunity of the fasting months to attempt to lose weight.

Most weight loss attempts were self-initiated without referral to professional help and tend to focus on diet or food based restrictions and changes in dietary behaviours. Many believed that they lack success in weight loss or weight maintenance but were confident in their capability to lose weight or even maintain it. In general, both sexes are unhappy with their current weight and body shape. The majority of the population is also minimally active.

Most participants lacked the confidence to deal with food temptations as well as with other social influences on food consumption but have a greater confidence in their ability to deal with negative emotional events. Most perceived being able to identify symptoms related specifically to their weight issues. Although many believed to perceive that their weight would remain the same, a bigger majority believed that their weight would not be forever the same. The majority were capable to understand the consequences of their weight issues on themselves and others. Participants also believed that they have a certain level of control over their weight issues and that a weight loss attempt would solve their weight issues.

Participants were sure that they are capable of understanding the issues surrounding their weight but are divided in terms of finding any coherence to it. Participants were rather confused in regards to their weight going through cycles. Most agreed that their emotions were affected by their weight.

4.6 Discussion – Descriptive Analysis

Malaysia had a steady increase in weight and obesity rates that is considered highest in the South East Asian region and is blamed on lifestyle changes brought upon rapid urbanization and industrialization (Institute, 2004). These changes brought upon increase in health related

care and reduction of national productivity. The Malaysian Ministry of Health (MoH) being the custodian of health for the public is not exempted from this problem. Healthcare workers are the sterling image of health for the public and to suffer problems that the public face can cause detrimental effects on the image of the service (Luckhaupt et al., 2014).

Type of work, stress and time are mostly cited as causes to lack of physical activity (O'Connor et al., 2008, Groesz et al., 2012, Barrington, 2012) and this was evident from the participants of the Know Your Weight e-survey by stressing time as the major barrier to weight loss. Most participants in the e-survey expressed they believed that they could find time to attempt weight loss but the evidence of this is rather contrary to this statement.

The survey revealed that a higher percentage of females, in comparison to males, are overweight. This is consistent with results from previous studies by the National Health Interview Survey from 1986 to 2002 (Caban et al., 2005). Females were also more engaged in attempts to lose weight using various methods. Interestingly, participants of this study working in the MoH, tend to engage in weight loss attempts without approaching a health care professional for support. Most attempted weight loss by engaging in self-dietary management through eating less, drinking more water and making better food choices (Dombrowski, Knittle, Avenell, Araujo-Soares, & Sniehotta, 2014).

Participants in this study were mostly minimally active, not achieving the High Energy Physical Activity (HEPA) level (iPAQ, 2004). The National Health and Morbidity Survey (NHMS) report stated that 64.8% of Malaysian were physically active but no exact level of physical activity was indicated (IPH, 2012a) in that study. In the study presented here the percentage of those minimally active was 64.6%. Only 22.3% achieved a high level of physical activity.

The DIET SE (Self-Efficacy) Scale used in the e-survey is able to portray a clear picture of the capabilities of the participants when they are presented with temptations of food, influenced by their social circle and upon facing emotional events. With a Cronbach Alpha close to the original tool (Stich et al., 2009), participants are neither strong nor weak enough to avoid food temptations. They believed that they are strong enough to say no to their companions when tempted with food but are incapable of holding back when presented with emotional events indicating many can succumb to food temptations when emotionally disturbed.

The Psychometrically Shortened Illness Perception Questionnaire (IPQ-PS) showed some issues. Several of the constructs had lower Cronbach Alpha values when compared to the adapted original tool (Sniehotta et al., 2010) especially in the personal control and Illness Treatment Control constructs. One possibility is that the psychometrically shortened version was adapted for illnesses and often people do not perceive weight issues as an illness. The second possibility can be associated with the way the tool was translated even though the tool ran through backward and forward translation to assure each translated item was enquiring a similar concept as in the original English scale. In terms of emotional representations it seems that some participants are emotionally affected by weight issues while others are not (see Table 31).

4.7 Discussion – Modelling Analysis

The extensive work done on the analysis of this chapter produced two models with the strongest predictive factors associated with weight loss success should a person attempt weight loss in the future. In this chapter, one model produced three key factors and the other model produced seven, all associated with either actual weight loss or perceived weight loss.

Model 1 predicted weight loss success, using actual weight loss, as being affected by sex, physical activity level and Treatment Control (Sniehotta et al., 2010). The model only explained a small percentage of variance (2.3%) indicating that the model is not that strong in predicting actual weight loss. In this model, treatment control had the greatest effect in the model as the general belief that the weight problem faced can be resolved if there is a proper engagement in treatment efforts. In this case, weight loss can be achieved if people receive/engage in adequate interventions. In this model sex also played a role as women are in general more concerned with weight loss compared to men. Women are known to be more aware of their body weight and shape thus this issue often takes a higher priority in concern to their weight. The model seems to indicate that being a woman increases chances to lose weight. Physical Activity was the least significant predictor, which seems to be in line with results on other studies that seem to indicate that diet is crucial for weight loss, and physical activity is more relevant when it comes to weight maintenance (Dombrowski, Knittle, Avenell, Araujo-Soares, & Sniehotta, 2014).

Model 2 aimed at modelling perceived weight loss success. In this model a higher number of relevant and significant associations where revealed. Physical activity level, High Caloric Food Temptations scores from the DIET-SE component, treatment control, emotional

representations, timeline cyclical, and timeline (Sniehotta et al., 2010) emerged as crucial. This model explained a bigger variance of 31.7%. Similar to Model 1, treatment control presented the greatest effect in this model. This was followed by emotional representations- the capability of people to develop parallel cognitive and emotional representations of their problems, which in turn gives rise to problem solving and emotion-focussed coping procedures (Leventhal et al., 1997). A strong emotional coping procedure is paramount in the process of weight management. Timeline cyclical plays a part where the beliefs about fluctuations in the symptoms and the temporal variability of the illness play a part in the success of weight loss outcomes (Wahl et al., 2014, Moss-Morris et al., 2002). The ability to abstain from temptations of high caloric food also played a part in weight loss success based on this model and two other constructs of the Illness Perception Questionnaire closely follow this – timeline (the belief of how long the illness will remain) and identity (the perceived capability of understanding and knowing the illness). Physical activity levels, similar to Model 1 still play a significant part in determining weight loss success in this model.

Model 1 presented a less set of robust predictors of weight loss success as it fits less well than compared to the predictors in Model 2. This is possibly due to the dependent variable used in Model 2 that used "perceived success" as opposed to actual success in weight loss (in kgs) as used in Model 1. Although both models are capable of predicting weight loss, Model 2 stands out better in predicting weight loss success with greater level of predictability of 31.7% compared to Model 2. It seems that the narratives that people build about their successes align better with their vision of their own successes or failures.

Chapter 5. Piloting the Body Image Scale: Methodology, Results and Discussion

5.1 General Aims

The aim of this study is to pilot test whether the Body Image Scale (BIS) can be used as a proxy for the assessment of BMI, especially in a Malaysian sample as it could prove a useful tool for national surveys. In order to do these two distinct methodologies will be used and described in this chapter as study 1 and study 2.

5.2 Study 1: A mix methods study on the relation between the BIS and objectively measured BMI

5.2.1 *Aims*

Study 1 main aim was to compare how a self-reported measure of BMI, the BIS (gender specific body images that link to BMI categories) relates to objective measures of BMI.

5.2.2 *Methodology*

This section of the study is part of a bigger qualitative study that aimed to explore the experiences of weight loss and weight management. Within this larger study a smaller section aimed to investigate how accurate the BIS can be in a Malay sample as a form of providing information on BMI categories. Details on sampling strategy and criteria are similar to the ones presented on Chapter 3.

5.2.3 *Procedures*

After informed consent participants were invited for a face to face interview (see chapter 3 for more details). At the start of the interview, participants were asked if they knew their current weight and height and this data was recorded. In the middle of the interview participants were asked where they would place themselves using the BIS scale. After this the interviewer would weight and measure participant's height. After this, current BMI would be calculated and, participants would be informed of his/her actual place on the BIS. Feedback from participants on their place at the scale was then retrieved. The aim was to understand level of agreement, match and mismatch, between their perceived positioning on the BIS scale and their actual position given the accurate BMI measures.

5.2.4 *Self-reported VS. recorded weight and height*

The main aim of this chapter was assess if the BIS can be used as a proxy measure of accurate BMI in large-scale population survey studies. It was noted in Chapter 1 that 50.4% of the Malay population did not accurately reported their own weight and 39.1% report a lower BMI than what seems to be the case (Kong et al., 2002). This implies inaccuracy in self-reported BMI as calculated by self-reported weight and height. It seems that objective measures of height and weight would be the best ways of assessing BMI. Doing this in a large scale population survey is extremely expensive in terms of human and material resources as well as hard to roll out considering the size and geography of Malaysia. But it has been done in the past.

Given these reasons studies in Malaysia have opted for objective measures of BMI– the National Health and Morbidity Survey (NHMS), Malaysian school-based Global Student Health Survey (GSHS) among them (NHMS, 2013). The study reported in this chapter will employ the same technique used by the Youth Behaviour Risk Factor Surveillance survey (YBRFS) conducted in Malaysia in 2010 (Mohammad Zabri et al., 2011): participants will be asked to self-report their own weight (in kgs) and height (in centimetres) at the beginning of the interview and later will be measured to obtain accurate data with calibrated height and weight measures. The use of the BIS to assess BMI will increase the knowledge on how people use this scale to report on their perceived body image (consequently BIS) and will provide detailed data on how the position people ascribe to themselves on the BIS relates to an objective measure of BMI. If the using the BIS reveals to be a form of accurately collecting data about people's BMI then, on the survey study reported on chapter 5, robust assessments of height and weight will not be implemented. The measuring equipment used to record weight will be the Tanita digital lithium weighing scale (Tanita 318, Japan) and for height will be the SECA portable body meter (SECA 206, Germany).

5.2.5 The Body Image Scale

This is the main tool used for assessment in this part of study: pilot testing the feasibility, acceptability and usability of a Body Image Scale (Appendix C, D & E) that was developed as a form of assessing body image perception (Thompson and Gray, 1995). This scale, as illustrated in the image below, starts of as a visual approach to the Body Mass Index (BMI) in explaining the meaning of the numbers mentioned by the BMI. This modified version of the scale utilized a "ranged" BMI that runs parallel with the coinciding pictures; hence an exact representation of the

BMI to the coinciding picture is non-existence. Thus, the utilization of the ranged BMI on the scale is slightly arcane but is the range is not overly adverse where the heuristics can be implanted in a software.

There are several existing Body Image Scales, asides from the Thompson and Gray version used here. A newer scale developed by Swami et.al (2012) uses photographic figures. Based on the pilot test done prior to actual data collection it was concluded that participants were rather uncomfortable with the use of the Swami scale. During this initial pilot test, participants were given both scales and were asked which one would they prefer to use and a higher number preferred the Thompson and Gray scale. The Swami scale lead to anxiety due to the missing "faces" in the images. Criticism towards the Thompson and Gray scale was also present like the lacking modesty of the image represented, but in general participants felt more comfortable with this scale in comparison to the Swami version.

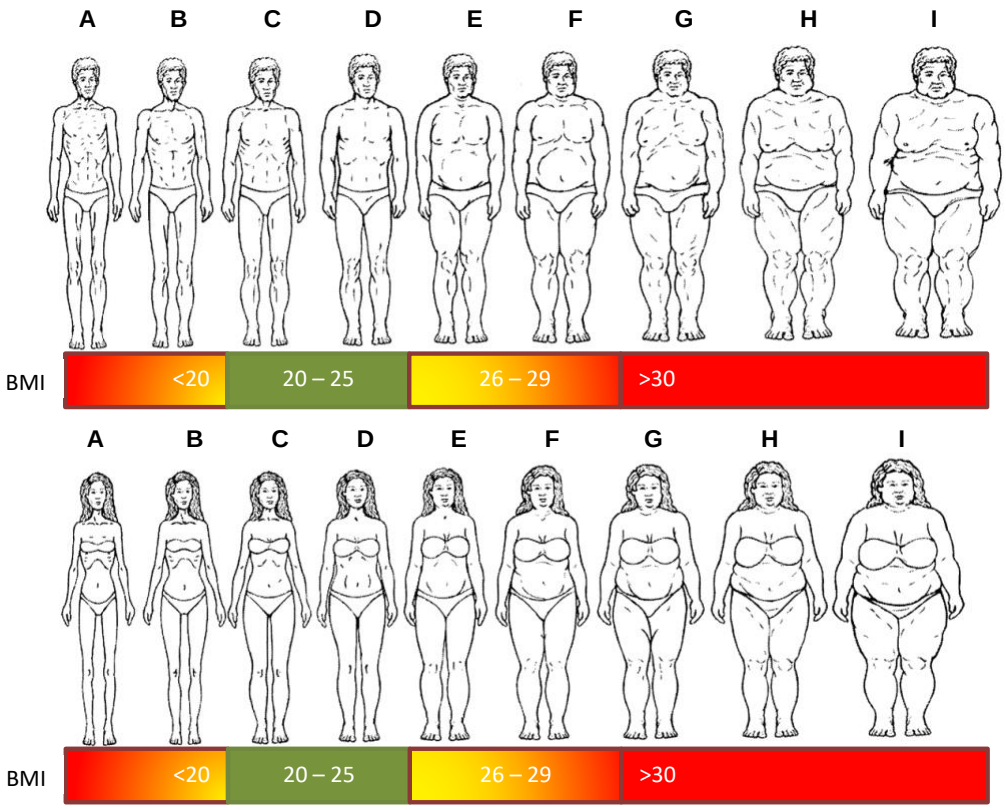


Figure 11: Modified Body Image Scale by Thompson and Gray, 1995

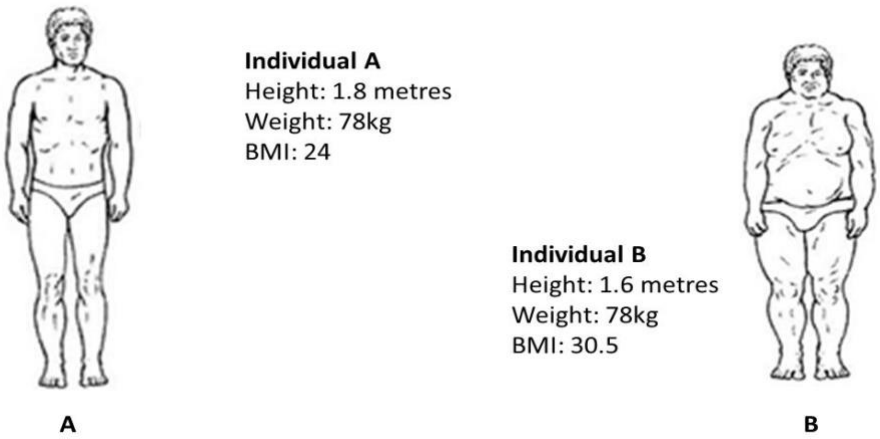


Figure 12: Comparison of BMI using the Visual Body Scale

In the Thompson and Gray Scale, if a person is 1.8 metres tall and weighs 78kg, he would have a desirable BMI of 24 whereas a person of 1.6 metres of height and weighs the same would have a BMI of 30.5 and is at a high risk of having health problems. This indicates of the two people who are the same weight the person who is shorter may have a higher percentage of fat. In this study, the participants are presented with similar pictures representing their sex (without the actual BMI representation) and they are requested to perceive where they see themselves in the scale. This would imply what is the perceptual idea of what they think they look like and will be compared later with the actual measurements and feedback given by the participants on the similarities or differences.

5.2.6 *Ethics for study*

Ethical approval for the study was sought from the Newcastle University Ethics Committee and the Medical Research and Ethics Committee (MREC) in Malaysia, sequentially. Newcastle University Ethics Committee granted approval for Phase 1 on May 16th 2014 (Approval number – 00879_1 2014) and The Medical Research Ethics Committee granted Phase 1 application on May 7th 2014 (NMRR-14-196-19848). Participation was voluntary and participants received a participant information sheet informing them of the specific characteristics of the study. To participate they needed to sign a consent form. The interviews were recorded on an audio recorder for the purpose of transcription and analysis; and the participants had to agree to this before joining. Anonymity was kept via the use of coded names. The anonymized transcribed data was accessible to the researcher and the supervisory team for the purpose of analysis and publication. Participants were informed of the outcome of the study if they had indicated they would like to be.

5.2.7 *Implementation plan*

After obtaining approval from both ethical committees, data collection phase for the study was initiated. For this the researcher returned to Malaysia in early March 2014 to begin preparations. These consisted in meetings with relevant officers and healthcare professionals to advertise the study and gather support.

5.2.8 *Data collection: preparatory actions and procedures*

Prior to the data collection, the researcher conducted several activities in preparation. This process has been described elsewhere (Chapter 3).

5.2.9 *Interview procedures*

This phase of the study employed a face-to-face semi-structured interview using a series of open-ended questions. This allowed naturalistic enquiry and exploration of information. The 39-question interview script contained 15 basic questions on the participants' weight history and 24 questions on the participants' weight loss experience (see appendix A & B). Questions on weight loss experience were driven from two theoretical models. Please refer to Chapter 3 for details of the interview procedures. To serve the aims of this study the pertinent questions were if they knew their current weight and height (the most recent measurements), where do they saw themselves on the BIS Scale and their feedback after having their height and weight measured, BMI calculated and their actual position on the BIS Scale compared to their perceived position.

5.2.10 *Analysis for the study*

For this part of the study, data collected from the interviews were tabulated in detail in quantitative form and then data was inserted in SPSS to be analysed descriptively. Secondary analysis performed on the data used Cohen's Kappa analysis to measure level agreement between perceived VS. actual BMI on BIS. Participants' feedback was analysed thematically.

A. Primary analysis – descriptive data

Normally distributed continuous data were summarized using means and standard deviations. Non-normally distributed continuous data were summarized using medians and quartiles. Categorical data were summarized using frequency counts.

B. Secondary analysis – Cohen's Kappa and participant's feedback

Cohen's Kappa statistical analysis was performed on the stated data – where do participants perceive themselves on the BIS and the actual position on the BIS. This was obtained by converting the data of the position on the BIS into weight categories – normal weight, overweight and obese based on Bland-Altman limits of agreement (Sedgwick, 2013). Plotting using the Bland-Altman limits of agreement was not conducted due the confirmatory analysis that the means comparison of the difference between the levels of agreement is significant. Further analysis using the Cohen's Kappa attempted to see if there is a good level of agreement amongst those who reported to be on current weight loss attempts. Feedback from participants was also analysed to cross compare the accuracy of the quantitative data.

5.2.11 *Results*

A. Descriptive analysis: Participants reported and measured height and weight and BIS outcome: match and mismatch

ID	Reported Current Weight (kg)	Measured Current Weight (kg)	Know current height	Reported Current Height (cm)	Measured Current Height (cm)	Current BMI	BIS - Current Perceived	BIS - Current Actual	Matching Perceived vs. Actual Body Image
P1S1	69	67.5	Y	155	164	25.9	D	D	Y
P2S1	78	80	Y	164	165	29.4	D	F	O
P3S1	92	94.5	Y	164	163	35.6	G	G	Y
P4S1	72	73.5	Y	172	171	25.3	D	D	Y
P5S1	89	91.7	Y	163	163	34.5	H	H	Y
P6S1	91.2	91.2	N	NAV	1.55	37.9	G	I	O
P7S1	89	88.6	Y	163	159	35	E	H	O
P1S2	80	76.4	Y	165	165	28	F	F	Y
P2S2	85	85	Y	175	175	27.5	F	F	Y
P3S2	140	135	Y	180	181	41	H	I	O
P4S2	87	85	Y	177	177	27.1	E	E	Y
P5S2	108	108	Y	155	155	45	I	I	Y
P1S3	78	75.4	Y	151	151	33	G	F	UN
P2S3	104	95.6	Y	170	170	33	E	G	O
P3S3	78	77	Y	155	156	31.6	G	G	Y
P4S3	76.4	78	Y	156	156	31.7	F	G	O
P5S3	90	85.1	Y	167	167	30.5	F	G	O
P6S3	91	93.5	Y	156	156	38.4	G	I	O
P1S4	79	80.3	Y	158	155	33.4	F	G	O
P2S4	73.5	73.4	Y	158	160	28.7	E	E	Y
P3S4	NA	102	N	NAV	165	37.5	E	H	O
P4S4	120	118.4	Y	172	173	39.5	H	I	O
P5S4	83	82.7	Y	157	157	33.5	F	H	O
P6S4	84	84	Y	147	147	39	H	I	O
P1S5	83	86.6	Y	158	158	34.5	G	H	O
P2S5	91	91	Y	160	160	33.5	H	H	Y
P3S5	110	114	Y	181	180	35.9	F	H	O
P4S5	74.5	73.5	Y	155	153	31.4	F	G	O
P5S5	66	67.6	Y	162	162	26.4	E	E	Y
P6S5	64	64.2	Y	160	160	25	D	D	Y
P1S6	62	64.7	Y	167	167	23.2	D	D	Y
P2S6	77	79.5	Y	145	146	37.3	F	H	O
P3S6	56	57.9	Y	161	161	22.3	D	D	Y
P4S6	NA	70.3	Y	151	153	30	F	G	O
P1S7	66	69	Y	160	160	26	E	E	Y
P2S7	76	77	Y	161	160	29.9	F	F	Y
P3S7	75	76	Y	164	166	27.5	F	F	Y
P4S7	138	137	Y	173	173	45.7	H	I	O
P5S7	80	80	Y	163	160	31	D	G	O
P6S7	110	109	N	NAV	167.5	38.8	E	I	O
P1S8	98	NA*	Y	152		42.4	G	I	O
P2S8	74	NA*	Y	145		35.2	F	H	O
P3S8	67	NA*	Y	154		28.3	E	F	O
P4S8	89	NA*	N	NAV**	160**	34.8	F	H	O

ID	Reported Current Weight (kg)	Measured Current Weight (kg)	Know current height	Reported Current Height (cm)	Measured Current Height (cm)	Current BMI	BIS - Current Perceived	BIS - Current Actual	Matching Perceived vs. Actual Body Image
P5S8	85	NA*	Y	166		30.8	F	G	O
P6S8	65	NA*	Y	145		31	F	G	O

Legend:
1. Know current weight : Y – Yes; N – No
2. Matching of BIS : Y – Yes; UN – Underestimated; O – Overestimated
3. NAV – No Available Information; NA – Not Available
Note:
*** For site 8, weight measurements were not taken because of weight scale malfunction during the data collection and unavailability of weight scale replacement on site. On this matter, the BMI is determined using most recent known weight.**
**** For participant 4 of site 8, the measure height was recorded and used, as the participant did not know their most recent reported height.**

Table 46: Results of Physical Parameters measurements and BIS comparison

As detailed in Table 46 above, only 15 of the 42 participants were able to match their BMI to the BIS. Of these 15, 8 were currently engaged in a weight loss structured programme (site 1 and 2), 5 were attempting to lose weight on their own and the remaining 2 were not currently engaging in weight loss. It is noted that the 8 participants currently on a structured programme who were able to match their BMI to the BIS were of BMI close to, or at, normal weight. Of those who were unable to match their BMI to the BIS, 3 were currently engaged on a WLA and on a structured programme, and 17 overestimated their BIS image in comparison to their actual BMI. This included both those who were and were not currently on WLA. Only one participant, currently active on WLA, underestimated his/her BMI on the BIS.

By referring to Table 3 in Chapter 3, all participants have a history with weight loss, past or current Weight loss methods varied from site to site (region where participants were interviewed) and the attempts also varied between individuals. Compared to past weight loss attempts, the number of participants currently attempting weight loss or maintenance are lower; numbering at 26 compared to past history of weight loss attempts of 42. The majority of the past weight loss attempts were driven by intervention programmes available at their place of work. When the interviews took place only 2 sites (Site 1 and 2) offered structured programmes for weight loss. The remaining active participants on weight loss or maintenance were mostly doing it without a formal support.

At this stage of the analysis, there seems to be seems indication that those currently on WLA are better able to match their BMI to the BIS; strengthening the accuracy of the BIS use within those who are actively engaged in WLA.

B. Advance analysis

I. Cohen's Kappa analysis – all participants

		Actual BMI			Total
		Normal Weight	Overweight	Obese	
Perceived BMI	Normal Weight	5	1	1	7
	Overweight	0	9	16	25
	Obese	0	1	13	14
Total		5	11	30	46

Table 47: Cross Tabulation Perceived BMI VS. Actual BMI of all Participants

		Value	Asymptotic Standardized Error[a]	Approximate T[b]	Approximate Significance
Measure of Agreement	Kappa	0.369	0.102	4.002	0
N of Valid Cases		46			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Table 48: Symmetric Measure of all Participants

The measure of weight categories were inter-rated as normal weight, overweight and obese by two measures – perceived and measured. Based on the table 49, agreement between perceived BMI (BIS?) and objectively measured BMI were 5 out of 7 for normal weight, 9 out of 25 for the overweight and 13 out of 14 for the obese category. The Cohen's Kappa calculated a fair level (Sedgwick, 2013) of inter-rater agreement (K = .369) (Table 48). This means that there is a poor matching of overall agreement between weight categories. The bar chart (Figure 13) showed a good matching for normal weight participants and also for the obese participants. However, many of the obese individuals perceived that they are in the overweight category rather than obese category – confirming the descriptive data of underestimation of actual BMI when using the BIS.

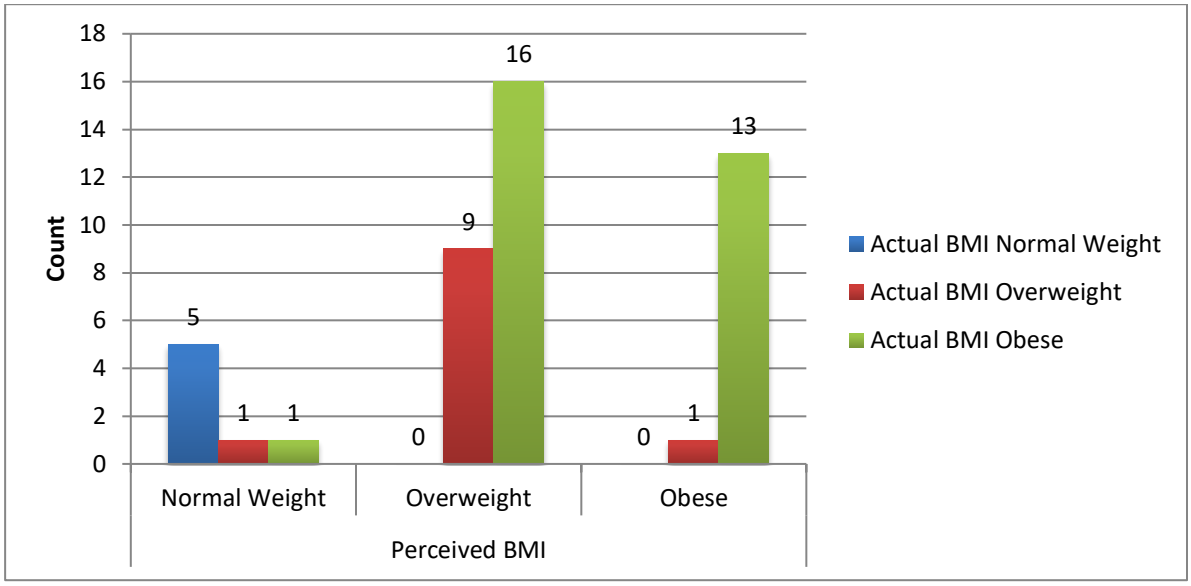


Figure 13: Distribution of participants based on perceived VS. actual BMI on the BIS Scale

II. Cohen's Kappa analysis – participants on Weight Loss Attempts (WLA)

		Actual BMI			Total
		Normal Weight	Overweight	Obese	
Perceived BMI	Normal Weight	5	1	1	7
	Overweight	0	9	5	14
	Obese	0	1	4	5
Total		5	5	11	10

Table 49: Cross Tabulation Perceived BMI VS. Actual BMI of Participants on WLA

		Value	Asymptotic Standardized Error[a]	Approximate T[b]	Approximate Significance
Measure of Agreement	Kappa	.524	.137	3.933	p < .001
N of Valid Cases		26			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Table 50: Symmetric Measure of Participants on WLA

The measure of weight categories were inter-rated as normal weight, overweight and obese by two measures – perceived BMI (via BIS) and objectively measured BMI for participants who are currently on WLA or aiming to maintain weight previously lost (maintenance). Based on the table 49, agreements between reported and measured were 5 out of 7 for normal weight, 9 out of 14 for the overweight and 4 out of 5 for the obese category. The Cohen's Kappa calculated a moderate level of agreement (Sedgwick, 2013) of inter-rater agreement of (K = .524) (Table 50). This means that there is a moderate matching of overall agreement between weight categories amongst participants who are on WLA or maintenance. The bar chart (Figure 14) showed a good matching for normal weight participants and also for the obese participants. There is still a disagreement for

the overweight category. Obese individuals seem to believe that they are leaner than they really are even amongst participants who are on WLA or maintenance.

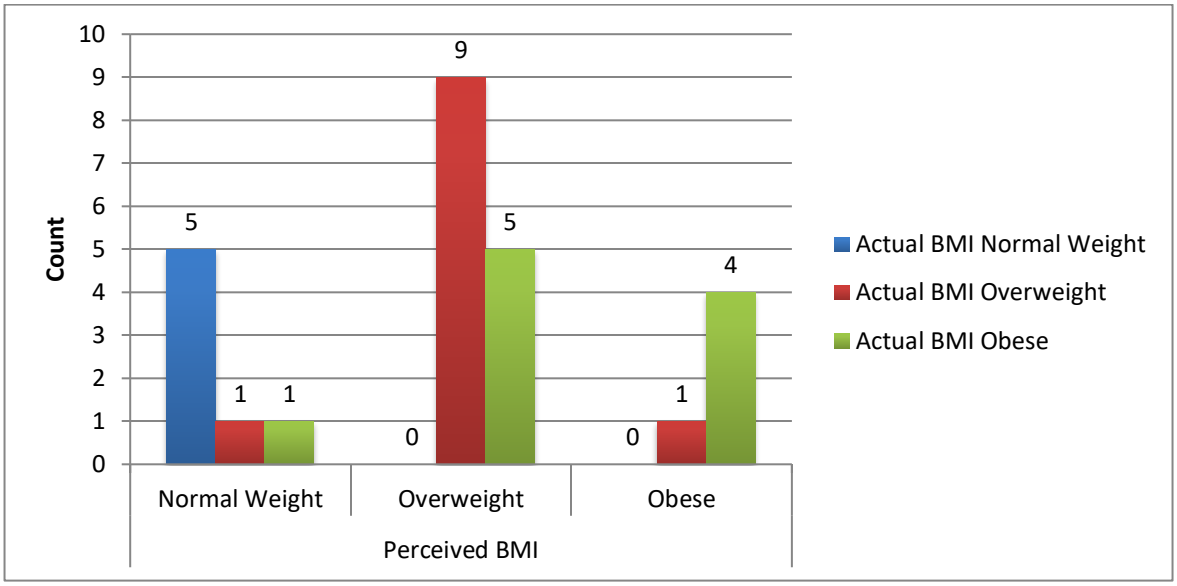


Figure 14: Distribution of participants based on perceived VS. actual BMI on the BIS Scale

C. Participants feedback on BIS

The majority of those who were able to match their current objectively measured BMI to BIS image agreed that this was an understandable and acceptable scale; including the small minority of those that were overweight and able to match their objectively measured BMI to the BIS. They perceived the BIS as capable of representing their BMI accurately.

"Yes <participant agreed with the image matching between C & D>"

P3S6, Female, 34, Bumiputra, Urban, Normal Weight.

"Owh this I agree <participant nodding in agreement to the image matching in the BIS>"

P1S7, Female, 34, Malay, Rural, Normal weight.

"I agree <laughs>. I look just like (at) H or probably (at) I. I am quite aware of my body"

P2S5, Female, 39, Malay, Urban, Obese.

One participant noted that he wanted to achieve a different position on the BIS scale, as its desired target weight was lower.

"Yeah, I still want to go there <pointing on scale to B> because if I get there I don't need to control my food (intake) <laughs> and eat whatever I want."

P1S6, Male, Bumiputra, Urban, Normal Weight.

Many of those who did not match their current objectively measured BMI to the actual BIS position stated not recognizing their body shape representation on the BIS (n= 18) and stated their body shape was different to the one proposed by the scale in accordance to current measured BMI.

"I definitely disagree because <thinks for a moment> you have to look at the height. If I am at G, then I am just 2 more (images on the scale) to the most obese. I don't agree. I agree that I am big but I don't agree that I'm at G. That's too big!"

P4S5, Female, 46, Malay, Urban, Obese

"I disagree <being at H> because I could be just heavier. I know people who are fatter than me are lighter."

P3S4, Male, 43, Malay, Urban, Obese

"Owh, Now I am really at G? But I don't believe I am at G because I don't have that kind of tummy <laughs>

P2S1, Female, 39, Malay, Rural, Overweight

A small number agreed when they were informed about their actual positioning on the BIS scale (n= 6) taking into account currently objectively assessed BMI, although they had not selected that position on the BIS scale initially.

"Well, I'm sure that this is fact so I agree (to the calculation of BMI with the BIS scale at G)"

P6S8, Female, 45, Malay, Urban, Obese

"Hurm, I think I can relate to the image at I more with my weight and height"

P4S7, Male, 38, Malay, Rural, Obese

“Hurm <thinks for a long while then laughs> well according to the BMI your scale says between G & H <thinks for a while longer> according to the picture I maybe should be here <points at G> so I guess I agree with it…”

P1S4, Female, 50, Indian, Urban, Obese

One single participant who overestimated her position on the BIS believed that her physical appearance did not match the one proposed by the BIS.

“Hurm, <takes time to think> I still believe I am at G <disagree with F>. I am not that thin.”

P1S3, Female, 40, Malay, Rural, Overweight

Practicing constant weighing is probably one of the key factors that increase accuracy.

“[I weigh myself] once a week, at least”

P2S4, Female, 58, Malay, Urban, Overweight

“…every morning I get up I would weigh myself at home. I have a scale at home. It’s a routine for me.”

P6S5, Female, 35, Malay, Urban, Normal Weight

5.2.12 *Discussion*

Body image has often been studied in tandem with eating disorders and body dysmorphic disordered populations to assess healthy body perceptions (Matos et al., 2002, Vander Wal and Thomas, 2004, Legenbauer et al., 2008). Several studies have attempted to link BMI and the BIS to assess its accuracy (Gilliard et al., 2007) and satisfaction (Kakeshita and de Sousa Almeida, 2006). In general, most adults often overestimated their body sizes on the referred body image scale whilst hoping for a leaner body.

In this study, the descriptive analysis and Cohen’s Kappa analysis showed similar findings to most studies that the participants often overestimate their body sizes when using the BIS and this happened mostly to those who are not currently engaging on weight loss attempts. For those on weight loss attempts and successful at losing weight or currently aiming at maintaining weight previously loss these are able to match their BIS image correctly to their objectively measured

BMI. Only 2 participants within the study that were not engaged in weight loss attempts, but that were engaged on weight maintenance were able to match their objectively measured BMI to the BIS. Interview transcripts revealed that they were aware of their own weight and were striving to prevent further weight increase.

Qualitative feedback on the BIS revealed key differences between those who were currently engaging with WLA or maintenance and those who were not. For those currently engaging with WLA or maintenance there was a match between currently measured BMI and their initial selected position on the BIS scale. The probable reasons for this could be rooted in their increased self-awareness due to activities (e.g. regular weighing) related to their WLA or maintenance that allowed them to be fully aware of their current body shape/image.

Those that practiced WLA or maintenance who did not agree with their position on the BIS believed that their image position on the BIS should be at the lower (leaner body) end of the scale. This is however seen as mostly self-preference and idealism of what thin/normal/fat should be – an issue often highlighted as a misconception of the real world VS. the ideal world portrayed through the media.

A single individual in this study believed that she should be portrayed thinner in the BIS. The individual in question is currently overweight and is in the process of working towards the desired goal of weight loss.

For those that were not engaging with WLA or maintenance they seemed divided into 2 main groups: those that agreed to the BIS positioning and those who did not. Those that agreed with the position on the scale in accordance to current objectively measured BMI believed that the positioning given was scientifically correct and not refutable. This belief is probably based on authoritarian beliefs that the information should be correct if given by a reliable source. The second group, also not currently engaging with WLA or maintenance, disagreed with the suggested match between current objectively measured BMI and the position on the BIS and believed that the BIS was not an accurate representation of their actual body shape. To justify these participants seemed to pick on specific details of the images in the BIS noting differences such as in facial shapes or tummy size. This probably is due to the fact that they are less aware of their physical shape as not currently actively engaging on weight management of any source (loss or maintenance. Another

probable reason is that the scale itself was built around the westernized culture and may not be truly representative of the Malaysian population. Possible further adjustments may be needed for future studies by including a scan of a standardized Malaysian body.

Given that those participants engaged in WLA or maintenance accepted and understood the BIS scale a decision was made to use this scale on a larger survey study. Nevertheless, and given the identified limitations of the tool, all those consenting in participating in the study were invited to use the local MoH health services to accurately measure their weight and height. This was decided given the fact that local statistics reveal that there is a big majority of people that do not own a weighing scale at home. Overall, there is a lack of evidence from the Kappa Analysis to state that the there is an agreement between perceived BMI and actual BMI on the BIS with exceptions to those currently on weight management and have reached normal weight.

5.3. Study 2: A further testing on the BIS usability on the MoH population: from the Quantitative Component

5.3.1 *Aim*

Study 2 main aim was to assess the accuracy and acceptability of the BIS compared to a self-reported BMI, the BIS (gender specific body images that link to BMI categories) from the different categories of participants (BMI < 25.0, BMI > 25.0., those on weight loss attempts (OWLA) and those not on any weight loss attempts (NOWLA)).

5.3.2 *Methodology*

This section uses data from the survey study to complement the overall aims of this component of the study. Sampling strategy and criteria are similar to those described on chapter 4.

5.3.3 *Tools for the study - Know Your Weight Survey (e-SURVEY)*

The e-survey (APPENDIX J – English & APPENDIX K - Malay) was originally based on several existing tools that has been used, tested and published. The e-Survey consists of a 7-part questionnaire. Each questionnaire incorporated was modified according to the needs of the local population without changing the actual intentions or structure. Theories used in the Qualitative Chapter and incorporated as part of the questionnaire. Elements of Goals, Self-Efficacy, Outcome Expectations and socio-structural factors from the Social Cognitive Theory (Bandura, 1998) and elements of illness representations (identity, timeline, cause, control, etc), emotional

representations and coping the Common Sense Self-Regulation Model (Leventhal et al., 1997) are present throughout the e-survey. Details on the survey questions can found in Chapter 4 section 4.2.1 or Chapter 5 section 5.2.1.

The data used for this section of the chapter are based on self-reported height (in centimetres) (Question 1) and weight (in kgs) (Question 2) as well as on participants positioning of themselves on the Body Image Scale (BIS) (Question 4). The Qualtrics™ heuristics embedded in the e-survey converted data on height and weight collected automatically to BMI scores.

It must be noted that the procedures of the study outlined that the participants were to measure themselves using validated measuring tools that are available within the services of the MoH before attempting to answer the e-survey.

5.3.4 *Ethics for study*

Ethical approval for the study was sought from the Newcastle University Ethics Committee and the Medical Research and Ethics Committee (MREC) in Malaysia sequentially. Newcastle University Ethics Committee granted approval for Phase 2 on July 8th 2015 (Approval number – 00879_1 2015) and The Medical Research Ethics Committee granted Phase 2 application as an amendment and extension of Phase 1 on July 13th 2015 (NMRR-14-196-19848). Participation was voluntary and all participants were served with a participant information sheet informing them of the specific characteristics of the study. Consent was assumed as soon as the person would select the link to enter the survey. All data was collected anonymously via the e-survey without any personal identifiers.

5.3.5 *Data analysis*

In order to assess the accuracy of the BIS using measured BMI, the BMI data collected from the e-survey was transformed into categorical data for the purpose of analysis:

a. BMI below 18 = Group 1 on the BIS (category A & B)
b. BMI between 18-24.99 = Group 2 on the BIS (category C & D)
c. BMI between 25-29.99 = Group 3 on the BIS (category E & F)
d. BMI above 30 = Group 4 on the BIS (category G, H & I)

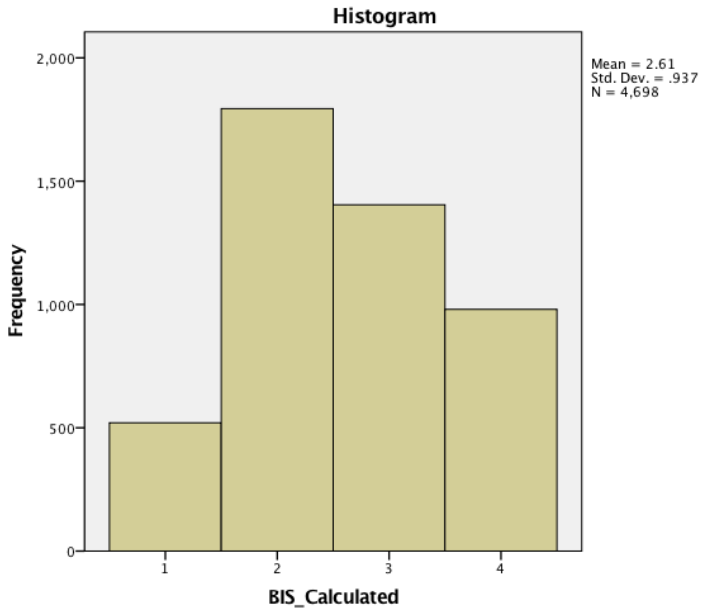
The reported positioning of participants on the BIS scale (BIS Perceived) were also categorized to match the rules above:

a. Perceived BIS Group 1, below 18.0 BMI, lower weight = category A & B
b. Perceived BIS Group 2 [18-24.99], normal weight = category C & D
c. Perceived BIS Group 3 [25-29.99], overweight = category E & F
d. Perceived BIS Group 4 [above 30], very overweight = category G, H & I

Wilcoxon signed rank analysis were used to test the matching between self-reported BMI (categorized into lower weight, normal weight, overweight and very overweight) and the position the person chose on the BIS that also indicate BMI category. Further analysis was also conducted to see the differences between BMI's (under 25.0 VS. 25.0 and over) and those who are currently on weight loss attempt (CWLA) VS. those not on weight loss management (NOWLA).

5.3.6 *Results*

A. Symmetry of the distribution of data



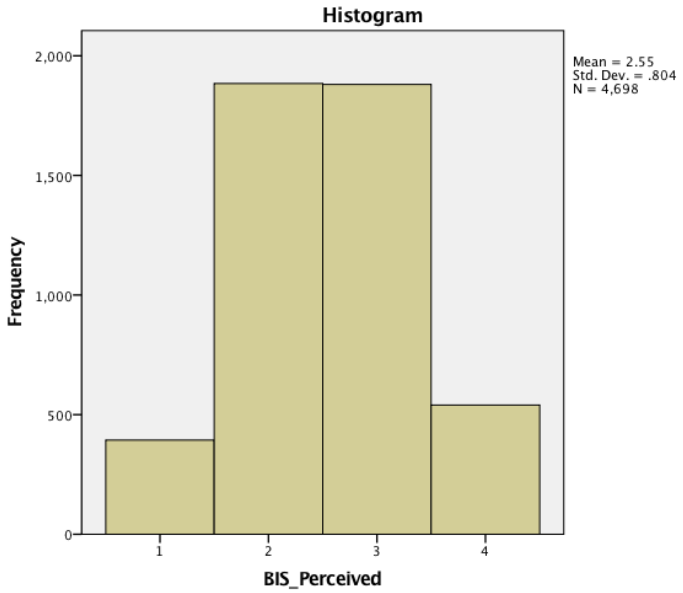


Figure 15: Histogram of data symmetry for BMI and Perceived BIS

Data symmetry distribution between both sets of data suggests that this assumption is not an unreasonable to make regarding the current data. From this the analysis moving forward attempted to analyse data over the general population, amongst the different BMI categories (below 25.0 and above 25.0). Amongst those on weight loss attempts (OWLA) and those not on weight loss attempts (NOWLA).

B. Analysis over general population

		N	Mean Rank	Sum of Ranks
BIS_Perceived - BMI_Calculated	Negative Ranks	1084[a]	965.87	1046998
	Positive Ranks	832[b]	948.9	789488
	Ties	2782[c]		
	Total	4698		

a. BIS_Perceived < BMI_Calculated

b. BIS_Perceived > BMI_Calculated

c. BIS_Perceived = BMI_Calculated

Table 51: Wilcoxon Signed Rank test ranking of data on General Population

	BIS_Perceived – BIS Calculated
Z	-6.053[b]
Asymp. Sig. (2-tailed)	p < .001

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

Table 52: Wilcoxon Signed Rank test on General Population

Follow up analysis – Effect Size

Clark-Carter (Clark-Carter, 2004) recommends converting *z* into *r* with:

$$r = \frac{z}{\sqrt{N}}$$

Where *z* can be read off the Test Statistics table and *N* is the total sample excluding ties. So,

$$r = \frac{-6.053}{\sqrt{1916}}$$

$$= -0.13$$

By Cohen's conventions (Cohen, 2013), this would be considered a small effect size. The Wilcoxon signed rank test indicated that the majority perceived BIS are lower than the calculated and categorized BMI, T = 789488, z = -6.053 (corrected for ties), N – Ties = 1916, p <0.0001, two-tailed. During the self-reported weight and height, 1084 participants ranked their perceived BIS as lower in comparison to their BMI (sum or rank = 1046998), whilst only 832 ranked their perceived BIS as higher in comparison to their BMI (sum or rank = 789488). This indicates that the larger majority of the two are overestimating their BMI rather than underestimating; perceiving that they are larger than what they really are. However, a bigger majority of 2782 perceived their BMI as the same as their perceived BIS. The effect is considered "small", r = 0.13.

C. Analysis among BMI <25.0

		N	Mean Rank	Sum of Ranks
BIS_Perceived - BMI_Calculated	Negative Ranks	721[a]	437.05	315113
	Positive Ranks	149[b]	428.00	63772
	Ties	1422[c]		
	Total	2292		

a. BIS_Perceived > BMI_Calculated

b. BIS_Perceived < BMI_Calculated

c. BIS_Perceived = BMI_Calculated

Table 53: Wilcoxon Signed Rank test ranking of data for BMI <25.0

	BIS_Perceived – BIS Calculated
Z	-19.403[a]
Asymp. Sig. (2-tailed)	p <.001

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

Table 54: Wilcoxon Signed Rank test for BMI <25.0

Follow up analysis – Effect Size

Clark-Carter (Clark-Carter, 2004)recommends converting *z* into *r* with:

$$r = \frac{z}{\sqrt{N}}$$

Where *z* can be read off the Test Statistics table and *N* is the total sample excluding ties. So,

$$r = \frac{-19.403}{\sqrt{1422}}$$
$$= -0.52$$

By Cohen's conventions (Cohen, 2013), this would be considered large. The Wilcoxon signed rank test indicated that the majority are able to match BMI to the perceived BIS, T = 315113, z = -19.403 (corrected for ties), N – Ties = 1422, p < .001, two-tailed. During the self-reported weight and height, only 149 participants ranked their perceived BIS as lower in comparison to their BMI (sum or rank = 63772), whilst a third (721) ranked their perceived BIS as higher in comparison to their BMI. This indicates a higher number is overestimating their position on the BIS in comparison to their BMI. However, about half of the total participants with BMI under 25 (1422) are able to match their BMI as the same as their perceived BIS. The effect is considered "large", r = 0.52.

D. Analysis among BMI ≥25.0

		N	Mean Rank	Sum of Ranks
BIS_Perceived - BIS_Calculated	Negative Ranks	111[a]	507.70	56355
	Positive Ranks	935[b]	525.38	491226
	Ties	1360[c]		
	Total	2406		

a. BIS_Perceived > BMI_Calculated

b. BIS_Perceived < BMI_Calculated

c. BIS_Perceived = BMI_Calculated

Table 55: Wilcoxon Signed Rank test ranking of data for BMI ≥25.0

	BIS_Perceived – BIS Calculated
Z	-25.215[b]
Asymp. Sig. (2-tailed)	p <.001

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

Table 56: Wilcoxon Signed Rank test for BMI ≥25.0

Follow up analysis – Effect Size

Clark-Carter (Clark-Carter, 2004)recommends converting z into r with:

$$r = \frac{z}{\sqrt{N}}$$

Where z can be read off the Test Statistics table and N is the total sample excluding ties. So,

$$r = \frac{-25.215}{\sqrt{1360}}$$
$$= -0.68$$

By Cohen's conventions (Cohen, 2013), this would be considered large. The Wilcoxon signed rank

test indicated that the majority are able to match calculated BMI to the perceived BIS, T = 491226, z = -25.215 (corrected for ties), N – Ties = 1360, p < .001, two-tailed. During the self-reported weight and height, only 111 participants ranked their perceived BIS as higher in comparison to their BMI (sum or rank = 56355), whilst a larger number (935) ranked their perceived BIS as lower in comparison to their BMI. This indicates a higher number of underestimating their position on the BIS in comparison to their BMI. However, slightly more than half of the total participants with BMI 25 and over (1360) are able to match their BMI as the same as their perceived BIS. The effect is considered "large", r = 0.68.

E. Analysis among those On Weight Loss Attempt (OWLA)

		N	Mean Rank	Sum of Ranks
BIS_Perceived - BMI_Calculated	Negative Ranks	372[a]	492.65	183264
	Positive Ranks	618[b]	497.22	307281
	Ties	1413[c]		
	Total	2403		

a. BIS_Perceived > BMI_Calculated
b. BIS_Perceived < BMI_Calculated
c. BIS_Perceived = BMI_Calculated

Table 57: Wilcoxon Signed Rank test ranking of data for participants OWLA

	BIS_Perceived – BIS Calculated
Z	-6.053[b]
Asymp. Sig. (2-tailed)	p <.001

a. Wilcoxon Signed Ranks Test
b. Based on positive ranks.

Table 58: Wilcoxon Signed Rank test for participants OWLA

Follow up analysis – Effect Size

Clark-Carter (Clark-Carter, 2004) recommends converting z into r with:

$$r = \frac{z}{\sqrt{N}}$$

Where z can be read off the Test Statistics table and N is the total sample excluding ties. So,

$$r = \frac{-6.053}{\sqrt{1413}}$$
$$= -0.08$$

By Cohen's conventions (Cohen, 2013), this would be considered small. The Wilcoxon signed rank test indicated that the majority are able to match calculated BMI to the perceived BIS, T = 307281, z = -6.053 (corrected for ties), N – Ties = 1413, p < .001, two-tailed. During the self-reported weight and height, 372 participants ranked their perceived BIS as higher in comparison to their BMI (sum

or rank = 183264), whilst 618 ranked their perceived BIS as lower in comparison to their BMI. This indicates the proportion of those underestimating their position on the BIS in comparison to their BMI is double. However, slightly more than half of the total participants who claimed to be on some kind of weight loss attempts (1413) are able to match their BMI as the same as their perceived BIS. The effect is considered "small", r = 0.08.

F. Analysis among those who are Not On Weight Loss Attempts (NOWLA)

		N	Mean Rank	Sum of Ranks
BIS_Perceived - BMI_Calculated	Negative Ranks	151[a]	159.15	24031.5
	Positive Ranks	166[b]	158.66	26371.5
	Ties	445[c]		
	Total	762		

a. BIS_Perceived > BMI_Calculated

b. BIS_Perceived < BMI_Calculated

c. BIS_Perceived = BMI_Calculated

Table 59: Wilcoxon Signed Rank test ranking of data on participants NOWLA

	BIS_Perceived – BIS Calculated
Z	-8.19[a]
Asymp. Sig. (2-tailed)	p = .0413

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

Table 60: Wilcoxon Signed Rank test on participants NOWLA

Follow up analysis – Effect Size

Clark-Carter (Clark-Carter, 2004)recommends converting *z* into *r* with:

$$r = \frac{z}{\sqrt{N}}$$

Where *z* can be read off the Test Statistics table and *N* is the total sample excluding ties. So,

$$r = \frac{-8.19}{\sqrt{445}}$$
$$= -0.09$$

By Cohen's conventions (Cohen, 2013), this would be considered small. The Wilcoxon signed rank test indicated that the majority are able to match BMI to the perceived BIS, *T* = 26371.5, *z* = -8.19 (corrected for ties), *N* – Ties = 445, *p* = .413, two-tailed. During the self-reported weight and height, 151 participants ranked their perceived BIS as higher in comparison to their BMI (sum or rank = 24031.5), whilst 166 ranked their perceived BIS as lower in comparison to their BMI. This indicates an almost equivalent number of participants overestimating their position on the BIS in comparison to their BMI. However, over half of the total participants who claimed not on any

weight loss attempts (NOWLA) (445) are able to match their BMI as the same as their perceived BIS. The effect is considered "small", r = 0.09.

5.3.7 *Discussion*

From this analysis it can be clearly indicated that most participants are able to match their BMI with the perceived BIS. The reasoning of this achievement is possibly due to the instructions given to the participants to measure their weight and height before answering the e-survey. However, this matching could also mean that the participants are much aware of their body size in relation to their BMI. It is interesting when the sub-analysis for the quantitative study data is plotted onto a graph as show in Figure 16.

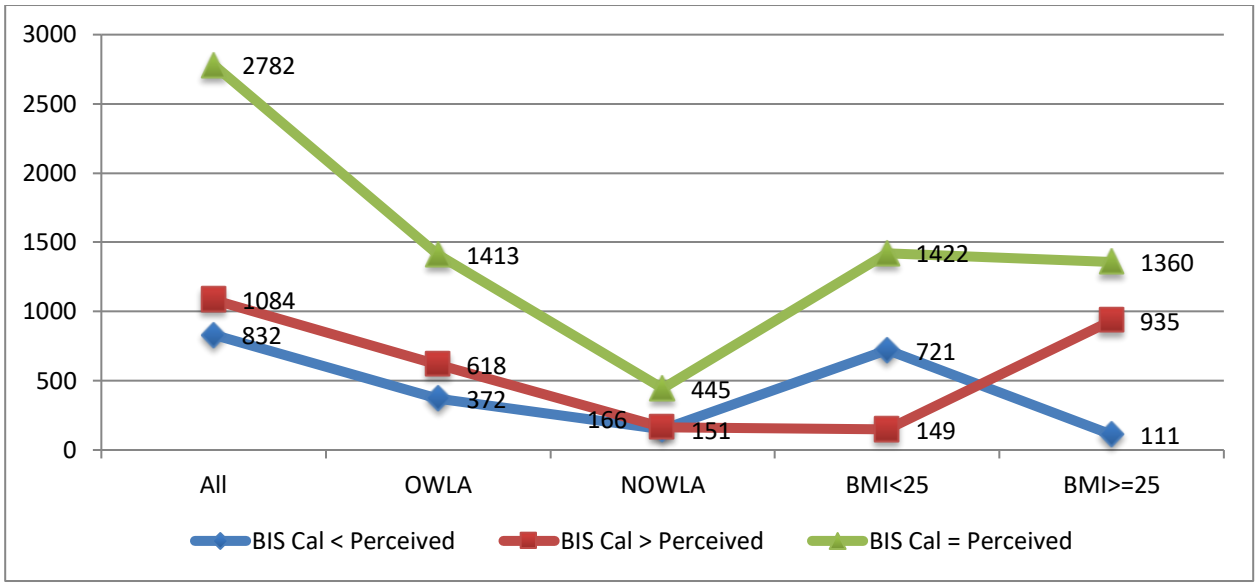


Figure 16: Data ranking plot for BMI and Perceived BIS

When comparing between participants with BMI under 25.0 to those with BMI 25.0 and over; there is no difference for those who are able to match their self-reported BMI and perceived BIS. However, for participants with BMI under 25.0, it can be observed that the larger number perceived their position at the BIS as higher than their self-reported BMI; indicating that they are overestimating their position on the BIS. The exact opposite is observed for participants with BMI 25.0 and over, where they perceived their position on the BIS as lower than their self-reported BMI; indicating they are underestimating their position on the BIS. This is parallel with the qualitative data where a number of the participants with BMI under 25.0 overestimated their position on the BIS and a bigger number of responses of participants with BMI 25.0 and over underestimated their position on the BIS. The scenario for overestimation of BIS perceived

compared self-reported BMI for participants with BMI under 25 could be akin to what is sometimes observed in adolescent samples (Kurth & Ellert, 2008) while the underestimation of BIS perceived compared to self-reported BMI for participants with BMI of 25 and over is the normal scenario for 90% of obese individuals being in denial of their own body size and weight problem (Johnson, Beeken, Croker, & Wardle, 2014). Only 54% of British women and 39% British men are able to identify obesity correctly – indicating a low rate of identification of obesity (Curtice, 2015). The scenario in this study is not that different.

What is more interesting is the comparison between participants who claimed to be on weight loss attempts (WLA) versus not on weight loss attempt (NOWLA). The proportion of those being able to match their perceived BIS to self-reported BMI are much higher amongst those on WLA as compared to NOWLA. Those who experienced weight loss attempts are very much aware of their physical changes they go through; revealing a heightened awareness of their own body (Ross, Brooks, Touchton-Leonard, & Wallen, 2016). Hence, the higher level of awareness of body changes allows the matching of perceived BIS and self-reported BMI to be possible amongst those on WLA as compared to those NOWLA.

5.4 Chapter Conclusion

Data from the Kappa Analysis, Study 1 , revealed that there was no clear agreement between the measured BMI and the perceived image on the BIS (BIS Perceived). There is a clear matching between actual BMI and perceived BIS amongst participants who are active in their pursuits of weight loss and maintenance. Those who are not on active weight management however often overestimate their BMI.

Section 2 is limited by the data that is extracted from the e-survey. From the analysis it was shown that the majority could match their actual BMI to their image perceived on the BIS correctly. But there is also a similar pattern emerging of overestimation as observed on Study 1. While the bigger majority of the population is able to correctly match their perceived BMI on the BIS to their actual BMI, a higher proportion of participants on WLA are able to match their perceived BMI on the BIS to their actual BMI. An interesting emerging pattern is that those with BMI < 25.0 overestimate more frequently their perceived BMI on the BIS as compared to the actual BMI while those with BMI ≥ 25.0 are better at underestimating their perceived BMI on the BIS as compared to the actual BMI.

By comparing the two sets of data from Study 1 and Study 2, what can be concluded is that the BIS could be used as a proxy to BMI measurements but may require additional modifications and could not yet be used on its own. The BIS works best with individuals who are currently active on weight management and who are close to their target weight. Men tend to overestimate their BMI on the BIS while women are vice versa.

Chapter 6. Overall Discussion & Conclusion

The overall aim of this thesis was to explore the history of weight management experienced by professionals working within the MoH Malaysia and increase our understanding of people's experiences with weight loss and maintenance as well as with the services and/or strategies used and how this all relates to successful experiences. To address this aim a mix of qualitative and quantitative studies was used. The studies conducted were based on two key theories: the Common Sense Self-Regulation Model (Leventhal et al., 1997) and the Social Cognitive Theory (Bandura, 1998). The use of both these theories was complementary: the CSSRM acted as a way of understanding people's engagement with the issue of overweight and obesity by understanding their illness representations, their lay conceptions of their weight issue and the SCT allowed to understand how to progress from these to actual behavioural enactment. Using theory to inform research is a key way to: promote cumulative science by using a shared language and understanding of key concepts and by allowing to summarize evidence; clarify prediction; make explicit models used in research so that these can be testable, replicable and potentially falsifiable (Bhattacherjee, 2012); guide the development and design of interventions as well as the evaluation and the understanding of a specific phenomenon (Fossey et al., 2002). Using this model and this theory allowed us to accumulate evidence on these well-researched theories but it also constituted a challenged, as there were no tools available in Malay to assess illness representations. This meant that part of this work was also to engage in translating a psychometrically shortened version of the IPQ-R (Sniehotta et al., 2010) to be used, as far as I know, for the first time in Malaysia. More work will need to be conducted on this to assure higher levels of reliability and make sure that this tool is culturally sensitive.

The first part of this thesis presents a Qualitative interview study that aims at increasing our understanding of experiences of weight loss and maintenance; what lead to the success or failures; what drives people to do what they need to lose weight and what impeded them from being successful or to try again. The interviews lead to a conclusion that revealed that although most people knew what the weight issue was all about, what needed to be done, and the consequences of not taking care of their weight; most also lacked the necessary levels of motivation and self-regulatory skills needed for successful weight management. Social challenges, in the form of societal norms and peer pressure, were perceived to limit success. Time management and commitment to the implementation of behaviour change were expressed as the most difficult issues

to resolve. Some cultural features seemed to act as impediments such as communal eating practices that are perceived as barriers in weight loss as individuals are required to join in camaraderie actions during festivities or parties and are expected to eat even though they are in the process of attempting weight loss.

The second part of this study used a Quantitative methodology to ascertain history and current weight management practices. Results revealed that the majority of those participating on this survey had attempted weight loss at least once in their lives and many are in a constant state of weight loss efforts. Most attempts are self-initiated and very few are under organized programmes or seeking professional help. The majority of people seem to seek more weight loss opportunities and very few attempts were successful. The survey also revealed that the predictors of weight loss success, actual kg loss versus perception of success, are varied. The first outcome – actual weight loss revealed *sex*, *physical activity level* and *treatment control* as the strongest predictors but with a very low level of predictability. The second outcome – perceived weight loss success revealed *physical activity level*, *high caloric food temptation*, *social internal factors* and *negative emotional events scores* from the DIET-Self Efficacy Scale and; *identity*, *timeline*, *personal control*, *treatment control*, *timeline cyclical* and *emotional representation* scores from the Illness Perception Questionnaire as the strongest predictors of weight loss with 31.7% predictability value.

A third part of the thesis explored quantitative data collected during the qualitative study and comparing this with data collected during the quantitative study in order to assess the utility of the Body Image Scale (BIS) for the Malaysian population. The conclusion was that the BIS can be used as a proxy measure of BMI but it cannot be used as a stand-alone tool unless modifications are made to suit the Malaysian population. Overall the results seemed to reveal that the BIS is more accurate for individuals who are actively pursuing weight loss or that are at the maintenance stage, near or within their target weight.

6.1 What This Study Told Us

6.1.1 *Factors influencing weight management*

In the qualitative study interviews, the majority of the participants seem to have the necessary knowledge about what overweight and obesity is, its causes and consequences (section 3.10.2). This knowledge seemed to be associated, in some way, to the fact that those participating in this study work in the healthcare setting. It should not be assumed, however, that by having the

necessary knowledge will lead to behaviour change (Ryan, 2009). The majority of participants actually do lack the self-regulatory skills needed for successful weight management.

Aside from self-regulatory skills, participants lack motivation to lose weight (section 3.10.3). Many do not have the intrinsic motivation to lose weight. Introjected motivation alone does not necessarily increase the success of weight loss (Teixeira et al., 2012) but if combined with intrinsic motivation, the possibility of success is much higher (Seifert et al., 2012). Some participants were enrolled into a programme to lose weight (section 2.2.4) but many have attempted weight loss on their own prior to joining these programmes; previous unsuccessful attempts may leave some consequences such as a lowered level of self-efficacy (Nease et al., 1999). It is worth noting as well that in Malaysia there is not a standard weight loss programme in place conducted across the MoH, regardless of location, but rather each location have attempted different methods or programmes to lose weight. Most of these programmes are also one-off, planned by the local healthcare professionals and very few have follow ups as expressed by participant frustration. Also, there does not seem to be an effort to assess the success, or otherwise, of these programmes. In the future more effort should be made to assess these programmes: what works, for whom and why (Michie, What works and how? Designing more effective interventions needs answer to both questions, 2008).

Many of those participating in the qualitative interviews have expressed key barriers for weight loss (section 3.10.6) and were rather thin on the identification of facilitators (section 3.10.5). Barriers seemed mostly related to social norms, cultural behaviour, and peer pressure. Social norms within the society can hinder the success of weight loss. In any organization, and in a Malaysian society specifically, camaraderie in eating is both a social practice and cultural practice. Everyone is expected to eat during parties and festivity celebrations. Colleagues and peers do not seem to make an effort to provide encouraging statements to support weight maintenance.

Cultural practices, as the expectation for families to sit and eat together, also emerge as an impediment to weight loss success. Many expressed specifically that the spouses are expected to sit and eat with the significant other (mainly the husbands) and this applies to the children as well. Feeding practices to encourage children to eat and avoid wastage of food are also seen as a hindrance to weight loss success amongst mothers with small children. Many have expressed the wish to lose more weight and believed that they are able to lose more weight (section 3.10.3) but

the feedback given by the participants are mainly conditional; the success of their weight loss is dependent on the probability that they could carry out the weight loss practices successfully and this is often seen as impossible as they are expected to actively participate in work and family events that often lead to overeating. Also, the idea of coking different meals for different people in the family seems like something that would go against the cultural expectation of fully sharing a meal.

Many perceived that their weight loss attempts were successful either in the past or present (section 3.10.4) but many also could not carry out with maintaining the weight off and regained. People were aware that the consequences of their weight loss could have an impact on others (section 3.10.7) that in turn would impact their weight loss management (section 3.10.8). Some received positive feedback while others faced negative feedback. Negative feedback in actual reality could come as concerns expressed by others who are not aware of the weight loss attempts of the individuals in question but was perceived as a threat that could reduce the motivation to lose weight.

In the quantitative study, the advance analysis on the e-survey data revealed that factors leading to weight loss success can identified both for actual weight loss achieved and perceived weight loss success. The first model revealed *sex, physical activity level* and *treatment control* were the strongest predictors but with low predictability (2.3%). The model seems to indicate that being a woman increases the chances of weight loss. This could potentially be related to the fact that women are often responsible for cooking family meals, hence have more control over what is on offer. Besides, the majority of staff in the MoH is women (section 4.3.1). Being around other women may increase sensitivity to weight and body image issues (Ross, 2015). Physical activity levels of the MoH staff are mostly at sufficient (section 4.3.5) but by increasing the levels of physical activity, this may significantly increase the probability of success in weight loss. A good level of treatment control does seem to increase the chance of weight loss as perceived by the participants (section 4.3.7 E), engaging in higher levels of Physical activity may lead to this. When trying to understand perception of weight loss success *physical activity level, high caloric food temptation, social internal factors* and *negative emotional events scores* from the DIET-Self Efficacy and; *identity, timeline, personal control, treatment control, timeline cyclical* and *emotional representation* scores from the Illness Perception Questionnaire were the strongest predictors of weight loss. The second model has more variable predictability. Participants believed that a higher degree in food temptation control along with social stress management and control

over negative emotional events would increase the chances of weight loss. The same is perceived for almost all the elements of the Illness Perception Questionnaire. In effect it seems that it is easier to predict people's perception of success than it is to predict their actual weight loss. This is probably related to the need we all have to build coherent narratives around our experiences and choices. When attempting at predicting success perception variables associated with the cognitive factors within the CSSRM emerge as significant predictors. Being able to correctly identify the symptoms associated with this potential health threat associated with overweight and obesity, understanding its timeline, believing that one's behaviours can go a long way to influence the identified health issue, that some treatment approaches are available and that being able to regulate ones emotions seem associated with higher perceptions of success.

6.1.2 *Weight management practices amongst MoH staff*

It was revealed that most MoH staff has attempted at least once to lose weight in their lives (section 4.3.2) and many have tried multiple times (section 4.3.2). Many were not successful and seemed to be in a perpetual state of continuous weight loss attempts (section 4.3.2). Most attempted weight loss on their own without seeking professional help. Most engaged in dietary based weight loss attempts engaging less in physical activity as a form weight loss method (section 4.3.2). Many stated that they were not satisfied with current body weight or shape but the data also revealed that most did not have a high enough level of motivation to successfully lose weight (section 4.3.4). The majority of the sample that answered the survey only reached the minimum sufficient level of activity (section 4.3.5). This might be related with less successful experiences in weight management.

6.1.3 *Usability of the Body Image Scale (BIS) as a proxy to Body Mass Index (BMI)*

The Body Image Scale (BIS), as tested in the qualitative study, revealed inconclusive data, as evidence showed there is a lack of agreement between the perceived, using the BIS, and actual Body Mass Index (BMI) in relation to the position on the BIS. However, for individuals who are close to their target weight and currently active in weight loss attempts or maintenance behaviours it seems easier to match their actual BMI with the relative position in the BIS. The quantitative study e-survey results have revealed that the majority is able to match their self-reported BMI to the corresponding image on the BIS although there is a substantial number of people that tend to overestimate their position in the BIS similar to the results obtained in the qualitative study. It is worth noting that women tend to overestimate their BMI more often indicating that they believe

they are bigger than they actually are, and this might be due to the fact that women feel more constraints in terms of social norms and expectations regarding ideal body weight and body image for women (Ross, 2015).

6.1.4 *Implications: a change in management and policy*

There is a lack of evidenced based and scientifically assessed structured weight management programmes within the MoH. Several steps could increase the quality of what is currently available: a low hanging fruit would be that current intervention programmes should be collecting before, after and weight maintenance data as well as conducting process evaluations.

Analysing the key active ingredients of each and every single of the interventions currently available and of its logic models and theory base, as part of the research tasks within the research institute in the MoH, could contribute to a better understanding of the factors associated with the success of these programmes, or otherwise. Understanding the active ingredients currently available in these interventions as well as implicit behavioural theories would allow us to better align these with what empirical research, such as the ones presented in this thesis. Behaviour change techniques need to target identified mechanisms of behaviour change, and some of the results from this research can give some clear indications on this. One clear example can be the one associated with the cultural influences and the associated social pressures. It is important that people are equipped with key interpersonal strategies to secure social support and to affirm personal choices (e.g. assertiveness training). From this analysis it can emerge that a possible future intervention, developed based on evidence and theory and tailored to the needs of the population, would be much more effective and lead to better levels of weight loss maintenance if it could account for cultural factors. Besides, there is no "one size fits all" and work needs to be done also on boosting controlled motivation. A didactic approach to weight loss , which seems to be most of what the current available intervention programmes provide, does not necessary equate to success.

Existing weight loss intervention programmes run by the MoH such as the Jom Mama, My BFF or the 10-on-10 can benefit by implementing the tools used in this study. Although the existing programmes are at present targeted to women; it serves the purpose of the use of the BIS as women tended to overestimate their position on the BIS. Furthermore, since the pilot of the BIS presented the usability of the tool as most effective for individuals who are presently active on weight loss

attempts and maintenance, the BIS can be effective as a goal setting tool and assessment tool at multiple points of the intervention (at starting point and post intervention), more so effective than the BMI because of the image representations of weight change. This means that the flexibility of the BIS allows it to be used as a comparator tool of reference for the individuals should the want to assess changes over the period of the intervention received. The design of the BIS tool is simple and can be incorporated/designed into different settings – including mobile use similar to an online version of the BMI. Even a plain chart version can be used for as long as there is a trained healthcare provider understands how the BIS works. This enables the tool to be implemented in any medium. However, existing programmes in MoH does not cover the male population; so the current development of the physical activity intervention (based on the 10-on-10 initiative) by the Health Education Division could utilize the BIS as part of their efforts to increase physical activity uptake on the general population as a whole and tackle the male population.

The MoH could also look into changing some of its policies as an employer in order to encourage higher physical activity and providing environmental resources and infrastructures that could encourage healthier life choices in terms of diet and physical activity (e.g. provide easy access to gym, as well as making sure that food provided within the MoH is low in sugar and fat). At present, the Health Education Division and Nutrition Division are enforcing changes on monitoring food access and uptake at the workplace setting; and also implementations of physical activity at the workplace and pockets of general population. If this is successful, it could be upscaled to a nationwide setting. The BIS can be used both as a screening tool and monitoring tool for the interventions.

6.2 Strength of this Study

This study is the first of its kind in Malaysia; exploring in depth the experiences and factors that lead to weight management success or otherwise. A key tool was developed and translated to Malay: the e-survey. The only instrument that was already available in Malay was the iPAQ. The iPAQ itself was, however, refined as, in our pre-testing/pilot study, it was revealed that it was notoriously difficult to understand. The development of this comprehensive tool also provides an opportunity for future studies to use and re-test the diverse components on this study, allowing for further refinements (e.g. some of the sub-scales in the psychometrically shortened version of the IPQ-R revealed a low Cronbach alpha) to be done in order to make sure that all the items in each and every scale used are fully comprehensible and sensible to use in a Malay population. The

groundwork lay by the development and results from this study will enable future studies to attempt possible interventions or new areas to explore.

6.3 What this Study Lacked

The e-survey did not attempt to incorporate the Food Frequency Questionnaire (FFQ) to assess eating behaviours in detail and this can be considered as a key limitation given that overweight and obesity are related to eating behaviours. Well-validated instruments to assess food consumption are widely available (Srd et al., 2003) and there are some that have been adapted to Malay (A Karim et al., 2008), but often these instruments are rather lengthy with approximately one hundred items to answer. Considering that this study used an e-survey, and knowing that response rates to this type of survey are low (Fincham, 2008), a trade-off was made, as research is all about this, to prevent excessive burden to participants. The e-survey, without a FFQ, was already time consuming and to add the FFQ would add further burden to participants. Besides, key studies seem to reveal that available FFQ are not only labour intensive but also often cannot provide accurate and valid data (Adamson et al., 2009, Kristal et al., 2005).

The e-survey also asked participants to report weight and height, advising them to first get measured before engaging in filling out the e-survey. This procedure was agreed after analysing data emerging from the qualitative study where participants were asked to report their weight and height and were later measured for accuracy. It was clear that there were many discrepancies so it was decided in the development of the e-survey that the participants would be instructed to measure their height and weight prior to answering the e-survey using available services to staff at the MoH. However participants were not asked during this survey if they had actually got measured. During preliminary analysis of the data (cleaning stage) it has been noted that participants have included measurements of weight and height technically not plausible hence some data had to be excluded from analysis. This seems to indicate that, despite prompted to do so; some of those participating on this survey do not seem to have followed these suggestions. However, there was no confirmation method of whether the participants actually measured their weight and height before answering the e-survey.

The design of the BIS scale was originally designed for the European population. In fact, the BIS never took consideration of an Asian population. Although the fact that individuals who are actively pursuing weight loss are able to match their position on the BIS correctly; those who are

not actively managing their weight are not able to do so. This causes a mismatch – either underestimating or overestimating their position on the BIS. Because the BIS did not take the actual measurements of an Asian population, the affected individuals could have felt that the images may have misrepresented their actual body image. This study only attempted at the usability of the BIS itself. Future studies should take into consideration the actual imaging of an actual Asian population similarly conducted by the MapMe study in Newcastle University for children BIS imaging.

During data collection (qualitative study), at Site 8, a problem was noted with the portable weighing scale and the unavailability of a replacement. Although steps were taken to ensure all equipment were working some issues were unforeseen and lead to some missing data. Nevertheless this has just affected 6 participants.

Appendix A

Phase 1 Topic Guide For Face-To-Face Interview (in English)

Standard Profiling Questions Prior to Interview

Script: How are you? We'll start with a few basic questions. These questions will not compromise anonymity and no one will be able to identify you using them. We are asking these to ensure that you meet the inclusion criteria for this study. Is this ok with you? Is there something that you will want to ask? Shall we begin?

1. How old are you? _____ years old
2. Gender of participant (need not ask) Male/Female
3. What is your personal circumstance?
   Married/single/divorced/separated/with partner
4. Are you living with any children? Yes/No Yes:_____ (number)
5. If woman: Did you have pregnancies? If yes, how many pregnancies you had?
   Yes/No Yes:_____ (number)
6. If woman: Did you revert to weight before pregnancy? Yes/No
7. Do you know your current weight? Yes/No Yes: _____kg
8. Do you know your current height? Yes/No Yes:_____ metre
9. Are you of a professional/non-professional grade? Professional/Non-professional
10. What is your ethnicity? Malay/Bumiputra/Chinese/Indian/Other
11. Do you live in urban/rural area? Urban/Rural
12. Have you tried to lose weight in the past? Yes/No
13. When was your last weight lost attempt? _____ days/weeks/months/years
14. Did you know what your highest weight was? Yes/No Yes: _____kg
    BMI (if known):_____
15. How long did you maintain your last weight loss? _____ days/weeks/months/years

Questions for the Interview

Script: Now I am going to ask you some questions about your weight changes. Please refer back to the time before your last weight loss attempt and to your last weight loss efforts.

1. How long have you had your current weight?
   (Probe: days/weeks/month/years/ refer to specific/significant events e.g. birth of a child**)**
2. How long do you think your current weight will go on?
   (Probe: time**)**
3. Where do you think you were before in terms of your weight?
   (Compare using Body Visual Scale**)**
4. Where do you think you are now in terms of your current weight?
   (Compare using Body Visual Scale**)**
5. Do you think that your current weight is a problem to you?
   (Probe: personal, family, colleague, employer**)**
6. Are you concerned about your weight/body size?
   (Probe: reasons for Yes/No**)**
7. How much does your weight/body size affects your emotions?
   (Probe: anger, fear, depression, sad, reasons for these emotions**)**
8. Do you have any health symptoms/problems related to your current weight/body size?
   (Probe: types of symptoms/illnesses and potential remedies**)**
9. Have you ever sought any kind of help with your weight?
   (Probe: who helped, what method used, why did help was sought, where did the help obtained, what was the outcome**)**
10. Did the help sought worked for you?
    (Probe: attempts, times, success, failure**)**
11. What was your target when you attempted you last weight loss?
    (Use body visual scale to note the start of target and end of target**)**
12. Did you reach that target? **(Probe:** reasons for Yes/No**)** and did you keep the weight off? **(Yes/No)**
13. Did you get any support in resolving your weight issues?
    (Probe: support received - friends, family, health professionals; problems faced**)**
14. With the knowledge and experience you now have, what would you say were the most important support needs to fill?
    (Probe at: initial weight loss phase; then the maintenance phase**)**

15. So if someone close to you needed support how you would build up the best possible support mechanisms for them, using all possible resources?

(Probe: GP, slimming class, family support, support from friends, promise of new wardrobe, great holiday, etc…**)**.

16. Do you think that you have control of your current weight?

(Probe: reasons for yes/no**)**

17. Can you think of three main causes of your weight issues you've faced before?

(Probe: habits, culture**)**

18. Could you describe the top three reasons of the weight loss attempts failures that you have faced before?

19. Can you describe the top three reasons why your last weight loss attempt is considered successful?

20. In your own words, how would you describe obesity?

21. In general what do you think are the causes associated with obesity?

22. In general do you think people can control their weight/body size?

23. In your family, what is the importance attributed to food?

(Probe: what is the role of food in celebrations, what is the role of food in bringing the family together, what kind of food preparation practices are used in the family-fried, grilled, roast, more sweets, probe also for personal perspective**)**

Questions for Post-Interview

Script: Now I am going measure your actual weight and height and will ask you one last question.

Recorded weight: _____kg

Recorded height: _____metre

BMI: _____

24. Based your current weight, height and BMI, and comparing it to the scale I have shown you, you would be **underweight/normal weighted/overweight/obese**. Do you agree with me?

(**Probe**: reasons for agree or disagree**)**

Appendix B

Phase 1 Topic Guide For Face-To-Face Interview (in Malay)

Soalan Profil Sebelum Temuduga

Skrip: Apa khabar? Saya ingin mulakan dengan beberapa soalan asas dahulu. Soalan-soalan berikut tidak akan memberitahu kami siapa anda dalam kajian ini. Kami hanya ingin mempastikan bahawa anda adalah calon yang betul untuk temuduga ini mengikut kriteria yang telah kami tetapkan. Adakah anda ingin menanyakan sesuatu dahulu? Kalau tiada, boleh kita mulakan?

1. Berapakah umur anda? _____ tahun
2. Jantina peserta (tidak perlu tanya) Lelaki/Perempuan
3. Apakah status anda sekarang?
   Berkahwin/Bujang/Bercerai/Berpisah/bersama pasangan
4. Adakah anda tinggal bersama anak? Ya/Tidak Ya:_____(bilangan)
5. Wanita sahaja: Adakah anda pernah mengandung? Jika ya, berapa kalikah anda mengandung?
   Ya/Tidak Ya: _____(bilangan)
6. Wanita sahaja: Adakah anda kembali kepada berat sebelum mengandung? Ya/Tidak
7. Adakah anda tahu berat anda sekarang? Ya/Tidak Ya: _____kg
8. Adakah anda tahu tinggi anda sekarang? Ya/Tidak Ya:_____ meter
9. Adakah anda pekerja profesional/bukan-profesional? Profesional/Bukan-profesional
10. Apakah bangsa anda? Melayu/Bumiputra/Cina/India/Lain2
11. Adakah anda tinggal di kawasan Bandar/Luar Bandar? Bandar/Luar Bandar
12. Pernahkah anda cuba untuk menurunkan berat badan? Pernah/Tidak Pernah
13. Bilakah kali terakhir anda mencuba? _____
    hari/minggu/bulan/tahun
14. Adakah anda tahu berat paling tinggi anda? Ya/Tidak Ya: _____kg
    BMI (jika tahu): _____
15. Berapa lamakah anda kekalkan berat badan ketika menurunkannya kali terakhir?
    _____ hari/minggu/bulan/tahun

Soalan untuk Temudga

Skrip: Sekarang saya akan menanyakan soalan berkenaan dengan perubahan berat anda dahulu dan sekarang. Sila fikir balik pada kali terakhir sebelum anda menurunkan berat badan anda.

1. Sudah berapa lamakah anda mempunyai berat badan sekarang?
   (Tanya: hari/minggu/bulan/tahun/ rujuk kepada perisitiwa yang spesifik/paling diingati cth: kelahiran anak**)**
2. Pada pandangan anda, agaknya berapa lamakah berat badan anda akan kekal sebegini?
   (Tanya: masa**)**
3. Dari segi berat badan, di manakah anda merasakan diri anda sebelum ini?
   (Bandingkan menggunakan Body Visual Scale**)**
4. Dari segi berat badan, di manakah anda merasakan diri anda sekarang?
   (Bandingkan menggunakan Body Visual Scale**)**
5. Adakah anda merasakan berat anda sekarang menimbulkan masalah kepada diri anda?
   (Tanya: diri, keluarga, rakan sekerja, majikan**)**
6. Adakah anda risau tentang berat/bentuk badan anda sekarang?
   (Tanya: sebab mengatakan ya/tidak**)**
7. Setakat manakah berat/bentuk badan anda memberi kesan terhadap emosi anda?
   (Tanya: marah/takut/depresi/sedih sebab untuk emosi tersebut**)**
8. Adakah anda mempunyai simptom/masalah kesihatan yang berkaitan dengan berat/bentuk badan anda sekarang?
   (Tanya: jenis simptom/masalah kesihatan dan langkah mengatasinya**)**
9. Pernahkah and mencari jalan penyelesaian untuk berat badan anda?
   (Tanya: siapa yang membantu, kaedah yang digunakan, kenapa mencari jalan penyelesaian, di mana bantuan tersebut dicari, dan hasil daripada jalan penyelesaian tersebut**)**
10. Adakah bantuan yang diperolehi berjaya?
    (Tanya: berapa kali percubaan, berjaya, gagal**)**
11. Apakah sasaran anda semasa kali terakhir anda cuba menurunkan berat badan?
    (Gunakan Body Visual Scale untuk mengenalpasti sasaran pada permulaan dan akhir**)**
12. Adakah mencapai sasaran tersebut? **(Tanya**: sebab mengatakan ya/tidak**)** dan adakah anda berjaya mengekalkan berat badan tersebut? **(Ya/Tidak)**
13. Adakah anda memperoleh sokongan dalam menyelesaikan masalah berat badan anda?
    (Tanya: sokongan diterima – kawan-kawan, keluarga, pegawai kesihatan; masalah dihadapi**)**

14. Dengan pengetahuan yang ada sekarang, pada pendapat anda apakah jenis sokongan yang paling penting perlu ada?

(Tanya: pada permulaan proses penurunan berat badan; pada peringkat pengekalan berat badan**)**

15. Sekiranya ada seseorang yang rapat dengan anda memerlukan sokongan anda, apakah system sokongan terbaik yang boleh dibentuk menggunakan semua sumber yang ada?

(Tanya: GP, kelas penurunan berat badan, sokongan keluarga, sokongan rakan-rakan, janji pakaian baru, percutian, dsb…**)**

16. Adakah anda mempunyai kawalan terhadap berat badan anda sekarang?

(Tanya: sebab mengatakan ya/tidak**)**

17. Bolehkah anda memikirkan tiga punca utama masalah berat badan anda sebelum ini?

(Tanya: tingkahlaku, budaya**)**

18. Bolehkah anda terangkan tiga sebab utama kegagalan proses penurunan berat badan yang anda lalui sebelum ini?

19. Bolehkah anda terangkan tiga sebab utama kenapa percubaan terakhir anda dianggap berjaya?

20. Dengan ayat anda sendiri, bagaimanakah anda menerangkan obesiti?

21. Secara umumnya, apakah yang anda fikir penyebab kepada masalah obesiti?

22. Secara umum adakah anda merasakan orang boleh mengawal berat/bentuk badan mereka sendiri?

23. Dalam keluarga anda, apakah kepentingan yang dikaitkan dengan makanan?

(Tanya: apakah kepentingan makanan dalam perayaan, apakah fungsi makanan dalam menyatukan keluarga, apakah kaedah penyediaan makanan yang diamalkan oleh keluarga – goreng, grill, bakar, manis, tanya juga pilihan peserta**)**

Soalan Selepas Temuduga

Skrip: Sekarang saya akan menimbang berat badan anda dan mengukur tinggi anda. Selepas ini saya hanya ada satu soalan sahaja lagi untuk saya tanyakan kepada anda.

Berat yang ditimbang: _____kg

Tinggi yang diukur: _____meter

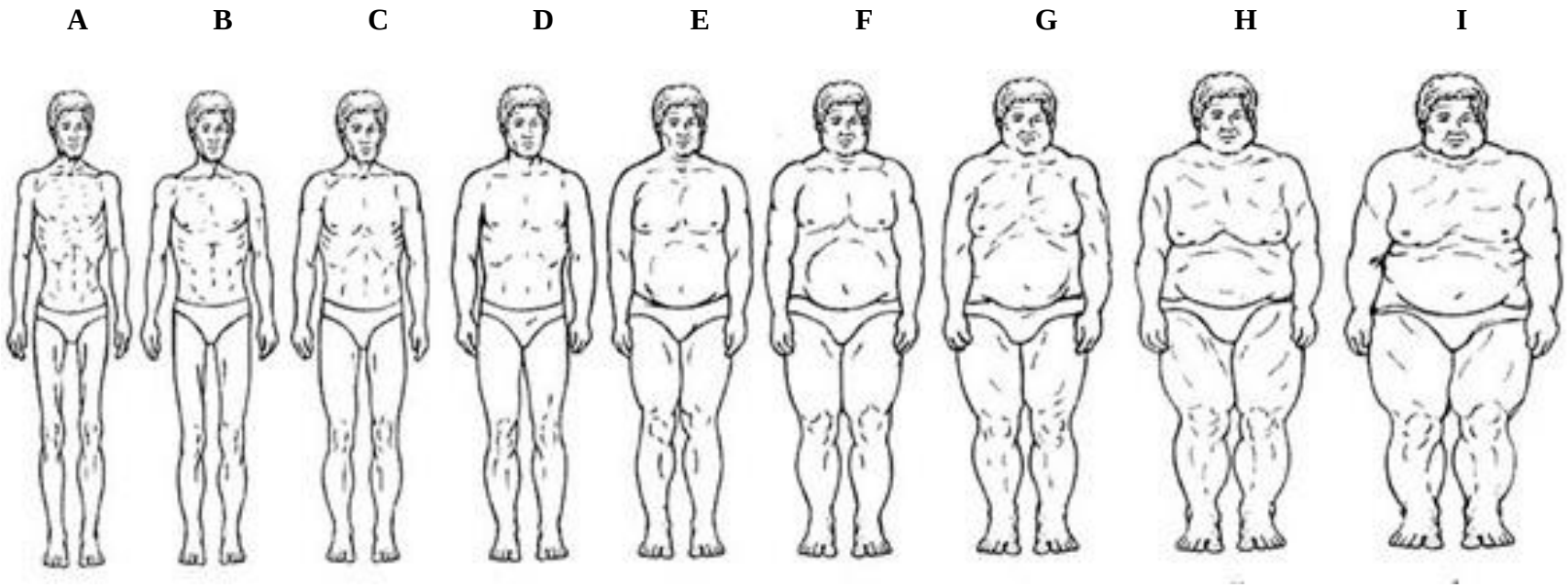
BMI: _____

24. Berdasarkan ukuran berat badan, tinggi dan BMI anda yang dibandingkan dengan skala yang telah saya tunjukkan tadi, anda sepatutnya berada dalam kumpulan **kurang berat badan/berat badan normal /berlebihan berat badan/obes**. Adakah anda bersetuju dengan saya?

(**Tanya**: sebab bersetuju atau tidak)

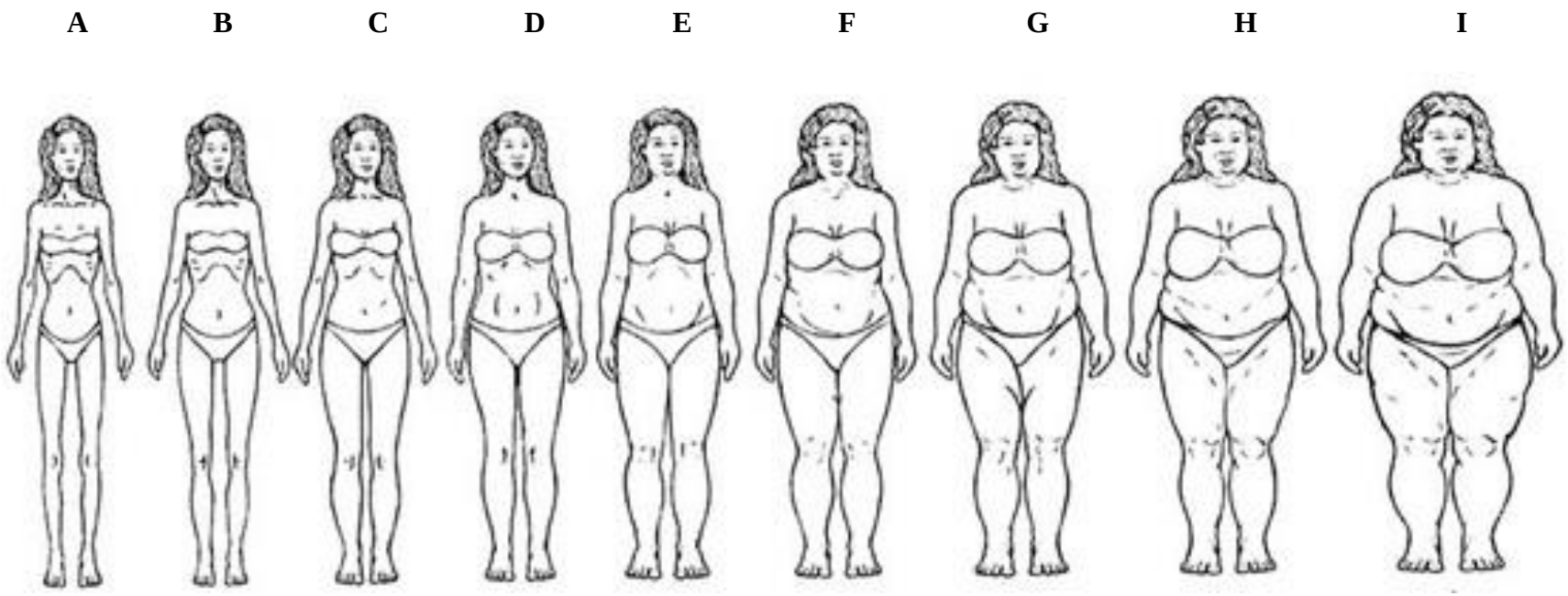
Appendix C

Phase 1 Reference Scale for Male Participants



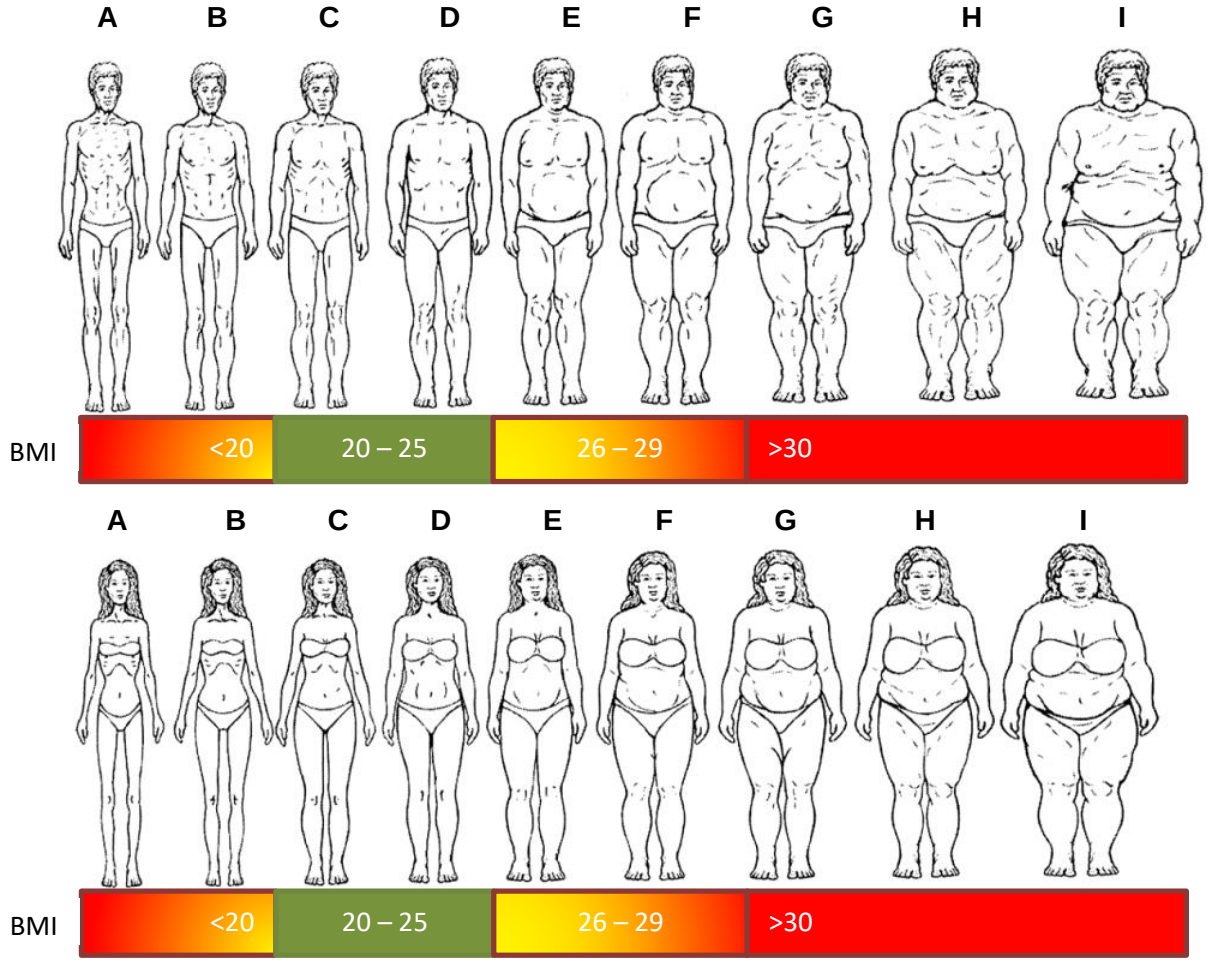
Appendix D

Phase 1 Reference Scale for Female Participants



Appendix E

Phase 1 Reference Scale for Interviewer



Appendix F

Phase 1 Participant Information Sheet and Consent Form (in English)

STUDY TITLE	:	PREDICTORS OF WEIGHT LOSS AND WEIGHT MAINTENANCE BEHAVIOUR AMONGST MALAYSIAN – PHASE 1: THE THEMATIC EXPLORATION OF WEIGHT MANAGEMENT EXPERIENCES THROUGH A QUALITATIVE STUDY			
RESEARCH ID	:	00879_1 2014	**NMRR ID**	:	14-196-19848
RESEARCH INSTITUTION	:	Newcastle University upon Tyne, United Kingdom	**SPONSORING INSTITUTION**	:	Ministry of Health Malaysia
RESEARCHER	:	Mohammad Zabri Johari			

PURPOSE OF RESEARCH

You have been invited to participate in this study to obtain information about your behaviour and lifestyle; in particular to weight loss attempts and maintenance; and its related issues. Your participation in this study will be purely voluntary and there is no obligation to take part. Your participation in this phase of the study will be a one-off event.

ETHICAL APPROVAL

This study has been approved by the Newcastle University Research Ethics Committee and the Medical Research and Ethics Committee, Ministry of Health Malaysia.

WHAT ARE THE PROCEDURES INVOLVED?

We will invite you to a one-on-one interview session that will be set via appointment with the researcher. This session will be conducted in a private, comfortable setting where you will have a chat with the researcher for about 1 hour of your time. This face to face chat session will focus only on the issues of behaviour and lifestyle; in particular to weight loss attempts and maintenance; and its related issues. No sensitive questions will be asked. This will be a one-time participation. There will be no repetition.

You will not be provided any form of reward (financial or otherwise) nor will you be provided with any form of reimbursement.

WHAT ARE THE RISKS INVOLVED?

No unforeseeable risk is anticipated as during the interview session as no invasive procedures will be conducted and answering the questions will not cause any known physical or mental harm. The questions merely ask your opinion on the stated issues. Your identity as a participant will be kept hidden and a coded name will be used to protect you identity unless you authorize us to use your real name. All information accumulated for this study will be kept anonymous and for research purposes only.

WHAT ARE THE BENEFITS IN JOINING THE STUDY?

You may or may not receive any benefit by joining this study. Results from this study however, may benefit others in the future.

WITHDRAWAL FROM STUDY

Your decision to participate in this study is voluntary. You may choose to not participate or you may withdraw from the study for any reason without prejudice or loss of benefits to which you are otherwise entitled during the course of this study. All data collected up to the point of your withdrawal will still be used for the purpose of analysis. However, your identity will remain hidden for the entire duration of the study. Please refer to Data Usage and Confidentiality Section.

WHO IS ORGANISING AND FUNDING THE RESEARCH

This research is based in Newcastle University. It is being funded by the Ministry of Health Malaysia under the Federal Training Scholarship Award.

DATA USAGE AND CONFIDENTIALITY

Your study-related records will be treated as private as possible. For this phase of the study, a coded name will be used instead of your name on the study documents to safeguard your identity; unless you authorize the use of your name for the study. All study records will be kept safe by the researcher within a storage area that is accessible only to the researcher. The digital data secured on a pen-drive will only be accessible by the researcher and the Supervisory Team at Newcastle University for the purpose of analysis. All data and records will be kept up to 7 years after the study and is non-transferable to any third party. Study records after the stated time period will be

destroyed except for publication materials. If the study results are published in medical or scientific journals, you will not be identified by your name.

EMERGENCY CONTACT/IRB CONTACT

During the course of the study, if you have any questions or concerns about the study, please contact the researcher using the contact information below:

RESEARCHER	:	Mohammad Zabri Johari			
CONTACT DETAILS	:	Institute of Health and Society Newcastle University The Baddiley-Clark Building Richardson Road Newcastle upon Tyne NE2 4AX United Kingdom Contact number: +447538915357 e-mail: m.z.johari@newcastle.ac.uk		Institute for Health Behavioural Research Ministry of Health Malaysia Jalan Rumah Sakit Bangsar 59000 Kuala Lumpur Malaysia Office contact number: +60320821400 Mobile number: +60122229341 e-mail: mzabrijohari@gmail.com	
SUPERVISORY TEAM	:	Dr. Vera Lucia Araujo-Soares	Dr. Falko Frank Sniehotta	Dr. Richard McNally	Dr. Emma Foster

If you have any questions about your rights as a research subject, or concerns or complaints regarding this research study, contact:

The Medical Research & Ethics Committee (MREC)

Ministry of Health Malaysia,

Institute of Health Management

Jalan Rumah Sakit, Bangsar

59000 Kuala Lumpur

Contact Number: +60322874032

INFORMED CONSENT FORM

I, the undersigned, confirm that (please tick box as appropriate):

1.	I have read and understood the information about the study, as provided in the Information Sheet dated _____.	☐
2.	I have been given the opportunity to ask questions about the study and my participation.	☐
3.	I voluntarily agree to be join this study.	☐
4.	I understand I can withdraw at any time without giving reasons and that I will not be penalised for withdrawing nor will I be questioned on why I have withdrawn.	☐
5.	The procedures regarding confidentiality have been clearly explained (e.g. use of names, coded names, anonymisation of data, etc.) to me.	☐
6.	I agree that my interview is recorded with the use of an audio recording device.	☐
7.	The use of the data in research, publications, sharing and archiving has been explained to me.	☐
8.	I understand that other researchers will have access to this data only if they agree to preserve the confidentiality of the data and if they agree to the terms I have specified in this form.	☐
9.	Select only **one** of the following: • I would like my name to be used and understand what I have said or written as part of this study will be used in reports, publications and other research outputs so that anything I have contributed to this project can be recognised. • I do not want my name used in this study.	☐ ☐
10.	I, along with the Researcher, agree to sign and date this informed consent form.	☐

Participant:

_____	_____	_____	_____
Name	Signature	IC Number	Date

Researcher:

_____	_____	_____	_____
Name	Signature	IC Number	Date

Appendix G

Phase 1 Participant Information Sheet and Consent Form (in Malay)

NAMA KAJIAN	:	PENENTU TINGKAHLAKU PENURUNAN DAN PENGEKALANAN BERAT BADAN DALAM KALANGAN ORANG MALAYSIA – FASA 1: EKSPLORASI TEMA PENGALAMAN DALAM PENJAGAAN BERAT BADAN MELALUI KACAMATA KAJIAN		
NO. KAJIAN	:	00879_1 2014	**NMRR ID**	: 14-196-19848
INSTITUSI KAJIAN	:	Newcastle University, Newcastle upon Tyne, United Kingdom	**INSTITUSI PENAJA**	: Kementerian Kesihatan Malaysia
PENGKAJI	:	Mohammad Zabri Johari		

TUJUAN KAJIAN

Anda telah dijemput menyertai kajian ini untuk mendapatkan maklumat berkenaan dengan tingkahlaku dan gaya hidup anda; secara khususnya cubaan untuk menurunkan dan mengekalkan berat badan, serta isu-isu yang berkaitan. Penyertaan anda dalam kajian ini adalah secara sukarela dan anda tidak perlu menyertainya sekiranya and tidak mahu. Penyertaan anda dalam fasa kajian ini adalah untuk sekali sahaja.

KELULUSAN ETIKA

Kajian ini telah diluluskan oleh Jawatankuasa Etika Penyelidikan Universiti Newcastle dan Jawatankuasa Etika dan Penyelidikan Perubatan, Kementerian Kesihatan Malaysia.

APAKAH PROSEDUR YANG TERLIBAT?

Kami akan menjemput anda untuk menyertai sesi temuramah individu secara bersemuka yang jadualnya akan ditentukan mengikut temujanji bersama pengkaji. Sesi temuduga ini hanya akan mengambil masa lebih kurang 1 jam dari masa anda dan akan dilakukan dalam ruang yang selesa dan asing demi menjaga privasi anda. Temuduga ini hanya akan berfokus kepada tingkahlaku dan gaya hidup anda; secara khususnya cubaan untuk menurunkan dan mengekalkan berat badan, serta isu-isu yang berkaitan. Tiada soalan sensitif yang akan ditanyakan. Penyertaan anda adalah untuk sekali sahaja dan tiada temudga ulangan akan dilakukan.

Anda tidak akan diberikan apa-apa ganjaran (kewangan atau lain-lain) ataupun diberikan apa-apa bentuk gantian untuk menyertai kajian ini.

APAKAH RISIKO MENYERTAI KAJIAN INI?

Tiada risiko yang dapat dikenalpasti kerana sesi temuduga ini tidak melibatkan prosedur invasif proses menjawab soalan tidak akan menyebabkan kecederaan fizikal atau mental. Soalan yang ditanyakan adalah untuk mendapatkan maklumbalas dan pendapat anda dengan isu yang berkaitan. Identiti anda akan dilindungi dan nama pena akan digunakan untuk menggantikan nama sebenar kecuali anda membenarkan kami menggunakannya. Semua maklumat yang dikumpulkan untuk kajian ini akan dirahsiakan dan untuk kajian ini sahaja.

APAKAH FAEDAH MENYERTAI KAJIAN INI?

Anda mungkin tidak akan menerima apa-apa faedah dari menyertai kajian ini. Namum begitu, hasil dari kajian ini mungkin akan memberi faedah kepada orang lain di masa hadapan.

PENARIKAN DIRI DARI MENYERTAI KAJIAN

Keputusan anda untuk menyertai kajian ini adalah sukarela. Anda boleh untuk tidak menyertai kajian ini atau menarik diri tanpa prejudis atau kehilangan apa-apa faedah yang anda layak semasa menyertai sepanjang kajian ini. Semua data yang dikumpulkan sehingga anda menarik diri tetap akan digunakan untuk tujuan analisa. Identiti anda akan tetap dilindungi sepanjang kajian ini. Sila rujuk kepada seksyen Penggunaan dan Kerahsiaan Data.

SIAPA YANG MENGANJUR DAN MEMBIAYAI KAJIAN INI

Kajian ini dianjurkan oleh Newcastle University dan dibiayai oleh Kementerian Kesihatan Malaysia melalui skim Hadiah Latihan Persekutuan kepada pengkaji.

PENGUNAAN DAN KERAHSIAAN DATA

Rekod berkenaan kajian ini akan dirahsiakan sebaik mungkin. Untuk fasa kajian ini, nama pena akan digunakan menggantikan nama sebenar anda pada semua dokumen dalam kajian ini; kecuali anda membenarkan kami menggunakannya. Semua rekod kajian akan dijaga dan hanya boleh diakses oleh pengkaji dalam tempat simpanan khas. Data digital akan disimpan dalam pen-drive yang hanya boleh diakses oleh pengkaji dan Pasukan Penyelia di Universiti Newcastle untuk tujuan analisa. Semua data akan disimpan sehingga 7 tahun selepas kajian tamat dan tidak boleh dipindah milik kepada mana-mana pihak ketiga. Rekod kajian selepas tempoh yang dinyatakan akan dimusnahkan kecuali bahan-bahan penerbitan. Sekiranya hasil kajian diterbitkan dalam mana-mana jurnal saintifik atau perubatan, identity anda tetap akan dirahsiakan.

MAKLUMAT UNTUK DIHUBUNGI/MAKLUMAT IRB

Sekiranya anda mempunyai apa-apa soalan atau kerisauan sepanjang kajian ini, sila hubungi pengkaji melalui maklumat di bawah:

PENGKAJI	:	Mohammad Zabri Johari			
MAKLUMAT UNTUK DIHUBUNGI	:	Institute of Health and Society Newcastle University The Baddiley-Clark Building Richardson Road Newcastle upon Tyne NE2 4AX United Kingdom No. Telefon: +447538915357 e-mail: m.z.johari@newcastle.ac.uk		Institut Penyelidikan Tingkahlaku Kesihatan Kementerian Kesihatan Malaysia Jalan Rumah Sakit Bangsar 59000 Kuala Lumpur Malaysia No. Telefon Pejabat: +60320821400 No. Telefon Peribadi: +60122229341 e-mail: mzabrijohari@gmail.com	
PASUKAN PENYELIA	:	Dr. Vera Lucia Araujo-Soares	Dr. Falko Frank Sniehotta	Dr. Richard McNally	Dr. Emma Foster

Sekiranya anda mempunyai apa-apa persoalan berkenaan dengan hak anda sebagai subjek dalam kajian atau sebarang kerisauan atau ingin membuat aduan berkenaan dengan kajian ini, sila hubungi:

Jawatankuasa Etika dan Penyelidikan Perubatan (JEPP)

Kementerian Kesihatan Malaysia

Institut Pengurusan Kesihatan

Jalan Rumah Sakit, Bangsar

59000 Kuala Lumpur

No. Telefon: +60322874032

BORANG PERSETUJUAN

Saya, seperti nama di bawah, dengan ini mengesahkan bahawa (sila tanda kotak yang bersesuaian dengan pilihan anda):

1.	Saya telah membaca dan memahami maklumat berkenaan dengan kajian ini, sepertimana yang diterangkan dalam Helaian Maklumat bertarikh _____.	☐
2.	Saya telah diberikan peluang untuk menanyakan apa-apa persoalan berkaitan dengan kajian ini termasuk penyertaan saya.	☐
3.	Saya bersetuju untuk menyertai kajian ini secara sukarela.	☐
4.	Saya faham yang saya boleh menarik diri dari kajian ini pada bila-bila masa tanpa perlu memberikan alasan dan saya tidak akan dikenakan apa-apa penalti semasa menarik diri atau dipersoalkan sebab saya menarik diri.	☐
5.	Prosedur berkenaan dengan kerahsiaan kajian telah diterangkan dengan jelas. (cth. penggunaan nama, nama pena, kerahsiaan data, dsb.) kepada saya.	☐
6.	Saya bersetuju untuk temuduga saya direkod menggunakan alat perakam audio.	☐
7.	Saya telah diterangkan berkenaan dengan penggunaan data dalam kajian dan penerbitan, perkongsian dan penyimpanan maklumat berkenaan dengan kajian..	☐
8.	Saya bersetuju yang pengkaji lain akan mempunyai akses kepada data dalam kajian ini dengan syarat mereka bersetuju dengan syarat-syarat kerahsiaan dalam borang ini.	☐
9.	Sila pilih **hanya satu** daripada yang di bawah: • Saya membenarkan penggunaan nama sebenar saya dan saya faham apa yang saya sebutkan atau ditulis untuk kajian ini akan digunakan dalam laporan, penerbitan dan bentuk output lain kajian supaya apa yang saya sumbangkan boleh diiktiraf. • Saya tidak mahu nama saya digunakan dalam kajian ini.	☐ ☐
10.	Saya bersama Pengkaji bersetuju untuk menandatangani borang persetujuan ini.	☐

Peserta:

_____	_____	_____	_____
Nama	Tandatangan	Nombor IC	Tarikh

Pengkaji:

_____	_____	_____	_____
Nama	Tandatangan	Nombor IC	Tarikh

Appendix H

Phase 1 Form For List Of Potential Participants

Please bear in mind of the inclusion criteria are:

- Normal weighted or currently overweight or obese.
- Have attempted weight loss activities before.

No.	Name	Age	Gender	Race	Grade of Employment	Locality
		(Yrs)	Male (M)/ Female (F)	Malay or Bumiputra (MB)/ Chinese (C)/Indian (I)	Professional (P)/ Non-Professional (NP)	(Rural/Urban)
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						

Name of State: _____
Contact number: _____ e-mail: _____
Reporting Officer:

_____	_____	_____	_____
Name	Designation	Signature	Date

Appendix I

Phase 1 Letter Of Invitation To Join The Study

Institute for Health Behavioural Research
Ministry of Health Malaysia
Jalan Rumah Sakit Bangsar
59000 Kuala Lumpur Tel: 03-20821400

Addressee
Address Line 1
Address Line 2
Address Line 3
Postcode
State Date:

Dear Sir/Madam/Miss,

RE: INVITATION TO JOIN A FACE-TO-FACE INTERVIEW FOR A QUALITATIVE STUDY

In reference to the matter above, you have been identified by your local healthcare professional as a potential participant for the said study. Your eligibility to join this study is based on the following criteria:

a. An individual who has attempted to lose weight before.
b. An individual who is either:
    i. Normal weighted, or
    ii. Overweight, or
    iii. Obese

2. The participation we are asking of you will be purely a one off interview for roughly one hour of your time. The location of the interview will be a quiet and private room at your current workplace set up by your healthcare professional and your head of institution to avoid the necessity of you leaving your place of work and reduce additional risk of harm or injury.

3. Attached along with this letter is an information sheet and consent form for you to read carefully and sign if you agree to join the study. You may choose to sign the consent form at any time but must be before the start of the interview. Please bear in mind that you agree there is still a possibility that you may not be invited to join the study. If you agree to participate, please e-mail your response with the following details the e-mail address stated and the researcher will contact you to set an appointment for an appropriate time and date for the interview:

Your name:

Your contact number:

Your e-mail address:

Your place of work:

State you are living in:

Email response to:

Mohammad Zabri Johari at m.z.johari@newcastle.ac.uk or mzabrijohari@gmail.com

Thank you for your consideration and we hope to see you in the interview session later.

Best wishes,

MOHAMMAD ZABRI JOHARI

SENIOR ASSITANT DIRECTOR

INSTITUTE FOR HEALTH BEHAVIOURAL RESEARCH

MINISTRY OF HEALTH MALAYSIA

Appendix J

Phase 2 Quantitative Questionnaire (English)

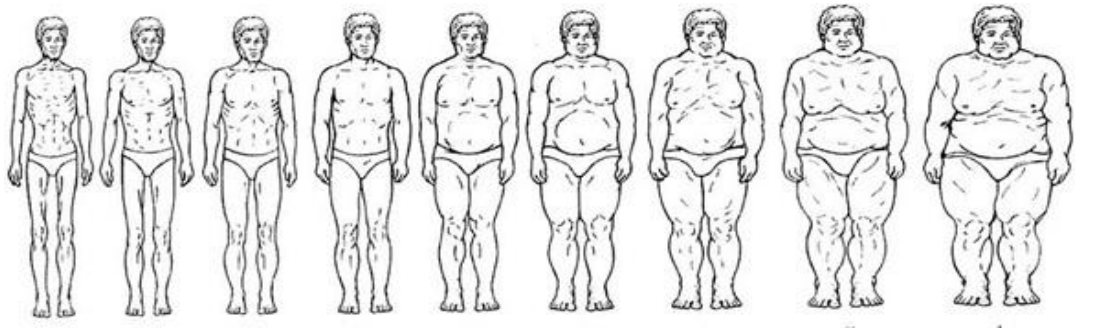
PART 1: YOUR PHYSICAL SELF

1. How tall are you?
   _____ cm

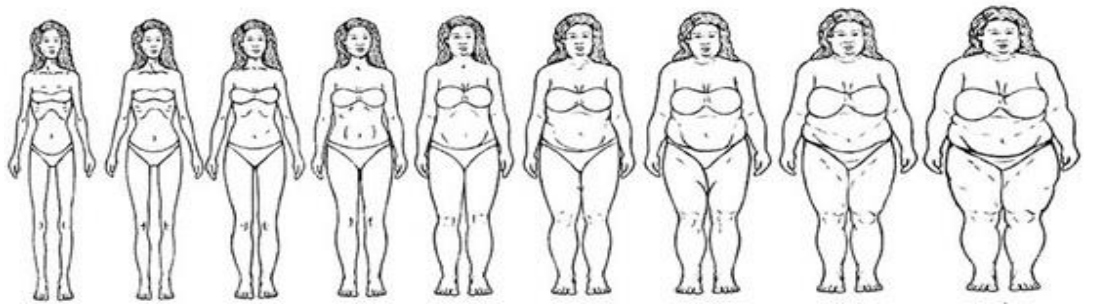
2. How much do you weigh now?
   _____ kg

3. Do you know how much is your ideal weight?
   ____Yes, if yes how much is it? _____ kg
   ____No

4. Imagine yourself in the scale below. Where do you believe you are now on the scale? (*circle one answer that best applies to you*)



A B C D E F G H I



A B C D E F G H I

5. What was the heaviest you weighed in relation to your current height? Provide your best guesstimate. (For women, *exclude weight DURING pregnancies).*
   ____kg
   ____Do not know

6. What was the least weight you weighed in relation to your current height? Provide your best guestimate. (*Please exclude weight loss caused by illness*).
   ____kg
   ____Do not know

Questions 6 & 7 are based on the algorithm difference of questions 2 and 5, questions 2 and 6. If there is a weight incremental difference of 2.3kg, participants will answer question 7. If there is a weight reduction difference of 2.3kg, participants will answer question 8. If either values falls within, then participant will skip questions 7 & 8 and continue to question 9.

7. The reason I have gained weight is:
   ___ I have gained it on purpose
   ___ I have gained it without even trying to
   ___ I have not realized that I have gained weight

8. The reason I have lost weight is:
   ___ I have lost it on purpose
   ___ I have lost it without even trying to
   ___ I am unsure why my weight has gone down

9. Do you know for how long you have been at or close (within 1kg) to your present weight?
   ___ Yes, if yes please indicate the time: _____ months
   ___ No

10. Which of the statements best describes what has happened to your weight in the past 12 months? *Please tick **ONLY ONE ANSWER** that applies best to you:*
   ___ My weight stayed about the same
   ___ My weight has increased
   ___ My weight has reduced
   ___ My weight has fluctuated a lot

PART 2: YOUR CURRENT PHYSICAL ACTIVITY PRACTICES

The following questions are about the time you have spent being physically active in the last 7 days. Please answer the following questions even if you do not consider yourself to be an active person.

Note: **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal.
Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

11. During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling? On average, how much time did you spend on these activities?

    _____ days per week or None
    ____ hours _____ minutes

12. Again, think *only* about those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do moderate physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking. On average, how much time did you spend on these activities?

    _____ days per week or None
    ____ hours _____ minutes

13. During the last 7 days, on how many days did you walk for at least 10 minutes at a time? This includes walking at work and at home, walking to travel from place to place, and any other walking that you did solely for recreation, sport, exercise or leisure. On average, how much time did you spend on walking?

    _____ days per week or None
    ____ hours _____ minutes

This last question is about the time you spent sitting on weekdays while at work, at home, while doing course work and during leisure time. This includes time spent sitting at a desk, visiting friends, reading traveling on a bus or sitting or lying down to watch television.

14. During the last 7 days, how much time in total did you usually spend *sitting* on a week day?

    ____ hours _____ minutes

PART 3: WEIGHT LOSS ATTEMPTS

Please answer these following questions thinking specifically about ANY weight loss attempts in the past 12 months.

15. Have you ever attempted any weight loss activities?
    ___ Yes
    ___ No

    Participants will proceed to question 16 if they answered "yes" for question 15 or skip to question 30 if they answered "no" for question 15.

16. Are you, at present, on any kind of weight loss activity? (*Weight loss activities include physical activity, exercise, and any kind of diet that is done within the guideline of that particular diet for at least one week. The diet may include prescribed diet program or changes in eating habits and lifestyle such as selecting what you eat or changes in eating patterns.)*
    ___ Yes,
    ___ No

    Participants will proceed to question 17 if they answered "yes" for question 16 or skip to question 19 if they answered "no" for question 16.

17. Why are you on a weight loss activity?
    ___ to lose weight
    ___ to avoid gaining weight

18. How long have you been on your current weight loss activity?
    ___ week(s)

    Participants who answered question 17 & 18 will continue to question 21.

19. If you are not currently on a weight loss activity, have you been on one to lose weight in the last 12 months?
    ___ Yes
    ___ No

20. What prevents you from starting or restarting your weight loss activity again? (*You may tick **MORE THAN ONE** answer*)
    ___ I have no time
    ___ I have no motivation
    ___ The weight loss activity is too complicated to do
    ___ I can't continue if my family is doing the exact opposite of my weight loss activity
    ___ The weight loss activity is expensive
    ___ I need help to do weight loss activity again
    ___ I don't need to do the weight loss activity anymore

Participants who answered question 19 & 20 will proceed to question 29.

21. Please estimate as best as you can the number of times in the last 12 months you have conducted your weight loss activity and purposely lost the amount of weight listed.
How many times in the last 12 months have you done weight loss activities and lost:

Less than 1.0kg	____ times
1.0kg – 4.9kg	____ times
5.0kg – 9.9kg	____ times
10.0kg or more	____ times

22. Thinking about your weight loss attempts in the last 12 months, how long does it usually take you to lose weight? *Please enter the **AVERAGE AMOUNT OF TIME** in weeks*:
___ weeks

23. Thinking about your weight loss attempt(s) in the last 12 months, please indicate the month(s) in which you attempted to lose weight. *(You may tick **MORE THAN ONE answer**)*:

___ January	___April	___ July	___ October
___ February	___May	___August	___ November
___ March	___ June	___September	___December

24. Thinking about your weight loss attempt(s) in the last 12 months, was there a known trigger for the weight loss?
___Yes
___No

Participants will proceed to question 25 if they answered "yes" for question 24 or skip to question 26 if they answered "no" to questions 24.

25. Please select **ONE OPTION** from the following list that best describes the trigger for your weight loss attempt(s) in the last 12 months:
___I have been advised by a health professional to lose weight
___I had health complications
___Comments about my weight from friends and/or family
___I saw a picture of myself and was unhappy about the way I looked
___I reached a lifetime high weight
___I can no longer fit into my clothes
___I was offered an incentive
___I was inspired to lose weight by someone
___I wanted to lose weight for a particular event
___ I wanted to increase my fitness level
___Other: please describe: _____

26. How successful are you in watching your weight? Please circle a number:
Not successful 1 2 3 4 5 6 7 Very successful

27. How successful are you in losing extra weight?
Not successful 1 2 3 4 5 6 7 Very successful

28. How confident are you in your ability to lose weight?
    Not confident 1 2 3 4 5 6 7 Very confident

29. How confident are you in your ability to maintain weight loss?
    Not confident 1 2 3 4 5 6 7 Very confident

30. This question describes two situations relating to weight loss and weight loss maintenance. Please consider both situations, and **select which one you think best applies** to your own weight loss approach.

    Scenario 1:
    ___ I would prefer to lose a larger amount of weight but not be successful at maintaining this weight loss
    Scenario 2:
    ___ I would prefer to lose a smaller amount of weight and be successful at maintaining this weight loss

31. How satisfied are you with your current weight?
    Not satisfied 1 2 3 4 5 6 7 Very satisfied

32. How satisfied are you with your current body shape?
    Not satisfied 1 2 3 4 5 6 7 Very satisfied

33. Which part of your body are you least satisfied with? _____

PART 4: WEIGHT LOSS STRATEGY
Participants who answered "no" for question 15 will skip questions 34 to 38.

These questions relate to the resources you have used to lose weight in the last 12 months.

34. What did you do to lose weight? *(You may tick **MORE THAN ONE** answer)*:
    ___ Ate less food
    ___ Switched to lower calorie foods
    ___ Ate "diet" food or products
    ___ Joined a weight loss program
    ___ Followed a special diet (e.g. Atkins Diet)
    ___ Took diet pills prescribed by my doctor
    ___ Bariatric surgery (e.g. gastric band, sleeve)
    ___ Took other pills/supplements without prescription
    ___ Drank lots of water
    ___ Ate more fruit, vegetables
    ___ Changed eating habits (e.g. avoid late night eating, smaller portions)
    ___ Ate less just food (including fast foods)
    ___ Exercise; do physical activity
    ___ Taking traditional & complimentary medicine
    ___ Others; please specify: _____

35. In the past 12 months, have you sought help from any of the following to lose weight? *(You may tick **MORE THAN ONE** answer)*
    ___ Personal trainer
    ___ Dietitian
    ___ Nutritionist
    ___ Medical Doctor/Consultant
    ___ Others; please specify:_____
    ___ No, I did it on my own

36. During the past 12 months have you done anything to keep from gaining weight?
    ___ Yes
    ___ No

    Participants will proceed to question 37 if they answered "yes" for question 36 or skip to question 39 if they answered "no" to questions 36.

37. What did you do to keep from gaining weight? *(You may tick **MORE THAN ONE** answer)*:
    ___ Ate less food
    ___ Switched to lower calorie foods
    ___ Ate "diet" food or products
    ___ Joined a weight loss program
    ___ Followed a special diet (e.g. Atkins Diet)
    ___ Took diet pills prescribed by my doctor
    ___ Bariatric surgery (e.g. gastric band, sleeve)
    ___ Took other pills/supplements without prescription
    ___ Drank lots of water
    ___ Ate more fruit, vegetables
    ___ Changed eating habits (e.g. avoid late night eating, smaller portions)
    ___ Ate less just food (including fast foods)
    ___ Exercise; do physical activity
    ___ Taking traditional & complimentary medicine/remedies
    ___ Others; please specify: _____

38. People who want to achieve long-term weight control need to spend at least 30 minutes a day, for a minimum of 6 months, trying to change their eating, exercise and thinking habits. Please tick **one statement below that most applies to you**:
    ___ I definitely will not be able to devote 30 mins daily to weight control
    ___ I'm not sure if I can find 30 mins daily for weight control
    ___ I can definitely find 30 mins daily for weight control
    ___ I can devote more than 30 mins daily to weight control

39. How often do you weigh yourself?
    ___ Never
    ___ Everyday
    ___ Once a week
    ___ Once every 2 weeks

___ Others: please specify: _____

40. Where do you usually weigh yourself?
___ At home
___ At work
___ At a local clinic/staff clinic
___ Others: please specify: _____

41. Do you own a weighing scale at home?
___ Yes
___ No

PART 5: DIET SELF-EFFICACY

Please imagine yourself in each of the following situations and rate how confident you are that you could overcome them, using the 5-point scale below. Circle the best answer that indicates how confident you feel that you could overcome the situation.

42. You are having dinner with your family and your favourite meal has been prepared. You finish the first helping and someone says, "Why don't you have some more?" How confident are you that you would turn down a second helping?
Not at all confident 1 2 3 4 5 Very confident

43. You often overeat at supper because you are tired and hungry when you get home. How confident are you that you would not overeat at supper?
Not at all confident 1 2 3 4 5 Very confident

44. There is a party at work for a co-worker and someone offers you a piece of cake. How confident are you that you would turn it down?
Not at all confident 1 2 3 4 5 Very confident

45. You just had an upsetting argument with a family member. You are standing in front of the refrigerator and you feel like eating everything in sight. How confident are you that you would find some other way to make yourself feel better?
Not at all confident 1 2 3 4 5 Very confident

46. You are invited to someone's house for dinner and your host is an excellent cook. You often overeat because the food tastes so good. How confident are you that you would not overeat as a dinner guest?
Not at all confident 1 2 3 4 5 Very confident

47. You finished your meal and you still feel hungry. There are cakes and fruits available. How confident are you that you would choose the fruits?
Not at all confident 1 2 3 4 5 Very confident

48. You are at a friend's house and your friend offers you a delicious looking pastry. How confident are you that you would refuse this offer?

Not at all confident 1 2 3 4 5 Very confident

49. You are having a hard day at work and you are anxious and upset. You feel like getting a candy bar. How confident are you that you would find a more constructive way to calm down and cope with your feelings?
Not at all confident 1 2 3 4 5 Very confident

50. You feel like celebrating. You are going out with friends to a good restaurant. How confident are you that you would celebrate without overeating?
Not at all confident 1 2 3 4 5 Very confident

51. You are out with a friend at lunchtime and your friend suggests that you stop and get some ice cream. How confident are you that you would resist the temptation?
Not at all confident 1 2 3 4 5 Very confident

52. You just had an argument with your boyfriend or girlfriend. You are upset, angry, and you feel like eating something. How confident are you that you would talk the situation over with someone or go for a walk instead of eating?
Not at all confident 1 2 3 4 5 Very confident

PART 6: HOW MUCH DO YOU KNOW ABOUT YOU & YOUR CONDITION/(BRIEF ILLNESS PERCEPTION QUESTIONNAIRE – REVISED & PSYCHOMETRICALLY SHORTENED)

Listed below are a number of symptoms that you may or may not have experienced since you gained weight. Please indicate by ticking *Yes* or *No*, whether you have experienced any of these symptoms and whether you believe that these symptoms are specifically related to your weight.

No.	**Symptoms**	I have experienced this symptom *since I gained weight*			This symptom is specifically *related to my weight*	
		Yes	No		Yes	No
53.	Pain	❑	❑		❑	❑
54.	Sore Throat	❑	❑		❑	❑
55.	Nausea	❑	❑		❑	❑
56.	Breathlessness	❑	❑		❑	❑
57.	Fatigue	❑	❑		❑	❑
58.	Stiff Joints	❑	❑		❑	❑
59.	Sore Eyes	❑	❑		❑	❑
60.	Wheeziness	❑	❑		❑	❑

No.	**Symptoms**	I have experienced this symptom *since I gained weight*			This symptom is specifically *related to my weight*	
61.	Headaches	❑	❑		❑	❑
62.	Upset Stomach	❑	❑		❑	❑
63.	Sleep Difficulties	❑	❑		❑	❑
64.	Dizziness	❑	❑		❑	❑
65.	Loss of Strength	❑	❑		❑	❑
66.	Weight change	❑	❑		❑	❑

For the following questions, please circle the number that best corresponds to your views to your weight and the symptoms above.

67. I do not understand my weight
    Strongly Disagree 1 2 3 4 5 Strongly Agree

68. My weight will remain the same for a long time
    Strongly Disagree 1 2 3 4 5 Strongly Agree

69. I get depressed thinking about my weight
    Strongly Disagree 1 2 3 4 5 Strongly Agree

70. My weight has major consequences on my life
    Strongly Disagree 1 2 3 4 5 Strongly Agree

71. The weight loss attempt I'm doing now will be effective in reducing my weight
    Strongly Disagree 1 2 3 4 5 Strongly Agree

72. Having this weight makes me feel anxious
    Strongly Disagree 1 2 3 4 5 Strongly Agree

73. Nothing I do will affect my weight
    Strongly Disagree 1 2 3 4 5 Strongly Agree

74. My weight doesn't make sense to me
    Strongly Disagree 1 2 3 4 5 Strongly Agree

75. The negative effects of my weight can be prevented by the weight loss attempt I'm doing now
    Strongly Disagree 1 2 3 4 5 Strongly Agree

76. My weight in unpredictable
    Strongly Disagree 1 2 3 4 5 Strongly Agree

77. My weight is a mystery to me
Strongly Disagree 1 2 3 4 5 Strongly Agree

78. My weight will be permanently the same rather than changing
Strongly Disagree 1 2 3 4 5 Strongly Agree

79. My weight causes difficulties for those who are close to me
Strongly Disagree 1 2 3 4 5 Strongly Agree

80. I have the power to influence my weight
Strongly Disagree 1 2 3 4 5 Strongly Agree

81. The symptoms related to my weight come and go in cycles
Strongly Disagree 1 2 3 4 5 Strongly Agree

82. My weight strongly affects the way others see me
Strongly Disagree 1 2 3 4 5 Strongly Agree

83. The weight loss attempt I'm doing now can control my weight
Strongly Disagree 1 2 3 4 5 Strongly Agree

84. I go through cycles where my weight would go up and down
Strongly Disagree 1 2 3 4 5 Strongly Agree

85. When I think about my weight I get upset
Strongly Disagree 1 2 3 4 5 Strongly Agree

86. I expect to have this weight the rest of my life
Strongly Disagree 1 2 3 4 5 Strongly Agree

87. My actions will have no effect on my weight outcomes
Strongly Disagree 1 2 3 4 5 Strongly Agree

88. Please list in rank-order the three most important factors that you believe caused your illness. The most important causes for me:-
1. _____
2. _____
3. _____

PART 7: OTHER INFORMATION

89. Are you male or female?
___ Male
___ Female

90. How old were you on your last birthday?

___ years old

91. What is the highest qualification you have attained?
___ UPSR (Highest Primary school qualifications)
___ PMR (Middle Secondary school qualifications)
___ SPM (V) (Higher Secondary school qualifications)
___ STPM (V) (Highest Secondary school qualifications)
___ Institutional Diploma equivalent
___ University Degree equivalent
___ Master Degree or higher

92. Which town, district and State are you living in?
_____ (town)
_____ (district)
_____ (state)

93. What is your current marital status?
___ Single
___Cohabiting
___ Married
___ Separated
___ Divorced
___ Widowed

94. What is your ethnicity?
___ Malay
___ Chinese
___ Indian
___ Sarawakian Bumiputra
___ Sabahan Bumiputra
___Others, please specify:_____

PART 8: INTEREST IN INTERVENTIONS

95. Are you interested in obtaining further information on how to lose weight?
___ Yes
___No

96. If you are interested please indicate the method you interested in:
___ Delivery of weight loss materials to your home.
___ Sign up for online information
___ Face to face consultation

Appendix K

Quantitative Questionnaire (Malay)

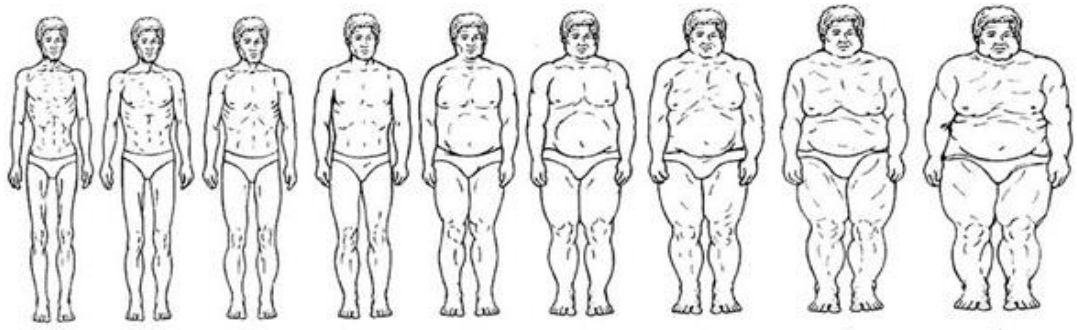
BAHAGIAN 1: BERKENAAN DENGAN FIZIKAL DIRI ANDA

1. Berapa ketinggian anda sekarang?
   _____ cm

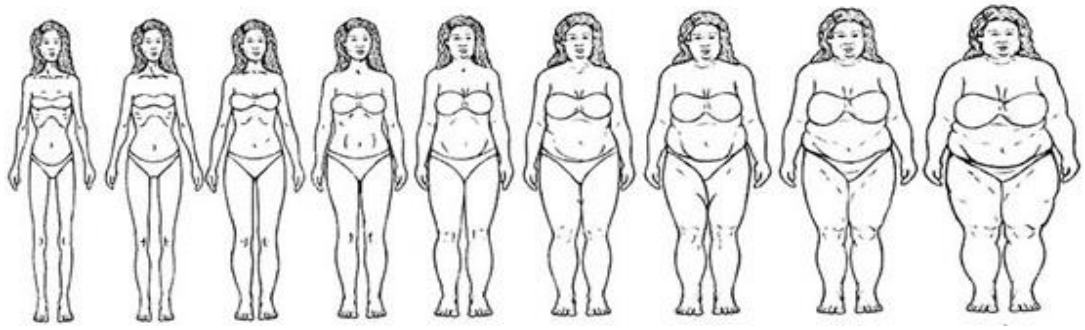
2. Berapa berat anda sekarang?
   _____ kg

3. Adakah anda tahu berat ideal anda?
   ____Ya. Jika "Ya" berapakah berat ideal anda? _____ kg
   ____Tidak

4. Bayangkan diri anda dalam skala ini. Di mana anda melihat diri anda sekarang dalam skala ini? (*bulatkan jawapan paling dekat dengan penilaian diri anda*)



A B C D E F G H I



A B C D E F G H I

5. Berapakah anggaran berat paling tinggi pernah anda capai? (*Untuk wanita - jangan ambil kira berat SEMASA mengandung*).
   ____kg

6. Berapakah anggaran berat paling ringan berbanding berat badan anda sekarang?
   ____kg

Soalan 6 & 7 adalah berdasarkan algoritma perbezaan soalan 2 & 5 dan soalan 2 dan 6. Sekiranya terdapat perbezaan peningkatan melebihi 2.3kg, peserta akan menjawab soalan 7. Sekiranya perbezaan penurunan melebihi 2.3kg, peserta akan menjawab soalan 8. Sekiranya perbezaan di bawah 2.3kg, peserta tidak akan menjawab soalan 7 & 8 dan terus menjawab ke soalan 9.

7. Sebab berat saya meningkat adalah:
   ___ Saya menaikkan berat badan dengan sengaja
   ___ Berat badan saya naik tanpa niat
   ___ Saya tidak sedar berat saya naik

8. Sebab berat saya menurun adalah:
   ___ Saya menurunkan berat badan dengan sengaja
   ___ Saya menurunkan berat badan tanpa niat
   ___ Saya tidak sedar berat saya turun

9. Adakah anda tahu berapa lama berat badan anda sekarang kekal atau dekat (dalam lingkungan 1kg) dengan berat anda sekarang?
   ___ Ya. Jika "Ya' sila nyatakan berapa lama: _____ bulan
   ___ Tidak

10. Pernyataan manakah yang paling sesuai menerangkan apa yang berlaku dengan berat badan anda dalam tempoh 12 bulan yang lepas? *Pilih **SATU JAWAPAN SAHAJA**:*
   ___ Berat saya kekal lebih kurang sama
   ___ Berat saya telah meningkat
   ___ Berat saya telah menurun
   ___ Berat saya sentiasa berubah-ubah

BAHAGIAN 2: AMALAN AKTIVITI FIZIKAL ANDA SEKARANG
Soalan-soalan berikut adalah berkenaan masa yang anda luangkan untuk aktiviti fizikal dalam tempoh 7 hari yang lepas. Sila jawab soalan-soalan berikut walaupun anda tidak merasakan anda seorang yang aktif.

Nota: Aktiviti fizikal **BERAT** merujuk kepada aktiviti fizikal yang menyebabkan anda berusaha dengan keras dan bernafas lebih kuat daripada biasa.
Aktiviti fizikal **SEDERHANA** merujuk kepada aktiviti fizikal yang menyebabkan anda berusaha lebih daripada biasa dan bernafas lebih daripada biasa.

11. Dalam tempoh 7 hari yang lepas, berapa hari anda melakukan aktiviti fizikal berat seperti mengangkat barang berat, mencangkul, aerobik ataupun berbasikal laju? Secara purata berapakah masa yang anda luangkan untuk aktiviti-aktiviti tersebut?

    _____ hari dalam seminggu atau Tiada
    ____ jam _____ minit

12. Sekali lagi, fikirkan hanya aktiviti fizikal yang anda lakukan dalam 10minit pada satu-satu masa. Dalam tempoh 7 hari yang lepas, berapa hari anda melakukan aktiviti fizikal sederhana seperti mengangkat barang yang ringan, berbasikal biasa atau bermain sukan seperti tenis atau badminton? Jangan ambil kira berjalan kaki. Secara purata berapakah masa yang anda luangkan untuk aktiviti-aktiviti tersebut?

    _____ hari dalam seminggu atau Tiada
    ____ jam _____ minit

13. Dalam tempoh 7 hari yang lepas, berapa hari anda berjalan untuk sekurang-kurangnya 10 minit pada satu-satu masa? Ini termasuk berjalan kaki semasa kerja atau di rumah, berjalan dari satu tempat ke tempat lain atau aktiviti jalan kaki untuk tujuan rekreasi, sukan, bersenam atau riadah. Secara purata berapakah masa yang anda luangkan untuk berjalan kaki?

    _____ hari dalam seminggu atau Tiada
    ____ jam _____ minit

Soalan terakhir bahagian ini adalah berkenaan masa anda habiskan untuk duduk. Tingkahlaku duduk ini merujuk kepada duduk di rumah, tempat kerja, sewaktu berkursus atau masa riadah pada hari biasa (tidak termasuk Sabtu dan Ahad). Tingkahlaku ini juga termasuk masa yang dihabiskan semasa duduk di meja kerja, menziarah kawan, membaca dalam kenderaan atau duduk/baring semasa menonton televisyen.

14. Dalam tempoh 7 hari yang lepas, berapakah jumlah masa anda habiskan untuk *duduk* pada hari biasa?

    ____ jam _____ minit

BAHAGIAN 3: CUBAAN PENURUNAN BERAT BADAN

Sila jawab soalan-soalan berikut dengan memikirkan secara khusus APA-APA cubaan penurunan berat badan dalam tempoh 12 bulan yang lepas.

15. Pernahkah anda cuba untuk menurunkan berat badan anda?
    ___ Ya
    ___ Tidak

    Peserta yang menjawab "ya' untuk soalan 15 akan terus ke soalan 16 manakala yang menjawab "tidak" untuk soalan 15 akan terus ke soalan 31.

16. Adakah anda sekarang dalam proses untuk menurunkan berat badan? (*Aktiviti penurunan berat badan termasuk aktiviti fizikal, senaman atau apa-apa diet yang dilakukan mengikut garis panduan aktiviti penurunan berat badan tersebut untuk sekurang-kurangnya satu minggu. Diet termasuk program diet yang disarankan atau perubahan kaedah pemakanan dan gaya hidup seperti memilih apa yang anda makan atau mengubah corak pemakanan)*
    ___ Ya
    ___ Tidak

    Peserta yang menjawab "ya untuk soalan 16 akan terus ke soalan 17 manakala yang menjawab "tidak" untuk soalan 16 akan terus ke soalan 19.

17. Kenapa anda cuba untuk menurunkan berat badan anda?
    ___ untuk mengurangkan berat badan berlebihan
    ___ untuk mengelak berat badan naik

18. Berapa lamakah anda telah melakukan aktiviti penurunan berat badan sekarang?
    ___ minggu

    Peserta yang menjawab soalan 17 & 18 akan terus ke soalan 21.

19. Sekiranya anda tidak mencuba untuk menurunkan berat badan sekarang, pernahkah anda cuba untuk menurunkan berat badan dalam tempoh 12 bulan yang lepas?
    ___ Ya
    ___ Tidak

20. Apakah yang menghalang anda untuk tidak melakukan atau memulakan semula aktiviti penurunan berat badan? (*Anda **BOLEH PILIH LEBIH DARI SATU** jawapan*)
    ___ Saya tiada masa
    ___ Saya tiada motivasi
    ___ Cubaan penurunan berat badan yang saya ingin buat terlalu sukar untuk dilakukan
    ___ Saya tidak boleh menurunkan berat badan saya sekiranya ahli keluarga saya melakukan tingkahlaku yang bertentangan dengan aktiviti penurunan berat badan saya
    ___ Aktiviti penurunan berat badan saya terlalu mahal
    ___ Saya memerlukan bantuan untuk cuba menurunkan berat badan sekali lagi
    ___ Saya tidak memerlukan aktiviti penurunan berat badan sekarang

Peserta menjawab soalan 19 & 20 akan terus ke soalan 29.

21. Anggarkan dengan sebaik mungkin berapa kali anda cuba menurunkan berat badan dalam 12 bulan yang lepas dan mengikut selang berat yang disenaraikan.
    Berapa kali dalam tempoh 12 bulan yang lepas anda telah cuba menurunkan berat badan dan hilang:
    Kurang 1.0kg ____ kali
    1.0kg – 4.9kg ____ kali
    5.0kg – 9.9kg ____ kali
    10.0kg or more ____ kali

22. Fikirkan cubaan penurunan berat badan dalam 12 bulan yang lepas. Berapa lama masa yang biasa akan anda ambil untuk menurunkan berat badan? *(Sila masukkan **ANGGARAN MASA** dalam minggu)*:
    ___ minggu

23. Fikirkan cubaan penurunan berat badan dalam 12 bulan yang lepas. Sila nyatakan bulan anda melakukan cubaan penurunan berat badan. *(Anda **BOLEH PILIH LEBIH DARI SATU** jawapan)*:

___ Januari	___April	___ Julai	___ Oktober
___ Februari	___Mei	___Ogos	___ November
___ Mac	___ Jun	___September	___ Disember

24. Fikirkan cubaan penurunan berat badan dalam 12 bulan yang lepas. Adakah anda tahu pencetus kepada penurunan berat badan anda?
    ___Ya
    ___Tidak

    Peserta yang menjawab "ya" untuk soalan 24 akan menjawab soalan 25 manakala yang menjawab "tidak" untuk soalan 24 akan terus ke soalan 26.

25. Sila pilih **SATU JAWAPAN SAHAJA** daripada senarai di bawah yang menjelaskan dengan sebaiknya pencetus penurunan berat badan anda dalam 12 bulan yang lepas::
    ___Saya dinasihatkan oleh Pakar Kesihatan (Doktor, Jururawat, Pakar Dietetik/Nutrisi, Pegawai Promosi Kesihatan dsb) untuk menurunkan berat badan
    ___Saya mengalami masalah kesihatan
    ___Kawan dan/atau keluarga komen tentang berat badan saya
    ___Saya melihat gambar lama saya dan saya tidak puas hati dengan rupa saya sekarang
    ___Berat saya sekarang paling tinggi dalam hidup saya
    ___Saya sudah tidak muat dengan baju saya
    ___Saya ditawarkan insentif untuk menurunkan berat badan saya
    ___Saya mendapat inspirasi untuk menurunkan berat badan saya dari seseorang
    ___Saya mahu menurunkan berat badan untuk menghadiri satu majlis
    ___ Saya ingin meningkatkan tahap kecergasan saya
    ___Lain-lain: sila nyatakan: _____

26. Berapa berjayakah anda merasakan dapat mengawal berat anda? Bulatkan satu nombor:
    Tidak berjaya 1 2 3 4 5 6 7 Sangat berjaya

27. Berapa berjayakah anda merasakan dapat mengurangkan berat badan berlebihan? Bulatkan satu nombor:
    Tidak berjaya 1 2 3 4 5 6 7 Sangat berjaya

28. Berapa yakinkah anda untuk mengurangkan berat badan anda? Bulatkan satu nombor:
    Tidak yakin 1 2 3 4 5 6 7 Sangat yakin

29. Berapa yakinkah anda untuk mengekalkan berat badan anda? Bulatkan satu nombor:
    Tidak yakin 1 2 3 4 5 6 7 Sangat yakin

30. Soalan ini menerangkan 2 situasi berkaitan dengan penurunan berat badan dan pengekalan berat badan. Baca kedua-dua situasi dan **pilih satu yang paling sesuai** dengan kaedah penurunan berat badan anda.

    Senario 1:
    ___ Saya lebih suka untuk mengurangkan berat badan dengan banyak tetapi tidak berapa perlu untuk mengekalkan berat badan saya.
    Senario 2:
    ___ Saya lebih suka untuk mengurangkan berat badan sedikit demi sedikit dan dapat mengekalkan pengurangan berat badan yang saya lakukan

31. Berapakah tahap kepuasan anda dengan berat anda sekarang? Bulatkan satu nombor:
    Tidak puas 1 2 3 4 5 6 7 Sangat berpuas hati

32. Berapakah tahap kepuasan anda dengan bentuk badan anda? Bulatkan satu nombor:
    Tidak puas 1 2 3 4 5 6 7 Sangat berpuas hati

33. Bahagian badan anda yang manakah anda paling tidak berpuas hati sekarang?
    _____

BAHAGIAN 4: STRATEGI PENURUNAN BERAT BADAN
Peserta yang menjawab "tidak" untuk soalan 15 tidak akan menjawab soalan 34 hingga 38.

Soalan-soalan berikut adalah berkaitan dengan sumber yang anda gunakan untuk menurunkan berat badan dalam tempoh 12 bulan yang lepas.

34. Apakah yang anda lakukan untuk turunkan berat badan anda? *(Anda **BOLEH PILIH LEBIH DARI SATU** jawapan)*:
___ Kurangkan pengambilan makanan
___ Ubah pilihan makanan ke makanan kurang kalori
___ Makan produk or makanan "diet"
___ Menyertai program penurunan berat badan
___ Amalkan diet khas (cth. Diet Atkins)
___ Ambil pil diet yang disarankan oleh doktor
___ Pembedahan bariatrik (cth. Ikat dinding dalam perut, pendekkan salur pemakanan)
___ Ambil pil atau makanan tambahan tanpa preskripsi/saranan Pakar Kesihatan
___ Minum banyak air
___ Makan lebih buah, sayur
___ Ubah amalan pemakanan (cth. Elak makan lewat malam, makan kuantiti kecil)
___ Kurang makan sahaja (termasuk makanan segera)
___ Senaman; buat aktiviti fizikal
___ Ambil ubat tradisional atau komplimentari
___ Lain-lain; sila nyatakan: _____

35. Dalam tempoh 12 bulan yang lepas, pernahkah anda mendapatkan bantuan untuk menurunkan berat badan daripada pihak berikut? *(Anda **BOLEH PILIH LEBIH DARI SATU** jawapan)*
___ Pelatih Peribadi (Personal trainer)
___ Pakar Dietetik
___ Pakar Nutrisi
___ Doktor/Konsultan Perubatan
___ Lain-lain; sila nyatakan:_____
___ Tidak, saya buat sendiri

36. Dalam tempoh 12 bulan yang lepas, adakah anda melakukan apa-apa untuk mengelak kenaikan berat badan?
___ Ya
___ Tidak

Peserta yang menjawab "ya" untuk soalan 36 akan menjawab soalan 37 manakala yang menjawab "tidak" untuk soalan 36 akan terus ke soalan 39.

37. Apa yang anda lakukan untuk mengelak kenaikan berat badan anda? *(Anda **BOLEH PILIH LEBIH DARI SATU** jawapan)*:
___ Kurangkan pengambilan makanan
___ Ubah pilihan makanan ke makanan kurang kalori
___ Makan produk or makanan "diet"

___ Menyertai program penurunan berat badan
___ Ikut diet khas (cth. Atkins Diet)
___ Ambil pil diet yang disarankan oleh doktor
___ Pembedahan bariatrik (cth. Mengikat perut, menyingkat salur)
___ Ambil pil atau makanan tambahan tanpa preskripsi/saranan Pakar Kesihatan
___ Minum banyak air
___ Makan lebih buah, sayur
___ Ubah amalan pemakanan (cth. Elak makan lewat malam, makan kuantiti kecil)
___ Kurang makan sahaja (termasuk makanan segera)
___ Senaman; buat aktiviti fizikal
___ Ambil ubat tradisional atau komplimentari
___ Lain-lain; sila nyatakan: _____

38. Orang yang hendak mencapai sasaran kawalan berat badan jangka panjang perlu menghabiskan masa sekurang-kurangnya 30 minit sehari, untuk sekurang-kurangnya 6 bulan mengubah gaya pemakanan, senaman dan pemikiran. Pilih **satu kenyataan di bawah yang paling sesuai untuk diri anda**:
___ Saya pasti tidak boleh meluangkan masa 30 minit sehari untuk mengawal berat badan saya
___ Saya tidak pasti saya boleh mencari masa 30 minit sehari untuk mengawal berat badan saya
___ Saya pasti boleh mencari masa 30 minit sehari untuk mengawal berat badan saya
___ Saya pasti boleh meluangkan 30 minit sehari untuk mengawal berat badan saya

39. Berapa kerap anda menimbang berat anda?
___ Tidak pernah
___ Setiap hari
___ Sekali seminggu
___ Setiap 2 minggu
___ Lain-lain; sila nyatakan: _____

40. Di mana biasanya anda menimbang diri anda?
___ Di rumah
___ Di tempat kerja
___ Di klinik kesihatan/klinik staff
___ Lain-lain; sila nyatakan: _____

41. Anda memiliki skala penimbang berat badan di rumah?
___ Ya
___ Tidak

BAHAGIAN 5: ANDA DAN MAKANAN

Sila bayangkan diri anda dalam situasi-situasi berikut. Nilaikan tahap keyakinan anda untuk mengatasi setiap situasi berikut menggunakan skala 5-mata yang disediakan. Bulatkan jawapan yang paling sesuai dengan tahap keyakinan anda untuk mengatasi situasi tersebut.

42. Anda sedang makan malam bersama keluarga dan makanan kegemaran anda telah disediakan. Anda baru habiskan hidangan dalam pinggan anda dan tiba-tiba ada orang berkata, "Makanlah lagi". Berapa yakin anda untuk tidak mengambil satu hidangan lagi?
    Tidak yakin langsung 1 2 3 4 5 Sangat yakin

43. Anda kerap terlebih makan waktu makan malam sebab anda penat dan lapar bila balik ke rumah. Berapa yakin anda untuk tidak makan lebih waktu malam?
    Tidak yakin langsung 1 2 3 4 5 Sangat yakin

44. Ada majlis harijadi di tempat kerja anda bekerja dan waktu itu anda dihidangkan dengan sepotong kek. Berapa yakin anda untuk menolak kek tersebut?
    Tidak yakin langsung 1 2 3 4 5 Sangat yakin

45. Anda baru sahaja bergaduh dengan ahli keluarga anda. Anda berdiri di depan peti sejuk dan anda rasa nak makan semua yang ada di depan mata. Berapa yakin anda untuk mencari cara lain untuk menenangkan hati anda?
    Tidak yakin langsung 1 2 3 4 5 Sangat yakin

46. Anda dijemput ke majlis makan malam di rumah kenalan anda dan tuan rumah adalah tukang masak yang hebat. Anda tahu anda kerap terlebih makan bila makanan dihidangkan sedap. Berapa yakin anda untuk tidak makan berlebihan sebagai tetamu?
    Tidak yakin langsung 1 2 3 4 5 Sangat yakin

47. Anda baru habis makan tetapi anda masih berasa lapar. Atas meja ada kuih dan buah. Berapa yakin anda untuk memilih buah berbanding kuih?
    Tidak yakin langsung 1 2 3 4 5 Sangat yakin

48. Anda berada di rumah kawan dan kawan anda mempelawakan anda untuk makan kuih yang kelihatan sangat sedap. Berapa yakin anda mampu untuk menolak pelawaan tersebut?
    Tidak yakin langsung 1 2 3 4 5 Sangat yakin

49. Anda mengalami hari yang kurang baik di tempat kerja dan anda berasa risau dan terganggu. Anda merasa nak makan cokelat. Berapa yakin anda untuk mencari kaedah yang lebih baik untuk menangani emosi anda?
    Tidak yakin langsung 1 2 3 4 5 Sangat yakin

50. Anda rasa seperti nak meraikan sesuatu. Anda akan pergi keluar bersama kawan-kawan ke sebuah restoran yang bagus. Berapa yakin anda untuk menyambut keraian itu tanpa terlebih makan?
Tidak yakin langsung 1 2 3 4 5 Sangat yakin

51. Anda keluar dengan kawan semasa makan tengahari dan dia mencadangkan untuk berhenti makan aiskrim. Berapa yakin anda untuk tidak makan aiskrim?
Tidak yakin langsung 1 2 3 4 5 Sangat yakin

52. Anda baru sahaja bergaduh dengan teman lelaki/wanita. Anda rasa terganggu, marah dan nak makan sesuatu. Berapa yakin anda untuk tidak makan dan sebaliknya pergi berjalan atau bercakap dengan seseorang untuk meluahkan perasaan anda?
Tidak yakin langsung 1 2 3 4 5 Sangat yakin

BAHAGIAN 6: SETAKAT MANA ANDA TAHU BERKENAAN DENGAN DIRI ANDA DAN MASALAH ANDA

Disenaraikan di bawah adalah simptom yang mungkin atau tidak anda pernah alami sewaktu anda naik berat badan. Sila nyatakan *Ya* atau *Tidak* samada anda pernah mengalami simptom berikut dan samada simptom berikut berkaitan dengan berat badan anda.

No.	**Simptom**	Saya pernah mengalami simptom ini *sewaktu berat badan saya naik*			Simptom ini *berkaitan secara khusus dengan berat badan* saya	
		Ya	Tidak		Ya	Tidak
53.	Sakit badan	❑	❑		❑	❑
54.	Sakit tekak	❑	❑		❑	❑
55.	Loya	❑	❑		❑	❑
56.	Susah bernafas	❑	❑		❑	❑
57.	Letih	❑	❑		❑	❑
58.	Sakit sendi	❑	❑		❑	❑
59.	Sakit mata	❑	❑		❑	❑
60.	Semput	❑	❑		❑	❑
61.	Sakit kepala	❑	❑		❑	❑
62.	Sakit perut	❑	❑		❑	❑
63.	Susah tidur	❑	❑		❑	❑
64.	Pening-pening lalat	❑	❑		❑	❑
65.	Hilang tenaga	❑	❑		❑	❑

No.	**Simptom**	Saya pernah mengalami simptom ini *sewaktu berat badan saya naik*			Simptom ini *berkaitan secara khusus dengan berat badan* saya	
66.	Perubahan berat badan	❑	❑		❑	❑

Untuk pernyataan berikut, sila bulatkan nombor yang paling sesuai dengan pandangan anda berkaitan berat badan dan simptom di atas.

67. Saya tidak faham dengan berat badan saya
    Sangat tidak bersetuju 1 2 3 4 5 Sangat bersetuju

68. Berat badan saya akan kekal untuk tempoh masa yang lama
    Sangat tidak bersetuju 1 2 3 4 5 Sangat bersetuju

69. Saya akan berasa tertekan memikirkan berat badan saya
    Sangat tidak bersetuju 1 2 3 4 5 Sangat bersetuju

70. Berat badan saya memberi kesan yang sangat besar dalam hidup saya
    Sangat tidak bersetuju 1 2 3 4 5 Sangat bersetuju

71. Cubaan penurunan berat badan sekarang adalah sangat berkesan untuk menurunkan berat badan saya.
    Sangat tidak bersetuju 1 2 3 4 5 Sangat bersetuju

72. Berat badan saya sekarang membuat saya bimbang
    Sangat tidak bersetuju 1 2 3 4 5 Sangat bersetuju

73. Tiada satu pun benda yang saya buat akan memberi kesan terhadap berat badan saya
    Sangat tidak bersetuju 1 2 3 4 5 Sangat bersetuju

74. Berat badan saya tidak masuk akal
    Sangat tidak bersetuju 1 2 3 4 5 Sangat bersetuju

75. Kesan negatif akibat berat badan saya boleh dielakkan dengan cubaan penurunan berat badan sekarang
    Sangat tidak bersetuju 1 2 3 4 5 Sangat bersetuju

76. Berat badan saya tidak dapat diduga
    Sangat tidak bersetuju 1 2 3 4 5 Sangat bersetuju

77. Berat badan saya merupakan suatu misteri
    Sangat tidak bersetuju 1 2 3 4 5 Sangat bersetuju

78. Berat badan saya akan kekal sama berbanding sentiasa berubah-ubah
    Sangat tidak bersetuju 1 2 3 4 5 Sangat bersetuju

79. Berat badan saya menyebabkan kesukaran kepada mereka yang rapat dengan diri saya
    Sangat tidak bersetuju 1 2 3 4 5 Sangat bersetuju

80. Saya mempunyai kuasa untuk mengubah berat badan saya
Sangat tidak bersetuju 1 2 3 4 5 Sangat bersetuju

81. Simptom berkaitan berat badan saya datang dan pergi berselang-seli
Sangat tidak bersetuju 1 2 3 4 5 Sangat bersetuju

82. Berat badan saya kuat mempengaruhi cara orang menilai saya
Sangat tidak bersetuju 1 2 3 4 5 Sangat bersetuju

83. Cubaan penurunan berat badan sekarang boleh mengawal berat badan saya
Sangat tidak bersetuju 1 2 3 4 5 Sangat bersetuju

84. Berat saya sentiasa naik dan turun
Sangat tidak bersetuju 1 2 3 4 5 Sangat bersetuju

85. Saya akan menjadi terganggu memikirkan berat badan saya
Sangat tidak bersetuju 1 2 3 4 5 Sangat bersetuju

86. Saya merasakan berat badan saya akan begini sepanjang hidup saya
Sangat tidak bersetuju 1 2 3 4 5 Sangat bersetuju

87. Perbuatan saya tidak memberi perubahan terhadap perubahan terhadap berat badan saya
Sangat tidak bersetuju 1 2 3 4 5 Sangat bersetuju

88. Sila senaraikan mengikut keutamaan tiga faktor utama yang anda percaya adalah punca kepada kenaikan berat badan anda. Punca-punca utama kenaikan berat badan saya adalah:-
1. _____
2. _____
3. _____

BAHAGIAN 7: MAKLUMAT LAIN

89. Apakah jantina anda?
___ Lelaki
___ Perempuan

90. Berapakah umur anda berdasarkan tarikh lahir terakhir anda?
___ tahun

91. Apakah kelayakan paling tinggi yang anda pernah capai?
___ UPSR (Ujian Penilaian Sekolah Rendah) atau yang setaraf
___ PMR (Penilaian Menengah Rendah) atau yang setaraf
___ SPM (V) (Sijil Penilaian Menengah) atau yang setaraf
___ STPM(Sijil Tinggi Penilaian Menengah) atau yang setaraf
___ Diploma atau sijil yang setaraf
___ Ijazah Universiti
___ Ijazah Lanjutan Universiti atau yang lebih tinggi

92. Anda tinggal di Bandar, Daerah dan Negeri?
    _____ (Bandar)
    _____ (Daerah)
    _____ (Negeri)

93. Apakah status anda sekarang?
    ___ Bujang
    ___ Tinggal bersama
    ___ Berkahwin
    ___ Berpisah
    ___ Bercerai
    ___ Duda/Janda/Balu

94. Apakah etnik anda?
    ___ Melayu
    ___ Cina
    ___ India
    ___ Bumiputra Sarawak
    ___ Bumiputra Sabah
    ___ Lain-lain; sila nyatakan: _____

BAHAGIAN 8: MINAT TERHADAP INTERVENSI

95. Adakah anda berminat untuk mendapatkan maklumat lanjut bagaimana hendak menurunkan berat badan?
    ___ Ya
    ___ Tidak

96. Sekiranya anda berminat, nyatakan kaedah anda berminat untuk dihubungi:
    ___ Penghantaran maklumat penurunan berat badan ke rumah
    ___ Pendaftaran secara online
    ___ Konsultasi secara bersemuka

Appendix L

Phase 2 Information Sheet (English)

STUDY TITLE	**:**	PREDICTORS OF WEIGHT LOSS MAINTENANCE AND ITS IMPACT IN INTERVENTION DEVELOPMENT EFFORTS. PHASE 2 – QUANTITATIVE COMPONENT			
RESEARCH ID	**:**	00879_1 2015	**NMRR ID**	**:**	14-196-19848
RESEARCH INSTITUTION	**:**	Newcastle University upon Tyne, United Kingdom	**SPONSORING INSTITUTION**	**:**	Ministry of Health Malaysia
RESEARCHER	**:**	Mohammad Zabri Johari			

PURPOSE OF RESEARCH

You have been invited to participate in this study to obtain information about your behaviour and lifestyle; in particular to eating habits, physical activity and its related issues. You have been selected based on the official mailing list within Ministry of Health's (MoH) e-mail system. Your participation in this study will be purely voluntary and there is no obligation to take part. Your participation in this study will be a one-off event. Should you be deemed eligible we would like to invite you for an interview in the future. A separate information sheet and consent form will be presented to you.

EXCLUSION CRITERIA

You should not participate if you are:

1. A woman who is currently pregnant.
2. Require an assistant to read the questionnaire for you. This is to prevent any bias with answering the questions.

ETHICAL APPROVAL

This study has been approved by the Newcastle University Research Ethics Committee and the Medical Research Ethics Committee, Ministry of Health Malaysia.

WHAT ARE THE PROCEDURES INVOLVED?

Prior to joining this study, you will be asked to officially measure your weight and height at your local staff clinic. DO NOT use any other measuring tools to avoid discrepancy and to maintain standardization. After obtaining the height and weight measurement, you will be asked to answer an online questionnaire. This will be done by using the following web address

https://newcastlehealth.qualtrics.com/SE/?SID=SV_7U5zPlWXMj6mBNj that is also provided in your official e-mail registered with the MoH Information Technology Division.

The questionnaire will be a multiple choice or fill in the blanks questionnaire. Questions will only ask about your behaviours and lifestyles in regards to physical activity, eating habits and related issues. No sensitive questions that compromise your identity will be asked. The estimated time spent for this questionnaire will be about 30 to 40 minutes. This will be a one-time participation. There will be no repetition. You will not be provided any form of reward (financial or otherwise) nor will you be provided with any form of reimbursement.

WHAT ARE THE RISKS INVOLVED?

No unforeseeable risk is anticipated as the questionnaire does not require you provide any identifiers nor will answering the questionnaire cause any known physical or mental harm. The questions merely ask your opinion on the stated issues. All information accumulated for this study will be kept anonymous and for research purposes only.

WHAT ARE THE BENEFITS IN JOINING THE STUDY?

You may or may not receive any benefit by joining this study. Results from this study however, may benefit others in the future.

WITHDRAWAL FROM STUDY

Your decision to participate in this study is voluntary. You may choose to not participate or you may withdraw from the study for any reason without prejudice or loss of benefits to which you are otherwise entitled during the course of this study. All data collected up to the point of your withdrawal will still be used for the purpose of analysis. However, your identity will remain hidden for the entire duration of the study. Please refer to Data Usage and Confidentiality Section.

WHO IS ORGANISING AND FUNDING THE RESEARCH

This research is based in Newcastle University. It is being funded by the Ministry of Health Malaysia under the Federal Training Scholarship Award.

DATA USAGE AND CONFIDENTIALITY

Your study-related records will be treated as private as possible. For this phase of the study, a coded name will be used instead of your name on the study documents to safeguard your identity; unless you authorize the use of your name for the study. All study records will be kept safe by the researcher within a storage area that is accessible only to the researcher. The digital data secured on a pen-drive will only be accessible by the researcher and the Supervisory Team at Newcastle University for the purpose of analysis. All data and records will be kept up to 7 years after the study and is non-transferable to any third party. Study records after the stated time period will be destroyed except for publication materials. If the study results are published in medical or scientific journals, you will not be identified by your name.

EMERGENCY CONTACT/IRB CONTACT

During the course of the study, if you have any questions or concerns about the study, please contact the researcher using the contact information below:

RESEARCHER	:	Mohammad Zabri Johari		
CONTACT DETAILS	:	Institute of Health and Society Newcastle University The Baddiley-Clark Building Richardson Road Newcastle upon Tyne NE2 4AX United Kingdom Contact number: +447538915357 e-mail: m.z.johari@newcastle.ac.uk		Institute for Health Behavioural Research Ministry of Health Malaysia Jalan Rumah Sakit Bangsar 59000 Kuala Lumpur Malaysia Office contact number: +60320821400 Mobile number: +60122229341 e-mail: mzabrijohari@iptk.MoH.gov.my or mzabrijohari@gmail.com
SUPERVISORY TEAM	:	Dr. Vera Lucia Araujo-Soares	Dr. Falko Frank Sniehotta	Dr. Richard McNally Dr. Emma Foster

If you have any questions about your rights as a research subject, or concerns or complaints regarding this research study, contact:

The Medical Research & Ethics Committee (MREC)
Ministry of Health Malaysia, Institute of Health Management.
Jalan Rumah Sakit, Bangsar
59000 Kuala Lumpur
Contact Number: +60322874032

Appendix M

Phase 2 Participant Information Sheet (Malay)

NAMA KAJIAN	**:**	PENENTU TINGKAHLAKU PENURUNAN DAN PENGEKALANAN BERAT BADAN DALAM KALANGAN ORANG MALAYSIA – FASA 2: KAJIAN KUANTITATIF			
NO. KAJIAN	**:**	00879_1 2015	**NMRR ID**	**:**	14-196-19848
INSTITUSI KAJIAN	**:**	Newcastle University, Newcastle upon Tyne, United Kingdom	**INSTITUSI PENAJA**	**:**	Kementerian Kesihatan Malaysia
PENGKAJI	**:**	Mohammad Zabri Johari			

TUJUAN KAJIAN

Anda telah dijemput menyertai kajian ini untuk mendapatkan maklumat berkenaan dengan tingkahlaku dan gaya hidup anda; secara khususnya cubaan untuk menurunkan dan mengekalkan berat badan, serta isu-isu yang berkaitan. Penyertaan anda dalam kajian ini adalah secara sukarela dan anda tidak perlu menyertainya sekiranya and tidak mahu. Penyertaan anda dalam fasa kajian ini adalah untuk sekali sahaja.

KELULUSAN ETIKA

Kajian ini telah diluluskan oleh Jawatankuasa Etika Penyelidikan Universiti Newcastle dan Jawatankuasa Etika dan Penyelidikan Perubatan, Kementerian Kesihatan Malaysia.

APAKAH PROSEDUR YANG TERLIBAT?

Sebelum menyertai kajian ini, anda akan diminta untuk mengukur berat dan tinggi secara rasmi di klinik staf berdekatan anda. JANGAN menggunakan alat pengukur lain bagi mengelakkan perbezaan dan untuk menjaga standard kajian. Setelah berat dan tinggi diperolehi, anda akan diminta untuk menjawab soal selidik secara atas talian melalui pautan https://newcastlehealth.qualtrics.com/SE/?SID=SV_7U5zPlWXMj6mBNj yang juga diberikan dalam email rasmi anda yang didaftarkan kepada Bahagian Teknologi Maklumat KKM.

Soal selidik yang akan dijawab adalah berbentuk pelbagai pilihan jawapan atau isi tempat kosong. Soalan adalah berkisar tingkahlaku dan gaya hidup anda yang meliputi aktiviti fizikal, kaedah pemakanan dan isu berkaitan. Tiada soalan sensitif akan ditanyakan. Tempoh masa yang dianggarkan untuk menjawab soal selidik atas talian ini adalah 30-40 minit. Penyertaan adalah

sekali sahaja. Anda tidak akan diberikan apa-apa ganjaran (kewangan atau lain-lain) ataupun diberikan apa-apa bentuk gantian untuk menyertai kajian ini.

APAKAH RISIKO MENYERTAI KAJIAN INI?

Tiada risiko yang dapat dikenalpasti kerana sesi temuduga ini tidak melibatkan prosedur invasif proses menjawab soalan tidak akan menyebabkan kecederaan fizikal atau mental. Soalan yang ditanyakan adalah untuk mendapatkan maklumbalas dan pendapat anda dengan isu yang berkaitan. Identiti anda akan dilindungi dan nama pena akan digunakan untuk menggantikan nama sebenar kecuali anda membenarkan kami menggunakannya. Semua maklumat yang dikumpulkan untuk kajian ini akan dirahsiakan dan untuk kajian ini sahaja.

APAKAH FAEDAH MENYERTAI KAJIAN INI?

Anda mungkin tidak akan menerima apa-apa faedah dari menyertai kajian ini. Namum begitu, hasil dari kajian ini mungkin akan memberi faedah kepada orang lain di masa hadapan.

PENARIKAN DIRI DARI MENYERTAI KAJIAN

Keputusan anda untuk menyertai kajian ini adalah sukarela. Anda boleh untuk tidak menyertai kajian ini atau menarik diri tanpa prejudis atau kehilangan apa-apa faedah yang anda layak semasa menyertai sepanjang kajian ini. Semua data yang dikumpulkan sehingga anda menarik diri tetap akan digunakan untuk tujuan analisa. Identiti anda akan tetap dilindungi sepanjang kajian ini. Sila rujuk kepada seksyen Penggunaan dan Kerahsiaan Data.

SIAPA YANG MENGANJUR DAN MEMBIAYAI KAJIAN INI

Kajian ini dianjurkan oleh Newcastle University dan dibiayai oleh Kementerian Kesihatan Malaysia melalui skim Hadiah Latihan Persekutuan kepada pengkaji.

PENGUNAAN DAN KERAHSIAAN DATA

Rekod berkenaan kajian ini akan dirahsiakan sebaik mungkin. Untuk fasa kajian ini, nama pena akan digunakan menggantikan nama sebenar anda pada semua dokumen dalam kajian ini; kecuali anda membenarkan kami menggunakannya. Semua rekod kajian akan dijaga dan hanya boleh diakses oleh pengkaji dalam tempat simpanan khas. Data digital akan disimpan dalam pen-drive yang hanya boleh diakses oleh pengkaji dan Pasukan Penyelia di Universiti Newcastle untuk tujuan analisa. Semua data akan disimpan sehingga 7 tahun selepas kajian

tamat dan tidak boleh dipindah milik kepada mana-mana pihak ketiga. Rekod kajian selepas tempoh yang dinyatakan akan dimusnahkan kecuali bahan-bahan penerbitan. Sekiranya hasil kajian diterbitkan dalam mana-mana jurnal saintifik atau perubatan, identity anda tetap akan dirahsiakan.

MAKLUMAT UNTUK DIHUBUNGI/MAKLUMAT IRB

Sekiranya anda mempunyai apa-apa soalan atau kerisauan sepanjang kajian ini, sila hubungi pengkaji melalui maklumat di bawah:

PENGKAJI	**:**	Mohammad Zabri Johari			
MAKLUMAT UNTUK DIHUBUNGI	**:**	Institute of Health and Society Newcastle University The Baddiley-Clark Building Richardson Road Newcastle upon Tyne NE2 4AX United Kingdom No. Telefon: +447538915357 e-mail: m.z.johari@newcastle.ac.uk		Institut Penyelidikan Tingkahlaku Kesihatan Kementerian Kesihatan Malaysia Jalan Rumah Sakit Bangsar 59000 Kuala Lumpur Malaysia No. Telefon Pejabat: +60320821400 No. Telefon Peribadi: +60122229341 e-mail: mzabrijohari@gmail.com	
PASUKAN PENYELIA	**:**	Dr. Vera Lucia Araujo-Soares	Dr. Falko Frank Sniehotta	Dr. Richard McNally	Dr. Emma Foster

Sekiranya anda mempunyai apa-apa persoalan berkenaan dengan hak anda sebagai subjek dalam kajian atau sebarang kerisauan atau ingin membuat aduan berkenaan dengan kajian ini, sila hubungi:

Jawatankuasa Etika dan Penyelidikan Perubatan (JEPP)
Kementerian Kesihatan Malaysia
Institut Pengurusan Kesihatan
Jalan Rumah Sakit, Bangsar
59000 Kuala Lumpur
No. Telefon: +60322874032

Appendix N

Sample Transcript From Qualitative Study

I: Good afternoon. Sorry to take a bit of your lunch time. How are you today?

P: Good afternoon, fine…

I: Wonderful… So we'll with some basic questions. These questions will not compromise your anonymity and no one will be able to identify you with them and I won't even mention your name so I won't know who I am interviewing with. So, I will be asking these questions to ensure, you met the inclusion criteria for this study; just to make sure. So, just the basic questions first. So, if this is okay with you do you have any questions before we start?

P: No

I: Ok, you're clear with it right? <participant nods> So how old are you?

P: 29.

I: 29 years old, wonderful. You're male of course I don't need to ask your gender. So what is your personal circumstances: are you married or… <participant cuts off>?

P: Married, got one kid.

I: Married with one child, living together?

P: Yea

I: I won't ask the next two questions as they are only for female participants… So, the seventh question is do you know your current weight?

P: Ummm <thinks for a bit> 87.

I: 87 kilograms and your height?

P: 177.

I: 177cm. Ok, so you are working as?

P: I work as a Staff Nurse.

I: Degree Nurse?

P: Diploma Nurse.

I: Male Nurse? I see, so of the non-professional group? So you are of Indian ethnicity?

P: Uhhm, yea <nods>

I: So, where do you live?

P: I live in Seremban.

I: Seremban town, so living in urban area?

P: Aah <nods>

I: Ok, so are you also on the NCD program?

P: Yes

I: Before that have you attempted other weight loss programs before?

P: No, so far no…

I: Even on your own, no?

P: I attend the gym.

I: OK, so you went to gym meaning it's your own attempt for weight loss?

P: Yeah, no because I cannot afford to join the aerobic. Because we have 4 groups: the first group will be weight loss and diet. So, exercise and diet. I can do the diet but not the exercise because I am working shifts so that's why I do on my own lay <interviewer coughs in background>

I: Ok, so you are on this program when did you start?

P: NCD program? 2nd February.

I: Have you completed?

P: Uhm, this is a 6 month program and is still going on.

I: Owh meaning that so you will be finishing soon lah? <participant nods> So do you know what was your highest weight?

P: My highest weight was 105.

I: 105, wow that's so far different. ok, so do you know your BMI then?

P: 30 plus something.

I: 30 plus something <stops to cough>. Ok, so the previous attempt; you have said you have done gym before, before this program.. <cuts by Participant>

P: No, no, no… I mean I gym when I'm in the program…

I: Owh, so you mean that you have never attempted before you joined the programlah? That would be fair enough..

P: Yup..

I: Ok, so you're current 87 kilogram weight, how long have you had it?

P: Uhm, since February, until now..

I: Ok, so that's about 3 months… that's wonderful…

P: uhuh <nods>

I: So how long do you think your current weight will continue on or…

<cuts by Participant>

P: Well, if I keep on doing my gym and my diet, we'll see how, how far I can maintain. I hope I can maintain. My target is to achieve 80kgs…

I: Ok, so you are still attempting to go down on the scale <participants nods>.

P: According to my BMI, I'm still considered overweight. So, if I can get 78kgs and more to ideal weight. so I think I need to reduce some more…

I: That's good that you have a target. Ok, so now I am going to show you a scale. This scale is called the body visual scale… So I want you to imagine yourself on this scale. Before you attempted weight loss on the NCD program where do you see yourself on this scale? And where do you see yourself now?

P: I think before I was at G.

I: Currently?

P: Currently, most probably I think at E or D lah… between lah…

I: Currently you are at between E or D… let me put this away for now. Do you think your current weight is a problem for you?

P: Yeah, I think I need to lose some more because my body below my hip is ok but here, my tummy is big lay, so I need to reduce.

I: I see, that is more of your personal matter then. What about your family?

P: So far my sister; actually my father before this was really obese lah…

I: What I mean is does your family have a problem with your weight?

P: Yes, my wife. She always comment that I am overweight, condemn me, saying "why do you always keep your body like this?" Then she feels shy, when I bring her out, I wear my shirt, tummy will be seen.

I: I see, you wife has a little problem with your weight. What about your colleagues?

P: So far okaylah…

I: And what about your bosses?

P: MY bosses don't really care about it <both laughs>

I: So currently you are still concerned with your weight?

P: Yeah…

I: So, does you current weight affect your emotions at the moment?

P: Yea… current weight, yea.. I still need some more lah…

I: Ok, fair enough. The emotion I'm asking about is do you feel sad, angry and what not?

P: I don't feel sad and what not; but it's like I feel like <thinks for a while> unsatisfied…

I: Do you have any health problems? P: <Quickly answers> so far no…

I: No? Wonderful, so can you tell me a bit about this NCD program?

P: What they will do first is they will collect all these people with; who BMI is overweight or obese. They call all the people and start separating all the people according to their ability. Let's say, the people, like aged factor, let's say 30 above and they all cannot do the activities, so they will do…. example ah, I'm in the first group; they do diet and exercise. So those that cannot do the exercise, they will go to diet and physio (therapy group). And they are (separated) according to BMI also lah… If you are more than 30 and they need exercise, they go in the first group. so, if they need to do the diet only, not exercise; they're put on (group) 2. So, they are 5 groups lah… and then every month they will follow up our current weight, about the diet, what diet must we take, how we must cook the proper food, healthy food, and at the same time they do the competition for the participant: how to make the healthy food and I won the prize lah…. <I won the 3rd prize.

I: Is it over already?

P: Yeah, over already.

I: Hang on, you said the NCD for you is not completed yet?

P: Yeah, because it's a 6 month program, the first month they do the healthy cooking competition among the participants lah… they want to seek how much you use the oil, santan (coconut milk) lah…

I: I see, that's wonderful, congratulations. Ok, so essentially this help that you enrolled for, it worked for you?

P: Yeah.

I: Wonderful ,and this was the only time you had attempted weight loss. Ok, so you said you were at F, recently when you went on the program, what was your target? Was it going to D?

P: Of course, everybody is looking for a six pack <both laughs> but most probably going to C lah…

I: You're target is to C and at the moment you are at D. So, you are still in the process lah…

P: Yeah.

I: When you started working on your weight loss attempt, so did you get any support?

P: Yeah, my wife will support me, encourage me…

I: After all the critic?

P: Yeah, when she knew I was going for gym and diet, she's so happy and she encouraged me to do some light exercise, even though I come back home late. She couldn't be bothered about it for as long as I lose my weight and keep fit.

I: So of course you do receive support from the healthcare professionals?

P: Yup! If they didn't support me, I don't think that I… yeah…

I: What about your friends?

P: My friends do support me because when I lost my weight from 10 to 20 kg, my friends started asking me "owh, how come you can do it like this? What are the tips you are using for losing weight?" I think then I just mentioned I control my food and then I started doing my gym.

I: So did you face any problems while you were trying to lose your weight?

P: So far, are you referring to family or what?

I: Personal, family, friends, employer?

P: No, no, so far no… they started encouraging me lah…

I: Aah, I see, you didn't face any problems at all… that's good…

I: That's wonderful… so you said that you even shared your knowledge and what not to your friends. With the knowledge and experience you have, in your own experience what would you say is the most important support that is needed? When you start off the program, starting off losing weight and at the maintenance stage?

P: You are asking the advice is it?

I: I'm asking your opinion what kind of support is important?

P: I think the most important is form our family lah… the second part is the guidance; that means from the dieticians because if we don't control our food, I mean if we need to plan for diet but at home we don't do it, it cannot be ok. After work we will go home and we want to

eat and if healthy food is not there, it's very difficult to maintain the diet. Apart from that, my wife supports me a lot, cooking healthy food, she never use much oil. That reference I take to my dietitian so they will let me know what kind of I can take, I cannot take.

I: If that's the case then if you someone, perhaps one of your close friend who needed your support to lose weight, what kind of possible support you could give them?

P: Actually, I already… most of my friend in my working clicks are mostly overweight lah… so always I ask them to come gym, and control the food… then they always ask me "how you control, how you control?" I said, " the problem is being Malaysian is the food". I you control the food, then you will be able to achieve your ideal weight. The same time you need the exercise. Some of my friends they can control the food but if you don't exercise how can you control the weight?

I: Ok, so essentially, do you think you have control of your current weight?

P: Yeah, because if compared to previous is 105kg and now is 87, I think already if I'm not mistaken is already 20 plus lah… 20 plus kg that means for me it's a big achievement but I still got 7kg to reduce. So I keep on doing the exercise and the diet but I think it's not that easy. Because it takes some time because we're also human, so its takes some time.

I: Ok wonderful, so can you think of at least 3 main causes of the weight problem that you had before? I mean before you keep putting on weight?

P: Because recently when I was studying during my college time my weight was already eighty something. When I married, and then I started having a family and then no control of food, no exercise… I: Can you tell me why there is no control? Is it because of your wife? <frustrated>

P: Of course that my wife's cooking is wonderful so that's the reason lah…

I: What about eating out and what not?

P: I won't take the fast food lah… Don't like fast food. I like my wife's cooking and most probably lah…

I: Ok, so you have never done weight loss before this program, so ok, so can you describe to me the top reasons why you think that the program you have joined is very successful for you?

P: Yeah, because if they have never guided me, I would have lost my… I don't know how to say that but if they never guided me, then I don't know what kind of food I must take. According to all the people diet means they must control their food; it's not actually like that. Diet, if you take a diet, the quantity you take the food, if according to the dietitian's (advice) I think you can eat like a normal person. But the quantity of the food is most important and then the quality of the food is most important.

I: Alright, so essentially you said you are nearing the last leg of your program, so can I say that although you are still in the process of losing weight, do you know the similarities and differences between your weight loss phase and maintenance phase?

P: Uhm, <thinks for a long time> you mean between is it?

I: The weight loss and the maintenance phase, once you achieve the target: do you think the process is the same?

P: I think no.

I: No? Then what are the difference? When you are losing weight and when you are maintaining weight?

P: Losing weight, will take some, ah, very difficult lah… because the time you go to gym and then you control the food. During the maintenance, you don't need to do so much of the exercise, but you must control the food. But in the first stage, you want to lose the weight, you must work hard for the exercise and the food.

I: What about the support during the maintenance phase and weight loss phase? IS it the same or different?

P: No, because the weight loss phase I get support from the dietitian, from family; that is high. But in the maintenance phase is not much, they won't push me at all. They know that I know how to handle my diet… <trails off>

I: Alright, ok so in your own words, how would you describe obesity to me?

P: Obesity is a problem where people cannot control their food, never do exercise at all, they don't know how to choose the healthy food.

I: So are you also describing the reasons why do people become obese?

P: Yeah

I: Ok, for those who have attempted weight loss programs, why do you think some people are able to take control of their weight or size while others cannot?

P: It all depends on their self. Because if compared with me or others. Because for myself, the support and guidance from the dietitian, I can go on and then achieve my target weight. For some people, they plan for diet, I mean they plan for weight loss, but they never follow the proper methods. So that's the reason I think they failed in weight loss. Because for some people, they think they can diet only it's enough for the weight loss. But it's wrong. If you do the diet but never do any exercise, no sweating at all, so how come you can burn all your calories?

I: Wonderful, in your family, I mean you, your wife and your child, perhaps even your parents when you are with them, what are the important attributes to food? What I am talking about is the role of food, for example celebrations in your family. And what is the role of food in bringing the family together? And what kind of food practices does your wife or parents do when you're with them? How do they prepare the food?

P: For me? Well, for me, normally what I do is for breakfast I will take two slices of bread.

I: This is prepared by your wife?

P: Sometimes prepared by my wife, sometimes prepared by myself. Because I'm staying with my wife and my mother as well. Most probably she will do for me lah… if she is busy I will do myself. Then for lunch I will take some quantity of vegetables with like chicken or fish or meat and I won't take the rice. For lunch lah, for dinner I will start to take my dinner at 6 o'clock. Before six I will take my dinner. That also like chapatti… like that.

I: Ok, so when you eat, do you normally eat on your own or with your wife and your child?

P: Because for my wife and child she will cook her normal meal but for me she will cook chapatti.<noise of other people calling each other>

I: She cooks separately for you?

P: She makes curry, for example chicken curry, or whatever but the same time she makes the chapati for me. So she eats rice with the curry and I eat chapati…

I: So she cooks some separately for you and for herself and your child? Because of your weight loss attempt…

P: Yeah

I: Do you eat together?

P: Yeah, of course.

I: That's wonderful. Ok, I only have one more questions left. But before I ask that I would like to measure you?

P: Sure.

<Interviewer measures height and weight of the Participant>

I: Do you know your current BMI?

P: No

I: Its ok, I will calculate it for you, so your weight is 85 and height is 177. So your current BMI is 27.13…

P: the previous BMI?

I: The previous BMI would be 33.5 based on the 105 weight. You have lost a significant amount of weight. So, essentially you were saying you were at G and now you are at E or D but you want to get to C. What I am going to show you right now is another scale but this scale has the BMI attached to it. So based on this scale you roughly about at E & F. What I wanted to ask from you is do you agree that you are at E or F?

P: Is this a Malaysian scale?

I: No, this is a Caucasian scale. But I am here to test the Malaysian perception. So do you agree with it?

P: I think I will agree for E.

P: So you agree that you are nearer to E rather than F?

P: Yeah

I: Alright, that's wonderful and that's what I wanted to know. Thank you very much!

P: Ok.

Appendix O

Newcastle University Ethical Approval – Phase 1

Monday, 19 February 2018 at 23:46:03 Malaysia Time

Subject: Mohammad Zabri Johari 00763 Ethical Application Approval
Date: Friday, 16 May 2014 at 14:27:44 Malaysia Time
From: Marianne Pownall
To: Mohammad Johari
CC: nethics

Dear Zabri,

Your ethical application has been approved by the FMS Ethics Committee. Please find a letter confirming this attached, a copy of which has been sent to you in the post.

Kind regards,

Marianne Pownall
Administrator
Faculty Research & Innovation Office
Faculty of Medical Sciences
Newcastle University
Newcastle upon Tyne
NE2 4HH
Tel: 0191 208 5633
marianne.pownall@ncl.ac.uk

Medical Research Ethics Committee Approval – Phase 1

National Medical Research Register - Medical Research Ethics Committee (MREC) - Ethics Approval (NMRR ID NMRR-14-196-19848 S2 R0)

nmrr to me 14/05/2014

Dear MS KALAI VAANIY BALAKRISHNAN (corresponding person) and all investigators,

NMRR ID : NMRR-14-196-19848
Research Title : PREDICTORS OF WEIGHT LOSS AND WEIGHT MANAGEMENT BEHAVIOUR AMONGST MALAYSIANS
Submission No : S2
RevisionNo : R0

The Ministry of Health Medical Research Ethics Committee (MREC has made the following decision on the above mentioned research protocol:

Approve, unconditional (with exemption from MREC full board review)

The MREC comments were:
<to be filled>

A formal letter will be sent to the Principal Investigator.

Please update recruitment status of your study accordingly.
This status will appear in the public Research Directory of NMRR
https://www.nmrr.gov.my/fwbPage.jsp?fwbPageId=PublicDirectoryOfMedicalResearchList&fwbAction=List

Thank you

With warm regards,

MREC Secretariat
Phone: +(603) 2282 9082 / 2282 9085 / 2287 4032
Fax : +(603) 2287 4030
Email: mrecsec@nih.gov.my
https://www.nmrr.gov.my

For Office Use only:
Session Year -
Session Number -
MRECSessionID -

(This is an auto-generated email.)

Newcastle University Ethical Approval – Phase 2

Mohammad Zabri Johari
Institute of Health and Society

Faculty of Medical Sciences
Newcastle University
The Medical School
Framlington Place
Newcastle upon Tyne
NE2 4HH United Kingdom

FACULTY OF MEDICAL SCIENCES: ETHICS COMMITTEE

Dear Mohammad,

Title: Predictors of Weight Loss Behaviours amongst Malaysians. Phase 2 – Know Your Weight Survey
Application No: 00879_1 2015
Start date to end date: 27/09/2012 to 26/09/2016

On behalf of the Faculty of Medical Sciences Ethics Committee, I am writing to confirm that the ethical aspects of your proposal have been considered and your study has been given ethical approval.

The approval is limited to this project: **00879_1/2015**. If you wish for a further approval to extend this project, please submit a re-application to the FMS Ethics Committee and this will be considered.

During the course of your research project you may find it necessary to revise your protocol. Substantial changes in methodology, or changes that impact on the interface between the researcher and the participants must be considered by the FMS Ethics Committee, prior to implementation.*

At the close of your research project, please report any adverse events that have occurred and the actions that were taken to the FMS Ethics Committee.*

Best wishes,
Yours sincerely

K. Sutherland

Kimberley Sutherland
On behalf of Faculty Ethics Committee

cc.
Professor Daniel Nettle, Chair of FMS Ethics Committee
Ms Lois Neal, Assistant Registrar (Research Strategy)

*Please refer to the latest guidance available on the internal Newcastle web-site.

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Medical Research Ethics Committee Approval – Phase 2

JAWATANKUASA ETIKA & PENYELIDIKAN PERUBATAN
(Medical Research & Ethics Committee)
KEMENTERIAN KESIHATAN MALAYSIA
d/a Institut Pengurusan Kesihatan
Jalan Rumah Sakit, Bangsar
59000 Kuala Lumpur

Tel. : 03 2282 9082/03 2282 9085
03 2287 4032/03 2282 0491
Faks : 03 2287 4030

Ref: (8)dlm.KKM/NIHSEC/ P14-332
Date : 13 July 2015

En. Mohammad Zabri Johari
Institute for Health Behavioral Research,

Dear Sir,

REF: Amendments of documents for study NMRR-14-196-19848
Predictors of Weight Loss and Weight Management Behaviour amongst Malaysians.

Your submission dated 4 July 2015 is referred.

2. Amendments to the following documents have been received and reviewed with reference to the above study:

Documents received and reviewed with reference to the above study:

1. Study Proposal, Version 2, dated 26 May 2015
2. Patient Information Sheet & Informed Consent Form (English & Malay Language), Version 2, dated 26 May 2015
3. Quantitative Questionnaire (English & Malay Language), Version 2, dated 26 May 2015

The Medical Research & Ethics Committee, Ministry of Health Malaysia operates in accordance to the International Conference of Harmonization Good Clinical Practice Guidelines.

Comments (if any):

Decision by Medical Research & Ethics Committee:
(√) Approved
( ) Disapproved

Date of Decision:13 July 2015

DATO' DR. CHANG KIAN MENG
Chairman
Medical Research & Ethics Committee
Ministry of Health Malaysia

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