Faculty of Medicine and Health Sciences

Disordered Eating Behaviour and its Associated Factors Among College and University Students in Sarawak

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DISORDERED EATING BEHAVIOUR AND ITS ASSOCIATED FACTORS AMONG COLLEGE AND UNIVERSITY STUDENTS IN SARAWAK

Edmund Shin Chin Vui

Dissertation submitted in partial fulfilment of the requirements for the degree of
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LIST OF ABBREVIATIONS

AN	Anorexia nervosa
BED	Binge Eating Disorder
BMI	Body Mass Index
BN	Bulimia Nervosa
CI	Confidence interval
DEB	Disordered eating behaviour
DSM - V	Diagnostic and Statistical Manual of Mental Disorders version five
ED	Eating disorder
OSFED	Other Specified Eating Disorders
SD	Standard deviation

ABSTRACT

Introduction: Disordered eating during late adolescents and young adulthood are common in order to pursuit idealized body image. This study aims to determine the prevalence of disordered eating and its associated factors, among college and university students in Sarawak. **Methodology:** A cross sectional study was conducted involving 20 public and private colleges and university in Sarawak, from September 2017 to March 2020. Respondents completed self-administered questionnaire printed in English and Malay language, collecting information on sociodemographic characteristics, eating attitude, body dissatisfaction, perceived sociocultural pressure, self-esteem, drive for muscularity and perfectionism. Height and weight were recorded, to calculate body mass index. **Results**: A total of 652 respondents (Male: 26.5%; Female: 73.5%) aged 19 - 25 years old took part in the study. The overall prevalence of disordered eating was 25.2% (95% CI 21.9,28.7) which was higher among females (28.6% (95% CI 24.6,32.9)) than males (15.6% (95% CI 10.5,21.9)). Multivariate analysis showed female gender (OD=2.782, 95%CI: 1.653, 4.683), perfectionism (OD=1.113, 95%CI: 1.064,1.163), Christian (OD=0.226, 95%CI: 0.088,0.803), perceived sociocultural pressure (OD=1.050, 95%CI: 1.019, 1.082), and drive for muscularity (OD=1.033, 95%CI: 1.015, 1.050), were significant predictors of disordered eating. Multigroup analysis showed, perceived sociocultural pressure ($\beta = 0.223$, $p < 0.001$) perfectionism ($\beta = 0.335$, $p < 0.01$) and drive for muscularity ($\beta = 0.266$, $p < 0.001$) explained 25% of the variance of disordered eating in male model. While in female, perceived sociocultural pressure ($\beta = 0.156$, $p < 0.001$), self-esteem ($\beta = 0.181$, $p < 0.01$), perfectionism ($\beta = 0.244$, $p < 0.001$), drive for muscularity ($\beta = 0.187$, $p < 0.01$) and body dissatisfaction ($\beta = 0.105$, $p < 0.01$) explained 15 % of the variance of disordered eating. Only perfectionism was found to be significantly differ in predicting disordered eating between gender. **Conclusion:** The prevalence of disordered eating among college and university students in Sarawak was high. The findings suggest that there are gender differences in the factors associated with disordered eating among college and university students in Sarawak. The result of this study showed male and female may require different approach when planning disordered eating prevention programs.

Keywords: Disordered eating, eating disorder, perceived sociocultural pressure, body dissatisfaction, self-esteem, perfectionism, drive for muscularity

ABSTRAK

Pengenalan: Tabiat makan bercelaru dikalangan remaja dan dewasa merupakan perkara yang kerap berlaku disebabkan faktor psikologi bagi mencapai bentuk badan yang diidamkan. Kajian ini bertujuan untuk menentukan kelaziman, serta menilai faktor-faktor yang mungkin menyumbang kepada tabiat makan bercelaru di Sarawak. Bahan dan Kaedah: Kajian ini merupakan kajian rentas melibatkan 20 buah kolej dan universiti kerajaan dan swasta di Sarawak yang dijalankan dari bulan September 2017 sehingga bulan Mac 2020. Maklumat berkaitan latar belakang sosial, tabiat pemakanan, rasa ketidakpuasan badan, tekanan budaya dan sosial, keinginan memiliki badan berotot dan sifat kesempurnaan diperolehi menggunakan borang kaji selidik dwibahasa bahasa Melayu dan bahasa Inggeris. Tinggi dan berat diukur bagi menentukan indeks jisim badan. Hasil Kajian: Sejumlah 652 pelajar (lelaki: 26.5% dan perempuan: 73.5%) berumur diantara 19 sehingga 25 tahun turut serta dalam kajian ini. Secara keseluruhan kajian mendapati, kekerapan tabiat makan bercelaru sebanyak 25.2 % (95% CI 21.9,28.7) (28.6%(95% CI 24.6,32.9) perempuan dan 15.6% (95% CI 10.5,21.9) lelaki) ditafsirkan sebagai kadar yang agak membimbangkan. Antara faktor penyumbang kepada tabiat makan bercelaru termasuklah jantina perempuan (OD=2.782, 95%CI: 1.653, 4.683), tekanan budaya sosial (OD=1.050, 95%CI: 1.019, 1.082), sifat kesempurnaan (OD=1.113, 95%CI: 1.064,1.163), beragama Kristian (OD=0.226, 95%CI: 0.088,0.803), keinginan memiliki badan berotot (OD=1.033, 95%CI: 1.015, 1.050). Analisis perbandingan jantina menunjukkan, tekanan budaya sosial ($\beta = 0.223$, $p < 0.001$), sifat kesempurnaan ($\beta = 0.335$, $p < 0.01$) dan keinginan memiliki badan berotot ($\beta = 0.266$, $p < 0.001$), menerangkan 25 % varian pada tabiat makan bercelaru bagi lelaki. Manakala, tekanan budaya sosial ($\beta = 0.156$, $p < 0.001$), harga diri ($\beta = 0.181$, $p < 0.01$), sifat kesempurnaan ($\beta = 0.244$, $p < 0.001$), keinginan badan berotot ($\beta = 0.187$, $p < 0.01$) dan ketidakpuasan badan ($\beta = 0.105$, $p < 0.01$) menerangkan 15 % varian tabiat makan bercelaru di kalangan pelajar perempuan. Kesimpulan: Kekerapan tabiat makan bercelaru di kalangan pelajar kolej dan universiti adalah tinggi. Faktor yang menyumbang kepada kecenderungan tabiat makan bercelaru berbeza mengikut jantina. Ini menunjukkan bahawa, program pencegahan memerlukan pendekatan berbeza berdasarkan jantina.

Kata Kunci: tabiat makan bercelaru, tekanan buday social, harga diri, kesempurnaan, keinginan badan berotot

CHAPTER 1: INTRODUCTION

This chapter provides an overview of disordered eating behaviour and its associated factors. This chapter also outline the scope of the study, with regards to the research objectives, research questions and hypothesis. It includes the importance of the study and its application to facilitate health care providers and policy makers in response to focus in prevention programs on disordered eating behaviour.

1.1 Background of study

Disordered eating is used to describe a wide range of unhealthy eating behaviours such as restriction of food intake, self-induced vomiting, binge eating and purging behaviours which are common during adolescence and early adulthood (Jacobi et al., 2004; John, 2016). Restricting one's diet are usually seen mainly for those overweight persons as a measure of weight managements (Neumark- Sztainer et al., 2002). However, due to overvaluation of shape and weight in non-overweight persons, negative cognition of self-schema which regarded a superior rather than physical well-being incline individual to engaged in disordered eating pattern (Boutelle, 2002; Williamson et al., 2004). Such individual tends to involve in disordered eating practices, such as restrictive eating, unhealthy weight control, laxatives, or diuretics use (Thompson & Stice, 2001). In an extreme form, these behaviours are associated with various negative psychological consequences such as poor self-esteem, depression, and obsession towards their shape (Mehler & Brown, 2015). Although the symptoms of disordered eating imply significant distress to the individuals, it is often concealed or presented sub-clinically (John, 2016). Moreover, the stigma associated with disordered eating make it less engaged in the support service (Costarelli &

Stamou, 2009). Disordered eating itself is considered one of the known risk factors that contribute to the development of eating disorders (Hay & Mitchison, 2014).

It has been widely acknowledged that disordered eating has multidimensional aetiology, which includes biological, psychological, and sociocultural (American Psychiatric Association, 2013). Although disordered eating has previously been viewed as an issue among women, recent evidence shows that disordered eating practices among males are comparable to females, however the pursuit of an ideal figure may differ between gender (Katcher & Wegner, 2014). Females glorify being slim and slender as an element of ideal beauty, whereas males internalize the concept of being muscular built as their idealized body appearance (Homan, 2010; McCreary and Sasse, 2000). Deviations from this quality of appearances or if there is a gap between the ideals and one's physique reality, the feelings of guilt and failure, will results in negative thought on body image (Ahrberg, 2014). Body dissatisfaction, although it is perceived as internal values, it can be influenced by several other external factors such as social and environmental factors (Tiggemann, 2014). Media has been attributed to play a great amount of role in exposing and influencing young adults with muscular and thin body images through magazines, internet and social apps, where they often promote body images which are unrealistic and stylized appearance, which in fact have been fabricated with digital manipulation and cannot be achieved in real life (Caldo et al., 2010). With these influencing commercials, body dissatisfaction has become a psychological issue concerning both men and women especially during adolescents and young adults in which during this particular age group, they become less resilient to psychological chaos including disordered eating behaviours (Sisk & Zehr, 2005).

Disordered eating among adolescents and young adult considered prevalent worldwide, although it may vary in different countries, ranging from the lowest of 7.8% in Spain (Rodríguez-Cano et al., 2005) to the highest of 45.2% in Turkey (Bas et al., 2005). There is no exception in developed and developing country. In the United States, the prevalence of disordered eating ranges between 22-26% (D'Souza et al., 2005). Similarly, in Japan, disordered eating was found to be higher among their adolescents' group, which was 35% (Mukai, 1994). In South Africa, literature has documented that disordered eating was as high as 21.2% (Caradas et al., 2001).

In Malaysia, the prevalence of disordered eating among adolescents and young adults has steadily increased in trend. Earlier, Indran et al., (1995) in their study among adolescents, showed the prevalence of disordered eating was 7%. Meanwhile, another study by Keep & Ho (2003) found a higher prevalence of 9.3%. Further, Edman and Yates (2004) in their study found, the prevalence of disordered eating was as high as 17%. Highest prevalence of 22.3% disordered behaviour among adolescents documented in a study done by Leng, (2008). Gan et al., (2011) found the prevalence of disordered eating among public university students in Selangor were 18.2%. Another study which compare the prevalence of disordered eating behaviour among university students in ASEAN found, 13.8% prevalence of disordered eating behaviours among university students in Malaysia. Recent study on eating behaviour among university students in Selangor found, 20.3% were found to have disordered eating (Chin et al., 2020)

In Sarawak, a study on eating behaviour among adolescents students in Kuching found 18.5% adolescents engaged in abnormal eating behaviour (Cheah, Hazmi & Chang, 2017). It appears that the prevalence of disordered eating has reached an alarming figure that may suggest the need for public health action.

1.2 Problem Statement

Evidence showed that the prevalence of disordered eating in Malaysia is increasing (Chin et al., 2020; Gan et al., 2011). Disordered eating is a public health concern that may be difficult to detect since a person with disordered eating patterns may not display all the classic symptoms typically defined with eating disorders. Disordered eating itself may pose significant psychological risks as it is associated with various physical, emotional, and mental health issues (Jacobi et al., 2004; Tsai et al., 2006; Nattiv et al., 2007). The long-term effect of disordered eating which includes micro and macronutrient deficiency will eventually cause poor health to the person (Chen et al., 2012). In the long run this may lead to clinical eating disorder. Many people who suffer from disordered eating behaviours either minimize or do not fully realize the impact it has on their mental and physical health (Mond, 2014). This lack of understanding may unnecessarily exacerbate the harm of disordered eating.

College and university years fall into a crucial development phase of emerging adulthood, which coincide with the peak onset of many mental and behavioural disorders (Arnett, 2014; Kamarulzaman et al., 2018). Life in a college or university is considered an independent period for decision making and life choices, including their eating behaviour. The loss of direct parental supervision may predispose college and university students at higher risk to develop an abnormal eating pattern (Killeya-Jones et al., 2007). Additionally, peer influence on body image may encourage the development of disordered eating (Hall & Valente, 2007).

Despite widely available studies that have identified factors associated with disordered eating behaviours, it is still considerably limited number of literatures attempted to explore the complex relationship and constructed a model concerning disordered eating behaviours among college and university students especially in local setting.

Furthermore, the risks factors that contribute to the development of disordered eating could be vary between different sociocultural background which limit the generalizability of other studies in local context. Considering the negative impact and high prevalence of disordered eating among college and university-aged individuals, it is worth exploring disordered eating in local context, particularly in Sarawak.

1.3 Objectives of the study

General objective

This study aimed to determine the prevalence of disordered eating and to determine the factors (psychological, social dimensions and body mass index) that could predict disordered eating among college and university students in Sarawak.

Specific objectives

1. To determine the prevalence of disordered eating among college and university students in Sarawak.
2. To determine body dissatisfaction, perceived sociocultural pressure, self-esteem, drive for muscularity and perfectionism level among college and university students in Sarawak.
3. To determine the factors (socio-demographic, nutritional status, body dissatisfaction, socio-cultural pressure, self-esteem, drive for muscularity and perfectionism) and its association with disordered eating.
4. To determine the relationship between body mass index, body dissatisfaction, socio-cultural pressure, self-esteem, drive for muscularity and perfectionism with disordered eating based on gender.

1.4 Research Questions

1. What are demographic and anthropometric characteristics of university students with disordered eating among college and university students in Sarawak?
2. What is the prevalence of disordered eating among college and university students in Sarawak?
3. What are the association between body dissatisfaction and disordered eating among college and university students in Sarawak?
4. What are the association between perceived socio-cultural pressure and disordered eating among college and university students in Sarawak?
5. What are the association between self-esteem and disordered eating among college and university students in Sarawak?
6. What are the association between the drive for muscularity and disordered eating among college and university students in Sarawak?
7. What are the association between perfectionism and disordered eating among college and university students in Sarawak?
8. What are the relationships between body mass index, body dissatisfaction, socio-cultural pressure, self-esteem, drive for muscularity and perfectionism with disordered eating in relation to gender?

1.5 Research hypothesis

The hypothesis for this study were:

1. The prevalence of disordered eating in this study is equivalent with results from other studies conducted among colleges and university students in Malaysia.
2. The prevalence of disordered eating is higher among females than males.
3. Higher BMI has a significant association between disordered eating behaviour.
4. Body dissatisfaction lead to disordered eating behaviours.
5. Sociocultural pressure lead to disordered eating behaviours
6. Self-esteem is associated with body dissatisfaction that lead to disordered eating behaviour.
7. Drive for muscularity is associated with body dissatisfaction that lead to disordered eating behaviour.
8. Perfectionism is associated with body dissatisfaction that lead to disordered eating behaviour.

1.6 Significance of the study

The long-term effect of disordered eating behaviour which includes obesity, anxiety, depression or micronutrient and macronutrient deficiency will eventually cause the poor health of a person. With a rigid diagnostic criterion used to diagnosed eating disorders, individuals who is having disordered eating behaviours are unable to access to health programmes that prevent them to develop full blown eating disorder. It is worth to explore the seriousness of disordered eating in the local context of Sarawak in order to provide a strong evidence which can be used as a guide in creating and developing health programmes to prevent and intervene disordered eating behaviours.

This study explores and determines the possible risks of disordered eating behaviours (sociodemographic characteristic, Body Mass Index, body dissatisfaction, socio-cultural influence, self-esteem, drive for muscularity and perfectionism) that will contribute to the advancement of understanding on eating behaviour among adolescents and young adults. Conducting the study among college and university students will give an idea on the types of health intervention that can be incorporated into healthy campuses programmes.

1.7. Operational definitions

Adolescent	An adolescent is a person aged 10 to 19 years unless national law defines a person to be an adult at an earlier age (WHO, 1998).
Anthropometry measurement	A set of non-invasive, quantitative techniques for determining an individual's body fat composition by measuring, recording, and analysing specific dimensions of the body, such as height and weight.
Body mass index (BMI)	Is a simple index of weight-for-height, defined as a person's weight in kilograms divided by the square of the height in meters (kg/m^2). Underweight: BMI < 18.5 kg/m^2 Normal weight: BMI 18.5 – 22.9 kg/m^2 Overweight: BMI ≥ 23 kg/m^2 Pre-obese: BMI 23.0-27.4 kg/m^2 Obese 1: BMI 27.5 – 34.9 kg/m^2 Obese 2: BMI 35.0 – 39.9 kg/m^2 Obese 3: BMI ≥ 40.0 kg/m^2
Disordered eating	Disordered eating a wide range of unhealthy eating behaviours which can be grouped into three main categories which are restrictive behaviours, purging behaviours and binge eating, which criteria do not fulfil the diagnosis of an eating disorder. In this study, participants who score 20 or more on Eating Attitude Test–26 (EAT-26) scale are considered having disordered eating or at risks of an eating disorder.

Dieting	Common type of disordered eating practices characterized by pathological refusal of high-calorie foods and concern with one's physical appearance.
Oral Control	Behaviour to displaying self-control around food and the perceived pressures from others to eat more and gain weight.
Eating Disorder	Eating disorders are characterized by a persistent disturbance of eating or eating-related behaviour that results in the altered consumption or absorption of food and that significantly impairs physical health or psychosocial functioning.
Body image	A subjective perception of one's physical appearance comprising cognitions, emotions, and behaviours established both by self-observation and by noting the reactions of others.
Body dissatisfaction	A component of body image concerns the dissatisfaction with one's weight, appearance, and physical shape. In this study the term body dissatisfaction assessed the respondents perceived their own body image in terms of weight, shape, and muscle built. The higher the score on the scale indicates greater body dissatisfaction.
Self-esteem	The set of feelings and thoughts of the individual regarding his or her own worth, competence, and suitability, which results in a positive or negative attitude towards oneself. In this study, self-esteem was recorded in a continuous scale. Low score indicated low self-esteem; meanwhile higher score indicates high self-esteem.
Drive for muscularity	Drive for Muscularity defined as an individual's perception of not being muscular enough and express desires to gain more muscle bulk in the form of muscle mass. In this study the higher score indicates a higher drive for muscularity.

Perfectionism Perfectionism is a personality style characterized by an individual's concern with striving for flawlessness and perfection, which is accompanied by critical self-evaluations and concerns regarding others' evaluations. Higher score on perfectionism scale used in this study indicates greater perfectionism.

Bulimia Bulimia is an eating disorder practices in which a person eats a very large amount of food (bingeing) during which the person feels a loss of control overeating, followed by purgative behaviours for body weight loss or control.

Cognitive bias A systematic error in thinking process that affect the decision and judgements, often occurring as a result of holding onto one's preferences and beliefs regardless of contrary information.

Self-schema Cognitive generalizations about the self-derived from experience that organise and guide the processing of self-related information contained in the person's social environment

1.8 Conceptual framework

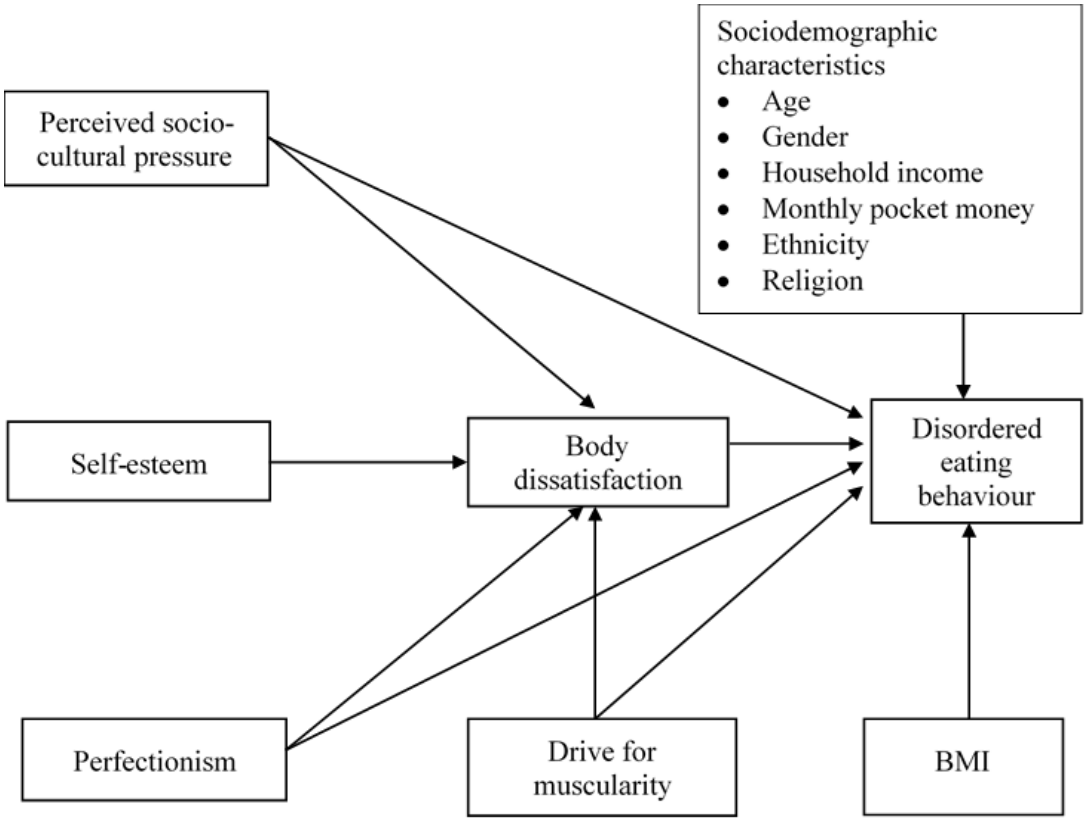

Figure 1. 1: Conceptual framework to determine the relationship between sociodemographic, body mass index, perceived sociocultural pressure and psychological characteristics with disordered eating behaviour

CHAPTER 2: LITERATURE REVIEW

This chapter represents the literature review of the current knowledge, substantive findings as well as theoretical and methodological contributions relevant to the scope of the study. It covers the associated factors of disordered eating and how these factors related and contribute to disordered eating behaviour.

2.1 Defining disordered eating

Disordered eating is a general term used to described abnormal eating behaviours which does not meet the criteria for the diagnosable eating disorder (Nattiv et al., 2007). These behaviours may range from dietary restriction such as severe restriction of calorie intake, emotional eating which either consuming large quantity of food or skipping meals, or practicing compensatory behaviour which includes excessive exercise or substance use with diet pills or diuretics with the purpose to reduce weight (Neumark-Sztainer et al., 2011). These behaviours arise due to over concern on individuals body size, weight, and body image (Kluck, 2010).

The term disordered eating and eating disordered although may create confusion, but, the clear distinction between disordered eating and eating disorder are, eating disorder is presented clinically with overt behavioural symptoms and impairment of daily function, whilst disordered eating is often has no clinical signs (Neumark-Sztainer et al., 1999). Although, individuals with disordered eating may engaged in a similar behaviour as of those with an eating disorder, the frequency is lesser (Blackstone et al., 2020). Nevertheless, there are possible health consequences which include increased risk for weight gain, obesity, as anxiety and depression (Jacobi et al., 2004;

Killen et al.,1996; Tsai et al., 2006; Nattiv et al., 2007). Disordered eating behaviour in long run will lead to clinical eating disorder (Rikani et al., 2013).

Study showed, eating disorder have been categorized as biologically based psychiatric disorder with clear genetic risks factors (Striegel-Moore et al., 2007), with specific diagnostic criteria. The Diagnostic and Statistical Manual of Mental Disorders (DSM-V) (2013), has been used to differentiate less severe disordered eating from the pathological eating disorder.

There are four main types of eating disorder such as anorexia nervosa, bulimia nervosa, binge eating disorder, and other specified eating disorders (OSFED). Unlike disordered eating, eating disorder cause serious disturbance in eating behaviour such as extreme unhealthy reduction in food intake or severe overeating, as well as feelings of distress or extreme concern about body shape or weight. The common medical complication includes cardiac arrhythmia, gastrointestinal complications, electrolyte disturbances and thermoregulation. Furthermore, disordered eating also associated with severe emotional distress and impaired social, academic, and occupational function (Toner et al., 1989).

2.2 The time course of disordered eating

Study has found, the incidence of disordered eating begins since childhood. Kaye (2009), has proposed childhood personality and temperament trait appear to contribute to the vulnerability to the development of an eating disorder. Although these personalities are consider mild, it appears to contribute to the development of an eating disorder during adolescents as this trait become intensified due to the consequence of

gonadal steroids influence, environmental stress and cultural influences (Vitousek & Manke, 1994). The surge of gonadal sex hormone during puberty not only known to modulate psychological and behavioural characteristics of an individual, but also involved in regulation on eating behaviour. It was believed that, circulating steroids act organizationally on adolescent brain development, which may permanently alter psychological traits and behaviour characteristic of an individuals. The effect of gonadal sex hormone further enhanced by stress hormone which was proposed to be correlated with disordered eating behaviour (Okbay Güneş et al., 2017; Chen at al., 2012). In the long run as in cases of chronic disordered eating behaviour, these neurobiological changes increase dysphoria, denial, obsession and perfectionism which individual enter in a viscous cycle.

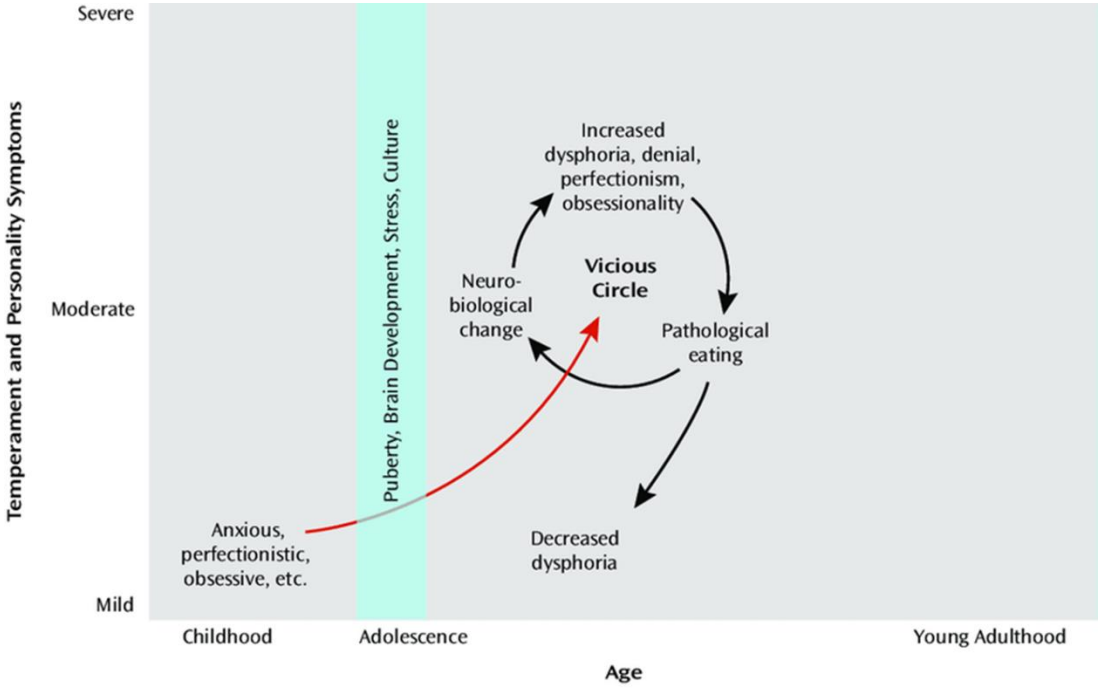

Figure 2. 1: Time Course and Phenomenology of Disordered Eating (Adapted from Kaye,2009).

2.3 Types of disordered eating practices

There are several types of disordered eating which commonly practiced, which includes binge eating, self-induced vomiting, use of diet pills, and excessive exercising are among the few disordered eating practices.

2.3.1 Binge Eating in disordered eating

Binge eating is an eating disorder which defined as consuming large amount of food than what others usually take, within the period of two hours (DSM-V, 2013). The prevalence of binge eating in the United States has dramatically increased over the period of time from 2% (Bruce & Agras, 1992) to 17% in the year 2002 (Johnson et al., 2002). However, evidence has shown that, its prevalence is higher in clinical sample (Berkowitz et al. 1993). Researchers have proposed the concept of binge eating psychopathology. The most prominent theories are the dietary restrain model, the interpersonal self-concept model, and the emotional coping model. (Heatherton & Baumeister 1991; Polivy & Herman 1985; Woods et al., 2010).

According to the dietary restraint model, dieting involves restriction of food below the one's calorie requirements. However, when the body senses this deprivation, it leads to compensatory mechanism by consuming large amount of food (Polivy & Herman 1985; Woods et al.,2010). The interpersonal self-concept model suggests that there exist an interpersonal problem and causing negative affect. This negative affect will then trigger binge eating practices (Fairbun et al., 1998). Heatherton and Baumeister (1991), posit that binge eating itself as a coping mechanism to avoid negative mood

and strong negative emotion. However, after consumed large amount of food, feeling of guilt ensue.

Jeppson et al., (2003) in their qualitative study among young woman found, binges served as a coping mechanism for negative emotion, method for self-improvement and as a strategy for psychological reinforcement. Besides, it was also found that binge eating practices triggered by anxiety, stress and rejection. The concept of thin ideal in the western society in fact serve as a reflection of self-discipline (Burns & Gavey, 2004) however failure to achieve the desired body shape lead to negative emotion and depression, particularly among woman. This may explain why woman are more likely to practice binge eating than man (Beardsworth et al., 2002). Another factor that lead to the development of binge eating was weight teasing, which was found to be significantly associated with disordered eating behaviour among normal weight and an overweight adolescent (Neumark et al., 2002). The negative emotion due to weight teasing will lead to negative self-evaluation, body dissatisfaction and low self-esteem which associate with binge eating (Stice, 2002).

2.3.2 Self -Induced Vomiting and disordered eating

Self-induced vomiting is considered an unhealthy behaviour used as inappropriate compensatory behaviour to prevent weight gain, shape control and a strategy to modulate mood (Copper & Fairburn, 1983). Studies have found that, self-induced vomiting commonly found in patient of Bulimia Nervosa (Reba et al., 2005), and approximately one third of cases of anorexia nervosa (Garner & Rosen, 1993). In many cases, self-induced vomiting is associated with other purging method such as the use of laxatives which their frequency is frequently parallel with severity of eating disorder (Edler, Haedt, & Keel, 2007). Individual who use multiple purging method, are likely

to have depression, anxiety and impulsivity and have higher tendency to commit self-harm and suicide behaviour (Favaro & Santonastaso, 1996). In bulimia nervosa individual, the frequency of vomiting is associate with higher rates of relapse (Olmsted, Kaplan, & Rockert, 1994). A study in United states found that 9% of adolescents' practices self-induced vomiting as weight control measures (Austin et al., 2008). Long standing self-induced vomiting may cause electrolyte imbalance and few other gastrointestinal complications.

2.3.3 Use of Diet Pills, Laxatives and Diuretics

There are various types of dieting pills currently available in the market and are easily accessible via over the counter prescription. Research has demonstrated the abuse of diet pills among eating disorder patients in San Diego was as high as 50% (Celio et al., 2006). The Project EAT, which assessed the trend of purging and non-purging weight control behaviour among adult in Minneapolis revealed, an increasing used of dieting pills among both men and women over the period of 10 years. Apart from the dubious effectiveness of the diet pills, it can exacerbate the complications of eating disorder itself, as well as increases risk of side effects, tolerance, and withdrawal associated with its abuse (Shekelle et al., 2003). Other than that, research has demonstrated the association between diet pill use in individuals with eating disorders and the risks for substance abuse such as alcohol and caffeine (Harrelson et al., 2006). Diet pills use are considered to be risky because the safety and efficacy of diet pills are unknown and are not evaluated by the U.S. Food and Drug Administration (USFDA, 2001).

2.3.4 Excessive Exercising and disordered eating

It is undeniable that exercise contribute to positive psychological benefits and able to increase self-transcendence, however when exercise become an obsession, negative health outcome may ensue (Franco, 2012). Exercise obsession may reduce an individuals' ability to deal with other aspects of their live to the extend where, the exercise compromises the dominant source of emotional reinforcement and identity for the person (Peele, 1977). Excessive exercise and disordered eating behaviours will lead to negative wellbeing and detrimentally adjust an individual's lifestyle, mental, emotional, and social problems (Wasko, 2012). Although various study documented the importance of excessive exercise in eating disorder, up to date there is no consensus definition of excessive exercise. According to the National Institute for Health and Care Excellence guidelines, an adult should accumulate 150 minutes of moderate intensity physical activity across the week (NICE, 2012).

Based on current literature, three psychological hypotheses have been proposed to explain the high levels of physical activity in disordered eating individuals, which includes compensation, affect regulation and compulsivity. The first hypothesis explained, excessive exercise as a drive to reduced weight and to recompense for ingested food (Fairburn et al., 2003; Garfinkel et al., 1995; Garner & Garfinkel, 1997). In this context, excessive exercise is said to have associated with weight psychopathology.

The second hypothesis postulates, excessive exercise is a way to dealt with negative affect (Casper, 1998; Davis & Woodside, 2002; Fairburn et al., 2003; Holtkamp et al., 2004). Davis and Woodside (2002), found that eating disordered patients used to exercise as a method to control their mood and to expand their calories.

The last hypothesis stated that exercise compulsive behaviour becoming ritualized and stereotyped, and linked with compulsive symptomatology and personality traits both in eating disorder and non-eating disordered exercisers (Davis et al., 1998).

It has been documented that, 39%-48% of individual who suffer from an eating disorder do suffer from exercise dependence (Hausenblas & Downs, 2002a; Klein et al., 2004). It has been highlighted in various studies that compulsive exercise in the eating disorders patient is often one of the last symptoms to subside (Crisp et al.,1980; Davis et al., 1994; Kron et al., 1978). Meanwhile, compulsive exercise has been identified as significant predictor for relapse in anorexia nervosa patient (Carter et al., 2004; Casper & Jabine, 1996).

2.4 Disordered eating in Malaysia

Although there are still considerably limited publications on disordered eating in Malaysia especially among university students, current evidence has highlighted that, there is significance increases in prevalence of disordered eating among adolescents. Back in year 1995, the prevalence of disordered eating among adolescence age 17 and 18 years old was around 7% (Indran & Mohamed Hatta, 1995). The result of this study highlighted that cultural values and attitude play an important role in the pursuit of thinnest. The study on eating behaviour among university students by Khor et al., (2002) found, there was great concern on appearance and body image among female students, which explained why females are more restrictive in their eating compared to males. This study also highlighted that more male students were found to be overweight due to uninhibited diet, in contrast to females which found to have high numbers of underweight.

Another study conducted to determine the prevalence of disordered eating among university student found 9.3% of respondents had disordered eating (Keep & Ho, 2003). This study concluded that ethnicity, Body Mass Index (BMI), inability to cope with studies, poor self-rating on academic performances, body image dissatisfaction, low self-esteem, presence of abnormal eating habits among family members, and depression, were positively correlated with the development of abnormal eating behaviour.

Edman and Yates (2004), found gender and ethnic plays an important role in the development of abnormal eating behaviour. In their study, females showed higher rates of abnormal eating behaviour compared to males. An intriguing finding in this study was that being a Malay male has a higher rate of abnormal eating behaviour compared to Chinese male. These ethnic differences could be due to cultural variation, where Malays ethnicity who participated in their study practised religious fasting. This could lead to cultural bias that inflates the EAT scores for adolescents in Malaysia. Although this study has few limitations, including small sample size, the finding in the study has valuable information for future research to explore and explain why certain male groups are at higher risk of eating disorder.

Soo et al., (2008), in their study, found that 23% adolescents girls exhibit restrained eating behaviour. The study also highlighted 87.3% of their respondents were dissatisfied with their body size. Furthermore, the study finding showed restrained eating positively correlated with BMI and dissatisfaction of body size.

Gan et al., (2011) in their study examined the association between depression, anxiety and stress and disordered eating among university students found the prevalence of disordered eating was higher among females (21.3%) compared to males (13.5%). It was found that disordered eating was positively associated with depression, anxiety,

and stress. Meanwhile study on eating behaviour among adolescent students by Cheah, Hazmi & Chang, (2017) found 18.5% of students recorded to have disordered eating. Surprisingly, more than one-third of the studied population were dissatisfied with their body weight and size. This study also showed, eating attitude was positively correlated with body mass index, body weight and body parts dissatisfaction. The studies on eating behaviour among adolescent and young adults in Malaysia summarized in table 2.1. There is clear evidence that the prevalence of disordered eating among secondary and university students has been increasing progressively and has reached an alarming figure. Therefore, more systematic investigations are needed to explore the complexity of disordered eating behaviour so that strategies aiming on the prevention of disordered eating can be formulated to prevent its serious complications.

Table 2. 1: Summary of studies on eating behaviour in Malaysia

Author/ year	Age Group (years)	n	Study Design	Factors Influencing	Findings
Indran et al., (1995)	17	132	Cross sectional	Socio-demographic Sociocultural	7% of adolescents estimated to have disordered eating behaviour
Keep P W & Ho BKW (2003)	19-21	445	Cross Sectional	Behaviour	Estimated 9.3% having disordered eating behaviour of anorexic type and more than one third (37.4%) classified having bulimic type of disordered eating.
Pon Lai Wan et al., (2004)	mean age 14.76	588	Cross sectional	Body Dissatisfaction	About half (50%) of the respondent with normal weight perceived themselves as an overweight and majority of them (70%) have the desired to lose their weight. Overweight respondents are 40% likely to skip their meal compared to normal weight respondents.
Edman & Yates, (2004)	20-21	267	Cross sectional	Behaviour Gender	Malay male found at greater risks (17%) of eating disorder compared to Malay female (15%), and other races such as Chinese females (7%) and Chinese males (3%)
Soo Kah Leng, (2008)	15–17	489	Cross-sectional	Behavioural and socio-environmental	Majority (87.3%) of the respondent were dissatisfied with their current body size, and more than half (69.1%) desired a slimmer body.

Table 2.1: continue...

Study	Age Group (years)	n	Study Design	Factors Influencing	Findings
Gan W.Y et al., (2011)	19-21	584	Cross - Sectional	Psychosocial	Majority of the respondents (73.8% males and 74.6%) females practices unhealthy eating habit such as skipped meal. The prevalence of disordered eating behaviours was 18.2%
Cheah, Hazmi & Chang, (2017)	13-17	329	Cross sectional	Psychological, sociocultural	Adolescents male were at higher risk (19.3%) of eating disorder compared to female adolescents (18%). Nearly half (46.9%) of female respondent reported to have body part dissatisfaction which is slightly more than male respondents (40%).
Pengpid & Peltzer, 2018	17-30	3148	Cross sectional	Socioeconomic status, perceived overweight, depressive symptoms, obesity	13% prevalence of disordered eating among university students in Malaysia Disordered eating associated with sociodemographic factors (wealthier subjective economic status, and living in a lower middle-income country), underweight and overweight body weight perception, psychological factors (depression symptoms and pathological internet use), and obesity

Table 2.1: continue...

Study	Age Group (years)	n	Study Design	Factors Influencing	Findings
Chin et al., 2020	Mean age 21.5	716	Cross sectional	Depressive symptoms, body appreciation, body size satisfaction	20.3% of university students were found to have disordered eating. Female students (22.9%) higher compared to males (13.3%) Depressive symptoms, body size satisfaction and body appreciation predict disorder eating behaviours among female Depressive symptom was the only predictors of disordered eating among males

2.5 Conceptualization of disordered eating

The initial theory on eating disorder mainly highlights the fear of fatness and body image disfigurements as a primary factor of self-starvation to avoid weight gain (Bruch, 1973; Russel, 1979). Subsequently, dietary restrain theory was developed by Polivy & Herman (1980) and "escape from negative affect" theory was conceptualized by Heartherton & Bauemister (1991). The modern cognitive behavioural theory of disordered eating was formulated based on several interactive cognitive processes which comprise body self-schema, cognitive bias, binge eating, compensatory behaviour, negative emotion, and psychological risk factors (Fairburn, 1997; Fairburn, Cooper, & Cooper, 1986; Vitousek & Hollon, 1990; Williamson, 1996; Williamson et al., 1999).

The modern cognitive behavioural theory of disordered eating explained how the cognitive process might lead to the development and maintenance of disordered eating behaviour. Self-schema, which is the central construct of this theory, was considered as highly efficient and organized knowledge pertaining to oneself in specific domains of emotional and behavioural commitment (Markus & Wurf, 1987). Self-schema, which is stored in the memory, will serve as a template in directing attention, perception and information processing which can lead to negative behaviour if they are bias judgement.

An individual with disordered eating was hypothesized of having stereotyped and overvalued information related to their weight and body shape leading to cognitive bias in judgement, attention and memory, specific to own body and eating practices (Copper and Fairburn, 1993). Therefore, this overvalued idea plays an active role in information processing, focused mainly on biased information on body self-schema.

This theory also highlights that an individual who has psycho-behavioural factors are at risk to develop disordered eating behaviour (Fairburn, 1997; Vitousek & Hollon, 1990; Williamson, 1996). Psycho-behaviour characteristic such as obsession on body size will influence the person's focus to the body and food-related stimuli which perceived themselves as being fat. Similarly, with the presence of psychological risk factors such as fear of fatness, thin-ideal internalization and perfectionism, will influence the self-schema towards cognitive bias. Any harmless remarks on body or food-related information will influence self-schema and thus lead to cognitive bias. Attention bias, selective memory bias, selective interpretation bias, body size overestimation and extreme drive for thinness are the main cognitive bias that will lead to the negative behaviour of eating disorder. Negative emotion which interrelated with self-schema may also predispose to cognitive bias.

The model also hypothesized that cognitive bias would elicit the negative emotion, which often characterized as worry, feeling of fatness, despair, body criticism, irritation, and self-loathing. These negative emotions on the other hand, will influence the self-schema, which creates a feedback loop mechanism. Dietary restraint is often initiated as a response to weight gain, which is considered as a motivation to become thin. Binge eating which is considered as one of the implications of increase negative emotion, may cause guilt and distress, which explain the tendency to indulge an unhealthy compensatory measure such as purging to counter the binge eating. Other compensatory behaviour includes frequent body checking, avoidance of body or food stimuli, restraining eating, compulsive exercise, and misuse of laxatives.

The outcome of these behaviours will lead to the reduction of negative emotion which further re-enforce on the need to engaging in compensatory behaviour. The model

assumed that this compensatory behaviour is an analogous of emotional reasoning. Figure 2.2 summarized the process involved in conceptualizing disordered eating.

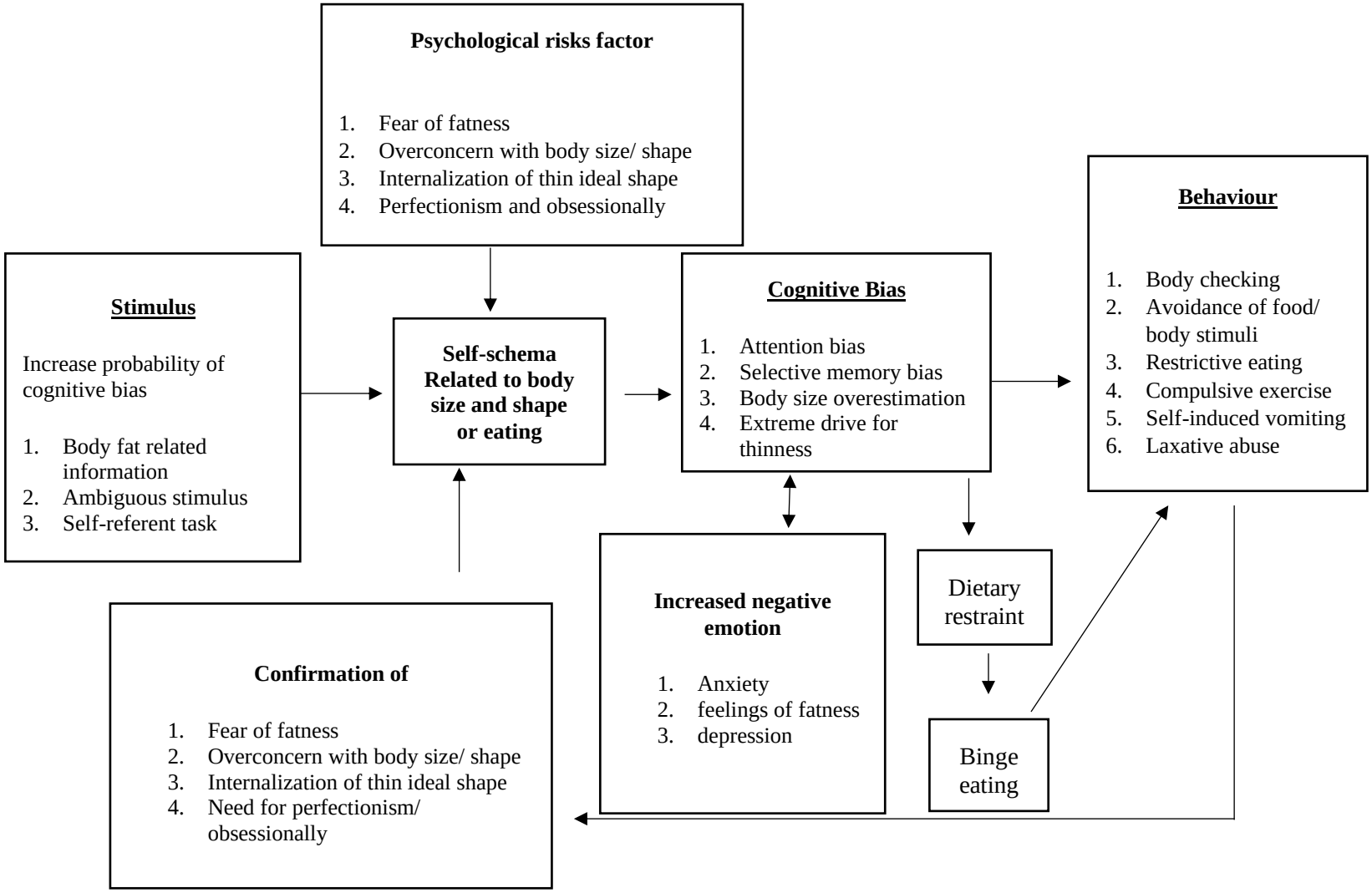

Figure 2. 2: Integrated cognitive behavioural theory on eating disorder (adapted from Williamson et al., (2004).

2.6 Gender and disordered eating

The role of gender has raised attention on how it is related to disordered eating. Traditionally, studies attributed disordered eating as women issue, but with increasing number of studies on eating attitude among males showed, the prevalence of disordered eating among males are increasing. Indeed, it has been consistently reported that males are particularly concern on their muscularity built (Lavender et al., 2017).

Studies suggested that, gender role such as being masculine or feminine may explain the association (Mussap, 2007). Various studies reported, females particularly, are more vulnerable to disordered eating than males (Johnson, Crosby et al., 2004; Rechan & Kvalem, 2015). This study was in agreement with the study by Muth and Cash, (1997), by which, females expressed high level of body dissatisfaction as compared to males. Furthermore, females consider their appearance as an investment, which is not true for males (Anderson & Bulik, 2004). Moreover, females express great concern on certain body parts which lead to lower level of body satisfaction as compared to males (Kashubeck-West et al., 2005). The study carried out by Shea and Pritchard (2007) found, female with body dissatisfaction was also found as a predictor of bulimic symptoms.

In contrast, few studies found the risks of disordered eating were equal among gender. (Davila et al., 2014; Striegel-Moore et al., 2009; Smolak &Levien 2002; Lewinsohn et al., 2002)

Other studies indicated that the association between gender and disordered could have a more complex relationship, attributed to high prevalence of overweight which contributed to body dissatisfaction and disordered eating (Whelton et al., 2007). The

finding was further supported by Pauli-Pott et al., (2014) and Gillen et al., (2012), who found, higher level of body dissatisfaction among overweight females positively associated with disordered eating.

Other studies proposed that, gender difference in disordered eating could be attributed to gender orientation (Couturier et al., 2014). This was particularly true as several studies among transgender males, were reported to have higher risks for disordered eating (Ewan et al., 2013; Lopez et al., 2013; Mason et al., 2017; Matthews-Ewald et al., 2014). Although disordered eating among transgender males were associated with disordered eating, more research is needed to explore the relationship and to keep in view other psychological attributes (Feder et al., 2017).

2.7 Body weight and disordered eating behaviours

Various literatures reported that disordered eating is usually more common among overweight or obese individuals (Kelly et al., 2014; Gardner et al., 2012; Fan et al., 2010; Neumark-Sztainer et al., 2007; Striegel-Moore et al., 2005). As overweight and obesity are associated with weight concern, dieting or other methods of weight control behaviour, these individuals are at risks of disordered eating (Neumark-Sztainer et al., 2006). Besides that, overweight and obese individuals also have a higher level of body dissatisfaction which may be subjected to weight teasing and therefore greater tendency to practice disordered eating (Philippi & Leme, 2018).

Studies has indicated that an overweight or obese individual who practice disordered eating posed significant risks to their physical and psychological threat. Longitudinal studies have found that weight and shape concern, and weight control behaviours are

strong predictors for future eating disorder (Vogeltanz-Holm et al., 2000; Killen et al., 1996). Other studies also indicated that overweight adolescents tend to practice unhealthy dieting and excessive exercises with higher tendency to practice extreme weight control behaviour such as self-induced vomiting, taking diet pills, or laxatives (Grunbaum et al., 2004; Neumark-Sztainer et al., 2002). An overweight individual with disordered eating practices was also at higher risks of for further weight gain when they engaged in binge eating behaviour (Shisslak et al., 1998).

Nevertheless, not necessarily overweight, and obese individual engaged in disordered eating behaviour. The crucial determinant lies on one's perception of their body weight known as body image distortion (Liechty, 2010). Individual with body image distortion perceived their weight in a wrong way. They may perceive themself as overweight despite of having healthy weight (Lim et al., 2014). As reported in various studies, abnormally perceived weight increased the risks of disordered eating behaviour (Alkazemi et al., 2018; Pengpid & Peltzer, 2018; Bilali et al., 2010; Fay et al., 2011; Haase, 2011; Jones et al., 2009; Grilo et al., 2009; French et al., 1997).

2.8 Family influence on body image

Family is an important social institution where attitudes, behaviour and values are taught. Based on the learning theory, family members exert influence on one another through behavioural modelling via rewards or punishment (Bandura & McDonald, 1963). Parents plays a crucial role in family development from childhood to adolescent

or even early adulthood. Parents may think that, their comment on the children appearance as an encouragement and considered natural comments during family bonding, but children may perceive it differently. It also has been shown that, the closest family members may exert strong influence on whom one close to, in behavioural development (Killeya-Jones et al., 2007).

Studies have found that family culture which placed a strong emphasized on appearance, eating and weight concern, will influence their children eating behaviour in later life (Kluck, 2008; Wertheim, 2002; Smolak et al.,1999; Vincent & McCabe, 2000). Negative comments from family related to food and eating during childhood, was associated with increased risk of disordered eating (Golan & Crow, 2004). Similarly, parents who emphasized appearance characteristic, increased risk of their daughters to engaged in disordered eating behaviour (Davis et al., 2004; Stice, 1999).

It was also noted that, children with disordered eating parents have an increased risk of disordered eating (Keel et al., 1997).

The association between negative family comments and risks of disordered eating lies in a subjective assessment on an individual which could link to body dissatisfaction and subsequently lead to disordered eating (Shaw et al., 2004).

2.9 Peer influence on disordered eating

From the theoretical perspective, social cognitive theory proposed by Bandura & McDonald (1963), has been used to model peer influence on disordered eating behaviour. According to this model, peer influence takes place if they found someone to be attractive and having qualities of close friend.

Individual with close friends usually well-liked within the broader group and have higher degree of social cache and social skills (Allen et al., 2011). On the individual level, peer influence usually take place if that person has lack of a desired characteristics (Fergusson & Horwood, 1999). During adolescence period, peers has been viewed as a source of modelling which have a powerful influence on harmful body-related behaviours and dissatisfaction (Hall & Valente, 2007). Peer group are also known to provides a subculture, which may act as an inhibitor or enhancer of disordered eating risk (Eisenberg et al., 2005). These peer influences were considered even stronger than family influence (Ostaszewski & Zimmerman, 2006).

Peer influenced has been demonstrated through peer modelling, whereby the perception of being thin rather than being fat could increase their likability with peers (Eisenberg et al., 2005). Study also found that females who tend to express their body related concern with their peers' group have had greater risks of developing body dissatisfaction (Paxton, 1996). Likewise, previous research found that friends' teasing of others weight and physique appearance will exert significantly influences on their negative emotion and body dissatisfactions (Xu et al., 2010; Neumark-Sztainer et al., 2006; Oliver & Thelen, 1996)

2.10 Media influence on body image

There are strong evidences available that mass media play the most potent role in communicating sociocultural standard (Heinberg, 1996; Mazur, 1986). The reason why people compare themselves especially with images displayed from the media, can be explained based several theories. Based on the social comparison theory developed by Festinger (1954), the information from media used as a motivational consideration.

Researcher has suggested that, these comparisons with others are usually in the upward direction which they perceived to be better in certain aspect they desire (Fitzsimmons-Craft, 2012). Via this social comparison theory, individuals come to know that they have not yet actualized their ideal. Body dissatisfaction will ensue if there is perceived discrepancy and negative view between the person's assessment and their actual and ideal body (Cash & Szymanski, 1995; Grogan, 2008).

Another theory used in explaining the association between media exposure and body dissatisfaction, and subsequent development of disordered eating, are the sociocultural theory (Thompson et al., 1999) and self-objectifications theory (Fredrickson & Roberts, 1997). According to the sociocultural theory, despite the impossibility to achieve an ideal beauty, women and men aspire these ideals which invariably lead to failure to achieve their ideals and subsequently resulting in body dissatisfaction (Stice, 1994; Tiggemann, 2002; Keery et al., 2004; Ata et al., 2007). Images portrayed by media encourage men and women to internalize this ideal beauty which is also important in the development and maintenance of body dissatisfaction (Stice, 1994; Groesz et al., 2002). This finding is further supported by Garner (1997), whereby women endorsed the influence exerted by women fashion magazine. Similarly, individual who exposed to television programmes that portrays ideal body images, were found to have greater body image dissatisfaction (Smolak,1995). Whilst Kolodner (1997) found, that, who exposed to thin photographed model reported to have higher level of self-consciousness and anxiety.

Alternatively, the association between media and disorder eating can be explained using the objectification theory (Fredrickson & Roberts, 1997). Body ideals determined by evaluating the most appealing images portrayed by media, which involve women in appearance comparison. It has been postulated that, in the western

societies, the female body is socially constructed as an object to be look at and evaluated based on appearance, particularly the sexual representation. Such objectification leads to women becoming acculturated to internalize viewer's perspective of their own bodies. Self-objectification is a form of self-consciousness characterized by habitual and constant monitoring of the body's external appearance know as body surveillance. This constant body surveillance lead to anxiety about one's body and contribute to various mental health issue including body dissatisfaction and subsequently disordered eating (Fredrickson & Roberts, 1997).

Although body dissatisfaction can be attributed to various social factors, media play the most pervasive and influential role (Thompson et al., 1999; Tiggemann, 2011). Media includes traditional form such as printed media, broadcast media such as television, films and music videos, portrays inspirational images with full perfection of beauty, appearance and attractiveness which called as an "ideal beauty" for woman and "muscular ideal" for men. These "ideal body image" is far beyond reach as it often photoshopped (Grabe et al., 2008; Tiggemann, 2011). Various studies have come into consensus that there is association between media and body image dissatisfaction that will lead to the development of disordered eating behaviour (Grabeet et al., 2008; Levine & Murnen, 2009; Groesz et al., 2002; Want, 2009).

In addition to mainstream media, the internet always portrays the stereotypical ideals of feminine beauty. Most images on the advertisement websites, advertised adolescent female with young, thin, and attractive appearance (Slater et al., 2011). With the increasing internet use particularly among adolescents and young adults, this age group are at greater risks of sociocultural pressure in their quest to develop their own identities (Brown & Bobkowski, 2011). It has been shown that, internet usage is related

to greater internalization, which lead to body dissatisfaction and development of eating disorder (Tiggemann & Miller, 2010; Tiggemann & Slater,2013).

One of the most popular and widely used internet is the social networking sites (SNS). According to social networking sites (SNS) fact sheet, (2018), 69% of adult in United States used social networking sites such as Facebook, Instagram, LinkedIn, and Twitter. These social network sites allow user to create their own profile and use it to interact with other user of the same sites. Compared to passive images on traditional media, social network sites are more interactive, allowing users to actively search for the content, particularly information about others and participate in a variety of activities, such as sharing photos, videos, and everyday information about their lives and making online comments about others' activities (Tufekci, 2008). These interactive processes may increase opportunities for SNS user to view enhanced images posted by their media friends and may subsequently involve in appearance comparison and body dissatisfaction ensue if viewer failed to comply with the beauty ideals (Choma et al., 2007).

2.11 Body dissatisfaction and disordered eating

Another construct that relevant to the development of eating disorder is body image. Body image is a dynamic concept defined as mental representation of body in term of size and shape, which resulted from interaction between biological, individual, past experiences, social and cultural factors (Slade, 1994). It is composed of two-dimensional concept known as perceptual and attitudinal construct (Brown, Cash & Mikulka, 1990). The perceptual construct is an objective evaluation of one's body size, shapes, and weight (Slade, 1994). The other construct of body image is referring to

subjective feeling on how much a person satisfied or dissatisfied with their size and shape. Among various aspect that lead to the formation of body image, socio-cultural influence has been studied extensively by many sociologists. Social reinforcement and modelling are the two processes on how socialization may have influenced attitude and behaviour in individual to express their body image (Fairburn & Brownell, 2002). Social reinforcement refers to the comments or actions of others which serve to support or maintenance of the socially accepted ideal whereas, modelling refers to the process through which an individual directly endorse or imitate behaviour that they observe from their surrounding environment. The current social standard which is overly emphasized in an unhealthy manner becomes a huge concern regarding body image among woman particularly. Mounting evidence available on how preoccupation lead to unhealthy interpretation of own body image (Catrin et al., 2000; Stormer & Thompson, 1996; Stice, 2002). The negative emotion exerted from body disfigurement will lead to the development of body dissatisfaction. Females who frequently exposed to fashion magazines are more likely to develop body dissatisfaction and has higher drive for thinness (Tiggemann, Polivy, & Hargreaves, 2009), which subsequently, form the basis as a predictor for disordered eating behaviour (Neumark et al., 2006; Johnson and Wardle, 2005; Annette S. Kluck 2010). Among various factors that lead to development of disordered eating, body dissatisfaction was found to be the strongest predictor in the development of abnormal eating pattern (Stice & Shaw, 2002; Wertheim et. al 2001) and a known risks factor for the development of anorexia nervosa and bulimia nervosa (Jacobi et al., 2004). In another study, body dissatisfaction serves as a predictor of relapse for anorexia nervosa and bulimia nervosa (Fairbun et al., 1993).

2.12 Self-esteem and disordered eating

Self-esteem is a ‘‘positive or negative attitude towards self’’ (Rosenberg, 1965). Guindon (2010), defines self-esteem as an attitudinal, evaluative aspect of the self, by which the affective decisions are placed on the self-concept, the 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 environment. Accumulating evidence are available to support the presence of strong associations between low self-esteem levels and the risk for eating disorders and body dissatisfaction (Guindon, 2010; Silverstone 1992; Markham, Thompson, & Bowling, 2005). Low self-esteem and perfectionism have been identified as the strongest risk factors in the development of eating disorders (Furnham, Badmin, & Sneade, 2002; Bas et al., 2004). Furthermore, in an established diagnosis of eating disorder, low self-esteem is associated with poor treatment response and higher tendency for case relapse (Fairburn, 2008). Individual with low self-esteem and poor body image may impede the development of positive interpersonal skills which act as a vicious cycle in development of disordered eating behaviour (Davison and McCabe, 2006).

Conversely, high level of self-esteem will enable individual to perform independently, account responsibility, able to handle task with confidence and pose positive insight against frustration (Butler & Gasson, 2005). High self-esteem helps in reducing depressive symptoms over time and to aid recovery in eating disorder (Roberts & Monroe, 1992). Besides being associated with less chances of depression, high self-esteem is linked with less neuroticism (Robins, Hendin, & Trzesniewski, 2001) and increased levels of self and body satisfaction (Diener, 2000).

There were few studies conducted to assess gender differences and the association between self-esteem with disordered eating (Harter, 1999; Kling et al., 1999; Costa et

al.,2001; Vorbach & Foster, 2002). Although there were variations in these study findings, gender characteristic was attributed to the discrepancy between their appearance and how they perceived others to look at them (Harter, 1999). Women's self-esteem is moderately, but significantly, lower than men (Kling et al., 1999). Therefore, females ranked themselves as higher score for neuroticism, whereas males' rate themselves as more assertive and open to ideas (Costa et al.,2001). Female also tend to engage on discussion about their problems which focus on their negative feelings as compared to males, which on the other hand tend to focus on power and excitement. Therefore, lower body satisfaction among woman were mainly due to higher levels of internalization of the thin ideal and social comparison from media images (Stice et al., 1994). This provide an evidence that female tend to have lower self-esteem in relation to male gender.

However other studies provide contrary findings. Davis and Cowles (1991), found body image has been reported to be significantly correlated with self-esteem for males but not for females. These signify that adolescent males' self-esteem seem to influence body image and dieting behaviour whereas in females, only body image was associated with dieting behaviours (Friestad & Rise, 2004). Grilo and Masheb (2001), who examined body dissatisfaction in an obese men and women found, men accounted for higher binge eating score and lower self-esteem, as compared to women. With these evidences, low self-esteem has found to play a significant role in moderating perfectionism and feeling about one body.

2.13 Perfectionism and disordered eating

Perfectionism is a personality trait that found to play a central role in the development and maintenance of eating disorders (Garner, 1986; Ferrier & Martens, 2009; Young

et al., 2013). Individuals with normal perfectionism will experience higher level of body satisfaction and increased self-esteem for their achievement, meanwhile people with neurotic perfectionism will never feel satisfied with their accomplishment and described themselves as never did things good enough (Hamacheck, 1978). It has been confirmed that, individuals with neurotic perfectionism will ultimately lead to the development of disordered eating behaviour (Strober, 1980; Olmsted & Polivy, 1983; Garner et al., 1984). Although the conceptualized perfectionism developed earlier was based on unidimensional construct, Hewitt and Flett, (1991a) conceptualized perfectionism as a multidimensional construct known as self-oriented perfectionism, other oriented perfectionism, and socially prescribed perfectionism. Self-oriented perfectionism involves self-imposed expectations of perfection including setting high standards for oneself, evaluating one's own behaviour stringently, and striving to attain perfection in one's own pursuits as well as striving to avoid failure. Other oriented perfectionism involves imposing expectations of perfection on others, such as unrealistically setting high standards for the behaviour of significant others. Socially prescribed perfectionism involves belief that others are imposing unrealistically high standards for the individual, that they stringently evaluate the individual, and that they exert pressure to be perfect.

In a highly perfectionist individual, a strict evaluation criterion has been set and therefore, even with a slight failure in achieving their goal, will be perceived as devastating failure (Hewitt, Flett, & Ediger, 1994), thus the development of disordered eating behaviour is resulted from failure of an individual to meet their ideal body or weight standards. Studies from clinical sample showed higher level of perfectionism found among anorexia nervosa and bulimia nervosa cases (Bastiani et al., 1995; Lilenfeld et al., 2000). Among the perfectionism construct, socially prescribed

perfectionism was found to be highly correlated with diagnosis of eating disorder and its severity (DiBartolo, Li, & Frost, 2008). On the other hand, socially prescribed perfectionism and perceived cultural ideals of thinness was also found to contribute to the development of eating disorder (Heatherton & Baumeister, 1991).

2.14 Drive for muscularity and disordered eating

Body dissatisfaction in male is said, at par with female. Body image concerns, which previously viewed as women's issues, have been increasingly observed in men (Leone et al., 2011). In contrast to sociocultural standard of physical attractiveness for women which emphasized on thinness and a slender body shape, the standard for men emphasizes a muscular body ideal (McCreary & Sasse, 2000). The ideal physique for men, is characterized by tall and muscular, with wide shoulders, large biceps, a hefty chest, and a narrow waist low in body fat (Hargreaves & Tiggemann,2004). Drive for muscularity is defined by McCreary (2011) as "attitudinal preoccupations with muscle mass and behavioural endeavours to enhance muscularity".

While mostly unattainable, males embrace the concept of muscularity which often perceived as dominance, competitiveness, and physical strength (Connell & Messerschmidt, 2005). Men who internalized the sociocultural messages about muscular ideals may be driven to obtain a muscular physique by engaging in muscular enhancing behaviours (Ward, 2006). However, if there is a gap between the ideal and one physique reality, body dissatisfaction may ensue (Thompson et al., 1996). Some study suggested that, muscularity is often associated with masculinity, and men that not fit the typical masculine feature may feel dissatisfied with their body (Lu & Wong, 2013).

Other study explained the concept of drive for muscularity as a pathological preoccupation with muscularity (Grieve, 2007). This pursuit is often associated with unhealthy eating behaviour (Smolak et al., 2005) and engagement with a variety of potentially harmful behaviours such as steroid use and over-exercising (Litt & Dodge, 2008).

CHAPTER 3: RESEARCH METHODOLOGY

This chapter introduced the overall methodological approach that was appropriate to fulfil the aims of the study and explained how the approach fits the overall research design. It also provided a justification for sample selection and sampling procedure. It further described the specific methods of data collection that were used and how it was originally created. It also described how these data were analysed to obtain an accurate assessment of distributions, relationships, and estimation. This chapter also discussed on how data was managed to ensure its quality and problems that were anticipated from the pre-test and the steps that have been taken to prevent it from occurring in the real study. Finally, it also explained how the ethics approval was obtained before the study was carried out.

3.1 Study Area

This study was conducted in the entire state of Sarawak. With an area of 124 000 km^2, Sarawak is the largest state in Malaysia. Sarawak has a population of approximately 2.8 million with diverse ethnic groups (Department of Statistics Malaysia Sarawak, 2010). Sarawak is divided into three main regions namely Southern, Central and Northern regions. The capital city of Sarawak in Kuching. Sarawak is one of the country's education hubs with both public and private institutions of higher learning.

3.2 Study Design

This was cross-sectional based study design, collected data on anthropometry measurement on height and weight, eating behaviour and the hypothesized risks factors among students of both public and private colleges and universities in Sarawak.

3.3 Study Duration

The study was conducted from September 2017 to March 2020. The whole period of study was divided into four phases:

In Phase One, it included the proposal writing, proposal presentation and proposal submission. Ethical approval was also obtained from the UNIMAS Ethics Committee (UNIMAS/NC-21.02/03-02 Jld.2 (124)). Thereafter, a pre-test was done over two month's duration. Before initializing the data collection process, approval from Ministry of Higher Education Malaysia and selected institutions were obtained. The initial data collection process was to create rapport and to plan the flow of data collection in the selected institutions.

In Phase Two of data collection and entry, it commenced for a period of one year. During this period, cross checking was done for inconsistencies and the incompleteness of data collection. Necessary feedback was also given by the supervisor to maintain the quality data. Data collection and data entry was done simultaneously.

In Phase Three, exploratory data analysis including data cleaning, validation, missing value analysis and final data analysis was done during this period. After data analysis, results were presented in tables. Research presentation was also done during this period. Comments and suggestions from department members were incorporated within the result section. The total duration of data analysis was six months.

Phase Four was the final research report writing and submission of the dissertation. Before submission, the whole research finding was again presented to the departmental review committee for pre-submission approval. The details activities and milestones were presented in Appendix 1.

3.4 The Study Population

The study was conducted among first year students in both public and private colleges and universities in in Sarawak. Students who want to pursue higher education after the secondary level need to have required academic qualifications. SPM qualifications can opt for diploma which offered by colleges or via pre-university qualifications such as form sixth or matriculation programmes, typically the age range from 19 to 21 years old. As for this study the age range of respondents were 19 to 25 years old. The selection of the institutions was based on the year 2017 list of registered public and private colleges and universities with valid Certificate of Registration until 2019 under Ministry of Higher Education Malaysia. Programs and students were identified and recruited via academic office form respective institution.

3.4.1 Inclusion criteria

- First-year college and university students in the selected institution who voluntarily took this survey were included in the study.

3.4.2 Exclusion criteria

- Non-Malaysian students
- Respondent who have been diagnosed or on follow-up treatment with eating disorders were not included in this study.

3.5 Sample size

Sample population size estimation was calculated using proportion formula; -

$n= z^2 p (1-p)/ d^2$

Whereby,

n = sample size

z = critical standard value for two-tail test = 1.96

p = anticipated population proportion, 0.182 (prevalence of disordered eating among university student in Malaysia: 18.2% (Gan & Yeoh ,2011)

d = absolute precision required on either side of the proportion, (0.05%)

Then, $n= (1.96^2 (0.182) (0.818)/ (0.05)^2)$

= 229

By considering the double design effect (DEFF) of 2.33 (WHO, 2015)

Then, $n= (1.96^2 (0.182) (0.818)/ (0.05)^2) * 2.33$

= 229 x 2.33

= 534

Using a Confidence Interval of 95%, absolute precision of ± 0.05, and anticipated non-response of 25%, then;

= 534 x 125%

= 668

The final sample size of 668 is needed to obtain significant results.

3.6 Sampling procedure

The lists of private and public colleges and universities in Sarawak obtained from Ministry of Higher Educations Malaysia. A total of 42 institutions with valid Certificate of Registration until 2019 were included as sampling frame. Institutions with Certificate of Registration expired in 2018 were excluded from the list. In order to select institutions, stratified random sampling technique was used. The state of Sarawak was divided into three region namely southern, central, and northern regions. Of all the institutions, there are 31 institutions located in the southern region, 5 institutions located in central region and 6 institutions located at northern region. The estimated number of students in each programme ranged from 20 to 45 students with an average of 33 students. Therefore, to obtain the required sample size for this study, 20 institutions (required sample size for this study divided by average number of students in each programme) were selected via simple random sampling using Microsoft excel random number generator. The calculated number of institutions for each region required 15 institutions in southern region, 2 institutions in central region and 3 institutions located at northern region. For each selected institution one specific faculty or programme was selected. Subsequently all first-year students on the selected program were taken as respondents. Figure 3.1 summarized the sampling procedure, number of institutions selected and sample size for each region.

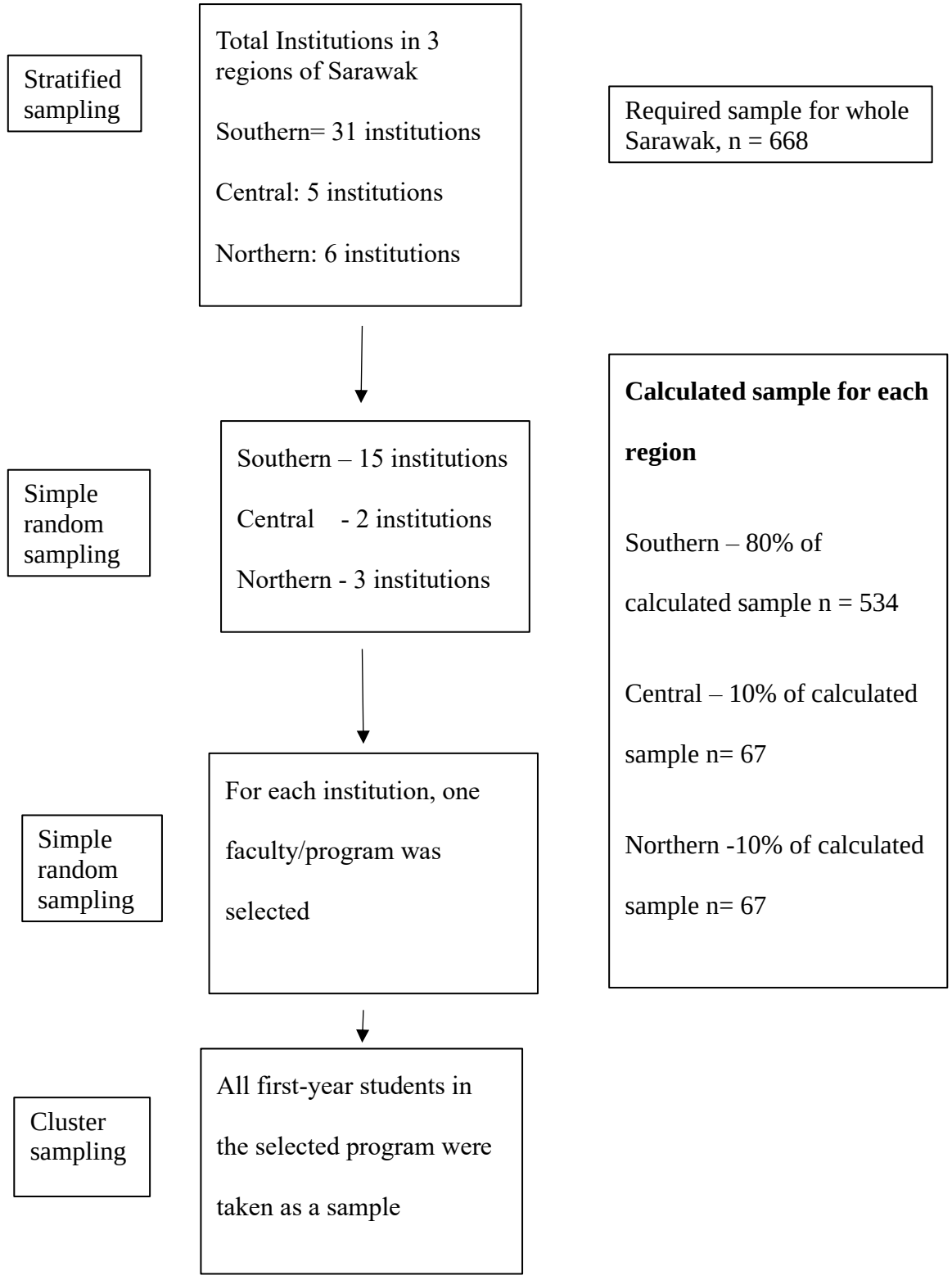

Figure 3. 1: Sampling procedure, number of institutions selected and sample size for each region

3.7 Data collection procedure

Data collection was carried out in a lecture hall setting. Prior to distributing the questionnaire, respondents were briefed by the researcher regarding the purpose of the research, confidentiality of information obtained and extent of which the data could be used. Respondents who agreed to participate were then consented. Subsequently, self-administered questionnaire was then distributed. The questionnaire was printed in Bahasa Malaysia and English. Upon completion, all the questionnaire was checked for completeness.

Height and weight were measured by researcher with the help of research assistant after the respondents completed the questionnaire. Respondents were informed to stand still in the middle of the Omron digital weighing scale's platform (Karada scan body composition monitor HBF-214). Reading of weight was taken twice to the nearest 0.1 kg. Height was measured using Seca 213 portable stadiometer. Respondents were asked to be barefoot, legs straight, and to look straight ahead at the horizontal plane. Reading of height measurements was taken twice to the nearest 0.1 cm. Body mass index (BMI) was derived using equation: weight in kilogram divided by height in meter square; BMI = weight (kg) / height (m^2).

3.8 Data collection instrument

The questionnaire was divided into eight parts. These parts include sociodemographic characteristics, assessment of eating behaviour, perceived sociocultural pressure, body dissatisfaction, self-esteem, drive for muscularity, perfectionism, and anthropometric measurements.

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

In this study, EAT-26 (Garner et al., 1982) was used to assess disordered eating behaviours of the respondents. It consists of the 26 items that has three subscales to assess an individual's behaviours and thoughts regarding (i) dieting, (ii) bulimia and food preoccupation, and (iii) oral control.

Items in the scale rated on a 6-point Likert scale: always (1), usually (2), often (3), sometimes (4), rarely (5), and never (6). Among all the items, item 26 was worded negatively, therefore the responses were re-coded in the reversed order. The responses sometimes, rarely, and never were given score of 0 while the responses always, usually, and often were scored of 3, 2, and 1, respectively. The final score was calculated as the sum of all 26 items with possible scores ranging from 0 to 78. The higher the score, indicate likely to have disordered eating behaviours. This scale can also be classified according to risk of disordered eating based on cut-off point of 20. The score of 20 or more is classified as at risks of eating disorder. Meanwhile EAT-26 scores of less than 20 were considered as not at risk of eating disorder.

The EAT-26 scale also provides information on the types of disordered eating practices namely binge eating, self-induced vomiting, taking pills or laxatives and excessive exercise. This component was rated based on the frequency of never, once a month,

two to three times a month, once a week, two to six times a week, or daily. Binge eating scale was considered significant if the participant answered the frequency of 2 to 3 times a month or more. The participant who has ever practices self-induced vomiting, taking diet pills or laxatives regardless of its frequency is considered significant. Meanwhile, for excessive exercise question, exercising more than 60 minutes daily regarded as significant.

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 scale does not provide a diagnosis but rather identifies the presence of symptoms that are consistent with a possible eating disorder. The EAT-26 was found to have good internal consistency from 0.84 to 0.89 (Mintz & O'Halloran, 2000). In the local setting, this scale has shown to have acceptable internal consistency of 0.78 (Chin et al., 2020).

3.8.2 Eating Disorder Inventory (EDI): Body Dissatisfaction Subscale

The Eating Disorder Inventory (EDI) (Garner et al., 1983), consists of 91 items with 12 subscales namely drive for thinness, bulimia, body dissatisfaction, low self-esteem, personal alienation, interpersonal insecurity, interpersonal alienation, interoceptive deficits, emotional dysregulation, perfectionism, asceticism, and maturity fears. With regard to this study, only body dissatisfaction subscale was adopted. The Eating Disorder Inventory (EDI) body dissatisfaction subscale was used to assess respondents' dissatisfaction and satisfaction towards their specific body parts. It consists of 9 items. Example of questions is "I think that my thighs are too large" which indicate dissatisfaction; meanwhile "I like the

shape of my buttocks" indicate satisfaction. Respondents rate their agreement with each statement on a 6-point Likert scale ranging from "always (6)" to "never (1)". After recoding the responses on four items that were worded oppositely (as satisfaction), an overall score was computed by summed up the responses for all the nine items. Higher scores indicate a greater dissatisfaction. This scale was found to have good internal consistency (Cronbach's alpha = 0.91) (Garner et al. 1983).

3.8.3 The Perceived Sociocultural Pressure Scale PSPS)

The Perceived Sociocultural Pressure Scale (PSPS) (Stice, Ziemba, & Margolis, 1996) is a 10-item scale used to measure the magnitude of ones' perceived pressure from the family, friends, dating partner and media to be thin. 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 high perceived sociocultural pressure to be thin. The final PSPS score was calculated as sum of all score between 10 to 50. Stice, et al., (1996) reported that this scale had a good internal consistency (Cronbach's alpha = 0.88)

3.8.4 Rosenberg's Self Esteem Scale

The Rosenberg's Self Esteem Scale is widely used to measure self-esteem. This scale was developed by Dr. Morris Rosenberg (Rosenberg M, 1965). It consists of 10 items which measures global self-worth by measuring both positive and negative feelings about the self. All items are answered using a 4-point Likert scale format ranging from strongly disagree to strongly agree. As for the items 1,3,4, 7 & 10, '1' indicates strong

disagreement while ‘4’ indicate strong agreement. Meanwhile items 2,5,6,8 & 9 were scored in reverse order. Blascovich (1993), found this scale to have a reliable and valid quantitative tool for self- esteem assessment. An overall score was obtained by sum up the responses of all 10 items. The final scores ranged from 0-40. Higher score indicates higher self-esteem.

3.8.7 Drive for muscularity (DMS)

The Drive for Muscularity scale was adopted from McCreary and Sasse, (2000). This scale was used to assess respondents’ perception on their muscular built. Although muscular drive is more common among men, but recent study found, muscularity drive also prevalent among female. Example of questions is “I wish that I were more muscular”. This scale consists of 15 items. Every item scored on a 6-point Likert scale with always (6), usually (5), often (4), sometimes (3), rarely (2) and never (1) response. The final score was calculated as sum of score for all items which ranges from 15 to 90. A higher score indicates a higher drive for muscularity. McCreary and Saucier (2009) indicated that internal consistencies for the DMS were good for both men (α = .90) and women (α = .83).

3.8.8 Eating Disorder Inventory (EDI-2) – Perfectionism subscale

The Eating Disorder Inventory (EDI-2) - perfectionism subscale was adopted from Eating Disorder Inventory-2 (Garner, 1991). This subscale has been used widely as a measure of perfectionism related to eating disorders. This scale consists of six items used to measure both intrapersonal and interpersonal domains, which is correspond to

the “self-oriented” and “socially prescribed” perfectionism dimensions proposed by the Hewitt and Flett (1991). Example of questions is “I hate being less than best at things”. Items response were based on six-point Likert scale. The item response was recorder from 0 to 3 whereby “always” = 3; “usually” = 2; “often” = 1; and “sometimes”, “rarely”, or “never” = 0) (Garner, 1991). The composite score ranges from 0 to 18. Higher scores indicate greater perfectionism. This subscale was found to have good internal consistency of 0.76. (Stairs et al., 2011).

3.9 List of Variables

The dependent variable was disordered eating behaviour. The independent variables were:

i. Sociodemographic characteristics such as age, gender, ethnicity, religion, household income and monthly pocket money of the students

ii. Body dissatisfaction

iii. Perceived sociocultural pressure

iv. Self-esteem

v. Drive for muscularity

vi. Perfectionism

vii. Body mass index

3.10 Data Management and Quality Control

3.10.1 Quality control

The questionnaire was translated to Malay using the back-to-back translation method. Two steps were involved. First, the original questionnaire was translated from English to Malay language. Subsequently, the Malay version was translated back into English. At this stage, any items that appeared discrepant to the meaning of the original items were translated again.

Height and weight were measured twice in order to get the average measurement before taking the final BMI. Equipment was checked and re-calibrated when necessary or at regular device-dependent intervals. The pre-tested questionnaire that suit the local setting was used to ensure validity and reliability.

3.10.2 Pre-test of instruments

The pre-test was conducted among 140 eligible first year medical and nursing students prior the main study. The samples represented the subjects in the main study and have little possibility of interacting with those recruited for the main study. The purpose of this pre-test was to test the duration, accuracy, and clarity of the wordings used. Cronbach alpha coefficient was used to measure the internal consistency of each domain of the questionnaire. The interpretation of the Cronbach alpha values was based on the rule of thumb by George and Mallery (2003), outlined in table 3.1.

Table 3. 1: Interpretation of Cronbach alpha values

Cronbach alpha value	Interpretation
> 0.9	Excellent
>0.8	Good
> 0.7	Acceptable
> 0.6	Questionable
> 0.5	Poor

Overall, the instruments demonstrated acceptable to excellent internal consistency. Table 3.2 summarized the Cronbach alpha for each of the domain of the questionnaire.

Table 3. 2: Cronbach alpha for each domain of the questionnaire

Scale/ Domain	Number of items	Cronbach alpha score	Interpretation
Eating attitude test (EAT-26)	26	0.706	Acceptable
Perceived sociocultural pressure scale	10	0.905	Excellent
Body dissatisfaction	10	0.921	Excellent
Rosenberg Self esteem	15	0.843	Good
Drive for muscularity	15	0.899	Good
Perfectionism	8	0.804	Good

3.11 Statistical analysis

After the data collection, all questionnaires were checked and verified for completeness before entered into the computer software. A total of sixteen respondents with inconsistent responses were discarded and not included for final analysis. Total of 652 respondents were included in the final data analysis using SPSS (Statistical Package for Social Science) Windows Software Programme, version 22.0 and WarpPLS stable trial version 6.0.

The initial phase of data analysis initiated with exploratory data analysis. Exploratory data analysis was used to explore the raw data to check for normality, outlier, estimates of parameters, rank individual factors, provide a conclusion whether individual factors are significant, and allow graphical analysis and presentation of the raw data (Pallant, 2011).

Subsequently, descriptive analysis was performed, and the results were presented in tables. Mean, median and standard deviation were used for continuous data, while frequency and percentage were mentioned for categorical data.

Bivariate analysis using Chi-square test of independence and independent t-test was employed to analysed association between categorical variables and continuous data where appropriate. All variables which found to have significant association on bivariate analysis were further analysed using binomial logistic regression to identify the predictors of disordered eating behaviour. In all statistical tests, a two-sided significant level of 0.05 and 95% confidence intervals were reported.

Compared to customary logistic regression analysis, which performs only one level of association between independent and dependent variables at a time, structural equation modelling (SEM) was used to model a concurrent relationships among multiple

independent and dependent constructs in this study (Tarka, 2017). Structural equation modelling was also used to examine the complex path models with direct and indirect effects, which accurately modelled causal mechanism on variables of interest (Gunzler et al., 2016). Given the objectives of the present study, which emphasized prediction and maximizes the variance of hypothesized constructs by different explanatory constructs instead of producing an empirical and universal covariance matrix (Hair et al., 2011), PLS-SEM was considered as the best approach. The software WarpPLS version 6.0 was used to develop a path modelling analysis. Multi-group analysis (MGA) was subsequently used to determine measurement invariance between gender (Deng & Yuan, 2015).

Path analysis procedure: WarpPLS version 6.0 was used to conduct the path analysis to examine the complex relationship between body mass index, perceived sociocultural pressure, self-esteem, perfectionism, drive for muscularity, and body dissatisfaction with disordered eating behaviour. Composite scores were used to model the relationship of the variables. A robust path analysis with non-linear algorithm, bootstrapping resampling method was applied for analysis. Subsequently, the structural model was assessed in term of model fitting and quality. Several indices were used which includes average path coefficient (APC), average R-squared (ARS), average block VIF (AVIF), average full collinearity VIF (AFVIF), the Tenenhaus GoF (GoF), Sympson's paradox ratio (SPR), R-squared contribution ratio (RSCR), statistical suppression ratio (SSR) and nonlinear bivariate causality direction ratio (NLBCDR) (Ned Kock, 2019). Structural path was examined with the respective significance value and path coefficients.

3.12 Ethical Issues

Ethical approval for this study was obtained from the Ethical Committee of University Malaysia Sarawak and the permission to conduct the study in the selected colleges or universities were obtained from the Ministry of Higher Education Malaysia and university Dean or chief executive officer (CEO) of respective colleges. Informed consent was obtained from respondents prior to data collection. All the respondents were briefed regarding the objectives of this study, steps of data collection, and expected outcome of the study. Any information obtained from the study were remained confidential and would be disclosed only with participant's permission to protect confidentiality. The participation of respondents in this study was entirely voluntary and they have the right to withdraw from this study at any time without affecting their relationship with faculty of Medicine and Health Sciences University Malaysia Sarawak.

CHAPTER 4: RESULTS

This chapter reveals the results from the data obtained in the field, after analysis using SPSS software version 22.0 and WarpPLS version 6.0. Results presented include the response rate and sociodemographic characteristics of the respondents. Subsequently, a systematic description of the results that follows the methodology section, highlighting the relevant research questions and hypothesis under investigation was presented. Included were the non-textual elements, such as tables and figures, to illustrate key findings further. Analysis of the factors hypothesized associated with disordered eating were first analysed using bivariate statistical analysis (independent t-test and chi-square). Significant factors found were then further analysed using binomial logistic regression to predict factors that lead to the development of disordered eating. Finally, structural equation modelling was used to demonstrate the structural relationship of all the variables. The results of the data analysis concerning the research questions and hypotheses reported as follow.

4.1 Response rate

For the current study to assess factors associated with disordered eating behaviour among colleges and university students in Sarawak, a total of 668 respondents were invited from twenty tertiary education centres. The final data analysis however only includes 652 respondents. Sixteen respondents had inconsistent data, therefore, was excluded from the final data analysis. The response rate was 97.6%.

4.2 The sociodemographic characteristics of the respondents

There were 479 or nearly three quarter (73.5%) of the study participants were females and 173 males (26.5%). The mean (SD) age of the participants was 20.41 (1.74), with a minimum age of 19 years old and a maximum age of 25 years old. Most (87.4%) of the respondents age ranged between 19 to 21 years, meanwhile only small proportion (2.6%) age between 22 to 25 years old. Respondents participated in the study are mainly Iban (32.2%), followed by Malay (29.6.%), Bidayuh (12.6%), Chinese (11.3%), and other natives of Sarawak (14.3%).

About half (54.6%) of the respondents were Christians; one third were Muslims (37.9%), Buddhist (5.5%) and an only small percentage (2%) were other religion.

As for the household income, the minimum household income was RM 500, and the maximum household income was RM 15000. The mean (SD) household income was RM 3005 (RM 2727). The highest percentage of household income range between RM 1000 to RM 2500 (37%), followed by household income less than RM 1000 (25.6%), household income between RM 2500 to RM 5000 (24.5%) and household income above RM 5000 (12.9%).

The minimum pocket money of the respondent was RM100, and maximum pocket money was RM 1300. The mean (SD) monthly pocket money was RM 340 (RM220). More than half (63.7%) of the respondents received monthly pocket money less than RM 340, meanwhile 36.3% received pocket money above RM 340. The sociodemographic characteristics of the respondents were summarized in table 4.1.

4.3 Nutritional status of the respondents

The nutritional status of the respondents was assessed based on their calculated Body Mass Index according to World Health Organization (WHO) Body Mass Index (BMI) classification. The mean (SD) BMI of the respondents was 22.59 (3.70), with a minimum BMI of 17.85 and maximum BMI of 34.39. A majority (71.5%) of the respondents had a normal Body Mass Index. Meanwhile, 8.6% were underweight, 14.0% were overweight, and 6.0% were obese.

Table 4. 1: Sociodemographic characteristics and nutritional status of the respondents (n=652)

Characteristics	n	%
Age group (years)		
19 - 21	164	87.4
22 - 25	488	12.6
Gender		
Female	479	73.5
Male	173	26.5
Ethnic		
Iban	210	32.2
Malay	193	29.6
Bidayuh	82	12.6
Chinese	74	11.3
Others	93	14.3
Religion		
Christian	356	54.6
Muslim	247	37.9
Buddhist	36	5.5
Others	13	2.0
Household Income		
≤ RM1000	167	25.6
RM1001-RM2500	241	37.0
RM2501-5000	160	24.5
> RM5000	84	12.9

Table 4. 1: Continue...

Characteristics	n	%
Monthly Pocket Money		
≤ RM340	313	63.7
> RM340	339	36.3
Body Mass Index		
Underweight (BMI < 18.5)	56	8.6
Normal weight (BMI =18.5-24.9)	466	71.5
Overweight (BMI = 25.0 -29.90)	91	14.0
Obese (BMI > 29.9)	39	6.0

4.4 Disordered eating behaviours of the respondents

The eating behaviour of the respondents was assessed using Eating Attitude Test-26 (EAT-26) which consist of three subscale which are dieting (13 items), bulimia and food preoccupation (6 items) and oral control (7 items). The details score for each subscale explained further in the following sections.

4.4.1 Dieting behaviour of the respondents

Among the respondents, nearly half (42.9%) felt terrified of being overweight by indicated always, usually, and often responses, meanwhile, 57.1% indicated sometimes, rarely, or never. About one third (33.8%) indicated always, usually, and often, aware of the calorie content of food when they ate, meanwhile, 66.2% indicate

sometimes, rarely or never. A small percentage (9.9%), indicated always, usually, and often avoid food with high carbohydrate content; meanwhile, 91.1% indicated sometimes, rarely, or never. About 8.1% indicated always, usually, or often, feel extremely guilty after eating, meanwhile, 91.9% indicated sometimes, rarely, or never. One quarter (32.8%) of the respondents responded always, usually, or often preoccupied with the desire to be thinner. Meanwhile, 67.2% indicated sometimes, rarely, or never. Almost half (45.5%) responded always, usually, or often think about burning up calories when exercising. Meanwhile, 54.5% indicated sometimes, rarely or never. About 30% indicated always, usually, or often preoccupied with the thought of having fat on their body; meanwhile, 70% indicated sometimes, rarely or never. About 22.2% avoid food with sugar; meanwhile, 77.8% indicated sometimes, rarely, or never. About 14.6% indicated always, usually, or often eat diet food; meanwhile, 85.4% indicated sometimes, rarely, or never. About 12.5% of the respondents feel uncomfortable when eating sweets, meanwhile 81.5% indicated sometimes, rarely, or never. About 6.3% engaged in dieting behaviour, meanwhile, 93.3% indicated sometimes, rarely, or never. About 6.3% of participant mentioned preferring their stomach to be empty. About 38.2% not enjoyed trying new rich food; meanwhile, 61.8% indicated always, usually, or often. Table 4.2 summarises the response in percentage for each item on dieting subscale.

Table 4. 2: Dieting behaviour of the respondents

Item	Frequency level					
	Always (%)	Usually (%)	Often (%)	Sometimes (%)	Rarely (%)	Never (%)
Score	3	2	1	0	0	0
Am terrified about being overweight.	23.6	13.2	6.1	27.0	11.8	18.3
Aware of the calorie content of foods that I eat.	10.4	14.0	9.4	25.6	19.2	21.5
Particularly avoid food with a high carbohydrate content (i.e. bread, rice, potatoes, etc.)	0.9	4.4	4.6	27.3	28.7	34.0
Feel extremely guilty after eating.	2.0	3.4	3.1	8.9	13.3	69.3
I am preoccupied with a desire to be thinner.	14.9	9.4	8.0	21.5	13.7	32.7
Think about burning up calories when I exercise.	16.6	17.6	11.3	23.6	15.8	15.0
I am preoccupied with the thought of having fat on my body.	10.3	10.0	9.7	25.6	20.7	23.8
Avoid foods with sugar in them.	3.4	11.0	7.8	33.6	29.3	14.9
Eat diet foods.	0.8	6.4	7.4	31.0	34.0	20.4
Feel uncomfortable after eating sweets.	2.6	4.1	5.8	24.8	26.4	36.2
Engage in dieting behaviour.	3.1	6.7	7.7	21.9	25.8	34.8
Like my stomach to be empty.	0.8	1.8	3.7	14.4	25.0	54.3
Enjoy trying new rich foods.	12.6	11.2	8.6	29.4	25.0	13.2

4.4.2 Bulimic behaviour and food preoccupation of the respondents

About 36.7% reported always, usually, and often have gone on eating binges where they were not able to stop; meanwhile, 63.3% indicated sometimes, rarely, and never experienced such action. Small proportion of about 3.7% of respondents responded always, usually, and often have the impulse to vomit after meals; meanwhile, the remaining 96.3% answered sometimes, rarely, or never. Relatively, a small number (4.15%) indicated always, usually, and often vomit after they ate, meanwhile the remaining 95.85% answer sometimes, rarely, and never. Regarding the question on food preoccupation, 52.2% of respondents indicated always, usually, and often preoccupied with food, whereas 47.8% indicate sometimes, rarely found themselves preoccupied with food. Almost half (46.7%) of the respondents felt that food control their life, and 22.7% give too much time thinking about food by giving always, usually, and often respond to the question asked. The distribution of response in percentage for each item was tabled 4.3 below.

Table 4. 3: Bulimic behaviour and food preoccupation of the respondents

Item	Frequency level					
	Always (%)	Usually (%)	Often (%)	Sometimes (%)	Rarely (%)	Never (%)
Score	3	2	1	0	0	0
Find myself preoccupied with food.	25.9	14.3	12.0	29.0	14.7	4.1
Have gone on eating binges where I feel that I may not be able to stop.	9.5	17.5	9.7	25.3	22.7	15.3
Vomit after I have eaten	0.9	1.8	1.4	8.0	26.7	61.2
Feel that food controls my life.	14.6	18.3	13.8	17.3	17.3	18.7
Give too much time and thought to food.	5.4	7.5	9.8	24.2	29.4	23.6
Have the impulse to vomit after meals.	0.2	2.1	1.4	8.0	14.9	73.5

4.4.3 Self-control of the respondents' eating behaviour

A small percentage (8%) of the respondents answered always, usually, and often avoid eating when they were hungry; meanwhile, 92% responded sometimes, rarely, and never. Nearly one third (29%) claimed always, usually of often cut their food into small pieces and about 71% said sometimes, rarely, or never. Almost half (42.5%) responded always, usually, or often feel that others would prefer them to eat more; meanwhile, 57.5% responded sometimes, rarely, or never had a feeling that others prefer them to eat more. Slightly more than one quarter (28.2%) respond always, usually, or often, to question on the perception of being too thin and 71.1% answered

sometimes, rarely or never. Regarding time taken to finish their meal, 35.6% of the respondents said always, usually, and often they take longer to finish their meal, meanwhile the remaining 64.4% answered sometimes, rarely or never. 34.3% of respondents answered always, usually, or often display self-control around food, whereas 65.7% responded sometimes, rarely or never exhibit self-control about food. 19.9% felt that others pressure them to eat by responded always, usually, or often. Meanwhile 80.1% said sometimes, rarely, or never had a feeling that, others pressure them to eat. The distribution of response in percentage for each item was tabled 4.4 below.

Table 4. 4: Percentage of respondent's self-control on eating behaviour

Item	Frequency level					
	Always	Usually	Often	Sometimes	Rarely	Never
Score	3	2	1	0	0	0
Avoid eating when I am hungry	1.4	3.8	2.8	28.1	24.2	39.7
Cut my food into small pieces.	6.6	13.2	9.2	30.8	27.1	13
Feel that others would prefer if I ate more.	16	15.6	10.9	17.9	19.3	20.2
Other people think that I am too thin.	11.2	11	6	17.3	20.2	34.2
Take longer than others to eat my meals.	13.7	15.6	6.3	25.8	23.3	15.3
Display self-control around food.	6.1	10.9	17.3	32.5	19.8	13.3
Feel that others pressure me to eat.	6	8.7	5.2	19.5	25.3	35.3

4.5 Types of disordered eating practices among the respondents

Results showed that 36% of the participants ever practice binge eating. About 4.6% of participant involved in self-induced vomiting and 6.6% ever used laxatives or diet pills or diuretic to as a method of losing weight. A small proportion (1.1%) of the participants exercised more than 60 minutes daily as a method of losing weight. Table 4.5 Summary of disordered eating practices based on the participants behavioural symptoms.

Table 4. 5: Types of disordered eating practices among the respondents

Disordered eating practices	n	%
Binge eating		
Never	417	64.0
Once a month	115	17.6
2 to 3 times a month	82	12.6
Once a week	27	4.1
2 to 6 times a week	9	1.4
At least once a day	2	0.3
Self-induced vomiting		
Never	599	91.9
Once a Month	24	3.7
2 to 3 times a month	20	3.1
Once a week	5	0.8
2 to 6 times a week	1	0.2
At least once a day	3	0.5
Taking Laxatives/Diet Pills/Diuretics		
Never	609	93.4
Once a Month	20	3.1
2 to 3 times a month	12	1.8
Once a week	6	0.9
2 to 6 times a week	2	0.3
At least once a day	3	0.5
Excessive Exercise > 60 minutes/day		
Never	280	42.9
Once a Month	175	26.8
2 to 3 times a month	89	13.7
Once a week	51	7.8
2 to 6 times a week	50	7.7
At least once a day	7	1.1

4.6 Body Dissatisfaction of the respondents

About 78.5% of the respondents indicated often, usually, and always response; meanwhile, 31.5% responded never, rarely, or sometimes, when asked about their stomach is too large. About 62% of the respondent's responded often, usually, and always, whereas 38% of them given never, rarely or sometimes response when asked about the size of their thigh are too large. In terms of satisfaction of their stomach size, 67.1% felt dissatisfied by giving never, rarely, or sometimes response; meanwhile, only 32.9% of them felt satisfied by indicating often, usually or always answer. About 63.1% of the respondent responded often, usually, or always feel satisfied with their overall body shape in contrast to 36.9% responded never, rarely or sometimes. About 63.7% of the respondents satisfied with the shape of their buttock by responded usually or always never, meanwhile 36.3% express dissatisfaction of their buttock by answering often, rarely, or sometimes. About 73.2% of the respondents expressed satisfaction with the shape of their hips, meanwhile one third (26.8%) responded never, rarely, or sometimes when asked about their hips are too big. 37.6% of the respondent think their thighs are just the right size meanwhile 62.4% responded dissatisfaction by answering never, rarely, or sometimes. Majority (73.9%) of respondents answered often, usually, or always to question asking on their buttock are too large, meanwhile 26.1% answer never, rarely or sometimes. 62.1% of the respondents responded never, rarely, or sometimes when asked on their hip are just the right size; meanwhile 62.1% answered sometimes, usually or always. The overall mean (SD) score was 32.54 (8.96), with a minimum score of 9 and a maximum score of 52. Females were found to have higher mean (SD) score of 30.96 (8.94) compared to males with mean (SD) of 29.10 (8.90). The distribution of response in percentage for each item was tabled 4.6 below.

Table 4. 6: Percentage of respondents' response Eating Disorder Inventory (EDI)-Body Dissatisfaction subscale

Item	Frequency level					
	Never	Rarely	Sometime	Often	Usually	Always
Score	1	2	3	4	5	6
I think that my stomach is too big.	12.4	9.4	9.7	27.8	18.7	22.1
I think that my thighs are too large.	16.7	10.9	10.4	21.8	17.5	22.7
I think that my stomach is just the right size.	16.3	25.3	25.5	7.2	13.2	12.6
I feel satisfied with the shape of my body.	15.3	17.6	30.2	6.6	16.0	14.3
I like the shape of my buttocks.	18.4	22.9	22.4	7.7	13.2	15.5
I think my hips are too big.	9.4	9.7	7.8	24.1	17.2	31.9
I think that my thighs are just the right size.	15.8	23.0	23.6	12.6	12.3	12.7
I think that my buttocks are too large.	7.7	7.2	11.2	19.0	17.9	37.0
I think that my hips are just the right size.	18.6	19.3	24.2	13.3	11.8	12.7

4.7 Perceived socio-cultural pressure of the respondents

The perceived socio-cultural pressure was used to determine the possible source pressure for the respondents to be thin. About 79% of the respondents answer none or never felt pressure from their friends to lose weight; meanwhile, 21% responded sometimes, often, or always felt pressure to lose weight from their friends. About 75% of the respondents responded none or never noticed strong message from their friends to have thin body meanwhile 25% responded sometimes, often, or always. Regarding

pressure to lose weight from family, 80% responded none or rarely, meanwhile, 18% responded sometimes, often, or always. Similarly, 79.8% of respondents responded none or rarely notice strong message from their family to have thin body, meanwhile, 20.2% responded sometimes, often, or always. In terms of pressure to lose weight from people they dated, 87.8% responded none or rarely, meanwhile 12.2% responded sometimes, often, or rarely. Similarly, 88.5% responded none or rarely noticed a strong message from the media to have a thin body, and small percentage About 11.5% answer sometimes, often, or always. Question were also asked on media influenced to lose weight. 77.6% of the respondents indicate none or rarely response, meanwhile another 22.4% indicate sometimes, often, or always answer. In terms of media influenced to have a thin body, 71.3% indicate none or rarely answer, meanwhile 28.7% indicate sometimes, often, or always response. 75.8% indicate none or rarely response on question asking about being teased by family members on their weight and shape, with quarter (24.2%) indicate sometimes, often, or always response. About 76.5% respondents indicate none or rarely response when asked whether their colleagues tease them about their weight or body shape, meanwhile only 23.5% indicate sometimes, often, or always response. The overall mean (SD) was 16.87 (6.99) with a minimum score of 10 and a maximum score of 36. The mean (SD) score for females and males were 16.90 (6.94) and 16.75 (7.11) respectively. The distribution of response in percentage for each item was tabled 4.7 below.

Table 4. 7: Percentage of respondents' response perceived socio-cultural pressure scale

Item	Frequency level				
	None	Rarely	Sometimes	Often	Always
Score	1	2	3	4	5
I've felt pressure from my friends to lose weight	61.2	17.8	15.2	3.5	2.3
I've noticed a strong message from my friends to have a thin body	56.7	18.3	16.1	6.0	2.9
I've felt pressure from my family to lose weight	68.3	13.7	10.7	4.9	2.5
I've noticed a strong message from my family to have a thin body.	65.8	14.0	11.8	5.5	2.9
I've felt pressure from people I've dated to lose weight	76.5	11.3	7.7	2.8	1.7
I've noticed a strong message from people I've dated to have a thin body.	71.9	16.6	8.3	2.0	1.2
I've felt pressure from the media (e.g., TV, magazines, web media) to lose weight.	55.8	21.8	15.6	3.8	2.9
I've noticed a strong message from the media to have a thin body.	52.3	19.0	18.7	6.0	3.4
Family members tease me about my weight or body shape.	52.8	23.0	15.3	5.2	3.5
My colleagues tease me about my weight or body shape	50.9	25.6	17.3	3.5	2.6

4.8 Level of self-esteem of the respondents

On a question about, “On the whole, I satisfied about myself”, 83.7% respondents gave strongly agree and agree response, meanwhile, 16.3% indicated disagree or strongly disagree. About 45.9% response strongly agree and agree; meanwhile, 54.1% indicate disagree or strongly disagree on the question “at times I think I am no good at all”. The question also asked whether respondents have numbers of good qualities, 86.3% indicate strongly agree and agree response, and only 13.7% indicate disagree and strongly disagree. About 82.2% of respondents indicate strongly agree and agree and 17.8% indicate disagree or strongly degree on the question asked on the ability to do things as well as most other people. About 45.9% indicate strongly agree and agree, and 54.1% indicate disagree and strongly disagree response on the question, “I feel I do not have much to be proud of”. About 54.9% indicates strongly agree or agree on the statements that they certainly feel useless at times meanwhile, 45.1% indicate disagree or strongly disagree response. About 86.1% respondents strongly agree or disagree on the statements about “I feel that I'm a person of worth, at least on an equal plane with others”; meanwhile, 13.9% responded disagree and strongly disagree. About 37.1% of respondents indicate strongly agree and agree on the statement about, “I wish I could have more respect for myself”; meanwhile, 62.9% indicate disagreement. About 26.8% of respondents agree or strongly agree that they inclined to feel as a failure, meanwhile majority of the respondents disagree with this statement. About 37.1% agree or strongly agree on taking a positive attitude towards themselves; meanwhile, 62.9% disagree with this statement. The overall mean (SD) score was 28.31(4.23) with a minimum score of 17 and a maximum score of 40. The mean (SD) score for self-esteem for males and females were 28.04 (4.09) and 28.40 (4.27)

respectively. Table 4.8 summarize the distribution of response in percentage for each item on self-esteem scale.

Table 4. 8: The distribution of response in percentage for each item on self-esteem scale

Item	Level of agreement			
	Strongly Agree	Agree	Disagree	Strongly Disagree
Score	4	3	2	1
On the whole, I am satisfied with myself.	29.1	54.6	14.9	1.4
At times I think I am no good at all.	14.3	31.6	44.3	9.8
I feel that I have a number of good qualities.	17.6	68.7	13.2	0.5
I am able to do things as well as most other people.	21.8	60.4	16.9	0.9
I feel I do not have much to be proud of.	7.2	38.7	46.8	7.4
I certainly feel useless at times.	20.9	34.0	36.2	8.9
I feel that I'm a person of worth, at least on an equal plane with others.	24.4	61.7	13.0	0.9
I wish I could have more respect for myself.	8.7	28.4	40.3	22.5
All in all, I am inclined to feel that I am a failure	23.3	3.5	24.2	48.9
I take a positive attitude toward myself.	8.7	28.4	40.3	22.5

4.9 The level of muscularity drive of the respondents

About 36.3% of respondents indicated always, very often or often response to the statement that their wish to be more muscular, meanwhile the remaining 63.7% indicate sometimes, rarely, or never response. About 16.5% of the respondents indicated always, very often or often on the statement about weightlifting to build up muscle, meanwhile 83.5% indicated sometimes, rarely, or never response. About 7.9% respondents used protein or energy supplements by indicating always, very often or often, meanwhile, 92.1% indicated sometimes, rarely, or never response on this statement. About 12% of the respondents indicated always, very often or often on statement about drinking weight gain or protein shakes, meanwhile 88% indicated sometimes, rarely, or never response. About 16.6% of respondents try to consume as many calories in a day by indicating always, very often or often response, meanwhile 83.4% indicated sometimes, rarely, or never answer. About 12.6% of respondents indicated always, very often or often on statement about feeling guilty if missed a weight training session. Meanwhile, 87.4% indicated sometimes, rarely, or never response for this statement. About 23% of respondents indicated always, very often or often on statement on feeling more confident if they had more muscle mass compared to 77% of respondents indicated sometimes, rarely, or never. About 10.5% indicated always, very often or often on statement on other people think I work out with weights too often; meanwhile, 89.5% indicated sometimes, rarely, or never response. About14.7% of respondents indicate always, very often or often to statements on they would look better if they gained 10 pounds in bulk, whereas 85.3% indicated sometimes, rarely, or never to this statement. About 4.3% indicated always, very often or often on the statement about thinking about taking anabolic steroids, whereas 95.7% indicated response as sometimes, rarely, or never. Regarding statement of feel stronger

if gained more muscle mass, 20.8% indicated always, very often or often response as compared to 79.2% indicate sometimes, rarely, or never. About 8% of the respondents indicated always, very often or often their weight training schedule interferes with other aspect of their life, meanwhile 92% indicate sometimes, rarely, or never. About 26.3% or the respondents indicated always, very often or often about their arms are not muscular enough whereas 73% indicated sometimes, rarely, or never. About 20.6% or the respondents indicated always, very often or often about their chest are not muscular enough whereas 79.3% indicated sometimes, rarely, or never. About 21.2% or the respondents indicated always, very often or often about their legs are not muscular enough whereas 78.8% indicated sometimes, rarely, or never. The overall mean (SD) score was 31.35 (12.37) with a minimum score of 15 and a maximum score of 60. Males found to have higher mean (SD) of 39.17 (12.9) compared to females 28.51 (12.9). The distribution of response in percentage for each item on drive for muscularity scale summarized on table 4.9.

Table 4. 9: The distribution of response in percentage for each item on drive for muscularity scale

Item	Frequency level					
	Always	Very Often	Often	Sometimes	Rarely	Never
Score	6	5	4	3	2	1
I wish that I were more muscular.	13.2	12.1	11.0	24.5	15.3	23.5
I lift weights to build up muscle.	3.4	6.0	7.1	13.5	22.4	47.4
I use protein or energy supplements.	2.1	2.1	3.7	8.3	13.3	70.4

Table 4. 9: Continue...

Item	Frequency level					
	Always	Very Often	Often	Sometimes	Rarely	Never
I drink weight gain or protein shakes.	3.4	4.6	4.0	12.4	15.2	60.4
I try to consume as many calories as I can in a day.	3.1	6.1	7.4	20.4	25.8	37.3
I feel guilty if I miss a weight training session	4.3	4.3	4.0	11.5	15.6	60.3
I think I would feel more confident if I had more muscle mass.	8.4	7.7	6.9	14.4	18.9	43.7
Other people think I work out with weights too often.	2.6	2.5	5.4	10.1	19.3	60.1
I think that I would look better if I gained 10 pounds in bulk	4.9	4.9	4.9	11.5	14.3	59.5
I think about taking anabolic steroids	0.6	1.1	2.6	5.1	4.3	86.3
I think that I would feel stronger if I gained a little more muscle mass.	6.0	7.1	7.7	15.8	20.9	42.6
I think that my weight training schedule interferes with other aspects of my life.	1.7	2.0	4.3	8.3	11.8	71.9
I think that my arms are not muscular enough	8.7	8.7	8.9	18.6	14.0	41.1
I think that my chest is not muscular enough.	6.6	6.7	7.4	12.0	13.5	53.8
I think that my legs are not muscular enough	6.7	7.8	6.7	15.8	16.6	46.3

4.10 Perfectionism level of the respondents

About 67.3% indicate never, rarely, or sometimes answer and 32.7% indicate often, usually, or always response on the question asked about only outstanding performance is good for their family. About 14.8% indicate response on never, rarely, or sometimes, meanwhile, 85.2% indicate response on often, usually, or always on the question asked on trying hard to avoid disappointing others. About 24.9% response never, rarely, or sometimes, meanwhile 75.1% responded as often, usually or always answer on the question about hate being less than best at things. About 10.4% indicate never, rarely, or sometimes response and 89.6% indicate often, usually or always response on the question on their parents expect excellence of them. About 31.9% indicate never, rarely, or sometimes response, meanwhile, 68.1% indicate answer as often, usually, or always on the question asking on they feel that they must do thing perfectly or no doing it at all. About 14.5% indicate never, rarely, or sometimes and 85.5% indicate response as often, usually or always response on they have extremely high goals. The overall mean (SD) score was 10.40 (4.64) with a minimum score of 0 and a maximum score of 18. The mean (SD) of perfectionism for males was 10.02 (4.96) and females 10.54 (4.51). Table 4.10 Summarized the perfectionism score of the respondents

Table 4. 10: Percentage of respondents' response on perfectionism scale

Item	Frequency					
	Never	Rarely	Sometimes	Often	Usually	Always
Score	0	0	0	1	2	3
Only outstanding performance is good enough in my family	25.6	18.7	23.0	7.4	11.5	13.7
I try very hard to avoid disappointing others	3.1	2.5	9.2	14.0	21.6	49.7
I hate being less than best at things	2.9	5.7	16.3	14.1	25.0	36.0
My parents expect excellence of me	1.2	2.9	6.3	11.8	17.3	60.3
I feel that I must do things perfectly or not do them at all	5.1	9.5	17.3	15.8	22.1	30.2
I have extremely high goals	1.2	2.3	11.0	11.0	21.8	52.6

4.11 Prevalence of disordered eating

The risks of an eating disorder were assessed using the Eating Attitude Test- 26 (EAT-26). A score below 20 indicates low risks; meanwhile, score of 20 and above indicate higher risks to develop an eating disorder. The overall prevalence of disordered eating among college and university students in Sarawak was 25.2% (95% CI:13.52, 14.77). The 28.6% prevalence of disordered eating among females was higher compared to males which was 15.6%. Table 4.12 summarize the prevalence of disordered eating based on gender.

Table 4. 11: Prevalence of disordered eating based on gender

Characteristics	Eating Attitude Test (EAT) Score (%)	
	EAT < 20	EAT ≥ 20
Male	84.40	15.60
Female	71.40	28.60
Overall	74.80	25.20

4.12 Association between disordered eating and Sociodemographic characteristics: Bi-variate analysis

The association between sociodemographic characteristics with disordered eating was first analysed using bivariate analysis (Chi-square test of independence) to identify the significant factors before proceeding to multivariate analysis (binomial logistic regression). Sociodemographic characteristics included age, gender, ethnic, religion, parental household income and respondents monthly pocket money. Disordered eating behaviour was the dichotomous dependent variable.

Age of the respondents were categorized into less than 22 and 22 or above based on the median age of 22 years old. Chi-square test showed no significant association between age and disordered eating, χ^2 (df) = 0.133 (1), $p > 0.05$.

Chi-square test (with Yates Continuity Correction) of gender and disordered eating showed, there was a significant relationship between gender and disordered eating, χ^2 (df) = 10.719 (1), $p < 0.05$.

Ethnics group were first categorized into Malay, Bidayuh, Iban, and others. Fewer numbers of respondents from Chinese and various indigenous ethnics of Sarawak such

as Kenyah, Kelabit, Melanau, Orang Ulu, Lun Bawang, Kedayan and Punan were grouped together constitute to others variable. Chi-square test for independence showed there was no significant association between ethnicity and disordered eating, χ^2 (df) = 8.213(4), $p > 0.05$.

The association between religion and disordered eating was examined. Religion was categorized into Muslim, Christian, Buddhist, and others. Chi-square showed a significant association between religion and disordered eating, χ^2 (df) = 8.621 (3), $p < 0.05$.

Continuous variables of parental household income were converted into categorized variables which were below RM 1000, RM1001-RM2500, RM2500-RM 5000 and above RM5000. Chi-square analysis indicated no significant association between monthly household income and disordered eating, χ^2 (df) = 4.163 (3), $p > 0.05$.

Similarly, the monthly pocket money of the respondents was categorized into low and high, based on the mean score. A score below the mean value taken as low, meanwhile score above the mean taken as high. Chi-square analysis indicated no significant association between monthly pocket money and disordered eating, χ^2 (df) = 0.000 (1), $p > 0.05$.

Table 4. 12 below summarized the association between disordered eating and Sociodemographic characteristics of the respondents.

Table 4. 12: Association between disordered eating and Sociodemographic characteristics of the respondents

Characteristics	EAT < 20 n (%)	EAT ≥ 20 n (%)	*p* value
Age			
19 – 21	125 (19.2)	39 (6.0)	*0.640*
22 - 25	363 (55.7)	125 (19.2)	
Gender			
Male	146 (22.4)	27 (4.1)	***0.001***
Female	342 (52.5)	137 (21.0)	
Ethnic			
Malay	141 (21.6)	52 (8.0)	*0.064*
Bidayuh	64 (9.8)	18 (2.8)	
Iban	147 (22.5)	63 (9.7)	
Chinese and Others	136 (20.9)	31 (4.8)	
Religion			
Muslim	181 (27.8)	66 (10.1)	***0.017***
Christian	262 (40.2)	94 (14.4)	
Buddhist and Others	45 (6.9)	4 (0.6)	
Household Income (RM)			
< 1000	117 (17.9)	50 (7.7)	*0.244*
1001 - 2500	186 (28.5)	55 (8.4)	
2501 - 5000	125 (19.2)	35 (5.4)	
≥ 5001	60 (9.2)	24 (3.7)	
Monthly pocket money (RM)			
< 340	310 (47.5)	105 (16.1)	
≥ 340	178 (27.3)	59 (9.0)	*0.534*

4.13 Association between nutritional status and disordered eating

The association between disordered eating with body mass index (BMI) was examined. Body mass index (BMI) was the independent variable categorized into underweight, normal weight, overweight and obese based on World Health Organization (2007). Disordered eating behaviour was the dependent dichotomous variable. A Chi-square test for independence indicate no significant association

between body mass index and disordered eating behaviour, χ^2 (df) = 1.194 (3), $p > 0.05$.

Table 4. 13: Association between disordered eating and nutritional status

Characteristics	n (%)	EAT < 20	EAT ≥ 20	*p value*
Body Mass Index				
Underweight	56 (8.6)	42 (6.4)	14 (2.1)	0.754
Normal weight	466 (71.5)	352 (54.0)	114 (17.5)	
Overweight	91 (14.0)	64 (9.8)	27 (4.1)	
Obese	39 (6.0%)	30 (4.6)	9 (1.4)	

4.14 Association between body dissatisfaction, perceived socio-cultural pressure, self-esteem, drive for muscularity and perfectionism with disordered eating

An independent t-test was used to compare scores on body dissatisfaction, perceived socio-cultural pressure, self-esteem, drive for muscularity, and perfectionism with respondents with and without disordered eating. The body dissatisfaction, perceived socio-cultural pressure, self-esteem, drive for muscularity and perfectionism were continuous variable. Disordered eating behaviour was dummy coded into dichotomous no disordered eating as 0 and with disordered eating as 1. Before conducting the analysis, continuous variables were checked for outliers. The data indicated as approximately normal distributed, as evidenced by absolute skewness value of ± 2, and an absolute kurtosis of ± 2 (George & Mallery, 2010) and histogram showed approximately bell-shaped.

The analysis showed, there was a statistically significant association between disordered eating behaviour and means score on body dissatisfaction. Respondents

with disordered eating scored higher mean (SD) = 32.30 (9.68), compared to those with no disordered eating with mean (SD) = 29.85 (8.62), t (650) = - 3.05, $p = 0.002$.

Respondents having disordered eating also scored higher mean on perceived socio-cultural pressure with mean (SD) of 19.01 (8.03) as compared to respondents who do not have disordered eating with mean (SD) of 16.14 (6.45) which is statistically significant t (650) = - 4.13, $p = 0.000$.

Similarly, respondents with disordered eating scored higher mean (SD) = 33.50 (11.23) on drive for muscularity as compared no disordered eating with mean (SD) of 30.62 (11.62), which is statistically significant t (240.70) = - 2.32, $p = 0.02$.

Furthermore, significant association observed between disordered eating behaviour and perfectionism. Respondents with disordered eating have higher mean (SD) score of perfectionism which was 11.90 (4.03), compared to no disordered eating with mean (SD) score of 9.89 (4.72) with t (9324.72) = -5.26, $p = 0.000$.

As for the association between disordered eating and self-esteem, there was no significant difference between self-esteem score of those with and without disordered eating with mean (SD) score of 28.10 (4.55) and 28.37 (4.11) respectively with t (650) = 0.711, $p = 0.499$. A summary of the bivariate analysis shown in table 4.14.

Table 4. 14: Association between body dissatisfaction, perceived socio-cultural pressure, self-esteem, drive for muscularity and perfectionism with disordered eating

Characteristics	EAT < 20 Mean (SD)	EAT ≥ 20 Mean (SD)	*p-value*
Body dissatisfaction	**29.85 (8.62)**	**32.30 (9.67)**	***0.002***
Perceived socio-cultural pressure	**16.14 (6.45)**	**19.01 (8.03)**	***0.000***
Drive for muscularity	**30.62 (11.62)**	**33.49 (14.19)**	***0.020***
Perfectionism	**9.89 (4.72)**	**11.90 (4.03)**	***0.000***
Self-esteem	28.37 (4.11)	28.10 (4.55)	*0.478*

4.15 Factors associated with disordered eating behaviour: Binomial logistic regression analysis

Binomial logistic regression was further performed to determine whether factors such as sociodemographic characteristics (gender and religion), body dissatisfaction, perceived socio-cultural pressure, drive for muscularity, and perfectionism to predict the disordered eating behaviour. Dichotomous categorical variables used in this analysis were dummy coded using 0 and 1 to facilitate interpretation of the output data. Males were coded as 0 and used as the reference for gender. Muslim was used as a reference for religion. Disordered eating, which was the dependent variable in this analysis, were categorized into dichotomous "yes" and "no". "Yes" response was coded as 1 and "no" as 0. Continuous scores on predictor variables such as body dissatisfaction, perceived socio-cultural pressure, drive for muscularity and perfectionism were examined for outliers, normality, multicollinearity, homoscedasticity and independence of residuals. Multicollinearity was excluded as

none of the variables were found with a Tolerance value of less than 0.1 and VIF of more than 10 (Pallant, 2016). Scattered plot and probability plot of the regression standardized residuals were used to check for outliers. It was noted that points were lying in a diagonal line from bottom left to top right in the P-P plot, while scattered plot of standardized residuals showed somewhat rectangular form. Cook's distance is within the range of ±1.

The full model containing all the predictors were statistically significant, χ^2 (df), N = 80.946 (8), 652, *p<0.001*, indicating that the model was able to distinguish between respondents with and without disordered eating. The model as a whole explained between 11.7% (Cox and Snell R square) and 17.3% (Nagelkerke R squared) of the variance of disordered eating behaviour, and correctly classified 75.6% of cases.

As shown in Table 4.15, gender, religion, perceived socio-cultural pressure, drive for muscularity and perfectionism made a unique statistically significant contribution to the model. Meanwhile, body dissatisfaction did not show any statistically significant contribution to disordered eating.

Females were 2.782 times (95% CI: 1.653, 4.683) more likely to developed disordered eating compared to male controlling for other factors in the model. Being Christian was found to be 0.266 (95% CI:0.088, 0.803) less likely to develop disordered eating compared to Muslim. With every 1 unit increase in perceived sociocultural pressure, the odds to develop disordered eating increased by1.050 (95% CI: 1.019, 1.082) times more likely, with all other factors being equal. Similarly, with every 1 unit increase in drive for muscularity score, the odds to develop disordered eating increased by 1.033 (95% CI: 1.015, 1.050), all other factors being equal. Furthermore, every 1 unit increase in perfectionism score, the odds of 1.113 (95% CI: 1.064, 1.163) more likely

to developed disordered eating, controlling for other factors in the model. Table 4.15 summarized factors affecting disordered eating behaviour.

Table 4. 15: Factors affecting disordered eating behaviour: Binomial regression analysis

Variables	β	SE	Wald	OR	95%CI
Gender					
Female	**1.023*** **	**0.266**	**14.837**	**2.782**	**1.653, 4.683**
Male (ref)					
Religion					
Christian	**-1.325***	**0.564**	**5.657**	**0.266**	**0.088, 0.803**
Others	- 0.366	0.827	0.196	0.694	0.137, 3.506
Muslim (ref)					
Perceived sociocultural pressure	**0.049** **	**0.015**	**10.011**	**1.050**	**1.019, 1.082**
Drive for muscularity	**0.032*** **	**0.008**	**14.229**	**1.033**	**1.015, 1.050**
Perfectionism	**0.107*** **	**0.023**	**22.15**	**1.113**	**1.064, 1.163**
Body Dissatisfaction	-0.016	0.013	1.607	0.984	0.96, 1.009

Goodness of fit > 0.05
**<0.05, **<0.01, **<0.001*

4.16 Relationship between nutritional status, perceived sociocultural pressure and psychological characteristics with disordered eating: Structural equation modelling

As a final analysis, the structural equation model (SEM) was used to explore the complex relationship of variables in the current study. Structural equation modelling (SEM) allows sets of relationships between one or more independent variables, either continuous or discrete, and one or more dependent variables, either continuous or

discrete, to be examined (Ullman & Bentler, 2012). Partial least square analysis was used to determine the measurements and path model simultaneously. The analysis was conducted using WarpPLS version 6.0 software.

Structural equation modelling was developed to test the hypothesis that:

H1 Perceived socio-cultural pressure has a direct positive relationship with disordered eating

H2 Perceived socio-cultural pressure has a direct positive relationship with body dissatisfaction

H3 Self-esteem has a direct negative relationship with body dissatisfaction

H4 Perfectionism has a direct positive relationship with body dissatisfaction

H5 Perfectionism has a direct positive relationship with disordered eating

H6 Drive for muscularity has a direct positive relationship with body dissatisfaction

H7 Drive for muscularity has a direct positive relationship with disordered eating

H8 Body Mass Index has a direct positive relationship with disordered eating

H9 Body dissatisfaction has a direct positive relationship with disordered eating

Model development: The analysis used disordered eating behaviour as a dependent variable, which was assessed using Eating Attitude Test-26 (EAT-26). EAT-26 consists of twenty-six items with three domains namely dieting, bulimia and food preoccupation, and oral control. A composite score was computed from the twenty-

six items to represent disordered eating behaviour. The independent variables were body mass index, perceived socio-cultural pressure, self-esteem, body dissatisfaction, perfectionism, and drive for muscularity. Body Mass Index of the respondents was derived from Body Mass Index formula of weight (kilogram)/ height^2 (meter) and was maintained as continuous variable. As for perceived socio-cultural pressure which consist of ten items with four domains (namely perceived pressure to be thin from family and friends, perceived pressure to be thin from dating partners/dates, perceived pressure to be thin from the media and weight teasing) a composite score was also computed from 10 items to represent perceived socio-cultural pressure scale. Similarly, composite score was also calculated for other dependent variables such as self-esteem (ten items), body dissatisfaction (nine items), perfectionism (six items), and drive for muscularity (fifteen items). Schematic diagram of the path model proposed for disordered eating behaviour in this study shown in figure 4.1.

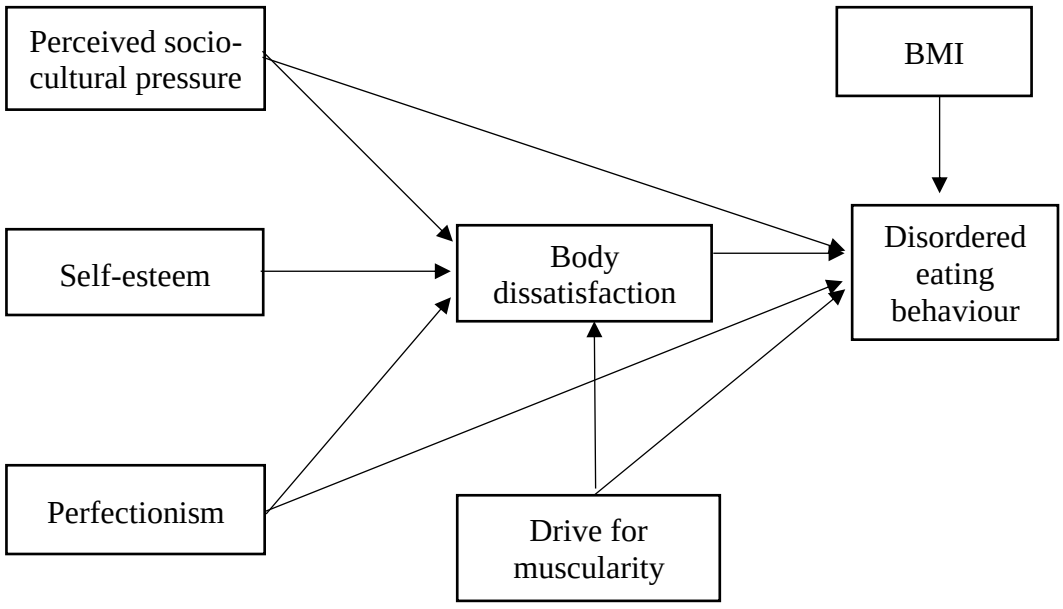

Figure 4. 1: Schematic diagram of path modelling proposed for disordered eating behaviour

Quality of the model: A robust path analysis with non-linear algorithm, bootstrapping resampling method was used for analysis (Kock N, 2018). Model fitting and quality indices indicated that average path coefficient (APC) = 0.169 p<0.001, average R-squared (ARS) = 0.241 p<0.001, average adjusted R-squared (AARS) = 0.236 p<0.001, average block VIF (AVIF) = 1.050 (acceptable if <= 5, ideally <= 3.3), average full collinearity VIF (AFVIF) = 1.266 (acceptable if <= 5, ideally <= 3.3). The Tenenhaus GoF (GoF) = 0.491 (small >= 0.1, medium >= 0.25, large >= 0.36), Sympson's paradox ratio (SPR) = 0.889 (acceptable if >= 0.7, ideally = 1), R-squared contribution ratio (RSCR) = 0.998 (acceptable if >= 0.9, ideally = 1), Statistical suppression ratio (SSR)=1.000 (acceptable if >= 0.7), and nonlinear bivariate causality direction ratio (NLBCDR) = 0.833 (acceptable if >= 0.7). All the model fitting information indicated a well-fitted model.

Model analysis: Figure 4.2 and Table 4.16 showed the analytic output with the decision of the hypothesis. It was found that, perceived sociocultural pressure lead to body dissatisfaction (β=0.51, p <0.01; ES= 0.279). The association between self-esteem and body dissatisfaction also showed significant positive finding (β= 0.15; p<0.01; ES= 0.039). Meanwhile, perfectionism (β= -0.06, p > 0.05; ES = 0.007) and drive for muscularity (β= -0.03; p > 0.05; ES= 0.001), was not associated with body dissatisfaction. Among the hypothesized variables that lead to development of disordered eating, the model showed perceived sociocultural pressure (β=0.18; p<0.01; ES= 0.043), perfectionism (β= 0.26; p< 0.01; ES= 0.067), drive for muscularity (β= 0.015; p < 0.01; ES= 0.023) and body dissatisfaction (β= 0.11; p < 0.01; ES= 0.018), were found positively associated with disordered eating. Body mass index was found to be not associated with disordered eating (β= -0.06; p > 0.05; ES= 0.003).

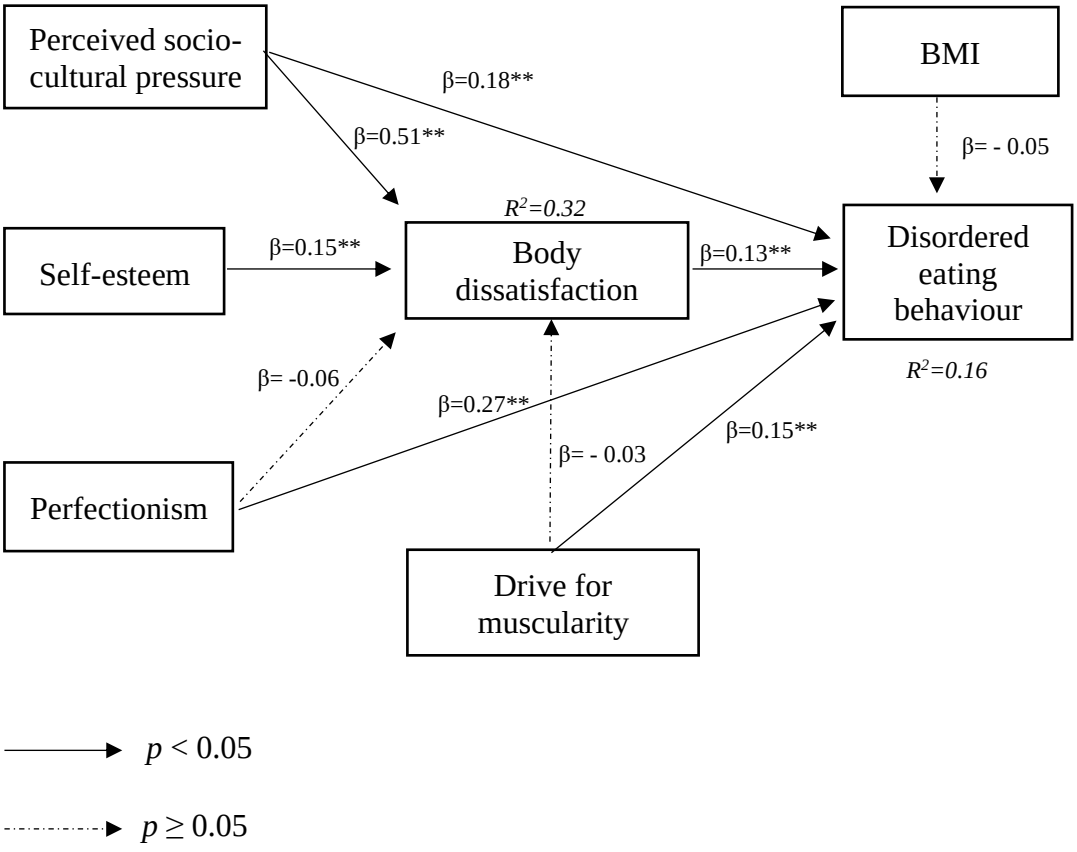

Figure 4. 2: Structural path analysis for combined male and female model

Table 4. 16: Path coefficient of disordered eating behaviour model (combined male and female model)

Hypothesis	Path relationship	Beta value	Std. Error	Effect size	Decision
H1	PSP > BD	0.511***	0.037	0.279	Accepted
H2	SE > BD	0.155***	0.039	0.039	Accepted
H3	Perfect > BD	- 0.061	0.039	0.007	Not accepted
H4	DFM > BD	- 0.027	0.007	0.001	Not accepted
H5	PSP > DE	0.177***	0.038	0.044	Accepted
H6	Perfect > DE	0.267***	0.038	0.068	Accepted
H7	DFM > DE	0.142***	0.039	0.024	Accepted
H8	BMI > DE	- 0.06	0.039	0.003	Not accepted
H9	BD > DE	0.106**	0.039	0.018	Accepted

** p < 0.05 **p < 0.01 *** p < 0.001*

Effect size (Cohen 1988) small= 0.02 medium=0.15 large=0.35

PSP: Perceived socio-cultural, DE: Disordered eating, BD: Body dissatisfaction, pressure, SE: Self-esteem, DFM: Drive for muscularity, Perfect: Perfectionism

Indirect and total effect: Direct and indirect effect of all the predictors variables were examined. Analysis of the direct and total effect of different parameters indicated that perceived sociocultural pressure has both direct and total effect towards disordered eating. Meanwhile, perfectionism and drive for muscularity has only significant total effect on disordered eating but not indirect effect. On the other hand, body dissatisfaction significantly associated with disordered eating. Self-esteem although, exert total effect on body dissatisfaction but has no significant effect on disordered eating. Both perfectionism and drive for muscularity were not significantly associated with body dissatisfaction. Similarly, body mass index was found not statistically

significant towards disordered eating. The summary of indirect and total effect of all the variables presented in table 4.17.

Table 4. 17: Results of an indirect and total effect of the independent variables with the dependent variable

Path relationship	Indirect Effect	p-value	Total Effect	p-value
PSP > DE	0.068	0.025	0.245	< 0.001
SE > DE	0.021	0.277	0.016	0.277
Perfect > DE	- 0.008	0.459	0.259	< 0.001
DFM > DE	- 0.004	0.409	0.139	< 0.001
BD > DE	-	-	0.106	0.003
PSP > BD	-	-	0.511	< 0.001
SE > BD	-	-	0.155	< 0.001
Perfect > BD	-	-	- 0.061	0.060
DFM > BD	-	-	- 0.027	0.247
BMI > DE	-	-	-0.059	0.065

PSP: Perceived socio-cultural, DE: Disordered eating, BD: Body dissatisfaction, pressure, SE: Self-esteem, DFM: Drive for muscularity, Perfect: Perfectionism

Multigroup analysis

Multigroup analysis was performed to assess any significant different among the predictor variables on disordered eating. In multigroup analysis, the path coefficient and R squared were compared between male and female model. Constrained latent growth technique was used as it able to analyse larger subsample compared to Satterthwaite and pooled standard error (Kock, 2014). The result of the multigroup analysis showed, association between perfectionism and disordered eating

significantly differ between gender. The beta coefficient value was higher in male (β=0.33) than in female (β=0.24). Self-esteem although found to be significantly associated with body dissatisfaction among female, it was noted to be not significant among male model. Similar finding noted on the association between body dissatisfaction. There was a positive significant association between body dissatisfaction and disordered eating in female model, but this relationship was insignificant among male model. The remaining of the path coefficient were generally consistent with one another. The model showed perceived sociocultural pressure and self-esteem explained 42 percent and 30 percent of variance of body dissatisfaction among male and female model, respectively. After taking into account all the hypothesized predictor variables on disordered eating in this model, the overall model explained 25 percent and 15 percent of variance of disordered eating behaviour among male and female model respectively. Figure 4.3 summarized the path coefficient and R-square difference between male and female, with at the top for the male and at the bottom for female. Table 4.18 summarize the combined, male and female model with respective *p* value.

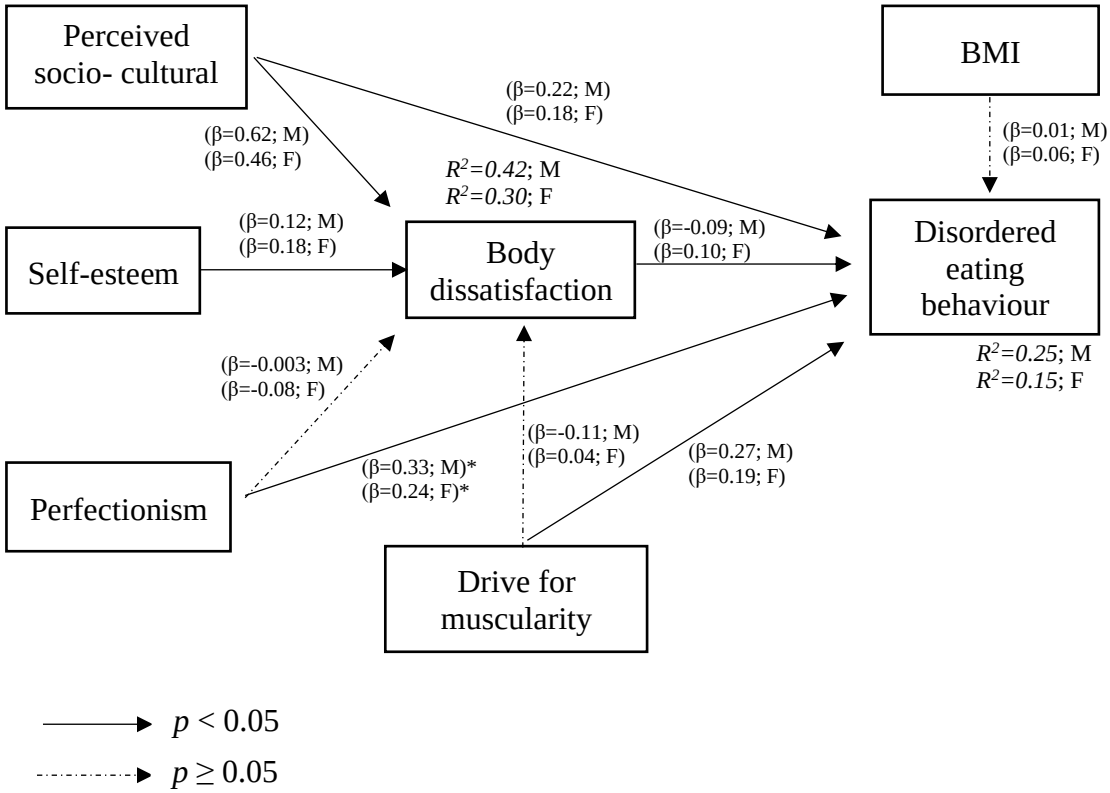

Figure 4. 3. Structural path for multi-group analysis of male and female model

Table 4. 18: Results of multi-group analysis summarizing combined, male and female model.

Parameters	Combined Standardized coefficient	Male Standardized coefficient	Female Standardized coefficient
PSP > BD	0.511**	0.625 **	0.460 **
SE > BD	0.155**	0.122	0.181 *
Perfect > BD	- 0.061	-0.003	-0.081
DFM > BD	- 0.027	-0.113	0.039
PSP > DE	0.187 **	0.223*	0.156 **
Perfect > DE	0.267 **	0.335 **	0.244 **
DFM > DE	0.142 **	0.266 **	0.187 **
BMI > DE	- 0.047	-0.008	-0.061
BD > DE	0.106 **	-0.092	0.105 *

p< 0.05 * *p*< 0.01 ** *p< 0.001* ***

DE: Disordered eating, BD: Body dissatisfaction, PSP: Perceived socio-cultural pressure, SE: Self-esteem, DFM: Drive for muscularity, Perfect: Perfectionism

CHAPTER 5: DISCUSSION

This chapter discussed the results of the study that answered all the research objectives. The discussion highlighted the prevalence of disordered eating among college and university students in Sarawak and the significance predictors that contribute to the development of disordered eating. The discussion also includes the implications of the study and how this information could assist policymakers in planning a program in prevention of disordered eating behaviour. The study limitations were also discussed in this section.

5.1 Prevalence of disordered eating among college and university students in Sarawak.

The overall prevalence of disordered eating behaviour of 25.2% was higher and quite alarming compared to other studies on disordered eating among university students locally. Chin et al. (2020), and Gan and Yeoh (2017) who conducted the study on eating behaviour among public university in Selangor recorded the prevalence of disordered eating was 20.3% and 21.0% respectively. Other study which used to compare the prevalence of disordered eating among university students in ASEAN country, found the prevalence of disordered eating among university students in Malaysia was 13.1%.

In this current study, the prevalence of disordered eating among females was 28.6% which was higher compared to 15.6% among males. This result supports other studies which reported females were at higher risks of disordered eating compared to males. (Amaral & Ferreira, 2017; Tabler & Utz, 2015; Laus et al., 2011). Females were at

greater risks of disordered eating because, they were reported to have more self-conscious and anxiety towards their weight, which gives rise to higher concern on their appearances (Bibiloni et al., 2017). Furthermore, females reported having greater pressure from parents to lose weight (Rodgers et al., 2011; Grossbard et al., 2011) which lead to lower body satisfaction (Laus et al., 2011). Moreover, Christofaro et al., (2015), reported that females were easily influenced and internalized thin body ideal from media. Therefore, females have a higher tendency of practising dieting to achieve an idealized slim figure (Muris et al., 2005). It was also noted in this study that, females scored higher mean on body dissatisfaction than males, which indicate females have a stronger desire to lose weight than males (Elgin & Pritchard, 2006).

Nonetheless, the prevalence of disordered eating among male participants in the current study was lower, compared to 20.1% from a study by Gan and Yeoh (2017), the finding of this present study raised great concern. This give an indication that males of college and university students in Sarawak are also at risk of disordered eating. The possible reason for lower prevalence of disordered eating among males compared to females was, males expressed their body dissatisfaction in different ways than females. Males emphasized body dissatisfaction towards their muscular built rather than a slim figure as seen among females. Therefore, males desire to gain more weight and preferred to exercise rather than dieting (Radwan et al., 2019; Khor et al., 2009; McCabe & Ricciardelli, 2003). The assessments of eating behaviour related to dieting, overweight concerns, vomiting, and skipping meals, served as a proxy for risk of eating disorders based on thin-ideal body size-oriented goals, which may be less relevant to males (Chin et al., 2020), which was in line with the finding of this study. In this study, males showed their body dissatisfaction towards their desire to be more muscular.

By comparing the finding of this current study with previous research on disordered eating behaviour among adolescents in Sarawak by Cheah et al. (2017), the prevalence of eating disordered found to be increasing with age. This is in agreement with finding form several longitudinal studies which found, prevalence disordered eating increased from adolescence through adulthood (Neumark-Sztainer et al., 2011; Keel et al., 2007; Heatherton et al., 1997). Increased prevalence of disordered eating behaviour from adolescents to an early adulthood could be due to weight gained throughout the adolescents' development period which may increase their body image concern (Neumark-Sztainer et al., 2011).

5.2 Types of disordered eating practice

In this study, the prevalence of binge eating practices, which was 32% considered so much higher than reported previously among university students (Yen et al., 2019; Gan et al., 2011a). This is considered alarming because it may indicate the existence of other psychological problem such as depression, excessive preoccupation with body image and anxiety (Lewer et al., 2017). Furthermore, regular binge eating practices has been shown to have increased risk of obesity (Cooper et al., 2019) which further create a vicious cycle of disordered eating and weight control strategy.

The use laxatives, diet pills or diuretic was found to be 6.6% in this study, which is lower compared to study on diet pills usage among obese and overweight patient in Malaysia (Abdul Malik et al., 2019). Although relatively lower, diet pills usage was associated with pathological weight perception and extreme weight concern which considered detrimental to one's health (Neumark-Sztainer & Hannan, 2000). Diet pills

usage was also found to be associated with increased novelty-seeking, impulsivity, and behavioural problems (Fichter et al., 1994). Wide accessibility of diet pills over the counter, supplemented with a misleading advertisement, will give rise to a significant concern as improper use can lead to adverse health effects (Shekelle et al., 2003).

5.3 Demographic and anthropometric characteristics of respondents.

Majority of the respondents were females, and only one quarter were males. This reflects the gender parity among higher education in Malaysia (Yong, 2017). Meanwhile, the distribution of religion is in accordance with the religious diversity in Sarawak (Demographics of Sarawak, 2012). In terms of nutritional status, majority (71.5%) of respondents were of normal body mass index, 8.6% were underweight, 14% were overweight and 6% obese. The prevalence of underweight in this study although lower compared to other studies among university students, 14.4% (Chin et al., 2020) and 27.4% (Gan et al., 2011), this figure may still indicate, fewer number of students have the desire to have thinner body size. In terms of obesity prevalence, the figure reported in this study was similar to nationwide prevalence of obesity among young adult in Malaysia (NHMS, 2015) and among other university students in Selangor (Chin et al., 2020).

5.4 Association between ethnicity and disordered eating

In this study, ethnicity did not show significant association in the development of disordered eating. This is in line with the finding on other studies (Chin et al., 2020; Wojtowicz & Von Ranson, 2012; Sampei et al., 2009). The non-significant

relationship may suggest that environmental or social stimuli prevail through cultural sensitivity and therefore all ethnic groups share an equal risk of eating disorders (Staiger et al.,1999). It is also worth noting that students are more exposed to western culture during college or university period which leads to greater acculturation in the pursuit of western standards (Cheng et al., 2019). Meanwhile, as the location of all the selected college and university in this current study are in an urban area, the insignificant relationship eating could be influenced by acculturation to Western standards of body image, and food availability which outweighs the cultural influence (Gorrell, Trainor, & Le Grange, (2019). Although there were several studies reported a significant association between disordered eating and ethnicity (Pernick et al., 2006; Johnson et al., 2004; Engel et al., 2003), the finding was attributed to media influence in modulating dieting practices on respective ethnicity.

5.5 Association between socio-economic and disordered eating

Overall, the study found rates of disordered eating are comparable across all socioeconomic classes. In particular, no association on the influence of socio-economic classes towards the development of disordered eating. This finding is consistent with other studies by Mulders-Jones et al., (2017) and DeLeel et al., (2009). The reason for this insignificant finding could be due to equality in accessing all the information related to disordered eating on media and social networking sites irrespective of their socio-economic status. Study has indicated that, there is a strong and consistent association between social media use and eating concerns (Sidani et al., 2016). Individuals who spend more time on social media are exposed to images and

messages that increase their body image concern which lead to disordered eating (Chin et al., 2020).

In contrast to the finding of this study, several studies have documented a significant association between higher socio-economic status and disordered eating (Lee et al., 2013; Palma-Coca et al., 2011). However, both studies suggested that their finding could be attributed to higher level of perfectionism among respondents in higher socioeconomic status. Similarly, positive association between disordered eating and higher socio-economic classes was linked to academic achievement (Wardle, 2001). High-achiever individuals is thought to have higher self-esteem and higher self-worth. Study has concluded that, the same emotions that motivate academic achievement in high-achiever individuals might also motivate disordered eating (Krafchek & Kronborg, 2019). However, in case of academic failure, these high-achiever individuals will compensate their negative emotions with positive feelings they experienced from disordered eating.

Meanwhile, other studies found, disordered eating was more prevalent among the lower socio-economic group (Kwok, 2012; Power et al., 2008). However, it was concluded that, the combinations of various factors, such as psychological characteristics, were considered contributed to the development of disordered eating rather than the role of socio-economic factor.

5.6 Association between Body Mass Index and disordered eating

Previous study indicated that higher BMI predict body dissatisfaction and disordered eating behaviour (Gardner et al., 2012; Xu et al., 2010), however in this study, BMI

was not a significant risk for disordered eating behaviours. This indicate that body dissatisfaction can be a subjective experienced, and disordered eating behaviours may be adopted regardless of individuals current BMI. It should be noted that BMI does not distinguish between weight from fat and weight from muscle, which may explain this finding. Although BMI has been used as a standard in many healthcare settings, it is not an accurate assessment of fitness or disease risk (Ades & Savage, 2010) rather than surrogate tool that may indicate "fatness" (CDC, 2018). Furthermore, study found that the link between Body Mass Index and eating attitudes was found to be through self-dissatisfaction, which referred to as self-loathing. This suggest that self-dissatisfaction affects eating behaviours beyond actual physical or elevated body mass index (Edman & Yates, 2004). This concept is further supported by several studies which found, the crucial determinant of eating attitudes may lie on individuals' perception on their body weight. Perceived overweight in an individual with a healthy body mass index was found to serve as a risk factors of disordered eating behaviour (Pengpid & Peltzer, 2018; Bilali et al., 2010; Fay et al., 2011; Haase, 2011; Jones et al., 2009; Grilo et al., 2009; French et al., 1997).

5.7 Association between religion and disordered eating

The association between religion and disordered eating showed being a Christian was least likely to developed disordered eating as compared to Muslims. This was in line with the finding from the earlier study, which found higher disordered eating among Muslims (Edman and Yates, 2004). The author concludes that cultural influence could contribute to their finding as Muslims were involved in religious fasting, which might inflate the EAT-26 score.

Religion has been viewed to provide resources to cope with any stressful event and offer a sense of meaning during these stressful situations. However, findings from several studies have documented a variety of views on the effect of religiosity which varies from negative (Boisvert et al., 2012), positive (Gluck et al., 2002) and non-significant (Jacobs-Pilipski et al., 2005) influence on disordered eating. Religious principles also formed the basis of self-worth, which opposed the societal standard (Koenig, 2012). Nevertheless, another study has reported the existence of a link between anorexia-nervosa and asceticism with self-starvation used as a means to achieve sanctity (Bemporad, 1996). Boyatzis & Quinlan, (2008) has concluded in their study that religiosity was related to healthy view their body image. This finding is supported by Akrawi et al., (2017) which showed the quality of one's relationship with God played an important role. A strong and internalized religious belief coupled with a strong relationship with God found to be a protective factor for disordered eating. Conversely, a superficial faith, coupled with a doubtful relationship with God, were associated with higher levels of disordered eating (Inman, 2014). Krauss & Hood (2013) found a positive relationship with God lead to a lower level of anxiety. In fact, religious and spirituality intervention has been proposed as an intervention in the treatment of eating disorder (Neumark-Sztainer et al., 2006).

5.8 Association between perceived sociocultural pressure, self-esteem, drive for muscularity and perfectionism, body dissatisfaction, with disordered eating

The final goal of this study was to test the research model explaining the relationship between multiple predictor variables towards the risk of practising disordered eating behaviour. There were five main independent variables namely sociocultural, self-

esteem, perfectionism, muscularity drive and body mass index. The model explained 16 percent of the overall variance of disordered eating behaviour in the combined male and female model. This is considered adequate in social science study. Falk and Miller (1992), proposed that R square value more than 10 percent indicate adequate model construct.

5.8.1 Association between sociocultural pressure and body dissatisfaction with disordered eating.

Sociocultural pressure scale used in this study assesses all three components of parents, friends, and media, specified based on the tripartite influence model influenced (Hardit, 2010). The tripartite model explained the role of appearance comparison and thin-ideal internalization which promote the development of body dissatisfaction and subsequently disordered eating. The result of this study confirmed the hypothesis that individuals perceiving greater socio-cultural pressure would develop disordered eating both directly and indirectly. The direct relationship between sociocultural pressure and disordered eating can be explained as perceived pressure from family, peers, and the media will lead to greater risks for disordered eating. The significant direct path found in this study was supported by several cross-sectional studies (Izydorczyk & Sitnik-Warchulska, 2018; Fortes et al., 2016) and prospective study (Keery et al., 2004).

The significant indirect relationship between sociocultural pressure and disordered eating, highlight that body dissatisfaction mediates this relationship. Individuals who are exposed to idealized images, developed a belief or schema about the importance of the idealized figure, in which internalisation of the ideal figure will lead to body dissatisfaction. The influence of sociocultural pressure on disordered eating is also

thought to have reciprocal relationship with global psychological functioning such as self-esteem, depression, and negative affect which further precipitate disordered eating behaviour (Van den Berg et al., 2002).

It is not surprising that media is most influential and strongest source of perceived pressure to be ideal figure, given that this source of pressure is commonly publicised as the key promoter of an appealing ideal figure. Studies have found, media has the most pervasive impact on eating behaviour (Rodgers et al., 2014; Tiggemann & Slater, 2013). Experimental study has demonstrated that exposure to material portraying women with "ideal figures" results in higher levels of depression, anger, body dissatisfaction, and disordered eating behaviours in women with high internalisation levels, when compared to those with low internalisation levels (Fitzsimmons-Craft et al., 2012). The media influence also relevant with the Cultivation Theory (Nacos, 2000). Based on this theory, when individuals are exposed to appealing idealized images displayed by media, they will slowly cultivate or adopt the beliefs that match with the images they saw. With social reinforcement to support this idealized body, body dissatisfaction will ensue as a result of perceived criticism (Stice, 1998).

As for this study, the respondents were students at colleges and universities. Studies that examine peer influence on eating behaviour found, exposure to peer dieting in college predicts disordered eating in women from late adolescence to adulthood, even though friendship groups, living environment, and life roles (Keel et al., 2013; Webb et al.,2017; Meyer & Gast, 2008). This indicate that, the role of peers may reinforce the cultural ideal of thinness and internalization of this ideal during a critical period of development. According to Thompson and Stice (2001), thin-ideal internalization is a potent causal risk factor for the development of eating disturbances. Internalization of this ideal occurs through social reinforcement, and roommate behaviours that conform

to this ideal may increase the likelihood that women develop a core value regarding the goodness of being thin at a time when they are forming their adult identity. Once internalized, this ideal could contribute to the enduring influence of peer behaviours long after women are no longer living with their college roommates.

5.8.2 Association between self-esteem, body dissatisfaction and disordered eating

Self-esteem has been regarded as a psychological characteristic that significantly contributes to the development of positive or negative behaviours. Finding of this study showed, self-esteem significantly predict body dissatisfaction. This finding was similar with other studies (Fortes et al., 2016; Cantin & Stan 2010) which found self-esteem is an important predictor of body dissatisfaction.

Literatures showed that positive self-esteem inversely associated with body dissatisfaction. According to Caqueo-Urízar et al., (2011), having positive self-esteem which is associated with positive self-worth less likely to internalized sociocultural influenced. Furthermore, individual with high self-esteem found to be less likely to have body dissatisfaction as they have less tendency to have negative behaviour towards oneself (Flament et al., (2012). Other study also reported that having positive self-esteem are able performs better in daily task and less vulnerable to develop body dissatisfaction (Johnson et al., 2004).

As of this current study, the full examination of the path model showed, self-esteem was not found as predictors of the development of disordered eating as evidence in table 4.18. This finding is similar to the study by Lampard et al., (2011). Most

probably, when it comes to the effect of self-esteem on eating behaviour, the result could be inconsistent (Shapiro, 1999). Furthermore, other study was also reported that self-esteem, although may exert some effect on disordered eating, it might be not the most influential. Therefore, when combined with other stronger variables, the effect of self-esteem will be attenuated (Shea & Pritchard, 2007).

5.8.3 Association between drives for muscularity, body dissatisfaction and disordered eating

In this current study, there is a positive direct relationship between drives for muscularity and disordered eating, which in line with previous studies (Jones & Crawford, 2005; McCabe & Ricciardelli, 2004; Nowell & Ricciardelli, 2008). As proposed by Thompson et al., (1999), when a gap exists between muscular ideals and one's physique reality, compensatory behaviour will ensue. This might not be limited to strict dieting, but also associated with other behaviours such as compulsive exercise, steroid use and other muscular enhancing substances (Tylka et al., 2005).

As found in this study, males have higher muscularity drive as compared to females and this finding was in agreement with study by Bratland and Sundgot (2012). This is particularly true as muscularity which related to masculinity is considered an ideal quality and characteristic appropriate for men, while slim ideal is a standard ideal for female. Study has demonstrated that, losing a muscular mass among men will lead to negative body perception which drive to more muscularity-oriented behaviours and disordered eating behaviour (Gomes et al., 2019). Similarly, the loss of muscle mass has been perceived as risks for sports and exercise performance which trigger disordered eating behaviour among men (Morrison et al., 2004)

Meanwhile, it has been reported that, less feminine female does have a significantly higher desire to pursuit muscularity drive compared to “normal” feminine female (Steinfeldt et al., 2011), which has been attributed to gender role orientation between male and female (Murray & Touyz, 2012).

5.8.4 Perfectionism and body dissatisfaction and disordered eating

Perfectionism is known to be associated with disordered eating. High level of perfectionism is associated with setting up an unrealistic high standard which leads to the discrepancy between reality and impractical achievement (Bordone et al., 2000). The direct association of perfectionism and disordered eating in this study showed a significant result. This coincides with the literature that showed eating disordered individuals express high levels of perfectionism (Downey & Chang, 2007; Hopkinson & Lock, 2004; Lilenfeld et al., 2000; Striegel-Moore & Kearney-Cooke, 2010; Halmi et al., 2000; Prat et al., 2001). According to cognitive behavioural theory, perfectionism is related to overvaluation of eating, weight, and body shape. If there is a failure to achieve on what being demanded with the actual body appearance, compensatory behaviour will ensue. A study by Hopkinson and Lock (2004), found perfectionism is a personality characteristic that increases the likelihood of disordered eating behaviours and attitudes particularly involved in dietary restrain. Studies that explore all the dimension of perfectionism (self-oriented, socially prescribed, and self-presentational) found, all the dimension contributed significantly to the prediction of dietary restraint (McLaren et al., 2001; Bastiani et al., 1995; Pliner & Haddock, 1996). The finding suggests that the role of perfectionism is not limited to self or personal

expectations, but also involves expectations of others in setting unrealistic standards for appearance which lead to disordered eating.

The indirect association between perfectionism and disordered eating via the mediation of body dissatisfaction showed insignificant finding in this study. This finding was in contrast with other studies (Keery et al., 2004; Shaw et al., 2004). The possible reason for this insignificant finding could be due to differences in age among the study participants. According to Shaw et al., (2004), perfectionism has been found to have a stronger association with body dissatisfaction among the younger age group. Another possible explanation for the insignificant association between perfectionism and body dissatisfaction was due to the difference in scale used. In this study, the unidimensional trait of perfectionism proposed by Garner, Olmstead & Polivy (1991), was used rather than the multidimensional (Frost et al., 1991) traits of perfectionism. Therefore, the total score used could be less sensitive to detect the association with body dissatisfaction in this sample (Wade & Tiggemann, 2013).

5.9 Multigroup model analysis

Multi-group analysis in this study provides meaningful finding on the path for both male and female. This study indicated that, among all the proposed predictor variables, only perceived sociocultural pressure, perfectionism, and drive for muscularity predict disordered eating behaviour among males, while among females, perceived sociocultural pressure, self-esteem, perfectionism, drive for muscularity and body dissatisfaction predict disordered eating disordered eating behaviours.

Several important findings need to be highlighted. Both men and women experience significant pressure from sociocultural influences such as messages from family, peers, media, which play an important role in shaping their body image. As demonstrated in the path model, both men and women showed body dissatisfaction as a result of sociocultural in influence.

Self-esteem was found to predict body dissatisfaction among females; however, was not a predictor for body dissatisfaction among males. This indicate that self-esteem is related to body dissatisfaction among females but for males.

On the other hand, perfectionism appear to exert stronger influence disordered eating behaviours among males' participants than among females, although perfectionism was also a predictor of disordered eating among females.

Similarly, body dissatisfaction was found to predict disordered eating among female sample but not in male. This shows, body dissatisfaction may not necessarily lead to disordered eating practices among males, which could be attributed by presence of stronger predictor variables such as sociocultural pressure, perfectionism, and drive for muscularity.

The drive for muscularity which found to predict disordered eating behaviours among males was also true for females. This finding may indicate both men and women identified muscularity to be an important component of their personal ideal physique (Butler & Ryckman, 1993). There is evidence suggesting that women do experience muscularity concerns, but perhaps with a different emphasis compared to men. As for women, the desire for muscularity might be referred as a lean, toned appearance rather than a large, bulky appearance (McCreary et al., 2004; Jacob et al., 2011).

5.10 Limitation of the research

Although the instruments used are valid and widely used in other studies, this study used structured questionnaire. Self-reported method employed could lead to social desirability bias whereby respondent may not reveal the truth or give the false response to the question given. When measuring an attitude and beliefs in Likert scale, respondents may respond based on their feelings which the statement triggers them.

This self-report of attitudes and behaviour are strongly influenced by the context. The answers may be exaggerated if they are too embarrassed to reveal any confidential details or it may be influenced by the person's feelings at the time, they filled up the questionnaire.

This study was employed a cross sectional study design to gather information on the dietary behaviour and psychological characteristics among first year private colleges and university in Sarawak. Therefore, this study could not be used to determine the causation between variables studied. Furthermore, previous information on eating behaviour and psychological characteristics of the respondents were not assessed. Data collected only reflective on the respondent state of mind during the time of data collection. This is necessary as psychological characteristic may consider as dynamic and may change over time.

As the respondents in this study are all Sarawakian, the unique culture of sample in this study may limit its generalizability to other university students in Malaysia.

5.11 Recommendations for future study

For future research, a qualitative research in this topic would be a supplementary to understand more in depth about the current topic. This will enable researchers to explore on the behaviours and perceptions on eating behaviour. Qualitative study will also serve as a complementary to currently available quantitative research.

Conducting a longitudinal study in the could be a potential research. Although this may require larger sample size and measure of behaviour over several time. This will provide valuable understanding on the establishment and progression of disordered eating, and its associated factory from adolescents to early adulthood. Subsequently, information can be used to precisely developed an intervention program.

As the current study conducted mainly at urban area, future study should include institutions located at rural area so that comparison of factors that could lead to disordered eating behaviour can be made between urban and rural participants.

CHAPTER 6: CONCLUSION AND RECOMMENDATION

This chapter summarised the findings and implications of the study. It also includes recommendations and future research on disordered eating.

6.1 Conclusion

The current study focused on the prevalence and sociodemographic characteristics, nutritional status, sociocultural and psychological factors that could lead to disordered eating behaviours. A total of 652 students from twenty public and private colleges and universities in Sarawak participated in this study. Male to female ratio was 1:3 with mean age of 20 years. Most of the respondents were Iban, Malay, Bidayuh, Chinese and other indigenous ethnics in Sarawak. Half of the respondents were Christian, followed by Muslim and small proportion were Buddhist. Household income ranged from RM500 to Rm15000 with mean income of RM3005. Majority (71.5%) of the respondents having healthy weight and meanwhile 8.6% were underweight, 14.0% were overweight and 6.0% were obese.

Overall, the prevalence of disordered eating behaviours was 25.2%, with higher prevalence found among females 28.6% compared to 15.6% among males. In terms of disordered eating practices, the prevalence of binge eating was 36%, taking substance such as diet pills or used laxatives 6.6%, 4.6% self-induced vomiting and 1.1% exercises more than 60 minutes a day. Gender and religion were among the two sociodemographic characteristics that found to be associated with disordered eating. Perceived sociocultural pressure, perfectionism and drive for muscularity were

positively associated with disordered eating. Gender combined structural model showed, perceived sociocultural pressure, perfectionism, drive for muscularity and body dissatisfaction were identified as predictors of disordered eating behaviours. Multigroup model on the predictors of disordered eating behaviour based on gender showed, sociocultural pressure, perfectionism and drive for muscularity predict disordered eating behaviours among males. Meanwhile, perceived sociocultural pressure, self-esteem, perfectionism, body dissatisfaction and driver for muscularity were found as predictors on disordered eating behaviour among females. Body mass index remained insignificant in any model.

6.2 Implication of the Study

The high prevalence of disordered eating behaviours reported in this study give rise to public health concern. The finding of this study provides an insight on the need to expand the existing public health program and to collaborate with other agencies to work hand-in-hand to address various risk factors that contributes to disordered eating. Given the complexity of disordered eating behaviour, finding of this study could be reflective of other mental health issues among college and university students. Therefore, broader view on the issue need to be explored and may require expansion of future research topic to cover various psychological issue.

Information on healthy eating, healthy weight and positive attitude towards appearance should be a one of the education programs in college or the university. The concept of healthy body image with positive acceptance on appearance could be served as a basis to prevent further development of other negative psychological characteristics.

6.3 Recommendations

General recommendations: This study revealed that the prevalence of disordered is alarming among college and university students in Sarawak. In consideration to its various contributing factors, the prevention of disordered eating requires multidimensional approach which beyond the focus on weight and nutrition, but inclusion of psychosocial elements. Given that ideal body is not a unique psychological characteristic but rather socially shared, incorporation of psychoeducation in the societal context considered appropriate. The prevention programmes could be aimed to improve the knowledge, attitude and behaviour associated with disordered eating.

Prevention of disordered eating behaviours can be divided into two different approach which are:

i. To reduce the negative risks factors
ii. To increase the protective factors

One way to reduced risks of body dissatisfaction is to improve appreciation of body functionality. Cultivating body functionality is known to reduced appearance comparison and enhanced positive body image, which allow individuals to appreciate and respect their own body. Involvement of activities such sports or yoga has been proposed to increase body and mind integration, not only known to enhance physical competence but also play a significant role in the development of positive body image.

As what being implemented currently among college and university, students' enrolment in non-academic activities are compulsory. However, enrolment doesn't mean they are actively participating in any of those activities. The role of institutions is to identify those who are not active in any non-academic activity to ensure

continuous participation. Via student representative, activities such yoga should be organized in the institutions. If such activity is available, any students identified by counsellor to have negative body image should be referred to this activity.

More attention should also be given towards good attributes of an individual rather than perceived flaws. Being non self-critical and focus on positive information on one's physical characteristics while rejecting negative information, helps to improve individual resilience towards coping a negative emotion. Incorporation of ecological theory for example not only limit the change to an individual but also changing the surrounding environment such as peers, family, and other institutions. More positive peers or social influence should be available in campus. The currently available non-profit organization which provide emotional support for those in needs such as 'Befrienders' should expand their service to institutions. One alternative is to create an online service which could be easily disseminated among all students and relatively inexpensive compared to face-to-face method.

Another way to increase individual resilience towards negative effect due to social comparison, is via individual sense of empowerment which also known as cognitive dissonance. Cognitive dissonance aims to change beliefs about the sociocultural thin or muscularity ideals, by having students to speak against these ideals. Cognitive dissonance occurs when individuals act in a way that contradict their belief and so they will have to change their beliefs to align with their action. In one study, young women with body image concern engaged in written, verbal and behavioural exercises in which they criticized the thin ideal, resulted in discomfort among the participants which motivate them to reduce their thin ideal internalization (McMillan et al., 2011). It was also shown that, cognitive dissonance increases individual's ability to withstand

and critically analysed the social and peer pressure. Besides that, cognitive dissonance is also associated with improvement of self-esteem of individuals.

In regard to counter the negative influence from media, the role of media needs to be changed whereby more programmes emphasizing health should be communicated. More importantly, individual should be able to critically analyse the messages conveyed by media in order to reduced vulnerability to negative media influences. The term media literacy has been shown to be positively improve cognitive skills and to neutralize the negative influenced of media content by emphasises skills on critical thinking which enable individual to develop independent judgements about media content. Media literacy can be incorporated into existing curriculum to enable viewers to better understand the meaning, conveyed by the media. Another way to reduced negative influence by media is via content filtering to reduced negative messages broadcast by media. This may require development of policy on media filtering which access to certain sites that promote negative influence in body image. The currently available service implemented by The Malaysian Communications and Multimedia Commission, should apply more stringent criteria to reduced negative message on media commercial.

Restrained eating is an adaptive coping mechanism for individual with disordered eating behaviour. Individual who engaged in this behaviour will try to ignore their hunger which subsequently lead to binge eating. This is opposite to a healthy eating whereby the relationship with food is based on psychological hunger and satiety cues to determine their eating behaviour. The promotion of intuitive eating to replace restrain eating could be beneficial in maintaining healthy weight and food preoccupation. Incorporation of intuitive eating subject into curriculum in schools and

higher level of institutions, helps one's to understand more on healthy eating behaviour which formed a core of healthy eating throughout their development period.

As family formed the basis of children behavioural formation, family connectedness can be targeted to provide potential protective factor and helps in promotions of positive psychological development and supportive family environment which can be achieve via parental educations. Parents need to be informed on the impact of their negative comments on their children appearances which may increase the risks of disordered eating behaviours. Additionally, education programs need to provide parents and their children with information emphasizing health and nutrition rather than appearances. The current service of providing family counselling by National Population and Family Development Board Malaysia (NPFBD) should incorporate scope on disordered eating prevention program as part of family counselling service.

Specific recommendations: Several programmes for prevention and an early detection on disordered eating development need to be prioritized. These programmes may also help students with disordered eating behaviour to seek help in campus advice. Suggested programmes will cover awareness events, counselling services, support groups and information available to students summarized in table 6.1.

Table 6. 1. Recommended in campus programmes and services on disordered eating

Programmes	**Explanation**
Screening services	Screenings for eating disorders can be a critical component of identifying those at risk for disordered eating behaviours. Screening also provide opportunity for an early intervention. Screening on disordered eating can be part of the assessment during college or university admission.
Informational resources	Informational pamphlets and web site should be made available so that information on disordered eating could be easily available for students
Counselling services	Training on staff as a counsellor who have a specialty such as psychologists or nutritionists, to provide in campus counselling services for those identified having disordered eating or those at risk should be made available.
Peer advisors	Trained peers support group should be available to identify and offer referrals for students with disordered eating behaviours
Educational events	To increase knowledge and awareness among college and university staff as well as students on disordered eating, organizing a programme or workshops such as Body Image workshops or Healthy Eating Awareness week should part of in campus event.

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APPENDIX 1: GANTT CHART

Year	2017		2018		2019				2020			
	DrPH Yr1				DrPH Yr-2				DrPH Yr-3			
Activities	Sept	Dec	March	June	Sept	Dec	March	June	Sept	Dec	March	June
Proposal												
Pilot Testing												
Data collection												
Data Entry												
Data Analysis												
Model Testing												
Report Writing												
Report submission												

APPENDIX 2: ETHICAL APPROVAL

Fakulti Perubatan dan Sains Kesihatan
Faculty of Medicine and Health Sciences

UNIMAS/NC-21.02/03-02 Jld.2 (124)

21 Februari 2018

Dr Edmund Shin Chin Vui
Fakulti Perubatan dan Sains Kesihatan
Universiti Malaysia Sarawak
94300 Kota Samarahan,
Sarawak.

Dr,

Kelulusan Mesyuarat Etika Perubatan Untuk Kajian:
- Disordered Eating Behaviour Among College And University Students In Sarawak.

Dengan segala hormatnya perkara tersebut di atas adalah dirujuk.

Sukacita dimaklumkan bahawa kertas kerja penyelidikan seperti di atas yang dijalankan oleh Dr Edmund Shin Chin Vui dibawah seliaan Prof Madya Dr Cheah Whye Lian telah **diluluskan** dalam **Mesyuarat Jawatankuasa Etika Perubatan Fakulti bil 01/2018 pada 19 February 2018.**

Sehubungan itu, penyelidikan tersebut boleh dimulakan dan diharap ia dapat dijalankan seperti yang dirancang.

Sekian, terima kasih.

Yang benar,

Tan Sri Prof Datu Dr Mohamad Taha Arif
Pengerusi
Jawatankuasa Etika Perubatan
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MSC-Status

APPENDIX 3: QUESTIONAIRE

Serial No:

QUESTIONNAIRE

BORANG SOAL SELIDIK

DISORDERED EATING BEHAVIOUR AMONG COLLEGE AND UNIVERSITY STUDENTS IN SARAWAK

TABIAT MAKAN BERCELARU DI KALANGAN PEAJAR KOLEJ DAN UNIVERSITI DI SARAWAK

1. Please tick your answers in the appropriate boxes
Sila tandakan jawapan anda di kotak yang disediakan.

2. All information provided will be confidential.
Semua maklumat yang diberikan adalah rahsia.

PLEASE **ANSWER ALL THE QUESTIONS** TRUTHFULLY AND SINCERELY

*SILA **JAWAB SEMUA SOALAN** DENGAN BENAR DAN IKHLAS*

RESPONDENT INFORMATION

Objective of study: The aim of this study is to determine the prevalence of disordered eating and to explore the factors that could lead to disordered eating behaviour among college and university students in Sarawak.
Benefit of the study: Identification of factors contributing to the development disordered eating will highlight the important areas to be focused in prevention programs such as to prioritize positive family influence on adolescents and young adult, educational programs on body acceptance, promotion of healthy BMI, promotion of high self-esteem, promotion of healthy levels of perfectionism, building self-confidence and self-compassion. Assessment of eating behaviour among college and university students will be part of mental health assessment to identify those at risks of mental illness. Furthermore, chronic disordered eating behaviour that eventually lead to poor health of an individual person and the seriousness of this condition may worth exploring to alleviate the harm caused by disordered eating practices.
Research Information: This survey will include questions regarding personal information, food habits, eating practices, general feelings about yourself, body satisfaction, perception about your muscle built and measurements of your height and weight.
Volunteering Participation: Please be informed that participation in this research is based on volunteering. No actions, penalties or loss of benefits if you wish not to participate.
Confidentiality: All information from this research is confidential and the processed data maybe publish in the academic publisher. Your privacy will be maintained, and your survey responses will be held in the strictest of confidence.

MAKLUMAT KAJIAN
Objektif kajian: *Kajian ini adalah untuk menentukan kekerapan tabiat makan bercelaru serta factor penyumbang kepada tabiat ini di kalangan pelajar kolej dan universiti di Sarawak.*
Faedah Kajian: *Pengenalpasitian fakor penyumbang tabiat makan bercelaru dapat membantu dalam perancangan program pencegahan seperti memberikan keutamaan terhadap pengaruh positif keluarga kepada golongan remaja dan dewasa muda, program pendidikan terhadap tubuh badan yang sempurna, mempromosikan jisim badan yang sihat, memupuk harga diri yang*

tinggi serta membina keyakinan diri yang positif. Penilaian terhadap tabiat makan bercelaru di kalangan pelajar kolej dan universiti merupakan sebahagian daripada penilaian kesihatan mental untuk mengenal pasti mereka yang menghadapi risiko penyakit mental. Tambahan pula, tingkah laku makan bercelaru yang berlarutan akan menyebabkan kesan negative kesihatan seseorang.

Maklumat Kajian: *Kajian ini akan merangkumi soalan mengenai maklumat peribadi serta tabiat dan amalan pemakanan, perasaan umum terhadap diri, penilaian terhadap ciri badan anda serta pengukuran ketinggian berat badan.*

Penyertaan Sukarela: *Adalah dimaklumkan bahawa penyertaan dalam kajian ini adalah secara sukarela. Tiada tindakan, hukuman atau penalti dikenakan sekiranya anda enggan menyertai kajian ini.*

Sulit:*Maklumat daripada kajian ini mungkin akan digunakan untuk tujuan penerbitan. Walaubagaimanapun, semua maklumat anda adalah sulit dan dirahsiakan.*

SECTION 1: PERSONAL INFORMATION

BAHAGIAN 1: MAKLUMAT PERIBADI

We would like to ask few questions about your personal information. Please answer the following questions by ticking the appropriate boxes.

Kami ingin mengetahui maklumat peribadi anda. Sila tandakan jawapan anda di kotak yang disediakan.

Questions	**Answers**
1.1 What is your date of birth? *Bilakah tarikh lahir anda?* (dd/mm/yy)	
1.2 What is your gender? *Apakah jantina jantina?*	1. Male Lelaki ( ) 2. Female Perempuan ( )
1.3 What is your ethnicity? *Apakah etnik anda?*	1. Malay ( ) 2. Bidayuh ( ) 3. Iban ( ) 4. Kenyah ( ) 5. Kelabit ( ) 6. Melanau ( ) 7. Orang Ulu ( ) 8. Lun bawang ( ) 9. Chinese ( ) 10. Indian ( ) 11. Others Lain-lain ( )
1.4 Which district/town you came from? *Apakah bandar/ daerah asal anda?*	_____ (Please state/ Sila nyatakan)
1.5 How much is your family household monthly income?	RM_____ (Please state/ *Sila nyatakan*)

Berapakah jumlah pendapatan keluarga anda dalam sebulan?	
1.6 What is the amount of money do you receive every month from your family? (or any other source of income) *Berapakah purata jumlah wang yang anda terima daripada keluarga atau dari sebarang sumber kewangan lain setiap bulan?*	RM_____(please state/ *Sila nyatakan*)

SECTION 2. EATING ATTITUDES TEST© (EAT-26) QUESTIONAIRE

Instructions: This is a screening measure to help you determine whether you might have an eating disorder that needs professional attention. However, it is not designed to make a diagnosis of an eating disorder. Please indicate (√) to each statement relevant to you.

Bahagian ini mengandung soalan yang mencerminkan tabiat makanan anda, sila tandakan (√) pada keadaan yang paling tepat yang anda dapat kaitkan dengan keadaan diri anda sendiri. Sila tandakan SATU JAWAPAN bagi setiap soalan.

Part A: Please check a response for each of the following statements

Bahagian A: Tandakan respons bagi setiap pernyataan berikut

		Always *Sentiasa*	Usually *Biasanya*	Often *Kebanyakan Masa*	Sometimes *Kadang-kala*	Rarely *Jarang jarang*	Never *Tidak Pernah*
1	Am terrified about being overweight. *Saya sangat takut akan jadi gemuk.*						

		Always *Sentiasa*	Usually *Biasanya*	Often *Kebanyakan Masa*	Sometimes *Kadang-kala*	Rarely *Jarang jarang*	Never *Tidak Pernah*
2	Avoid eating when I am hungry. *Saya elakkan makan ketika saya lapar.*						
3	Find myself preoccupied with food. *Saya asyik memikirkan akan hal makanan.*						
4	Have gone on eating binges where I feel that I may not be able to stop. *Ada ketika dimana, saya rasa terlalu seronok makan sehingga saya tidak boleh berhenti makan.*						

		Always *Sentiasa*	Usually *Biasanya*	Often *Kebanyakan Masa*	Sometimes *Kadang-kala*	Rarely *Jarang jarang*	Never *Tidak Pernah*
5	Cut my food into small pieces. *Saya biasa memotong makanan saya kepada ketulan-ketulan yang lebih kecil.*						
6	Aware of the calorie content of foods that I eat. *Saya sedar tentang kandungan kalori makanan yang saya makan.*						
7	Particularly avoid food with a high carbohydrate content (i.e. bread, rice, potatoes, etc.) *Saya mengelakkan makanan yang mengandungi karbohidrat yang tinggi (seperti roti, nasi, kentang dll.)*						

		Always *Sentiasa*	Usually *Biasanya*	Often *Kebanyakan Masa*	Sometimes *Kadang-kala*	Rarely *Jarang jarang*	Never *Tidak Pernah*
8	Feel that others would prefer if I ate more. *Saya rasa orang lain akan lebih suka jika saya makan lebih.*						
9	Vomit after I have eaten. Saya muntah selepas saya makan.						
10	Feel extremely guilty after eating. *Saya rasa amat bersalah selepas saya makan.*						
11	Am preoccupied with a desire to be thinner. *Saya mempunyai keinginan kuat untuk menjadi lebih kurus.*						
12	Think about burning up calories when I exercise. *Saya berfikir tentang kalori yang dapat dibakar apabila saya bersenam.*						

		Always *Sentiasa*	Usually *Biasanya*	Often *Kebanyakan Masa*	Sometimes *Kadang-kala*	Rarely *Jarang jarang*	Never *Tidak Pernah*
13	Other people think that I am too thin. *Orang lain berpendapat bahawa saya terlalu kurus.*						
14	Am preoccupied with the thought of having fat on my body. *Fikiran saya asyik tertumpu pada kandungan lemak dalam badan saya.*						
15	Take longer than others to eat my meals. *Saya mengambil masa yang lebih lama daripada orang lain untuk menghabiskan makanan saya.*						
16	Avoid foods with sugar in them. *Saya mengelakkan makanan yang manis.*						
17	Eat diet foods. (food with low fat and low carbohydrate) *Saya makan makanan diet.*						

		Always *Sentiasa*	Usually *Biasanya*	Often *Kebanyakan Masa*	Sometimes *Kadang-kala*	Rarely *Jarang jarang*	Never *Tidak Pernah*
18	Feel that food controls my life. *Saya rasa makanan menguasai kehidupan saya.*						
19	Display self-control around food. *Saya mengamalkan kawalan diri dalam tabiat pemakanan saya.*						
20	Feel that others pressure me to eat. *Saya rasa orang lain mendesak saya untuk makan.*						
21	Give too much time and thought to food. *Saya menghabiskan terlalu banyak masa dan terlalu menumpukan fikiran dalam hal makanan.*						
22	Feel uncomfortable after eating sweets. *Saya berasa tidak selesa selepas makan gula- gula.*						
23	Engage in dieting behaviour. *Saya mempunyai tabiat berdiet.*						

		Always *Sentiasa*	Usually *Biasanya*	Often *Kebanyakan Masa*	Sometimes *Kadang-kala*	Rarely *Jarang jarang*	Never *Tidak Pernah*
24	Like my stomach to be empty. *Saya suka berperut kosong.*						
25	Have the impulse to vomit after meals. *Saya mempunyai dorongan yang mendadak untuk muntah selepas habis makan.*						
26	Enjoy trying new rich foods. *Saya suka mencuba makanan baru yang kaya dengan krim, majerin, gula serta lain-lain bahan dan perisa yang menarik.*						

	Part B: Behavioural Questions. In the past 6 months have you *Bahagian B: Tingkah Laku.* *Dalam 6 bulan yang lalu pernahkah anda*	Never *Tidak pernah*	Once a month *Sekali sebulan*	2-3 times a month *2-3 kali sebulan*	Once a week *Sekali seminggu*	2-6 times a week *2-6 kali seminggu*	Once a day *Sekali sehari*
A	Gone on eating binges where you feel that you may not be able to stop? *Terlalu seronok makan sehingga anda rasa anda mungkin tidak dapat berhenti makan?*						
B	Ever made yourself sick (vomited) to control your weight or shape? *Membuat diri anda sakit (dengan memuntahkan makanan) untuk mengawal berat atau bentuk badan anda?*						
C	Ever used laxatives, diet pills or diuretics (water pills) to control your weight or shape? *Menggunakan julap, pil diet atau diuretic ('pil air') untuk mengawal berat atau bentuk badan anda?*						

		Never *Tidak pernah*	Once a month *Sekali sebulan*	2-3 times a month *2-3 kali sebulan*	Once a week *Sekali seminggu*	2-6 times a week *2-6 kali seminggu*	Once a day *Sekali sehari*
D	Exercised more than 60 minutes a day to lose or to control your weight? *Bersenam lebih daripada 60 minit sehari untuk mengurangkan atau mengawal berat badan anda?*						
E	Lost 9 kilogram or more in the past 6 months? *Hilang 9 kilogram atau lebih dalam masa 6 bulan yang lalu?*	Yes			No		

SECTION 3. EATING DISORDER INVENTORY (EDI)-BODY DISSATISFACTION SUBSCALE

Please indicate (√) the response that best captures your own experience.

Bahagian ini mengandungi 9 soalan berkaitan dengan ketidakpuasan hati terhadap badan anda. Sila tandakan tik (√) pada keadaan yang paling tepat yang anda dapat kaitkan dengan keadaan diri anda sendiri. Sila tandakan SATU JAWAPAN bagi setiap soalan.

		Never *Tidak pernah*	Rarely *Jarang jarang*	Sometimes *Kadang kala*	Often *Kebanyakan masa*	Usually *Biasanya*	Always *Sentiasa*
1	I think that my stomach is too big. *Saya rasa perut saya terlalu besar.*						
2	I think that my thighs are too large. *Saya rasa paha saya terlalu besar.*						
3	I think that my stomach is just the right size. *Saya rasa perut saya adalah saiz yang sesuai.*						
4	I feel satisfied with the shape of my body. *Saya berpuas hati dengan bentuk badan saya.*						
5	I like the shape of my buttocks. *Saya suka bentuk punggung saya.*						
6	I think my hips are too big. *Saya rasa pinggang saya terlalu besar.*						

		Never *Tidak pernah*	Rarely *Jarang jarang*	Sometimes *Kadang kala*	Often *Kebanyakan masa*	Usually *Biasanya*	Always *Sentiasa*
7	I think that my thighs are just the right size. *Saya rasa paha saya adalah saiz yang sesuai*						
8	I think that my buttocks are too large. *Saya rasa punggung saya terlalu besar.*						
9	I think that my hips are just the right size. *Saya rasa punggung saya adalah saiz yang sesuai.*						

SECTION 4. PERCEIVED SOCIOCULTURAL PRESSURE SCALE (PSPS)

Please read each item carefully then, indicate (√) the box that best applies to you.

Bahagian ini mengandungi sejumlah 10 soalan. Sila tandakan tik (√) pada jawapan yang terbaik berdasarkan pengalaman anda sendiri. Sila tandakan SATU JAWAPAN bagi setiap soalan.

		Never *Tidak pernah*	Rarely *Jarang jarang*	Sometimes *Kadang kala*	Often *Kebanyakan masa*	Always *Sentiasa*
1	I've felt pressure from my friends to lose weight *Saya pernah rasa tekanan daripada rakan-rakan saya untuk menurunkan berat badan.*					
2	I've noticed a strong message from my friends to have a thin body. *Saya pernah merasai satu mesej yang kuat daripada rakan- rakan saya yang inginkan saya memiliki badan yang kurus.*					
3	I've felt pressure from my family to lose weight. *Saya pernah rasa tekanan daripada keluarga saya untuk menurunkan berat badan.*					
4	I've noticed a strong message from my family to have a thin body. *Saya pernah merasai satu mesej yang kuat daripada keluarga yang inginkan saya memiliki badan yang kurus.*					
5	I've felt pressure from people I've dated to lose weight. *Saya pernah rasa tekanan daripada orang yang saya telah 'dating' untuk menurunkan berat badan saya.*					

		Never *Tidak pernah*	Rarely *Jarang jarang*	Sometimes *Kadang kala*	Often *Kebanyakan masa*	Always *Sentiasa*
6	I've noticed a strong message from people I've dated to have a thin body. *Saya pernah merasai satu mesej yang kuat daripada orang yang saya telah 'dating' yang inginkan saya memiliki badan yang kurus.*					
7	I've felt pressure from the media (e.g., TV, magazines, web media) to lose weight. *Saya pernah rasa tekanan daripada media (contohnya, TV, majalah,dan laman sosial) untuk menurunkan berat badan.*					
8	I've noticed a strong message from the media to have a thin body. *Saya pernah merasai satu mesej yang kuat daripada media (contohnya, TV, majalah, lama sosial) 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	My colleagues tease me about my weight or body shape. *Rakan-rakan saya mengejek saya tentang berat atau bentuk badan saya.*					

SECTION 5. ROSENBERG SELF-ESTEEM SCALE

Instructions: Below is a list of statements dealing with your general feelings about yourself. Please indicate (√) how strongly you agree or disagree with each statement.

Bahagian ini mengandungi soalan berkaitan perasaan umum anda tentang diri anda. Sila tandakan tik (√) pada pada keadaan yang paling tepat yang anda dapat kaitkan dengan diri anda. Sila pilih satu jawapan sahaja bagi setiap soalan.

		Strongly agree *Sangat setuju*	Agree *Setuju*	Disagree *Tidak bersetuju*	Strongly disagree *Sangat tidak bersetuju*
1	On the whole, I am satisfied with myself. *Secara keseluruhan, saya berpuas hati dengan diri saya.*				
2	At times I think I am no good at all. *Kadangkala, saya rasa saya tidak baik sama sekali.*				
3	I feel that I have a number of good qualities. *Saya rasa saya mempunyai beberapa kualiti yang baik.*				
4	I am able to do things as well as most other people. *Saya dapat melakukan kerja dan tugas sebaik orang lain.*				
5	I feel I do not have much to be proud of. *Saya rasa saya tidak mempunyai banyak perkara untuk dibanggakan.*				
6	I certainly feel useless at times. *Kadangkala, saya rasa tidak berguna.*				
7	I feel that I'm a person of worth, at least on an equal plane with others. *Saya rasa, saya seorang yang bernilai, sekurang- kurangnya pada tahap yang sama dengan orang lain.*				

		Strongly agree *Sangat setuju*	Agree *Setuju*	Disagree *Tidak bersetuju*	Strongly disagree *Sangat tidak bersetuju*
8	I wish I could have more respect for myself. *Saya ingin memberi lebih hormat terhadap diri sendiri.*				
9	All in all, I am inclined to feel that I am a failure. *Secara keseluruhannya, saya cenderung untuk berasa bahawa saya seorang yang selalu gagal dalam segala-galanya.*				
10	I take a positive attitude toward myself. *Saya mempunyai sikap positif terhadap diri sendiri.*				

SECTION 6. THE DRIVE FOR MUSCULARITY SCALE

Please read each item carefully then, for each one, indicate (√) the area that best applies to you.

Bahagian ini mengandungi 15 soalan berkaitan factor pendorong maskulariti tentang diri anda. Sila tandakan tik (√) pada keadaan yang paling tepat yang anda dapat kaitkan dengan diri anda. Sila pilih satu jawapan sahaja bagi setiap soalan.

		Always *Sentiasa*	Usually *Biasanya*	Often *Kebanyakan Masa*	Sometimes *Kadang-kala*	Rarely *Jarang jarang*	Never *Tidak Pernah*
1	I wish that I were more muscular. *Saya ingin saya lebih berotot.*						
2	I lift weights to build up muscle. *Saya angkat berat untuk bina otot*						
3	I use protein or energy supplements. *Saya mengambil suplemen protin and tenaga.*						
4	I drink weight gain or protein shakes. *Saya minum minuman yang dapat menambah berat badan atau minuman protin.*						

		Always *Sentiasa*	Usually *Biasanya*	Often *Kebanyakan Masa*	Sometimes *Kadang-kala*	Rarely *Jarang jarang*	Never *Tidak Pernah*
5	I try to consume as many calories as I can in a day. *Saya cuba mengambil sebanyak kalori yang boleh dalam satu hari.*						
6	I feel guilty if I miss a weight training session. *Saya rasa bersalah jika saya tidak pergi sesi latihan berat badan.*						
7	I think I would feel more confident if I had more muscle mass. *Saya rasa, saya akan rasa lebih yakin jika saya lebih berotot.*						
8	Other people think I work out with weights too often. *Orang lain berpendapat, saya terlalu mementngkan berat.*						
9	I think that I would look better if I gained 10 pounds in bulk. *Saya rasa saya akan Nampak lebih elok kalau saya naik 5 kg dalam bentuk otot.*						

		Always *Sentiasa*	Usually *Biasanya*	Often *Kebanyakan Masa*	Sometimes *Kadang-kala*	Rarely *Jarang jarang*	Never *Tidak Pernah*
10	I think about taking anabolic steroids. *Saya terfikir untuk mengambil steroid anabolik.*						
11	I think that I would feel stronger if I gained a little more muscle mass. *Saya rasa saya akan rasa lebih kuat kalau saya peroleh otot sedikit lagi.*						
12	I think that my weight training schedule interferes with other aspects of my life. *Saya rasa jadual latihan angkat berat saya mengganggu aspek-aspek hidup saya yang lain.*						
13	I think that my arms are not muscular enough. *Saya rasa lengan saya tidak cukup berotot.*						
14	I think that my chest is not muscular enough. *Saya rasa dada saya tidak cukup berotot.*						

		Always *Sentiasa*	Usually *Biasanya*	Often *Kebanyakan Masa*	Sometimes *Kadang-kala*	Rarely *Jarang jarang*	Never *Tidak Pernah*
15	I think that my legs are not muscular enough. *Saya rasa kaki saya tidak cukup berotot.*						

SECTION 7: EATING DISORDER INVENTORY - PERFECTIONISM SUBSCALE (EDI-P)

This is a scale which measures a variety of attitudes, feelings and behaviours.
Ini adalah skala yang mengukur pelbagai sikap, perasaan dan tingkah laku. Tiada jawapan yang betul atau salah supaya cuba sedaya upaya untuk menjadi benar-benar jujur dalam jawapan anda.

		Never *Tidak pernah*	Rarely *Jarang jarang*	Sometimes *Kadang kala*	Often *Kebanyakan masa*	Usually *Biasanya*	Always *Sentiasa*
1	Only outstanding performance is good enough in my family. *Hanya prestasi cemerlang sahaja yang diterima baik dalam keluarga saya.*						
2	I try very hard to avoid disappointing others. *Saya cuba sedaya upaya untuk tidak mengecewakan orang lain.*						

		Never *Tidak pernah*	Rarely *Jarang jarang*	Sometimes *Kadang kala*	Often *Kebanyakan masa*	Usually *Biasanya*	Always *Sentiasa*
3	I hate being less than best at things. *Saya tidak suka, jika pencapaian saya kurang daripada yang terbaik dalam sesuatu perkara.*						
4	My parents expect excellence of me. *Ibu bapa saya mengharapkan kecemerlangan saya.*						
5	I feel that I must do things perfectly or not do them at all. *Saya merasakan bahawa saya perlu melakukan perkara-perkara dengan sempurna, jika tidak, saya tidak akan melakukannya sama sekali.*						
6	I have extremely high goals. *Saya mempunyai matlamat yang sangat tinggi.*						

SECTION 8. ANTHROPOMETRIC DATA

We would like to know about your height and weight base on your latest measurements.

Kami ingin mengetahui tinggi dan berat anda berdasarkan pengukuran terkini.

	First reading Bacaan pertama	Second reading Second reading	Average reading
Height (m) Tinggi (m)			
Weight (kg) Berat (kg)			
BMI (kg/m2)			

Thank You For Your Contribution

Terima Kasih Di Atas Penyertaan Anda