



UNIVERSITI PUTRA MALAYSIA

***FACTORS ASSOCIATED WITH BODY WEIGHT STATUS AMONG
SECONDARY SCHOOL CHILDREN IN HULU LANGAT DISTRICT,
SELANGOR, MALAYSIA***

NOR MAZNI BINTI IBRAHIM

FPSK(m) 2019 57



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SECONDARY SCHOOL CHILDREN IN HULU LANGAT DISTRICT,
SELANGOR, MALAYSIA**

By

NOR MAZNI BINTI IBRAHIM

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

January 2017

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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 BODY WEIGHT STATUS AMONG
SECONDARY SCHOOL STUDENTS IN HULU LANGAT DISTRICT,
SELANGOR, MALAYSIA**

By

NOR MAZNI BINTI IBRAHIM

January 2017

Chair : Zuriati binti Ibrahim, PhD
Faculty : Medicine and Health Sciences

This cross sectional study was conducted to determine the predictors of body weight status among secondary school students in Hulu Langat District of Selangor. A total of 455 adolescents from five secondary schools aged 13-16 years old were recruited through random cluster sampling. Socio-demographic status (age, gender, ethnicity, religion, parent's income) were collected. Dietary intakes were measured using a 24-hour diet recall and total energy and macronutrient were compared with Recommended Nutrient Intake (RNI) value. Body weight and height were measured and BMI-for-age was calculated. A set of self-administered questionnaires of Physical Activity Questionnaire for Adolescents (PAQ-A), Perceived Stress Scale (PSS), Perception of Teasing Scale (POTS), Secondary School Stressor Questionnaire (SSSQ), Parental Authority Questionnaire (PAQ), Rosenberg Self-Esteem Scale (RSE) and Children Depression Inventory (CDI) were used to measure physical activity, perceived stress, weight teasing, secondary school stressor, parenting style, self-esteem and depression respectively. The mean age of the subjects was 14.33 ± 1.23 years old in which the percentage of males and females was 50.3% and 49.7% respectively. More than half of the subjects were Malays (69.9%), followed by Chinese (17.1%), Indian (12.5%) and others (0.4%). Majority of the subjects (64.4%) having a normal body weight status, while 6.0% and 30% were severe thinness/thinness and overweight/obese respectively. Compared with RNI value, 92.3% (n=420) and 48.6% (n=221) of subjects had low total energy and protein intake respectively. Body weight status was only correlated with perceived stress ($r=-0.097$, $p=0.04$), weight teasing ($r=0.514$, $p<0.000$), academic related stressor ($r=-0.095$, $p=0.043$) and females adolescent's permissive parenting style ($r=-0.154$, $p=0.021$), however not significantly correlated with physical activity ($r=0.041$, $p=0.381$) and depression ($r=-0.030$, $p=0.527$). Meanwhile, there was a significant difference

in total energy ($t=4.555$, $p=0.000$), carbohydrate ($t=3.781$, $p=0.000$), protein ($t=3.846$, $p=0.000$) and fat intake ($t=4.153$, $p=0.000$) between overweight/obese and non-obese subjects. In addition, Stepwise Multiple Linear Regression (MLR) analysis was performed and results showed only age ($\beta=-0.153$, $p<0.05$), weight-related teasing ($\beta=0.113$, $p<0.05$) and carbohydrate intake ($\beta=-0.048$, $p<0.05$) significantly predict of body weight status, $R^2 = 0.749$, $\Delta R^2 = 0.746$, $F(4, 450) = 334.94$, $p<0.001$. In term of Logistic Regression (LR) analysis, only one factor that significantly predict body weight status which was weight-related teasing (high weight-related teasing: OR 0.12; 95% CI 0.07, 0.21). Thus, these findings can contribute for future intervention programmes among school-aged students in order to curb the overweight and obesity among adolescents.



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

**FAKTOR-FAKTOR YANG BERKAITAN DENGAN STATUS BERAT BADAN
DALAM KALANGAN PELAJAR SEKOLAH MENENGAH DI DAERAH HULU
LANGAT, SELANGOR, MALAYSIA**

Oleh

NOR MAZNI BINTI IBRAHIM

Januari 2017

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Kajian keratan rentas ini dijalankan untuk menentukan faktor peramal bagi status berat badan dalam kalangan pelajar sekolah menengah di daerah Hulu Langat di Selangor. Seramai 455 remaja daripada 5 buah sekolah yang berumur 13-16 tahun telah dipilih melalui persampelan kelompok rawak. Status sosio-demografi (umur, jantina, etnik, agama dan pendapatan ibu bapa) telah diambil. Pengambilan pemakanan telah diperolehi menggunakan satu hari ingatan diet 24-jam dan jumlah tenaga dan makronutrien telah dibandingkan dengan nilai Pengambilan Nutrien Disyorkan (RNI). Berat badan dan tinggi telah diukur dan BMI-for-age telah dikira. Satu set borang soal selidik sendiri yang terdiri daripada Physical Activity Questionnaire for Adolescents (PAQ-A), Perceived Stress Scale (PSS), Perception of Teasing Scale (POTS), Secondary School Stressor Questionnaire (SSSQ), Parental Authority Questionnaire (PAQ), Rosenberg Self-Esteem Scale (RSE) and Children Depression Inventory (CDI) telah digunakan untuk mengukur aktiviti fizikal, tahap stress, ejekan berat badan, stresor sekolah menengah, gaya keibubapaan, tahap keyakinan dan kemurungan. Min umur subjek adalah 14.33 ± 1.23 tahun yang mana peratusan lelaki dan perempuan masing-masing adalah 50.3% dan 49.7%. Lebih daripada separuh subjek terdiri daripada Melayu (69.9%), diikuti oleh Cina (17.1%), India (12.5%) dan lain-lain (0.4%). Majoriti subjek (64.4%) mempunyai status berat badan normal, manakala 6.0% dan 30% masing-masing mempunyai berat badan kurus teruk/kurus dan berlebihan berat badan/obes. Jika dibandingkan dengan nilai RNI, 92.3% (n=420) dan 48.6% (n=221) subjek masing-masing mempunyai jumlah pengambilan tenaga dan protin yang rendah. Status berat badan hanya berkorelasi dengan tahap stres ($r=-0.097$, $p=0.04$), ejekan berat badan ($r=0.514$, $p<0.000$), stresor berkenaan akademik ($r=-0.095$, $p=0.043$) dan gaya keibubapaan permisif bagi remaja perempuan ($r=-0.154$, $p=0.021$), walau bagaimanapun, tiada kolerasi yang signifikan diperolehi bagi aktiviti fizikal

($r=0.041$, $p=0.381$) dan depresi ($r=-0.030$, $p=0.527$). Sementara itu, terdapat perbedaan yang signifikan dalam jumlah pengambilan tenaga ($t=4.555$, $p=0.000$), karbohidrat ($t=3.781$, $p=0.000$), protein ($t=3.846$, $p=0.000$) dan lemak ($t=4.153$, $p=0.000$) antara subjek yang berlebihan berat badan/obes dan tidak obes. Tambahan pula, analisis Stepwise Multiple Linear Regression (MLR) telah dijalankan dan keputusan menunjukkan hanya umur ($\beta=-0.153$, $p<0.05$), ejekan berat badan ($\beta=0.113$, $p<0.05$) dan pengambilan karbohidrat ($\beta=-0.048$, $p<0.05$) secara signifikan meramalkan status berat badan, $R^2 = 0.749$, $\Delta R^2 = 0.746$, $F(4, 450) = 334.94$, $p<0.001$. Daripada segi analisis Logistic Regression (LR), hanya satu faktor sahaja yang secara signifikan meramalkan status berat badan iaitu ejekan berat badan (ejekan berat badan yang tinggi: OR 0.12; 95% CI 0.07, 0.21). Oleh itu, keputusan ini boleh menyumbang kepada program intervensi yang akan dilaksanakan pada masa akan datang dalam kalangan pelajar sekolah bagi membendung berat badan berlebihan dan obesiti dalam kalangan remaja.

ACKNOWLEDGEMENTS

In the name of Allah, the Most Gracious and the Most Merciful Alhamdulillah, all praises to Allah for His blessing and giving me strength in completing this study.

I would like to express my special appreciation to my supervisor, Dr. Zuriati binti Ibrahim for her constant guidance and supervision. Her endless support, comments and suggestion have contributed to the success of this thesis. My special thanks to my co-supervisor, Dr. Rosita Jamaluddin for her valuable advice and knowledge regarding to this thesis.

I would like to express my special thanks to all my friends especially Zaini, Aainaa Syarfa, Nuurul Ainaa, Aini, Sarah, Fatin Nasirah, Faizal and all my friends for their support and kindness that inspired me completing the study. Thanks for the invaluable friendship that we have created.

Last but not least, my deep gratitude to my mother, Ramlah Binti Mamat, my late father, Ibrahim Bin Jusoh and my brothers for their endless support, love, prayers and encouragement. Not forgetting, my husband, Mohd Shahidan Azlan Bin Zali for his love and care. Thank you also to those who indirectly contributed for the study.

Thank you very much!!

I certify that a Thesis Examination Committee has met on 19 Januari 2017 to conduct the final examination of Nor Mazni Binti Ibrahim on her thesis entitled “Factors Associated with Body Weight Status Among Secondary School Children in Hulu Langat District, 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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LIST OF ABBREVIATIONS

AMDR	Acceptable Macronutrient Distribution Ranges
ARS	Academic Related Stressor
BMI	Body mass index
BMR	Basal metabolic rate
CDI	Children Depression Inventory
CHD	Coronary heart disease
COMPASS	Combating Obesity in Māori and Pasifika Adolescent School-children Study
FFQ	Food frequency questionnaire
GSHS	Global School-based Health Survey
GSRs	Social Related Stressor
InterRS	Interpersonal Related Stressor
IntraRS	Intrapersonal Related Stressor
JPN	Jabatan Pendidikan Negeri
LTRS	Learning and Teaching Related Stressor
MHS	Mental Health Survey
MLR	Multiple linear regression
MSNS	Malaysian School-Based Nutrition Survey
PA	Physical activity
PAQ	Parental Authority Questionnaire
PAQ-A	Physical Activity Questionnaire for Adolescents PAQ
PAQ-C	Physical Activity Questionnaire for Old Children
PE	Physical education
POTS	Perception of Teasing Scale
PPD	<i>Pejabat Pendidikan Daerah</i>
PSS	Perceived Stress Scale
RNI	Recommended Nutrient Intake
RSE	Rosenberg Self-Esteem Scale
SAR	Subcutaneous abdominal adipose tissue
SES	Socioeconomic status
SSSM	Secondary School Stressor
TRS	Teacher Related Stressor
US	United States
VAT	Visceral adipose tissue
VIF	Variance inflation factor

CHAPTER 1

INTRODUCTION

1.1 Introduction

Obesity is the most common nutritional problem in both developing and developed countries. It is recognised as a major public health problem occurs in children and adolescents. Adolescence period is a crucial period for the development of nutritional problem. The problem will continuously happened in the period of adulthood and projecting risk of chronic diseases if no preventive measure taken (Story, Neumark- Sztainer, & French, 2002; Goran, Ball, & Cruz, 2003). Apart from their high nutrient requirements at this stage of life, the rising rates of obesity among children and adolescents need to be concerned (Ogden et al., 2006; Lee, Okumura, Davis, Herman, & Gurney, 2006). The development of nutritional problems experienced by young youth led to the increasing in the prevalence of overweight and obesity (de Onis et al., 2007).

In the United States (US), there was an increment in the prevalence of obesity among adolescents between 5% in 1976 to 18% in 2008 (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010). Almost 9 million of children and one-sixth of the adolescents (17%) were considered to be overweight (Bibbins-Domingo, Coxson, Pletcher, Lightwood, & Goldman, 2007). Even though the prevalence of obesity in all populations in most of the countries in Asia Pacific Region was relatively low across low, middle and high-income populations (Khambalia & Seen, 2010), however there is a rapid increasing in the prevalence of obesity among children and adolescents especially in Malaysia (Mohd Ismail et al., 2009; Reilly, 2006).

A study conducted by Moy, Gan, and Zaleha (2004) found that the prevalence of obesity among school children aged 7-16 years old in Kuala Lumpur was 7.3%. Apart from that, a national study showed that the prevalence of overweight children and adolescents age 18 years old and below was 5.4% (Ministry of Health Malaysia, 2008). Moreover, Institute of Public Health (unpublished IPH, MOH) reported the prevalence of obesity were 6.7%, 6.3% and 4.9% for the age groups of 5.0-9.9, 10.0- 14.9 and 15.0-17.9 years old respectively (Khor, 2012). Although the prevalence of overweight and obesity in Malaysia was relatively low as compared to western countries, it still requires concern due to the later life consequences on individual health.

As a consequence of increasing prevalence of obesity, adolescent who is overweight may begin to experience various weight-related illness in later life (Cheah et al., 2011). Several studies have reported that obesity at adolescence period is associated with serious medical problems, including cardiovascular disease (David, Mei, Srinivasan, Berenson, & Dietz, 2007), diabetes mellitus (Li, Ford, Zhao, & Mokdad, 2009), high blood pressure, coronary heart disease (Stice, Presnell, Shaw, & Rohde, 2005), breast cancer (Kushi et al., 2012), bone and joint problems and sleep apnoea. In addition, an obese adolescent is at risk of having social and psychological problems such as weight teasing, bullying and low self-esteem (Jackson, 2009; Daniels et al., 2005). Apart from the medical problems, an obese adolescent has the potential of having psychological and emotional consequences (Cheah et al., 2011). Childhood, particularly adolescent who had an excessive weight had the higher possibility to become an obese person in adulthood life (Guo, Wu, Chumlea, & Roche, 2002).

The identification of the determinants or contributing factors to obesity is very crucial in order to prevent and reduce the occurrence of health complications in later life. The risk factors of obesity include several factors that related to the accumulation of adipose tissue, such as money, time, lifestyle, dietary practices of the individuals, and the availability of food acquisition (Khor, 2012). In addition, increasing urbanisation and the globalisation of food markets are found to be the contributing factors of obesity (Abu Baker & Daradkeh, 2010). The dietary patterns shifted to energy dense foods which are high in fat, salt and sugar (National Heart Lung and Blood Institute, 2010). In Malaysia, due to improvement and progression in the food system, there is an increased in food availability, which contribute to the consumption of varieties of foods that are high in sugar (Lipoeto, Geok Lin, & Angeles-Agdeppa, 2013). In line with the current progression in food system, the food choices and dietary intake of adolescents also have changed (Aounallah-Skhiri et al., 2011).

In addition, behavioural factors also contribute to the increasing in the prevalence of obesity. Obese adolescents are more likely to be physically inactive, in which they spend less time on sports, playing games and so on during their free time (Aeberli, Kaspar, & Zimmermann, 2007). Apart from being physically inactive, psychosocial factors play a role in the increasing prevalence of obesity among adolescents (Nieman & Leblanc, 2012). Youth who experienced stressful events, depressive and low self-esteem have a higher tendency to become overweight and obese (Gunstad et al., 2006; Danielsen et al., 2012; Loke, 2002). Besides that, previous study found that parents who have controlled too much over their children's eating habits have contributed to the development of childhood overweight and obesity (Van Strien, van Niekerk, & Ouwens, 2009). Thus, understanding these multidimensional factors related to overweight and obesity is crucial to address the public health problems among adolescents.

1.2 Statements of problem

Currently, obesity has become a prominent and leading public health concern worldwide in which the number of children and adolescents who are overweight or obese is alarmingly high (Rivera et al., 2013). Based on the identified factors, multiple approaches and recommendations were suggested by physicians for treatment of children and adolescents who are overweight and obese. Generally, the factors contributed to weight gain included imbalance between energy intake and expenditure, sedentary lifestyle and physically inactive (Spear et al., 2007). However, these findings are not the eventual findings. This is because previous studies revealed that either energy intake or energy expenditure as well as physically inactive were not the primary determinants of adolescent obesity (Aeberli, Kaspar, & Zimmermann, 2007; Adams, 2006; Lagiou & Parava, 2008). Therefore, more research are needed to determine the relative contribution of nutritional components as well as physical activity on the obesity among adolescents.

Furthermore, the emergence of knowledge pertaining to psychosocial factors may contribute to the complexity of the obesity epidemic (Nieman & Leblanc, 2012). Children and adolescents are considered as the potential groups to experiencing physical and mental health implications due to psychosocial stressor exposure (Gundersen, Mahatmya, Garasky, & Lohman, 2011). Stress and depression were contributed to increment of body weight. Stress is defined as a process of adaptation in response to the challenge either physical or psychological challenge, meanwhile depression is a feeling of sad that can interfere the daily life (Kim et al., 2009; Health National Institute of Mental, 2011). There is a need to study both variables because of contribution to body weight status. Psychosocial stressor (stressful life events) and less social support were identified as the components that may contribute to the increment in the probability of being overweight or obese in adolescents (Lohman, Stewart, Gundersen, Garasky, & Eisenmann, 2009; Mackenbach, Simon, Looman, & Joung, 2002; Martikainen, Bartley, & Lahelma, 2002). Parenting style which is one of the components in the psychosocial factors also plays an important key role towards increasing prevalence of obesity. Parenting style may influence children's daily activities, eating habits, emotional functioning, and ultimately the risk of being overweight among them (Rhee, Lumeng, Appugliese, Kaciroti, & Bradley, 2006; Jackson, 2009). Therefore, the link between psychosocial factors and obesity should not be neglected.

Eventhough there were many western studies examining the psychosocial stressor and physical health implications, studies on psychosocial stressor and obesity in Asia particularly in Malaysia are still scarce. In addition, there is very limited published data pertaining to the association between parenting style and obesity in the Malaysia context. Nutritional components and behavioural factor such as physical activity among adolescents need to be further investigated due to the rapid changes in food development and organisation. More information is needed in order to improve nutritional status among

adolescents. Thus, understanding the factors contributed to obesity is crucially required in order to provide effective intervention for overweight and obese youths.

Hence, this study aimed to ascertain the determinants of body weight status among secondary school students. In attempt to this study, the following research questions are addressed:

- i. What are the socio-demographic status, dietary intake, physical activity, psychosocial factors and body weight status of adolescents in Hulu Langat District?
- ii. Is there any significant difference in term of socio-demographic status, dietary intake, physical activity, parenting style, secondary school stressor and body weight status between male and female respondents?
- iii. Is there any significant difference in term of socio-demographic status, dietary intake, physical activity, psychosocial factors and body weight status between non-obese and overweight/obese respondents?
- iv. Is there any association between socio-demographic status, dietary intake, physical activity, psychosocial factors and body weight status among adolescents?
- v. Is there any significant contributions of socio-demographic status, dietary intake, physical activity, psychosocial factors on the body weight status among adolescents?

1.3 Objectives

1.3.1 General Objective

To determine factors associated with body weight status among adolescents in Hulu Langat District, Selangor.

1.3.2 Specific objectives

- i. To determine socio-demographic status, dietary intake, physical activity, psychosocial factors and body weight status among adolescents.
- ii. To determine significant difference in term of socio-demographic status, dietary intake, physical activity, parenting style, secondary school stressor and body weight status between male and female respondents.
- iii. To determine significant difference in term of socio-demographic status, dietary intake, physical activity, psychosocial factors and body weight status between non-obese and overweight/obese respondents.

- iv. To determine the association between socio-demographic status, dietary intake, physical activity and psychosocial factors with body weight status among adolescents.
- v. To determine the contribution of socio-demographic status, dietary intake, physical activity, psychosocial factors on body weight status among adolescents.

1.4 Null hypotheses

- i. There is no significant difference in term of socio-demographic status, dietary intake, physical activity, parenting style, secondary school stressor and body weight status between male and female respondents
- ii. There is no significant difference in term of socio-demographic status, dietary intake, physical activity, psychosocial factors and body weight status between non-obese and overweight/obese respondents
- iii. There are no significant associations between socio demographic status, dietary intake, physical activity, psychosocial factors with body weight status among adolescents
- iv. There is no significant contribution of socio-demographic status, dietary intake, physical activity and psychosocial factors on body weight status.

1.5 Conceptual framework

The Six-Cs ecological model (Harrison & Bost, 2011) was used as the theoretical framework for this study. It serves as a guidance to examine the potential risk factors of socio-demographic status, dietary intake, physical activity and psychosocial factors on body weight status among secondary school students. The model has six- spheres embedded together in a big sphere. The model highlights that childhood body weight status is depending on five spheres of environmental influences (child, clan, community, country and culture) and one sphere of genetic influence (cell) (Figure 1.1) (Harrison & Bost, 2011). In this model, it illustrates that child's body weight status is not only influenced by the dietary intake but also have influenced by family, community, country as well as the culture since it embeds within one ecology sphere (Harrison & Bost, 2011). There are numerous of contributing factors associated with body weight status. However, this current study only focusing on selected level and variables in the ecological model because of limitation of time and cost.

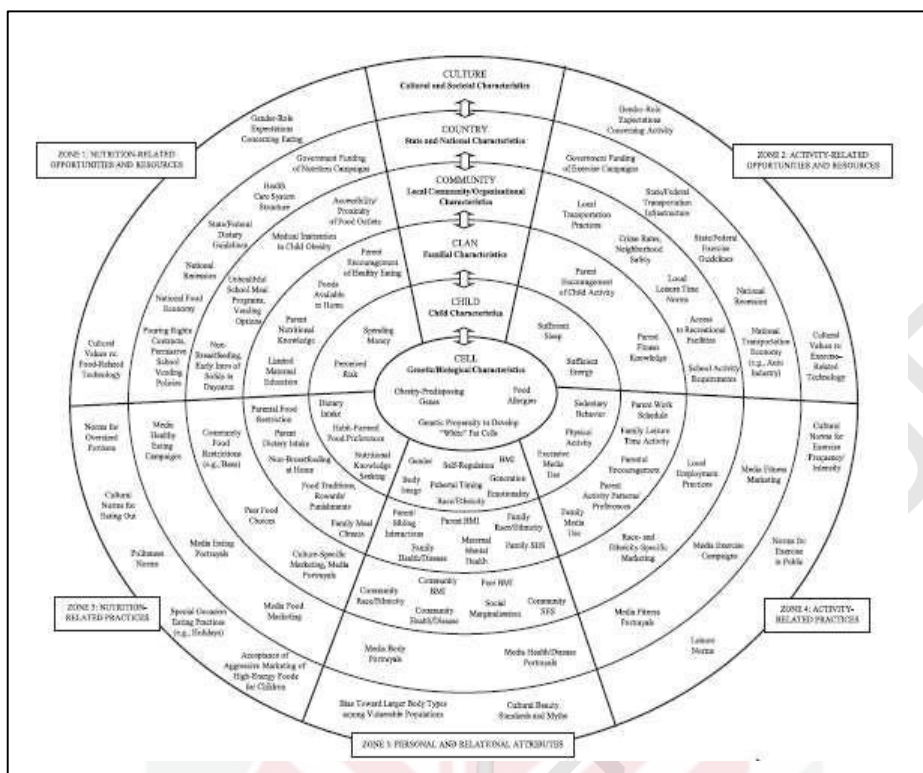


Figure 1.1: The Six-Cs developmental ecological model of determinants of overweight and obesity. (Source: Harrison & Bost, 2011).

Thus, as adapted from the theoretical framework from Harrison and Bost (2011), Figure 1.2 shows potential risk factors or determinants that are associated with body weight status (BMI-for-age) among adolescents. In this current study, body weight status among adolescents is expected to be affected by various factors including socio-demographic status, dietary intake, physical activity and psychosocial factors. Socio-demographic status consisted of age, socioeconomic status (SES), gender, ethnicity (McLaren, 2007; Naidu et al., 2013; Zalilah et al., 2006), household size (Tesfalem, Singh, & Debebe, 2013) and parental education level (Oh et al., 2011; Yen et al., 2010).

Physical activity and dietary intake which accounted for total energy, carbohydrate, protein and fat intakes were also assessed in this study (Chee, Roseline Yap, & Siti Sabariah, 2008; Zalilah, Khor, Miralini, Norimah, & Ang, 2006; Aeberli, Kaspar, & Zimmermann, 2007). Also, psychosocial factors consisted of self-esteem, depression (Bjornelv, Nordahl, & Holmen, 2011a), perceived stress (van Jaarsveld, Fidler, Steptoe, Boniface, & Wardle, 2009), weight teasing (Gan, Mohd Nasir, Zalilah, & Hazizi, 2011), parenting style (Rhee et al., 2006) and stressor (Falkner et al., 2001) were included in the study.

In summary, the proposed conceptual framework was developed to determine the four main potential risk factors (socio-demographic status, physical activity, dietary intake and psychosocial factors) that influence the body weight status of adolescents.



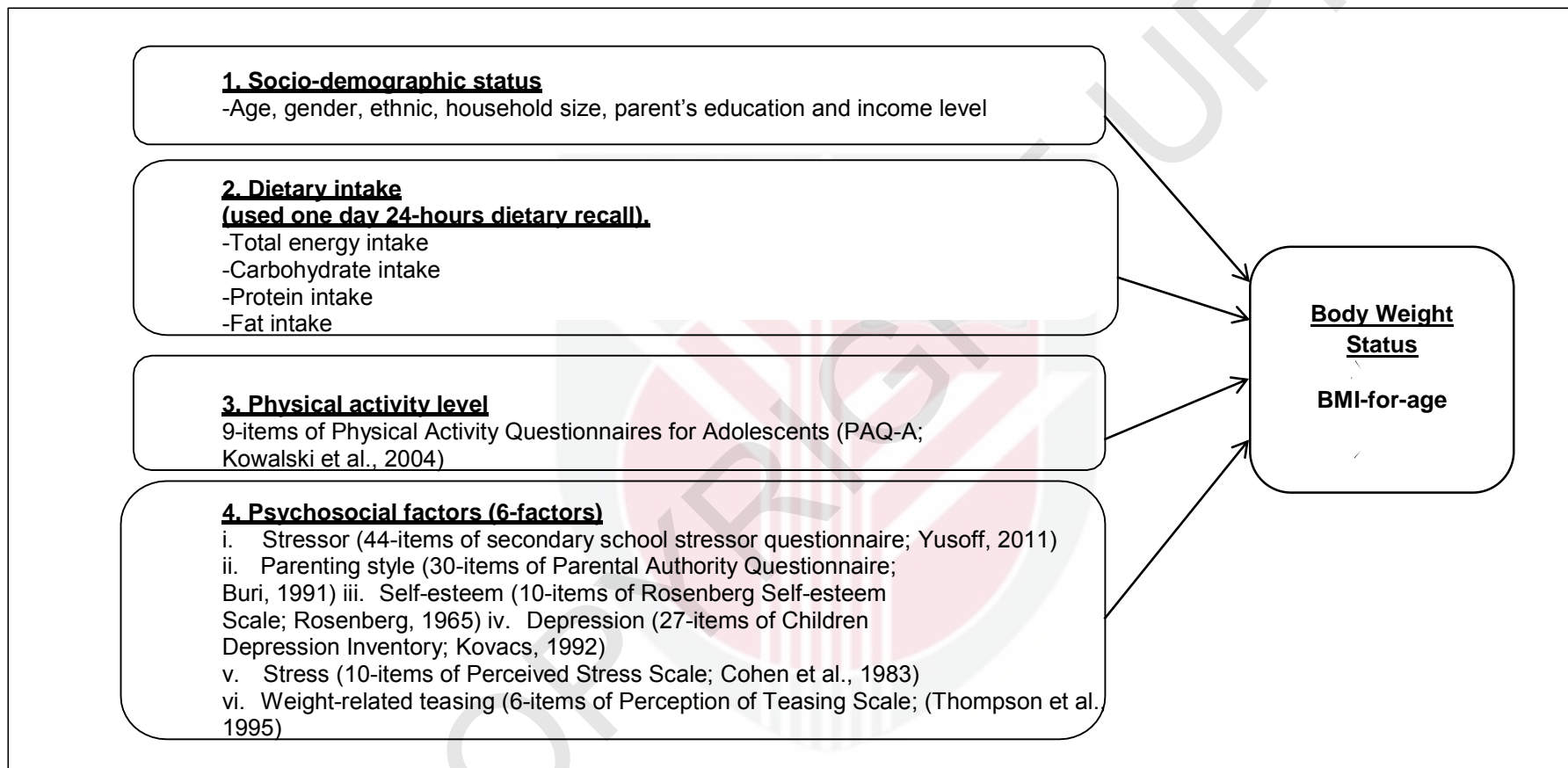


Figure 1.2: Conceptual framework of the study

1.6 Significance of the study

Obesity is linked with an adverse nutritional and health related problems in all age groups including adolescents. By determining the potential factors associated with increasing prevalence of overweight and obesity, it will provide a better understanding of the cause of the problem. The findings from this study will contribute to the body of knowledge in nutrition related to body weight status among adolescents in Malaysia.

In addition, the findings on overweight and obesity obtained from this study can serve as a baseline data for future research to determine prevalence and other predicting factors to obesity. It will also contribute to the development of appropriate intervention programs to reduce obesity related diseases in the future.

The rising rate of overweight and obesity may elevate the cost of healthcare. Hence, the identification of the potential risk factors for obesity may help in the prevention of the obesity as early as possible. It is important in order to reduce the cost to treat the complications from the obesity problems. Also, early prevention of the obesity will improve the quality of life of the individuals.

1.7 Conceptual and operational definition

1.7.1 Socio demographic status (SES)

SES is one of the crucial factors that has been identified related to obesity. SES for the children and adolescent can be measure by their parental marital status, income, occupation and education level (Knai, Lobstein, Darmon, Rutter, & McKee, 2012). The socio-demographic status of interest for this study was parental income, occupation and education level of the respondents.

1.7.2 Dietary intake

Dietary intake is estimation of food intake using several methods either assessed by subjective or objectives observation (Shim, Oh, & Kim, 2014; Johnson, 2002). For the current study, dietary intake operationally defined as all food and beverages consumed within 24 hour period; using 24-hour diet recall to assess current nutrient intake. Only total intake of energy, carbohydrate, protein and fat were analysed.

1.7.3 Physical activity

Physical activity is defined as any bodily movement produced by skeletal muscles that requires energy expenditure (WHO, 2017). For the current study, physical activity was operationalised using Physical Activity Questionnaire for Adolescents (PAQ-A) developed by Kowalski, Crocker and Donen (2004) for assessing physical activity (leisure time, physical education, lunch, after school, evening activities).

1.7.4 Stressor

Stressor is defined as possible sources of stress that can develop from employment, social strain and schooling (Yusoff et. al. 2011). For the current study, stressor of the respondents were operationalised using Secondary School Stressor (SSSM) developed by Yusoff et al. (2011). It was grouped into 6 domains consisted of Academic Related Stressor, Interpersonal Related Stressor, Intrapersonal Related Stressor, Learning and Teaching Related Stressor, Social Related Stressor and Teacher Related Stressor.

1.7.5 Parenting style

Parenting style is described as a characteristic of the parent that is stable over time and constitutes the environmental and emotional context for child-rearing and socialization and categorised into four parenting style: authoritative, authoritarian, permissive, and neglectful (Strauss & Pollack, 2001; Darling, 1993) For the current study, parenting style were operationalised using Parental Authority Questionnaire (PAQ) developed by Buri (1991) by measuring three parenting style (permissive, authoritative and authoritarian).

1.7.6 Self-esteem

Self-esteem is the judgement a worth and the feelings of individual towards themselves (Rosenberg, 1965a). For the current study, self-esteem was operationalised using self-reporting questionnaire in a 4-point Likert scale which is Rosenberg Self-esteem Scale (Rosenberg, 1965a).

1.7.7 Depression

Depression is a feeling of sad that can interfere the daily life (Health National Institute of Mental, 2011). For the current study, depression was operationalised using a self-report questionnaire, Children Depression

Inventory (CDI) for assessing symptoms of depression last two weeks among children and adolescents (Kovac, 1992).

1.7.8 Stress

Stress is defined as a process of adaptation in response to the challenge either physical or psychological challenges (Kim et al., 2009). For the current study, stress was operationalised using a self-report questionnaire, Perceived Stress Scale in which to assess stress response of the subject last one month (Cohen, Kamarck, & Mermelstein, 1983).

1.7.9 Weight Teasing

Teasing has been defined as a personal communication from agent to a target that combines elements of humour, aggression or ambiguity (Shapiro, Baumeister, & Kessler, 1991). Weight teasing commonly happened to overweight children and adolescents (Eisenbergh, Neumark-Sztainer, Story, 2003). For the current study, weight teasing was operationalised using a self-report questionnaire, Perception of Teasing Scale (POTS; Thompson, Cattarin, Fowler, & Fisher, 1995).

REFERENCES

- Abu Baker, N. N., & Daradkeh, S. M. (2010). Prevalence of overweight and obesity among adolescents in Irbid governorate, Jordan. *Eastern Mediterranean Health Journal*, 16(6), 657–662
- Adair, L. S., & Popkin, B. M. (2005). Are child eating patterns being transformed globally? *Obesity Research*, 13, 1281–1299. doi:10.1038/oby.2005.153
- Adams, J. (2006). Trends in physical activity and inactivity amongst US 14-18 year olds by gender, school grade and race, 1993-2003: evidence from the youth risk behavior survey. *Bio Med Central Public Health*, 6, 57. doi:10.1186/1471-2458-6-57
- Adam, T. C., & Epel, E. S. (2007). Stress, eating and the reward system. *Physiology Behaviour*, 91(4), 449-458
- Adeniyi, A. F., Okafor, N. C., & Adeniyi, C. Y. (2011). Depression and physical activity in a sample of nigerian adolescents: levels, relationships and predictors. *Child and Adolescent Psychiatry and Mental Health*, 5, 16. doi:10.1186/1753-2000-5-16
- Adesina, A. F., Peterside, O., Anochie, I., & Akani, N. A. (2012). Weight status of adolescents in secondary schools in port Harcourt using Body Mass Index (BMI). *Italian Journal of Pediatrics*, 38(1), 31. doi:10.1186/1824-7288-38-31
- Adlina, S., Suthahar, A., Ramli, M., Edariah, A. B., Soe, S. A., Mohd Ariff, F., ... Karuthan, C. (2007). Pilot study on depression among secondary school students in Selangor. *The Medical Journal of Malaysia*, 62, 218–222
- Aeberli, I., Kaspar, M., & Zimmermann, M. B. (2007). Dietary intake and physical activity of normal weight and overweight 6 to 14 year old Swiss children. *Swiss Medical Weekly: Official Journal of the Swiss Society of Infectious Diseases, the Swiss Society of Internal Medicine, the Swiss Society of Pneumology*, 137,424–430. doi:2007/29/smw-11696
- Alberga, A. S., Medd, E. R., Adamo, K. B., Goldfield, G. S., Prud'homme, D., Kenny, G. P., & Sigal, R. J. (2013). Top 10 practical lessons learned from physical activity interventions in overweight and obese children and adolescents. *Applied Physiology, Nutrition, and Metabolism*, 38, 249–258. doi:10.1139/apnm-2012-0227
- Aldaql, S. M., & Sehlo, M. G. (2013). Self-esteem and quality of life in adolescents with extreme obesity in Saudi Arabia: The effect of weight loss after laparoscopic sleeve gastrectomy. *General Hospital Psychiatry*, 35, 259–264. doi:10.1016/j.genhosppsych.2012.12.011

- Al-Dubai, S. A. R., Alshagga, M. A., Rampal, K. G., & Sulaiman, N. A. (2012). Factor Structure and Reliability of the Malay Version of the Perceived Stress Scale among Malaysian Medical Students. *The Malaysian Journal of Medical Sciences*, 19, 43–9. Retrieved from <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3684234&to=pmcentrez&rendertype=abstract>
- Alvani, R. S. (2011). The Effect of Obesity on Self-Esteem among Pre University Iranian Students in Kashan City of Iran April 2009. *European Journal of Social Sciences*, 24(1).
- Andegiorgish, A. K., Wang, J., Zhang, X., Liu, X., & Zhu, H. (2012). Prevalence of overweight, obesity, and associated risk factors among school children and adolescents in Tianjin, China. *European Journal of Pediatrics*, 171, 697–703. doi:10.1007/s00431-011-1636-x
- Anderson, D. A., Shapiro, J. R., & Lundgren, J. D. (2003). The freshman year of college as a critical period for weight gain: An initial evaluation. *Eating Behaviors*, 4, 363–367. doi:10.1016/S1471-0153(03)00030-8
- Anderson, S. E., Cohen, P., Naumova, E. N., & Must, A. (2006). Association of depression and anxiety disorders with weight change in a prospective community-based study of children followed up into adulthood. *Archives of Pediatrics & Adolescent Medicine*, 160, 285–291. doi:10.1001/archpedi.160.3.285
- Anderson, S. E., Dallal, G. E., & Must, A. (2003). Relative Weight and Race Influence Average Age at Menarche: Results From Two Nationally Representative Surveys of US Girls Studied 25 Years Apart. *Pediatrics*, 111(4), 844–850. doi:10.1542/peds.111.4.844
- Aounallah-Skhiri, H., Traissac, P., El Ati, J., Eymard-Duvernay, S., Landais, E., Achour, N., ... Maire, B. (2011). Nutrition transition among adolescents of a south-Mediterranean country: dietary patterns, association with socio-economic factors, overweight and blood pressure. A cross-sectional study in Tunisia. *Nutrition Journal*, 10(1), 38. doi:10.1186/1475-2891-10-38
- Bachman, J. G., O'Malley, P. M., Freedman-Doan, P., Trzesniewski, K. H., & Donnellan, M. B. (2011). Adolescent Self-esteem: Differences by Race/Ethnicity, Gender, and Age. *Self and Identity*. doi:10.1080/15298861003794538
- Baharudin, A., Zainuddin, A. A., Manickam, M. A., Ambak, R., Hasnan Amad, M., Balkish Mahadir Naidu, S. M. C., ... Ahmad, N. A. (2014). Factors Associated With Physical Inactivity Among School-Going Adolescents: Data From the Malaysian School-Based Nutrition Survey 2012. *Asia-Pacific Journal of Public Health*, 26(5S), 27S–35S.
- Baker, J. L., Olsen, L. W., Sørensen, T. I. A., & Sorensen, T. I. (2007). Childhood body-mass index and the risk of coronary heart disease in adulthood. *The New English Journal Medicine*, 357, 2329–2337. doi:357/23/2329 [pii]n10.1056/NEJMoa072515
- Baltrus, P. T., Lynch, J. W., Everson-Rose, S., Raghunathan, T. E., & Kaplan, G. A. (2005). Race/ethnicity, life-course socioeconomic position, and body weight trajectories over 34 years: The Alameda County Study. *American Journal of Public Health*, 95, 1595–1601. doi:10.2105/AJPH.2004.046292

- Baumrind, D. (1971). Current patterns of parental authority. *Developmental Psychology*. doi:10.1037/h0030372
- Bell, J. F., Zimmerman, F. J., Arterburn, D. E., & Maciejewski, M. L. (2011). Health-care expenditures of overweight and obese males and females in the medical expenditures panel survey by age cohort. *Obesity (Silver Spring, Md.)*, *19*, 228–232. doi:10.1038/oby.2010.104
- Benson, L. P., Williams, R. J., & Novick, M. B. (2012). Pediatric Obesity and Depression: A Cross-sectional Analysis of Absolute BMI as It Relates to Children's Depression Index Scores in Obese 7- to 17-Year-Old Children. *Clinical Pediatrics*. doi:10.1177/0009922812459949
- Berenson, G. S. (2012). Health Consequences of Obesity. *Pediatric Blood and Cancer*. doi:10.1002/pbc.23373
- Berge, J. M., Wall, M., Loth, K., & Neumark-Sztainer, D. (2010). Parenting Style as a Predictor of Adolescent Weight and Weight-Related Behaviors. *Journal of Adolescent Health*, *46*, 331–338. doi:10.1016/j.jadohealth.2009.08.004
- Bibbins-Domingo, K., Coxson, P., Pletcher, M. J., Lightwood, J., & Goldman, L. (2007). Adolescent overweight and future adult coronary heart disease. *The New England Journal of Medicine*, *357*, 2371–2379. doi:10.1056/NEJMsa073166
- Bidad, K., Anari, S., & Tavasoli, S. (2008). Dietary intakes of adolescent girls in relation to weight status. *Iranian Journal of ...*, *37*(1), 114–118. Retrieved from <http://journals.tums.ac.ir/abs/6094>
- Biro, F. M., McMahon, R. P., Striegel-Moore, R., Crawford, P. B., Obarzanek, E., Morrison, J. A., ... Falkner, F. (2001). Impact of timing of pubertal maturation on growth in black and white female adolescents: The National Heart, Lung, and Blood Institute Growth and Health Study. *The Journal of Pediatrics*, *138*(5), 636–643. doi:10.1067/mpd.2001.114476
- Biro, F. M., Striegel-Moore, R. H., Franko, D. L., Padgett, J., & Bean, J. A. (2006). Self-Esteem in Adolescent Females. *Journal of Adolescent Health*, *39*, 501–507. doi:10.1016/j.jadohealth.2006.03.010
- Bish, C. L., Blanck, H. M., Serdula, M. K., Marcus, M., Kohl, H. W., & Khan, L. K. (2005). Diet and physical activity behaviors among Americans trying to lose weight: 2000 Behavioral Risk Factor Surveillance System. *Obesity Research*, *13*, 596–607. doi:10.1038/oby.2005.64
- Björge, T., Engeland, A., Tverdal, A., & Smith, G. D. (2008). Body mass index in adolescence in relation to cause-specific mortality: A follow-up of 230,000 Norwegian adolescents. *American Journal of Epidemiology*, *168*, 30–37. doi:10.1093/aje/kwn096
- Björge, T., Tretli, S., & Engeland, A. (2004). Relation of height and body mass index to renal cell carcinoma in two million Norwegian men and women. *American Journal of Epidemiology*, *160*, 1168–1176. doi:10.1093/aje/
- Bjornelv, S., Nordahl, H. M., & Holmen, T. L. (2011a). Psychological factors and weight problems in adolescents. The role of eating problems, emotional problems, and personality traits: the Young-HUNT study.

- Social Psychiatry and Psychiatric Epidemiology*, 46, 353–362. doi:10.1007/s00127-010-0197-z
- Bjorneliv, S., Nordahl, H. M., & Holmen, T. L. (2011b). Psychological factors and weight problems in adolescents. The role of eating problems, emotional problems, and personality traits: the Young-HUNT study. *Social Psychiatry and Psychiatric Epidemiology*, 46(5), 353–62. doi:10.1007/s00127-010-0197-z
- Blundell, J. E., Goodson, S., & Halford J. C. G. (2001). Regulation of appetite: role of leptin in signalling systems for drive and satiety. *International Journal of Obesity*, 25(1), S29-S34
- Bose, M., Oliván, B., & Laferrère, B. (2009). Stress and obesity: the role of the hypothalamic-pituitary-adrenal axis in metabolic disease. *Current Opinion in Endocrinology, Diabetes, and Obesity*, 16, 340–346. doi:10.1097/MED.0b013e32832fa137
- Briefel, R. R., & Johnson, C. L. (2004). Secular trends in dietary intake in the United States. *Annual Review of Nutrition*, 24, 401–431. doi:10.1146/annurev.nutr.23.011702.073349
- Buri, J. R. (1991). Parental authority questionnaire. *Journal of Personality Assessment*, 57, 110–119. doi:10.1207/s15327752jpa5701_13
- Butte, N. F., Puyau, M. R., Adolph, A. L., Vohra, F. A., & Zakeri, I. (2007). Physical activity in nonoverweight and overweight hispanic children and adolescents. *Medicine and Science in Sports and Exercise*, 39, 1257–1266. doi:10.1249/mss.0b013e3180621fb6
- Calvez, J., Fromentin, G., Nadkarni, N., Darcel, N., Even, P., Tomé, D., ... Chaumontet, C. (2011). Inhibition of food intake induced by acute stress in rats is due to satiation effects. *Physiology and Behavior*, 104, 675–683. doi:10.1016/j.physbeh.2011.07.012
- Cartwright, M., Wardle, J., Steggle, N., Simon, A. E., Croker, H., & Jarvis, M. J. (2003). Stress and dietary practices in adolescents. *Health Psychology: Official Journal of the Division of Health Psychology, American Psychological Association*, 22, 362–369. doi:10.1037/0278-6133.22.4.362
- Chay, O. M., Goh, A., Abisheganaden, J., Tang, J., Lim, W. H., Chan, Y. H., ... Machin, D. (2000). Obstructive sleep apnea syndrome in obese Singapore children. *Pediatric Pulmonology*, 29, 284–290. doi:10.1002/(SICI)1099-0496(200004)29:4<284::AID-PPUL8>3.0.CO;2-D
- Cheah, W. L., Chang, C. T., Rosalia, S., Charles, L. D., Yii, S. L., Tiong, P. H., & Yeap, K. P. (2011). The Relationship between Media Use and Body Mass Index among Secondary Students in Kuching South City, Sarawak, Malaysia. *The Malaysian Journal of Medical Sciences*, 18, 33–42. Retrieved from <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3216231&to=pmc&entrez&rendertype=abstract>
- Chee, Y. F., Roseline Yap, W. K., & Siti Sabariah, B. (2008). Weight Status and Dietary Intake among Female Children and Adolescents Aged 6-17 Years in a Welfare Home, Kuala Lumpur. *Malaysian Journal of*

- Nutrition*, 14(1), 79–89. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/22691766>
- Chen, L. J., Fox, K. R., Haase, A., & Wang, J. M. (2006). Obesity, fitness and health in Taiwanese children and adolescents. *European Journal of Clinical Nutrition*, 60, 1367–1375. doi:10.1038/sj.ejcn.1602466
- Chin, Y. S., Taib, M. N. M., Shariff, Z. M., & Khor, G. L. (2008). Development of multi-dimensional body image scale for Malaysian female adolescents. *Nutrition Research and Practice*, 2, 85–92. doi:10.4162/nrp.2008.2.2.85
- Chor, D., Faerstein, E., Kaplan, G. A., Lynch, J. W., & Lopes, C. S. (2004). Association of weight change with ethnicity and life course socioeconomic position among Brazilian civil servants. *International Journal of Epidemiology*, 33, 100–106. doi:10.1093/ije/dyg277
- Cohen, J. I. (2000). Stress and mental health: a biobehavioral perspective. *Issues in Mental Health Nursing*, 21, 185–202. doi:10.1080/016128400248185
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health Social Behavior*, 24(385-396).
- Collins, A. E., Pakiz, B., & Rock, C. L. (2008). Factors associated with obesity in Indonesian adolescents. *International Journal of Pediatric Obesity: IJPO: An Official Journal of the International Association for the Study of Obesity*, 3, 58–64. doi:10.1080/17477160701520132
- Collins, C. E., Watson, J., & Burrows, T. (2010). Measuring dietary intake in children and adolescents in the context of overweight and obesity. *International Journal of Obesity*, 34, 1103–1115. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0-77954657544&partnerID=40&md5=21c69d878abefe8e67567daeed25200>
- Crouch, P., O'Dea, J. a., & Battisti, R. (2007). Child feeding practices and perceptions of childhood overweight and childhood obesity risk among mothers of preschool children. *Nutrition & Dietetics*, 64, 151–158. doi:10.1111/j.1747-0080.2007.00180.x
- Cui, Z., & Dibley, M. J. (2012). Trends in dietary energy, fat, carbohydrate and protein intake in Chinese children and adolescents from 1991 to 2009. *The British Journal of Nutrition*, 108, 1292–9. doi:10.1017/S0007114511006891
- Dabelea, D., Bell, R. A., D'Agostino, R. B., Imperatore, G., Johansen, J. M., Linder, B., ... Waitzfelder, B. (2007). Incidence of diabetes in youth in the United States. *JAMA: The Journal of the American Medical Association*, 297, 2716–2724. doi:10.1001/jama.297.24.2716
- Dan, S. P., Mohd Nasir, M. T., & Zalilah, M. S. (2011). Determination of factors associated with physical activity levels among adolescents attending school in Kuantan, Malaysia. *Malaysian Journal of Nutrition*, 17, 175–187.
- Daniels, S. R., Arnett, D. K., Eckel, R. H., Gidding, S. S., Hayman, L. L., Kumanyika, S., ... Williams, C. L. (2005). Overweight in children and adolescents: Pathophysiology, consequences, prevention, and treatment. *Circulation*. doi:10.1161/01.CIR.0000161369.71722.10

- Danielsen, Y. S., Stormark, K. M., Nordhus, I. H., Mæhle, M., Sand, L., Ekornås, B., & Pallesen, S. (2012). Factors associated with low self esteem in children with overweight. *Obesity Facts*, 5, 722–733. doi:10.1159/000338333
- Darling, N., & Steinberg, L. (1993). Parenting style as context: An integrative model. *Psychological Bulletin*. doi:10.1037/0033-2909.113.3.487
- de Gouw, L., Klepp, K.-I., Vignerová, J., Lien, N., Steenhuis, I. H. M., & Wind, M. (2010). Associations between diet and (in)activity behaviours with overweight and obesity among 10-18-year-old Czech Republic adolescents. *Public Health Nutrition*, 13, 1701–1707. doi:10.1017/S1368980010002259
- de Onis, M., Onyango, A. W., Borghi, E., Siyam, A., Nishida, C., & Siekmann, J. (2007). Development of a WHO growth reference for school-aged children and adolescents. *Bulletin of the World Health Organization*, 85, 660–667. doi:10.2471/BLT.07.043497
- De Vriendt, T., Clays, E., Maes, L., De Bourdeaudhuij, I., Vicente-Rodriguez, G., Moreno, L. A., ... De Henauw, S. (2012). European adolescents' level of perceived stress and its relationship with body adiposity - The HELENA Study. *European Journal of Public Health*, 22, 519–524. doi:10.1093/eurpub/ckr134
- Delinsky, S. S., & Wilson, G. T. (2008). Weight gain, dietary restraint, and disordered eating in the freshman year of college. *Eating Behaviors*, 9, 82–90. doi:10.1016/j.eatbeh.2007.06.001
- Denzer, C., Weibel, A., Muche, R., Karges, B., Sorgo, W., & Wabitsch, M. (2007). Pubertal development in obese children and adolescents. *International Journal of Obesity* (2005), 31(10), 1509–19. doi:10.1038/sj.ijo.0803691
- Donoho, C. J., Weigensberg, M. J., Emken, B. A., Hsu, J.-W., & Spruijt-Metz, D. (2011). Stress and abdominal fat: preliminary evidence of moderation by the cortisol awakening response in Hispanic peripubertal girls. *Obesity (Silver Spring, Md.)*, 19, 946–952. doi:10.1038/oby.2010.287
- Drewnowski, A., & Specter, S. E. (2004). Poverty and obesity: The role of energy density and energy costs. *American Journal of Clinical Nutrition*. doi:10.1038/nrg1178
- Eisenberg, M. E., Neumark-Sztainer, D., & Story, M. (2003). Associations of weight-based teasing and emotional well-being among adolescents. *Archives of Pediatrics & Adolescent Medicine*, 157, 733–738. doi:10.1016/S1054-139X(02)00610-9
- Ekpanyaskul, C., Sithisarankul, P., & Wattanasirichaigoon, S. (2011). Overweight/Obesity and Related Factors Among Thai Medical Students. *Asia-Pacific Journal of Public Health*. doi:10.1177/1010539511428665
- Engeland, A., Tretli, S., & Bjørge, T. (2003). Height, body mass index, and ovarian cancer: a follow-up of 1.1 million Norwegian women. *Journal of the National Cancer Institute*, 95, 1244–1248. doi:10.1093/jnci/djg010

- Falkner, N. H., Neumark-Sztainer, D., Story, M., Jeffery, R. W., Beuhring, T., & Resnick, M. D. (2001). Social, educational, and psychological correlates of weight status in adolescents. *Obesity Research, 9*, 32–42. doi:10.1038/oby.2001.5
- Fara Wahida, R., Chin, Y. S., & Barakatun Nisak, M. Y. (2012). Obesity-related behaviors of Malaysian adolescents: a sample from Kajang district of Selangor state. *Nutrition Research and Practices, 6*(5), 458–465.
- Fedewa, A. L., Candelaria, A., Erwin, H. E., & Clark, T. P. (2013). Incorporating Physical Activity Into the Schools Using a 3-Tiered Approach. *Journal of School Health, 83*, 290–297. doi:10.1111/josh.12029
- Firouzi, S., Poh, B. K., Ismail, M. N., & Sadeghilar, A. (2014). Sleep habits, food intake, and physical activity levels in normal and overweight and obese Malaysian children. *Obesity Research and Clinical Practice, 8*. doi:10.1016/j.orcp.2012.12.001
- Fonseca, H., Matos, M. G., Guerra, A., & Pedro, J. G. (2009). Are overweight adolescents at higher risk of engaging in unhealthy weight-control behaviours? *Acta Paediatrica, International Journal of Paediatrics, 98*, 847–852. doi:10.1111/j.1651-2227.2009.01244.x
- Foo, L. H., Khor, G. L., Tee, E. S., & Dhanaraj, P. (2006). Dietary Intake of Adolescents in a Rural Fishing Community in Tuaran District, Sabah. *Malaysia Journal of Nutrition, 12*(1), 11–21.
- Franko, D. L., Striegel-Moore, R. H., Thompson, D., Schreiber, G. B., & Daniels, S.R. (2005). Does adolescent depression predict obesity in black and white young adult women? *Psychological Medicine, 35*, 1505–1513. doi:10.1017/S0033291705005386
- Freedman, D. S., Khan, L. K., Serdula, M. K., Dietz, W. H., Srinivasan, S. R., & Berenson, G. S. (2002). Relation of Age at Menarche to Race, Time Period, and Anthropometric Dimensions: The Bogalusa Heart Study. *Pediatrics, 110*(4), e43–e43. doi:10.1542/peds.110.4.e43
- Freedman, D. S., Mei, Z., Srinivasan, S. R., Berenson, G. S., & Dietz, W. H. (2007). Cardiovascular risk factors and excess adiposity among overweight children and adolescents: the Bogalusa Heart Study. *The Journal of Pediatrics, 150*, 12–17.e2. doi:10.1016/j.jpeds.2006.08.042
- Frisch, R. E. (1987). Body fat, menarche, fitness and fertility. *Human Reproduction (Oxford, England), 2*(6), 521–33. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/3117838>
- Gan, W. Y., Mohd Nasir, M. T., Zalilah, M. S., & Hazizi, A. S. (2011). Direct and indirect effects of sociocultural influences on disordered eating among Malaysian male and female university students. A mediation analysis of psychological distress. *Appetite, 56*(3), 778–83. doi:10.1016/j.appet.2011.03.005
- Giovannini, M., Agostoni, C., Gianni, M., Bernardo, L., & Riva, E. (2000). Adolescence: macronutrient needs. *European Journal of Clinical Nutrition, 54*Suppl 1, S7–S10. doi:10.1038/sj.ejcn.1600977
- Goldberg, G.R., Prentice, A.M., Coward, W.A., Davies, H.L., Murgatroyd, P.R., Sawyer, M.B., Ashford, J. & Black, A.E. (1991). Longitudinal

- assessment of the components of energy balance in well-nourished lactating women. *The American Journal of Clinical Nutrition*, 54, 788-798.
- Gopinath, B., Baur, L. A., Burlutsky, G., Robaei, D., & Mitchell, P. (2012). Socio-economic, familial and perinatal factors associated with obesity in Sydney schoolchildren. *Journal of Paediatrics and Child Health*, 48, 44–51. doi:10.1111/j.1440-1754.2011.02181.x
- Goran, M. I., Ball, G. D. ., & Cruz, M. L. (2003). Obesity and Risk of Type 2 Diabetes and Cardiovascular Disease in Children and Adolescents. *Journal of Clinical Endocrinology & Metabolism*, 88, 1417–1427. doi:10.1210/jc.2002-021442
- Green, S. B. (1991). How Many Subjects Does It Take To Do A Regression Analysis. *Multivariate Behavioral Research*. doi:10.1207/s15327906mbr2603_7
- Greenleaf, C., Petrie, T. A., & Martin, S. B. (2014). Relationship of weight-based teasing and adolescents' psychological well-being and physical health. *Journal of School Health*, 84, 49–55. doi:10.1111/josh.12118
- Gundersen, C., Mahatmya, D., Garasky, S., & Lohman, B. (2011). Linking psychosocial stressors and childhood obesity. *Obesity Reviews: An Official Journal of the International Association for the Study of Obesity*, 12(5), e54–63. doi:10.1111/j.1467-789X.2010.00813.x
- Gunstad, J., Paul, R. H., Spitznagel, M. B., Cohen, R. A., Williams, L. M., Kohn, M., & Gordon, E. (2006). Exposure to early life trauma is associated with adult obesity. *Psychiatry Research*, 142(1), 31–7. doi:10.1016/j.psychres.2005.11.007
- Guo, S. S., Wu, W., Chumlea, W. C., & Roche, A. F. (2002). Predicting overweight and obesity in adulthood from body mass index values in childhood and adolescence. *The American Journal of Clinical Nutrition*, 76, 653–658.
- Guo, X., Zheng, L., Li, Y., Zhang, X., Yu, S., Yang, H., ... Sun, Y. (2013). Prevalence and risk factors of being overweight or obese among children and adolescents in northeast China. *Pediatric Research*, 74, 443–9. doi:10.1038/pr.2013.116
- Haas, J. S., Lee, L. B., Kaplan, C. P., Sonneborn, D., Phillips, K. A., & Liang, S. Y. (2003). The Association of Race, Socioeconomic Status, and Health Insurance Status with the Prevalence of Overweight among Children and Adolescents. *American Journal of Public Health*, 93, 2105–2110. doi:10.2105/AJPH.93.12.2105
- Haines, J., Neumark-Sztainer, D., Eisenberg, M. E., & Hannan, P. J. (2006). Weight teasing and disordered eating behaviors in adolescents: longitudinal findings from Project EAT (Eating Among Teens). *Pediatrics*, 117, e209–e215. doi:10.1542/peds.2005-1242
- Haines, J., Neumark-Sztainer, D., Hannan, P. J., van den Berg, P., & Eisenberg, M. E. (2008). Longitudinal and secular trends in weight-related teasing during adolescence. *Obesity (Silver Spring, Md.)*, 16 Suppl 2, S18–S23. doi:10.1038/oby.2008.447

- Hamaideh, S. H. Al-Khateeb, R. Y., & Al-Rawashdeh, A. B. (2010). Overweight and obesity and their correlates among Jordanian adolescents. *Journal of Nursing Scholarship*, 42(4), 387-394
- Hampl, S. E., Carroll, C. A., Simon, S. D., & Sharma, V. (2007). Resource utilization and expenditures for overweight and obese children. *Archives of Pediatrics & Adolescent Medicine*, 161, 11–14. doi:10.1001/archpedi.161.1.11
- Harrison, K., & Bost, K. (2011). Toward a Developmental Conceptualization of Contributors to Overweight and Obesity in Childhood: The Six C's Model. *Child Development* ..., 5, 50–58. doi:http://dx.doi.org/10.1111/j.1750-8606.2010.00150.x
- Hatami, M., Taib, M. N. M., Jamaluddin, R., Saad, H. A., Djazayery, A., Chamari, M., & Nazari, M. (2014). Dietary factors as the major determinants of overweight and obesity among Iranian adolescents. A cross-sectional study. *Appetite*, 82, 194–201. doi:10.1016/j.appet.2014.07.026
- Hawks, S. R., & Madanat, H. N. (2003). Stemming Racial and Ethnic Disparities in the Rising Tide of Obesity. *American Journal of Health Education*, 34, 90–96.
- Hayden-Wade, H. A., Stein, R. I., Ghaderi, A., Saelens, B. E., Zabinski, M. F., & Wilfley, D. E. (2005). Prevalence, characteristics, and correlates of teasing experiences among overweight children vs. non-overweight peers. *Obesity Research*, 13, 1381–1392. doi:10.1038/oby.2005.167
- Health National Institute of Mental. (2011). *Depression*. United States. Retrieved from http://www.nimh.nih.gov/health/publications/depression/depression-booklet_34625.pdf
- Herva, A., Laitinen, J., Miettunen, J., Veijola, J., Karvonen, J. T., Läksy, K., & Joukamaa, M. (2006). Obesity and depression: results from the longitudinal Northern Finland 1966 Birth Cohort Study. *International Journal of Obesity* (2005), 30, 520–527. doi:10.1038/sj.ijo.0803174
- Hughes, S. O., Shewchuk, R. M., Baskin, M. L., Nicklas, T. A., & Qu, H. (2008). Indulgent feeding style and children's weight status in preschool. *Journal of Developmental and Behavioral Pediatrics*, 29, 403–410. doi:10.1097/DBP.0b013e318182a976
- Institute of Public Health. (1999). *Nutritional Status. A report of the National Health and Morbidity Survey 1996. Volume 14*. Kuala Lumpur, Malaysia.
- Institute of Public Health. (2006). *Nutritional Status. The Third National Health and Morbidity Survey 2006*. Kuala Lumpur, Malaysia.
- Ishak, Z., Low, S. F., & Lau, P. L. (2012). Parenting Style as a Moderator for Students' Academic Achievement. *Journal of Science Education and Technology*, 21, 487–493. doi:10.1007/s10956-011-9340-1
- Jackson, C. M. (2009). Prevalence of North American and Global Childhood and Adulthood Obesity and the Contributing Factors Christina Marie Jackson Fall 2009 A critical literature review submitted in partial fulfillment of the requirements for the senior research thesis, 1–66.

- Jayawardena, R., Byrne, N. M., Soares, M. J., Katulanda, P., & Hills, A. P. (2013). Prevalence, Trends and associated socio-economic factors of obesity in South Asia. *Obesity Facts*, 6, 405–414. doi:10.1159/000355598
- Jensen, C., & Steele, R. (2010). Validation of the Perceptions of Teasing Scale (POTS) in a Preadolescent Sample: Associations With Attitudes Toward Physical Activity. *Children's Health Care*. doi:10.1080/02739615.2010.515925
- Jinadu, L.O., Salmiah, M.S., & Azuhairi, A.A. (2016). Association between Self esteem and Smoking among Religious Schools Students in Petaling District, Selangor. *The International Medical Journal of Malaysia*, 15(1), 3-11.
- Kaplowitz, P. B., Slora, E. J., Wasserman, R. C., Pedlow, S. E., & Herman-Giddens, M. E. (2001). Earlier Onset of Puberty in Girls: Relation to Increased Body Mass Index and Race. *PEDIATRICS*, 108(2), 347–353. doi:10.1542/peds.108.2.347
- Kastorini, C. M., Milionis, H. J., Ioannidi, A., Kalantzi, K., Nikolaou, V., Vemmos, K. N., ... Panagiotakos, D. B. (2011). Adherence to the Mediterranean diet in relation to acute coronary syndrome or stroke nonfatal events: A comparative analysis of a case/case-control study. *American Heart Journal*, 162, 717–724. doi:10.1016/j.ahj.2011.07.012
- Kaur, J., Cheong, S. ., Naidu, B. M., Kaur, G., Manickam, M. A., Noor, M. M., ... Rosman, A. (2014). Prevalence and Correlates of Depression Among Adolescents in Malaysia. *Asia-Pacific Journal of Public Health*, 26(5S), 53S–62S.
- Khambalia, A. Z., & Seen, L. S. (2010). Trends in overweight and obese adults in Malaysia (1996-2009): a systematic review. *Obesity Reviews: An Official Journal of the International Association for the Study of Obesity*, 11, 403–412. doi:10.1111/j.1467-789X.2010.00728.x
- Khan, A., Ahmad, R., Hamdan, A. R., & Mustaffa, M. S. (2014). Educational Encouragement, Parenting Styles, Gender and Ethnicity as Predictors of Academic Achievement among Special Education Students. *International Education Study*, 7.2, 18–24.
- Khor, G. (2012). Food availability and the rising obesity prevalence in Malaysia, 6(Suppl 1), 61–68.
- Kimm, S. Y. S., & Obarzanek, E. (2002). Childhood obesity: a new pandemic of the new millennium. *Pediatrics*, 110, 1003–1007. doi:10.1542/peds.110.5.1003
- Kim, K.H., Bursac, Z., Dilillo, V., White, D. B., & West, D. S. (2009). Stress, race and body weight. *Health Psychological*, 28, 131-135. doi: [10.1037/a0012648](https://doi.org/10.1037/a0012648)
- Knai, C., Lobstein, T., Darmon, N., Rutter, H., & McKee, M. (2012). Socioeconomic patterning of childhood overweight status in Europe. *International Journal of Environmental Research and Public Health*. doi:10.3390/ijerph9041472
- Kobe, H., Kržišnik, C., & Mis, N. F. (2012). Under- and Over-Reporting of Energy Intake in Slovenian Adolescents. *Journal of Nutrition Education and Behavior*, 44, 574–583. doi:10.1016/j.jneb.2010.02.015

- Kovacs, M. (1992). *Manual of the Children's Depression Inventory*. Toronto: Multi-Health Systems.
- Kowalski, K., Crocker, P., & Donen, R. (2004). *The Physical Activity Questionnaire for Older Children (PAQ-C) and Adolescents (PAQ-A) Manual*.
- Krebs, H., Macht, M., Weyers, P., Weijers, H. G., & Janke, W. (1996). Effects of stressful noise on eating and non-eating behavior in rats. *Appetite*, 26, 193–202. doi:10.1006/appe.1996.0015
- Kuhle, S., Kirk, S., Ohinmaa, A., Yasui, Y., Allen, A. C., & Veugelers, P. J. (2011). Use and cost of health services among overweight and obese Canadian children. *International Journal of Pediatric Obesity: IJPO: An Official Journal of the International Association for the Study of Obesity*, 6, 142–148. doi:10.3109/17477166.2010.486834
- Kushi, L. H., Doyle, C., McCullough, M., Rock, C. L., Demark-Wahnefried, W., Bandera, E. V., ... Gansler, T. (2012). American Cancer Society Guidelines on nutrition and physical activity for cancer prevention: reducing the risk of cancer with healthy food choices and physical activity. *A Cancer Journal for Clinicians*, 62, 30–67. doi:10.3322/caac.20140
- Lagiou, A., & Parava, M. (2008). Correlates of childhood obesity in Athens, Greece. *Public Health Nutrition*, 11, 940–945. doi:10.1017/S1368980008002462
- Lai, J. wei, Zhehg, G., & Liu, F. (2008). The effect of peer relationship on self-esteem of middle school students. *Chinese Journal of Clinical Psychology*.
- Laible, D. J., Carlo, G., & Roesch, S. C. (2004). Pathways to self-esteem in late adolescence: The role of parent and peer attachment, empathy, and social behaviours. *Journal of Adolescence*, 27, 703–716. doi:10.1016/j.adolescence.2004.05.005
- [Lamborn, S. D.](#), [Mounts, N. S.](#), [Steinberg, L.](#), & [Dornbusch, S. M.](#) (1991). Patterns of competence and adjustment among adolescents from authoritative, authoritarian, indulgent, and neglectful families. *Children Development*, 62(5), 1049-1065.
- Langendijk, G., Wellings, S., van Wyk, M., Thompson, S. J., McComb, J., & Chusilp, K. (2003). The prevalence of childhood obesity in primary school children in urban Khon Kaen, northeast Thailand. *Asia Pacific Journal of Clinical Nutrition*, 12, 66–72.
- Lau, X. C., Chong, K. H., Poh, B. K., & Ismail, M. N. (2013). Physical Activity, Fitness and the Energy Cost of Activities. Implications for Obesity in Children and Adolescents in the Tropics. *Advances in Food and Nutrition Research*, 70, 49–101. doi:10.1016/B978-0-12-416555-7.00002-3
- Lawler, M., & Nixon, E. (2011). Body Dissatisfaction Among Adolescent Boys and Girls: The Effects of Body Mass, Peer Appearance Culture and Internalization of Appearance Ideals. *Journal of Youth and Adolescence*, 40, 59–71. doi:10.1007/s10964-009-9500-2
- Lee, J. M., Okumura, M. J., Davis, M. M., Herman, W. H., & Gurney, J. G. (2006). Prevalence and determinants of insulin resistance among U.S.

- adolescents: a population-based study. *Diabetes Care*, 29, 2427–2432. doi:10.2337/dc06-0709
- Lee, J.-I., & Yen, C.-F. (2014). Associations between body weight and depression, social phobia, insomnia, and self-esteem among Taiwanese adolescents. *Kaohsiung Journal of Medical Sciences*, 30, 625–630.
- Levy, P. S., & Lemeshow, S. (1991). *Sampling of Populations Methods and applications* (3rd Editio.). USA: A Willey Interscience Publication.
- Li, C., Ford, E. S., Zhao, G., & Mokdad, A. H. (2009). Prevalence of pre-diabetes and its association with clustering of cardiometabolic risk factors and hyperinsulinemia among U.S. adolescents: National Health and Nutrition Examination Survey 2005-2006. *Diabetes Care*, 32, 342–347. doi:10.2337/dc08-1128
- Liou, Y. M., Liou, T. H., & Chang, L. C. (2010). Obesity among adolescents: Sedentary leisure time and sleeping as determinants. *Journal of Advanced Nursing*, 66, 1246–1256. doi:10.1111/j.1365-2648.2010.05293.x
- Lipoeto, N. I., Geok Lin, K., & Angeles-Agdeppa, I. (2013). Food consumption patterns and nutrition transition in South-East Asia. *Public Health Nutrition*, 16(9), 1637–43. doi:10.1017/S1368980012004569
- Lohman, B. J., Stewart, S., Gundersen, C., Garasky, S., & Eisenmann, J. C. (2009). Adolescent Overweight and Obesity: Links to Food Insecurity and Individual, Maternal, and Family Stressors. *Journal of Adolescent Health*, 45, 230–237. doi:10.1016/j.jadohealth.2009.01.003
- Loke, K. Y. (2002). Consequences of childhood and adolescent obesity. *Asia Pacific Journal of Clinical Nutrition*, 11 Suppl 8, S702–S704. doi:10.1046/j.1440-6047.11.s8.13.x
- Lopez, A. D., Mathers, C. D., Ezzati, M., Jamison, D. T., & Murray, C. J. L. (2006). Global and regional burden of disease and risk factors, 2001: systematic analysis of population health data. *Lancet*, 367, 1747–1757.
- Loth, K. A., Maclehorse, R. F., Bucchianeri, M. M., Crow, S., & Neumark-Sztainer, D. R. (2014). Predictors of dieting and disordered eating behaviors from adolescence to young adulthood. *The Journal of Adolescent Health*. doi:10.1016/j.jadohealth.2014.04.016
- Luppino, F. S., de Wit, L. M., Bouvy, P. F., Stijnen, T., Cuijpers, P., Penninx, B. W. J. H., & Zitman, F. G. (2014). Overweight, Obesity, and Depression. *American Medical Association*, 67, 220–229. doi:doi:10.1001/archgenpsychiatry.2010.2
- Lutfiyya, M. N., Garcia, R., Dankwa, C. M., Young, T., & Lipsky, M. S. (2008). Overweight and obese prevalence rates in African American and Hispanic children: an analysis of data from the 2003-2004 National Survey of Children's Health. *Journal of the American Board of Family Medicine*, 21, 191–199. doi:10.3122/jabfm.2008.03.070207
- Maccoby, E. E. (2000). Parenting and its effects on children: on reading and misreading behavior genetics. *Annual Review of Psychology*, 51, 1–27. doi:10.1146/annurev.psych.51.1.1
- Mackenbach, J. P., Simon, J. G., Looman, C. W. N., & Joung, I. M. A. (2002). Self-assessed health and mortality: could psychosocial factors

- explain the association? *International Journal of Epidemiology*, 31, 1162–1168. doi:10.1093/ije/31.6.1162
- Malinauskas, B. M., Raedeke, T. D., Aeby, V. G., Smith, J. L., & Dallas, M. B. (2006). Dieting practices, weight perceptions, and body composition: a comparison of normal weight, overweight, and obese college females. *Nutrition Journal*, 5, 11. doi:10.1186/1475-2891-5-11
- Maniam, J., & Morris, M. J. (2012). The link between stress and feeding behaviour. *Neuropharmacology*, 63(1), 97-110
- Martikainen, P., Bartley, M., & Lahelma, E. (2002). Psychosocial determinants of health in social epidemiology. *International Journal of Epidemiology*. doi:10.1093/ije/31.6.1091
- Martin, M. A., Frisco, M. L., Nau, C., & Burnett, K. (2012). Social stratification and adolescent overweight in the United States: How income and educational resources matter across families and schools. *Social Science and Medicine*, 74, 597–606. doi:10.1016/j.socscimed.2011.11.006
- Martyn-Nemeth, P. A., & Penckofer, S. (2012). Psychological Vulnerability Among Overweight/Obese Minority Adolescents. *The Journal of School Nursing*. doi:10.1177/1059840511430508
- Martyn-Nemeth, P., Penckofer, S., Gulanick, M., Velsor-Friedrich, B., & Bryant, F. B. (2009). The relationships among self-esteem, stress, coping, eating behavior, and depressive mood in adolescents. *Research in Nursing and Health*, 32, 96–109. doi:10.1002/nur.20304
- Maryam, Z., Huang, M. S. ., Mohd Nasir, M. T., & Fatemeh, Z. (2014). Nutritional Status of Adolescents Attending the Iranian Secondary School in Kuala Lumpur, Malaysia. *Global Journal of Health Science*, 6(6), 185–197.
- Maximova, K., McGrath, J. J., Barnett, T., O'Loughlin, J., Paradis, G., & Lambert, M. (2008). Do you see what I see? Weight status misperception and exposure to obesity among children and adolescents. *International Journal of Obesity (2005)*, 32, 1008–1015. doi:10.1038/ijo.2008.15
- McClure, A. C., Tanski, S. E., Kingsbury, J., Gerrard, M., & Sargent, J. D. (2010). Characteristics associated with low self-esteem among US adolescents. *Academic Pediatrics*, 10(4), 238–44.e2. doi:10.1016/j.acap.2010.03.007
- McLaren, L. (2007). Socioeconomic status and obesity. *Epidemiologic Reviews*, 29(1), 29–48. doi:10.1093/epirev/mxm001
- Merchant, A. T., Vatanparast, H., & Barlas, S. (2010). Carbohydrate Intake and Overweight and Obesity Among Healthy Adults. *Nutrition in Clinical Practice*, 25(6), 680–681.
- Ministry of Health Malaysia. (2008). *National Health Morbidity Survey: Volume III*. Malaysia.
- Mohamud, W. N. W., Musa, K. I., Khir, A. S. M., Ismail, A. A. S., Ismail, I. S., Kadir, K. A., ... Bebakar, W. M. W. (2011). Prevalence of overweight and obesity among adult Malaysians: An update. *Asia Pacific Journal of Clinical Nutrition*, 20, 35–41.
- Mohd Ismail, M. N., Norimah, A. K., Poh, B. K., Nik Shanita, S., Nik Mazlan, M., Roslee, R., ... Raduan, S. (2009). Prevalence and trends of

- overweight and obesity in two cross-sectional studies in Malaysia children, 2002-2008. Kuala Lumpur, Malaysia: MASO Scientific Conference on Obesity.
- Mohd Jamil, H. . (2006). Validity and Reliability Study of Rosenberg Self-esteem Scale in Seremban School Children. *Malaysian Journal of Psychiatry, 15*(2), 35–39.
- Mokdad, A. H., Ford, E. S., Bowman, B. A., Dietz, W. H., Vinicor, F., Bales, V. S., & Marks, J. S. (2003). Prevalence of obesity, diabetes, and obesity-related health risk factors, 2001. *JAMA : The Journal of the American Medical Association, 289*, 76–79. doi:10.1001/jama.289.1.76.
- Moore, M., Braid, S., Falk, B., & Klentrou, P. (2007). Daily calcium intake in male children and adolescents obtained from the rapid assessment method and the 24- hour recall method. *Nutrition Journal, 6*, 24. doi:10.1186/1475-2891-6-24
- Moy, F. ., Gan, C. Y., & Siti Zaleha, M. K. (2004). Body mass status of school children and adolescents in Kuala Lumpur, Malaysia. *Asia Pacific Journal of Clinical Nutrition, 13*, 324–329.
- Moy, F. M., Gan, C. Y., & Siti Zaleha, M. . (2006). Eating Patterns of School Children and Adolescents in Kuala Lumpur. *Malaysian Journal of Nutrition, 12*, 1–10. Retrieved from http://nutriweb.org.my/publications/mjn0012_1/mjn12n1_art1.pdf
- Moy, F. M., Gan, C. Y., & Zaleha, M. K. S. (2004). Body mass status of school children and adolescents in Kuala Lumpur, Malaysia. *Asia Pacific Journal of Clinical Nutrition, 13*, 324–329.
- Murakami, K., Miyake, Y., Sasaki, S., Tanaka, K., & Arakawa, M. (2012). Characteristics of under- and over-reporters of energy intake among Japanese children and adolescents: The Ryukyus Child Health Study. *Nutrition, 28*, 532–538. doi:10.1016/j.nut.2011.08.011
- Murray, C. J. L., & Lopez, A. D. (1997). Alternative projections of mortality and disability by cause 1990-2020: Global Burden of Disease Study. *Lancet, 349*, 1498–1504. doi:10.1016/S0140-6736(96)07492-2
- Mushi-Brunt, C., Haire-Joshu, D., Elliott, M., & Brownson, R. (2007). Fruit and vegetable intake and obesity in preadolescent children: The role of neighborhood poverty and grocery store access. *American Journal of Health Education, 38*(5), 258–265.
- Naidu, B. M., Mahmud, S. Z., Ambak, R., Sallehuddin, S. M., Mutalip, H. A., Saari, R., ... Hamid, H. A. (2013). Overweight among primary school-age children in Malaysia. *Asia Pac J Clin Nutr, 22*, 408–415. doi:10.6133/apjcn.2013.22.3.18
- National Heart Lung and Blood Institute, N. (2010). What Causes Overweight and Obesity? Retrieved from <http://www.nhlbi.nih.gov/health/health-topics/topics/obe/causes.html>
- NCCFN (2005). *Recommended Nutrient Intake (RNI) for Malaysia*. Malaysia.
- NCCFN (2005). *Recommended Nutrient Intakes for Malaysia: A Report of the Technical Working Group on Nutritional Guidelines*. Putrajaya.
- Neumark-Sztainer, D., Wall, M., Larson, N. I., Eisenberg, M. E., & Loth, K. (2011). Dieting and disordered eating behaviors from adolescence to young adulthood: Findings from a 10-year longitudinal study. *Journal of*

- the American Dietetic Association*, 111, 1004–1011.
doi:10.1016/j.jada.2011.04.012
- Ng, D. K. K., Lam, Y. Y., Kwok, K. L., & Chow, P. Y. (2004). Obstructive sleep apnoea syndrome and obesity in children. *Hong Kong Medical Journal = Xianggang Yi Xue Za Zhi / Hong Kong Academy of Medicine*, 10, 44–48.
- Nicklas, T. A., Baranowski, T., Cullen, K. W., & Berenson, G. (2001). Eating patterns, dietary quality and obesity. *Journal of the American College of Nutrition*, 20, 599–608.
doi:10.1080/07315724.2001.10719064
- Nieman, P., & Leblanc, C. M. (2012). Psychosocial aspects of child and adolescent obesity. *Paediatrics & Child Health*, 17(4), 205–8. Retrieved from <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3381665&to=pmc-entrez&rendertype=abstract>
- Ning, Y., Yang, S., Evans, R. K., Stern, M., Sun, S., Francis, G. L., & Wickham, E.P. (2014). Changes in body anthropometry and composition in obese adolescents in a lifestyle intervention program. *European Journal of Nutrition*, 53, 1093–1102.
doi:10.1007/s00394-013-0612-9
- Noor, M. I. (2002). The nutrition and health transition in Malaysia. *Public Health Nutrition*, 5, 191–195. doi:10.1079/PHN2001293
- Nurul Hazrina, M., & Affizal, A. (2012). A Validity Study of Malay-translated Version of Perceived Stress Scale. *Malaysian Journal of Forensic Sciences*, 3(1), 52–57.
- Nurul-Fadhilah, A., Teo, P. S., & Foo, L. H. (2012). Validity and reproducibility of a food frequency questionnaire (FFQ) for dietary assessment in Malay adolescents in Malaysia. *Asia Pacific Journal of Clinical Nutrition*, 21, 97–103.
- Ogden, C. L., Carroll, M. D., Curtin, L. R., Lamb, M. M., & Flegal, K. M. (2010). Prevalence of high body mass index in US children and adolescents, 2007-2008. *JAMA: The Journal of the American Medical Association*, 303, 242–249. doi:10.1001/jama.2009.2012
- Ogden, C. L., Carroll, M. D., Curtin, L. R., McDowell, M. A., Tabak, C. J., & Flegal, K. M. (2006). Prevalence of overweight and obesity in the United States, 1999-2004. *JAMA: The Journal of the American Medical Association*, 295, 1549–1555.
doi:10.1001/jama.295.13.1549
- Ogden, C. L., Carroll, M. D., Kit, B. K., & Flegal, K. M. (2014). Prevalence of childhood and adult obesity in the United States, 2011-2012. *JAMA: The Journal of the American Medical Association*, 311(8), 806–14. doi:10.1001/jama.2014.732
- Ogechi, U. P., Akhakhia, O. I., & Ugwunna, U. A. (2007). Nutritional Status and Energy Intake of Adolescents in Umuahia Urban, Nigeria. *Pakistan Journal of Nutrition*, 6(6), 641–646. Retrieved from <http://pjbs.org/pjnonline/fin777.pdf>
- Oh, I.-H., Cho, Y., Park, S.-Y., Oh, C., Choe, B.-K., Choi, J.-M., & Yoon, T.-Y. (2011). Relationship between socioeconomic variables and obesity in

- Korean adolescents. *Journal of Epidemiology / Japan Epidemiological Association*, 21,263–270. doi:10.2188/jea.JE20100099
- Olvera, N., & Power, T. G. (2010). Brief report: Parenting styles and obesity in mexican american children: A longitudinal study. *Journal of Pediatric Psychology*, 35, 243–249. doi:10.1093/jpepsy/jsp071
- Ozmen, D., Ozmen, E., Ergin, D., Cetinkaya, A. C., Sen, N., Dundar, P. E., & Taskin, E. O. (2007). The association of self-esteem, depression and body satisfaction with obesity among Turkish adolescents. *BMC Public Health*, 7, 80. doi:10.1186/1471-2458-7-80
- Pallant, J. (2010). *SPSS Survival Manual: A step by step guide to data analysis using SPSS* (4th edition.). Australia: Allen & Unwin Book Publisher.
- Park, M. H., Falconer, C., Viner, R. M., & Kinra, S. (2012). The impact of childhood obesity on morbidity and mortality in adulthood: a systematic review. *Obesity Reviews: An Official Journal of the International Association for the Study of Obesity*, 13, 985–1000. doi:10.1111/j.1467-789X.2012.01015.x
- Poh, B. K., Jannah, A. N., Chong, L. K., Ruzita, A. T., Ismail, M. N., & McCarthy, D. (2011). Waist circumference percentile curves for Malaysian children and adolescents aged 6.0-16.9 years. *International Journal of Pediatric Obesity*, 6(3-4), 229–235.
- Pon, L. W., Kandiah, M., & Mohd Nasir, M. T. (2004). Body image perception, dietary practices and physical activity of overweight and normal weight Malaysian female adolescents. *Malaysian Journal of Nutrition*, 10, 131–47. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/22691735>
- Popkin, B. M. (2002). The shift in stages of the nutrition transition in the developing world differs from past experiences! *Public Health Nutrition*, 5, 205–214. doi:10.1079/PHN2001295
- Popkin, B. M., Adair, L. S., & Ng, S. W. (2012a). Global nutrition transition and the pandemic of obesity in developing countries. *Nutrition Reviews*, 70, 3–21. doi:10.1111/j.1753-4887.2011.00456.x
- Popkin, B. M., Adair, L. S., & Ng, S. W. (2012b). Global nutrition transition and the pandemic of obesity in developing countries. *Nutrition Reviews*, 70(1), 3–21. doi:10.1111/j.1753-4887.2011.00456.x
- Porter, J. S., Stern, M., Mazzeo, S. E., Evans, R. K., & Laver, J. (2012). Relations Among Teasing, Body Satisfaction, Self-Esteem, and Depression in Treatment- Seeking Obese African American Adolescents. *Journal of Black Psychology*, 39(4), 375–395. doi:10.1177/0095798412454680
- Poti, J. M., & Popkin, B. M. (2011). Trends in Energy Intake among US Children by Eating Location and Food Source, 1977-2006. *Journal of the American Dietetic Association*, 111, 1156–1164. doi:10.1016/j.jada.2011.05.007
- Puhl, R. M., & Latner, J. D. (2007). Stigma, obesity, and the health of the nation's children. *Psychological Bulletin*, 133, 557–580. doi:10.1037/0033-2909.133.4.557

- Puhl, R. M., Luedicke, J., & Heuer, C. (2011). Weight-based victimization toward overweight adolescents: Observations and reactions of peers. *Journal of School Health, 81*, 696–703. doi:10.1111/j.1746-1561.2011.00646.x
- Rampal, L., Rampal, S., Khor, G. L., Zain, A. M., Ooyub, S. Bin, Rahmat, R. Bin, ... Krishnan, J. (2007). A national study on the prevalence of obesity among 16,127 Malaysians. *Asia Pacific Journal of Clinical Nutrition, 16*(3), 561–6. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/17704038>
- Rancourt, D., Barker, D. H., Sato, A. F., Lloyd-Richardson, E. E., Hart, C. N., & Jelalian, E. (2014). Longitudinal associations among change in overweight status, fear of negative evaluation, and weight-related teasing among obese adolescents. *Journal of Pediatric Psychology, 39*, 697–707. doi:10.1093/jpepsy/jsu033
- Reilly, J. J. (2006). Obesity in childhood and adolescence: evidence based clinical and public health perspectives. *Postgraduate Medical Journal, 82*(969), 429–37. doi:10.1136/pgmj.2005.043836
- Rhee, K. E., Lumeng, J. C., Appugliese, D. P., Kaciroti, N., & Bradley, R. H. (2006). Parenting styles and overweight status in first grade. *Pediatrics, 117*(6), 2047–54. doi:10.1542/peds.2005-2259
- Rivera, J. Á., de Cossío, T. G., Pedraza, L. S., Aburto, T. C., Sánchez, T. G., & Martorell, R. (2013). Childhood and adolescent overweight and obesity in Latin America: a systematic review. *The Lancet Diabetes & Endocrinology*. doi:10.1016/S2213-8587(13)70173-6
- Robinson, E., & Kirkham, T. C. (2014). Is he a healthy weight? Exposure to obesity changes perception of the weight status of others. *International Journal of Obesity, 38*, 663–7. doi:10.1038/ijo.2013.154
- Rojo-Moreno, L., Rubio, T., Plumed, J., Barberá, M., Serrano, M., Gimeno, N., ... Livianos, L. (2013). Teasing and disordered eating behaviors in Spanish adolescents. *Eating Disorders, 21*, 53–69. doi:10.1080/10640266.2013.741988
- Rosenberg, M. (1965a). *Rosenberg Self-Esteem Scale*. New York. doi:/S0034-98872009000600009
- Rosenberg, M. (1965b). *Society and the adolescent self-image*. Princeton: NJ: Princeton University Press.
- Rosliwati, M. Y., Rohayah, H., Jamil, B. Y. M., & Zaharah, S. (2008). Validation of the Malay version of the Children Depression Inventory (CDI) among children and adolescents attending outpatient clinics in Kota Bharu, Kelantan. *Malaysia Journal of Psychiatry, 17*(1), 23–29.
- Sabanayagam, C., Shankar, A., Chong, Y. S., Wong, T. Y., & Saw, S. M. (2009). Breast-feeding and overweight in Singapore school children. *Pediatrics International, 51*, 650–656. doi:10.1111/j.1442-200X.2009.02919.x
- Salehi, M., Ferenczi, A., & Zumoff, B. (2005). Obesity and cortisol status. *Hormone and Metabolic Research*. doi:10.1055/s-2005-861374
- Salsberry, P. J., & Reagan, P. B. (2009). Comparing the influence of childhood and adult economic status on midlife obesity in Mexican American, white, and African American women. *Public*

- Health Nursing (Boston, Mass.)*, 26(1), 14–22. doi:10.1111/j.1525-1446.2008.00751.x
- Sánchez-Villegas, A., Pimenta, A. M., Beunza, J. J., Guillen-Grima, F., Toledo, E., & Martinez-Gonzalez, M. A. (2010). Childhood and young adult overweight/obesity and incidence of depression in the SUN project. *Obesity (Silver Spring, Md.)*, 18, 1443–1448. doi:10.1038/oby.2009.375
- Sargrad, K. R., Homko, C., Mozzoli, M., & Boden, G. (2005). Effect of High Protein vs High Carbohydrate Intake on Insulin Sensitivity, Body Weight, Hemoglobin A1c, and Blood Pressure in Patients with Type 2 Diabetes Mellitus. *Journal of the American Dietetic Association*, 105(4), 573–580.
- Schmitt, D. P., & Allik, J. (2005). Simultaneous administration of the Rosenberg Self-Esteem Scale in 53 nations: exploring the universal and culture-specific features of global self-esteem. *Journal of Personality and Social Psychology*, 89, 623–642. doi:10.1037/0022-3514.89.4.623
- Shapiro, J., Baumeister, R.F., Kessler, J. (1991). A three component model of children's teasing: Aggression, humor, and ambiguity. *Journal of Social and Clinical Psychology*, 10, 459-472.
- Shariff, Z. M., & Khor, G. L. (2005). Obesity and household food insecurity: evidence from a sample of rural households in Malaysia. *European Journal of Clinical Nutrition*, 59, 1049–1058. doi:10.1038/sj.ejcn.1602210
- Sherar, L. B., Esliger, D. W., Baxter-Jones, A. D. G., & Tremblay, M. S. (2007). Age and gender differences in youth physical activity: Does physical maturity matter? *Medicine and Science in Sports and Exercise*, 39, 830–835. doi:10.1249/mss.0b013e3180335c3c
- Sherina, M. S., Rampal, L., Loh, J. W., Chan, C. L., Teh, P. C., & Tan, P. O. (2008). Self-esteem and its associated factors among secondary school students in Klang District, Selangor. *Medical Journal of Malaysia*, 63, 26–30.
- Shim, Jee-Seon, Oh, K., & Kim, H.C. (2014). Dietary assessment method in epidemiology studies. *Epidemiology and Health*, 36, 1-8. doi: [10.4178/epih/e2014009](https://doi.org/10.4178/epih/e2014009)
- Siega-Riz, A. M., Evenson, K. R., & Dole, N. (2004). Pregnancy-related weight gain--a link to obesity? *Nutrition Reviews*, 62, S105–S111. doi:10.1301/nr.2004.jul.S105
- Silventoinen, K., Magnusson, P. K. E., Tynelius, P., Batty, G. D., & Rasmussen, F. (2009). Association of body size and muscle strength with incidence of coronary heart disease and cerebrovascular diseases: a population-based cohort study of one million Swedish men. *International Journal of Epidemiology*, 38(1), 110–8. doi:10.1093/ije/dyn231
- Singh, A. S., Mulder, C., Twisk, J. W. R., Van Mechelen, W., & Chinapaw, M. J. M. (2008). Tracking of childhood overweight into adulthood: A systematic review of the literature. *Obesity Reviews*. doi:10.1111/j.1467-789X.2008.00475.x

- Siti Nor, Y., Rumaya, J., Mansor, A. T., & Ikechukwu, U. (2009). Loneliness , stress, self esteem and depression among Malaysian adolescent. *Jurnal Kemanusiaan*, 14, 85-95.
- Skelton, J. A., Cook, S. R., Auinger, P., Klein, J. D., & Barlow, S. E. (2009). Prevalence and Trends of Severe Obesity Among US Children and Adolescents. *Academic Pediatrics*, 9, 322–329. doi:10.1016/j.acap.2009.04.005
- Smokowski, P. R., Evans, C. B. R., Cotter, K. L., & Guo, S. (2014). Ecological Correlates of Depression and Self-Esteem in Rural Youth. *Child Psychiatry Human Development*, 45, 500–518. doi:10.1007/s10578-013-0420-8
- Soo, K. L., Wan Abdul Manan, W. M., Abdul Manaf, H., & Lee, Y. Y. (2011). Dietary practices among overweight and obese Chinese children in Kota Bharu, Kelantan. *Malaysian Journal of Nutrition*, 17, 87–95.
- Sørensen, K., Aksglaede, L., Petersen, J. H., & Juul, A. (2010). Recent changes in pubertal timing in healthy Danish boys: associations with body mass index. *The Journal of Clinical Endocrinology and Metabolism*, 95(1), 263–70. doi:10.1210/jc.2009-1478
- Spear, B. A., Barlow, S. E., Ervin, C., Ludwig, D. S., Saelens, B. E., Schetzina, K.E., & Taveras, E. M. (2007). Recommendations for treatment of child and adolescent overweight and obesity. *Pediatrics*, 120 Suppl, S254–S288. doi:10.1542/peds.2007-2329F
- Stice, E., Presnell, K., Shaw, H., & Rohde, P. (2005). Psychological and behavioral risk factors for obesity onset in adolescent girls: a prospective study. *Journal of Consulting and Clinical Psychology*, 73(2), 195–202. doi:10.1037/0022-006X.73.2.195
- Stoner, L., Shultz, S. P., Lambrick, D. M., Krebs, J., Weatherall, M., Palmer, B. R.,... Williams, M. A. (2013). The combating obesity in Māori and Pasifika adolescent school-children study: COMPASS methodology and study protocol. *International Journal of Preventive Medicine*, 4, 565–579.
- Story, M., Neumark-Sztainer, D., & French, S. (2002). Individual and environmental influences on adolescent eating behaviors. *Journal of the American Dietetic Association*, 102, S40–S51. doi:10.1016/S0002-8223(02)90421-9
- Su, T. T., Sim, P. Y., Nahar, A. M., Majid, H. A., Murray, L. J., Cantwell, M. M., ... Jalaludin, M. Y. (2014). Association between self-reported physical activity and indicators of body composition in Malaysian adolescents. *Preventive Medicine*, 67, 100–105. doi:10.1016/j.ypmed.2014.07.001
- Sun, S. S., Liang, R., Huang, T. T.-K., Daniels, S. R., Arslanian, S., Liu, K., ... Siervogel, R. M. (2008). Childhood obesity predicts adult metabolic syndrome: the Fels Longitudinal Study. *The Journal of Pediatrics*, 152(2), 191–200. doi:10.1016/j.jpeds.2007.07.055
- Sun, Y., Roth, D. L., Ritchie, C. S., Burgio, K. L., & Locher, J. L. (2010). Reliability and Predictive Validity of Energy Intake Measures from the 24-Hour Dietary Recalls of Homebound Older Adults. *Journal of the American Dietetic Association*, 110, 773–778. doi:10.1016/j.jada.2010.02.003

- Suzana, S., Noor Aini, M. Y., Nik Shanita, S., Rafidah, G., & Roslina, A. (2009). *Atlas of food exchanges & portion sizes* (2nd Editio.). Malaysia: MDC publisher.
- Sweeting, H., Wright, C., & Minnis, H. (2005). Psychosocial correlates of adolescent obesity, "slimming down" and "becoming obese." *Journal of Adolescent Health, 37*. doi:10.1016/j.jadohealth.2005.01.008
- Tam, C. L., Lee, T. H., Har, W. M., & Pook, W. L. (2011). Perceived social support and self-esteem towards gender roles: Contributing factors in adolescents. *Asian Social Science, 7*, 49–57. doi:10.5539/ass.v7n8p49
- Tan, A. K. G., Dunn, R. A., Samad, M. I. A., & Feisul, M. I. (2011). Sociodemographic and health-lifestyle determinants of obesity risks in Malaysia. *Asia-Pacific Journal of Public Health / Asia-Pacific Academic Consortium for Public Health, 23*, 192–202. doi:10.1177/1010539509359535
- Tan, A. K. G., Yen, S. T., & Feisul, M. I. (2012). Determinants of body weight status in Malaysia: An ethnic comparison. *International Journal of Public Health, 57*, 279–288. doi:10.1007/s00038-011-0238-8
- Tee, E. S., Khor, S.-C., Ooi, H.-E., Young, S.-I., Zakayah, O., & Zulkafli, H. (2002). Regional study of nutritional status of urban primary schoolchildren. 3. Kuala Lumpur, Malaysia. *Food and Nutrition Bulletin, 23*, 41–47. doi:10.1080/1361767990200210
- Tee, E. S., Mohd Ismail, N., Mohd Nasir, A., & Khatijah, I. (1997). *Nutrient composition of Malaysian foods* (4th Editio.). Malaysia: Institute for Medical Research Kuala Lumpur.
- Tesfalem, T., Singh, P., & Debebe, M. (2013). Prevalence and associated factors of overweight and obesity among high school adolescents in urban communities of Hawassa, Southern Ethiopia. *Current Research in Nutrition and Food Science Journal, 1*(1), 23–36. Retrieved from <http://www.foodandnutritionjournal.org/volume1number1/prevalence-and-associated-factors-of-overweight-and-obesity-among-high-school-adolescents-in-urban-communities-of-hawassa-southern-ethiopia/>
- The, N. S., Suchindran, C., North, K. E., Popkin, B. M., & Gordon-Larsen, P. (2010). Association of adolescent obesity with risk of severe obesity in adulthood. *JAMA: The Journal of the American Medical Association, 304*(18), 2042–7. doi:10.1001/jama.2010.1635
- Thomas, C., Hyppönen, E., & Power, C. (2008). Obesity and type 2 diabetes risk in midadult life: the role of childhood adversity. *Pediatrics, 121*, e1240–e1249. doi:10.1542/peds.2007-2403
- Thompson, J. K., Cattarin, J., Fowler, B., & Fisher, E. (1995). The Perception of Teasing Scale (POTS): a revision and extension of the Physical Appearance Related Teasing Scale (PARTS). *Journal of Personality Assessment, 65*, 146–157. doi:10.1207/s15327752jpa6501_11
- Tirosh, A., Shai, I., Afek, A., Dubnov-Raz, G., Ayalon, N., Gordon, B., ... Rudich, A. (2011). Adolescent BMI trajectory and risk of diabetes

- versus coronary disease. *The New England Journal of Medicine*, 364(14), 1315–25. doi:10.1056/NEJMoa1006992
- Torun, B. 1996. Energy requirements and dietary energy recommendations for children and adolescents 1 to 18 years old. *European Journal on Clinical Nutrition*, 50 (suppl. 1), S37-S81
- Torres, S. J., & Nowson, C. A. (2007). Relationship between stress, eating behavior, and obesity. *Nutrition*. doi:10.1016/j.nut.2007.08.008
- Trasande, L., & Chatterjee, S. (2009). The impact of obesity on health service utilization and costs in childhood. *Obesity (Silver Spring)*, 17, 1749–1754. doi:oby200967 [pii]n10.1038/oby.2009.67 [doi]
- Trasande, L., & Elbel, B. (2012). The economic burden placed on healthcare systems by childhood obesity. *Expert Review of Pharmacoeconomics & Outcomes Research*. doi:10.1586/erp.11.93
- Trost, S. G., Rosenkranz, R. R., & Dziewaltowski, D. (2008). Physical activity levels among children attending after-school programs. *Medicine and Science in Sports and Exercise*, 40, 622–629. doi:10.1249/MSS.0b013e318161eaa5
- Urbaniak, G. C., & Plous, S. (2013). Research Randomizer (version 4.0)[Computer software]. Retrieved from <http://www.randomizer.org/>
- Uslu, M. (2013). Relationship between degrees of self-esteem and peer pressure in high school adolescents. *International Journal of Academic Research*, 5(3),117–122.
- Vallès, A., Martí, O., García, A., & Armario, A. (2000). Single exposure to stressors causes long-lasting, stress-dependent reduction of food intake in rats. *American Journal of Physiology. Regulatory, Integrative and Comparative Physiology*, 279, R1138–R1144.
- van den Berg, P., Neumark-Sztainer, D., Eisenberg, M. E., & Haines, J. (2008). Racial/ethnic differences in weight-related teasing in adolescents. *Obesity (Silver Spring, Md.)*, 16 Suppl 2, S3–S10. doi:10.1038/oby.2008.445
- van Jaarsveld, C. H. M., Fidler, J. A., Steptoe, A., Boniface, D., & Wardle, J. (2009). Perceived stress and weight gain in adolescence: a longitudinal analysis. *Obesity (Silver Spring, Md.)*, 17, 2155–2161. doi:10.1038/oby.2009.183
- Van Strien, T., van Niekerk, R., & Ouwens, M. A. (2009). Perceived parental food controlling practices are related to obesogenic or leptogenic child life style behaviors. *Appetite*, 53(1), 151–4. doi:10.1016/j.appet.2009.05.011
- Wamala, S. P., Lynch, J., & Kaplan, G. A. (2001). Women's exposure to early and later life socioeconomic disadvantage and coronary heart disease risk: the Stockholm Female Coronary Risk Study. *International Journal of Epidemiology*, 30, 275–284. doi:10.1093/ije/30.2.275
- Wardle, J., Williamson, S., Johnson, F., & Edwards, C. (2006). Depression in adolescent obesity: cultural moderators of the association between obesity and depressive symptoms. *International Journal of Obesity*, 30, 634–643. doi:10.1038/sj.ijo.0803142
- Wenig, C. M. (2012). The impact of BMI on direct costs in Children and Adolescents: Empirical findings for the German Healthcare

- System based on the KiGGS-study. *European Journal of Health Economics*, 13, 39–50. doi:10.1007/s10198-010-0278-7
- White, G. N., Cordato, D. J., O'Rourke, F., Mendis, R. L., Ghia, D., & Chan, D. K. (2012). Validation of the Stroke Rehabilitation Motivation Scale: a pilot study. *Asian Journal Geriatria Geriatric*, 7, 80–87.
- White, M. A., O'Neil, P. M., Kolotkin, R. L., & Byrne, T. K. (2004). Gender, race, and obesity-related quality of life at extreme levels of obesity. *Obesity Research*, 12, 949–955. doi:10.1038/oby.2004.116
- WHO Expert Consultation. (2004). Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. *Lancet*, 363, 157–163. doi:10.1016/S0140-6736(03)15268-3
- World Health Organisation (2017). Health topics: Physical activity. Retrieved on February, 14, from http://www.who.int/topics/physical_activity/en/.
- Wilson, S. M., & Sato, A. F. (2013). Stress and paediatric obesity: What we know and where to go. *Stress and Health*, 30, 91–102. doi:10.1002/smi.2501
- Witherspoon, D., Latta, L., Wang, Y., & Black, M. M. (2013). Do depression, self-esteem, body-esteem, and eating attitudes vary by bmi among african american adolescents. *Journal of Pediatric Psychology*, 38, 1112–1120. doi:10.1093/jpepsy/jst055
- Witherspoon, D., Schotland, M., Way, N., & Hughes, D. (2009). Connecting the Dots: How Connectedness to Multiple Contexts Influences the Psychological and Academic Adjustment of Urban Youth. *Applied Developmental Science*. doi:10.1080/10888690903288755
- Woon, F. C., Chin, Y. S., & Mohd Nasir, M. T. (2014). Association between behavioural factors and BMI-for-age among early adolescents in Hulu Langat district, Selangor, Malaysia. *Obesity Research & Clinical Practice, In Press*.
- World Health Organization, W. (2007). WHO | BMI-for-age (5-19 years). World Health Organization. Retrieved from http://www.who.int/growthref/who2007_bmi_for_age/en/
- Xie, B., Chou, C.-P., Spruijt-Metz, D., Liu, C., Xia, J., Gong, J., ... Johnson, C. A. (2005). Effects of perceived peer isolation and social support availability on the relationship between body mass index and depressive symptoms. *International Journal of Obesity*, 29, 1137–1143. doi:10.1038/sj.ijo.0803006
- Yen, C. F., Hsiao, R. C., Yen, J. Y., Ko, C. H., Liu, S. C., Huang, C. F., & Wang, S. Y. (2010). Body Weight Statuses and Their Sociodemographic Correlates Among Adolescents in Southern Taiwan: Results Using Two Sets of Cutoff References. *Journal of Adolescent Health*, 46, 62–69. doi:10.1016/j.jadohealth.2009.05.015
- Ying-Xiu, Z., Jing-Yang, Z., Jin-Shan, Z., & Zun-Hua, C. (2013). The role of 1-h physical activity every day in preventing obesity in adolescents in Shandong, China. *European Journal of Pediatrics*, 172, 325–330. doi:10.1007/s00431-012-1882-6
- Ying-Xiu, Z., Ya-Lin, L., Jin-Shan, Z., Zun-Hua, C., & Jing-Yang, Z. (2013). Distributions of waist circumference and waist-to-height ratio for

- children and adolescents in Shandong, China. *European Journal of Pediatrics*, 172, 185–191. doi:10.1007/s00431-012-1862-x
- Yoon, K., Lee, J., Kim, J., Cho, J., & Choi, Y. (2006). Epidemic obesity and type 2 diabetes in Asia. *Lancet*, 368, 1681–8. doi:10.1016/S0140-6736(06)69703-1
- Young-Hyman, D., Tanofsky-Kraff, M., Yanovski, S. Z., Keil, M., Cohen, M. L., Peyrot, M., & Yanovski, J. A. (2006). Psychological status and weight-related distress in overweight or at-risk-for-overweight children. *Obesity (Silver Spring, Md.)*, 14, 2249–2258. doi:10.1038/oby.2006.264
- Yusoff, M. S. B. (2011). The Validity and Reliability of Secondary School Stressor Questionnaire (3SQ) in Identifying Stressor among Adolescents in Secondary School. *International Medical Journal*, 18(2), 100.
- Yusoff, M. S. B., Ahmad Hamid, A. H., Rosli, N. R., Zakaria, N. A., Che Rameli, N.A., Abdul Rahman, N. S., ... Abdul Rahman, A. (2011). Prevalence of stress, stressors and coping strategies among secondary school students in Kota Bharu, Kelantan, Malaysia. *International Journal of Students' Research*, 1(1), 23–28.
- Zaini, M. Z. A., Low, W. Y., & Harun, F. (2005). Factors affecting nutritional status of Malaysian primary school children. *Asia-Pacific Journal of Public Health / Asia-Pacific Academic Consortium for Public Health*, 17, 71–80. doi:10.1177/101053950501700203
- Zainon, B., Rosadah, A. M., & Zalizan, M. J. (2014). Big Five Personality Factors, Perceived Parenting Styles, and Perfectionism among Academically Gifted Students. *Asian Social Science*, 10(4), 8–16. doi:10.5539/ass.v10n4p8
- Zainuddin, A. A., Manickam, M. A., Baharudin, A., Omar, A., Cheong, S. M., Ambak, R., ... Ghaffar, S. A. (2014). Self-Perception of Body Weight Status and Weight Control Practices Among Adolescents in Malaysia. *Asia-Pacific Journal of Public Health*, 26(5S), 18S–26S.
- Zalilah, M. S., Khor, G. L., Mirnalini, K., Norimah, A. K., & Ang, M. (2006). Dietary intake, physical activity and energy expenditure of Malaysian adolescents. *Singapore Medical Journal*, 47, 491–498

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PUBLICATION

Nor Mazni, I., Zuriati, I., & Rosita, J. (2019). Association between Weight Teasing by Peers, Self Esteem, and Academic Related Stressor with Body Weight Status among Adolescents in Hulu Langat District, Selangor, Malaysia. *Malaysian Journal of Medicine and Health Sciences*, 15 (SP1), 10-15





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