

**DISORDERED EATING AMONG URBAN & RURAL
SECONDARY SCHOOL CHILDREN IN SELANGOR,
MALAYSIA**

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**FACULTY OF MEDICINE
UNIVERSITY OF MALAYA
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SECONDARY SCHOOL CHILDREN IN SELANGOR,
MALAYSIA**

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ABSTRACT

Disordered eating would be debilitating if it reaches the clinical diagnostic criteria of an eating disorder (i.e. anorexia nervosa and bulimia nervosa). Previous studies in Malaysia have shown a 7% (1995) to 22% (2011) increase in the prevalence of disordered eating. Most prevalence studies comparing rates of disordered eating in urban and rural regions are only conducted abroad. A few that are carried regionally focuses on disordered eating behaviors but not many resorting evidence on its related factors. This study describes the adaptation and validation of the Perceived Sociocultural Pressure Scale (PSPS) and further to assess the prevalence and correlates of disordered eating behaviors among urban and rural secondary school students in Selangor, Malaysia. This two phase study involved the validation of the Bahasa Malaysia version of the Perceived Sociocultural Pressure Scale (PSPS). Confirmatory Factor Analysis (CFA) (n=354) and reliability test were performed (n=70). Phase two comprised a cross-sectional study through multistage sampling of urban and rural schools in Selangor. Providing a sample of 601 students ages between 13 to 16 years. A self-administered questionnaire measuring eating attitudes and behaviors as well as the predictors of disordered eating which was self-esteem, body dissatisfaction and perceived sociocultural pressures (PSP) were assessed. In phase one, overall, items in the scale showed to have high internal consistency (Cronbach $\alpha = 0.91$). The kappa values in the test-retest reliability of each item ranged from 0.3 to 0.6. In confirmatory factor analysis a 4 factor model yielded a sufficient fit. In phase two, the prevalence of disordered eating was 19.8% (95% CI 16.5, 23.5). More females 20.8% (95% CI 16.6, 25.8) and adolescents who were overweight 26.5% (95 % CI 18.3, 36.7) had disordered eating. Disordered eating was mainly seen among rural schools 25.6% as compared to urban schools 15.2%. The common type of disordered eating practices were binge

eating 4.10% (95% CI 2.70, 6.00), and excessive exercising, 6.50 % (95% CI 4.70, 9.00). There were moderate correlations seen among the predictors of disordered eating. Perceived sociocultural pressure to be thin remained to be the significant predictor of disordered eating (OR=4.23 95% CI: 2.89, 6.19). A subgroup analysis between the domains of PSP showed perceived sociocultural pressure (PSP) from family & friends (OR=1.60 95% CI: 1.16, 2.21), PSP media (OR=1.53 95% CI: 1.20, 1.94) and weight teasing (OR=1.39 95% CI: 1.01, 1.90) were significant predictors of disordered eating among these adolescents. The Bahasa Malaysia version of the PSPS has good psychometric properties and can be used to assess sociocultural pressure to be thin among adolescents in Malaysia. Phase two of the study provides support for the importance in targeting adolescent in prevention programs for disordered eating. Public Health Prevention Programs need to take into consideration the full range of disordered eating practices, including binge eating, excessive dieting, consumption of diet pills/laxatives/diuretics as well as excessive exercising as an integrated approach to address the importance of healthy eating in the community.

ABSTRAK

Tabiat makan bercelaru akan menjadi lebih membimbangkan jika ia mencapai kriteria diagnostik klinikal gangguan pemakanan (iaitu anorexia nervosa dan bulimia nervosa). Kajian sebelum ini di Malaysia telah menunjukkan 7% (1995) hingga 22% (2011) peningkatan dalam kelaziman tabiat makan yang bercelaru. Lazimnya kajian yang membandingkan kadar tabiat makan bercelaru di kawasan-kawasan bandar dan luar bandar hanya dijalankan di luar negara. Beberapa kajian yang dijalankan di rantau ini hanya memberi tumpuan kepada tabiat makan bercelaru tetapi tidak menumpukan kepada faktor-faktor yang berkaitan dengan tabiat berkenaan. Kajian ini menerangkan penyesuaian dan pengesahan Skala Tekanan Persepsi sosiobudaya (PSPS) dan seterusnya menilai kelaziman dan faktor-faktor berkaitan tabiat makan bercelaru di kalangan pelajar sekolah menengah bandar dan luar bandar di Selangor, Malaysia. Kajian ini mempunyai dua fasa dan fasa pertama melibatkan pengesahan versi Bahasa Malaysia Skala Tekanan Persepsi Sosiobudaya (PSPS) bagi menjadi kurus. Analisis pengesahan Factor (CFA) ($n = 354$) dan ujian kebolehppercayaan telah dijalankan ($n = 70$). Fasa kedua terdiri daripada kajian keratan rentas (*cross sectional*) melalui pensampelan murid-murid sekolah menengah bandar dan luar bandar di Selangor. Sampel seramai 601 pelajar berusia antara 13 hingga 16 tahun telah berserta. Borang Soal selidik yang digunakan mengukur tabiat dan tingkah laku makan serta peramal makan bercelaru iaitu harga diri, rasa tidak puas hati terhadap badan sendiri dan tekanan sosiobudaya (PSP) untuk menjadi kurus telah dinilai. Dalam fasa pertama, secara keseluruhan, item dalam skala yang mempunyai ketekalan dalaman yang tinggi (Cronbach $\alpha = 0.91$). Nilai kappa dalam kebolehppercayaan ujian-ujian semula setiap item adalah antara 0.3-0.6. Dalam analisis faktor pengesahan model 4 faktor menunjukkan *model fit*. Dalam fasa kedua kajian ini, kelaziman tabiat makan bercelaru adalah 19.8% (95% CI 16.5, 23.5). Pelajar perempuan 20.8% (95% CI 16.6, 25.8) dan

murid yang mempunyai berat badan berlebihan 26.5% (95% CI 18.3, 36.7) mempunyai tabiat makan yang bercelaru. Makan bercelaru dilaporkan lebih ramai di kalangan murid di sekolah luar bandar 25.6% berbanding dengan murid sekolah di bandar 15.2%. Jenis tabiat makan yang bercelaru yang kerap dilaporkan adalah “binge eating” 4.10% (95% CI 2.70, 6.00), dan bersenam dengan berlebihan, 6.50% (95% CI 4.70, 9.00). Terdapat kaitan yang sederhana di antara peramal-peramal makan bercelaru. Tekanan sosiobudaya untuk menjadi kurus dilihat sebagai peramal yang signifikan bagi kejadian makan yang bercelaru (OR = 4.23 95% CI: 2.89, 6.19). Analisa antara domain PSP menunjukkan tekanan sosiobudaya (PSP) untuk menjadi kurus dari keluarga dan rakan-rakan (OR = 1.60 95% CI: 1.16, 2.21), PSP media (OR = 1.53 95% CI: 1.20, 1.94) dan ejekan berat badan (OR = 1.39 95% CI: 1.01, 1.90) adalah peramal signifikan tabiat makan bercelaru di kalangan murid-murid ini. Versi Bahasa Malaysia PSPS mempunyai ciri-ciri psikometrik yang bagus dan boleh digunakan untuk menilai tekanan sosiobudaya untuk menjadi kurus di kalangan remaja di Malaysia. Fasa kedua kajian ini memberi bukti agar untuk program-program pencegahan tabiat makan yang bercelaru disasarkan kepada remaja. Program Pencegahan Kesihatan Awam perlu mengambil kira rangkaian penuh amalan dan sikap makan bercelaru, termasuk “binge eating”, amalan berdiet yang berlebihan, pengambilan diet pil / julap / diuretik serta senaman berlebihan agar pendekatan bersepadu untuk menangani kepentingan pemakanan sihat di masyarakat dapat dilaksanakan.

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LIST OF SYMBOLS AND ABBREVIATIONS

AVE	: Average Variance Extracted
BMI	: Body Mass Index
BM	: Bahasa Malaysia
BITE	: Bulimic Investigatory Test
CFA	: Confirmatory Factor Analysis
CFI	: Comparative Fit Index
ChEAT	: Children Eat Attitude Test
CI	: Confidence Interval
CITC	: Corrected Item-Total Correlation
CL	: Classroom
CR	: Composite Reliability
BD	: Body Dissatisfaction
BDS	: Body Dissatisfaction Subscale
DEFF	: Design Effect
DS	: District
DSM-5	: Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition
e	: Error Variances
EAT-26	: Eating Attitude Test-26
EDNOS	: Eating Disorder Not Otherwise Specified
EDI	: Eating Disorder Inventory
EFA	: Exploratory Factor Analysis
FL	: Final
GFI	: Goodness-of-Fit Index
GLM	: General Linear Model

ICD-10	: International Classification of Diseases-10
MLE	: Maximum Likelihood Estimation
MOE	: Ministry of Education
NEDA	: National Eating Disorder Association
NMRR	: National Medical Research Registry
NW	: Normal Weight
OR	: Odds Ratio
PSP	: Perceived Sociocultural Pressure
PSPS	: Perceived Sociocultural Pressure Scale
Q	: Question
r	: Correlation Coefficient
RM	: Ringgit Malaysia
RCT	: Randomised Control Trial
RMSEA	: Root-Mean-Square Error Of Approximation
SC	: School
SE	: Self- Esteem
SE-10	: Rosenberg Self- Esteem Scale
S.E.	: Standardized Estimate
ST	: Student
SES	: Socioeconomic Status
SMK	: Sekolah Menengah Kebangsaan
SPSS	: Statistical Package for Social Sciences
TLI	: Tucker-Lewis Index
W	: Weight
WHO	: World Health Organisation
YSR	: Youth Self Report

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CHAPTER 1: INTRODUCTION

Disordered eating is a phenomenon among adolescents where the practice of food restriction and weight managing has become an endless obsession and a favourite topic of discussion amongst their peers (Natenshon, 1999).

By the time girls reach the age of ten, about 80% of them would have provided feedback on dissatisfaction with their body and their weight or afraid of being fat while 50% of them would have felt better about themselves if they are on a diet (Mellin LM, Irwin CE, & Scully S, 1992). Findings from the BELLA study - National German Health Interview and Examination Survey for Children and Adolescents (KiGGS) showed that about 30% of girls and 15% of boys have disordered eating behaviours and attitudes (Beate Dahlmann, Nora Wille, Heike Hölling, Timo D. Vloet, & Ulrike Sieberer, 2008).

The assessment of disordered eating behaviours in non-clinical subjects is necessary in order to monitor the changes in its prevalence and this can assist in the coordination of preventive and treatment programs (Jennifer M. Jones, Susan Bennett, Marion P. Olmsted, Margaret L. Lawson, & Gary Rodin, 2001).

What is disordered eating? What are the factors that are associated with disordered eating? These are the burning questions frequently asked. It is also true that the concept of disordered eating is often confused with the concept of eating disorders.

The most vulnerable group to disordered eating is the adolescents in Malaysia (Wan Ying Gan, Mohd Nasir, Zalilah, & Hazizi, 2011a; Leng, 2008; Pon Lai Wan, Kandiah, & Taib, 2004). Adolescence is the period of cultural susceptibility and social transition, where one of the main influence could be an increased in sociocultural pressure to maintain an ideal/slim figure. Hence in order to assess sociocultural pressure besides

other factors such as self-esteem and body dissatisfaction to disordered eating where those scales have been validated in the local context, a sociocultural pressure scale is validated in the first phase of this study.

1.1 The ideology of Disordered Eating

Disordered eating refers to a wide range of abnormal eating behaviours, many of which are shared with the diagnosis of eating disorders. These disorders include restrictive dieting, bingeing and purging. The main thing differentiating disordered eating from an eating disorder is the level of severity and frequency of these behaviours (D. Neumark-Sztainer, 1996).

Disordered eating is considered as an early warning sign of an eating disorder (Baranowski & Hetherington, 2001; J. C. Carter, Stewart, Dunn, & Fairburn, 1997; Moriarty, Shore, & Maxim, 1990; D. Neumark-Sztainer, Butler, & Palti, 1995b; Shisslak, Crago, & Neal, 1990; Strong, 2000). Though they are not life threatening, these practices are linked with other undesirable health outcomes such as to electrolyte disparities and other physical manifestations that may ultimately lead to full blown eating disorders (Haley, Hedberg, & Leman, 2010).

The expression disordered eating materialized in medical and psychological literature in the late 1970s, concurring with the institution of diagnostic principles for bulimia nervosa (Russell, 1979). Dietary chaos and emotional instability experienced during recovery from anorexia nervosa were first used to define disordered eating (Palmer, 1979). Then the expression was used in a loose manner to describe young women, who "...diet at some point of time and lost more than 3 kg in weight; may experience events of binge eating and "picking" behaviour; obsessed to be thinner regardless of their body weight and abuse of laxatives or diuretics in order to attain a

fashionably slim figure" (Abraham, Mira, Beumont, Sowerbutts, & Llewellyn-Jones, 1983).

Although the concept of disordered eating still lacks a constant definition, it is generally used to describe eating behaviours that are broader than eating disorders as defined in ICD-10 and DSM-5 classifications.

1.2 Disordered Eating versus Eating Disorders

Disordered eating is basically an abnormal eating pattern which is less severe and less frequent to qualify one as having eating disorder. This includes unhealthy dieting, such as severe caloric restriction and use of meal supplements; unhealthy eating, such as consumption of large quantities of high fat foods or skipping meals; and anorexic as well as bulimic behaviours, such as laxative and diet pill use, cycles of binge eating and dieting, and self-induced vomiting (D. Neumark-Sztainer, 1996).

Often researchers use disordered eating and eating disorders interchangeably. Yet the difference is that eating disorders are diagnosed clinically with presenting behavioural symptoms and prolonged disordered eating could lead to a pathological eating disorders (J. C. Carter et al., 1997; D. Neumark-Sztainer, 1996; Strong, 2000).

Researchers and clinicians progressively agree and portray eating disorders as a biologically-based psychiatric disorder (Easter, 2012). In the American Psychiatric Association Diagnostic Statistical Manual 5th Revision (DSM-5; APA, 2013), eating disorders are classified into three categories; Anorexia Nervosa, Bulimia Nervosa and Eating Disorders Not Otherwise Specified (EDNOS) (American Psychiatric Association, 1994). Eating disorders are severe emotional and physical problems that can have life-threatening effects on both females and males (Nietzel & Wakefield, 1996).

The problem starts when an individual starts focusing on food as a way to overcome fundamental emotive issues. When the thought about what to eat and how to eat is grounded in obsessive and rigid expressive needs, he or she becomes a slave to food rituals. If this continues and gets to a worrying state, or if it begins to disrupt one's daily activities, there is a need for a clinician's assessment on the diagnosis of an eating disorder.

1.3 Historical Background on Disordered Eating

Historically, controlled or restricted eating was considered to be disordered eating. Self-inflicted starvation has played a significant role in the history of mankind as one of many ways of applying self-control, purifying oneself, and influencing others into disordered eating.

Early religious literatures contain descriptions of what anorexia nervosa (a type of eating disorder) probably was. The most famous symbolic of such a holy anorexia was Catharina Benincasa of Siena, in the 14-th century. At the age of 12 Siena opposed her parents' choice of husband, and left for a monastery life. Suffering and fasting were her strength and way to impose her will. She died after several years of self-induced starvation. She was later canonized in 1461 by Pope Pius II (Wolfskeel, 1989).

In Cessar's Rome, it was noted that physicians recommended vomiting for curative and purification purposes (Nasser, 1988). At that time, one of the signs of prosperity in the affluent and middle class was to have a private room where one could relax and vomit after an excessive meal. Two millennia later, Russell (1979), a psychiatrist from London defined bulimia nervosa as a distinct syndrome, though he identified bulimia nervosa as an ominous variation of anorexia nervosa.

The cases of anorexia and bulimia escalated in the 1970s and 1980s, and though some say they peaked at that time, bulimia, especially, continues to escalate (Hudson, Hiripi, Pope, & Kessler, 2007). It was the same period in time when the rates of obesity in the United States began to increase at an unprecedented rate, and low fat eating began its popular progression through the mainstream (Hudson et al., 2007). Most academics point to cultural pressures for thinness, increasing depression and obsessive compulsive behaviour, and increased dieting behaviours as precipitants for disordered eating.

1.4 Etiology of Disordered Eating

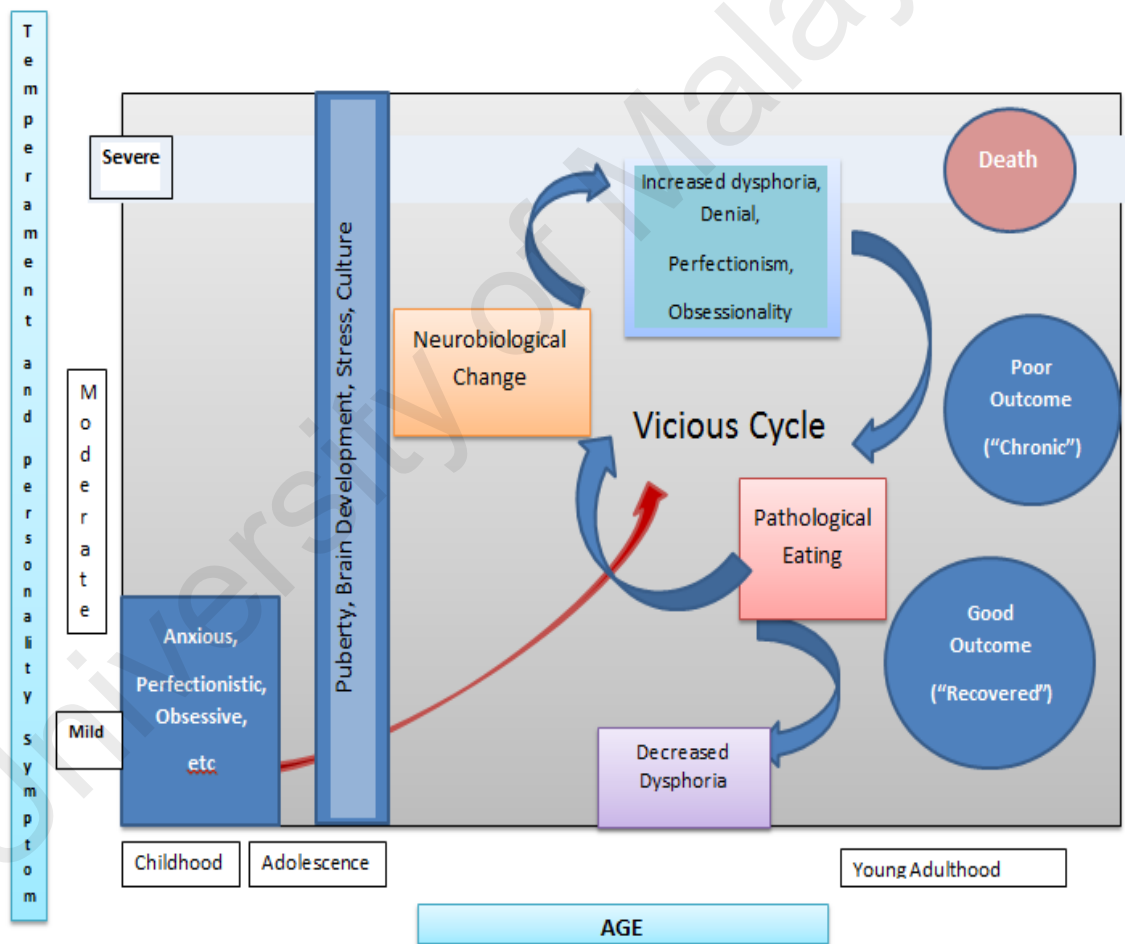


Figure 1.1: Time Course and Phenomenology of Disordered Eating leading to Pathological Eating Disorders (Kaye,2009)

Character and fairly mild temperament behaviours during childhood seem to contribute to the susceptibility of disordered eating (Figure 1.1). Characters and fairly mild temperament behaviours during childhood here means the character of being Anxious, Perfectionist and Obsessive as depicted in Figure 1.1 depending on the severity, could be susceptible to disordered eating. During adolescence, these traits may become deepened, as the consequences of puberty, gonadal steroids, stress, and sociocultural impacts (Kaye, 2009).

Failure of early detection will lead these adolescents into a vicious cycle of increased denial, inflexibility, depression, anxiety, and other essential traits which in turn may lead to a pathological eating disorder. Hence provision of early prevention efforts with the goal of intervening before the commencement of these behaviours is necessary (Dianne Neumark-Sztainer, Melanie Wall, Nicole I. Larson, Marla E. Eisenberg, & Katie Loth, 2011).

Concerns over weight and body image are the major causes of body image dissatisfaction, disordered eating patterns and possibly even eating disorders (Bryla, 2003). Besides these concerns, there are many other factors that contribute to disordered eating behaviours. These factors include behavioural, social, cultural, psychological and environmental factors such as gender, socioeconomic status, personality factors, and family (Thatcher & Rhea, 2003).

Disordered eating may lead to other frequently reported negative consequences such as poor eating habits, nutritional deficiencies, difficulty in future weight loss and maintenance as a result of weight bouncing as well as increased binge eating patterns

following restrained eating (D. Neumark-Sztainer, Butler, & Palti, 1995a). For individuals who feel the pressure to 'kowtow' to an "ideal" body image, intense exercise and disordered eating behaviours are commonly embraced in efforts to gain a greater sense of weight control.

Over the years the average age of onset of disordered eating has decreased, from the adolescent age to the preadolescent age (Beate Dahlmann et al., 2008; Bryant-Waugh, 2006). Prevalence of disordered eating is higher among females as compared to the males due to the fact that the level of weight obsession and body image idealization are higher among the females (V. Eapen, Mabrouk, & Bin-Othman, 2006; D. R. Neumark-Sztainer et al., 2010).

Disordered eating in the form of excessive diet, binge eating, self-induced vomiting, consumption of dietary replacements, abuse of laxatives, diet pills and excessive exercise have been the modus operand of individuals to achieve their desirable body weight.

The consequences following prolonged involvement in these behaviours have a dire effect on one's wellbeing. Individuals indulge in disordered eating behaviours as a control mechanism for managing their weight or manipulating their psychological state, but ultimately become controlled by the activities themselves (Gapin, Etnier, & Tucker, 2009). This distorted mental state can be harmful both physically and psychologically resulting in additional grave conditions such as obsessive compulsive disorder, depression, panic disorders and anxiety (Cockerill & Riddington, 1996).

Aside from co-morbid disorders, other psychosocial factors have also been acknowledged as causes and correlates of disordered eating. Low self-esteem for example, has been commonly associated with individuals with disordered eating.

(Mendelson, White, & Mendelson, 1996; Talwar P, 2012). Low self-esteem appears to interact with overvalued ideas of body shape, perfectionism and parental conflict which may directly or indirectly contribute to the development of disordered eating (Wade & Lowes, 2002).

Body dissatisfaction is another component has been found to play a major role in disordered eating. Many women perceive themselves as overweight and try to lose weight despite being underweight or normal weight (Low et al., 2003; Sirang et al., 2013).

A five-year prospective study found that adolescent girls with low body satisfaction tend to have high levels of dieting, binge eating and unhealthy weight control behaviours later in life (D. Neumark-Sztainer et al., 2006). There is a concern among researchers that women who have 'normalizing' feeling of being overweight tend to compensate that feeling by indulging themselves in disordered eating behaviours (Wardle, Haase, & Steptoe, 2006).

Sociocultural or societal influences from close family members, peers and media have a daunting effect on disordered eating too. A woman, depending on which time frame or culture she came from, would be subjected to the objectification of body image to the current environment she is exposed to. *Objectification theory*, developed by Fredrickson and Roberts (1997) claims that:

...this cultural milieu of sexual objectification functions to socialize girls and women to treat themselves as objects to be evaluated based on appearance. Girls learn, both directly and vicariously, that their "looks" matter, and that other people's evaluations of their physical appearance can determine how they are treated and, ultimately, affect their social and economic life outcomes.

The theory argues that girls and women therefore can be preoccupied with their own physical appearance as a way of anticipating and controlling their treatment—an effect termed “self-objectification.” Self-objectification is conceived to lead to a variation of emotional and behavioural costs” (T.-A. Roberts & Gettman, 2004).

Social comparison theory on the other hand asserts that adolescents scrutinize media images to learn what is beautiful and choose the way they should look. They then relate their appearance to what the media set forth as beautiful, and inspire themselves to change the way they look to match the models and actors seen in media. Unfortunately it is one of the ways the adolescents become dissatisfied with their bodies and resort to unhealthy or disordered eating behaviours (Botta, 2003).

The food, diet, and fitness industries, aided by the media, advocate the message that liberation for women simply means self-improvement, self-control, and obligation to achieve the ultra-slender body ideal; while the converse of this implies laziness, indignity, self-indulgence, lack of control, and moral failure (Hesse-Biber, Leavy, Quinn, & Zoino, 2006). Family, peer group and school often reflect and amplify these messages, which often take the form of rewards and punishments that urge women wanting to be thin. It is the women's “Horatio Alger” story; ‘if you work hard, you will be rewarded as if thinness is achievable by all women who strive for it’ (Wolf, 2013). Many women who strive to be thin tend to develop disorderly eating and eating disorders.

Environmental factors, such as place of residence, whether urban or rural, have been identified as risk factors for the development of disordered eating. Sociocultural theory argues that increased disordered eating symptomatology among urban women, is a result of multiple causes, comprising urbanization, modernization, and social transitions (Becker, Keel, Andersonfye, & Thomas, 2004). Urbanization and traditional

feminine gender role conflicts with more modern ones have a major impact on disordered eating (Becker et al., 2004).

Other investigators agree that urbanization nurtures eating disorder and offer various clarifications. Van Son et al (2006) proposed the “Opportunity Hypothesis,” suggesting that disordered eating may be higher in urban areas because large populated cities make it easier to engage in secretive behaviours. The “Migration Hypothesis,” states that disorderly eating is more common in adolescents and young adults (Van Son, Van Hoeken, Bartelds, van Furth, & Hoek, 2006). This could be due to the fact that migration to urban areas is higher among the adolescents and young adults

1.5 Implications for studying Disordered Eating Behaviours

Disordered eating should not be brushed off as a common eating trend due only to influences of the flawless body world that we encounter day in and day out. There are also many adolescents who suffer from disordered eating without satisfying the full criteria of DSM-5 associated with eating disorders. Disordered eating is an early warning sign to impending pathological eating behaviours such as anorexia nervosa and bulimia nervosa. It could unknowingly develop into a full blown clinical disorder which is detrimental to one’s physical and mental wellbeing if preventive measures are not taken at early stages.

1.6 Background of Study

1.6.1 Problem Statement

Disordered eating is a health concern that may be difficult to detect since a person with disordered eating patterns may not display all of the classic symptoms typically identified with eating disorders. A person exhibiting disordered eating habits and behaviours may also be experiencing significant physical, emotional and mental stress (W. Y. Gan, M. T. M. Nasir, M. S. Zalilah, & A. S. Hazizi, 2011b).

Adolescents who suffer from disordered eating patterns do not fully realize the effect it has on their mental and physical health. This lack of understanding may unnecessarily exacerbate the harm of disordered eating.

In Malaysia eating disorder has not been viewed as a serious condition that needs urgent attention. However the growing knowledge of evidence on disordered eating in the country (Wan Ying Gan et al., 2011b; Indran, Saroja K, & Hatta, 1995; Keep P W & Ho BKW, 2003; Leng, 2008; Sue-Yee Tan & Yew, 2012) makes it important to view the significance of disordered eating and its associated factors.

Evidence shows that Malaysians are terrified with the thought of being overweight and wanting to be thinner even though they are of normal weight (Edman & Yates, 2004; Mellor et al., 2009; Pon Lai Wan et al., 2004; Viren Swami & Martin J. Tovée, 2005). Meals-skipping, excessive dieting, binge eating practices are the most commonly reported disordered eating practices (Edman & Yates, 2004; Pon Lai Wan et al., 2004) and this drive for thinness may ultimately manifest into potentially deadly eating disorders.

Past research have addressed the relationships between factors such as BMI, gender differences, socio-cultural influence, self-esteem, dissatisfaction, and disordered eating practices among Malaysians (Edman & Yates, 2004; Wan Ying Gan et al., 2011b). However, the associations are still not thoroughly explored among the younger adolescents both in rural and urban areas in Malaysia.

Determining the prevalence of disordered eating practices and identifying the factors associated with it will help policy makers to take effective measures to reduce the potential harmful effect of disordered eating behaviours.

1.6.2 Rationale

The younger generation in Malaysia seems to be held up amongst the contrasting cultural effects of traditionalism versus liberalization. These results in the coupling of psychosocial stressors causing an increased risk of adjustment difficulties and disordered eating can be viewed as one of the surviving mechanism. Like in other countries, cultural evolution, social change and globalization also have a complex influence on the eating behaviours among the younger generation in Malaysia (V. Eapen et al., 2006).

Among secondary school children aged between 14 to 17 years in Peninsula, Malaysia, 22.3% of the subjects were at-risk of eating disorders (Leng, 2008). Evidence suggesting that adolescents in Selangor were found to have some form of disordered eating behavior, many fall within the late adolescent age group (college /university going students (Edman & Yates, 2004; Keep P W & Ho BKW, 2003). However the determinants and its associated factors of disordered eating have not been further explored among the adolescents in Selangor.

Sociocultural influences play a pivotal role in adolescents indulging in disordered eating behaviours (E. Stice, 1998; E. Stice, 1994; E. Stice, Ziemba, Margolis, & Flick, 1996). The three primary sources of sociocultural influences identified are; families, peers, and media. In Malaysia there are evidences (Wan Ying Gan et al., 2011b; Mellor et al., 2009) that these sociocultural influences have an impact on disordered eating behaviours. These three sources of sociocultural pressure, individually or in combination, may lead to individuals internalizing societal messages about the importance of thinness and that in turn, may lead to a schematic set of beliefs about the importance of thinness and beauty for success in a woman's life (L. Smolak, Levine, & Schermer, 1999; E. Stice, 1998).

Perceived pressure to be thin is defined as comments or actions by others that may serve to perpetuate the thin ideal (e.g., critical comments regarding weight, encouragement to diet, and exposure to media containing thin ideal images), whereas modelling refers to the process of directly copying behaviour performed by others (Bandura, 1996).

In theory, feedback about appearance from close ones, such as parents, friends, and romantic partners, may have an especially important influence on late adolescents' disordered eating (Tantleff-Dunn, 2004). Romantic partners and close friends become increasingly salient in late adolescents' lives (W. Furman & Buhrmester, 1992; W. B. Furman, B. Bradford ; Feiring, Candice 1999) and thus, are likely to exert influence on eating behaviour.

Weight-teasing, for example, by family and friends, is a common type of sociocultural pressure among adolescents, especially overweight young adults (Heather P. Libbey, Mary T. Story, Dianne R. Neumark-Sztainer, & Kerri N. Boutelle, 2008). Regular weight related teasing during childhood may have an impact on the expansion of disordered eating (Jessica s. Benas & Brandon E. Gibb, 2008).

There is a strong empirical support for the adverse impact of mass media on several adolescent behavioural health outcomes (Strasburger, Jordan, & Donnerstein, 2010). Pon Lai Wan et al. (2004) argued that even healthy adolescents link themselves with very thin images of men and women depicted in media and view themselves as being fat. In their pursuit to match these media images, adolescents' recourse to disordered eating patterns, such as yo-yo dieting and skipping meals.

Internet social networking sites have become a preferred topic of discussion. These sites permit users to comment or 'like' on their friend's profile pages (often

called “walls”), customize their pages with photos, form similar interest groups with other users, “talk” via forums or discussion boards, and send private mails to others (Boyd & Ellison, 2007; Kuss & Griffiths, 2011). Adolescents mainly use these sites to form new friends besides maintaining their existing friends. These sites also have the potential to increase pressure on adolescent girls to portray a specific image (as attractive as possible) and provide an increased avenue for appearance comparison (Tiggemann & Miller, 2010).

Having known the extent to which perceived sociocultural pressures imparts on disordered eating, it is equally important to measure the extent of these effects on our adolescents population. There are various tools to measure sociocultural influences on body image and disordered eating. Among them the most preferred and widely used tool is the Perceived Sociocultural Pressure Scale (PSPS) (E. Stice, Ziemba, et al., 1996).

The usability of any tool should be tested in the cultural context and language, even though the original version has exhibited good psychometric properties (E. Stice, Nemeroff, & Shaw, 1996). The first phase of this study therefore, was to translate PSPS to Bahasa Malaysia, the national language that is spoken by majority of people in Malaysia, and test the translated version among Malaysian adolescents for the instrument’s psychometric properties and factor structure.

According to the National Eating Disorder Association (NEDA) the negative impacts of disordered eating in adolescents include; cognitive development, student’s behaviour and academic performance, deficiencies in specific nutrients, more vulnerable to illnesses and increased absenteeism (*NEDA Educators ToolKit*, 2008).

Prolonged disordered eating habits will pose an increased risk for anxiety disorders, cardiovascular symptoms, chronic fatigue, chronic pain, depressive disorders

and restrictions in activities due to poor health, infectious diseases, insomnia, neurological symptoms, and suicide attempts during early adulthood (Jeffrey G. Johnson, Patricia Cohen, Stephanie Kasen, & Brook, 2002). In extreme conditions these will develop into an eating disorder whereby, if uncontrolled, can lead to death (Birmingham, Su, Hlynsky, Goldner, & Gao, 2005).

Weighing the seriousness of disordered eating and its risk factors, the second phase of this study focused on studying the prevalence of disordered eating among Malaysian secondary school students and the factors associated. The outcome of this study could help in early detection of disordered eating behaviour and formulating appropriate intervention strategies. Adolescents found to be at risk may be counselled or referred for further assessment to determine if they have eating disorder pathology.

This study was conducted among school students in the aged 13 to 16 years old in Selangor, Malaysia. Here onwards, the adolescents in this study would be referred to secondary school students in Selangor.

1.6.3 Research Questions

1. What is the current prevalence of disordered eating among secondary schools students in Selangor, Malaysia?
2. What are the types of disordered eating practices among these students?
3. What are the demographic and anthropometric characteristics of the students with disordered eating?
4. Is there any association between low self-esteem, body dissatisfaction as well as perceived sociocultural pressures and disordered eating among these students?
5. Is there a difference in prevalence of disordered eating between students from urban and rural schools?

1.7 Objectives

1.7.1 General Objective

To determine the prevalence of disordered eating among secondary school students in Selangor and the associated factors.

1.7.2 Specific Objectives

Phase 1

1. To validate the Bahasa Malaysia (BM) version of the Perceived Sociocultural Pressure Scale (PSPS) in order to measure the sociocultural pressure to disordered eating in Phase 2 of this study.

Phase 2

2. To determine the prevalence of disordered eating among secondary school students in Selangor.
3. To determine the demographic and anthropometric characteristics of the students with disordered eating.
4. To determine the difference in disordered eating between students from urban and rural schools.
5. To determine the types of disordered eating practices among secondary school students in Selangor.
6. To determine the association between self-esteem, perceive sociocultural pressure and body dissatisfaction among students with disordered eating.

CHAPTER 2: LITERATURE REVIEW

2.1 Literature Search methods

According to the Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5), disordered eating is defined as "a wide range of irregular eating behaviors that do not warrant a diagnosis of a specific eating disorder" (DSM-5; APA, 2013). Disordered eating can also be conceptualized as a wide spectrum of harmful and often ineffective eating behaviors used in attempts to lose weight or achieve a lean appearance (American College of Sports Medicine, 1997). However these harmful and ineffective behaviors vary drastically across cultures. Among the general population a very small number of people are considered to have full blown eating disorder as compared to disordered eating behaviors.

Among the commonly used tool is the EAT-Eating Attitude Test, The EAT has been a particularly useful screening tool to assess "eating disorder risk" in high school, college and other special risk samples such as athletes. The original version of the EAT was published in 1979, with 40 items each rated on a 6-point likert scale (David M Garner & Garfinkel, 1979). In 1982, Garner and colleagues modified the original version to create an abbreviated 26-item test (Garner, Olmsted, Bohr, & & Garfinkel, 1982). The items were reduced after a factor analysis on the original 40-item data set revealed there to be only 26 independent items.

The EAT-26 has three subscales to assess an individual's behaviours and thoughts regarding dieting, bulimia and food preoccupation, and oral control. In this scale, respondents who scored 20 or more were classified as having a high level of concern about dieting, body weight or disordered eating behaviours and those who scored less than 20 were classified as having no symptoms of disordered eating.

The EAT-26 also included a behavioural component to determine the presence of extreme weight control behaviours and their frequency. This gave an opportunity to gain invaluable and accurate insight into a person's behavior. However, as with all self-reported assessments, individual may not be entirely truthful in his or her responses.

In non-clinical populations, the EAT-26 has been used as a screening instrument to detect individuals who are more likely to have disordered eating behaviours. This questionnaire does not provide a diagnosis but rather identifies the presence of symptoms that are consistent with a possible eating disorder.

To acquire an overview of the existing research on adolescent disordered eating habits, a literature search was performed in the PubMed, Science Direct and Embase databases. Further information was retrieved from sources like books, unpublished research findings and websites. The following key words were used in the literature search: adolescence, disordered eating, Asia, Malaysia, urban/rural, demographic, socioeconomic, self-esteem, body dissatisfaction, academic performance, gender differences, socio-cultural and behavioural. The literature review provided an overall view of the existing knowledge about disordered eating in Asia, Malaysia, comparing the differences of urban and rural population and salient risk determinants which include self-esteem, body dissatisfaction and perceived sociocultural pressure. This chapter further explicates the association among the salient risk determinants and its impacts on disordered eating.

2.2 Disordered Eating in Asia

The summary of researches conducted in Asian countries on the prevalence and the factors associated with disordered eating is presented in Table 2.1.

Table 2.1: Summary of previous studies on disordered eating in Asia

Study	Country	Age	n	Study Design	Associated Factors	Findings
Tao, Z.L (2010)	China	12-25	1199	Cross-sectional	Body dissatisfaction Psychosocial	9.9% of the female respondents and 2.0% of the male respondents showed disordered eating (EAT \geq 20).
Yang S.-J(2010)	South Korea	10-13	2226	Cross-sectional	Psychosocial Sociocultural	Disordered Eating (EAT-26 \geq 20) were found in 155 individuals (7.0%); this included 72 girls (6.4%) and 83 boys (7.6%). There was no significant gender difference.
Mukai et al (1994)	Japan	16-17	197	Cross-sectional	Sociocultural	35% of respondents were at risk of disordered eating.

Table 2.1: Summary of previous studies on disordered eating in Asia (continued)

Study	Country	Age	n	Study Design	Associated Factors	Findings
Mak K K et. al (2011)	Hong Kong	12-18	893	Cross sectional	Behavioural Socio-environmental	18.5% of boys and 26.6% of girls were at risk of disordered eating.
Tsai M R, (2011)	Taiwan	14-16	835	Cross sectional	Sociocultural Psychosocial	Disturbed eating attitudes and behaviours were found in 10.4 % of participants.
T.Y. Mousa et al. (2010)	Jordan	10-16	432	Cross-sectional	Self Esteem, Body dissatisfaction Sociocultural	40.5% of adolescent girls scored at or above the cut-off point of EAT-26 indicating negative eating attitudes.

Table 2.1: Summary of previous studies on disordered eating in Asia (continued)

Study	Country	Age	n	Study Design	Associated Factors	Findings
Pourghassem Gargari et. al (2011)	Iran	16-18	1887	Cross sectional	Body dissatisfaction	16.7% (C.I with 95%: 15.1% to 18.3%) of students had disordered eating attitudes. About half of the participants were unhappy with their body weight and considered themselves as obese.
O'zcan Uzunt. et. al (2006)	Turkey	16-24	414	Cross sectional	Sociocultural, Psychosocial	17.1% of respondent were classified as having disordered eating attitudes. 1% of the respondent had eating disorders including anorexia nervosa (0.5%) and bulimia nervosa (0.5%).

Table 2.1: Summary of previous studies on disordered eating in Asia (continued)

Study	Country	Age	n	Study Design	Associated Factors	Findings
Lorenzo CR et. al (2002)	Philippines	13-17	932	Cross sectional	Sociocultural	Prevalence of abnormal eating attitudes according to the EAT scores were 14.5% +/- 3.2% among males and 15.0% +/- 3.5% among females.
Mandanat et. al (2006)	Philippines	17-18	340	Cross sectional	Behavioural	Filipino students were 10.9 times more likely to have disordered eating than their American counterparts.
Ho TF (2006)	Singapore	12-26	4,461	Cross sectional	Sociocultural	Prevalence of at risk of eating disorder was 7.4% Female Malays constituted a larger proportion at risk (20.6 %).
Tendulkar (2006)	India	16-18	451	Cross sectional	Psychosocial	13.3% of respondents had disordered eating.

While disordered eating maybe commonly dispersed in Western society, it has gradually manifested its way into the Asian society. Much of the discussion of disordered eating in non-Western societies is predicated upon the assumption that an is the by-product of “Westernization”, the term used to describe the process by which increased cultural contact with the West results in the transmission of so-called ‘Western’ ideas and cultural norms to a non-Western culture (Pike & Dunne, 2015).

Westernization may in fact be accurately associated with the process of industrialization and urbanization (Heath, 2004). The fact that our populations is now getting more urban, fundamental shifts in the population demographics –moving from rural to urban coincide with the drastic changes in diet to sedentary life style, change in the type of diet, where traditional Asian diet which was formerly rich in vegetable, fiber and grains now shifting towards those high in fat, sugar and salt (Pike & Borovoy, 2004). Rising of income and transition to wage economy as oppose to what it was before, changing gender roles leading to changes of traditional family structure demands where women are expected to develop new set of skills and overall accessibility of food supply (Pike & Dunne, 2015).

As summarized in Table 2.1, the prevalence of disordered eating in Asian countries ranges from 2% to 40.5%. Tao Z.L (2010), in his study on disordered eating behaviours among a group of respondents in the age group of 12 and 25 in China, reported that 10% of the females and 2 % of the males had disordered eating behaviours, regardless of their weights. In their study, Tsai et al (2011) found that 10.4% of the female junior high school students in Taiwan had disordered eating. In this study weight-related teasing and body dissatisfaction were found to be associated with disordered eating.

In Japan due to its massive urbanization and Western acculturation where the process by which increased cultural contact in the transmission of western ideas and cultural norms, eating disorders seem to be on a rapid rise. describes that 35% of students from a female high school showed a risk of disordered eating, the rates of participants who recorded above the disordered eating confirmatory score for the ChEAT-26 (the children's form of the 26-item Eating Attitudes Test) were 14.1% amongst children aged 8 to 10 years. This indicates disordered eating is prevalent among the Asian population from an early age.

High prevalence of disordered eating has been reported in the Middle Eastern countries, where an astounding 40.5% prevalence was recorded in Jordan, 17.1% in Turkey and 16.7 % in Iran (Mousa, Al-Domi, Mashal, & Jibril, 2010; Pourghassem Gargari et al., 2011; Uzun et al., 2006). The associated factors were mainly sociocultural in nature.

In the Philippines, Lorenzo CR, Lavori PW, and JD (2002) found a prevalence of 3.2% among males and 3.5% among females to have disordered eating. In 2006 , the risk of disordered eating among young adults had increased to 26.7% (Madanat, Hawks, & Novilla, 2006).

In Mumbai, India, Tendulkar et al. (2006) conducted a survey on eating attitudes and behaviours among 451 junior high college students. Results revealed faulty eating habits in 13.3% of the respondents, where students perceived themselves to have problem with eating. To achieve weight loss, some respondents turned to substance use, a controlled diet and exercise.

In 2006, a survey over 4,000 Singaporean women between the ages of 12 and 26 showed a 7.4 % risk of developing disordered eating (Ho T. F, Tai B. C, Lee E. L.,

Cheng S., & H., 2006). In this study a majority of Malay females were found to be at risk of developing disordered eating.

In an article titled “*More youngsters diagnosed with eating disorders*”, published in the Singapore Straits Times in October 2013, the author claimed that a third of 95 teens treated in 2012 for anorexia or bulimia had to be hospitalized (Tan, 2013). The article also claimed that disordered eating among youngsters, as young as 13 years of age, was increasing.

Based on the study findings summarized in Table 2.1, developing countries in Asia, albeit their socio-economic differences are not spared from disordered eating behaviours. The main factors associated with the high prevalence of disordered eating in the Asian countries were self-esteem, depression, body dissatisfaction and sociocultural factors. The issue on disordered eating, if not addressed at initial stages, could pose a serious health hazard.

2.3 Disordered Eating in Malaysia

The summary of researches conducted in Malaysia on the prevalence and the factors associated with disordered eating is presented in Table 2.2.

Table 2.2: Summary of previous studies on disordered eating in Malaysia

Study	Age Group (years)	n	Study Design	Factors Influencing	Findings
Indran et al (1995)	17	132	Cross sectional	Socio-demographic Sociocultural	Possible prevalence of 7% was found to have disordered eating.
Keep P W & Ho BKW (2003)	19-21	445	Cross Sectional	Behaviour	The prevalence rate of EAT-40 positives and BITE (Bulimic Investigatory Test) symptomatic among them were 9.3% and 37.4% respectively.
Pon Lai Wan et al (2004)	mean age 14.76	588	Cross sectional	Socio-economic Body Dissatisfaction	In the normal weight (NW) group, 50% considered themselves as overweight. NW group too had a large majority (74%) who desired to lose weight. Over weight respondents (40%) were likely to skip their daily meals compared to their NW counterparts (16%) (p<0.05).

Table 2.2: Summary of previous studies on disordered eating in Malaysia (continued)

Study	Age Group (years)	n	Study Design	Factors Influencing	Findings
Jeanne L.Edman & Alayne Yates (2004)	20-21	267	Cross Sectional	Psychosocial Body Dissatisfaction	The percentage of EAT-26 total scores that were greater than 20 were as follows: Malay females, 15%; Malay males, 17%; Chinese females, 7%; Chinese males, 3%.
Soo Kah Leng (2008)	15–17	489	Cross-sectional	Behavioural and socio-environmental	22.3% of the respondents had disordered eating. The EAT-26 scores (49.8%) than in the binge scores (34.2%).
Gan W.Y et al (2011)	19-21	584	Cross -Sectional	Psychosocial	18.2% of the samples were at risk of disordered eating. Females had significantly higher proportion at risk of disordered eating There was no sex difference in mean EAT-26 scores.

Based on the information provided in Table 2.2, in the last two decades, the prevalence of disordered eating in Malaysia has increased by three folds. In 1995, Indran et al. conducted a study in Kuala Lumpur on eating behaviours in a group of upper secondary students among the age group of 17 to 18 years, using the Eat Attitude Test (EAT). Their study showed a disordered eating prevalence of 7%. Then, cultural values and attitudes in their pursuit of thinness were found to be significantly associated with eating behaviours. In the past, research on eating behaviours focussed on the outcome of obesity. There was not much focus on the root causes and development of disordered eating or eating disorder.

Based on a study in 2002, comparing gender differences in eating behaviours among Malaysian university students, female students appeared to be suggestively more restrictive in their eating behaviour compared to their male counterpart. Female students expressed more concern on their appearance and body image, whereas, majority of the males expressed overall satisfaction with their body (Khor Geok Lin, Cobiac, & Skrzypiec, 2002).

In 2003, a study was conducted among female undergraduate students on the prevalence of disordered eating using the EAT-40 and Bulimic Investigatory Test (BITE) questionnaires. The EAT-40 indicated a prevalence of 9.3% and the BITE indicated a prevalence of 37.4% (Keep P W & Ho BKW, 2003). They found eating attitude to be significantly associated with (i) ethnicity, (ii) Body Mass Index (BMI), (iii) inability to cope with studies, (iv) poor self-rating of academic performance, (v) body image dissatisfaction, (vi) low self-esteem, (vii) presence of abnormal eating habits among family members, (viii) previous consultation on dieting, and (ix) previous consultation on depression.

Edman and Yates (2004), examined gender and ethnic differences among college students in Malaysia using the EAT-26 questionnaire. In this study, the prevalence of disordered eating was 15% in Malay females; 17% in Malay males; 7% in Chinese females and 3 % in Chinese males. The Malay males and females had a higher risk of disordered eating. The authors concluded that that the main reason for the ethnic difference could be cultural difference. A large number of Malays who participated in the study practiced religious fasting. According to Edman and Yates (2004), Malaysians were alarmed at the thought of being overweight and wanted to be thin although they were of normal weight.

Leng (2008) in his research among 189 secondary school girls found that 22.3% had disordered eating. Restrained eating and binge eating were reported by 36.0% and 35.4% of the respondents, respectively. Out of the 189 students, 87.3% were dissatisfied with their body size. In 2011, W. Gan, M. M. Nasir, M. Zalilah, and A. Hazizi (2011) examined the association between depression, anxiety and stress and disordered eating among university students. Their finding showed that one in five participants had disordered eating. The prevalence was higher among the females (21.3%) compared to males (13.5%). Disordered eating was positively associated with depression, anxiety and stress.

The evidence shows that, in Malaysia, between 1995 and 2011, the prevalence of disordered eating has increased from 7% to 22%. Disordered eating behaviours among adolescents in Malaysia is alarming and this issue cannot be ignored. Many factors are associated with disordered eating. In light of its prevalence among adolescents and the potentially serious consequences, strategies aimed at their prevention are imperative.

2.4 Disordered eating comparing the urban and rural communities

Over the years, researchers have paid little attention to disordered eating in rural communities, yet these communities can provide a unique opportunity to study the effects of varying cultural characteristics between groups. These characteristics are frequently confounded within groups, such as ethnicity and cultural practices. Findings from the few studies that compared rural and urban populations in three countries are provided in Table 2.3.

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Table 2.3: Summary of previous studies on disordered eating among urban and rural communities

Study	Country	Age Group(years)	n	Study Design	Findings
Miller et. al (1999)	America	11-18	868	Cross Sectional	Higher trend towards the EAT-40 scores among rural school children .19.8% had higher risk of disordered eating.
Van Son et. al (2006)	Dutch	12-22	217	Cross Sectional	Adolescents living in urban areas pose a higher risk of binge eating behaviours. Large population-large quantity of food supply(grocery stores, fast food chains)-easy accessibility-harvest unhealthy eating
Serafin (2004)	America	13-18	495	Cross Sectional	Females from rural schools were at high risk compared to those of the suburban and urban group.
Jonat & Lard (2004)	Canada	12-19	396	Cross sectional	Prevalence of disordered eating attitudes and behaviours in the rural setting was similar to that reported in urban communities in Canada.

As summarized in Table 2.3, Miller et al (1999) explored the prevalence of disordered eating in the rural population of East Tennessee, United States of America. In their study they used the EAT-40 questionnaire among school children from the ages of 11 to 18 years. An EAT-40 score of 29 or higher was used as an indication of disordered eating. Their findings showed that 19.8% of the participants had disordered eating. Miller, Verhegge, Miller, and Pumariega (1999) reported that surprisingly the prevalence of disordered eating was high among rural school children despite having an overall lower socio-economic status.

In another study in Holland, Van Son et al (2006) found that adolescents living in urban areas posed a higher risk of binge eating behaviours. They argued that in urban areas, where a large percentage of people resided, it was necessary to cater large food supplies in places like the grocery stores and fast food restaurants. This resulted in easy accessibility to food that leads to unhealthy eating habits.

In 2004, Serafin examined disordered eating behaviour among the urban, suburban and rural high school female students in the United States of America. The findings showed that those from the rural schools were at high risk of disordered eating behaviours compared to those from the suburban and urban locations (Serafin, 2004). The researchers attributed these findings to media exposure. They discovered these adolescents from rural schools were hooked on Hollywood's obsession with skinny celebrities and tend to depict images exhibited in magazines, popular movies and television series.

. However, at the same time period, based on their study among 396 high school students of age 12 to 19, Jonat and Birmingham (2004) reported that there were no

differences in the prevalence of disordered eating, attitudes and behaviours between the rural and urban communities in Canada.

Although much is known about body image and disordered eating in the Malaysian context, there are still scarcities dealing with the sentiments of the rural communities.

2.5 Socio-demographic factors and disordered eating

Many researchers have attempted in establishing the sociodemographic factors that are associated with disordered eating. Some of the studies and findings are summarized in Table 2.4.

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Table 2.4: Summary of previous studies on various sociodemographic factors to disordered eating

Study	n	Socio-demographic	Study Design	Findings
Collins ME. (1991)	1118	Age Association	Cross Sectional	Onset of disparate figure perceptions and expectations regarding thinness among females may be obvious as early as 6 and 7 years of age.
Abraham et. al (1983)	50	Gender Association	Cross Sectional	20% of young women may satisfy the criteria for an eating disorder (bulimia or anorexia nervosa) at some stage and about 7% misuse laxatives or diuretics in order to achieve a fashionably slim figure.
Dianne Nuemark – Stainer et. al (2010)	356	Gender Association	Cross sectional	45% of the girls reported that their mothers encouraged them to diet and 58% reported weight-teasing by family members.

Table 2.4: Summary of previous studies on various sociodemographic factors to disordered eating (continued)

Study	n	Socio-demographic	Study Design	Findings
.Eapen et al (2006)	495	Gender Association	Cross Sectional	23.4% of females found to have disordered eating, of 23.4% half of those were found to have a propensity for anorexic behaviour, while 2% met the criteria for the full clinical syndrome.
Francis & Brich (2005)	173	Gender Association	Cross sectional	Mothers' preoccupation with weight and eating, via attempts to influence daughters' weight and eating habits.
Alison et. al (1997)	1325	Gender Association	Cross sectional	More females reported trying to lose weight or maintain their current weight, bulimic tendencies affected both male and female adolescents from multi ethnic background.
Dianne Nuemark – Stainer et. al (1999)	9118	Gender Association	1 year cohort	Frequent weight control behaviour among females. Older girls reported slightly more dieting and disordered eating.
Bramon-Bosch et. al(2000)	60	Gender Association	2.5 years cohort	Similar findings to disordered eating among male and female in the sample.
Nur Syuhada (2011)	356	Association with BMI	Cross Sectional	Disordered eating was seen associated with BMI status.

Table 2.4: Summary of previous studies on various sociodemographic factors to disordered eating (continued)

Study	n	Socio-demographic	Study Design	Findings
Fan et. al (2010)	3544	Association with BMI	Cross Sectional	High BMI was significantly associated with high score of drive for thinness, body dissatisfaction, and disordered eating behaviours.
Jones et al (2001)		Association with BMI	Cross Sectional	Disordered eating attitudes and behaviours were present in over 27% of girls aged 12–18 years and were seen to increase gradually throughout adolescence and those with high BMI.
Lynch et al (2008)	962	Association with BMI	Cross Sectional	Body dissatisfaction was a significant mediator of the relationship between body mass index (BMI) and disordered eating for both ethnic groups.
Wang et al (2005)	768	Ethnic & Socioeconomic (SES) Associations	Cross sectional	No significant SES and ethnic difference in the proportion of participants with eating problems and body dissatisfaction.
Gan et al(2011)	584	Ethnic & Socioeconomic (SES) Associations	Cross Sectional	Prevalence of disordered eating among university students were high in Malaysia where 18.2 % with no sex and ethnicity differences seen.
Jennifer A. Boisvert (2009)	386	Ethnic & Socioeconomic (SES) Associations	Cross Sectional	Respondents from English speaking household reported higher tendency to think about dieting than non-English speaking household.

Table 2.4: Summary of previous studies on various sociodemographic factors to disordered eating (continued)

Study	n	Socio-demographic	Study Design	Findings
Swami & Tovee (2007)	119	Ethnic & Socioeconomic (SES) Associations	Cross Sectional	Preferences for physical attractiveness, with the indigenous Sámi desiring figures with larger BMIs and more tolerant of heavyweight figures than either Finnish participants in Helsinki or Britons in London, who were indistinguishable in their preferences for slim figures.
MJ Tové et. al (2006)	135	Ethnic & Socioeconomic (SES) Associations	Cross Sectional	Differences in attractiveness preferences for female bodies between United Kingdom (UK) Caucasian and South African Zulu observers. In the UK, a high body mass is correlated with low health and low fertility, and the converse is true in rural South Africa.
Grogan (2007)		Ethnic & Socioeconomic (SES) Associations	Literature Review	Youth, control and success of women encourages objectification of the body and the disproportionate allocation of energies to body upkeep.
Gard & Freeman (1996)		Ethnic & Socioeconomic (SES) Associations	Literature Review	There is an increased prevalence of eating disorders in high socioeconomic groups.
Rogers et al 1997	17,571	Ethnic & Socioeconomic (SES) Associations	Cross sectional	There may be a significant relationship between SES and dieting or other behaviours associated with disordered eating. However that does not appear to be a significant factor, among those who meet psychiatric criteria for an eating disorder.

As evidenced by Collins ME (1991), based on a study on children between the ages of eight and ten, disordered eating seem to be inculcated at a very young age (Table 2.4). Collins also found that almost 50% of the female and 33% of the male respondents was dissatisfied with their size. Most females were dissatisfied and desired to be slimmer, while about half of the males wanted to be heavier and/or have a more muscular appearance. Apart from Collin's study, many other studies also indicated that disordered eating to be more common among the females compared to the males (Abraham et al., 1983; Dianne Neumark-Sztainer et al., 2010; V. Eapen, Mabrouk, A. A., & Bin-Othman, S., 2006; Francis & Birch, 2005; Indran et al., 1995).

In a survey by the National Association of Anorexia Nervosa and Associated Disorders, it was found that 95% of those who had disordered eating were within the ages of 12 and 25 (Herpertz-Dahlmann et al., 2001).

As it is found to be common at a very young age the epidemiological factors and other imperative factors associated with disordered eating have to be identified and addressed in an appropriate manner.

A study conducted by Alison E Field, Colditz, and Peterson (1997), on bulimic behaviours involving a large group of participants from an urban public high school in Northeast of America reported that around 61% of the girls and 43% of the boys were trying to lose weight or sustain with their current weight. Neumark-Sztainer D., Story M., Faulkner, Beuhring, and Resnick (1999) pursued to determine the prevalence of disordered eating behaviours, focusing at weight loss and weight/muscle gain among adolescents across sociodemographic and personal variables in Connecticut. The study showed that 7.4% of adolescent girls and 3.1% of adolescent boys reported to have indulged in self-induced vomiting, taking pills to diet, laxatives, or diuretics over the previous week. Their study also reported that girls with high body mass index had the

greatest risk for disordered eating, whereas boys with the lowest body mass index had the greatest risk for steroid use.

It is generally perceived as a disorder affecting the female population on grounds that they tend to be more body conscious. However, the trend of a thin body image is slowly seeping among the male population.

In a study by Bramon-Bosch, Troop, and Treasure (2000), a comparison was made between 30 male and 30 female respondents who were undergoing assessed at the Maudsley hospital, London for 30 months. Their findings showed that 33% out of the males were anorexic, 50% were bulimic and 17% met the criteria for an eating disorder not otherwise specified. The female sample showed similarities to the males by diagnosis.

Looking at table 2.4, it is much evident that females suffered from disturbed eating behaviours such as excessive dieting and striving for thinness. It was also found that elevated body mass index may be associated disordered eating behaviours.

A cross-sectional survey among 2019 adolescent girls and 1525 adolescent boys in the 7th, 8th, 10th and 11th grades from seven cities in China revealed that BMI was significantly associated with drive to be thin, body dissatisfaction, bulimia, low self-esteem, interceptive deficits and maturity fears, as well as perceived body weight status. (Fan et al., 2010).

A study conducted among Malaysian adolescents, examining how body image, BMI, and eating attitudes were related, found an association between emotional eating and BMI (Nur Syuhada Zofiran, 2011). Jones, Bennett, Olmsted, Lawson, and Rodin (2001) found that, age and body mass index were independently related to symptoms of eating disorders. Lynch, Heil, Wagner, and Havens (2007) found that regardless of

ethnicity or gender, BMI was positively correlated with body concerns and weight control behaviours. In another study, Lynch, Heil, Wagner, and Havens (2008), also found that body dissatisfaction mediated the relationship between BMI and eating disorder risk. Although body dissatisfaction was not associated with BMI or binge eating, it was apparently associated with body size and some risky weight control behaviours.

Based on the information summarized in Table 2.4, ethnicity and socioeconomic status seem to have inconclusive effects on disordered eating. In a study comprising of multi ethnic population of 10 to 18 years old adolescents in Australia, comprising of Caucasian Australian, Chinese, Vietnamese, Italian and Greek ethnicity, socioeconomic status had shown no influence in disordered eating.

In most studies, parents occupation and income did not show significant association with disordered eating and body dissatisfaction (Wang, Byrne, Kenardy, & Hills, 2005). A similar observation was made in a Malaysian study by W.Y. Gan, Mohd Nasir M.T, Zalilah M.S, and Haziz (2011). In two studies, individuals with higher socioeconomic status were found to have more body image problems and disordered eating, regardless of their culture of origin (Boisvert & Harrell, 2009; Swami & Tovée, 2007). Higher socioeconomic status was also associated with preference for thinner figures in a number of populations (Viren Swami & Martin J Tovée, 2005; Swami & Tovée, 2007; Tovée, Swami, Furnham, & Mangalparsad, 2006).

Based on literature, it is inconclusive if ethnicity and socioeconomic status have an influence over disordered eating and this need to be explored further.

2.6 Disordered Eating Practices

Binge eating, self-induced vomiting, use of dietary substitutes such as diet pills, herbal products, diet drinks and excessive exercising are among the few disordered eating practices. Unhealthy weight loss mechanism could lead to a dire health outcome if left undetected for prolonged periods. Table 2.5 shows the types of disordered eating practices.

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Table 2.5: Summary of previous studies on types of disordered eating practices

Study	n	Disordered Eating Practices	Study Design	Findings
Marcus et. al (1985), Wadden et. al (1992)	432 235	Binge Eating	Cross Sectional 26 week Randomized Control Trial(RCT) using Cognitive Behavioral Therapy (CBT)	Dietary inhibition due to excessive concern with shape and thinness.
Eldredge et. al (1997)	46	Binge Eating	12 week phase RCT using CBT	Binge eaters have negative affect to perceived evaluation of weight by others.
Sierra et. al (2009)	259	Binge Eating	Cross sectional	Adolescents who binge eats have psychosocial competences, emotional and behavioural problems compared to those who do not engage in binge eating.
Neumark-sztainer (2002)	4746	Binge Eating	Cross Sectional	Overweight adolescents who experienced frequent weight teasing engaged in binge eating practices.

Table 2.5: Summary of previous studies on types of disordered eating practices (continued)

Study	n	Disordered Eating Practices	Study Design	Findings
Fairburn et. al (1998) Stice et. al (2002)	360	Binge Eating	Case control 2 year cohort	Obesity, negative self-evaluation, body dissatisfaction, depressive symptoms, emotional eating, body mass, and low self-esteem predicted binge eating.
Neumark-sztainer (2006)	2516	Binge Eating	5 year cohort	Binge eating was interconnected with other disordered eating practices for extreme weight control behaviour like self- induce vomiting, use of diet pills, laxatives and diuretics.
Fairburn & Cooper (1982)	620	Self –Induced Vomiting	Cross sectional	Self-induced vomiting and binge eating were associated with weight and body shape concern and disordered eating.
Austin et. al (2008)	2791	Self-Induce Vomiting	Cross Sectional	Irregular menses was found to be linked to self-induced vomiting in a nonclinical sample: findings from the national eating disorders screening program in high schools.

Table 2.5: Summary of previous studies on types of disordered eating practices (continued)

Study	n	Disordered Eating Practices	Study Design	Findings
Mitchell & Crow (2006)		Self-Induce Vomiting	Literature review	Other complication associated with self-induced vomiting were dehydration, body fluid imbalance, stomach acid secretions resulting in erosion of the dental enamel and full blown eating disorder.
Jones et al (2001)	1739	Self-Induce Vomiting	Cross Sectional	Disordered eating was associated with an increased risk of self-induce vomiting and binge-eating.
Neumark- Stainer (2011)	2287	Use of Diet Pills/Laxatives and Diuretics	10 year cohort	Increase use of diet pills and laxatives in females as compared to males.
Abebe et. al (2012)	12287	Use of Diet Pills/Laxatives and Diuretics	13 year cohort	Frequency of diet regime usage declined with the changeover from adolescence to adulthood.

Table 2.5: Summary of previous studies on types of disordered eating practices (continued)

Study	n	Disordered Eating Practices	Study Design	Findings
Gapin et. al (2009)	28	Excessive Exercising	Cross sectional	Exercise addiction leading to cope with other aspects of life.
Yates (2013)	584	Excessive Exercising	Literature	Link between Exercise addiction and disordered eating. Being labelled as compulsive athleticism which is problematic as it assumes the central position in the life of an individual.
Crisp et. al (1994)	102 patients	Excessive Exercising	Retrospective analysis of 5.9 years on patients records	Excessive exercise was found to be the last symptom to subside on patients with disordered eating.
Solenberger (2001)	199	Excessive Exercising	3 year Retrospective analysis on in patients records	Study demonstrates that patients with excessive exercise show significantly greater drive for thinness and require a longer length of hospitalization.

Table 2.5: Summary of previous studies on types of disordered eating practices (continued)

Study	n	Disordered Eating Practices	Study Design	Findings
Fairburn et. al (2003), Garfinkel et. al (1995)	8119	Excessive Exercising	Literature review Cross sectional	Excessive physical activity attributed by drive for thinness and the need to recompense for eating.
McDonald & Thompson (1992)	791	Excessive Exercising	Cross Sectional	Excessive exercising was to facilitate weight loss and drive for thinness.
Holtkamp et. al (2004)	30	Excessive Exercising	Cross sectional	Anxiety symptoms and food restriction synergistically contribute to increased levels of physical activity.
Davis et. al (1998)	53	Excessive Exercising	Cross sectional	Excessive exercise is linked to obsessive compulsive symptoms in disordered eating.
Riccardo et al (2008)	165	Excessive Exercising	Cross sectional	Dietary restraints, weight and shape concerns seen to be associated with excessive exercising.
Wakso (2012)	2947	Excessive Exercising	Cross Sectional	Study indicated a relationship between disordered eating and exercise addiction in both genders. Females and males are exhibiting these weight control behaviors and should be of concern to health educators.

2.6.1 Binge Eating

Binge eating behaviour occurs when a person experiences lack of control over eating and is unable to curb what or how much one consumes (C. G Fairburn & G.T. Wilson, 1993).

An eating episode is considered as a binge-eating episode when an amount of food eaten is absolutely larger than the amount most people would consume during a similar period of time and under similar circumstances. By definition, eating has to happen within a discrete period of time (two hours) and there has to be a sense of deficiency of control over eating during that period. Most people who engaged in binge eating dine in privacy as they are embarrassed by the amount of food being consumed.

During binge eating episodes, those suffering from eating disorders tend to eat their meals rapidly without enjoying the food being consumed. Huge portions of food are eaten even when a person is not feeling physically hungry.

Binge eaters subsequently feel disgusted with themselves, depressed or very guilty (Spitzer et al., 1991) and are more likely to report dietary disinhibition (Marcus, Wing, & Lamparski, 1985; Wadden, Foster, & Letizia, 1992). As summarized in Table 2.5, excessive concern with shape and thinness and difficulty in deducing visceral sensations are related to hunger and satiety (Kuehnel & Wadden, 1994; Marcus, Wing, & Ewing, 1990).

Furthermore, adolescents with binge eating habits have a tendency to experience negative affect in response to perceived evaluation by others of weight-related behaviour (Eldredge et al., 1997).

The indicative criterion for binge eating is questionable, partly because of the difficulty operationalizing a binge episode. For several reasons, researchers and

clinicians are often unsuccessful in assessing and differentiating an unusually large amount of food from overeating (Z. Cooper & Fairburn, 2003). Assessors are not consistent in recognizing bouts of overeating from grazing (i.e., eating continuously throughout the day instead of eating planned meals) and in interpreting what constitutes a truly large portion size from normal intake, overindulgence or circumstantial eating (e.g., holiday). These discrepancies make it difficult to justify the true number of binge episodes experienced by a patient or research participant.

Researchers, clinicians and patients are inconsistent in informing if loss of control in binge eating was present (Z. Cooper & Fairburn, 2003). Some individuals may report loss of control after eating a small amount of food (e.g., one cookie), while others may only feel a sense of loss of control after a much larger amount of food (e.g., a box of cereal).

As summarized in Table 2.5, exploring the relationship between binge eating and behavioural problems for a sample of adolescents, Sierra et al. (2009), found that binge eating was a frequent behaviour in adolescence, with 33.2% of the sample reporting binge eating at least once in the last six months. The adolescents who reported binge eating had higher scores on most of the Youth Self Report (YSR) first-order factors compared to those who did not engage in this behaviour (Sierra-Baigrie, Lemos-Giraldez, & Fonseca-Pedrero, 2009). The YSR is a self-report questionnaire designed for adolescents which allowed them to assess their psychosocial competences, emotional and behavioural problems in a standardized format (Achenbach, 1991).

D. Neumark-Sztainer et al. (2002) found perceived weight-teasing was significantly associated with disordered eating behaviours among overweight and non-overweight girls and boys. Among the overweight youths, 29% of girls and 18% of

boys who experienced frequent weight-teasing reported binge-eating as compared to only 16% of girls and 7% of boys who were not teased.

Studies have found that, obesity, negative self- evaluation, body dissatisfaction, depressive symptoms, emotional eating, body mass, and low self-esteem were associated with binge eating (C. G. Fairburn et al., 1998; E. Stice, Presnell, & Spangler, 2002).

Binge eating is a disordered eating behaviour that needs to be curbed. A prolonged habit could lead to a full blown eating disorder which is distinguished as a psychiatric problem. Binge eating is often found to be interconnected with other related disordered eating behaviours.

In a study of adolescents using unhealthy weight-control behaviours, there was an increased risk for binge eating with loss of control (OR=6.4 with 95% CI for girls; OR=5.9 with 95% CI for boys) and for extreme weight-control behaviour such as self-induced vomiting and use of diet pills, laxatives and use of diuretics (D. Neumark-Sztainer et al., 2006).

2.6.2 Self -Induced Vomiting

Self -induced vomiting occurs when a person regularly engage in purging out the food contents to prevent weight gain. This practice is usually performed discretely.

As summarized in Table 2.5, a study examining the secrecy surrounding self-induce vomiting, 620 women, mostly with normal body weight, were found to have practiced self-induced vomiting. Out of the 620, 499 (83.0%) fulfilled diagnostic criteria for bulimia nervosa, of which, 56.1% practiced self-induced vomiting at least once a day, with the mean duration of vomiting of 4.5 years (standard deviation 4.0), using standardized measures, 68.1% of women exhibited pronounced psychiatric morbidity,

89% of the respondents had disturbed attitudes to food and eating and 56.4% thought they absolutely desired medical help (C G Fairburn & Cooper, 1982). Cooper and Fairburn concluded that self-induced vomiting along with binge eating were strongly associated with disturbed attitudes to food, eating, body weight and shape (P. J. Cooper & Fairburn, 1983).

Researchers analyzed self-reported data from 2,791 girls between the ages 14 and 19 in the United States and found almost 9% reported vomiting for weight control between one and three times a month and an additional 3.1% vomited once a week or more (Austin et al., 2008). Further analysis, to evaluate the risk of irregular menses (defined as menses less often than monthly), revealed that vomiting frequency, adjusting to other eating disorder symptoms, weight status, age, race/ethnicity, and school clusters showed self-induced vomiting for weight control were associated with irregular menses. Besides irregular menses, other medical complications that are frequently associated with prolonged self-induced vomiting, include dehydration that leads to electrolyte and body fluid imbalance, stomach acid secretions resulting in erosion of the dental enamel as well as gastrointestinal complications. This eventually lead to a full blown eating disorder (Mitchell & Crow, 2006).

In a school based study, on teenage girls for disordered eating attitudes and behaviours, it was found that 13% of those between ages 12 to 14 years and 16% of those aged 15 to 18 years had scores above the suggested cut-off (≥ 20) for disordered eating on the Eating Attitude Test (EAT-26) (Jennifer M. Jones et al., 2001).

In a study on dieting to lose weight, Jones et al. (2001), found binge eating among 23% of participants, loss of control in 15% of participants, self-induced vomiting in 8.2% and the use of diet pills in 2.4%. It is alarming that some young adolescents turn to the use of substances in the form of diet pills, laxatives and diuretics to lose

weight (D. Neumark-Sztainer, M. Wall, N. I. Larson, M. E. Eisenberg, & K. Loth, 2011; D. Neumark-Sztainer, 2005).

2.6.3 Use of Diet Pills/Laxatives and Diuretics

The use of diet pills /laxatives and diuretics, based on literature, are shown in Table 2.5. Frequent use of diet regimes, laxatives and other forms of weight loss formulas is seemed to be a growing trend (D. Neumark-Sztainer et al., 2011; L Smolak, 1996). With the media disseminating and promoting these weight loss products in an excessive manner including its easy purchasing over the counter, there are no restrictions to its access. Excessive use of diet formulas and use of laxatives in an unprescribed manner could lead to untoward health outcomes like stimulation of the central nervous system of the body causing addictions, insomnia, nausea, elevated blood pressure, diarrhea, rash, lung and heart complications, and anxiety (Sherry, 1999).

Americans spend over \$40 billion (RM 155.3 billion) on dieting and diet-related products each year (L Smolak, 1996). Over one-half of teenage girls and nearly one-third of teenage boys turn to unhealthy weight control mechanism such as skipping meals, fasting, smoking cigarettes, vomiting and consuming diet pills/ laxatives (D. Neumark-Sztainer, 2005).

Studies have rarely examined diet pill/laxative use, and as a consequence little is known on the behaviour itself. Two longitudinal studies had reported on changes in purging and non-purging weight control behaviours from adolescence to young adulthood. Project EAT, a longitudinal study of high school students in Minneapolis, St.Paul (United States, US), found an age effect in that, over a 10-year period, the prevalence of diet pill use increased in girls and boys, laxative use increased in girls, and vomiting reduced in girls and boys (D. Neumark-Sztainer et al., 2011).

The comparisons of two cohorts discovered that fewer students in a cohort recruited in year 2010 reported extreme weight control behaviours as compared to the samples in year 1999 (D. Neumark-Sztainer et al., 2012).

A study conducted among a nationally representative sample of Norwegian school children (ages 12 to 20 years at study entry), comparing purging and non-purging weight control behaviours, found that diet pill use was classified as a non-purging behaviour. Age differences in rates of purging and non-purging weight control behaviours were surveyed by grouping participants into four age categories: 14–16, 17–19, 20–22, and ≥ 23 years old at each wave. In both boys and girls, prevalence estimates of purging and non-purging weight control behaviours progressively declined with the changeover from adolescence to adulthood (Abebe, Lien, Torgersen, & von Soest, 2012).

Early identification of individuals who practice unhealthy weight control through the diet regimes, laxatives and other forms of weight loss formulas are important. These individuals may require something beyond regular counseling and guidance to halt these disordered eating practices.

2.6.4 Excessive Exercising

Excessive exercising is another common behaviour among the adolescents to lose weight. Although much is known about the positive effects of exercise on physical and psychological well-being, there are few indications on the negative effects of exercise addiction and its associated disorders (Cockerill & Riddington, 1996).

For some individuals, routine exercise patterns can become maladaptive and may contribute to the development of excessive exercise patterns and exercise addiction (Gapin et al., 2009). Addiction has been defined as “any obsessive activity or

involvement which reduces a person's ability to deal with other aspects of his or her life to the point where the activity compromises the dominant source of emotional reinforcement and identity for the person" (Gapin et al., 2009). Yates (2013) claimed that exercise and dieting are 'sister activities' with reference to the etiology and that a serious investment in one was likely to be escorted by the preoccupation with the other.

The significance of excessive exercise in disordered eating is highlighted by the fact that it is often one of the last symptoms to subside (Crisp, Hsu, Harding, & Hartshorn, 1980; Davis, Kennedy, Ravelski, & Dionne, 1994). For example, a three-year in-patient hospital records examination that found disordered eating patterns in patients across diagnoses who were excessive exercisers required a longer length of hospitalization than non-excessive exercisers (Solenberger, 2001). In addition, excessive exercise has been recognized as an important risk factor for relapse in anorexia nervosa (J. Carter, Blackmore, Sutandar-Pinnock, & Woodside, 2004; Casper & Jabine, 1996) .

Three psychological hypotheses have been suggested to explain the high levels of physical activity in disordered eating (i.e., compensation, affect regulation and compulsivity). The first hypothesis asserts that excessive exercise is determined by a drive for thinness and a need to recompense for ingested food (Christopher G Fairburn, Cooper, & Shafran, 2003; Garfinkel et al., 1995; David M Garner & Garfinkel, 1997).

In this outlook, excessive exercise is essentially a magnitude of cognitive processing associated with eating psychopathology (i.e., weight preoccupation). The primary function of excessive exercise is therefore to facilitate weight loss. Indeed, many eating disordered patients in retrospect clearly attribute their high activity levels to the longing to lose weight, especially at the beginning of weight loss (McDonald & Thompson, 1992).

The second hypothesis postulates excessive exercise is a way to adapt chronic negative affect (Casper, 1998; Davis & Woodside, 2002; Christopher G Fairburn et al., 2003; Holtkamp, Hebebrand, & Herpertz-Dahlmann, 2004). Patients with eating disorder frequently described using exercise as much to control the mood as to consume calories (Davis & Woodside, 2002). One study suggested an overlap between the two psychological hypotheses, reporting that the acute phase of anorexic anxiety and food restriction may collaborate to contribute to increased levels of physical activity (Holtkamp et al., 2004).

The third hypothesis states that obsessive-compulsiveness outcomes in exercise behaviour becoming ritualized, stereotyped and excessive (Davis, Kaptein, Kaplan, Olmsted, & Woodside, 1998). Supporting this, excessive exercise has been shown to be linked with greater obsessive-compulsive symptomatology and personality traits both in disordered eating and non-eating disordered exercisers (Davis et al., 1998).

It is also true that many excessive exercisers report ongoing exercise even when it is no longer rewarding (Davis & Woodside, 2002). However, a study in 2010 found evidence of an inverse relationship between obsessive-compulsive symptomatology and excessive exercise in Anorexia Nervosa, thereby calling into question the rationality of this specific etiological model (Bewell-Weiss & Carter, 2010).

Among disordered eating samples, excessive exercise has been shown to be associated with higher levels of dietary restraint, weight and shape concerns (Dalle Grave, Calugi, & Marchesini, 2008), drive for thinness (Solenberger, 2001), body dissatisfaction (Brewerton, Stelfox, Hibbs, Hodges, & Cochrane, 1995) and bulimic tendencies (Ackard, Brehm, & Steffen, 2002).

In addition, Mond and Calogero (2009), demonstrated that the extent to which exercise is undertaken mainly to change weight or shape is one of the dimensions of excessive exercise. This was strongly associated with disordered eating psychopathology and reduced quality of life.

Evidence shows that excessive exercise and disordered eating behaviours influence health and wellbeing. These unhealthy weight control behaviours are serious and may be injurious to those who frequently engage in them (Wasko, 2012). While these disordered eating behaviours are often ignored by society, it is crucial to determine the frequency of these disordered behaviours in order to reduce the prevalence of them. Disordered eating behaviours and excessive exercise patterns can detrimentally adjust an individual's lifestyle, causing physical, mental, emotional, financial, medical and social problems (Wasko, 2012).

2.7 Self –Esteem and Disordered Eating

Findings from literature search on the association between self-esteem and

Disordered eating are summarized in table 2.6.

Table 2.6: Summary of previous studies on the associations of self- esteem to disordered eating

Study	Age Group	n	Study Design	Findings
Markham et. al (2005)	18-25	146	Cross Sectional	Low self-esteem predicts increased susceptibility to body dissatisfaction.
Bas et. al (2004)	15-18	783	Cross sectional	Low self- esteem is associated with disturbances in eating habits.
Davidson & McCabe(2006)	Mean age 13.92	418	Cross sectional	Low self- esteem contributes to poorer body image and eating disorder symptoms.
Friestad & Rise (2004)	15,18 and 21	487	10 year prospective cohort	Self- esteem has an effect on body image and dieting behaviour in adolescent males.
Grilo & Masheb (2001)	Above 21	145	Cross sectional	56% & 33% of obese men and women accounted body dissatisfaction for by binge eating and self-esteem.
Talwar (2012)	Mean age 21.4	217	Cross sectional	Younger students had lower self -esteem and are more vulnerable to disordered eating habits.

Table 2.7: Summary of previous studies on the associations of self- esteem to disordered eating (continued)

Berg et. al (2009)	Mean age 19.5	186	Cross sectional	28% girls with low self-esteem had higher disordered eating scores.
Bardone et al (2007)	Mean age 18.5		Literature Review	Low self-esteem has been found to moderate perfectionism and bulimia symptoms.
Grant & Fodor (1986)	10 to 12 th graders	169	Cross Sectional	Low self-esteem has been associated with binge eating.
Fisher et. al (1991)	Mean age 16.2	268		
Akan & Grilo (1995)	Mean age 22	98		
Neumark-Sztainer et. al (1995)	42-97	257		
Finstad (2003)			Cross Sectional	Personal obsession with thin ideal, with disordered eating seen in low self-esteem.
O'Dea and Abraham (2000)	11-14	470	12 month RCT	Improving self-esteem may be effective to prevent the development of eating disorders, particularly if reinforced by teachers and family.

Guindon, defines self-esteem as the attitudinal, evaluative aspect of the self; the affective decisions placed on the self-concept comprising of feelings of worth and acceptance, which are developed and preserved as a consequence of awareness of competence, sense of achievement, and feedback from the external world (Guindon, 2002). According to Rosenberg (1965) cited in Clay, Vignoles, and Dittmar, 2005, self-esteem is a 'positive or negative attitude towards the self' (Clay, Vignoles, & Dittmar, 2005; Rosenberg M, 1965). The findings explained as how well a person prizes, values, approves or likes him or herself (Blascovich, 1993).

Positive implications of having high self-esteem have been to predict a reduction in depressive symptoms over time and to aid recovery (J. E. Roberts & Monroe, 1992). Those with high self-esteem are able to perform independently, assume responsibility and endure frustration and endeavor new tasks with confidence (Butler & Gasson, 2005). Besides being associated with less depression, high self-esteem is linked with less neuroticism (Robins, Hendin, & Trzesniewski, 2001) and increased levels of self-satisfaction (Diener, 2000).

Low self-esteem has been found to predict increased vulnerability to body image dissatisfaction (Markham, Thompson, & Bowling, 2005) and disturbance in eating attitudes (Bas, Asci, Karabudak, & Kiziltan, 2004).

Davison and McCabe (2006) have concluded in their findings that poor body image may impede adolescents' development of interpersonal skills and positive relations with boys and girls. Several studies have reported gender variances in the associations of body image, self-esteem and eating attitudes. In one study, body image has been reported to be significantly correlated with self-esteem for males but not for females (Davis & Cowles, 1991).

Adolescent males' self-esteem seem to have an effect on body image and dieting behaviour while for females only body image has been seen to be associated with dieting behaviours (Friestad & Rise, 2004). In 2001, Grilo and Masheb (2001) examined body image dissatisfaction in obese men and women seeking surgery to solve the problem. 56% of the variance in men was accounted for by binge eating and self-esteem, whereas it was 33% of the variance in women.

Button, Sonuga-Barke, Davies, and Thompson (1996) conducted a study to look at the role of self-esteem in subclinical disordered eating behaviour among 600 adolescent girls. The results showed support for the predictive value of low self-esteem for disordered eating, 28.1% of girls with low self-esteem had high disordered eating scores. In addition, Berg, Frazier, and Sherr (2009) found that an increase in self-esteem was one of the most reliable predictors of reducing eating pathology for college women over a two-month period.

Low self-esteem has been found to moderate perfectionism and feeling overweight in predicting bulimia symptoms. This is apparent in women striving for perfectionism, those who consider themselves overweight and show bulimic symptoms only if they have low self-esteem (Bardone-Cone et al., 2007). The association between low self-esteem and disordered eating such as binge eating has been demonstrated in several studies (Akan & Grilo, 1995; Fisher, Schneider, Pegler, & Napolitano, 1991; Grant & Fodor, 1986; D. Neumark-Sztainer et al., 1995a). In a sequence of community-based case-control studies, Fairburn et al. showed that low self-esteem was a significant risk factor for bulimic eating (C. G Fairburn & G.T. Wilson, 1993).

Finstad (2003) discovered that internalization and personal investment in the thin-ideal, tied with disordered eating scores, was predicted by lower self-esteem and greater importance placed on appearance as a source of self-esteem in adolescent

females. Another study conducted in Denmark, showed similar finding as that of Finstad's, indicating that women suffering from an eating disorder had lower self-esteem (Blaase & Elklit, 2001). These women used more inefficient coping methods, and were subjected to more stress than those without disordered eating.

In summary, low self-esteem has been found to contribute significantly to disordered eating behaviour. It has been associated with gender, body image dissatisfaction, thin idealization and perfectionism. O'Dea and Abraham (2000) conducted an education based intervention that focused to improve body image by building general self-esteem. Their findings showed that working to improve a person's self-esteem may improve body image and eating attitudes in adolescents (O'Dea & Abraham, 2000). The intervention was found to improve body satisfaction, physical appearance ratings and disordered eating.

2.8 Body Dissatisfaction and Disordered Eating

Studies on the association between body dissatisfaction and disordered eating

and the findings are summarized in Table 2.7.

Table 2.7: Summary of previous studies on the relationship between body dissatisfaction and disordered eating

Study	Age Group	n	Study Design	Findings
D. Neumark-Sztainer et. al (2006)	Teen boys and girls	2516	5 Longitudinal study	Lower body satisfaction in adolescent girls projected future higher levels disordered eating.
Johnson & Wardle (2005)	mean age 19.5	1177	Cross sectional	Body dissatisfaction predicted emotional eating, binge eating, and abnormal eating habits.
Wertheim et. al (2001)	Grade 7,8 and 10	435	Cross sectional	Body dissatisfaction predicted future increases in restrictive eating.
Blowers et. al (2003)	10-13	153	Cross Sectional	Body dissatisfaction has extended from prepubescent girls to adults.
Linda Smolak (2004)	Mean age 18.2		Literature Review	Body dissatisfaction during childhood and adolescence creates risk for the development of eating disturbances. Factors such as peer relationships, family characteristics, personality traits and body mass index have been found to be influencing factors.
Stice (2001)	13-17	231	Cross sectional	Body dissatisfaction predicts depressive symptoms in adolescent hence leading to unhealthy weight control measures.
Stice (2002)	18-24		Literature Review	Sociocultural processes nurture body dissatisfaction, which in turn increase the risk for bulimic pathology.

Table 2.7: Summary of previous studies on the relationship between body dissatisfaction and disordered eating

Study	Age Group	n	Study Design	Findings
Stormer & Thompson (1996)	18-21	162	Cross Sectional	Social comparison of one's appearance with others correlated with various measures of body dissatisfaction or negative body image.
Catrin et. al (2000)	Mean age		Literature Review	Women who focused on thin attractive models in television commercial reported more body dissatisfaction. Findings are discussed with regard to sociocultural models and its influence on body image.

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According to Grogan (2007), body dissatisfaction exists within the context where body image is socially determined not by actual shape or size. Ogden (2003) described body dissatisfaction as a discrepancy between an individual's perception of his/her body size and real body size. It is a discrepancy between his/her perception of his/her actual size compared to ideal size or as feelings of discontent with the body's size and shape. Body dissatisfaction arises when an individual internalizes a culturally determined body ideal and realizes there is a discrepancy between her own body in comparison with the ideal (Dunkley, Wertheim, & Paxton, 2001a; Ogden, 2003). Another viewpoint refers to one's negative feelings and cognition regarding the body and its conceptualization used in the measure such as the Eating Disorder Inventory (Ogden, 2003).

Body dissatisfaction has been found to play a role in disordered eating (Table 2.7). A five-year prospective study established that lower body satisfaction in adolescent girls projected future higher levels of dieting, unhealthy weight control behaviours (defined as fasting, eating minimal food, using a food substitute or smoking cigarettes), very unhealthy weight control behaviours (defined as consuming diet pills, inducing vomiting, using laxatives, and using diuretics), and binge eating (D. Neumark-Sztainer et al., 2006).

Johnson and Wardle (2005) further established that body dissatisfaction predicted emotional eating, binge eating, and abnormal attitudes about eating and weight, in addition to low self-esteem, stress, and depression. Wertheim, Koerner, and Paxton (2001) study with students in grades 7, 8, and 10 found that for grade seven girls, body dissatisfaction predicted future increases in restrictive eating, while being teased about weight predicted later increases in bulimic behaviours.

Body dissatisfaction is a common component in the female population. Studies have found that females with body dissatisfaction are positively associated with disordered eating behaviours (Annette S. Kluck 2010; Dianne Neumark-Sztainer et al., 2010; Sue-Yee Tan & Yew, 2012). Although commonly found among adolescence body dissatisfaction has extended from prepubescent girls to adults (Blowers, Loxton, Grady-Flessler, Occhipinti, & Dawe, 2003; David M Garner, 2004).

Body image dissatisfaction forms a basis to envisage the formation of eating disturbances where many factors such as peer relationships, family characteristics, personality traits and body mass index have been found to be influencing factors (Linda Smolak, 2004). Body dissatisfaction seems to lead to dieting because it is thought that dieting is an effective weight control strategy. Body dissatisfaction may also bring about a negative effect because appearance and physique are important criteria by which individuals, particularly women, appraise their worth. In a meta-analytic review looking at risk and maintenance factors for disordered eating, E. Stice and Shaw (2002) reported that body dissatisfaction was “one of the most consistent and robust risk and maintenance factors for eating pathology.”

There is sufficient evidence to show that body dissatisfaction is associated with depressive symptoms in adolescent, leading to unhealthy weight control measures (D. Neumark-Sztainer, Paxton, Hannan, Haines, & Story, 2006; E. Stice & Bearman, 2001; E. Stice, Hayward, Cameron, Killen, & Taylor, 2000).

E. Stice and Shaw (2002) proposed that body dissatisfaction increases the risk of disordered eating via two mechanisms. Firstly, body dissatisfaction may lead to dieting as a way to lose excess weight, which in turn leads to the development of anorexic and bulimic habits. Secondly, a negative affect regulation pathway where responses from

social environment due to the importance placed on appearance in turn may increase the risk for disordered eating behaviours.

Stormer and Thompson (1996) established that individual differences in the purpose for social comparison of one's appearance with others are significantly correlated with various measures of negative body image. Female undergraduates with high levels of weight and shape worry tend to emphasize appearance and weight in gauging other women (Beebe, Holmbeck, Schober, Lane, & Rosa, 1996). The intricacy of transaction between perceiver and stimulus images is also seen among Australian undergraduate women who had weight and shape concerns. They judged thin celebrities to be thinner than those models truly were, an underestimation not seen in undergraduates unconcerned about shape (King, Touyz, & Charles, 2000).

Cattarin, Thompson, Thomas, and Williams (2000) established that, in relation to a condition in which college women focused on some other aspect of televised commercials, women who were coached to focus on the thin, attractive models reported more immediate appearance dissatisfaction.

Martin and Gentry (1997) discovered that girls ages between 9 and 14 who were instructed to compare their own physical attractiveness to slim models (for the purpose of self-evaluation) felt less physically attractive. In comparison, girls instructed to think about slim models in ways that inspire self-improvement or enhance their perceptions of their own personal beauty felt more physically attractive after seeing the models.

These findings indicate that an expanded application of social comparison theory and methodology will be crucial for understanding the effects of body dissatisfaction and its effects on disordered eating.

2.9 Sociocultural Pressure and Disordered Eating

Table 2.8 summarizes various studies on associations of sociocultural pressure to be thin exerted through family, friends, media to disordered eating.

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Table 2.8: Summary of previous studies on the relationship between sociocultural pressure and disordered eating

Study	Age Group	n	Study Design	Findings
Stice (1998)	Adolescents	332	Cross Sectional	Sociocultural model states internalization of thin ideal leads to body dissatisfaction and subsequently results in an increased risk of disordered eating.
Stoylen & Laberg (1990)			Literature Review	Family environment and social climate influence the risk of developing an eating disorder.
Meno et. al (2008)	College students	581	Cross sectional	Weight-teasing by parents and relatives models the encouragement of dieting behaviours.
Francis and Birch (2005)	5,7,9 and 11	173	Cross sectional	Parents' excessive control over their children's weight and eating behaviours impeded children's progress of self-regulation over food and eating.
Neumark Sztainer et. al (2004)	middle and senior high schools students	4746	Cross sectional	Regular family meals help early detection of disordered eating.
Brown & Witherspoon (2002)			Literature Review	Media through constant exposure of thin images help engage women in disordered eating practices as they tend to portray a thin deal image.

Table 2.8: Summary of previous studies on the relationship between sociocultural pressure and disordered eating (continued)

Study	Age Group	n	Study Design	Findings
Pon et. al (2004)	Mean age 14.76	588	Cross sectional	Teenagers connect themselves with slim pictures of men and ladies defined in the media and afterward come to view themselves as being fat. In their interest to depict these pictures, they resort to disordered eating.
Tiggermann & Miller (2010)	Mean age 14.9	156	Cross Sectional	Adolescents resort to disordered eating practices to portray attractive images of them and increase appearance comparison through Internet social networking.
Borzekowski et. al (2010)		180 websites	Systematic analytic study	Internet pro eating disorder website providing overt ideas on how to involve in eating disordered behaviours.

Sociocultural simply relates to the different groups of people in society and their habits, traditions, and beliefs. Adolescence is a crucial period in social development, of one's identity and understanding of the self in relation to the social world (Coleman and Hendry, 1990). Evidence has shown that the brain goes through a remodeling process during adolescence (Choudhury, Blakemore, & Charman, 2006). It is possible that neural plasticity facilitates the development of social cognitive skills required during the period of adolescence. The environmental and biological changes at adolescence lead to new social encounters and heightened awareness and interest in other people.

The importance of evaluating other people may be associated with increased attention to socially salient stimuli, particularly faces, and the processing of emotional information. Recognition of facial expressions of emotion is one area of social cognition that has been investigated during adolescence (Herba & Phillips, 2004). The amygdala, a brain region associated with emotion processing (Adolphs, 1999; Phillips, Drevets, Rauch, & Lane, 2003), was found to be significantly activated in response to the perception of fearful facial expressions in an MRI study of adolescents aged between 12 and 17 years (Baird et al., 1999).

The emergence of the social self seems to be marked by a period of heightened self-consciousness, during which adolescents are thought to become increasingly preoccupied with other people's concerns about their actions, thoughts and appearance. This development has been described in terms of phases of egocentrism during childhood and adolescence (Elkind, 1967) and is based on Piaget's stages of cognitive growth (Piaget, Inhelder, & Piaget, 2013).

Many hypothesized models emphasized sociocultural influences in the development of disordered eating (Bradford, 2008; T. Jackson & H. Chen, 2007), particularly social pressure to be thin (i.e., pressure from parents, peers, and media) and weigh-related

teasing. The path where exposure to the thin ideal leads to eating disorder development is depicted by the sociocultural or dual pathway model (E. Stice, 1998).

According to the model, internalization of the thin ideal leads to body dissatisfaction which leads to negative affect and dieting behaviours. This subsequently results in an increased risk of disordered eating symptomatology, specifically bulimic pathology.

The gender additive model of female adolescent depression further suggests that elevated adiposity may precede perceived pressure to attain the thin ideal as well as body dissatisfaction (E. Stice & Bearman, 2001).

Disordered eating is observed between many risk factors, and there is a mounting agreement that factors such as biological vulnerability, psychological predisposition, family environment and social climate, influence the risk of developing an eating disorder (Støylen & Laberg, 1990).

Perceived sociocultural influences are portrayed in various forms, such as family members, friends, peers, mass media and social networking. The pressures of wanting to be skinny in a thin world seem to be a big test for individuals with disordered eating. It is a challenge to identify who would fare the most 'result' of having attained a 'perfect body'. Overweight young adults often endure weight teasing by family members and friends. This is a type of socio-cultural pressure which is common among adolescents (Heather P. Libbey et al., 2008).

In a study among 581 college females, it was found that weight-teasing by parents and relatives as an encouragement of dieting behaviours paving the way for adolescents disordered eating (Meno, Hannum, Espelage, & Douglas Low, 2008). Regular weight related teasing during childhood may provide an impact to the expansion of disordered eating (Jessica s. Benas & Brandon E. Gibb, 2008).

Home and family surroundings have been recognized as a significant influence on children's weight-related outcomes (Davison KK & Birch LL, 2001; Golan M, 2006). Branen and Fletcher (1999), in a study of 1000 undergraduate students, found that eating habits like finishing everything on one's plate, and having regular meals with the family were formed during childhood from the way they were fed by parents/caregivers. These eating habits persisted into adolescence and adulthood. Francis and Birch (2005) found that parents' excessive control over their children's weight and eating behaviours impede children's progress of self-regulation over food and eating.

There have been a wide range of studies on how family plays a role in curbing disordered eating behaviours (D. Neumark-Sztainer, Wall, Story, & Fulkerson, 2004; Sierra-Baigrie et al., 2009; Snoek, van Strien, Janssens, & Engels, 2009). D. Neumark-Sztainer, Wall, et al. (2004) explained that regular family meals provide an opening for the role modeling of healthy eating patterns and social interactions among family members. This may help to support healthy eating patterns and prevent disordered eating behaviours. When adolescents do not participate in family meals regularly, it may be challenging for parents to notice food-related issues or that their child is not eating an adequate diet. Thus, regular family meals may assist in the early detection of disordered eating behaviours (D. Neumark-Sztainer, Wall, et al., 2004). Francis and Birch (2005) again found that mothers' 'high restriction of their daughters' snacks intake and encouragement of weight loss were related to their daughters' unhealthy restrained eating.

A meta-meta-analysis of 17 studies examining obesity, eating patterns, and disordered eating laid out the benefits of sharing three or more family meals per week.

This helped to reduce the odds for overweight by 12%, eating unhealthy foods 20%, and reduced disordered eating by 35% (Hammons & Fiese, 2011).

Therefore, it is important to explore if family characteristics and practices play an important role in disordered eating behaviours. Similarly to identify if family could serve as a protective factor to contribute students healthy eating.

Although sociocultural factors associated with body image are generated by a wide range of socialization agents such as family, friends, and peers, it seems the mass media plays a conclusive role as a vehicle for female body objectification (Wiederman, 2000). This is done through exposure to constant, reiterative, and persuasive thin-ideal images (Blaine & McElroy, 2002; Brown & Witherspoon, 2002; Cusumano & Thompson, 1997).

Wolf (1991) argued that beauty ideals are not only subject to variable definitions, but that the images portrayed by advertising agencies attempt to engage women in consumptive practices, may also seek to divert their attention from established power structures. Similarly, Ventura (2000) has discovered the relationship between women and Western standards of beauty. The author found a strong association between beauty, thinness, and health arguing that these groups were usually together marketed through the mass media.

There is strong empirical support for the adverse impact of mass media on several adolescent behavioural health outcomes (Strasburger et al., 2010). To cement these findings, Pon Lai Wan et al. (2004) argued that many healthy adolescents link themselves with very thin images of men and women depicted in the media and then come to view themselves as being fat. In their pursuit to match these images,

adolescents recourse to disordered eating patterns, such as yo-yo dieting and skipping meals.

Internet social networking has become a preferred topic of discussion too. These sites permit users to comment or 'like' on their friend's profile pages (often called "walls"), customize their pages with photos, form similar interest groups with other users, "talk" via forums or discussion boards, and send private mails to others (Boyd & Ellison, 2007). Adolescents use these sites to form new and continue their existing friends. These sites also have the potential to increase pressure on adolescent girls to portray a specific image (as attractive as possible) and provide an increased avenue for appearance comparison (Tiggemann & Miller, 2010).

As it is estimated that every seven people on the planet use Facebook (Smith, 2012), the number of social assessments and comparisons possible on the social media platform staggers. It is possible that Facebook usage could have positive effects on body image and disordered eating, as the site provides a stage for constructing social relationships and assembling potentially positive and self-esteem enhancing evaluations.

On the other hand, Facebook use could be maladaptive when individuals use the website to occupy negative social evaluations and comparisons. This sort of maladaptive usage may be especially malicious for women susceptible to disordered eating given their noted interpersonal problems (Grisset & Norvell, 1992; Hopwood, Clarke, & Perez, 2007; Lampard, Byrne, & McLean, 2011).

Some support the hypothesis from recent research which found that Facebook usage may worsen interpersonal problems for individuals with low self-esteem. Specifically, the study established that low self-esteem individuals posted more negative

updates and got less feedback on these updates as compared to individuals with high self-esteem (Forest & Wood, 2012) .

Another emerging trend over the internet is the pro eating disorder website fashionably known as the pro-ana and pro-mia website where, graphic material to inspire, support, and encourage site users to endure their efforts with disordered eating behaviours.

In a systematic analytic study of 180 active web sites, Borzekowski, Schenk, Wilson, and Peebles (2010) found that practically 91% of the web sites were accessible to public, and almost 80% had collaborative features. 84% offered pro-anorexia content, and 64% catered to pro-bulimia content, thin inspiration material appeared on 85% of the sites, and 83% provided overt ideas on how to involve in eating-disordered behaviours.

A call for an ongoing monitoring and controlling system of these websites may help reduce the occurrence of disordered eating among young vulnerable internet users.

2.10 Associations among Perceived Sociocultural Pressures, Body Dissatisfaction and Self Esteem in the development of disordered eating.

Table 2.9 summarises the studies on the associations between perceived sociocultural pressure, body dissatisfaction and self-esteem to disordered eating.

Table 2.9 : Summary of previous studies on the relationship between perceived sociocultural pressure, body dissatisfaction and self-esteem to disordered eating

Study	Age Group	n	Study Design	Findings
Knauss (2007)	Adolescents	1610	Cross Sectional	Awareness of a thin ideal, internalization of a thin ideal, and perceived pressures to be thin have reported greater body dissatisfaction among women.
Thompson et. al (1999)			Literature	Increased societal preoccupation with thinness causes increased rates of body dissatisfaction and disordered eating in Western society.
Field et. al (1999)	5 th -12 th grade	548	Cross sectional	Fashion magazine influence concept of ideal body image and inspire weight loss through disordered eating.
A.Botta (2003)	High school	400	Cross sectional	Exposure to sports and fitness magazines were associated with body dissatisfaction among both female and male students.

Table 2.9: Summary of previous studies on the relationship between perceived sociocultural pressure, body dissatisfaction and self-esteem to disordered eating (continued)

Study	Age Group	n	Study Design	Findings
Slater & Tiggemann (2014)	Average age 15.2	182	Cross sectional	Prolonged Television exposure especially to soap operas influenced body dissatisfaction and drive for thinness among adolescents boys.
Hefner et al (2014)	Average age 44.57	166	Cross sectional	Ideal self-disparities were found to intercede the relationship between aging, beauty, media and disordered eating symptomatology.
Stice et al (1994) (2001)		231	Systematic review Cross sectional	Media exposure causes the development of internalization of thin ideal and body dissatisfaction. Internalization of the thin ideal is conceptualized as a mediator between media exposure and development of disordered eating.
Dakanalis & Riva (2013)			Meta-analysis	Individuals, who are routinely exposed to media messages with strong importance to physical appearance, endorse these messages as being relevant. This encourages body dissatisfaction.

Table 2.9: Summary of previous studies on the relationship between perceived sociocultural pressure, body dissatisfaction and self-esteem to disordered eating (continued)

Study	Age Group	n	Study Design	Findings
Berge et. al (2013)	Average age of adolescents 14.4	2793	Cross-sectional analysis using data from 2 linked multilevel population-based studies	Family influence such as weight related conversation inspires adolescents to have disordered eating practices.
	Average age of parents 42.3	3709		
Kluck (2010)	Adolescents	268	Cross sectional	Negative comments about weight and eating shown to be predictors of body dissatisfaction and disordered eating.
Smolak (1999)	parents	220	Cross sectional	
Wertheim (2001)		435	Longitudinal (8months apart)	
Benas Jessica S & Brandon E. Gibb (2008)	Average age 19.07	203	Cross sectional	Parental weight related comments in childhood and adolescence shown to have long term effects on body dissatisfaction and self-esteem in undergraduate students.
Taylor et. al (2006)		455	Retrospective study	
Ricciardelli & Mc Cabe (2001)	11 and 15	1185	Cross Sectional	Self -esteem is a major determinant of body dissatisfaction and disordered eating.

Table 2.9: Summary of the previous studies on the relationship between perceived sociocultural pressure, body dissatisfaction and self-esteem to disordered eating (continued)

Study	Age Group	n	Study Design	Findings
Tiggermann (2005)	High school students	242	2 year longitudinal study	Girls with heavier weight or perceive to be overweight were likely to develop low self-esteem. This could lead to body dissatisfaction and weight control measures.
Bailey & Ricciardelli (2010)	18-35	196	Cross sectional	Negative appearance related comments and contingent self-esteem predicted more disordered eating.
Dakanalis et al (2014) Fitzsimmons-Craft (2011) Stice & Shaw, (2002)		605	Cross sectional Literature Review Literature Review	Sociocultural influence strongly predicts body dissatisfaction and low self-esteem.

Judging the evidence of each individual predictor which is perceived sociocultural pressures, body dissatisfaction and self-esteem to disordered eating, it is important to examine the associations among the predictors to create a clearer picture in the course of the disordered eating outcome.

Awareness of a thin ideal, internalization of a thin ideal, and perceived pressures to be thin have reported greater body dissatisfaction among women (Knauss, 2007). According to a sociocultural model by J Kevin Thompson, Heinberg, Altabe, and Tantleff-Dunn (1999), disordered eating and body dissatisfaction were partly a result of increased pressure for women to achieve an ultra-thin body. It has been argued the increased rates of body dissatisfaction and disordered eating in Western society corresponds with the increased societal preoccupation with thinness (J Kevin Thompson et al., 1999).

In early 2000, clinically underweight celebrities, such as Nicole Richie and Victoria Beckham, have been branded as 'role models' by the internet pro-ana and pro-mia website (Alexander, 2010). In addition to being thin, women of today are also compelled to have a biologically contradictory appearance such as low levels of body fat, large firm breast, firm and shapely muscles (Klassen, Jasper, & Schwartz, 1993).

Alison E. Field et al. (1999) analysed that a number of beauty and fashion magazines played a major role in influencing primary and secondary school students about weight and beauty, resulting in body dissatisfaction among teenagers. The study reported that 69% of students believed that fashion magazine images influenced their concept of ideal body image. 47% of the respondents expressed the desire to lose weight because of this influence. Similarly, in a study by A. Botta (2003), the author found that exposure to sports and fitness magazines were associated with body dissatisfaction in both female and male students.

Another study investigated the relationships between magazine exposure, self-objectification, body shape dissatisfaction, and eating disorder symptomatology in 150 men and women aged between 18 and 42 years. The study found that respondents reading beauty and fitness magazine internalized societal ideals and caused body dissatisfaction. Exposure to media in the form of magazines predicted eating problems for men and women, for women this was mediated by internalization (Morry & Staska, 2001). Similarly on television exposure, overweight and obese individuals are shown rarely on screen, especially programs targeted towards middle school age girls (Linda Smolak, Striegel-Moore, & Levine, 2013).

Tiggemann and Pickering (1996) found that female students who spent more time watching films and series presented greater body dissatisfaction. One study examining the role of television programmes on the drive for thinness and muscularity among 182 adolescent boys with an average age of 15.2 years revealed viewing of soap operas emerged as significant unique predictors of drive for thinness (Slater & Tiggemann, 2014).

The most commonly cited reason for the link between media exposure and disordered eating among adults is internalization of the thin ideal (E. Stice, 1994; J Kevin Thompson & Stice, 2001). It is worrying that individuals distinguish ideals of beauty and attractiveness as defined by society, both cognitively and behaviourally, they are said to have adopted or internalized these ideals. Internalization of the thin ideal is conceptualized as a mediator between media exposure and development of disordered eating (J Kevin Thompson & Stice, 2001).

According to the socio-cultural model of body dissatisfaction (E. Stice, 1994), individuals who are regularly exposed to media messages with a strong importance on physical appearance are more likely to endorse these messages as personally relevant.

Endorsement of cultural body shape ideals and the values linked with them specifies that these ideals can become a reference point against which individuals judge their body (Dakanalis & Riva, 2013; Fitzsimmons-Craft, 2011).

Several studies have also highlighted the role of family influences especially mothers have been shown to act as both role models and social reinforcers in relation to girls eating attitudes and behaviours (Francis & Birch, 2005; Mukai & McCloskey, 1996). Berge et al. (2013) identified parents who engaged in weight-related conversations had adolescents who were more likely to diet, use unhealthy weight-control behaviours, and engage in binge eating.

The explanation to this influence concerns the direct transmission of weight-related attitudes and thoughts from parent to child. Both cross-sectional and longitudinal studies with preadolescents and adolescents show that precarious negative comments about eating and weight are predictors of body image dissatisfaction, weight concerns and disordered eating (A. S. Kluck, 2010; L. Smolak et al., 1999; Wertheim et al., 2001). This encouragement can have several long-term effects, not only on body dissatisfaction and disordered eating but also on self-esteem and depressive symptoms. This has been indicated by few retrospective studies where undergraduate students reported their experiences about parental weight-related comments in childhood and adolescence (Jessica S Benas & Brandon E Gibb, 2008; Taylor et al., 2006).

Self-esteem, which is more broadly referred to as self-concept, is viewed as a major determinant of body dissatisfaction, weight loss strategies and associated eating problems (L. Ricciardelli & M. McCabe, 2001). These relationships have been confirmed with the preadolescent girls and boys (Lawrence, 1995). A study by Svaldi, Zimmermann, and Naumann (2012) found that negative manipulations of self-esteem led to a significant increase in body dissatisfaction and positive manipulation of self-

esteem did not decrease body dissatisfaction. A study among younger girls with heavier actual weight and perceptions of being overweight were particularly vulnerable to develop low self-esteem. This could lead to body dissatisfaction and drastic weight control measures (Tiggemann, 2005).

Between genders, internalization caused by sociocultural influence strongly predicts body dissatisfaction and low self-esteem. Both constructs have been found to be linked to disordered eating (Dakanalis, Timko, Clerici, Zanetti, & Riva, 2014; Fitzsimmons-Craft, 2011; E. Stice & Shaw, 2002) and are documented as the most important psychopathological features of the development and maintenance of all forms of eating disturbances (Z. Cooper & Fairburn, 2011; Dakanalis et al., 2014; E. Stice & Shaw, 2002).

Based on the findings from previous researches on disordered eating, along with its risk factors, a conceptual framework is developed as shown in Figure 2.1. The conceptual framework elaborates the three main predictors to disordered eating which are perceived sociocultural pressure, body dissatisfaction and self-esteem.

2.11 Conceptual Framework

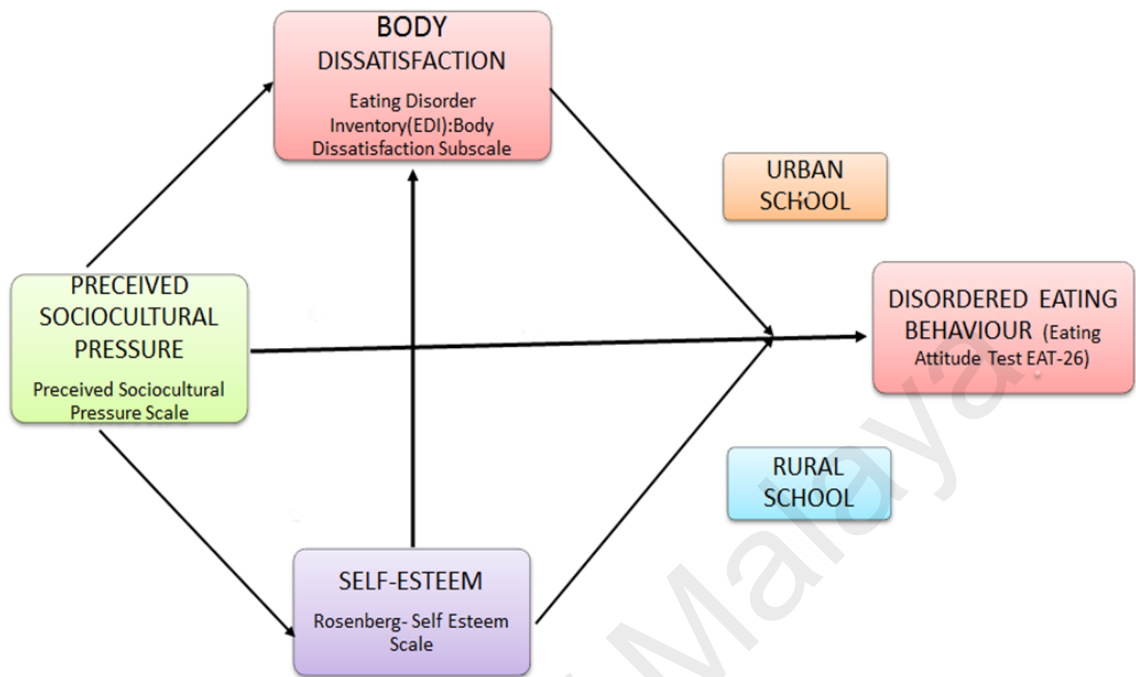


Figure 2.1: The Conceptual framework for the current study on disordered eating

CHAPTER 3: METHODOLOGY

This chapter discusses the methodology used in this. There were two phases involved; Phase 1 was to validate the Bahasa Malaysia version of the Perceived Sociocultural Pressure Scale (PSPS) and Phase 2 was to determine the prevalence and risk determinants of disordered eating.

The quantitative method was used to assess disordered eating among the secondary school children in Selangor along with the associated factors. This research involved mainly field work. A thorough literature search was done to identify the factors associated with disordered eating. In the second phase data was collected using a questionnaire to assess disordered eating. The study was conducted from January 2014 to September 2014.

3.1 Validation of the Bahasa Malaysia version of the Perceived Sociocultural Pressure Scale (PSPS) (Phase 1)

There are several tools available to measure sociocultural influences on body image and disordered eating such as; Pressure to be Physically Attractive Questionnaire (PPAQ) (Shomaker LB, 2008), The Sociocultural Attitudes Towards Appearance Scale (SATAQ) (Heinberg, Thompson, & Stormer, 1995), Perception of Teasing Scale (POTS) (J. Kevin Thompson, Cattarin, Fowler, & Fisher, 1995) and Perceived Sociocultural Pressure Scale (E. Stice, Ziemba, et al., 1996). Among these, the Perceived Sociocultural Pressure Scale (PSPS) is the most preferred and widely used tool.

PSPS has been tested in different cultural contexts and languages and was proven to exhibit good psychometric properties (E. Stice, Nemeroff, et al., 1996). However, the PSPS instrument has not been validated in the Malaysian context, yet. The

most commonly spoken and widely used language among adolescents in Malaysia is Bahasa Malaysia, which is also the national language.

The first part of this study is therefore aimed to translate the PSPS into Bahasa Malaysia, investigate the instrument's psychometric properties and validate the translated instrument for Malaysian secondary school children. Consent was obtained from the respective instrument developers prior using it in this study.

3.1.1 The Perceived Sociocultural Pressure Scale (PSPS)

The Perceived Sociocultural Pressure Scale (PSPS) is used to measure the perceived pressure to be thin that the respondents feel due to sociocultural sources. The 10-item self-administered scale assesses the perceived pressure to be thin from family, friends, and the media (E. Stice, Ziemba, C., & Margolis, 1996).

There are three domains in PSPS; family pressure to be thin, friend pressure to be thin and media pressure to be thin. Examples of items on family pressure to be thin are: "I've felt pressure from my family to lose weight" and "I've felt pressure from my family to have a thin body"). Each item is measured on a 5-point Likert scale (1 = *none*, 5 = *a lot*), and subscale scores are calculated by computing the average for items in each domain. A higher score represent a greater perceived pressure to be thin.

The original PSPS has demonstrated a satisfactory internal consistency and good test-retest reliability estimates among female undergraduate students (Eric Stice, 1998). Internal consistency was reported as Cronbach alpha whereby the values for the items in Family, Friend, and Media Pressure domains were 0.85, 0.78, and 0.80 respectively (Eric Stice, 1998).

3.1.2 The PSPS Validation Procedure

3.1.2.1 Content Validity

Firstly the PSPS instrument was tested on the suitability of its content for Malaysian adolescents. A panel of expert consisting of two public health specialists, a secondary school teacher and a child psychiatrist reviewed the PSPS. In their opinion, the question on media influences should include Facebook as well, since adolescent are heavily influenced by this social media. Slight modifications were made to item number 7 and 8 in the original PSPS by including the word “Facebook”. The modifications are reflected in italics in Table 3.1.

Table 3.1: Original and modified items in Perceived Sociocultural Pressure Scale

1. I've felt pressure from my friends to lose weight
2. I've noticed a strong message from my friends to have a thin body
3. I've felt pressure from my family to lose weight
4. I've noticed a strong message from my family to have a thin body
5. I've felt pressure from people I've dated to lose weight
6. I've noticed a strong message from people I've dated to have a thin body
7. I've felt pressure from the media (e.g., TV, magazines) to lose weight <i>I've felt pressure from the media (e.g., TV, magazines, Facebook) to lose weight</i>
8. I've noticed a strong message from the media to have a thin body <i>I've noticed a strong message from the media (e.g., TV, magazines, Facebook) to have a thin body</i>
9. Family members tease me about my weight or body shape
10. Kids at school tease me about my weight or body shape

3.1.2.2 Translation Process

The translation process was carefully planned with the importance of ensuring contents and meaning preservation. The aim was to evaluate clarity, comprehension, naturalness and adequacy of wording.

At first, the modified English version of the PSPS was translated into Bahasa Malaysia (BM) by a professional linguist and a public health specialist working independently; both were bilingual. The modified English and BM version of the PSPS were reviewed by the same expert panel again. Backward translation from BM to English was performed by an independent linguist blinded to the modified English version of the PSPS.

The translated version was then compared with the modified English version and inconsistencies were ironed out by the panel of experts to ensure the BM version retained the meanings inherent in the original PSPS. The modified English version along with the BM version of the PSPS is shown in Table 3.2.

Table 3.2: The modified and translated Perceived Sociocultural Pressure Scale

1. I've felt pressure from my friends to lose weight
<i>Saya pernah rasa tekanan daripada rakan-rakan saya untuk menurunkan berat badan</i>
2. I've noticed a strong message from my friends to have a thin body
<i>Saya pernah merasai satu mesej yang kuat daripada rakan-rakan saya yang inginkan saya memiliki badan yang kurus.</i>
3. I've felt pressure from my family to lose weight
<i>Saya pernah rasa tekanan daripada keluarga saya untuk menurunkan berat badan</i>
4. I've noticed a strong message from my family to have a thin body
<i>Saya pernah merasai satu mesej yang kuat daripada keluarga yang inginkan saya memiliki badan yang kurus.</i>
5. I've felt pressure from people I've dated to lose weight
<i>Saya pernah rasa tekanan daripada orang yang saya telah 'dating' untuk menurunkan berat badan saya.</i>
6. I've noticed a strong message from people I've dated to have a thin body
<i>Saya pernah merasai satu mesej yang kuat daripada orang yang saya telah 'dating' yang inginkan saya memiliki badan yang kurus.</i>
7. I've felt pressure from the media (e.g., TV, magazines, facebook) to lose weight
<i>Saya pernah rasa tekanan daripada media (contohnya, TV, majalah, internet (facebook) untuk menurunkan berat badan</i>
8. I've noticed a strong message from the media (e.g., TV, magazines, facebook) to have a thin body.

Saya pernah merasai satu mesej yang kuat daripada media (contohnya, TV, majalah, internet (facebook) untuk memiliki badan yang kurus.

9. Family members tease me about my weight or body shape

Ahli- ahli keluarga saya mengejek saya tentang berat atau bentuk badan saya

10. Kids at school tease me about my weight or body shape

Kanak-kanak sekolah mengejek saya tentang berat atau bentuk badan saya.

3.1.2.3 Pre- Testing

A preliminary testing of the BM version PSPS was conducted among 10 secondary school students of multiethnic background (Malay, Chinese and Indian) through face-to-face interviews. This was performed to confirm item clarity by checking the order and wording of questions along the duration required for respondents to complete the questionnaire. Based on the responses, no changes in the items were necessary.

3.1.2.4 Reliability Analysis

The questionnaire was then pilot tested among 70 secondary school students. Cronbach alpha values were calculated for the items in each construct. A Cronbach alpha value of more than 0.7 is acceptable for sufficient internal consistency of the items in the construct (Nunnally, 2010) and a value of more than 0.96 is an indication of redundancy.

A retest was conducted after two weeks among the same 70 respondents in the pilot test. Weighted Kappa coefficients were used to assess the test-retest reliability of the items. The weighted kappa is a measure of agreement greater than that expected, by chance. Kappa values range from 0 to 1, whereby a value below 0.20 is generally considered to be poor, a value between 0.21- 0.40 is considered to be fair, a value between 0.41-0.80 is considered to be moderate to substantial, and a value more than 0.81 is considered to be very good (Altman, 1990).

3.1.2.5 Validity Analysis

Validation of the BM version of the PSPS

Confirmatory factor analysis (CFA) procedure was used in the validation process. For CFA a minimum sample of 300 respondents are required (Raykov, 2011). With an anticipated 25% nonresponse rate, a sample size of 400 was decided upon. Data were collected from two conveniently sampled national secondary schools in the Klang Valley, whereby permission to administer the questionnaires was granted only for selected classrooms.

The students were briefed on the objectives of this study and technique to fill the questionnaire. Any terms or questions that were not well understood by the students were explained on an individual basis. A total of 354 students completed the BM-PSPS questionnaire.

In CFA, several indices were used to assess the model fit. These include; Chi-square/*df* ratio, comparative fit index (CFI), Joreskog's goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), Tucker-Lewis Index (TLI), and the root-mean-square error of approximation (RMSEA). It is generally accepted that Chi-square/*df* ratio value of less than 3; CFI, GFI, AGFI, and TLI value greater than 0.90; and $RMSEA \leq 0.07$ indicate an adequate model fit (Hair, Tatham, Anderson, & Black, 2006; Tabachnick & Fidell, 2007).

For each construct, the average variance extracted (AVE) values were computed based on the factor loadings of the items in the construct. AVE is a measure of convergent validity. The value of AVE for each construct should be at least 0.50 (Fornell, 1981). For discriminant validity between two constructs, AVEs of the two constructs were compared with the R-squared value between the two construct. The

AVE value being more than the R-squared value is an indication of sufficient discriminant validity between the two constructs (Fornell, 1981).

Data were analyzed using Statistical Package of Social Sciences (SPSS) Version 19.0 (SPSS Inc., 2006) and AMOS version 21 (Arbuckle, 2008). Figure 3.1 shows the flow chart of the validation process.

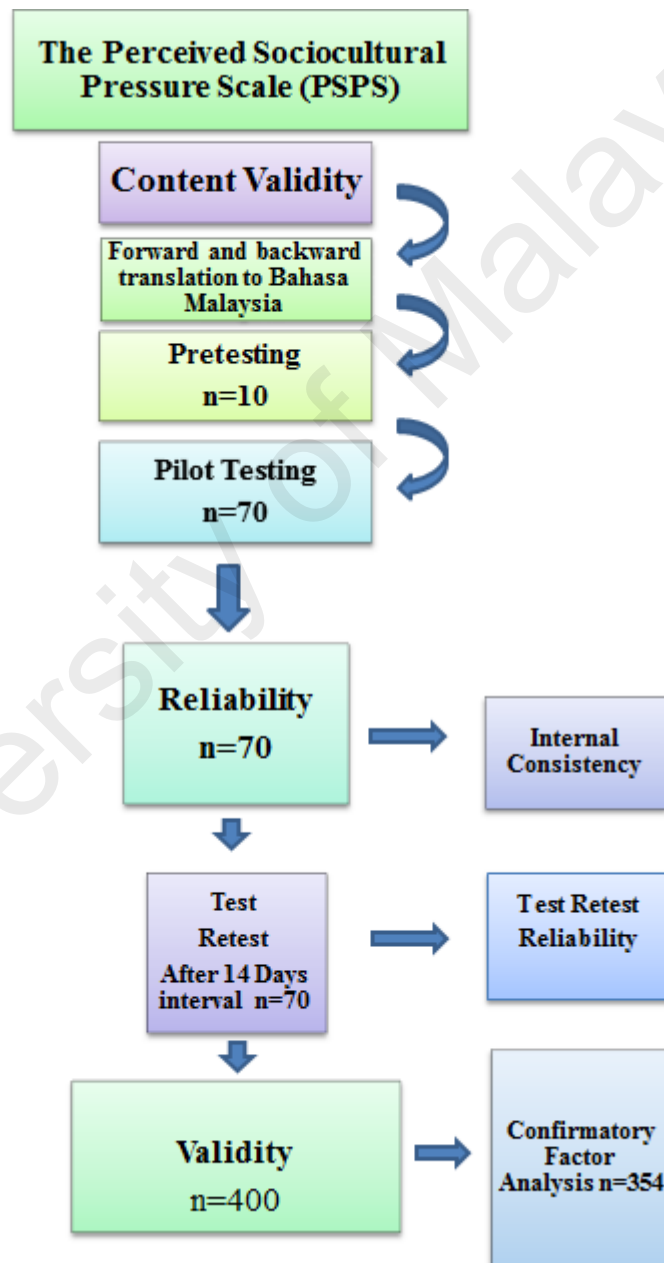


Figure 3.1: Validation flow chart of the Perceived Sociocultural Pressure Scale (PSPS)

3.2 To determine the prevalence and risk determinants of disordered eating among urban and rural secondary school students in Selangor, Malaysia. (Phase 2)

3.2.1 Study Design

This is a cross sectional study aimed to determine the prevalence of disordered eating behaviours among adolescents at a given time point. This design provides a platform to describe a population or subgroup within a population with respect to an outcome, in this case disordered eating and the associated risk factors, commonly for the purposes of public health planning (Levin, 2006).

3.2.2 Study Area

This study was conducted in Selangor; the state located on the west coast of Peninsular Malaysia and is bordered by Perak to the north, Pahang to the east and Negeri Sembilan to the south. There are 10 school districts in Selangor with a mix of urban and rural locations.

Based on the list provided by Selangor State Education Department, as of 2011, there were 256 government-funded national secondary schools in Selangor, of which 199 schools met the inclusion criteria. In this study, Vernacular, Boarding, Private, Single Gender and Religious Schools were excluded along with Special Education Schools for the Handicapped.

In Malaysia, schools are classified by the Ministry of Education (MOE) as rural or urban based on their location. Rural schools are those located in towns or districts having a population of less than 10,000 people whereas urban schools are located in bigger towns and districts with a population of more than 10,000 people (Chandrasegaran, 1981).

3.2.3 Study population

The study population included students from National Secondary Schools (*Sekolah Menengah Kebangsaan*, SMK) in Selangor. Secondary school education is the second stage of formal education in Malaysia after the Primary school education. Students begin their secondary school education at the age of 13 and complete by the age of 17 to 19 years old.

In the Malaysian school system, Form I to Form III are known as Lower Secondary (*Menengah Rendah*), while Form IV and V are known as Upper Secondary (*Menengah Atas*). Malay language is the main medium of instruction used in all National Secondary Schools (*Sekolah Menengah Kebangsaan*). Form III and Form V students will sit for major public exams, hence permission was granted to collect data from the Form I, Form II and Form IV students only.

In this study, students who have been diagnosed or on follow-up treatment with eating disorders were not included in this study. This is captured in item 6 Bahagian C of the questionnaire where student on treatment with eating disorders are requested to declare their treatment status.

3.2.4 Sample size

In this study a multistage sampling (complex sampling) method was used. In order to calculate the required sample size, it was necessary to calculate the design effect (DEFF), which is the ratio of variance in the complex sample as compared to that of a simple random sample. This is a measure of the effect of specifying a complex design, whereby values further from 1 indicate higher levels of heterogeneity (Bell et al., 2012).

Based on a study by W.Y. Gan et al. (2011), the prevalence of disordered eating among students in Malaysia was 18.2%. In a pilot test, involving 40 urban and 40 rural school students, the computed DEFF value for disordered eating was 2.36.

The following are the details of the sample size calculation:

$$\begin{aligned} \text{The minimum required sample size, } n &= \frac{(1.96)^2(0.18)(0.82)}{0.012} \\ &= 236 \end{aligned}$$

$$\text{The DEFF (Urban and Rural Schools)} = 2.36$$

$$\text{The minimum required sample size adjusted for DEFF} = 236 \times 2.36 = 558$$

$$\text{With the expected response rate of 90\%} = 558/0.9 = 620$$

In this study, a total of 654 participants were recruited.

3.2.5 Sampling Procedure

The estimated student population in Selangor National Secondary Schools was 422,918 (NHMS, 2011). The total enrolment for Form I, II & IV in 2014 based on the Selangor state department of education was 202,030.

The list of secondary schools in Selangor obtained from the Ministry of education served as the sampling frame. In this study, a multistage random sampling method was used.

In stage one, three out of ten school districts in Selangor were selected randomly. The selected districts were; Hulu Langat, Kuala Langat and Gombak. In Hulu

Langat district, 32 secondary schools met the inclusion criteria, of which 26 were urban and 6 were rural. In Kuala Langat district, 12 schools met the inclusion criteria, of which 4 were urban and 8 were rural. In Gombak district, there were 28 schools met the criteria, of which 23 were urban and 5 were rural.

In stage two, one urban and one rural school were chosen randomly from each of the selected districts. In Hulu Langat district, the urban school selected was Sekolah Menengah Kebangsaan (SMK) Bandar Tun Hussein Onn 2 which had a total of 42 classes, 14 classes each in Forms I, II and IV. The rural school selected was SMK Bandar Tasik Kesuma which had a total of 34 classes, 12 classes each in Forms I & II and 10 classes in Form IV.

In Kuala Langat district, the urban school selected was SMK Telok Datok which had a total of 20 classes, 6 classes each in Forms I & II and 8 classes in Form IV. The rural school selected was SMK Jenjarom which had a total of 30 classes, 10 classes each in Forms I, II and Form IV.

In Gombak district, the urban school selected was SMK Seri Gombak which had a total of 34 classes, 12 classes each in Forms I & II and 10 classes in Form IV. The rural school selected was SMK Bandar Tasik Puteri Rawang which had a total of 38 classes, 13 classes each in Forms I & II and 12 classes in Form IV.

In stage three, 3 classes were selected randomly from each form: Form I, Form II and Form IV in each selected schools. Hence, there were a total of 54 classes.

In stage four, 11 students were identified randomly from the enrollment of each selected classes. The total number of students in each classroom ranged from 19 to 49, with an average of 35 students per classroom.

A total of six schools from the three selected districts with 54 classes provided a total sample of 620 respondents.

3.2.5.1 Weighting procedure

Typically, observations from complex sample surveys are weighted such that an observation's weight is equal to the reciprocal of the probability of selection. That is, observations that are more likely to be selected (e.g., from oversampling) receive a smaller weight than do observations less likely to be selected.

In the data available from large-scale surveys, weights are computed such that the sum of the weights equals either the sample size (relative weights) or the population size (raw weights). Sample weights are then used in data analysis using a complex samples procedure.

If data are not analyzed using complex samples procedures, with appropriate weights, the parameter estimates will be biased and incorrect inferences can be drawn. When sample weights are not used, findings may not be representative of the larger population of interest but generalizable to the sample used only (Bell et al., 2012). Therefore, in this study, sampling weights were computed to reflect the multistage complex sampling design.

District(DS), school(SC), classroom(CL) and student(ST) weights were computed separately and a final (FL) weight was obtained as follows;

$$W^{FL} = W^{DS} \times W^{SC} \times W^{CL} \times W^{ST}$$

In computing district and schools weights, the number of students in each district and school was considered as well.

Table 3.3: The final weight calculations based on the multistage random sample

School	District weight (W^{DS})	School weight (W^{SC})	Classroom weight (W^{CL})		Student weight (W^{ST})	Final Weight (W^{FL})
Bandar Tun Hussein Onn (2)	17.5	604.6	Form I	4.6	2.9	105.8
			Form II	4.6		
			Form IV	4.6		
Bandar Tasik Kesuma	17.5	37.7	Form I	4.0	3.0	7521
			Form II	4.0		
			Form IV	3.3		
SMK Telok Datok	66.6	28.5	Form I	2.0	2.6	10857
			Form II	2.0		
			Form IV	2.6		
SMK Jenjarom	66.6	57.9	Form I	3.3	2.6	33125
			Form II	3.3		
			Form IV	3.3		
SMK Seri Gombak	22.9	489.4	Form I	4.0	3.1	132,010
			Form II	4.0		
			Form IV	3.3		
SMK Bandar Tasik Rawang	22.9	16.2	Form I	4.3	3.5	5463
			Form II	4.3		
			Form IV	4.0		

The flow chart in Figure 3.2 depicts the sampling procedure.

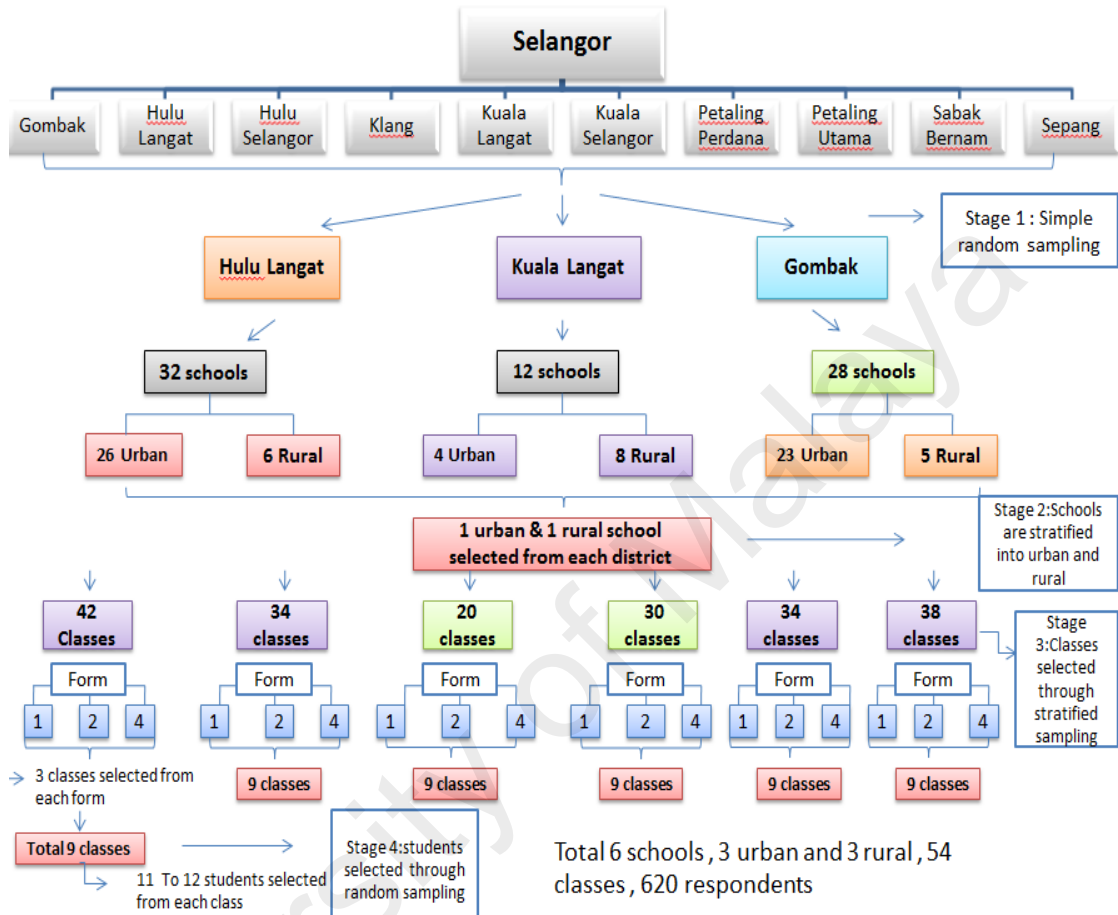


Figure 3.2: Flow chart explaining the sampling procedure

3.3 Study variables

3.3.1 Dependent variables

Disordered Eating

3.3.2 Independent variables

Sociodemographic

Age

Gender

Ethnicity

School Type

Parents Education Level (Father and mother)

Monthly Household income

Self Esteem

Body Dissatisfaction

Perceived Socio Cultural Pressure

Body Mass Index (BMI)

3.3.3 Operational definition of the variables

1.Age

Age was calculated based on the year the student was born. Categorization of age groups was done during data analysis.

2.Ethnicity

Ethnicity was divided into 4 categories; Malay, Indian, Chinese and Others. This is as stated on the students' school register. The students, who chose to answer 'others' were requested to specify their ethnicity.

3. School Type - Urban and Rural Schools

Rural schools in Malaysia, classified by the Ministry of Education in Malaysia, are schools located in towns or districts having a total population of less than 10,000 people. Urban schools on the other hand, are those located in bigger towns and districts with a population of more than 10000 people (Chandrasegaran, 1981).

4. Parents Education Level

Parents Education Level (both father and mother) was categorized as having, no formal education, Primary, Secondary or College/University Level education.

5. Monthly Household Income

Household Income was defined as combined family income of both parents per month and it was categorized as less than RM 500, RM 500-1000, RM 1000-3000, RM 3000-5000 and more than RM 5000.

6. Disordered Eating

Disordered Eating was defined as disordered eating behaviours, which are related to eating and eating disorder symptoms (Garner et al., 1982); dieting, binge eating, self-induce vomiting and excessive exercising. Disordered Eating was recorded into a dichotomous variable as positive and negative based on the EAT-26 scores.

7 Self Esteem

Self-esteem is an element of self-concept and was defined as an individual's set of opinions and mood about his or her own worth and importance, that is, a global positive or negative attitude towards oneself (Rosenberg M, 1965). It was measured to identify high, normal or low self-esteem among students.

8. Body Dissatisfaction

Body Dissatisfaction refers to body-image dissatisfaction, that is, how satisfied one is with their own body-image appearance. It is basically used to assess on how satisfied the students were with their weight/shape, muscle, lower body, middle body, and upper body. Higher scores on this variable indicated greater body dissatisfaction.

9. Perceived Sociocultural Pressure

Perceived Sociocultural Pressure is assessments of students' perceived pressure to be thin as well as weight teasing by significant others (family, friends, and dating partners). It was measured using a 10-item questionnaire measured on a Likert scale of 0 to 5; where a response of '0' indicated none at all, while a response of '5' indicated a lot. Higher scores indicate greater perceived pressure to be thin and weight teasing by significant others.

3.4 Measures and Instruments

3.4.1 Anthropometric measurements

Body weight and height of the students were measured to determine their body mass index (BMI). Body weight was measured in light clothing with their shoes removed using a digital calibrated floor scale (SECA 813, Hamburg, Germany) to the nearest 0.1 kg. Height was measured without shoes using a portable stadiometer to the

nearest 0.1cm. Next BMI was calculated as kg/m^2 and classified based on the WHO criterion.

Body Mass Index (BMI)

Body Mass Index (BMI) was used to assess weight. BMI was computed using the following formula: $\text{BMI} = \text{weight (kg)} / \text{height (m)}^2$. Based on the BMI values, students were categorized into too thin (BMI<16), thin (BMI 16- 17.5), normal (BMI 17.6- 21.5), overweight (BMI 21.6- 27.5) and obese (BMI >27.5), based on WHO's cut-off points for adolescents males and females (WHO, 1995).

3.4.2 Study instruments

A self-administered questionnaire was used to assess four main components of the study;

- a) Disordered Eating
- b) Self -Esteem
- c) Body Dissatisfaction
- d) Perceived socio cultural pressure to be thin

The students' sociodemographic variable such as age, gender, ethnicity, parents' education and joint family income per month were also captured in the questionnaire.

3.4.2.1 The Eating Attitudes Test-26 (EAT-26)

In this study, the 26-item EAT-26 scale was used to assess "eating disorder risk", that is, disordered eating behaviours (Garner et al., 1982). The EAT-26 has three subscales to assess an individual's behaviours and thoughts regarding dieting, bulimia and food preoccupation, and oral control.

Each item in the scale was rated on a 6-point Likert scale: “always (1)”, “usually (2)”, “often (3)”, “sometimes (4)”, “rarely (5)”, and “never (6)”. In EAT-26, item 26 was worded negatively, hence the responses were recoded. On scoring, the responses “sometimes”, “rarely”, and “never” were given a score of 0 while the responses “always”, “usually”, and “often” were given scores of 3, 2, and 1, respectively. The final score was calculated as the sum of all the 26 items with possible scores ranging from 0 to 78.

In this scale, respondents who scored 20 or more were classified as having a high level of concern about dieting, body weight or disordered eating behaviours and those who scored less than 20 were classified as having no symptoms of eating disorder.

The EAT-26 also included a behavioural component to determine the presence of extreme weight control behaviours and their frequency. This gave an opportunity to gain invaluable and accurate insight into a person’s behavior. However, as with all self-reported assessments, individual may not be entirely truthful in his or her responses.

The items in EAT-26 scale have shown desirable internal consistency values, with Cronbach’s alpha values ranging from 0.77 to 0.83. In non-clinical populations, the EAT-26 has been used as a screening instrument to detect individuals who are more likely to have disordered eating behaviours.

This questionnaire does not provide a diagnosis but rather identifies the presence of symptoms that are consistent with a possible eating disorder. The EAT-26 can be used in group or individual settings and can be self-administered or administered by health professional, school counselors, coaches, camp counselors and others who are interested in gathering information to determine if an individual should be referred to a specialist for evaluation of an eating disorder.

The EAT-26 again has been particularly a useful screening tool to assess eating disorder risk (or disordered eating) in high schools, colleges and other special risk samples such as athletes (D. M. Garner, Rosen, & Barry, 1998) but not as a clinical diagnosis tool for eating disorder. (Kindly refer to APPENDIX E for the questionnaire in English and APPENDIX I, *Bahagian B & C* for the Bahasa Malaysia version of the EAT-26)

3.4.2.2 Rosenberg's Self Esteem Scale. (SE-10)

The Rosenberg's Self Esteem Scale (SE-10) is widely used in social science research to measure self-esteem. SE-10 was developed by sociologist Dr. Morris Rosenberg (Rosenberg M, 1965). In SE-10, the respondents answers 10 items, each measured on a scale of 0 to 3; in which 0 indicates strongly disagreement while 3 indicate strongly agreement to the statement for items 1,3,4, 7 & 10 where else items 2,5,6,8 & 9 were in reverse valence.

In SE-10, five items were positively worded statements and the other five were negatively worded. The original sample through which the scale was developed consisted of 5,024 high-school juniors and seniors from 10 randomly selected schools in New York. The Rosenberg Self-Esteem Scale is considered to be a reliable and valid quantitative tool for self-esteem assessment (Blascovich, 1993).

An overall score was obtained by totaling the responses to the 10 items, after recoding the responses for the negatively worded items. The final scores ranged from 0-30. Scores ranging between 15 and 25 are were within normal range, scores below 15 indicate low self-esteem and scores above 25 indicate high self- esteem.

Studies have demonstrated both a unidimensional and a two-factor (self-confidence and self-deprecation) structure to the scale. The general reliability is high;

test-retest correlations and Cronbach's alpha values r typically range from 0.82 to 0.88 and from 0.77 to 0.88 respectively (Rosenberg M, 1965).

The Rosenberg Self-esteem scale has been translated into 28 languages, across 53 nations (Schmitt & Allik, 2005). The scale could be easily administered by anyone who is interested in gathering information to determine the level of self-esteem among the study respondents. This scale could be accessed online where the scores are provided immediately upon completing the questionnaire.

(Kindly refer to APPENDIX F for the questionnaire in English and APPENDIX I, *Bahagian D* for the Bahasa Malaysia version of the SE-10)

3.4.2.3 The Perceived Sociocultural Pressure Scale (PSPS)

The Perceived Sociocultural Pressure Scale (PSPS) is a 10-item scale used to measure the magnitude of ones' perceived pressure from the family and friends to be thin (E. Stice, Ziemba, C., & Margolis, 1996). PSPS also includes the contribution of media on perceived pressure.

The items in PSPS were measured on a scale of 1 to 5, where a response of 1 indicated no perceived sociocultural pressure at all and a response of 5 indicated a lot of perceived sociocultural pressure to be thin. The final PSPS score was calculated as the average of the responses for the 10 items. The values range from 1 to 5. E. Stice, Ziemba, et al. (1996) reported that this scale had a desirable internal consistency (Cronbach's $\alpha = 0.88$) and test-retest reliability ($r=0.93$).

In addition to an overall score, one can also explore the four subscales in PSPS; family pressure, media pressure, friend pressure, and dating partner pressure.

(Kindly refer to APPENDIX G for the questionnaire in English and APPENDIX I, *Bahagian E* for the Bahasa Malaysia version of the PSPS)

3.4.2.4 Eating Disorder Inventory (EDI): Body Dissatisfaction Subscale

The Eating Disorder Inventory (EDI) is a self-reported measure of eating related attitudes and traits (Garner D. M, Olmsted. M.P, & Polivy.J, 1983). The 9-item Body Dissatisfaction Subscale measures one's dissatisfaction to specific body parts. Each item reflects beliefs that specific parts of the body are associated with fat increases during puberty (e.g., "I think that my thighs are too large"-dissatisfaction; "I like the shape of my buttocks"-satisfaction).

Respondents rate their agreement with each statement on a 6-point Likert type scale ranging from "always" to "never". Higher scores indicate a greater dissatisfaction with one's body.

After recoding the responses on four items that are worded oppositely (as satisfaction), an overall score was created by summing the responses for all the nine items. The final scores ranged from 0 to 40, the scores above 22 indicating greater body dissatisfaction (Wiederman.M.W & Hurst. S.R, 1997). Garner D. M et al. (1983) reported a high reliability among the nine items (Cronbach's alpha = 0.910 among a sample of University students).

Research has shown that the body dissatisfaction subscale is an effective measure of body dissatisfaction (Cash & Deagle, 1997) and has been used in various

studies examining body image among adolescents (Cattarin & Thompson, 1994; Kostanski & Gullone, 1998)

(Kindly refer to APPENDIX H for the questionnaire and APPENDIX I, *Bahagian F* for the Bahasa Malaysia version of the Body Dissatisfaction Subscale)

3.4.2.5 Validity of the study instruments

The Malay versions of Eating Attitudes Test-26 (EAT-26), Rosenberg Self-Esteem Scale and Body Dissatisfaction Subscale have been validated in Malaysia. The Malay version of Eating Attitudes Test-26 and Body dissatisfaction subscale were found to be reliable, with Cronbach's alpha values of 0.864 and 0.928 respectively (Chin, Taib, Shariff, & Khor, 2008).

The Rosenberg Self-esteem Scale, validated by (Mohd Jamil, 2006), reported a Cronbach's alpha value of 0.8. The BM translated version of the PSPS was validated in Phase 1 of this study. Consent for the usage of all the above instruments were obtained from the original researchers prior to using it in this study.

3.5 Methods of data collection

Firstly, permission to conduct the study at the selected schools was obtained from the relevant authorities. Next, the schools were visited. The objectives, procedures and importance of the study were explained to the respective principals and class teachers assigned (by the school) to assist in the study.

Consent was obtained from the respective school authorities prior to data collection. During these visits, information such as the number of classes and students in the schools was also gathered.

In the actual data collection, students were selected randomly from the classrooms. The selected students and the respective class teachers were briefed about the research. The students were assured on anonymity and that all information provided will be kept confidential and only be used for research purpose.

The questionnaire booklets were then distributed to the students. They were asked to complete it independently and were requested to provide their honest responses. The researcher was present at all times to clarify personal queries to ensure the students understood the questions. On average, students took about 10 to 15 minutes to complete the questionnaire booklet.

All questionnaires were collected and kept safely by the principal researcher. Height and weight of the students were recorded immediately after the completion of the questionnaire.

3.6 Statistical Analysis for Phase 2

Data from all completed questionnaires were entered into Statistical Package for Social Sciences (SPSS) software version 19.0. The principal researcher was responsible for all data entry.

Total and average scores for each scale measures were computed using procedures in SPSS. Since this study incorporated a multistage stage sampling method, complex sample procedures were used in the analyses after weighting each case appropriately.

Descriptive statistics for complex samples were used to describe the data; frequencies and percentages for categorical variables and means and standard deviations for continuous variables. Cross-tabulation was used to compare for the prevalence of disordered eating between categorical variables.

Complex samples General Liners Model (GLM) analysis was used to examine the levels of association between Perceived Sociocultural Pressure and Body Dissatisfaction, Perceived Sociocultural Pressure and Self –Esteem as well as Body Dissatisfaction and Self -Esteem.

Complex samples Logistic Regression was used to test the association between Self- Esteem, Perceive Sociocultural Pressure and Body Dissatisfaction with disordered eating. The associations were also tested after controlling for sociodemographic factors. In all statistical tests, a two-sided significant level of 0.05 and 95% confidence intervals were reported.

3.7 Ethical Clearance

Research Integrity embodies a range of good research practices. Therefore prior to the commencement of this study ethical clearance was obtained from the University Malaya Ethics Committee, Malaysian Ministry of Education (MOE) and the National Medical Research Registry (NMRR) (Appendix A).

CHAPTER 4: RESULTS

This chapter gives the results from data analyses.

There were two phases: Phase 1 - validation of the Bahasa Malaysia (BM) version of the Perceived Sociocultural Pressure Scale (PSPS) and Phase 2 - determining the prevalence of disordered eating among secondary school students and the associated risk factors.

Phase 1

Instrument validation results are discussed in this section.

4.1 Reliability analysis

The internal consistency and test-retest reliability of the items in the BM version of the PSPS were tested using 70 respondents. The results of reliability and test-retest analysis are discussed below.

4.1.1 Internal consistency

The inter-item correlation coefficients and the corrected item-total correlation (CITC) values for the 10 items in the BM version of the PSPS are presented in Table 4.1. For inter-item correlation matrix, the highest correlation for each item with at least one item in the construct ranged between 0.54 and 0.83. This suggests a sufficient relationship between each item in the construct. Since the highest value is less than 0.85, of lack of discriminant validity is unlikely (Hair, 2010). The Cronbach's α value was 0.909; hence, there is sufficient internal consistency among the 10 items. The minimum CITC value was 0.454, which is more than 0.3.

Table 4.1: Inter-item correlation between the items in Bahasa Malaysia version of PSPS

Items	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	CITC
Q1	1	0.418	0.457	0.596	0.673	0.554	0.562	0.569	0.441	0.287	0.684
Q2	0.418	1	0.246	0.541	0.057	0.266	0.244	0.500	0.487	0.395	0.454
Q3	0.457	0.246	1	0.738	0.523	0.511	0.603	0.463	0.366	0.386	0.648
Q4	0.596	0.541	0.738	1	0.485	0.633	0.562	0.711	0.640	0.425	0.814
Q5	0.673	0.057	0.523	0.485	1	0.833	0.638	0.452	0.402	0.307	0.668
Q6	0.554	0.266	0.511	0.633	0.833	1	0.659	0.687	0.506	0.485	0.779
Q7	0.562	0.244	0.603	0.562	0.638	0.659	1	0.627	0.464	0.513	0.736
Q8	0.569	0.500	0.463	0.711	0.452	0.687	0.627	1	0.569	0.522	0.765
Q9	0.441	0.487	0.366	0.64	0.402	0.506	0.464	0.569	1	0.485	0.639
Q10	0.287	0.395	0.386	0.425	0.307	0.485	0.513	0.522	0.485	1	0.551

CITC- corrected item-total correlation

4.1.2 Test-retest reliability analysis

The results of test-retest reliability analyses using weighted kappa values are shown in Table 4.2. Weighted kappa coefficients are commonly used to quantify inter-rater and intra-rater reliability or test-retest reliability of ordinal ratings in clinical and epidemiologic applications (Brenner & Kliedsch, 1996). The weighted kappa values indicate the measure of reliability of each item for the test-retest. In this study, the weighted kappa value for each item ranged from 0.3 to 0.6, indicating a fair to substantial agreement.

Table 4.2: Results from test-retest analyses

Items	Weighted kappa
Q1	.518
Q2	.451
Q3	.323
Q4	.411
Q5	.642
Q6	.507
Q7	.293
Q8	.426
Q9	.281
Q10	.372

4.2 Validation analysis

Validation of the Bahasa Malaysia version of the PSPS was tested using confirmatory factor analysis (CFA). Model fit assessment using CFA describes the ability of the proposed model to capture the covariance between all the items or measures in the model. In this study several fit indices were used to assess the model fit. The indices and the accepted values are: Chi-square/df < 3, Goodness of Fit Index (GFI) >0.9, Adjusted Goodness of Fit Index (AGFI)>0.9, Tucker-Lewis Index (TLI) > 0.9, Comparative Fit Index (CFI) >0.9 and Root Mean Square Error Approximation (RMSEA) < 0.008 (Hair, 2010).

4.2.1 The respondents in the validation analysis

The sample size for the validation study was determined in accordance with the notion that in factor analysis, there should be a minimum of 300 respondents (Raykov, 2011). Initially, a total of 400 students were targeted for this phase. However, only 354 secondary school students completed the Bahasa Malaysia version of the PSPS.

Demographic profile of the respondents is provided in Table 4.3. Gender distribution was relatively equal; 51.7% males and 48.3% females. Most of the

participants were Malays (55.4%) followed by 37.9% Indians, 6.2% Chinese and 0.6% were others (Ibans). The mean age was 14.7 ± 1.3 years. Almost 50% of the student's parents had secondary school education and around 40% had a joint family income per month of RM 1000 to RM 3000.

Table 4.3: Sociodemographic characteristics of respondents in the validation study

(n=354)		
Variables	n	%
Gender		
Male	183	51.7
Female	171	48.3
Age(years)		
13	84	23.7
14	92	26.0
16	178	50.3
Ethic Group		
Malay	198	55.4
Chinese	22	6.1
Indian	134	37.9
Others	2	0.6
Father's Education Level		
No Formal Education	6	1.7
Primary Education	16	4.5
Secondary Education	184	53.0
College/University	142	40.8
Mother's Education Level		
No Formal Education	15	4.3
Primary Education	22	6.4
Secondary Education	202	58.0
College/University	109	31.3

Table 4.3: Sociodemographic characteristics of respondents in the validation study (continued)

(n=354) Variables	n	%
Family Income (RM)		
≤ RM 500	5	1.4
RM 500-RM 1000	56	15.8
RM 1000-RM 3000	142	40.1
RM 3000-RM 5000	90	26.7
≥ RM 5000	56	16.0

RM-Ringgit Malaysia

4.2.2 Results from Validation Analysis

In the initially tested model, all the 10 items were in a single construct as shown in Figure 4.1. This model did not fit well (Chi-square/df > 3, GFI < 0.9, AGFI < 0.9, TLI < 0.9, CFI < 0.9 and RMSEA > 0.08).

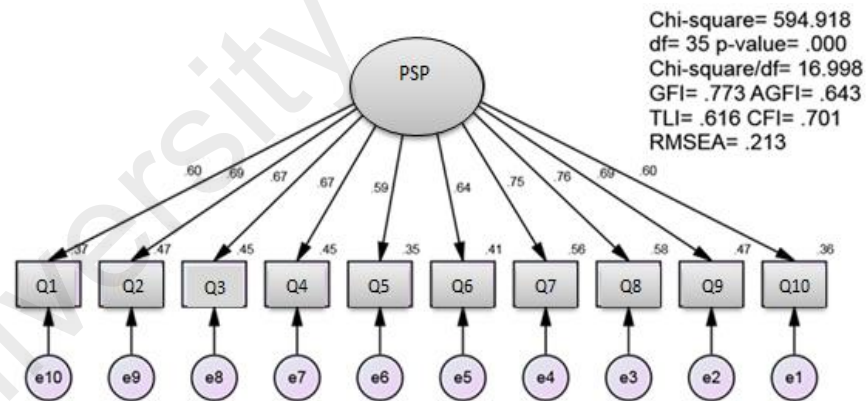


Figure 4.1: Single factor model

PSP-Perceived Sociocultural Pressure

GFI- Joreskog's goodness of fit index

AGFI- adjusted goodness of fit index

TLI- Tucker-Lewis Index

CFI- comparative fit index

RMSEA- root mean square error of approximation

After several modifications, a 4-factor model as shown in Figure 4.2 was found to be acceptable, (Chi-square/df < 3, GFI > 0.9, AGFI > 0.9, TLI > 0.9, CFI > 0.9 and RMSEA < 0.08). One assumption in using maximum likelihood estimation (MLE) is multivariate normality. This is usually based on the Mardia's coefficient of multivariate kurtosis. If the critical ratio for this value is less than 1.96, assumption of multivariate normality can be assumed (Mardia, 2004).

In testing the assumption of multivariate normality, the critical ratio for Mardia's multivariate kurtosis was 94.53, which is more than 1.96. However, a cross-validation using 1000 bootstrap resamples gave a p-value of 0.199, which is more than 0.05. Hence, the model "correctness" is acceptable.

The four domains identified were; (1) Pressure to be thin from Family & Friends, (2) Pressure to be thin from people they dated, (3) Pressure to be thin from the media and (4) Weight Teasing by Family & Friends.

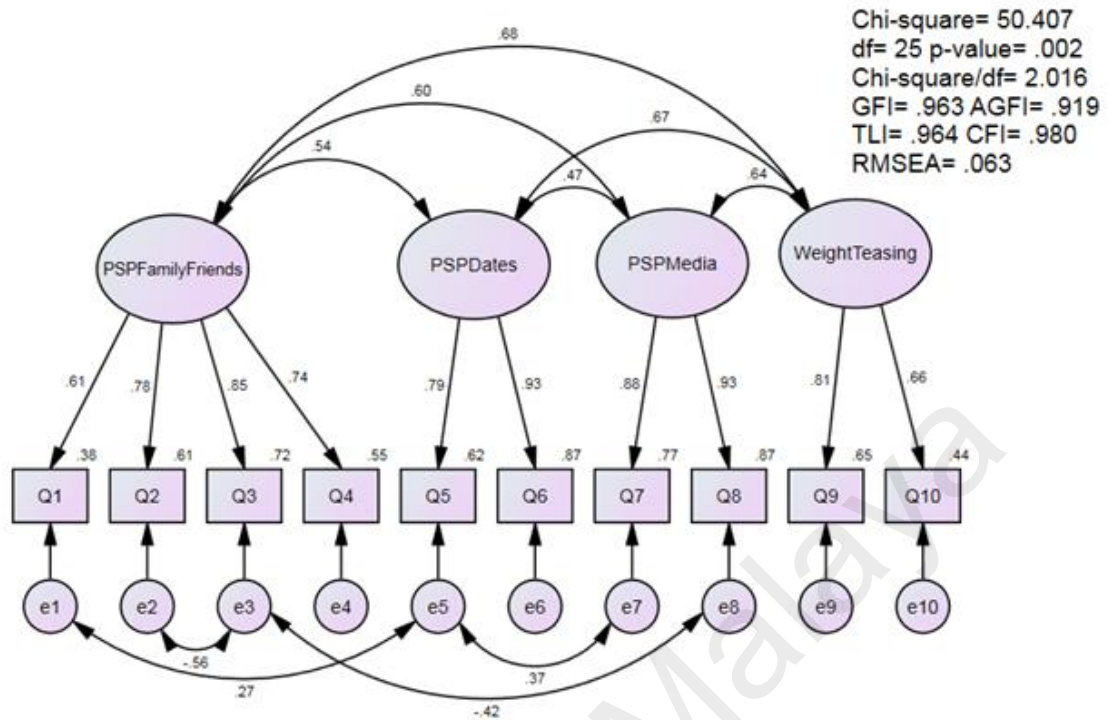


Figure 4.2 : Four-factor model

PSP-Perceived Sociocultural Pressure

GFI- Joreskog's goodness of fit index

AGFI- adjusted goodness of fit index

TLI- Tucker-Lewis Index

CFI- comparative fit index

RMSEA- root mean square error of approximation

The factor loadings, average variance extracted (AVE) and composite reliability (CR) values are given in Table 4.4. The minimum factor loading was 0.614, which is more than 0.5 (Hair, 2010). The AVE values are all above 50%, indicating a good convergence of the items in each domain. The CR values are more than 0.7 which is more than the respective AVE values.

Table 4.4: Factor loadings in the 4-factor Bahasa Malaysia version of PSPS

Subscale	Items	Unstandard- ized Estimate	S.E.	C.R.	p	Standar- dized Estimate	AVE	CR
PSP Family &Friends	Q1	1.000				0.614	0.579	0.844
	Q2	1.321	0.115	11.464	<0.001	0.782		
	Q3	1.527	0.127	11.980	<0.001	0.851		
	Q4	1.406	0.116	12.146	<0.001	0.742		
PSP Date	Q6	1.000				0.932	0.734	0.845
	Q5	0.894	0.069	13.051	<0.001	0.794		
PSP Weight Teasing	Q10	1.000				0.663	0.555	0.712
	Q9	1.415	0.126	11.252	<0.001	0.810		
PSP Media	Q8	1.072	0.054	19.726	<0.001	0.931	0.845	0.916
	Q7	1.000				0.884		

PSP-Perceived Sociocultural Pressure, S.E.-Standardized Estimate, CR-Composite Reliability

In assessing discriminant validity, the method proposed by Fornell and Larcker (Fornell, 1981) was used. In this method, in testing two factors F1 and F2, the AVE values for F1 and F2 are compared with the R-squared value between the two factors.

As a rule, if the R-squared value is less than the AVE values, then there is sufficient discriminant validity between the two constructs. The results for discriminant analysis between the four domains are shown in table 4.5.

Table 4.5: Test of discriminant validity between the domains in Bahasa Malaysia version of PSPS

Subscales	1	2	3	4
1. PSP Family & friends	0.579*			
2. PSP Dates	(0.281)	0.734*		
3. PSP Media	(0.398)	(0.228)	0.845*	
4. PSP Weight Teasing	(0.473)	(0.448)	(0.411)	0.555*

*AVE and values in parenthesis are the R-squared values, PSP-Perceived Sociocultural Pressure

In Table 4.5, the R-squared values are less than the respective AVE values. Hence, there is sufficient discriminant validity among the four subscales of the BM version of PSPS.

Phase 2

4.3 Prevalence of disordered eating and the associated risk factors

Results for the prevalence of disordered eating among secondary school students and the associated risk factors are given in this section.

4.3.1 Prevalence disordered eating among secondary school students

A total of 654 secondary school students from the selected schools participated in the second phase of which 53 questionnaires received, were incomplete. There was no pattern among the students who did not complete the questionnaire they were missing at random.

As such, data from the remaining 601 questionnaires was used in the analysis. No students were found to be treated or undergoing treatment for eating disorder over the last 6 months.

Demographic characteristics of the respondents are shown in Table 4.6. Since a complex sample design was used in this study, all cases were weighted accordingly before analysis. In the analysis, the complex samples add-on module in SPSS version 19 was used.

The number of respondents from urban and rural locations was similar (for n=302 vs 299). Majority of the respondents (59%) in the sample were females, 89% were Malays, 5% Chinese, 5% Indians and 1% other ethnics mainly of Kadazans, Ibans and Eurasians. As for parents' education level, most parents of both rural and urban school students have completed college level education.

In terms of family income per month, about 50% of parents of students from urban schools were in the highest family income bracket of more than RM 5000,

compared to only 17% parents from the rural location. This can be explained by the fact that urban areas in Malaysia have better job opportunities with higher paying wages comparatively.

About 50% of the students from both urban and rural schools are of normal BMI and about one-quarter of them are either over-weight or obese.

Table 4.6: Sociodemographic characteristics of respondents in Phase 2 of study

Variable	Urban n=302		Rural n=299	
	n	%	n	%
Gender				
Male	131	43.4	116	38.8
Female	171	56.6	183	61.2
Age(years)				
13	81	25.4	100	33.8
14	109	36.0	94	31.4
16	112	38.6	105	34.8
Ethic Group				
Malay	280	92.7	257	86.0
Chinese	11	3.6	19	6.4
Indian	10	3.4	20	6.6
Others	1	0.3	3	1.0
Parents Education Level				
Father				
No Formal Education	2	0.7	7	2.4
Primary Education	8	2.6	18	6.0
Secondary Education	104	34.4	119	39.8
College/University	188	62.3	155	51.8
Mother				
No Formal Education	1	0.3	8	2.7
Primary Education	14	4.6	19	6.4
Secondary Education	119	39.6	130	43.4
College/University	168	55.5	142	47.5
Family Income (RM)				
≤ RM 499	1	0.3	7	2.3
RM 500-RM 999	17	5.6	35	11.7
RM 1000-RM 2999	91	30.1	99	33.2
RM 3000-RM 4999	73	24.3	88	29.4
≥ RM 5000	120	39.7	70	23.4

Table 4.6: Sociodemographic characteristics of respondents in Phase 2 of study, continued

Variable	Urban n=302		Rural n=299	
	n	%	n	%
BMI				
Too Thin	30	9.9	25	8.4
Thin	41	13.6	34	11.4
Normal Weight	151	50.0	158	52.8
Overweight	54	17.9	53	17.7
Obese	26	8.6	29	9.7

RM-Ringgit Malaysia, BMI-Body Mass Index

Prevalence of disordered eating was determined based on the scoring guidelines in EAT-26, where a score of more than 20 indicates high concern about body weight, body shape and eating and hence, possibly having risk of disordered eating.

The prevalence of disordered eating, overall and by location is provided in Table 4.7. The overall prevalence of disordered eating among school students in Selangor was 19.8% (95% CI 16.5, 23.5). The prevalence of disordered eating was higher among students from rural schools (25.6%, 95% CI 20.6, 31.5) as compared to those from urban schools (15.2%, 95% CI 11.3, 20.0). There was no significant difference in the prevalence of disordered eating within the three urban schools. Similarly there was no significant difference in the prevalence of disordered eating within the three rural schools.

Table 4.7: Prevalence of disordered eating among secondary schools students in Selangor by location

n=601	EAT>20	EAT<20
	% (95% CI)	%(95% CI)
Overall	19.8 (16.5,23.5)	80.2(76.5, 83.5)
Location		
Urban	15.2(11.3,20.0)	84.8(80.0,88.7)
Rural	25.6(20.6, 31.5)	74.4(68.5,79.4)
Urban School		
SMK Bandar Tun Hussein Onn (2)	12.0(6.9,20.0)	88.0(80.0,93.1)
SMK Telok Datok	16.8(10.7,25.5)	83.2(74.5,89.3)
SMK Seri Gombak	18.8(12.3,27.7)	81.2(72.3,87.7)
Rural Schools		
SMK Bandar Tasik Kesuma	21.8(15.2,31.0)	78.2(70.0,83.8)
SMK Jenjarom	28.4(20.5,38.0)	71.6(62.0,79.5)
SMK Bandar Tasik Rawang	28.7(20.7,38.3)	71.3(61.7,79.3)

The prevalence of disordered eating by demographic characteristics are provided in Table 4.8. The prevalence of disordered eating was lower among the Malays (18.7%, 95% CI 15.4, 22.5) compared to Chinese (28.0%, 95% CI 13.7, 48.9) and Indians (33.5%, 95% CI 18.1, 53.5). The prevalence of disordered eating was higher in the low income group (37.3%, 95% CI 24.6, 52.0) and among those who were overweight (26.5%, 95% CI 18.3, 36.7).

Table 4.8: Prevalence of disordered eating among secondary schools students in Selangor by demographic characteristics

	EAT>20	EAT<20
n=601	% (95% CI)	%(95% CI)
Overall	19.8 (16.5,23.5)	80.2(76.5, 83.5)
Gender		
Male	18.2(13.5,24.0)	81.8(76.0,86.5)
Female	20.8(16.6,25.8)	79.2(74.2,83.4)
Age(years)		
13	20.0(14.5,26.9)	80.0(73.1,85.5)
14	20.6(15.2,27.4)	79.4(72.6,84.8)
16	18.8(13.7,25.2)	81.2(74.8,86.3)
Ethic Group		
Malay	18.7(15.4,22.5)	81.3(77.5,84.6)
Chinese	28.0(13.7,48.9)	72.0(51.1,86.3)
Indian	33.5(18.1,53.5)	66.5(46.5,81.9)
Father's education		
Primary Education	17.2(6.7,37.5)	82.8(62.5,93.3)
Secondary Education	24.4(18.7,31.1)	75.6(68.9,81.3)
College/University	16.7(12.9,21.5)	83.3(78.5,87.1)
Mother's education		
Primary Education	19.6(8.8,38.4)	80.4(61.6,91.2)
Secondary Education	21.9(16.8,27.9)	78.1(72.1,83.2)
College/University	18.0(13.8,23.1)	82.0(76.9,86.2)
Family Income (RM)		
RM 500-RM 999	37.3(24.6,52.0)	62.7(48.0,75.4)
RM 1000-RM 2999	21.1(15.4,28.3)	78.9(71.7,84.6)
RM 3000-RM 4999	17.4(12.1,24.5)	82.6(75.5,87.9)
≥ RM 5000	15.5(10.8,21.8)	84.5(78.2,89.2)

Table 4.8: Prevalence of disordered eating among secondary schools students in Selangor by demographic characteristics continued

n=601	EAT>20	EAT<20
	% (95% CI)	%(95% CI)
BMI		
Too Thin	9.9(4.3,21.2)	90.1(78.8,95.7)
Thin	13.4(6.9,24.5)	86.6(75.5,93.1)
Normal Weight	20.8(16.3,26.1)	79.2(73.9,83.7)
Overweight	26.5(18.3,36.7)	73.5(63.3,81.7)
Obese	19.8(10.9,33.1)	80.2(66.9,89.1)

EAT-26>20- Indicates HIGH concerns about body weight, body shape and eating. Indicates risk of disordered eating.

EAT-26<20- Indicates LOW concerns about body weight, body shape, and eating.

RM-Ringgit Malaysia

4.3.2 Types of Disordered Eating Practices

The EAT-26 questionnaire (Part C of Appendix E) the students responded to questions concerning binge eating, self-induced vomiting and taking laxatives/diet pills /diuretics. The purpose was to determine the types disordered eating practices, if any. The frequencies of the disordered eating practices are summarized in Table 4.9.

Table 4.9: Types of disordered eating practices in the population

Disordered Eating Practices n=601	% (95%CI)
Binge Eating	
Never	49.31(45.01,53.72)
Once a Month	23.43(19.89,27.31)
2 to 3 times a month	11.52(8.90,14.68)
Once a week	8.00 (5.90,10.89)
2 to 6 times a week	3.70 (2.30,5.80)
At least once a day	4.10 (2.70,6.00)
Self-Induced Vomiting	
Never	91.34(88.41,93.49)
Once a Month	4.60(3.00,6.80)
2 to 3 times a month	1.70 (0.80,3.50)
Once a week	1.00 (0.40,2.40)
2 to 6 times a week	0.80 (0.30,2.10)
At least once a day	0.60 (0.20,1.60)
Taking Laxatives/Diet Pills/Diuretics	
Never	93.67(91.01,95.69)
Once a Month	2.10(1.10, 3.90)
2 to 3 times a month	1.60(0.70,3.30)
Once a week	0.80(0.30,2.30)
2 to 6 times a week	0.70(0.20,2.10)
At least once a day	1.10(0.50,2.70)
Excessive Exercise >60mins/day	
Never	29.23(25.31,33.27)
Once a Month	19.72(16.54,23.44)
2 to 3 times a month	13.01(10.34,16.17)
Once a week	17.67(14.61,21.43)
2 to 6 times a week	13.86(11.23,17.18)
At least once a day	6.50(4.70,9.00)

Based on table 4.9, the common types of disordered eating practices (at least once a day) among the students were binge eating (4.10%, 95% CI 2.70, 6.00) and excessive exercising (6.50, 95% CI 4.70, 9.00) these practices were seen more than 2 to 6 times a week in the sample (3.70%, 95% CI 2.30,5.80) (13.86%, 95% CI 11.23,17.18) respectively. Self-induced vomiting and usage of laxative, diet pills or diuretics were minimal.

4.3.3 Factors associated with disordered eating

In the questionnaire, there were 10 items used to measure self-esteem (SE). Each item was measured on the scale of 0 to 3. After reverse coding the responses for the five negatively worded items, the total score for the 10 items was computed and saved as Self Esteem. The scores ranged from 0 to 30, a high score indicating high SE. In the analysis the range of 0 to 30 was used, these scores are often categorized as 'low SE' (0 to 14), 'normal' (15 to 25) and scores more than 25 as 'high SE'.

There were 10 items measuring Perceived Sociocultural Pressure (PSP). Each item was measured on the scale of 1 to 5, whereby a response of 1 indicated no perceived sociocultural pressure, while a response of 5 indicated high perceived sociocultural pressure to be thin. The average score of the ten items was computed and named as Perceived Sociocultural Pressure (PSP). The values ranged from 1 to 5.

There were 9 items in the Body Dissatisfaction instrument, each measured on the scale of 1 to 6. After reverse coding the responses for the four negatively worded items, the total score for the 9 items was computed and saved as Body Dissatisfaction. The scores ranged from 0 to 40 whereby the scores above 22 indicated greater body dissatisfaction. The population estimates and the correlation values for the three variables are shown in Table 4.10.

Table 4.10: Estimates for predictors of disordered eating and the correlation among them

Predictors	Mean (95%CI)	SE	PSP	BD
Self Esteem(SE)	15.69 (15.52,15.87)	1		
Perceived Sociocultural Pressure (PSP)	1.57(1.51,1.63)	0.58	1	
Body Dissatisfaction (BD)	13.42 (12.67,14.17)	0.25	0.57	1

r-correlation coefficient, CI-Confidence Interval

Based on Table 4.10, the overall estimates for Self-Esteem is 15.69 (95 % CI 15.52, 15.87), which is on the lower boundary of “normal” Self-Esteem. The estimated Perceived Sociocultural Pressure value of 1.57(95% CI 1.51, 1.63) indicates low levels of perceived sociocultural pressure to be thin, overall. The estimated Body Dissatisfaction value of 13.42 (95% CI 12.67, 14.17) indicates, a low level of body dissatisfaction overall.

There is moderate to strong positive association between; Perceived Sociocultural Pressure and Self-Esteem ($r = 0.58$), Perceived Sociocultural Pressure and Body Dissatisfaction ($r = 0.58$). There is fair positive association between Self-Esteem and Body Dissatisfaction ($r = 0.25$). Based on the correlation values, there is no serious problem of multicollinearity. All these variables were then used as predictors in the regression analysis.

4.3.4 The effect of predictors on disordered eating

As defined earlier, the students were classified into two groups based on their EAT-26 score, $EAT > 20$ as having disordered eating and $EAT \leq 20$ as not having disordered eating. The complex samples logistic regression analysis in SPSS was used to determine the effect of Perceived Sociocultural Pressure, Body Dissatisfaction and Self-Esteem on Disordered Eating. The results are shown in Table 4.11.

Table 4.11: Association between perceived sociocultural pressure, self –esteem, body dissatisfaction with disordered eating

Predictors	B	95% CI		Sig.	OR	95% CI	
		Lower	Upper			Lower	Upper
PSP	1.442	1.061	1.823	0.001*	4.229	2.890	6.189
SE	0.297	-0.057	0.651	0.100	1.346	0.944	1.918
BD	-0.007	-0.042	0.029	0.705	0.993	0.959	1.029

Reference category = EAT26<20, CI-Confidence Interval

PSP-Perceived Sociocultural Pressure, SE- Self-Esteem, BD- Body Dissatisfaction

Based on Table 4.11, among the three predictors, only perceived sociocultural pressure was identified as the significant predictor of disordered eating (OR=4.23 95% CI: 2.89, 6.19). The OR indicates that, for every unit increase in PSP the odds of disordered eating increases by 4.23.

The results of the effect of PSP on disordered eating upon controlling for demographic variables are presented in Table 4.12.

Table 4.12: Effect of perceived sociocultural pressure on disordered eating when controlled for sociodemographic factors

DE Risk Variable	B	95% CI		Sig.	OR	95% CI	
		Lower	Upper			Lower	Upper
EAT26>20							
PSP	1.398	1.027	1.810	0.001*	4.092	2.802	5.998

Corrected for- school type, age, sex, race, father's education, mother's education, monthly income, BMI

PSP-Perceived Sociocultural Pressure, DE-Disordered Eating

CI-Confidence Interval

As shown in Table 4.12, even after controlling for the demographic variables including BMI the effect of perceived sociocultural pressure still remained significant (OR=4.09 95% CI: 2.80, 5.99).

Having shown that Perceived Sociocultural Pressure was the significant predictor of disordered eating, further tests were conducted to determine the effect of the four domains of Perceived Sociocultural Pressure on disordered eating.

As discussed in the Phase 1, there are four domains of the Perceived Sociocultural Pressure Scale: (1) Perceived Pressure to be thin from Family and Friends, (2) Perceived Pressure to be thin from Dating Partners/Dates, (3) Perceived Pressure to be thin from the Media and (4) Weight Teasing.

In the PSPS questionnaire, Perceived Pressure to be thin from Family and Friends was measured by items 1, 2, 3 and 4. The average score of these four items was computed and saved as “PSP Family & Friends”.

Perceived Pressure to be thin from dating partners/dates was measured by items 5 and 6. The average score of these two items was computed and saved as “PSP Dates”. Perceived Pressure to be thin from media was measured by items 7 and 8. The average score of these two items was computed and saved as “PSP Media”. The fourth domain, weight teasing, was measured by items 9 and 10. The average score of these two items was computed and saved as “Weight Teasing”.

The estimates for the four domains of PSP are presented in Table 4.13.

Table 4.13: Estimates for the four domains in PSP

Subdomains of PSP	Mean (95%CI)
Family & Friends	1.68(1.59,1.76)
Dates	1.21(1.15,1.26)
Media	1.72 (1.62,1.81)
Weight Teasing	1.57(1.49,1.64)

PSP-Perceived Sociocultural Pressure

Based on the results shown in Table 4.13, overall, Perceived Sociocultural Pressure from Dates was the lowest and Perceived Sociocultural Pressure from Media was the highest.

Following this, the effect of the four domains of PSP on disordered eating was tested and the results are shown in Table 4.14.

Table 4.14: Effects of PSP subdomains on disordered eating

PSP Subdomains	B	95% CI		Sig.	OR	95% CI	
		Lower	Upper			Lower	Upper
(Intercept)	-3.904	-4.535	-3.273	0.001*	0.020	0.011	0.038
Family & Friends	0.469	0.146	0.793	0.005	1.599	1.157	2.210
Dates	0.188	-0.176	0.552	0.310	1.207	0.839	1.737
Media	0.423	0.184	0.662	0.001	1.526	1.202	1.938
Weight Teasing	0.326	0.012	0.641	0.042	1.386	1.012	1.899

PSP- Perceived Sociocultural Pressure, CI-Confidence Interval, OR-Odds Ratio

As shown in Table 4.14, PSP Family and Friends, PSP Media and Weight Teasing were the significant predictors of disordered eating among urban and rural secondary school students (OR=1.60 95% CI: 1.16, 2.21). (OR=1.53 95% CI: 1.20, 1.94) and (OR=1.39 95% CI: 1.01, 1.89) respectively. PSP Dates however was not significant.

These show that, the odds of disordered eating increases by 1.60, 1.53 and 1.39 for every unit increase in perceive pressure to be thin from family and friends, perceived pressure to be thin from media and weight teasing respectively.

CHAPTER 5: DISCUSSION

5.1 Validation of the Bahasa Malaysia version of the Perceived Sociocultural Pressure Scale

Associations between perceived pressure to be thin from social agents and the presence of disordered eating attitudes and behavior have been clearly substantiated (Caqueo-Urizar et al., 2011; Meno et al., 2008; Støylen & Laberg, 1990). Hence having an appropriate tool to measure these social agents is vital in order to capture the intensity or drive towards unhealthy eating habits.

The first phase of this study was aimed at translating and validating the BM version of the PSPS in a sample of multiethnic secondary school students in Selangor, Malaysia. The PSPS differs from other existing measures in its brevity, simple language, and exclusive focus on perceived pressures to be thin exerted by ones surrounding that emboldens disordered eating behaviors. The BM version of this tool has shown to be potentially useful among adolescents in Malaysia since it manifested an acceptable reliability as well as adequate discriminant validity.

The study participants were students aged between 13 to 16 years old, mainly those of middle income bracket and from multiethnic background comprising Malays, Chinese and Indians. The adolescent age group chosen in this study is highly exposed to sociocultural influences which may drive them into specific behaviors' leading to untoward outcomes like disordered eating (Dunkley, Wertheim, & Paxton, 2001b; Gifford-Smith, Dodge, Dishion, & McCord, 2005; McCabe & Ricciardelli, 2003). Malaysia being a multiracial and multilingual society with approximately 67.0% Malay, 24.3% Chinese, 7.4% Indian and 0.35% from other ethnic backgrounds (Loke & Hoon, 2011), the findings suggest that there exist some important ethnic differences on various

aspects of eating, dieting, and body image among adolescents (Edman & Yates, 2004; Keep P W & Ho BKW, 2003).

Discussing further into the psychometric properties of the BM version of the PSPS, internal consistency was good with a Cronbach alpha coefficient of 0.91, which was good and is similar to that of the original version (0.91) (E. Stice, 1998) . Past research indicates that this scale exhibited acceptable internal consistencies: Cronbach's alphas was 0.84 for the family subscale, 0.56 for the peer/friends subscale, and 0.75 for the media subscale (Eric Stice, 1998). In the current study, the Cronbach alpha reported was 0.79 for the family subscale, 0.59 for the peer/friends subscale and 0.81 for the media subscale. These values are acceptable and close to values reported in the original version.

The item total correlation is a measure of relationship between the question scores. This relationship in psychometrics is denoted as 'discrimination' referring to how well a question differentiates between participants who know the material and those who do not know the material. Based on Kline 2013, participants who had the material explained earlier should get high scores on questions and a high overall assessment scores. Meanwhile, participants who did not master the material should get lower scores on questions and a lower overall assessment scores.

This is the relationship that an item-total correlation provides which will be useful to evaluate the performance of questions (Kline, 2013). We want to have as many as possible highly discriminating questions on our tests because they are the most fine-tuned measurements to explore what participants know and can do. Items that are less than 0.3 indicates that a particular item does not correlate very well with the scale overall and may have to be deleted (Kline, 2013). High inter-item correlations (>0.8) suggest that items are indeed repetitions of each other (sometimes referred to as bloated

specifics) and are in essence of asking the same question (Ferketich, 1991; Kline, 2013) or having a narrow construct coverage.

In this study the item total correlation ranged from 0.45 to 0.8, indicating there were indeed good discrimination between the items. Most items has item total correlation below 0.8 except for question 4 which was 0.84 (Table 4.1). Question 4 which say “I’ve felt a strong message from family members to have a thin body” might have shown slight similarities to question 3, which indicates pressure to lose weight from family members. Having said that, for some instances perhaps narrow construct coverage is desirable. Such cases include if one wants to measure a highly specific attribute of a construct, or if the intention is a selection process which, with the use of a test, aims to isolate only the persons with the highest ability (Kline, 2013).

The test-retest reliability analyses after a 2 week interval using weighted Kappa coefficient with quadratic weights provided satisfactory results. The weighted Kappa with quadratic weights seem to be a method recommended for this study instead of the intra-class correlations as it is a measure of the agreement (reliability) of ordinal data (Jakobsson & Westergren, 2005).

The intra-class correlation on the other hand is often used to measure the reliability in quantitative scales (Jakobsson & Westergren, 2005). However some authors like Fleiss and Cohen (1973) argued in their article that weighted Kappa coefficient is asymptotically equivalent to the intra class–correlations. This equivalence is only possible when square error weights are used and systematic variability between observers is included as a component of total variation (Fleiss & Cohen, 1973). Though there are similarities (under certain circumstances) between correlation and agreement (Kappa coefficient), it seems to be much easier to use the

Kappa coefficient when investigating agreement for ordinal scales (Jakobsson & Westergren, 2005).

In this study the level of agreement (Kappa coefficient) of each item were 0.3 to 0.6 (Table 4.2) a range from fair to substantial agreement. These results are satisfactory even though researchers prefer them to range from 0.6 and above. This is because taking the number of respondents, raters, categories and test-retest interval into consideration, can substantially affect the agreement coefficient probability distribution, and therefore its error margin (Gwet, 2014).

Confirmatory factor analysis (CFA) was a statistical technique used in this study to verify the factor structure of a set of observed variables, in this case the sociocultural pressure to be thin and weight teasing. CFA allows the researcher to test the hypothesis that there exists a relationship between observed variables and their underlying latent constructs (Suhr, 2006). CFA was the preferred technique as compare to exploratory factor analysis (EFA). The latter may be appropriate for scale development while CFA would be preferred when measurement models have a well-developed underlying theory for hypothesized patterns of loadings (Hurley et al., 1997).

Since there was a well-established theory behind the PSPS (E. Stice, Ziemba, C., & Margolis, 1996) and phase 1 of this study was a cross cultural adaptation of an existing tool, CFA was used for the validity analysis similarly seen in few other studies (Dorman, 2003; Hepner & Sechrest, 2002).

Confirmatory factory analysis (CFA) yielded a 4-subscale model: (1) Pressure to be thin from Family & Friends, (2) Pressure to be thin from people they dated, (3) Pressure to be thin from media and (4) Weight Teasing by Family & Friends. Upon

closer examination, it is apparent that all the items appropriately belonged to the respective subscales (Figure 4.2).

In addition to the standardized factor loadings in CFA, convergent validity in the present study was examined by observing the value of composite or construct reliability (CR) and average variance extracted (AVE) for each dimensions of the PSPS . As noted by Hair et al. (2006), the CR and AVE values should be greater than 0.6 and 0.5 respectively. A CR value lower than 0.6 indicates that the items do not consistently measure the hypothesized latent construct and while an AVE smaller than 0.5 indicates that more error remains in the items than variance explained by the latent factor structure imposed on the measure (Hair et al., 2006).

CR, AVE, and standardized factor loadings are the indicators for convergent validity. The factor structure of this 4-subscale model in this study was good whereby; the overall factor loading values were more than 0.5, the AVE values were more than 50%, all composite reliability values were more than 0.7. Thus there was sufficient discriminant validity between the 4 subscales .

Other studies using a similar tool around Asia, reported mixed findings in which some were almost similar to this study and some were not. The validation of the Chinese version of the PSPS by Jackson and Chen, had a similar Cronbach alpha of .91 (Todd Jackson & Hong Chen, 2007). The Persian version of the PSPS however exhibited a Cronbach alpha of >0.7. In the Persian study, the internal consistency of the questionnaire was compared between the general population and those with eating disorders. The global score and individual items score in the eating disorder group were significantly higher than the comparison general population group (Garrusi, Garrusi, & Baneshi, 2013). Convergent validity of the Persian study was assessed in comparison with the Rosenberg –Self-esteem scale whereas, in the current study, construct validity

was determined using CFA looking into the domains of the PSPS. This indicates that many approaches were implemented in the validation of this tool and has attributed a satisfactory outcome to its psychometric properties globally.

Sociocultural pressure to be thin has been shown to lead individuals in exhibiting a greater passion to be thin, body dissatisfaction and having disordered eating and weight management (Michael P. Levine, Linda Smolak, & Hayden, 1994). In Malaysia, as mentioned before, disordered eating practices have become an evolving ailment which needs to be addressed urgently. The BM version of the PSPS used in this study would therefore determine associated factors towards the drive to be thin among Malaysian adolescents.

Strengths of this study included its large sample of adolescents, who were ethnically diverse as compared to other studies where the samples were confined to a single ethnic group (Garrusi et al., 2013; T. Jackson & H. Chen, 2007) . The current study included school students aged 13 to 16, who were at risk for eating pathology due to age factor.

5.2 To determine the prevalence of disordered eating in urban and rural secondary school students in Selangor, Malaysia.

Phase 2 of this study examined the risk determinants of disordered eating among urban and rural secondary school students in Selangor. The finding shows that the prevalence of disordered eating was (19.8%) mainly seen among rural school students (25.6%) as compared to that of urban schools (15.2%). Further testing within the three urban and rural schools did not show any significant difference among them.

Female students from rural schools were the prime group to have disordered eating (20.8 %). This is an expected finding as previous studies have shown that

disordered eating behaviors predominantly affect females as compared to males (Abraham et al., 1983; V. Eapen et al., 2006; Francis & Birch, 2005; Indran et al., 1995; D. R. Neumark-Sztainer et al., 2010).

Females in adolescent's years are often associated with weight and shape concerns in which a thin body is considered desirable (Crowther, 1992). Hence they are prone to engage themselves in disordered eating behaviors. In general, the results of the present study can be compared to those reported in surveys among rural adolescents. One study reported that 27% of girls aged between 12 to 18 years old had significant symptoms of disordered eating as reflected by their EAT-26 scores (Jones et al., 2001).

One other study showed 29.2% of rural female students had EAT-26 scores of 20 or higher, suggesting highly disordered eating attitudes and behavior (Becker, Burwell, Herzog, Hamburg, & Gilman, 2002). Question might arise, as to why is it common among rural school adolescents as compared among the urban school adolescents who are more exposed to and have limitless accessibility to technological advancement with media influences, large choices of food supply and peer pressure (Van Son et al., 2006).

One study attributed media exposure for disordered eating among rural adolescents since they tend to depict images from magazines, popular movies or television (Serafin, 2004). However, Packard & Krogstrand in their study among rural school adolescents attributes disordered eating behaviors to leisure activities, differences in lifestyle, and sources of food (Packard & Krogstrand, 2002).

There was a remarkable 18.2 % prevalence of disordered eating among the male students in this study. According to Ricciardelli et al (Ricciardelli, McCabe, Williams, & Thompson, 2007), it was found that males from a range of cultural groups engaged

in more extreme body change strategies and binge eating. The influencing factors include body build, levels of acculturation, socio-economic status, media exposure, and internalization of the muscular and lean body ideal. These findings have also been supported by Muris, Meesters, van de Blom, and Mayer (2005) stating that boys generally try to become more muscular, whereas girls attempt to lose weight.

In this study, boys were generally concerned over their body structure as they had expressed about their body parts in the body dissatisfaction questionnaire. Although the questionnaire did not explicitly enquire if they wanted a muscular body, it did express concerns on the body part which they were not happy about. We can concur with the above study findings that male students in this study were generally more concern in having a lean and muscular body ideal.

Looking further into the BMI, although some respondents with disordered eating were of normal weight 20.8%, 26.5% and 19.8% were overweight and obese, both in urban and rural schools. These findings seem not to be surprising because many studies have associated overweight and obesity to disordered eating (Fan et al., 2010; H. P. Libbey, M. T. Story, D. R. Neumark-Sztainer, & K. N. Boutelle, 2008; D. Neumark-Sztainer et al., 2002; Nur Syuhada Zofiran, 2011). Adolescents who are overweight have many concerns relating to their body image and shape. They tend to be subjected to weight teasing by family or peers and more often report a greater value on thinness, higher levels of anxiety, lower self-esteem, anger and depression (D. Neumark-Sztainer et al., 2002). Higher weight teasing frequency and being bothered by the teasing were related to greater odds of adolescents endorsing severe levels of binge eating behaviors and depressive symptomology (Fan et al., 2010).

This study shows that adolescents with normal weight range feel the need to engage in disordered eating. Similar findings were reported by Mintz and Betz (1988),

643 non-obese respondents indicated a high prevalence of disordered eating behaviors. The authors correlated disordered eating with lowered self-esteem, negative body image and greater tendency to endorse sociocultural beliefs regarding the desirability of thinness. Furthermore, obsessive thoughts concerning weight and appearance interfere with other life domains.

Grigg, Bowman, and Redman (1996) found 12% of the sample was classified to have a distorted body image, three-quarters of whom were underweight. Thus many of the underweight students regarded themselves as overweight. In addition, almost two-thirds of the total sample perceived them-selves as fat, when only 16% were actually overweight.

Here we can clearly see that adolescents tend to have a fear on weight gain and appearance related factors even though with desirable body weight, probably due to external influences which engage them into disordered eating.

5.3 To describe the disordered eating practices of secondary school students in Selangor, Malaysia

The type of disordered eating practices described in Phase two of this study were, binge eating, self-induced vomiting, taking laxatives/diet pills or diuretics and excessive exercising practices as shown in Table 4.9. The severity of each pattern was measured based on the frequency of the practices in a monthly, weekly and daily basis. Any disordered eating pattern practiced more than 2 to 6 times a week and once a day was considered as frequent (Garner et al., 1982). The prevalence was 4.10% and 3.70% for binge eating habits seen to be practiced daily and more than 2 to 6 times a week respectively in the sample. The prevalence of excessive exercising for more than 60 minutes was 6.50% and 13.86% practiced daily and more than 2 to 6 times a week respectively (Table 4.9).

Binge eating was a common disordered eating practice seen, similar to findings in certain studies (Miller et al., 1999; Serafin, 2004). Numerous factors have been identified as possible precursors to binge eating such as depressive mood, excessive preoccupation with body image, anxiety, hostility, boredom and dietary restraint. (Benjamin & Wulfert, 2005; Fischer, Anderson, & Smith, 2004; Ghaderi, 2003; McLaren, Gauvin, & Steiger, 2001; E. Stice et al., 2002). Whether these factors are actual precursors or consequences of binge eating still remains unclear. Longitudinal studies are needed to clarify this relationship.

The other interesting finding in this study was excessive exercising for more than 60 minutes daily. While exercise is easily recognized as a healthy behavior, research suggests that it might also be used as a coping mechanism by some individuals to manage stress and promote psychological health (Ingledeew & McDonagh, 1998). Conversely, exercise can become a compulsive behavior that may in turn limit its effectiveness in enhancing psychological states. This could be especially true for individuals with eating pathology and body image disturbance who might be exercising excessively and for externally oriented reasons (Thome & L. Espelage, 2004).

It was alarming to find that students in rural schools practiced taking laxatives/diet pills or diuretics for weight loss. No doubt minimal, 1.1% (Table 4.9) of these practices are considered detrimental to one's health (Sherry, 1999). Excessive weight concerns and distorted weight perception are associated with health compromising behaviors such as substance use (D. Neumark-Sztainer, Hannan, Story, & Perry, 2004). The use of these substances to achieve weight control in adolescents is worrisome, particularly when they have inaccurate weight perceptions (Cheung, Ip, Lam, & Bibby, 2007).

Thus binge eating and excessive exercising were the common disordered eating practices among students in this study. Excessive preoccupation with body image, anxiety, stress, hostility, boredom and dietary restraint could be attributed to these finding.

5.4 To determine the association between predictors of disordered eating

Further assessments of the association among the 3 predictors of disordered eating (Perceived Sociocultural Pressure (PSP), Self Esteem (SE) and Body Dissatisfaction) gave an overall moderate correlation, as shown in Table 4.10. Moderately strong positive correlations were seen between PSP and Self Esteem ($r=0.58$). PSP and self-esteem have been previously linked to disordered eating (Bailey & Ricciardelli, 2010; Irving, 1990; L. A. Ricciardelli & M. P. McCabe, 2001). The strong associations between self-esteem and body image may be accounted for family and friends influences as adolescents' self-perception are of what others think of them (Young, Clopton, & Bleckley, 2004).

An experimental exposure to either ultra-thin or average-sized magazine models lowered body satisfaction and consequently self-esteem among 136 girls aged between 11 to 16 in a study in the United Kingdom (Clay et al., 2005).

In this study, as we explore further, findings show influences of most PSP components (family, friends, media and weight teasing) to cause disordered eating. Weight teasing has shown to cause low self-esteem, low body image and depression. In a 5 year longitudinal study to determine if weight-teasing predicts low self-esteem, poor body image, and depressive symptoms, Eisenberg, Neumark-Sztainer, Haines, and Wall (2006) found that weight teasing affects the emotional wellbeing of adolescents, a sample population similar to the present study. Perceived sociocultural to be thin in the

form of family, friends, and media along with weight teasing shows correlation to self – esteem hence leading to disordered eating.

Similar correlation was seen between PSP and Body Dissatisfaction ($r=0.57$) as shown in Table 4.10. There has been a great sociocultural emphasis placed on physical attractiveness for girls and women (McKinley, 1999). Media images create a beauty standard for girls in which a perfect, thin, body is central. However, the thin ideal propagated in media is generally unattainable (Wiseman, Gray, Mosimann, & Ahrens, 1992).

It has been suggested that the discrepancy between actual and ideal body can result in body dissatisfaction.

Sociocultural pressure, individually or in combination, may lead to individuals internalizing societal messages about the importance of thinness and may lead to a schematic set of beliefs about the importance of thinness and beauty for success in a woman's life (L. Smolak et al., 1999). For the current sample we predict that a similar thin idealization lead to the correlation to body dissatisfaction.

Fair positive correlation was seen between self-esteem and body dissatisfaction ($r=0.25$). In many studies strong positive correlation is often seen between self-esteem and body dissatisfaction (Frost & McKelvie, 2004; Mendelson et al., 1996; Polce-Lynch, Myers, Kliewer, & Kilmartin, 2001; Tiggemann, 2005).

Self-concept theories in the Jamesian tradition, James (1890) proposed that dissatisfaction in a particular domain will have an impact on overall global self-esteem to the extent that the domain is central to the individual's self-definition. Nevertheless, it is likely that self-esteem is not equally strongly tied to body dissatisfaction for all adolescents. For example, associations may be stronger in a specific racial/ethnic or

gender groups that place more importance on appearance and body shape. Associations might also be expected to be stronger at ages in which appearance-related concerns are highest. Hence, in the current sample, further exploration to identify variation in the body dissatisfaction/self-esteem relationship across gender, age, weight status, race/ethnicity, and socioeconomic status can be carried out.

5.5 The effect of predictors and the significant predictor of disordered eating

In the final model examining the effect of the 3 predictors which were PSP, self-esteem and body dissatisfaction to the outcome disordered eating, PSP significantly shows association to the outcome even after correcting for sociodemographic factors as seen in Table 4.11 & Table 4.12.

The inference, which could be drawn, is when there is an increase in perceived sociocultural pressure to be thin among these adolescents the risk of disordered eating increases in 4 folds. (OR=4.09) (Table 4.12).

Sociocultural influences, which propose three areas of influence (family, peers and the media) are important predecessors in the development of eating pathology. These three influences are also thought to affect, via two processes: (i) internalization of unrealistic and in many cases unattainable appearance standards (the thin ideal) and (ii) increased appearance comparison. These mediating variables are assumed to lead to body image dissatisfaction, which in turn influences onset and maintenance of disordered eating symptoms (J Kevin Thompson & Covert, 1999).

Findings in Table 4.13 elaborate further that sociocultural pressure exerted through media had the highest impact on disordered eating among the adolescents. Media embodies a powerful socializing strength that shapes how adolescents assess

themselves in relation to cultural ideals of beauty and physical attractiveness (Grabe, Ward, & Hyde, 2008).

Based on the Cultivation Theory, when people are “exposed to media content or other socialization agents, they slowly cultivate or adopt beliefs about the world that coincide with the images they have been viewing or messages they have been hearing” (Zurbriggen et al., 2007). This can be harmful to young people who are regularly exposed to unrealistic expectations about beauty and physical attractiveness.

Media influence through portraying thin images of men and women , encourage adolescents in being dissatisfied with their body image (Pon Lai Wan et al., 2004). This in return make them recourse to disordered eating patterns like excessive dieting, binge eating and self -induced vomiting.

The emerging trend of social networking have contributed to the development of disordered eating as adolescents tend to depict ideal images of themselves in order to be ‘ liked’ and have more friends (Boyd & Ellison, 2007).

In a study, women of college age were randomized to spend time on social media. Mabe, Forney, and Keel (2014) reported greater shape and weight concerns as well as anxiety compared to the control group who viewed a neutral Web site.

Greater online appearance exposure and time devoted to photo application on Facebook has been associated with greater thin-ideal internalization (belief thin bodies are more attractive) and henceforth the drive to be thin (Meier & Gray, 2014). The results of this study indicate that perceived sociocultural pressure to be thin is an important predictor for disordered eating among adolescents from urban and rural schools in Selangor.

To further understand the influence between the domains of PSP, regression analysis was performed. Three out of four domains; pressure to be thin from family and friends, pressure to be thin from the media and weight teasing remain significant (Table 4.14).

Social influences are central to most etiologic models of disordered eating (Linda Smolak et al., 2013; Striegel-Moore, 1993). Drawing from Kandel's socialization theory (Kandel, 1980; Kandel & Davies, 1992), there are two processes by which socialization agents may promote behavior: social reinforcement and modeling.

Social reinforcement refers to the process whereby people internalize definitions and exhibit behaviors and values approved by significant others (Kandel, 1980). Social reinforcement would basically mean comments or actions of others that serve to support and perpetuate the thin-ideal body image (E. Stice, 1998).

For example, if an adolescent's peer group pressures her to lose weight, she may be more likely to purge following overeating. Social reinforcement of the thin-ideal might also be manifest through criticism regarding weight, encouragement to diet, and exposure to media containing thin-ideal images (E. Stice, 1998).

Theoretically, social reinforcement of the thin-ideal promotes an internalization of this ideal and body dissatisfaction. These factors in turn are thought to result in dietary restraint and negative affect, which increase the likelihood of the emergence of eating pathology (E. Stice, 1998).

On the other hand, modeling refers to the process wherein individuals directly copy behaviors that they see others perform (Bandura, 1996). For example, an adolescent may be more likely to binge eat if she sees a parent binge.

In this current study PSP has emerged as the most significant predictor of disordered eating. As depicted by the theory of socialization, it can be concluded that both social reinforcement and modeling has played a major influence in the development of disordered eating among these adolescents.

Current findings show almost a 2 fold increase of disordered eating in the existence of peer and family pressure to be thin as well as weight teasing (Table 4.14). However the domain for pressure from dating partners was not significant. This was probably due to either, adolescents being too young to understand the concept of dating or choose to remain confidential in answering the questions relating to dating partners.

5.6 Strengths of current research

The present study was among the first to focus into the effects of body dissatisfaction, perceived sociocultural pressure and self –esteem on the development of disordered eating in Malaysia. The use of multiple measures to represent the latent constructs of disordered eating reduce the error of measurement (Annette S. Kluck, 2008) and may further aid in clarifying the mixed findings from previous studies since multiple indicators are a more stable measure of a construct.

Although not a treatment based study, the findings from the present study could be used in the planning and development of prevention programs for disordered eating among adolescents.

Respondents were recruited from public schools (both from rural and urban areas) in Selangor. The study reflected ethnic diversity and differences in socioeconomic status as well as parent’s educational background. This sample could be a representation of the adolescent population found in Selangor.

Thirdly, specific influence of each source of sociocultural pressure was examined in this study. Although not the main objective of this study, these findings are useful in predicting other factors related to disordered eating, including internalization of thin ideal and social comparison. Future research may consider prospectively examining those factors and other pressures that drives an adolescent to disordered eating behaviours.

5.7 Limitations of current research

There are several limitations in the current research. One of the key limitations is the study design itself. Even though the study provides a strong support for the proposed theoretical model, cross sectional research design does not provide details about the developmental changes over time and precludes in determining the directionality of effects. Longitudinal research provides support with perceived pressure to be thin and alternatively help in the onset detection of disordered eating behaviours such as binge eating, excessive exercise or consumption of diet pills /laxatives/diuretics.

The current study has also focused on adolescents; hence the developmental trajectory of disordered eating is vital, especially in determining the outline of prevention and treatment programs. Prospective research should focus on disordered eating behaviours from preadolescents through adulthood.

Thirdly the study uses only self-report measures. Although a confidential procedure was employed in the collection of data for this study, self-report measure is still susceptible to the effects of bias and social desirability. This could be apparent given the sensitive nature of some questions relating to dating partners and family pressure. It may be possible that some participants may underreport or chose to remain confidential in disclosing personal information. Future studies should consider the inclusion of multiple raters report.

Finally, the current model specifically focused on the prediction of disordered eating behaviours rather than clinical eating disorders. The possible pathways to pathological eating were not examined. Therefore, the result of this study is unlikely to generalize adolescents diagnosed with a clinical eating disorder.

It could be than argued that disordered eating behavior is benign and no special attention needs be given to its progression. Disordered eating does have negative consequences to health and risk to develop clinical eating disorder (D. Neumark-Sztainer et al., 2006). The identification of those young adolescents engaging in disordered eating may be useful in selecting respondents for prevention programs.

University of Malaya

CHAPTER 6: CONCLUSION

6.1 Validation of the Bahasa Malaysia version of the Perceived Sociocultural Pressure Scale (PSPS)

Overall, the Bahasa Malaysia version of the Perceived Sociocultural Pressure Scale (PSPS) was found to have good psychometric properties. Internal consistency and test retest correlation were good, supporting the reliability of the scale. Moreover, the scale demonstrated acceptable measurement model fit where there was sufficient evidence to sustain the construct validity of the scale. The results provided justification for the use of the PSPS in its BM version and therefore it can be appropriately used to assess sociocultural pressure to be thin among adolescents in Malaysia.

Strengths of this study included its large sample of adolescents, who were ethnically diverse as compared to other studies where the samples were confined to a single ethnic group (Garrusi et al., 2013; T. Jackson & H. Chen, 2007). The current study included school students aged 13 to 16, who were at risk of eating pathology due to sociocultural influences.

However there are limitations that need to be considered when interpreting the results and applying the findings of this study. Firstly, the samples were recruited from randomly selected schools from only one state, in Malaysia. This may not be representative of students throughout the country.

Secondly, the influences of social media channels such as Twitter, Whats App, Snap Chat and websites that served a platform to promote disordered eating behaviours were not clearly outlined in the questionnaire. Although the influence of Facebook was highlighted under the media subscale of the PSPS, it was not a standalone item in the questionnaire to reflect the perceived pressure by social media to be thin.

Future research should consider including the social networking apps and pro-disordered eating websites to neutralize the potential confounding effects of media representation in the questionnaire.

6.2 To determine the prevalence and predictors of disordered eating among urban and rural secondary school students in Selangor, Malaysia.

Phase 2 of the study disclosed the prevalence of disordered eating of students among urban and rural secondary schools in Selangor and examined the risk determinants. Current study shows a prevalence of 19.8 % which indicates that out of every 10 students found in Selangor at least two students will have disordered eating.

Comparing literatures over the last 20 years in Malaysia, disordered eating has seen as an alarming increase from 0.7% to 19.8 % (W.Y. Gan et al., 2011; Indran et al., 1995)

Rural schools showed a higher prevalence compared to urban schools. This was an unexpected finding as disordered eating practices were commonly predicted among the urban dwellers (Van Son et al., 2006). Many studies attribute this fact to accessibility to a large variety of food supply and exposure to media (Hoek, Bartelds, Bosveld, & van der Graaf, 1995; Keel & Klump, 2003; Van Son et al., 2006).

This study proves that rural school adolescents are not spared from disordered eating irrespective of the location they come from in Selangor.

Female students of rural schools were found to have disordered eating. Females in general as discussed in earlier chapters were more prone to disordered eating habits (Abraham et al., 1983; V. Eapen et al., 2006; Indran et al., 1995; D. R. Neumark-

Sztainer et al., 2010) due to their high drive for thinness, body dissatisfaction and perception of their body weight status.

Urban school students whose parents are of higher education and high joint salary income bracket were seen to have disordered eating. Better social conditions lead to better accessibility to a large variety of food choices and technological advancements along with thin idealization have proven to be related to disordered eating (Palma-Coca et al., 2011; Wang et al., 2005).

Career driven parents who infrequently have family meals with their children were seen to have kids with chronic dieting habits (D. Neumark-Sztainer, Wall, et al., 2004).

In the current study, overweight and obese students from both rural and urban schools were found to have disordered eating. This could be commonly attributed to weight related stigmatization (D. R. Neumark-Sztainer et al., 2007; Stunkard & Costello Allison, 2003; Tanofsky-Kraff & Yanovski, 2004).

Binge eating habits and excessive exercising for more than 60 minutes per day were identified as the most frequent type of disordered eating practices. Binge eating is seen among rural school adolescents.

Bingeing and purging are prevalent in ancient history. Ancient Egyptian physicians recommended periodical purgation as a health practice. The Hebrew Talmud (A.D. 400-500), referred binge eating to a ravenous hunger that should be treated with sweet foods, called boolmot (Gordon, 2000).

The Romans used the word “vomitorium” referring to a special room where wealthy Romans would go to purge themselves after a large meal (Gordon, 2000). Binge eating is often linked to depressive mood, excessive preoccupation with body

image, anxiety, hostility, boredom and dietary restraint. (Benjamin & Wulfert, 2005; Fischer et al., 2004; Ghaderi, 2003; McLaren et al., 2001; E. Stice et al., 2002).

Excessive exercise was seen as a compulsive behavior closely knit to body dissatisfaction (Sue-Yee Tan & Yew, 2012).

There were associations seen among the three predictors of disordered eating which were perceived sociocultural pressure, body dissatisfaction and self-esteem. Perceived sociocultural pressure emerged as the most significant predictor to disordered eating. According to a sociocultural model, disordered eating and body dissatisfaction are partly the consequences of an increased pressure for women to achieve an ultra-thin body and other unrealistic standards of beauty (Fallon, 1990; J Kevin Thompson et al., 1999).

There have been historical changes to the thin ideal which reflect societal values regarding the importance of thinness. The ideal weight for women plateaued at 13-19% below the population average (Wiseman et al., 1992).

In addition to being thin, women today are also pressured to achieve biologically contradictory appearance goals, such as low levels of body fat, large firm breasts and shapely muscles (Klassen et al., 1993; J Kevin Thompson & Tantleff, 1992).

According to E. Stice (1994) family, peers which include dating partners and mass media play an important role in the transmission of sociocultural pressure to be thin. This study found that sociocultural pressure from family, peers and media had significant associations to disordered eating whereas dating partners did not play any significant role.

Family influence is considered important as they are seen as the most intimate and personal source of influence to adolescents (Irving, 1990). Parent's weight-related

comments, dieting behaviours, as well as family weight-teasing, may contribute to disordered eating behaviours in adolescents (D. Neumark-Sztainer et al., 2010).

Disordered eating may be more apparent among adolescents who frequently hear about dieting from their family members (84%), followed by media (48%) and peers (29%) (Schur, Sanders, & Steiner, 2000). Linda Smolak, Levine, and Gralen (1993) suggests that individuals who receive pressure from these three sources are more vulnerable in internalizing societal messages about the importance of thinness.

Students who were found to have disordered eating based on their EAT-26 scores were referred to the nearest health clinic for further assessment.

6.1.1 Implications for Prevention Programs

The outcome of the current research has proved that it is important to consider targeted prevention programs for disordered eating.

This study provides evidence that factors such as gender, BMI, urban and rural schools, types of disordered eating practices and perceived sociocultural pressure are associated to disordered eating. In addition self-reported modelling of disordered eating by family, peers and media along with weight teasing was highlighted as an important variable. However it has received limited research in this field.

It is imperative that programs aimed at preventing eating disorder and disordered eating recognize that there are many sources and types of societal pressure that serve to reinforce the thin-ideal.

In the current study perceived pressure to be thin by family, peers and media along with weight teasing have predicted disordered eating either directly or indirectly. Thus family and peer pressure are important areas to be focused in prevention programs.

It is essential to educate the parents, teachers and peer groups within school about the potentially disturbing effects of inappropriate weight related comments as well as direct modeling of weight concerns and disordered eating behaviours. Particularly among adolescents who are immersed in a subculture of routine dieting or binge eating.

Programs in school should inculcate healthy eating habits and the acceptance of different body shapes and sizes. It is vital to have well planned strategies that engage parents in interactive forums, targeting peers on a no tolerance policy on weight teasing and implementing tactics to encourage the acceptance of diversity in weight and shape (Linda Smolak et al., 2013).

The current study suggests the importance of targeting adolescent girls at different stages in life. From a development perspective girls are still living in a child's world with strong bonds to parents and have yet to make the change to high-school and for the majority have yet to experience the onset of puberty (Linda Smolak et al., 2013).

This is a time when young girls are still developing self-concept as well as attitudes, beliefs and expectations about weight, appearance and gender role (Levine & Smolak, 2006). They should be taught about social comparison that helps improve their self-worth, similar findings by Martin and Gentry (1997), where social comparison was used for self enhancement with positive body-esteem.

It is important to encourage girls to build self-confidence and self-compassion. By boosting their self-esteem, we can be assured that there will be a lower percentage of girls having disordered eating issues (Tylka, Russell, & Neal, 2015).

Efforts on counteracting the negative impact of thin-ideal may be highly helpful among girls to develop self-esteem, promote diversity in weight and educate adolescents' ways to offset media messages about thinness.

Counteracting media exposure requires a community approach. Mass media may be able to play an influential role in spreading messages about body acceptance. In 2004, personal care brand 'Dove' launched 'The Real Beauty' campaign which emphasizes the need for a wider definition of beauty after the study proved the hypothesis that the definition of beauty had become limiting and unattainable (Etcoff, Orbach, Scott, & D'Agostino, 2004).

The aim of the campaign was to celebrate the natural physical variation embodied by women and inspire them to have the confidence to be comfortable with them. The campaign also chains an online discussion forum and provides funding support for school programs that attempts to develop self-confidence and body satisfaction. Messages from this campaign reached broader audiences and have resulted in a positive impact in reducing thin-ideal internalization (Etcoff et al., 2004).

There are recent attempts to change certain standards set for models by the government and fashion industry. In 2006, the regional government of Madrid imposed the world's first ban on overly thin models (BMI < 18) to participate in a fashion show, fearing that teenagers may emulate the ultra-thinness being embellished on the runway (CNN, 2006).

Milan Italy's fashion hub-followed and soon after the United Kingdom also intervened in fashion shows by banning size 'zero' models (Millar, 2007). Although this plan has been critiqued for being overly simplistic, it is encouraging that the relevant authorities take eating disorders and their consequences very seriously.

Finally, prevention programs need to take the full range of disordered eating practices, including binge eating, excessive dieting, consumption of diet pills/laxatives/diuretics and excessive exercising into consideration. An integrated approach that addresses the importance of healthy eating and exercise is required. This includes the need to promote a healthy body image, active lifestyle, good eating habits and skills to cope with stress.

Many obesity and eating disorder prevention programs have similar targets in their program outline (D. Neumark-Sztainer, 2009). "The Be Active Eat Well Program", is a community related program involving the entire community in Colac, Victoria in Australia, to adopt a healthy lifestyle and combat obesity.

This program had a combined approach by directing multiple systems in the community including playground, schools, restaurants, supermarkets and sporting facilities to encourage healthy eating, reducing sugar consumption and increased exercise. To date this program has attained some promising results (Sanigorski, Bell, Kremer, Cuttler, & Swinburn, 2008).

The existing National Adolescent Health Plan of Action in Malaysia developed in 2005 covers nutritional health where programs in strengthening existing nutritional health promotional programs targeted for adolescents such as Healthy Eating Camps are conducted. Incorporating information on burden of disordered eating and the factors associated into these camps will provide early awareness among adolescents.

6.1.2 Future Research

Potential research should integrate sociocultural model for disordered eating behavior over time. These studies would utilize large sample sizes, multiple measures

for each construct and multiple assessment methods rather than relying on self-reported measures.

Potential research is important in understanding the risk factors of disordered eating; this will assist in determining factors that need to be focused in prevention programs.

Current risk factor models have only accounted a relatively small portion of eating disorder. Thus, it is important to continue to uncover new risk factors that may play a significant role in the etiology of disordered eating, for example exploring the use of social media and its influences on disordered eating.

Experimental studies involving adolescents of different age groups will provide valuable information about the impact of sociocultural factors on disordered eating.

To have a better understanding of the influence of family, peers and media, qualitative research would be helpful. Qualitative research provides rich and valuable information on how family, peers and media sources exert influence on disordered eating.

6.2 Final Conclusion

Disordered eating is a rapidly growing disorder in Malaysia that needs urgent attention. The current research provides evidence for the differences in the prevalence of disordered eating between urban and rural secondary school students as well as the association with sociocultural factors.

The study also provides evidence for a number of variables that need to be focused when prevention programs for disordered eating are developed. Preventive programs must not only target the affected individuals but also schools, parents,

teachers, communities and the mass media. Longitudinal research will further develop our understanding of these factors from preadolescence through adulthood.

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LIST OF PUBLICATIONS AND PAPERS PRESENTED

1. Poster presentation on the 'Validation of the Bahasa Malaysia Version of the Perceived Sociocultural Pressure Scale' at the 46th Asia Pacific conference of Public Health held in Kuala Lumpur from the 17 to 19th October 2014.
2. Best Oral Presentation –'The Effects Of Sociocultural Pressure On Disordered Eating Among Adolescents In Malaysia, What Public Health Prevention Programs Can Do?'' at the 4 the Asia Pacific Conference on Public Health from the 7th to 9th September 2015.
3. 'Validation of the Bahasa Malaysia version of the Perceived Sociocultural Pressure Scale (PSPS) paper submitted to Asia Pacific Journal of Public Health' 8/10/2015-pending feedback
4. 'The Effects of Sociocultural Pressure on Disordered Eating in Malaysia' paper submitted to the International Journal of Disordered Eating 1/12/2016-pending feedback.