
**UNIVERSITI PUTRA MALAYSIA**

# *FACTORS ASSOCIATED WITH DISORDERED EATING AMONG PRIMARY SCHOOL CHILDREN IN SELANGOR, MALAYSIA*

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# FACTORS ASSOCIATED WITH DISORDERED EATING AMONG PRIMARY SCHOOL CHILDREN IN SELANGOR, MALAYSIA

**By**

**CHONG LIN SIEW**

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Master of Science**

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

**FACTORS ASSOCIATED WITH DISORDERED EATING AMONG PRIMARY SCHOOL CHILDREN IN SELANGOR, MALAYSIA**

By

**CHONG LIN SIEW**

**January 2016**

**Chair : Chin Yit Siew, PhD**
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The prevalence of disordered eating is on the rise among children. This study aimed to determine the prevalence of disordered eating and the associations between socio-demographic characteristics, pubertal development, body weight status, psychological factors, socio-cultural factors and behavioral factors with disordered eating among primary school children (aged 10 to 11 years) in Selangor.

A total of 816 children (35.1% males and 64.9% females) from 12 randomly selected primary schools involved in this cross-sectional study. Children completed a set of self-administered questionnaire on disordered eating, socio-demographic characteristics (sex, ethnicity, parental monthly income, parental education level), pubertal development, psychological factors (self-esteem, depression, health specific self-efficacy, body size satisfaction), socio-cultural factors (perceived pressure to lose weight, gain weight and increase muscle tone from parents, peers and media) and behavioral factors (meal skipping behaviors, snacking behaviors, fast food consumption, dietary intake, physical activity level). Their body weight and height were measured and body weight status was categorized based on WHO Growth Reference (2007). Multivariate logistic regression analysis was conducted to determine factors associated with disordered eating among the children.

The prevalence of disordered eating was 30.8% [Males: 32.8% (95% CI: 27.3, 38.8); Females: 29.7% (95% CI: 25.8, 33.9)]. Older age children (10.7; 95% CI: 10.7, 10.8) reported higher prevalence of disordered eating than younger age children (10.5; 95% CI: 10.5, 10.6). Indian (39.9%; 95% CI: 29.3, 51.40) showed the highest prevalence of disordered eating, followed by Malay (33.6%; 95% CI: 29.7, 37.8) and Chinese (17.0%; 95% CI: 11.8, 23.8). Children who were in advanced and post-pubertal stage had the highest prevalence of disordered eating (44.6%; 95% CI: 33.0, 56.7). Those who consumed fast food at least once a week showed the highest prevalence of disordered eating (38.4%; 95% CI: 32.6, 44.5). Socio-cultural pressures to lose weight among children with disordered eating (32.4; 95% CI: 31.0, 33.8) was higher than those without disordered eating (27.6; 95% CI: 26.7, 28.4). No associations were found between sex, parental monthly income, parental education level, body weight status,

self-esteem, depression, health specific self-efficacy, body size satisfaction, meal skipping behaviors, snacking behaviors, energy and macronutrient intakes, energy expenditure and physical activity level with disordered eating of the children.

Factors that associated with disordered eating were being an Indian (OR = 2.048; 95% CI: 1.050, 3.995), perceived pressure to lose weight from parents, peers and media (OR = 1.035; 95% CI: 1.017, 1.053) and fast food consumption at least once a week (OR = 1.540; 95% CI: 1.098, 2.162) after age was controlled.

In conclusion, one third of the children had disordered eating. After controlling for age, factors of disordered eating in both males and females were being an Indian, perceived pressure to lose weight from parents, peers and media and fast food consumption at least once a week. Future ethnic specific intervention programs on the prevention of disordered eating should be taken consideration of age, socio-cultural factors and fast food consumption.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

**FAKTOR-FAKTOR BERKAITAN DENGAN GANGGUAN TINGKAH LAKU PEMAKANAN DALAM KALANGAN KANAK-KANAK SEKOLAH RENDAH DI SELANGOR, MALAYSIA**

Oleh

**CHONG LIN SIEW**

**Januari 2016**

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Prevalens gangguan tingkah laku pemakanan semakin meningkat di kalangan kanak-kanak. Kajian ini bertujuan untuk menentukan prevalens gangguan tingkah laku pemakanan dan perkaitan antara ciri-ciri sosio-demografi, perkembangan akil baligh, status berat badan, faktor-faktor psikologi, faktor-faktor sosio-budaya dan faktor-faktor tingkah laku dengan gangguan tingkah laku pemakanan dalam kalangan kanak-kanak sekolah rendah berumur 10 - 11 tahun di Selangor.

Sejumlah 816 kanak-kanak (35.1% lelaki dan 64.9% perempuan) dari 12 sekolah rendah yang dipilih secara rawak terlibat dalam kajian ini. Kanak-kanak tersebut menjawab satu set borang soal-selidik tentang gangguan tingkah laku pemakanan, ciri-ciri sosio-demografi (jantina, keturunan, pendapatan bulanan ibu bapa, taraf pendidikan ibu bapa), perkembangan akil baligh, faktor-faktor psikologi (harga diri, kemurungan, efikasi diri khusus untuk kesihatan, kepuasan terhadap saiz tubuh badan), faktor-faktor sosio-budaya (tekanan yang dirasakan untuk menurunkan berat badan, meningkatkan berat badan, meningkatkan tona otot daripada ibu bapa, rakan sebaya dan media) dan faktor-faktor tingkah laku (melangkau waktu makan utama, pengambilan snek, pengambilan makanan segera, pengambilan pemakanan, tahap aktiviti fizikal). Berat badan dan ketinggian mereka telah diukur. Status berat badan telah dikategorikan berdasarkan Rujukan Pertumbuhan WHO (2007). Analisis regresi logistik multivariat telah dijalankan untuk menentukan faktor-faktor yang berkaitan dengan tingkah laku makan yang tidak teratur dalam kalangan kanak-kanak.

Prevalens gangguan tingkah laku pemakanan adalah 30.8% [Lelaki: 32.8% (95% CI: 27.3, 38.8); Perempuan: 29.7% (95% CI: 25.8, 33.9)]. Kanak-kanak yang lebih tua (10.7; 95% CI: 10.7, 10.8) menunjukkan prevalens gangguan tingkah laku pemakanan yang lebih tinggi berbanding dengan kanak-kanak yang lebih muda (10.5; 95% CI: 10.5, 10.6). India (39.9%; 95% CI: 29.3, 51.40) menunjukkan prevalens gangguan tingkah laku pemakanan yang tertinggi, diikuti dengan Melayu (33.6%; 95% CI: 29.7, 37.8) dan Cina (17.0%; 95% CI: 11.8, 23.8). Kanak-kanak yang berada di peringkat akhir dan pasca akil baligh mempunyai prevalens gangguan tingkah laku pemakanan yang

tertinggi (44.6%; 95% CI: 33.0, 56.7). Mereka yang mengamalkan pengambilan makanan segera sekurang-kurangnya seminggu sekali menunjukkan prevalens gangguan tingkah laku pemakanan yang tertinggi (38.4%; 95% CI: 32.6, 44.5). Tekanan sosio-budaya untuk menurunkan berat badan dalam kalangan kanak-kanak yang mempunyai gangguan tingkah laku pemakanan (32.4; 95% CI: 31.0, 33.8) adalah lebih tinggi daripada mereka yang tidak mempunyai gangguan tingkah laku pemakanan (27.6; 95% CI: 26.7, 28.4). Tiada perkaitan didapati antara jantina, pendapatan bulanan ibu bapa, taraf pendidikan ibu bapa, status berat badan, harga diri, kemurungan, keberkesanan diri khusus untuk kesihatan, kepuasan terhadap saiz tubuh badan, tingkah laku melangkau waktu makan utama, tingkah laku pengambilan snek, pengambilan tenaga dan nutrien, penggunaan tenaga dan tahap aktiviti fizikal dengan gangguan tingkah laku pemakanan dalam kalangan kanak-kanak tersebut.

Faktor-faktor yang berkaitan dengan gangguan tingkah laku pemakanan adalah sebagai seorang India (OR = 2.048; 95% CI: 1.050, 3.995), tekanan yang dirasakan untuk menurunkan berat badan daripada ibubapa, rakan sebaya dan media (OR = 1.035; 95% CI: 1.017, 1.053) dan pengambilan makanan segera sekurang-kurangnya seminggu sekali (OR = 1.540; 95% CI: 1.098, 2.162) selepas umur diselaraskan.

Kesimpulannya, satu pertiga daripada kanak-kanak mempunyai gangguan tingkah laku pemakanan. Faktor-faktor berkaitan dengan gangguan tingkah laku pemakanan dalam kalangan lelaki dan perempuan adalah sebagai seorang India, tekanan yang dirasakan untuk menurunkan berat badan daripada ibubapa, rakan sebaya dan media dan pengambilan makanan segera sekurang-kurangnya seminggu sekali selepas umur diselaraskan. Program intervensi untuk mencegah gangguan tingkah laku pemakanan yang khusus untuk etnik tertentu perlu dijalankan dengan mengambil kira umur, faktor-faktor sosio-budaya dan pengambilan makanan segera.

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I certify that a Thesis Examination Committee has met on 14 January 2016 to conduct the final examination of Chong Lin Siew on her thesis entitled "Factors Associated with Disordered Eating among Primary School Children in Selangor, Malaysia" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Master of Science.

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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee were as follows:

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- the research conducted and the writing of this thesis was under our supervision;
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## LIST OF ABBREVIATIONS

| | |
|---|---|
| AN | Anorexia Nervosa |
| BED | Binge Eating Disorder |
| BMI | Body Mass Index |
| BMR | Basal Metabolic Rate |
| BN | Bulimia Nervosa |
| ChEAT | Children's Eating Attitude Test |
| DOSM | Department of Statistics Malaysia |
| DSM-5 | Diagnostic and Statistical Manual of Mental Disorders-5 |
| EAT | Eating Attitude Test |
| EBQ | Eating Behaviors Questionnaire |
| FAO | Food and Agriculture Organization |
| IOTF | International Obesity Task Force |
| IPH | Institute of Public Health |
| MET | Metabolic Equivalent |
| MOHR | Ministry of Human Resource Malaysia |
| NCCFN | National Coordinating Committee on Food and Nutrition of Malaysia |
| OSFED | Other Specified Feeding Or Eating Disorder |
| PAL | Physical Activity Level |
| RMR | Resting Metabolic Rate |
| RNI | Recommended Nutrient Intakes for Malaysians |
| SES | Socio-economic Status |
| SPSS | Statistical Package for Social Sciences |
| TDEE | Total Daily Energy Expenditure |
| UNICEF | United Nations Children's Fund |
| WHO | World Health Organization |

## GLOSSARY OF TERMS

| | |
|---|---|
| Disordered eating | Troublesome eating behaviors such as restrictive dieting, bingeing, or purging which occur less frequently or are less severe than those required to meet the full criteria for the diagnosis of an eating disorder (U.S. Department of Health and Human Services, 2005) |
| Child | A person under the age of 18 years stated in the Children Act 2001 (Aldgate & Stratham, 2001) |
| Meal skipping | Skipped at least one of the three main meals per day (Fara Wahida, Chin, & Barakatun Nisak, 2012) |
| Snacking | Snacked between meals at least once per day (Fara Wahida et al., 2012) |

# CHAPTER 1

# INTRODUCTION

## 1.1 Background of the Study

Disordered eating is defined as troublesome eating behaviors including restrictive dieting, bingeing, or purging, which occur less frequently or are less severe than those required to meet the full criteria for the diagnosis of an eating disorder (U.S. Department of Health and Human Services, 2005). Disordered eating is a recognised predictor of the onset of eating disorders involving serious eating disturbances, such as extreme and restriction of food intake, severe overeating, as well as feelings of distress or extreme concern about body shape or weight (Abebe, Torgersen, Lien, Hafstad, & Soest, 2013; Stice, Davis, Miller, & Marti, 2008). According to The Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM–5; American Psychiatric Association [APA], 2013), eating disorders are currently classified into four types; anorexia nervosa, bulimia nervosa, binge eating disorder and other specified feeding or eating disorder (OSFED). In the general population, the prevalence estimates of eating disorders are between 1% to 4% (Lofrano-Prado et al., 2011). Although studies have estimated that eating disorders affect only 0.3 - 1.6% of the children population (Swanson, Crow, Le Grange, Swendsen, & Merikangas, 2011), complications may lead to life-threatening situations.

Disordered eating occurs across all age groups from adults to children. In general, the prevalence of disordered eating among adults ranges from 11.2% to 31.4%, while around 2.7% to 17.1% of university students had disordered eating (Eisenberg, Nicklett, Roeder, & Kirz, 2011; Forrester-Knauss & Zemp Stutz, 2012; Paulson & Rutledge, 2014; Reba-Harrelson et al., 2009; Uzun et al., 2006). Disordered eating is most commonly found in children and increased prevalence of disordered eating has been observed in the children population (Neumark-Sztainer, Wall, Larson, Eisenberg, & Loth, 2011). The prevalence of disordered eating among children in Western coutries ranges from 7.6% to 16.7%, namely Ireland (7.6%); United States (12.0%); Kosovo (13.1%) and Greece (16.7%) (Bilali, Galanis, Velonakis, & Katostaras, 2010; McNicholas et al., 2010; Santos, Richards, & Bleckley, 2007). On the contrary, studies in Asian countries have reported that the prevalence of disordered eating varied from 5.1% to 12.7%, including Hong Kong (5.1%); Taiwan (10.5%) and Korea (12.7%) (Lee et al., 2013; Tam, Ng, Yu, & Young, 2007; Wong, Chang, & Tsao, 2014). In general, disordered eating is more prevalent among Western populations than Asian populations, but the prevalent of disordered eating in Asian populations has shown an increasing trend over the last decades (Chisuwa & O'Dea, 2010). Since the industrialization era, the Western countries have emphasize the thin ideal body image as the beauty standard in Western cultures, which may lead to high prevalence of disordered eating (Mallick, Ray, & Mukhopadhyay, 2014). However, in recent decades, the globalization has exposed the Western beauty culture to the Asian countries that increased the prevalence of disordered eating in Asian countries (Yang, Kim, & Yoon, 2010). Based on these findings, although the prevalence estimates of eating disorders is relatively low (0.3% - 1.6%) (Swanson et al., 2011), disordered eating has been reported within a

significant number of children (5.1% - 41.2%) (Musaiger, Al-Mannai, & Al-Lalla, 2014; Tam et al., 2007). This shows that attention is needed in this area.

Disordered eating is associated with various adverse behavioral, psychological, and physical consequences such as increased risk of weight-gain, obesity, and poorer dietary intake (Chang, Lin, & Wong, 2011; Field et al., 2003; Neumark-Sztainer, Wall, Story, & Standish, 2012; Tsai, Chang, Lien, & Wong, 2011). In terms of psychological and mental health consequences, disordered eating is associated with increased fatigue, depression, anxiety and suicidal behavior (Solmi, Hatch, Hotopf, Treasure, & Micali, 2014; Wille, Hölling, Vloet, & Ravens-Sieberer, 2008). In addition, findings has shown that disordered eating reduced the quality of life for children (Wille et al., 2008). Due to the high prevalence of disordered eating during childhood and the negative health implications, there is a need to clearly understand the factors associated with disordered eating among children.

## 1.2 Problem Statement

There are three broad stages of growth in childhood: early childhood (birth to eight years), middle childhood (eight to twelve years), and adolescence (twelve to eighteen years (Tomanari, 2011). Previous findings reported that disordered eating started in the age range 10 to 11 years among children (Combs, Pearson, & Smith, 2011; McVey, Tweed, & Blackmore, 2004; Pearson, Combs, & Smith, 2010; Tam et al., 2007; Wong et al., 2014; Yang et al., 2010). Studies from the United States reported that disordered eating behavior was present in males and females at the age of 11 years (Combs et al., 2011; Pearson et al., 2010). A Canadian study published in 2004 reported that females as young as 10 years of age reported disordered eating (McVey et al., 2004). Studies from non-Western countries such as South Korea, Hong Kong and Taiwan also found that disordered eating appeared among children since middle childhood (Tam et al., 2007; Wong et al., 2014; Yang et al., 2010). For instance, study from South Korea indicated that disordered eating is more prevalent among fourth grade students (aged 9-10 years) than seventh grade students (aged 12-13 years). Moreover, in Hong Kong, the youngest case of disordered eating reported was 11 years old (Tam et al., 2007). Therefore, it can be concluded that disordered eating started to emerge during middle childhood, particularly between the age of 10 to 13 years. However, little is known about the disordered eating behavior on children among this age group in the Malaysian context.

There are few studies on disordered eating in Malaysia focusing on young children (8-9 years) and adolescents (13-17 years) (Dan, Mohd Nasir, & Zalilah, 2011; Farah, Mohd Nasir, & Hazizi, 2011; Law, Mohd Nasir, & Abu Saad, 2014; Soo, Zalilah, Mohd Nasir, & Bahaman, 2008; Zalilah & Zaidah, 2005). For instance, a study conducted on 107 Malay female children aged 8 to 9 years in Selangor reported that 38.0% of the Malay females reported disordered eating (Zalilah & Zaidah, 2005). Besides, Soo et al. (2008) found that the prevalence of disordered eating was 35.4% to 36.0% among female adolescents aged between 15 to 17 years in Kelantan. However, the study by Zalilah and Zaidah (2005) was limited to a sample of Malay females at a younger age group (8 to 9 years) while the study by Soo et al. (2008) was focused on a sample of female

adolescents aged 15 to 17 years. There is a lack of published studies on disordered eating in Malaysia which focus on children of various ethnic groups, considering that Malaysia is a multi-ethnic country.

A number of studies have examined the prevalence of disordered eating focused primarily on female children, however, disordered eating is not a problem solely by a single sex (Chang et al., 2011; Evans, Tovee, Boothroyd, & Drewett, 2013; Hamel, Zaitsoff, Taylor, Menna, & Le Grange, 2012; Harrison & Hefner, 2006; Jones, Bennett, Olmsted, Lawson, & Rodin, 2001; McVey et al., 2004; Toro et al., 2006; Tsai et al., 2011). Evidence suggested that disordered eating among males were in increasing trends. In fact, disordered eating is prevalent among both male and female children (Neumark-Sztainer et al., 2011). Evidence from a 10-year longitudinal study on disordered eating behaviors reported that the prevalence of dieting among males had significantly increased from 21.9% to 27.9%; while the prevalence of extreme weight control behaviors increased from 2.1% to 7.3% after 10 years of follow-up from adolescence to young adulthood (Neumark-Sztainer et al., 2011). However, the local studies only focused primarily on female children and adolescents but not on male children and adolescents (Soo et al., 2008; Zalilah & Zaidah, 2005). Limited number of published studies included both sexes (Farah et al., 2011; Law et al., 2014). Farah et al. (2011) reported that both males and females in Pahang reported high prevalence of disordered eating (Males: 28.8%; Females: 26.9%); however there is no significance between sexes. Another local study by Law et al. (2014) reported that 18.3% of males and 20.4% of females in Sarawak had disordered eating. Nevertheless, the difference according to sex in disordered eating was not examined. Thus, there is a need to conduct a study on disordered eating which includes both male and female children and examine the difference in terms of different sexes in Malaysia.

The development of disordered eating is complex and no single factor can explain it. It has been reported that various socio-demographic characteristics, body weight status, psychological, socio-cultural and behavioral factors were found to be associated with disordered eating (Muris, Meesters, van de Blom, & Mayer, 2005; Neumark-Sztainer, Wall, Story, & Sherwood, 2009). Previous findings reported that socio-demographic characteristics (age and pubertal development), body weight status, familial and social factors were associated with disordered eating among female children in Jordan (Mousa, Al-Domi, Mashal, & Jibril, 2010). Furthermore, Evans et al. (2013) reported that psychological factors including depression and body image were correlated with disordered eating among female children in North East England. Besides that, psychological factors and socio-cultural factors were associated with disordered eating among children aged 9-15 years in United States (Field et al., 2008). A recent research by Veses et al. (2014) reported that behavioral factors particularly physical activity level was a significant factor of disordered eating among a sample of Spanish children. However, all these studies focused on single domains and were conducted in Western countries. Factors associated with disordered eating in children from non-Western countries have not been fully investigated. There is still lack of studies that investigate the combination of psychological, body weight status, socio-cultural, and behavioral factors on disordered eating among school children in Malaysia.

The following are the research questions to be addressed in this study: -

1. What is the prevalence of disordered eating among male and female primary school children in Selangor?
2. Do socio-demographic characteristics, body weight status, psychological factors, socio-cultural factors and behavioral factors contribute to disordered eating among primary school children?

## 1.3 Significance of the Study

At present, there is insufficient information on disordered eating among primary school children in Malaysia. Thus, the findings from this study can provide the baseline information on disordered eating for future research. This study contributes and updates the data on the prevalence of disordered eating among primary school children.

In addition, the present study covers socio-demographic characteristics, body weight status, psychological factors, socio-cultural factors as well as behavioral factors on disordered eating whereas others studies only focused on certain factors on disordered eating. Therefore, this study can provide a more comprehensive picture of the factors associated to disordered eating among primary school children.

Besides that, this study also provides information about factors contributed to disordered eating, particularly among primary school children, which may serve as potential targets for prevention of disordered eating that can be tracked into adulthood. The factors associated to disordered eating among primary school children in this study are useful as reference for developing prevention and intervention programs for successful improvement of children's physical and psychological well-being.

## 1.4 Objectives of the Study

### 1.4.1 General Objective

To determine the factors associated with disordered eating among primary school children in Selangor.

### 1.4.2 Specific Objectives

1. To determine the prevalence of disordered eating among primary school children in Selangor.

2. To determine the socio-demographic characteristics (age, sex, ethnicity, parental education level, parental monthly income, socio-economic status); pubertal development; body weight status; psychological factors (self-esteem, depression, health specific self-efficacy, and body size satisfaction); socio-cultural factors (perceived pressure to lose weight, gain weight and increase muscle tone from parents, peers and media); and behavioral factors (meal skipping and snacking behaviors, frequency of fast food consumption, dietary intake and physical activity) of the primary school children in Selangor.

3. To determine the associations between socio-demographic characteristics (age, sex, ethnicity, parental education level, parental monthly income, socio-economic status); pubertal development; body weight status; psychological factors (self-esteem, depression, health specific self-efficacy, and body size satisfaction); socio-cultural factors (perceived pressure to lose weight, gain weight and increase muscle tone from parents, peers and media); and behavioral factors (meal skipping and snacking behaviors, frequency of fast food consumption, dietary intake and physical activity) with disordered eating among primary school children in Selangor.

4. To determine the contribution of socio-demographic characteristics, pubertal development, body weight status, psychological, socio-cultural and behavioral factors towards disordered eating among primary school children in Selangor.

## 1.5 Null Hypotheses

1. There are no significant associations between socio-demographic characteristics, pubertal development, body weight status, psychological factors, socio-cultural factors and behavioral factors with disordered eating among primary school children in Selangor.

2. There are no significant contributions of socio-demographic characteristics, pubertal development, body weight status, psychological factors, socio-cultural factors and behavioral factors towards disordered eating among primary school children in Selangor.

## 1.6 Conceptual Framework

Figure 1.1 shows the dependent and independent variables in this study. The dependent variable in this study is disordered eating. The independent variables in this study are categorized as six sections, including socio-demographic characteristics, pubertal

development, body weight status, psychological factors, socio-cultural factors and behavioral factors.

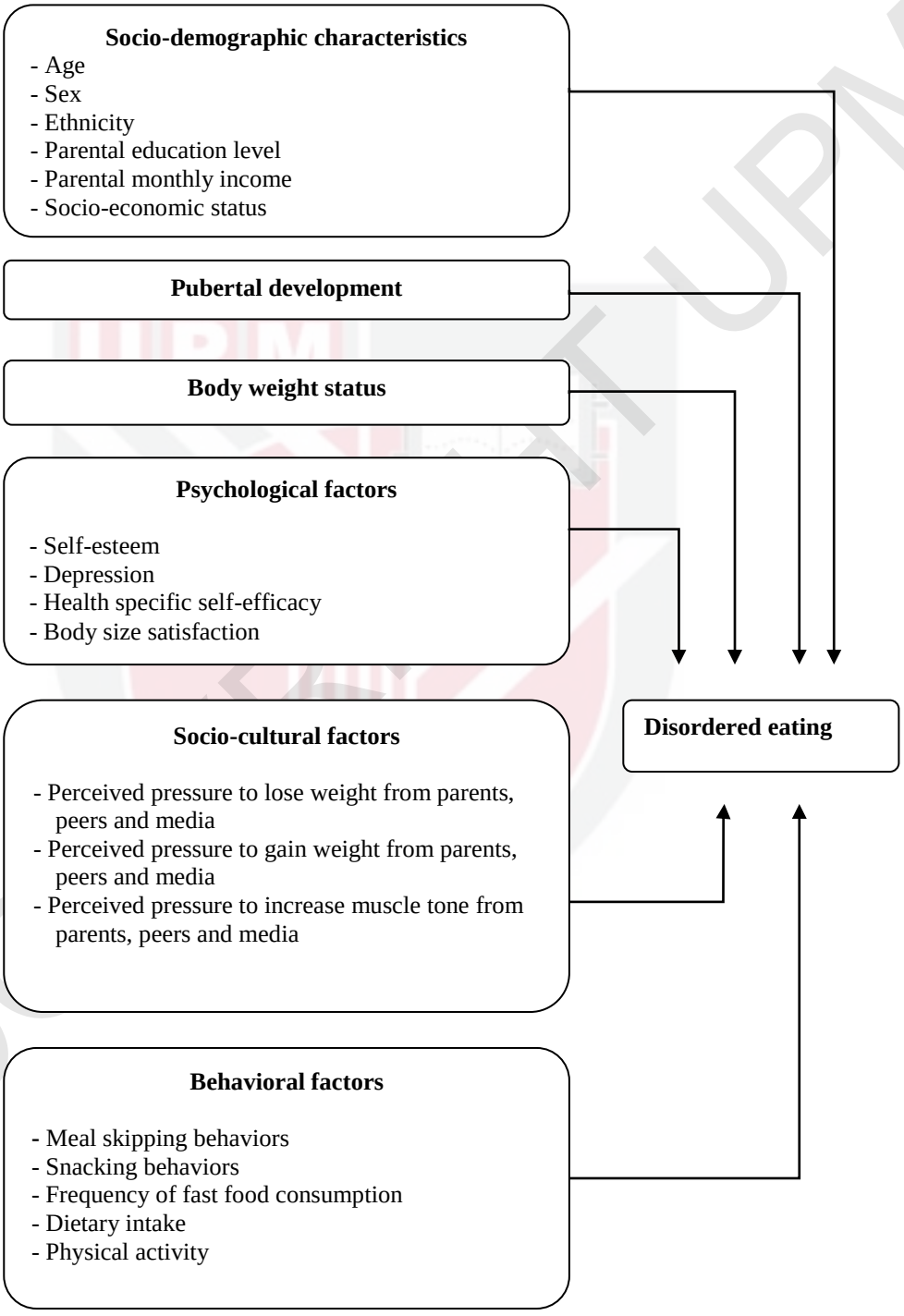


**Figure 1.1. Conceptual framework**

Socio-demographic characteristics include age, sex, ethnicity, parental education level, and parental monthly income. Previous studies have shown that socio-demographic characteristics, including sex, age, ethnicity, parental education level, and parental monthly income may serve as potential contributing factors to disordered eating (Downs, DiNallo, Savage, & Davison, 2007; Ho, Tai, Lee, Cheng, & Liow, 2006; Yang et al., 2010). For instance, findings from South Korea reported that younger students (aged 9-10 years) reported higher prevalence of disordered eating than older students (aged 12-13 years) (Yang et al., 2010).

Moreover, numerous studies showed that females were more likely to develop disordered eating as compared to males (Bilali et al., 2010; Ferreiro, Seoane, & Senra, 2012; Hadjigeorgiou, Tornaritis, Savva, Solea, & Kafatos, 2012; Musaiger et al., 2013). In addition, Ho et al. (2006) reported that Malay female children were more likely to develop disordered eating than Chinese female children in Singapore. Previous research found pubertal development increased the risk of disordered eating (Baker, Thornton, Lichtenstein, & Bulik, 2012; McNicholas, Dooley, McNamara, & Lennon, 2012; Mousa et al., 2010). Findings from Ireland reported that female children who are more matured was correlated with disordered eating (McNicholas et al., 2012).

Body weigh status is one of the hypothesized risk factor of disordered eating in current study. For instance, findings from Hong Kong conducted by Tam et al. (2007) found that overweight children were at higher risk to have disordered eating as compared to normal weight children. Goldschmidt, Aspen, Sinton, Tanofsky-Kraff, and Wilfley (2008) reported that childhood obesity is associated with an increased risk of disordered eating, weight concern, dieting and bingeing.

Psychological factors comprise of self-esteem, depression, health specific self-efficacy and body size satisfaction. Previous research reported that low self-esteem associated with increased risk of disordered eating (Ata et al., 2007; Fan et al., 2010; Rhea & Thatcher, 2013). Downs et al. (2007) reported that high levels of depression has been recognized as a risk factor for disordered eating among children. In addition, according to Bilali et al. (2010), body dissatisfaction was a risk factor for disordered eating among Greek children.

Socio-cultural factors encompass perceived pressure to lose weight, gain weight and increase muscle tone from parents, peers and media. Ata, Ludden, and Lally (2007) reported that children with disordered eating reported higher levels of pressures from peers and family to lose weight. In EAT Project (Eating Among Teens), Neumark-Sztainer et al. (2009) reported that reading magazines articles regarding weight loss was correlated with increased prevalence of disordered eating among children.

Behavioral factors cover meal skipping behaviors, snacking behaviors, frequency of fast food consumption, dietary intake and physical activity. A study by Chang et al. (2011) on Taiwanese female high school students indicated that caloric intake in students with disordered eating was significantly lower than students without disordered eating. Veses et al. (2014) in their AVENA and AFINOS studies found that

disordered eating was associated with medium and low levels of physical activity among children. Moreover, Stice et al. (2008) reported that meal skipping and obsessive exercise are recognized predictors of disordered eating.

Based on the literature review, the development of disordered eating is multifactorial; socio-demographic characteristics, pubertal development, body weight status, psychological factors, socio-cultural factors and behavioral factors are important contributing factors of disordered eating (Ata et al., 2007; Bilali et al., 2010; Downs et al., 2007; Lai et al., 2013; Lee et al., 2013; Tsai et al., 2011). In short, socio-demographic characteristics, pubertal development, body weight status, psychological factors, socio-cultural factors and behavioral factors were hypothesized as contributors to disordered eating among primary school children.

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