



UNIVERSITI PUTRA MALAYSIA

***FACTORS ASSOCIATED WITH ENERGY INTAKE
AMONG ADOLESCENTS IN SELECTED SECONDARY SCHOOLS
IN HULU LANGAT DISTRICT, MALAYSIA***

AAINAA SYARFA BINTI MOHD SHAHAR

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By

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

September 2015

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

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Chair: Zuriati Binti Ibrahim, PhD

Faculty: Medicine and Health Sciences

This cross-sectional study aimed to determine factors associated with energy intake among adolescents in Hulu Langat district. Multistage cluster sampling was used for school and class selection. One class was selected from each form 1, form 2 and form 4 classes within each school by the principal. Anthropometric measurements such as height, body weight and waist circumference were taken. Respondents completed questionnaires consisted of socio-demographic background, lifestyle practices (eating behaviours, physical activity, smoking habits and sleeping hours), personality traits, parenting styles, social support and dietary intake. Eating behaviours were assessed using Three-Factor Eating Questionnaire-R18. Physical Activity Questionnaire for Adolescents (PAQ-A), WHO Global School-Based Student Health Survey Model (GSHS) and formula of $(\text{mean hours of sleeping on weekdays} \times 5) + (\text{mean hours of sleeping on weekends} \times 2) / 7$ for average hours (and minutes) of sleep during weekdays and weekend days were used to determine physical activity, smoking habits and sleeping hours respectively. Personality traits were obtained using USM Personality Inventory (USMaP-i). Parenting styles were assessed through Parental Authority Questionnaire, while social support was determined using Multidimensional Scale of Perceived Social Support (MSPSS). The current dietary intake was measured through 24-hour dietary recall.

Altogether, there were 199 male and 231 female students from five randomly selected schools participated in this study on a voluntary basis. The sample comprised of 84.7% Malays, 7.9% Chinese, 6.7% Indian, while 0.7% were from other ethnic groups. Distribution of the respondents according to age showed 29.1% aged 13 years old, while 34.7% and 36.3% aged 14 and 16 respectively. A majority of the respondents' father (91.4%) and mother (92.3%) aged between 36 - 55 years old with the mean age of 46.45 ± 5.67 and 43.34 ± 5.39 for father and mother respectively. Most of the parents had at least finished secondary school with a proportion of 50.0% and 57.2% for respondents' father and mother respectively. More than half of the respondents' mother (67.2%) has a total income below RM 2300 with a median of RM 800.00, while most of the respondents' fathers (49.1%) earn between RM 2300 - RM 5599 with a mean of RM 3720.62 ± 2792.83 .

Uncontrolled eating is the most prevalent among respondents with female respondents significantly having a higher score of restrained eating ($t=-2.477$, $p<0.05$) and emotional eating ($t=-2.089$, $p<0.05$) compared to male respondents. In contrast, male respondents reported to score higher than female respondents for physical activity part ($t=5.756$, $p<0.01$). Current smoking was reported by 3.0% of the respondents. Sleeping duration of the respondents was longer during weekdays than weekend days with female respondents reported having longer sleeping hours (8.43 ± 7.30) during the weekend, as compared to male respondents who tend to sleep longer during weekdays (7.79 ± 5.10). Female respondents were more likely to be neurotic ($t=-4.961$, $p<0.01$) and agreeable ($t=-4.961$, $p<0.01$) as compared to male respondents.

Both of father ($t=3.189$, $p<0.01$) and mother ($t=3.443$, $p<0.01$) were more permissive towards males compared to females, while mother authoritarianism was significantly greater among females ($t=-2.604$, $p<0.01$). The respondents relied more on family members and friends as the main support. A proportion of 31.2% and 22.9% were in the overweight and obese category for male and female respondents respectively. Mean of BMI-for-age for male and female respondents was 0.17 ± 1.52 and 0.55 ± 1.34 respectively. Waist circumference showed that around 21.6% of female and 15.6% of male respondents had a high risk of developing abdominal obesity with a mean of 72.16 ± 11.85 cm in males and 73.08 ± 10.06 cm in females. The consumption of energy, protein and several key micronutrients did not meet Recommended Nutrient Intake (RNI). Males significantly have a higher intake of energy with a mean of 1425 ± 583 kcal compared to females with a mean of 1232 ± 529 kcal. Prevalence of misreporting of energy intake was high with 79.6% of them were underreported and 2.4% over reported.

Respondents with a higher score of uncontrolled eating ($r=0.231$, $p<0.01$), highly perceived their fathers ($r=0.107$, $p<0.05$) and mothers ($r=0.104$, $p<0.01$) as authoritarian, highly perceived their fathers ($r=0.098$, $p<0.05$) and mothers as permissive ($r=0.098$, $p<0.05$), have high supportive family ($r=0.142$, $p<0.05$) and friends ($r=0.095$, $p<0.05$) were found to be significantly associated with higher energy intake. On the other hand, higher energy intake was associated among respondents with low conscientiousness trait ($r=-0.158$, $p<0.01$), low BMI-for-age ($r=-0.147$, $p<0.01$) and smaller waist circumference ($r=-0.108$, $p<0.05$). Uncontrolled eating ($\beta=0.090$, $p<0.05$) was found to have the strongest influence on energy intake of the respondents and followed by conscientiousness trait ($\beta=-0.068$, $p<0.05$).

The findings of this study showed that energy consumption of adolescents could be influenced by lifestyle and individual trait. This is in line with the findings of previous studies in which uncontrolled eating style may result in overconsumption of food. Personality traits often associated with human behaviours with low conscientious individuals consumed more energy compared to high conscientious individuals. Findings on their lifestyle practices and nutritional status indicate a need for a healthy lifestyle intervention program in future. Both of individual and interpersonal factors should be considered when planning and implementing future intervention with specifically focusing on self-regulation of eating and personality-based approach.

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

**FAKTOR-FAKTOR BERKAITAN DENGAN PENGAMBILAN TENAGA
DALAM KALANGAN REMAJA DI SEKOLAH-SEKOLAH MENENGAH
YANG TERPILIH DI DAERAH HULU LANGAT, MALAYSIA**

Oleh

AAINAA SYARFA BINTI MOHD SHAHAR

September 2015

Pengerusi: Zuriati Binti Ibrahim, PhD
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Kajian keratan rentas ini bertujuan untuk menentukan faktor-faktor berkaitan dengan pengambilan tenaga dalam kalangan remaja di daerah Hulu Langat. *Multistage cluster sampling* digunakan dalam pemilihan sekolah dan kelas. Satu kelas daripada setiap sekolah dipilih daripada tingkatan 1, tingkatan 2 dan tingkatan 4 oleh pengetua. Ukuran antropometri seperti tinggi, berat badan dan lilitan pinggang diambil. Responden melengkapkan borang soal-selidik yang mengandungi latar belakang sosio demografi, amalan gaya hidup (tingkah laku pemakanan, aktiviti fizikal, tabiat merokok dan tempoh tidur), ciri personaliti, gaya keibubapaan, sokongan sosial dan pengambilan diet. Tingkah laku pemakanan ditaksir menggunakan *Three-Factor Eating Questionnaire-R18*, *Physical Activity Questionnaire for Adolescents (PAQ-A)*, *WHO Global School-Based Student Health Survey Model (GSHS)* dan formula $(\text{min waktu tidur hari biasa} \times 5) + (\text{min waktu tidur hari minggu} \times 2) / 7$ untuk purata jam (dan minit) waktu tidur pada hari biasa dan hari minggu masing-masing digunakan untuk menentukan aktiviti fizikal, tabiat merokok dan tempoh tidur. Ciri personaliti diperolehi menggunakan *USM Personality Inventory (USMaP-i)*. Gaya keibubapaan ditaksir menggunakan *Parental Authority Questionnaire*, manakala sokongan sosial ditentukan menggunakan *Multidimensional Scale of Perceived Social Support (MSPSS)*. Pengambilan diet terkini diukur menggunakan kaedah ingatan diet 24-jam.

Secara keseluruhan, seramai 199 pelajar lelaki dan 231 pelajar perempuan dari lima buah sekolah yang dipilih secara rawak terlibat secara sukarela dalam kajian ini. Sampel kajian terdiri daripada 84.7% kaum Melayu, 7.9% kaum Cina, 6.7% kaum India, manakala 0.7% daripada lain-lain kumpulan etnik. Taburan responden mengikut umur menunjukkan 29.1% berumur 13 tahun, manakala 34.7% dan 36.3% masing-masing berumur 14 dan 16 tahun. Majoriti daripada bapa (91.4%) dan ibu (92.3%) responden berumur di antara 36 - 55 tahun dengan min umur 46.45 ± 5.67 dan 43.34 ± 5.39 masing-masing untuk bapa dan ibu. Kebanyakan ibubapa sekurang-kurangnya tamat sekolah menengah dengan sebahagian 50.0% dan 57.2% masing-masing daripada bapa dan ibu responden. Lebih separuh daripada ibu responden (67.2%) mempunyai jumlah pendapatan bawah RM 2300 dengan median RM 800.00, manakala kebanyakan bapa responden (49.1%) berpendapatan di antara RM 2300 - RM 5599 (49.1%) dengan min RM 3720.62 ± 2792.83 .

Uncontrolled eating adalah paling prevalen dalam kalangan responden dengan responden perempuan mempunyai skor signifikan yang tinggi untuk *restrained eating* ($t=-2.477, p<0.05$) dan *emotional eating* ($t=-2.089, p<0.05$) berbanding responden lelaki. Sebaliknya, responden lelaki melaporkan skor yang tinggi bebanding responden perempuan untuk bahagian aktiviti fizikal ($t=5.756, p<0.01$). Perokok semasa dilaporkan oleh seramai 3.0% daripada responden. Tempoh masa tidur responden adalah lebih lama pada hari biasa berbanding hari minggu dengan responden perempuan melaporkan tempoh masa tidur yang lebih lama (8.43 ± 7.30) ketika hari minggu, berbanding responden lelaki yang lebih cenderung untuk tidur lebih lama ketika hari biasa (7.79 ± 5.10). Responden perempuan lebih cenderung untuk menjadi neurotik ($t=-4.961, p<0.01$) dan *agreeable* ($t=-4.961, p<0.01$) berbanding responden lelaki.

Kedua-dua bapa ($t=3.189, p<0.01$) dan ibu ($t=3.443, p<0.01$) responden adalah lebih permisif terhadap responden lelaki berbanding lelaki, manakala gaya *authoritiveness* ibu adalah lebih signifikan dalam kalangan responden perempuan ($t=-2.604, p<0.01$). Responden lebih mengharapkan ahli keluarga dan rakan-rakan sebagai sumber sokongan utama. Sebahagian daripada 31.2% dan 22.9 % adalah dalam kategori berlebihan berat badan dan obes masing-masing bagi responden lelaki dan perempuan. Min untuk *BMI-for-age* bagi responden lelaki dan perempuan masing-masing ialah 0.17 ± 1.52 and 0.55 ± 1.34 . Lilitan pinggang menunjukkan sekitar 21.6% responden perempuan dan 15.6% responden lelaki berisiko tinggi untuk mengalami *abdominal obesity* dengan min 72.16 ± 11.85 cm dalam kalangan responden lelaki dan 73.08 ± 10.06 cm dalam kalangan responden perempuan. Pengambilan tenaga, protein dan beberapa mikronutrien penting tidak menepati *Recommended Nutrient Intake (RNI)*. Responden lelaki secara signifikannya mempunyai pengambilan tenaga yang lebih tinggi dengan min 1425 ± 583 kkal berbanding responden perempuan dengan min 1232 ± 529 kkal. Prevalen *misreporting* untuk pengambilan tenaga adalah tinggi dengan 79.6% daripada mereka adalah *underreported* dan 2.4% *over reported*.

Responden dengan skor yang lebih tinggi untuk *uncontrolled eating* ($r=0.231, p<0.01$), lebih menganggap bapa ($r=0.107, p<0.05$) dan ibu ($r=0.104, p<0.01$) mereka adalah *authoritarian*, lebih menganggap bapa ($r=0.098, p=0.05$) dan ibu ($r=0.098, p=0.05$) mereka adalah permisif, mempunyai ahli keluarga ($r=0.142, p<0.05$) dan rakan ($r=0.095, p<0.05$) yang sangat menyokong adalah secara signifikannya berkaitan dengan pengambilan tenaga yang lebih tinggi. Manakala, pengambilan tenaga yang tinggi dikaitkan dengan responden yang dengan sifat *conscientiousness* yang rendah ($r=-0.158, p<0.01$), indeks jisim tubuh (IJT) yang rendah ($r=-0.147, p<0.01$) dan lilitan pinggang yang kecil ($r=-0.108, p<0.05$) berkait songsang dengan pengambilan tenaga para responden. *Uncontrolled eating* ($\beta=0.090, p<0.05$) mempunyai pengaruh paling kuat ke atas pengambilan tenaga para responden dan diikuti dengan sifat *conscientiousness* ($\beta=-0.068, p<0.05$).

Hasil dapatan kajian ini menunjukkan bahawa pengambilan tenaga dalam kalangan remaja boleh dipengaruhi oleh gaya hidup dan sifat individu. Hal ini selari dengan hasil dapatan kajian-kajian sebelum ini di mana gaya *uncontrolled eating* mungkin menyebabkan pengambilan makanan berlebihan. Sifat personaliti selalu dikaitkan dengan perlakuan manusia di mana individu dengan *conscientious* yang rendah

mengambil lebih tenaga berbanding individu dengan *conscientious* yang tinggi. Hasil dapatan bagi gaya hidup dan status pemakanan menunjukkan keperluan mengadakan program intervensi gaya hidup sihat pada masa hadapan. Kedua-dua faktor individu dan *interpersonal* perlu dipertimbangkan apabila merancang dan menjalankan intervensi pada masa hadapan dengan fokus secara spesifik pada pemakanan *self-regulation* dan *personality-based approach*.



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

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LIST OF ABBREVIATIONS

BMI	Body Mass Index
BMR	Basal Metabolic Rate
GSHS	Global School Health Survey
JPNS	Jabatan Pelajaran Negeri Selangor
MSPSS	Multidimensional Scale of Perceived Social Support
MASCO	Malaysian Standard Classification of Occupation
MoE	Ministry of Education
NHMS	National Health and Morbidity Survey
NREM	Non-Rapid Eye Movement
PAQ	Parental Authority Questionnaire
PAQ-A	Physical Activity Questionnaire-Adolescent
PE	Physical Education
PMR	Penilaian Menengah Rendah
PPD	Pejabat Pendidikan Daerah
REM	Rapid Eye Movement
RNI	Recommended Nutrient Intake
SD	Standard Deviation
SES	Socio-Economic Status
SMK	Sekolah Menengah Kebangsaan
SPM	Sijil Pelajaran Malaysia
SPSS	Statistical Package for the Social Sciences
TFEQ-R18	Three Factors Eating Questionnaire-Revised 18
USMaP-i	Universiti Sains Malaysia (USM) Personality-Inventory
WHO	World Health Organization

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CHAPTER ONE

INTRODUCTION

1.1 Background of study

Adolescence is a transition process from childhood to adulthood, which begins with initial secondary sexual characteristics development that usually requires adequate nutritional intake to achieve optimum growth and development (National Coordinating Committee on Food and Nutrition, 2005; WHO, 2005). Healthy eating could promote better health, well-being and minimise the possibility of getting chronic diseases in later life (Shannon, Story, Fulkerson, & French, 2002). It is essential for adolescents to have reliable nutrition information and develop healthy dietary habits to help them get the right nutrients. Energy and nutrient needs may vary according to an individual, for example, a 15 or 16-year-old actively growing adolescent boy may need higher calorie consumption compared to a slowly growing girl of the same age (Lew & Barlow, 2005).

The dietary intake of adolescents is one of the major concerns in public health as there is accumulating evidence that relates poor nutrition to elevated risks of obesity-related health problems (Canete, Gil-Campos, Aguilera & Gil, 2007). Changes in lifestyle have resulted in sedentary ways of living with less physical activity and increased food consumption (El-Hazmi & Warsy, 2001). Lifestyle practices such as eating behaviours, smoking, alcohol consumption, physical inactivity and lack of sleep have an influence on adolescents' food intake, making it important to point out the lifestyle problems that are related to adolescents' health (Qidwai, Ishaque, Shah & Rahim, 2010).

The psychology of eating behaviours consists of cognitive, behavioural and emotional eating habits; which are much related to dietary intake of adolescents (Angle et al., 2009). Uncontrolled eating has been found to be associated with the liking for salty and fatty foods, while sweet and fatty foods were preferred among emotional eaters (Keskitalo et al., 2008). Active adolescents have been reported to have higher energy, carbohydrate, meat and vegetable intakes than their non-active counterparts (Croll et al., 2006; Tur, Puig, Benito & Pons, 2004). Risky behaviours such as cigarette smoking and alcohol consumption have been shown to be positively associated with high-fat foods and fast food intakes, but lower intakes of fiber and antioxidants (Padrao, Lunet, Santos & Barros, 2007; Arcan, Kubik, Fulkerson, Hannan & Story, 2011). Other studies found that adolescents with less than 8 hours of sleep tend to consume higher amounts of macronutrients, total calories and snacks, but inadequate intakes of fruit and vegetables (Landis, Parker & Dunbar, 2009; Weiss et al., 2010; Garaulet et al., 2011).

A number of studies on determinants of dietary intake that focus on individual determinants such as attitudes, personality traits and taste preference shows that all of these determinants could subsequently affect the nutritional health (Steyn, 2010; van der Host et al., 2007). Personality is considered as one of the potentially essential determinants of health behaviours. It refers to broad dispositions that could explain why

individuals behave differently in a healthier manner (Rhodes, Courneya & Jones, 2003; Miller et al., 2004). Different personality types have a different approach in term of food consumption. In general, those with conscientiousness, agreeableness and openness to experience traits tend to consume a diet high in fiber, but low in fat and salt content (de Bruijn, Kremes, van Mechelen & Brug, 2005).

Interpersonal or environment factors could also result in individual differences in term of dietary intake; being in subcultural groups or even within families, individuals may have different patterns of food consumption (Birch 1998; Cullen et al., 2001; Woodruff & Hanning, 2008; Pearson, Timperio, Salmon, Crawford & Biddle, 2009). Parents are one of the most influential social–environmental factors for adolescents who could affect adolescents' health behaviours (Baranowski, 1997; Kodl & Mermelstein, 2004). Peers and friends may exert much stronger influential effect than parents on youths' eating behaviour as they have broad social circles that motivate them to behave in a certain way like dieting (Salvy, Howard, Read & Mele, 2009; Mueller, Pearson, Muller, Frank & Turner, 2010). Parenting styles are closely related to children's dietary intake, as a child with parent-centered feeding (authoritarian) is more likely to consume healthy food, while adolescents who reported more permissiveness or demanding parents (authoritative) have been reported to have less healthy food choices (De Bourdeaudhuij, 1997; Francis, Hofer & Birch, 2001; Arredondo et al., 2006).

Social support is an important predictor of healthy eating and often associated with dietary intake (Kubik, Lytle & Fulkerson, 2005). Lack of social support could make adolescents turn to food to compensate the physical distance from family or friends especially when dealing with new emotions (Wainer, 2010). Those with supportive family members and friends were related to healthful diet, high intake of fiber and calcium, but low consumption of fast foods and soft drinks (Larson, Story, Wall & Neumark-Sztainer, 2006; Stanton, Green & Fries, 2007).

Obese individuals are more prone to overeating as they failed to recognize the need of hunger due to poor interoceptive awareness (van Strien & Ouwens, 2003). Some studies showed that obese individuals are tempted by the sensory characteristics of food; faced with an environment rich in dietary signals, they tend to overeat (Braet & Crombez, 2003). Those with larger body mass index (BMI) have been found to have higher calorie and fat intake, but less intake of carbohydrate (Garaulet et al., 2000; Zalilah, Khor, Mirnalini, Norimah & Ang, 2006; Villa et al., 2007). Overweight adolescents also tend to adopt unhealthy eating by consuming more snacks such as chips, pizza and chocolate, but less fruit and vegetables compared to the normal weight counterparts (Hassapidou, Fotiadou, Maglara & Papadopoulou, 2006).

1.2 Problem statement

Energy intake is the foundation of diet, as all nutrients needed must be provided from the food consumed to fulfill the nutritional requirement. However, nutrition transition among adolescents shows a trend of the double-edged sword of nutritional issues; nutrition deficiency and overconsumption. One local study reported that snack food

pattern and high-energy pattern were found as habitual dietary intakes of adolescents (Nurliyana, Muhd Nasir, Zalilah & Rohani, 2015). Consumption of total energy had increased from the 1970s to 2000s in all South East Asia countries except for Singapore. Westernisation of diet and moving away from traditional food result in an increase of calorie due to high consumption of protein and fat in diets (Mei Soon & Siong Tee, 2014). Changes in the type and amount of food consumption, especially if energy intake exceeds energy expenditure could induce greater risks of weight gain. The worldwide prevalence of obesity among adolescents shows an alarming trend. In Malaysia, the risk of becoming overweight or obese during adolescence has increased at a rapid rate in recent years (Moy, Gan & Zaleha, 2004; Sakinah, Seong-Ting, Rosniza & Jayah, 2012). According to National Health and Morbidity Survey (NHMS), the prevalence of obesity among children < 18 years old had increased from 5.4% (NHMS III) to 6.8% (NHMS IV) (Azli et al., 2013). In comparison, a higher prevalence was reported in the United States (30%), United Kingdom (20%), Japan (10%) and Thailand (15.8%) (Lobstein, Baur & Uauy, 2004).

Food choices that are formed during childhood and adolescence may persist until adulthood with long-term consequences on health. Personal, environmental, social and lifestyle factors could influence the shifts in dietary intake as children enter into adolescence and start have more independent choices for food (Story, Neumark-Sztainer & French, 2002; Fitzgerald, Heary, Nixon & Kelly, 2010). Moreover, for the past decades, food has become more affordable to people and even the concept of food has changed from just a means of nourishment to a source of pleasure and a marker of lifestyle. As a result, numbers of study have been conducted to examine factors associated with dietary intake. However, most studies have focused mainly on specific foods or food groups rather than energy intake with little information is available on the contribution of factors of interest towards energy intake among adolescents. For example, in term of lifestyle practices, despite various campaign conducted to reduce the prevalence of risky behaviours associated with lifestyle such as tobacco use or unhealthy dietary habits, they continue being major issues in public health (Moy, Gan & Siti Zaleha, 2006; Sirirassamee, Sirirassamee, Borland, Omar & Driezen, 2011; Hizlinda et al., 2012). Previous studies have shown personality traits does influence people's behaviours. However, to the best of my knowledge, there is no study has addressed the issue of association between personality traits with energy intake among adolescents in Malaysia. In addition, there is a lack of data regarding the association between parenting styles and social support with energy intake among adolescents in Malaysia.

An elaborate understanding of the factors that may regulate dietary intake in adolescents is essential as it could be used to modify obesity-inducing eating patterns and develop effective interventions (van der Horst et al., 2007). The findings from this study could fill the gap in the body of knowledge of adolescence nutrition by providing preliminary evidence of the association between personality traits, parenting styles and social support with energy intake; and the possible discovery of new information regarding factors associated with energy intake. Furthermore, the findings could also be used as a reference for future research and to identify any potential problems that relate to dietary intake among the adolescents. Thus, this study aims to determine the predictors of energy intake among adolescents such as socio-economic status, lifestyle practices, personality traits, parenting styles, social support, BMI-for-age and waist circumference.

1.3 Significance of study

The current study may provide baseline data that collect background information regarding factors associated with energy intake among adolescents in selected schools in Hulu Langat district. This gathered information might provide details necessary for understanding the extent and the distribution of problem in this particular area. In addition, the baseline data can be used to monitor and track changes in the area of interest that may occur and may be used for a comparison to assess the effectiveness of future intervention program. The findings also can act as a reference for future research to determine other factors that may associate with energy intake among adolescents in Malaysia other than factors of interest.

Prevention is the key strategy in controlling epidemic such as obesity. Findings from this study may provide and highlight new information regarding behavioural and environmental determinants of energy intake. Based on this information, appropriate and effective intervention strategies can then be developed to educate adolescents about the importance of having a balanced diet and adequate nutrition intake. Thus, it could help in reducing obesity and related health problems among adolescents in the future. School children are often the target for intervention strategies as there are greater numbers of potential interventions for children compared to adults. Schools are a natural setting for influencing the environments of children and it is more sensible to initiate prevention during childhood or adolescence because it is difficult to change behaviour once it becomes established in adults.

Policymaker could also use the study findings for the formulation of new policies to promote healthy nutrition among adolescents. Identifying the issues are an important task in policy design as influences at individual, family, community and even policy levels will affect health and well-being of adolescents. Individuals and groups who make and implement the relevant policy can integrate the key findings of the study to address the issues related to energy intake among adolescents and disseminate the messages effectively towards policy audiences. For example, nutrition policies at school may suggest healthier foods available in school or have standards for a number of time students spend in physical education classes.

1.4 Research question

There have been many studies conducted on determinants of energy intake among adolescents. Identifying factors that influence the energy intake of adolescents may help in targeting at-risk groups and developing strategies to promote healthy eating. In this current study, the focus was on intrapersonal factors that include lifestyle practices and personality traits; and interpersonal factors such as parenting styles and social support. This study aimed to determine the contribution of all the factors mentioned on energy intake. Thus, the research question for this study is what are the predictors of energy intake among adolescents?

1.5 General objective

The aim of the present study is to determine factors associated with energy intake among adolescents in Hulu Langat district.

1.6 Specific objectives

1.6.1 Univariate analysis

To determine the socio-economic status (SES), lifestyle practices (eating behaviours, physical activity, smoking habits and sleeping hours) personality traits, parenting styles, social support, body mass index-for-age (BMI-for-age), waist circumference and energy intake of the respondents.

1.6.2 Bivariate analysis

- i. To determine differences in SES, lifestyle practices, personality traits, parenting styles, social support, BMI-for-age, waist circumference and energy intake between male and female respondents.
- ii. To determine differences in energy intake of respondents between different fathers' and mothers' educational levels.
- iii. To determine a difference in energy intake between respondents who smoked and respondents who do not smoke cigarettes.
- iii. To determine associations between SES, lifestyle practices, personality traits, parenting styles, social support, BMI-for-age and waist circumference with the energy intake of the respondents.

1.6.3 Multivariate analysis

To determine the contribution of socio-economic status, lifestyle practices, personality traits, parenting styles, social support, BMI-for-age and waist circumference towards energy intake of the respondents.

1.7 Null hypotheses

1. Ho: There are no significant differences in SES, lifestyle practices, personality traits, parenting styles, social support, BMI-for-age and waist circumference and dietary intake between male and female respondents.
2. Ho: There are no significant differences in energy intake of respondents between different fathers' and mothers' educational levels.
3. Ho: There is no significant difference in energy intake between respondents who smoked and respondents who do not smoke cigarettes.
4. Ho: There are no significant associations between SES, lifestyle practices, personality traits, parenting styles, social support, BMI-for-age and waist circumference with the energy intake of the respondents.

5. Ho: There is no significant contribution of SES, lifestyle practices, personality traits, parenting styles, social support, BMI-for-age and waist circumference towards energy intake of the respondents.

1.8 Conceptual and operational definitions

1.8.1 Socio-economic status (SES)

Cowan and colleagues (2012) defined SES as the one's access to financial, social, cultural and human capital resources. Conventionally, a student's SES include parental educational attainment, parental occupational status and household or family income. The concept of SES can be broadening to include measures of additional household, neighbourhood and school resources. In this current study, SES aspect was measured through the parental educational level and parental income of the respondents.

1.8.2 Eating behaviours

According to Elsnor (2002), eating behaviour is described as the thoughts, actions, and intends that an organism enact in order to ingest solids or liquids. In the current study, the focus was on psychological eating behaviours which include restrained eating, uncontrolled eating and emotional eating. Restrained eating is characterised by an intentional restriction of food intake in order to lose or control body weight (Burger & Stice, 2011). On the other hand, uncontrolled eating is defined as the tendency to overconsume of food more than usual due to a loss of control over food intake (Karlsson, Persson, Sjostrom & Sullivan, 2000), while emotional eating is an act of (over) eating in response to negative affect with no particular moods or emotions (Faith, Allison & Geliebter, 1997; Thayer, 2001). Eating behaviours factor was determined using Three-Factor Eating Questionnaire-R18 (TFEQ-R18) developed by Karlsson, Persson, Sjostrom and Sullivan (2000).

1.8.3 Physical activity

Physical activity is any bodily movement that is produced by skeletal muscles which require physical expenditures (WHO, 2001). For the current study, physical activity was operationalised using Physical Activity Questionnaire for Adolescents (PAQ-A) originally developed by Kowalski, Crocker and Donen (2004) which includes activities during leisure time, school days (physical education and lunch) and weekend.

1.8.4 Smoking status

Smoking has several definitions depending on the frequency of smoking. Based on the WHO (1998) definition, respondents who report smoking at the time of the survey or known as current smokers should be further classified into daily (at least once a day) and occasional smokers (who smokes, but not every day). A non-smoker is a person who does not smoke at all during the time of the survey. For the current study, smoking refers

to someone who is smoking at least once for the past 30 days. It was determined using WHO Global School-Based Student Health Survey Model (GSHS).

1.8.5 Sleeping hours

Sleeping hours refers to the total amount of sleep obtained, either during a nocturnal sleep episode or across a 24-hour period (Kline, 2013). In the current study, sleeping hours was represented by the average total sleeping hours for both weekend days and weekdays (Garaulet et al., 2011).

1.8.6 Personality traits

Personality can be defined as “a relatively enduring structure of motivations and resources” (Helson, Ravenna & Stewart, 1994). Five major personality traits are individually unique but complement each other, extraversion, agreeableness, conscientiousness, neuroticism and openness to experience. Extraversion refers to sociable, preference for large groups, energetic and talkative types. Agreeableness involves social adaptability, cooperativeness, helpful, affectionate, trust and warm toward others. Conscientious individuals are very reliable, organised, dependent and efficient when performing tasks. Neuroticism deals with the emotional instability that covers a range of negative emotions such as anger, tense, irritable and moody. Openness to experience represents a willingness to adopt an unconventional way of thinking, imaginative, creative, curiosity and invest in learning new experiences (John & Srivastava, 1999). In this current study, personality traits that include extraversion, agreeableness, conscientiousness, neuroticism and openness to experience was measured using USM Personality Inventory (USMaP-i) by Muhd Saiful, Ahmad Fuad and Abdul Rahman (2010).

1.8.7 Parenting styles

Parenting styles can be explained by how parents respond towards their children’s needs and how they control their children’s action (Maccoby & Martin, 1983). In this study, the parenting styles refer to those parenting styles perceived by the respondents that included authoritarian, authoritative, or permissive parenting styles and these perceived parenting styles were measured using Parental Authority Questionnaire by Buri (1991). Authoritarian parents exert controlling behaviours towards their children based on standard rules without any flexibility. Authoritative parenting encourages verbal give and take, exerts firm control, but does not confine the children with restriction. On the other hand, children with permissive able to self-regulate their own activities as much as possible and does not restricted to any specified rules (Baumrind, 1966).

1.8.8 Social support

Generally, social support is known as support provided by others within interpersonal relationships (Hirsh, 1981). For the purpose of this study, social support consisted of perceived support received from family, friends and significant others and it was

determined using Multidimensional Scale of Perceived Social Support by Zimet, Dahlem, Zimet and Farley (1988).

1.8.9 Dietary intake

Dietary intake refers to the intake of food that can be metabolised to provide energy and build tissues, while energy intake is the total amount of calories taken either ingested or parenteral routes daily (Polonov, Nocheva, Balabanski & Andreev, 1982). In this study, dietary intake was assessed using 24-hour dietary recall to determine total energy, carbohydrate, protein, fat and micronutrients intake.

1.9 Conceptual framework

Figure 1.1 presents the conceptual framework of this study. The independent variables assessed in this study are SES, lifestyle practices, personality traits, parenting styles, social support, BMI-for-age and waist circumference. All of these independent variables were analysed with one dependent variable; energy intake. A family's SES is basically based on the income, educational level, occupation and social status of the family in the community. SES is one of the most widely studied constructs in epidemiology research and it is often found to be related to health and well-being of children (Wang & Beydoun, 2007; Wang & Lim, 2012). Several ways of measuring SES have been proposed with the characteristics of an individual, family and neighbourhood could each define and represents the SES (Chen & Paterson, 2006). In this current study, SES includes both parental income and parental educational level of the respondents.

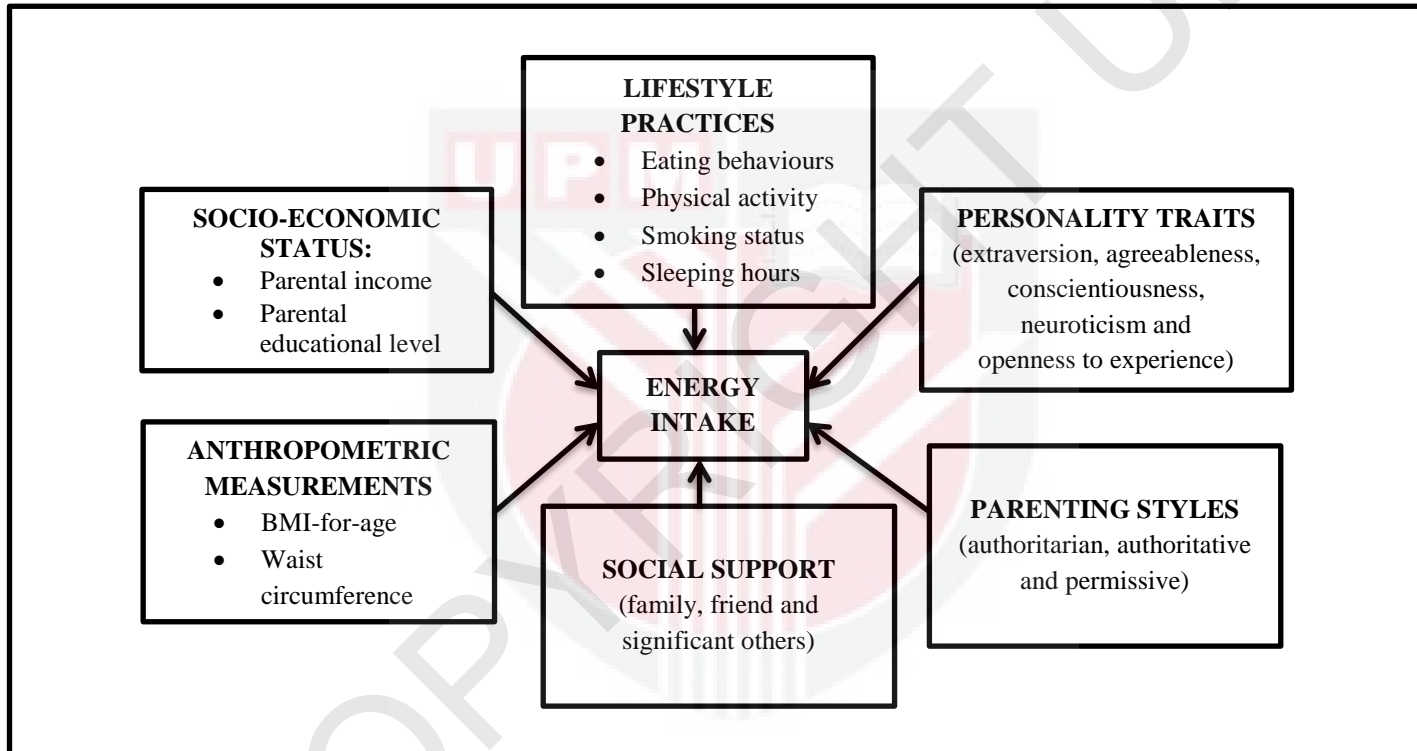


Figure 1.1: Conceptual framework of the study

Practising healthy lifestyle remains a challenge to a majority of the population. It typically involves a behavioural decision about food, exercise, substances use, stress reduction and other health-related behaviours which are up to the individuals. Previous studies show that lifestyle factors have a profound effect on health during lifetime (Chiueve, McCullough, Sacks & Rimm, 2006; Landsberg et al., 2010). In the field of health promotion, lifestyle modification should be taken into consideration to assist people to live a healthy lifestyle. As lifestyle is often related to other aspects of life, it should be examined within this context. For the purpose of this study, lifestyle practices consist of eating behaviours (restrained eating, uncontrolled eating and emotional eating), physical activity, smoking habits and sleeping hours.

Personality traits can be used to describe how people differ from one another; some people are very talkative while others prefer to be alone. These traits reflect peoples' characteristics of thoughts, feelings and behaviours that persist over time and across situations (Atkinson et al., 2000). Studies on personality-health relationship may explain why certain people are healthier than others (Goodwin & Friedman, 2006; Hudek-Knežević & Kardum, 2009). The differences in personality style can be observed through diet as well. People with anxiety-proneness were associated with eating after satiated, while low sociability individuals were correlated with greater dietary intake control (van den Bree, Przybeck & Robert Cloninger, 2006). In this study, personality traits comprise of conscientiousness, extraversion, openness to experience, neuroticism and agreeableness. These 5-factor personality traits indicate the commonalities among the existing systems of personality traits and often being used in research (John & Srivastav, 1999).

A parenting style is a process and strategies that parents use in child rearing. It is a representation of how parents respond and demand towards their children and involving much more than providing food, safety and care to the children (Spera, 2005). Likewise, parenting styles have been associated with health-related behaviours in children and adolescents such as dietary intake. Arredondo and colleagues (2006) have found that parents practising positive monitoring and appropriate disciplining style were associated with children's healthy eating, while children with controlling parents associated with unhealthy eating. For the purpose of this study, parenting styles involve both paternal and maternal authoritarian parenting, authoritative parenting and permissive parenting.

Social support is a range of interpersonal relationships that provided support which have an impact on individual's functioning (Costello, Pickens & Fenton, 2001). Most adolescents may not experience any major problems or have significant personal problems throughout adolescence, but they still need help and support to make the transition to adulthood (Fydenberg, 1997). The role of social support in determining adolescents' dietary habits has been widely reported in the literature. A study by Stanton, Green & Fries (2007) shows that support from family and friend related with healthier dietary practices, while total energy intake was found to be positively correlated with social support (Risvas et al., 2008). In this study, social support composes of family support, friend support and significant others support.

Body mass index (BMI) is typically used to assess weight status in children and adolescents as well as adults. Unlike adults, the BMI for children and adolescents must be based on a reference-standard that accounts for the child age and sex (Must & Anderson, 2006). Waist circumference can be used to determine abdominal obesity in adolescents by comparing it with proposed cutoff points (Rosa, Mesquita, Romeiro da Rocha & Fonseca, 2007). Studies have been conducted in investigating the relationship between diet and adiposity in adolescents. For example, higher BMI z-score and waist circumference consumed more energy than their lean counterparts (Elliot et al., 2010). For this study, BMI-for-age and waist circumference were taken as part of anthropometric measurements.



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