UNIVERSITI PUTRA MALAYSIA

ASSOCIATIONS OF DIETARY INTAKE, EATING BEHAVIOR AND PHYSICAL ACTIVITY LEVEL WITH BODY WEIGHT STATUS AMONG ADOLESCENTS IN PUTRAJAYA

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BY

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ABSTRACT

ASSOCIATIONS OF DIETARY INTAKE, PHYSICAL ACTIVITY LEVEL AND EATING BEHAVIOR WITH BODY WEIGHT STATUS AMONG ADOLESCENTS IN PUTRAJAYA

Nur Syairah Che Noh

Obesity is one of the major public health problems worldwide and it is a common nutritional problem among children and adolescents. This cross-sectional study was conducted to determine the associations between dietary intake, physical activity level and eating behavior with body weight status among secondary school students in SMK Putrajaya Presint 16(1). Respondents completed a self-administered questionnaire including measures of socio demographic data. Dietary intakes were measured using 24-hour diet recall and total energy and macronutrients were compared with Recommended Nutrient Intake (RNI) value. Physical activity level was assessed using Physical Activity Questionnaire for adolescent (PAQ-A) and eating behavior was assessed using Eating Behavior Questionnaire (EBQ). Body weight and height were measured and Body Mass Index (BMI) was calculated. A total of 180 respondents aged 14-16 years old with equal number of male and female participated in this study. Majority of respondents (97.2%) were Malays and the household income ranged from RM 800-RM 24000. The mean of total energy intake for 14 and 16 years old were 2118±605 kcal and 2179±593 kcal, respectively. Majority (77.2%) of the respondents skipped meals 2-3 times/week, snacked between meals (91.1%) and having moderate physical activity level (53.9%). The prevalence of overweight and obesity (27.2%) was about four times than the underweight (6.1%). Energy intake ($r=0.229, p<0.05$) and fast food consumption ($r=0.156, p<0.05$) were positively correlated with BMI while snacking behaviors was inversely correlated with BMI ($r=-0.171, p<0.05$).There is significant association between type of dietary practices and body weight status ($p<0.05$). However, socio-demographic status, meal skipping behaviors, eating companion and physical activity level were not associated with body weight status. Body weight status was associated with energy intake, snacking, fast food consumption and types of dietary practices. Thus, promoting healthy eating practices and have physically active lifestyle should be emphasised among adolescents to achieve healthy body weight.

ABSTRAK

PENGAMBILAN MAKANAN, TINGKAH LAKU PEMAKANAN, TAHAP AKTIVITI FIZIKAL DAN STATUS BERAT BADAN DI KALANGAN REMAJA DI PUTRAJAYA

Nur Syairah Che Noh

Obesiti merupakan salah satu masalah kesihatan awam yang utama di seluruh dunia dan merupakan masalah pemakanan yang sering berlaku di kalangan kanak-kanak dan remaja. Kajian keratan rentas telah dijalankan untuk menentukan hubungan antara pengambilan pemakanan, tahap aktiviti fizikal dan tingkah laku pemakanan dengan status berat badan di kalangan pelajar sekolah menengah di SMK Putrajaya Presint 16 (1). Responden mengisi maklumat sosio demografi di dalam borang soal selidik. Pengambilan pemakanan telah dinilai menggunakan ingatan diet 24 jam dan jumlah kalori dan makronutrien dibandingkan dengan Saranan Pengambilan Nutrien (RNI). Tahap aktiviti fizikal dinilai menggunakan Soal Selidik Aktiviti Fizikal untuk Remaja (PAQ-A) dan tingkah laku pemakanan dinilai menggunakan Soal Selidik Tingkah Laku Pemakanan (EBQ).Berat badan dan ketinggian telah diukur dan Indeks Jisim Badan (BMI) telah dikira. Seramai 180 responden yang berumur 14-16 tahun dengan bilangan lelaki dan perempuan yang sama terlibat di dalam kajian ini. Seramai 97.2% daripada responden adalah Melayu dan pendapatan isi rumah adalah di antara RM 800-RM 24000. Purata jumlah pengambilan kalori bagi responden berusia 14 tahun ialah 2118±605 kcal manakala bagi responden 16 tahun ialah 2179±593 kcal. Majoriti (77.2%) daripada responden tidak mengambil makanan 2-3 kali/minggu, mengambil snek (91.1%) dan mempunyai tahap aktiviti fizikal sederhana (53.9%). Prevalen berat badan berlebihan dan obesiti (27.2%) adalah empat kali ganda daripada kekurangan berat badan (6.1%). Pengambilan kalori ($r=0.229, p<0.05$) dan makanan segera ($r=0.156, p<0.05$) mempunyai hubungan yang positif dengan BMI manakala pengambilan snek mempunyai hubungan yang songsang dengan BMI ($r=-0.171, p<0.05$).Jenis amalan pemakanan telah didapati mempunyai hubungan yang signifikan dengan status berat badan ($p<0.05$).Walau bagaimanapun, faktor sosio-demografi, tidak mengambil makanan dan tahap aktiviti fizikal tidak berkaitan dengan status berat badan.Status berat badan dikaitkan dengan pengambilan kalori, pengambilan snek, pengambilan makanan segera dan jenis amalan pemakanan. Oleh itu, pemakanan yang sihat dan mempunyai gaya hidup aktif perlu ditekankan di kalangan remaja untuk mencapai berat badan yang sihat.

CHAPTER 1

INTRODUCTION

1.1 Background

Overweight and obesity are defined as an abnormal or excessive fat accumulation that may impair health. It became one of the emerging threats to the health status of adolescents living in developed countries, Asia and Asia Pacific regions (WHO, 2003). Obesity is considered to be a major public health problem and its prevalence is increasing not only in developed countries (Wang & Beydoun, 2007; Janssen et al., 2005) but also in countries that are undergoing economic and social transition (Laxmaiah et al., 2007; Xie et al., 2007; Salazar et al., 2006). According to World Health Organization (WHO), one in three adolescents are overweight and obese and obesity is now dramatically increasing in low- and middle income countries (WHO, 2012).

The prevalence of overweight and obesity has increased at an alarming rate not only in developed countries, but also around the world. Based on the National Health and Nutrition Examination Survey (2009-2012), the prevalence of obesity among United States adolescents aged 12 to 19 years has increased from 18.4% in 2009-2010 to 20.5% in 2011-2012 (Fryar, Carroll, & Ogden, 2014).

In context of Malaysia, National Health and Morbidity Survey (NHMS) III reported that the prevalence of obesity among children aged below 18 years old is 5.4% while in NHMS IV the prevalence of obesity is 6.1%. In addition, report from Malaysia Global School Health Survey which was a school-based survey of students that involve Forms 1 until Form 5 students, reported that prevalence of overweight among students aged 13-17 years old was 24.2% while for obesity was 10.0% (WHO, 2014).

According to the study done by Rampal et al. (2007), among 3,333 secondary school students aged 13-17 years in the Klang district found that the prevalence of overweight among adolescents was 19.6%. Another study also reported that the prevalence of overweight and obesity among adolescents aged 13-15 years old in Kajang district was 19.5% (Rezali, Chin, & Nisak, 2012). These findings show that high prevalence of overweight and obesity among adolescents in Malaysia has become a serious epidemic. The increment in overweight and obesity problems has been related to an increasing sedentary lifestyle as well as changing dietary habits. In many countries, rapid economic development has brought about changes in the populations dietary intakes and lifestyle (WHO, 2000).

Adolescence represents an important life stage for the development of healthy nutrition behaviors. The nutritional demands were associated with rapid physical and cognitive development (Rogol, Roemmich, & Clark 2002). It is a crucial period since the dietary patterns may be adopted and will be followed in the subsequent life stage. Adolescents who were practicing an unbalance diet, have a great influence on fatness and chronic disease that may developed later since adiposity track into adulthood. Therefore, the aim of this study is to determine associations between dietary intake, eating behavior and physical activity level with body weight status among adolescents.

1.2 Problem statement

Obesity has been reported to be a serious public health problem among children and adolescents across the developed and developing country in recent years (Reilly, 2006). The high prevalence of overweight and obesity should be as one of the priority health issues among adolescents as overweight and obesity during adolescence tend to persist until adulthood (Gordon, 2001). This statement is supported by about 70% to 80% of obese adolescents remained to be obese in their adulthood (Segal & Sanchez, 2001).

Obesity in children and adolescents is associated with both short-term and long-term consequences, which could be of a greater health concern. Short-term consequences of obesity in children include low self-esteem, behavioral problems, clinical conditions such as asthma, systemic inflammation and type 1 diabetes mellitus, and cardiovascular risk factors. While for long-term consequences of obesity in childhood and adolescents may include adverse social and economic outcomes such as

income and educational achievement and increased cardiovascular risks and premature mortality in adulthood (Reilly et al., 2003).

In addition, overweight and obesity are one of the independent risk factors for many non-communicable chronic diseases (Swinburn, Caterson, Seidell, & James, 2004). For example, overweight and obesity in childhood and adolescence may be higher for cardiovascular diseases when in an advanced ages as overweight and children had at least one cardiovascular risk factor (Hamidi et al., 2006). Hence, there is a need to determine the risk factors that could contribute to the body weight status among adolescents. Below is the research question in this study:

I. Is there any association between socio-demographic status, dietary intake, eating behaviors and physical activity level with body weight status among respondents?

1.3 Significance of the study

This study could add to the body of knowledge in the field of nutrition related to body weight status among adolescent since the pervious study were mainly focused on children and adults. In addition, this study could provide a base-line data for future study on body weight status among adolescents. The findings from this study may provide recommendations for the health practitioners, researchers and other authorities in planning interventions program that promoting healthy eating practices and healthy lifestyle among adolescents.

1.4 Objectives

1.4.1 General objective

To determine the associations between socio-demographic status, dietary intake, eating behaviors, physical activity level and body weight status among respondents.

1.4.2 Specific objectives

1. To assess the socio-demographic status, dietary intake, eating behaviors, physical activity level and body weight status among adolescents.
2. To determine the associations between socio demographic status, dietary intake, eating behaviors and physical activity level with body weight status among adolescents.

1.5 Null hypothesis

There is no significant association between socio-demographic status, dietary intake, eating behaviour and physical activity level with body weight status among adolescents

1.6 Conceptual framework

Figure 1.1 shows the independent and dependent variable in this study. The independent variables included socio-demographic status, dietary intake, eating behaviors and physical activity level.

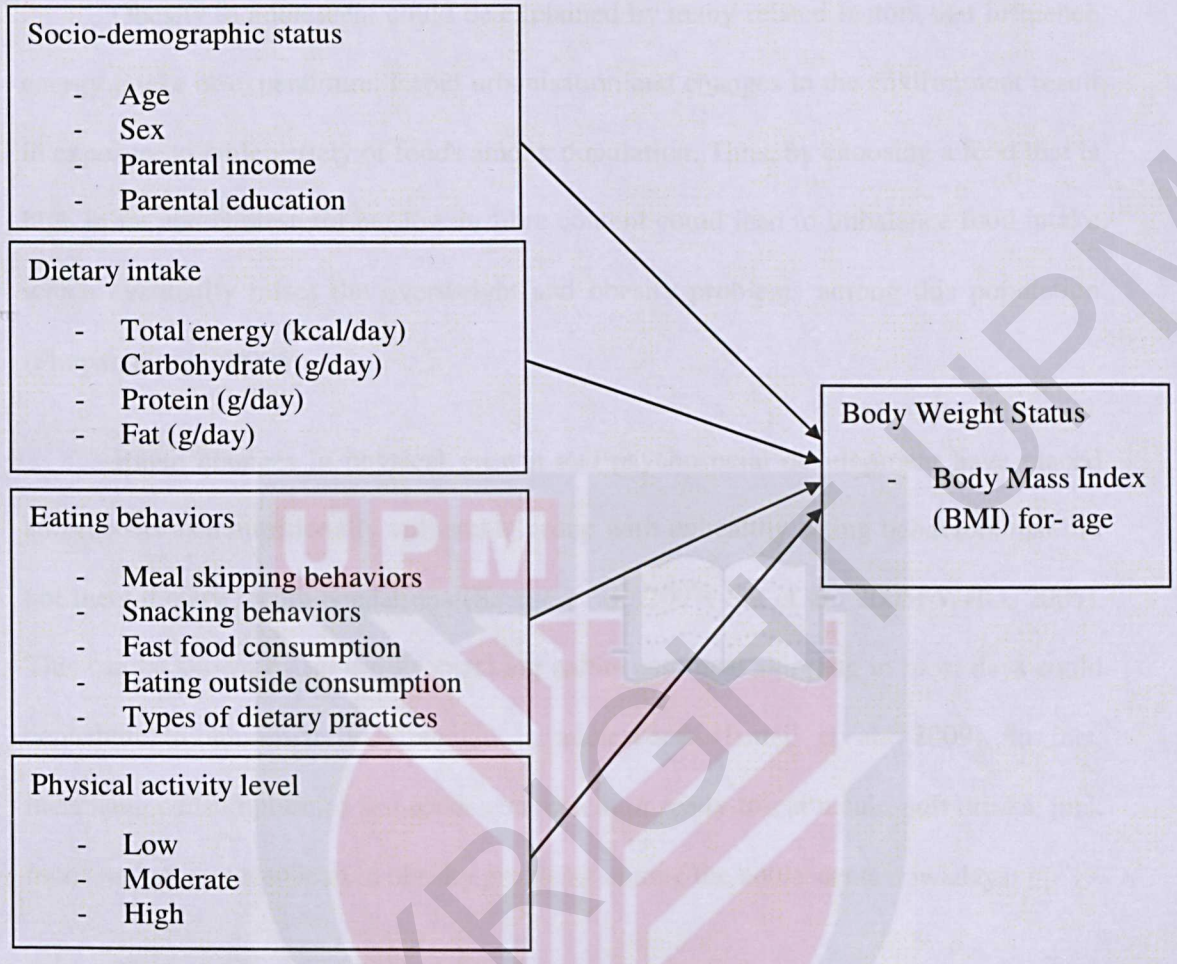

Figure 1.1: Conceptual framework of the study

Socio-demographic status in this study includes age, sex, parental education and parental income. Age and gender difference might influence the body weight status among girls and boys adolescent as younger males (<15 years old) were more likely to be an overweight and obese compared to older males (≥15 years old) (Cheng et al., 2009). Next, lower education and socio-economical family background is associated with less healthier dietary patterns and these populations have a higher risk for overweight both for children (Serra, García, Ribas, Pérez, & Aranceta, 2001).

Obesity in adolescent could be explained by many related factors that influence energy intake or expenditure. Rapid urbanisation and changes in the environment result in exposure to wide variety of foods among population. Thus, by choosing a food that is high in fat and cholesterol but low in fibre content could lead to imbalance food intake which eventually raises the overweight and obesity problems among this population (Phupakdi et al., 2005).

Rapid changes in physical growth and psychosocial development have placed adolescents as a nutritionally vulnerable group with unhealthy eating behaviors that did not meet dietary recommendations (Savige et al., 2007; Shi et al., 2005; WHO, 2005). This can be shown by unhealthy snacking habits and meal skipping in most days could contribute to abnormal body weight in adolescents (Ismail et al., 2009). In fact, increasing consumption of fast foods convenient or ready-to-eat meals, soft drinks, junk foods and sweets also lead to obesity problems among the adolescents nowadays.

Next, inadequate physical activity also associated to overweight and obesity. Teenagers nowadays tend to have sedentary lifestyles, which would rather prefer staying at home for computer games, internet and watching television. Thus, without regular physical activity, energy intake is not balanced up with energy expenditure which can increase the overweight problems (Sakinah, Seong-Ting, Rosniza, & Jayah, 2012).

CHAPTER 2

LITERATURE REVIEW

2.1 Socio-demographic status

Several socio-demographic status have been associated with body weight status among adolescents. Studies done by Cheng et al. (2010), conclude that age, gender and parental education were associated with body weight status among adolescents. In addition, it also associated with ethnicity, single parent families, family size, and urban or rural setting (Shrewsbury & Wardle, 2005). The socio demographic variables studied were age, sex, parental income and education.

2.1.1 Age

A cross sectional study was conducted among Standard 5, Form 2 and Form 4 school children (3620 students) in Kuala Lumpur to determine the body weight status of the children and adolescents (Moy, Gan, & Zaleha, 2004). The cut-off of BMI-for-age > 95th percentile for overweight while <5th percentile for underweight respectively

and reported that the overall prevalence of overweight was 7.3% of overweight while underweight was 14.8%. In addition, this study shows that the youngest age group (Standard 5) had the highest prevalence of overweight (10.1%) as well as underweight (16.1%). In contrast, the prevalence of overweight for Form 2 and Form 4 were 5.6% and 5.7% while for underweight were 15.1% and 12.8% respectively. Hence, it can conclude that as the children's age increased, the prevalence of overweight and underweight has decreased. This could be due to the fact that as they undergo puberty they were able to grow into their desirable weight since they had their growth spurts.

Another cross sectional study was conducted among 10,371 Taiwanese adolescents in Southern Taiwan to determine the relationship between the socio-demographic factors and body weight status found that younger males were more likely to be an overweight when using The International Obesity Task Force (IOTF) and Working Group on Obesity in China (WGOC) references (23.0%, 20.2%) while obese were (11.1%, 14.3%) compared to older males in which the prevalence of having an overweight when using IOTF and WGOC references were (16.8%, 16.6%) and obese were (6.8%, 10.1%) (Cheng et al., 2009).

In this study, the researcher divided the participants into younger (<15 years old) and older adolescents (≥15 years old). This findings show that younger age increased the risk of being overweight or obese compared with older age. A possible explanation is that, as in many other Asian countries, Taiwanese junior high students aged 12 to 14 years old are subjected to very competitive high school entrance examinations and face tremendous pressure to succeed academically. Therefore, they have limited time devoted to exercise and sleep thus increased the possibility to increase their BMI (Fu et

al., 2004). Limitations of the study included using a self-reported weight and height to determine their body weight statuses and recall bias especially females, may underreport their weight under the consideration of social standards.

2.1.2 Sex

A cross-sectional study done by Zalilah et al. (2006), in which the aim of the study is to report on the differences in energy intake, diet composition, time spent doing physical activity and energy expenditure among underweight (UW), normal weight (NW) and at-risk of overweight (OW) Malaysian adolescents (317 females and 301 males) aged 11-15 years reported that prevalence of overweight was higher in male (19.7%) than female (16.7%). In this study, Body mass index (BMI) was computed and the students were classified as underweight, normal weight or overweight according to the WHO's cut-off points for males and females.

In contrast, the prevalence of overweight and obesity were higher among girls (11.1% and 2.7%) compared to boys (8.2% and 1.5%) in the study done by Guedes, Rocha, Sliva, Carvalhal, and Coelho (2011). Overweight and obesity were defined by BMI based on the current method recommended by the WHO in 2007. The study aimed to identify the social and environmental determinants with the prevalence of overweight and obesity in Brazilian school children from a developing region among 5100 schoolchildren aged 6–18 years. The high prevalence among girls may be partially explained by the vulnerability of females associated with sex hormones that increase body fat stores at ages near puberty (Jasik & Lustig, 2008).

On the other hand, study done by Özgüven et al. (2010), among 680 adolescent students (284 males, 396 females) aged 14−18 years found that there were no sex difference was observed in the prevalence of overweight and obesity among adolescents.. Nutritional status was evaluated according to the anthropometric indicators, which were based on the WHO criteria.

2.1.3 Parental education

Parental education was another factor that appeared to have some impact on the body weight status. A study found that school children whose parents had 12 or more years of schooling had 1.5- fold higher odds of being overweight and 2-fold higher odds of being obese compared with whose parents had not completed more than 4 years of schooling (Guedes, Rocha, Sliva, Carvalhal, & Coelho, 2011).

In contrast, study done by Júlíusson et al. (2010), found that risk of overweight and obesity being increased in children with lower parental educational level. The level of parental education was defined by the highest degree obtained by the father or the mother, and classified as no secondary education (including secondary education not finished), secondary education, or university education. The aim of the study was to estimate the prevalence of childhood overweight and obesity and to identify socio-demographic risk factors in Norwegian children. The body mass index of 6386 children aged 2–19 years was compared with the (IOTF) cut-off values to estimate the prevalence of overweight and obesity.

Among young people, diet is influenced by the financial resources available to purchase food and by family education levels that influence the choice and preparation of food. Therefore, it is assumed that young people belonging to families of disadvantaged economic status have low earning power and lack of knowledge of healthy nutrition thus they are more exposed to high-calorie foods and simple carbohydrates, which are cheaper and easier to access which could contribute to overweight and obesity problems. However, more educated parents have more critical awareness of their children's weight status and therefore stimulate a healthier life style. Alternatively, the educational level may represent as an indicator for family wealth, making it easier for those families to take healthier lifestyle (Hesketh, Crawford, Salmon, Jackson, & Campbell, 2007).

2.1.4 Parental income

Based on the cross sectional study conducted by Kim, Ham, Jang, Yun and Park (2013), among 407 overweight and obese children in South Korea found that children in the lower income were more likely to have higher BMI, percentage of body fat, waist–hip ratio (WHR) and lower cardio respiratory fitness than normal body weight. The aim for the study is to identify the economic differences in familial, physiological, psychological, and lifestyle characteristics associated with overweight and obese. Economic statuses were divided into three groups: those with incomes less than 2 million won (US$2,000.00), 2 to 4 million won (US$2,000.00–4,000.00), and more than 4 million won (US$4,000.00).

In contrast, a cross-sectional survey done by Hatami et al. (2014), among 1157 Iranian adolescents to investigate the determinants of overweight/obesity among adolescents found that prevalence of overweight and obesity were higher among adolescents in low (23.1%) or high income families (24.0%) compared to middle income families (16.0%). Based on the family income, participants were categorised as low, middle, and high socioeconomic status (SES).

According to Rossen and Schoendorf, (2012); Singh, Siahpush, and Kogan, (2010), people with low-income levels suffer from a variety of diseases and health risks, including obesity. Studies have reported that low-income families only have access to low-quality, high-fat food, and the habit of binge eating when food is available can lead to obesity (Hofferth & Curtin, 2005; Kang et al., 2006).

2.2 Dietary intake

Study on the association between obesity-related behaviors (dietary practices, physical activity and body image) and body weight status among adolescents among 382 adolescents (187 males and 195 females) aged 13 to 15 years in Kajang, found that the mean total energy intake for overweight and obese respondents (1,760 ± 464 kcal per day) was the highest compared to the underweight and normal weight respondents. However, the mean total energy intake for underweight (1,601 ± 517 kcal per day) and normal weight respondents (1,617 ± 438 kcal per day) were slightly similar. From the results above, it can be concluded that there were no significant differences of mean total energy intake were found between body weight status of the respondents (Rezali, Chin & Nisak, 2012). In contrast, a cross-sectional study conducted by Zalilah et al.

(2006), found that the total energy intake was higher among overweight adolescents (2,138 kcal per day) compare to underweight (1,916 kcal per day) and (1,903 kcal per day).

Dietary intakes were also the determinants of excess body weight in which Bazhan, Kalantari, and Hoshyarrad, (2011), stated that when energy intake increased, the risk of excess bodyweight also increased by 3.05 folds. Furthermore, a prospective study among adolescents found that an increase in energy intake was associated with increase in BMI after one year (Berkey et al., 2000).

2.3 Eating behaviour

Rapid changes in physical growth and psychosocial development have made the adolescents as one of the nutritionally vulnerable group with unhealthy eating behaviors that did not meet dietary recommendations. Typical eating patterns among adolescents are meal skipping, snacking, eating away from home, fast food consumption for meal and snack consumption and unconventional dietary patterns (Savige et al., 2007; Shi et al., 2005; WHO, 2005).

A cross sectional study done by Vik, Øverby, Lien, and Bere, (2010), to assess the relationship between number of meals eaten and weight status among 2870 Norwegian 9th and 10th graders at 33 schools found that the proportions of overweight adolescents related to the number of meals eaten were 10% (0–1 meals), 18% (2 meals), 14% (3 meals), and 10% (4 meals). The study also show that the odd ratio of being overweight among the respondents were decrease as the number of meals increased. Thus, it can conclude that eating four meals per day was significantly negatively related

to being overweight. Number of meals was measured with questions asking whether they ate breakfast, lunch, dinner, and supper the day before.

In addition, in a longitudinal study done by Franko et al. (2007) among 1209 black girls and 1,166 white girls to determine the relationship between meal frequency and body mass index (BMI) reported that girls who ate 3 or more meals per days had lower BMI-for-age z-scores. However, a cross sectional study done by Rezali, Chin, and Nisak, (2012), among 382 adolescents (187 males and 195 females) aged 13 to 15 years in Kajang found that meal skipping were not significantly with body weight status among adolescents. Adolescents who skipped at least one meal per day were considered as skipping meal.

Snack foods tend to be energy dense and lack of nutritional value. Despite their lack of nutritional value, snack foods are readily available to children and adolescents in a variety of settings, including school. A cross sectional study done by Musaiger, Al-Roomi and Bader (2014), among 735 subjects (339 males and 396 females) aged 15–18 years old in Bahrain found that eating between lunch and dinner were significantly associated with the risk of obesity among males, but not among females. The frequency of snacking between meals is divided into never, sometimes and always.

However, Vik, Overby, Lien and Bere, (2010), stated that eating snacks between meals reduces the risk for obesity since the children will eat fewer food items at the next meal but this depends on the type and quantity of food eaten as snack. Snacking between breakfast and lunch was significantly associated with a lower risk of obesity among both males and females. This finding is consistent with the results of a study

among adolescents aged 12–17 years old in Dubai, the United Arab Emirates (Bin, Musaiger, & D'Souza, 2009). In general, healthy snacking between meals was reported to have a protective effect from obesity among children (Zurriaga et al., 2011).

There are several reasons that snacking might increase energy intake and promote weight gain. Snacking might increase energy intake as snack food could contribute to 140–300 calories per item thus it will results in addition of calorie per day. Next, if snack foods derive a substantial amount of energy from fat which is more energy-dense than carbohydrates or proteins as fat has 9 kcal/g compared to carbohydrates or proteins that has 4 kcal/g. Hence, consumption of snack foods could increase energy intake beyond the needs for energy expenditure and promote weight gain (Vik, Overby, Lien, & Bere, 2010).

A cross-sectional study was conducted among 178 secondary school students aged 13 to 16 years old in Bachok district (n=88) and Kota Bharu district (n=90) to determine the association between socio-demographic, dietary habits and physical activity risk factors with overweight and obesity prevalence showed a significant association between frequency of fast food consumption overweight and obesity prevalence in which 31.8% subject who were overweight and obese stated that they always consume fast food while 11.1% subject stated that they were occasionally/not consume fast food (Sakinah, Seong-Ting, Rosniza, & Jayah, 2012).

Brug (2007), pointed out that high consumption of energy-dense fast foods was the major cause for body weight problem as deep frying was the main method of cooking that high in saturated fat. Moreover, the food choices in fast food restaurants

were nutrient imbalanced as they serve a large amount of carbohydrate source and limited vegetables and fruits. In addition, the 'size-up' effect have a greater risk to the obesity problem as people can enjoy a bigger serving with just addition of small amount of money. This is in agreement with Moy et al. (2004) that the rising number of fast food outlets and promotional activities is significantly contribute to high consumption of fast food among children and adolescents.

2.4 Physical activity level

Physical inactivity among adolescents has been reported to be on an uprising trend and has been gaining attention among public health practitioners and policy makers (WHO, 2010). According to Ortega, Ruiz and Sjöström, (2007), children and adolescents who had a low level (first tertile) of vigorous physical activity (PA) , had four times higher odds of being overweight and two times higher odds of having a high-risk waist circumference, compared to those who had a high level (third tertile) of vigorous PA. The aim of the study is to determine the associations of PA and other factors predisposing to overweight, with overweight and central adiposity in children and adolescents among of 557 Swedish children and 517 adolescents. Physical activity was measured with accelerometers which provide a measure of frequency, intensity, and duration of movement over four consecutive days (including necessarily both weekdays and weekend days). Total PA was expressed as total counts recorded, divided by total daily registered time (counts/min).

On the other hand, a cross-sectional study by Farah Wahida, Mohd Nasir and Hazizi (2011), to determine physical activity eating behavior, body weight management knowledge, perception of body image and their association with body weight status of adolescents among 360 adolescents; aged between 13 to 14 years old did not find any correlation between physical activity and BMI of the adolescents. This finding also similar with Dan et al. (2007) which reported there were no significant associations between physical activity and body weight status of adolescents. Both studies measured the physical activity level by using The Physical Activity Questionnaire for Older Children (PAQ-C), which was modified and adapted from Kowalski, Crocker and Donen (2004). The mean scores were classified into three categories of either 'low' (1-2.33), 'moderate' (2.34-3.66) or 'high' (3.67-5.00).

Data from Canadian records from the 2001/02 World Health Organization Health Behavior in School-Aged Children Survey (HBSC) among 11–16-year-old adolescents (5890) reported that physical activity levels were lower in overweight and obese boys and girls than normal-weight youth. The physical activity were measured by asking the subject on how many days in a typical week there were physically active for 60 minutes or more. Subjects were categorized into "low" (≤once/week), "low-moderate"(2–4 days/week), "moderate-high" (4–5 days/week), and "high" (5–6 days/week) physical activity (Janssen et al., 2005).

Schaller et al. (2005), stated that the mean BMI for those who were physically active and use less of the computer and television was significantly lower than in subjects who were not active and spent a long time watching television during leisure time. In addition, subjects were at risk of being obese were those from low physical

activity category meanwhile subjects in the high physical activity category were less likely to be obese. The reason of the changes in physical activity patterns among youth is may due to an increase in time spent watching television, the advent of video games and the internet, and a decrease in the opportunities for physical activity in schools and communities (French, Story, & Jeffery, 2001).

CHAPTER 3

METHODOLOGY

3.1 Study design

The study design used in this study is a cross sectional. Cross sectional is type of an observational study that involves data collected at one point of time.

3.2 Study location

This study was conducted in Putrajaya which the total area is 4,931 hectares. Total population in Putrajaya is 68,361 people in 2010. There are 6,785 of the population in which Malaysian citizens are made up of 64,644 Malay (96.8%), 452 Chinese (0.68%), 820 Indian (1.22%) and 82 other ethnic group (0.12%) (Department of statistic Malayia, 2010). There are 11 schools in Putrajaya namely SMK Putrajaya Presint 8(1), SMK Putrajaya Presint 9(1), SMK Putrajaya Presint 16(1), SMK Putrajaya Presint 11(1), SMK Putrajaya Presint 9(2), Sekolah Sultan Alam Shah (Smbp), SMK

Putrajaya Presint 14(1), SMK Putrajaya Presint 11(2), SMK Putrajaya Presint 18(1), SMKA Putrajaya and SMK Putrajaya Presint 5(1) (Ministry of Education, 2014).

3.3 Sample size determination

Based on a study conducted by Elliot et al. (2010), the correlation between energy intake and BMI among 468 respondents aged 15 years old was r= 0.23. The sample size needed was calculated as below:

Sample size, n $= \frac{(Z_{1-\alpha/2}+Z_{1-\beta})^2}{d^2/(1-d^2)} + 5$

(Cole, 1997)

Where,

n = required sample size

$Z_{1-\alpha/2}$ = confidence level at 95% (1.96)

$Z_{1-\beta}$ = power at 80% (0.84)

d = significant correlation (0.23)

Thus, the minimum sample size:

Correlation, r=0.23:

$$= \frac{(1.96 + 0.84)^2}{0.23^2/(1 - 0.23^2)} + 5$$

= 145

Based on the above calculation, total sample size needed for the study is at least 145 respondents. The sample size was added for additional 20% to avoid any missing data or unwilling participation. Hence, a total of 174 respondents were required in this study.

3.4 Respondents

This study was conducted among 14 to 16 years old adolescents in SMK Putrajaya Presint 16(1). Respondents were chosen according to the inclusion and exclusion criteria were in Table 3.1.

Table 3.1: Inclusion and exclusion criteria's for subject recruitment

Inclusion criteria	Exclusion criteria
Male or female	Adolescents that were having physical disability
Form 2 or 4	Adolescents that were having chronic diseases
Malaysian adolescent	Adolescents that were unable to read and write

3.5 Sampling design

The lists of secondary schools in Putrajaya were obtained from the Ministry of Education. There were 9 regular secondary schools, 1 fully residential school and 1 religious secondary school. However, only regular secondary schools were taken into the sampling process. SMK Putrajaya Presint 16(1) was purposively selected and the students of Form 2 and Form 4 were selected as the subjects. Students who meet the inclusion and exclusion criteria were chosen as the subjects. In this study, 5 out of 7 of Form 2 classes were chosen while 3 out of 5 of Form 4 classes were chosen. The sampling process is shown in Figure 3.1.

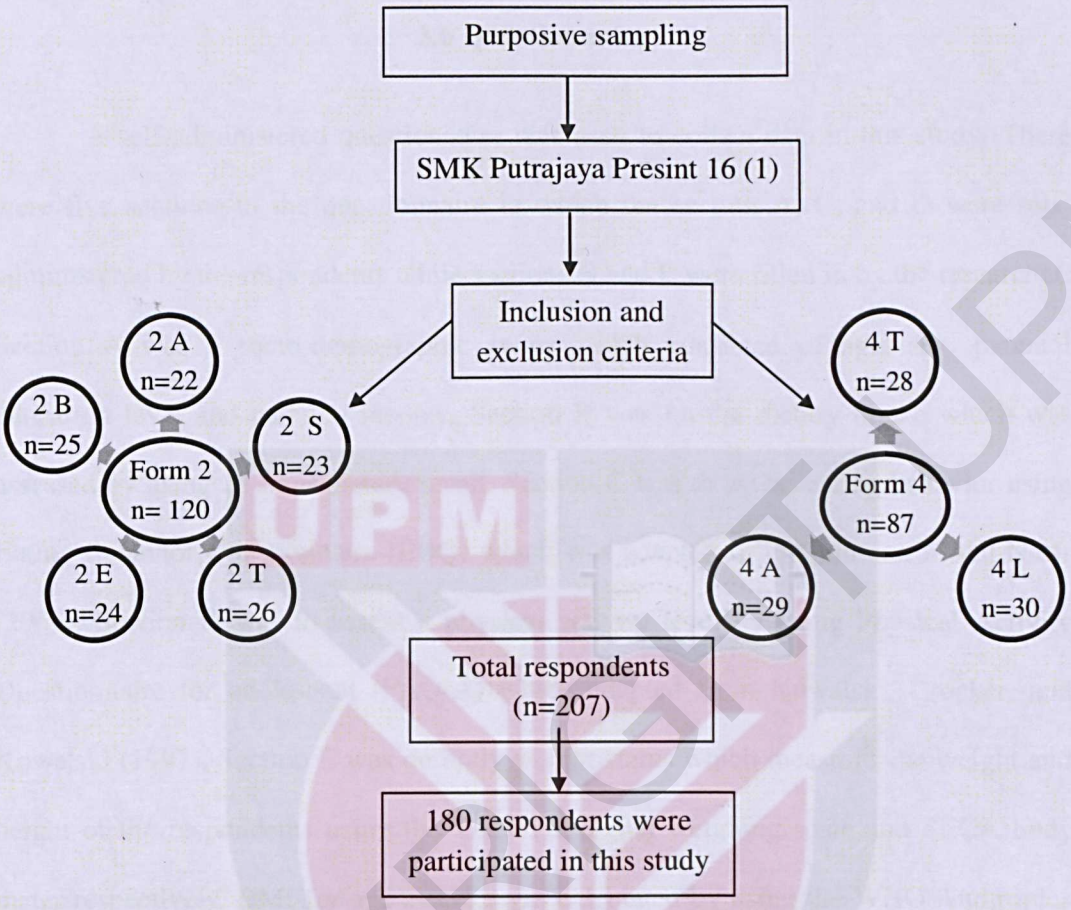

Figure 3.1: Flow chart of sampling design and selection of respondents

3.6 Questionnaire

A self-administered questionnaire was used to collect data in this study. There were five sections in the questionnaire in which the section A, C, and D were self-administered by the respondents while sections B and E were filled in by the researcher. Section A was a socio-demographic status which consisted of age, sex, parental education level and parental income. Section B was on the dietary intake which was assessed by using 24-hour dietary recall. Section C was to assess eating behavior using Eating Behavior Questionnaire (EBQ) which was adapted from Chin and Mohd Nasir (2009). Section D was to assess a physical activity level by using Physical Activity Questionnaire for adolescent (PAQ-A) which adapted from Kowalski, Crocker, and Kowalski (1997). Section E was on body weight status which measures the weight and height of the respondents using the TANITA digital weighing scale and SECA body meter respectively. BMI-for-age z-score was calculated by using the WHO Anthroplus software.

Section A: Socio-demographic status

There were two sections for socio-demographic status which were for the subjects and their parents. For subject's part, they filled in their age and sex while for parents' part they filled in parental education and parental income.

Section B: Dietary intake

For dietary intake, a face to face interview was conducted in this study. The researchers recorded the consumption of all foods and beverages, including snacks and asked the detailed descriptions of the foods and beverages, which included brand names and methods of food preparation. Respondents have been briefed on how to estimate the amount or serving size of the food and beverage taken by the researchers. The Nutritionist Pro™ Diet Analysis software was used to assess energy and macronutrients intakes. The averages of energy and macronutrients intake of respondents were compared with Recommended Nutrient Intake (RNI) of Malaysia (NCCFN, 2005).

Section C: Eating behaviors

Eating behaviors was assessed by using a self-administered Eating Behaviors Questionnaire (EBQ). There were five items in the questionnaire which included meal skipping behaviors, snacking behaviors, fast food consumption, eating outside, consumption and types of dietary practices.

For meal skipping behaviors, the scoring was based on 8-point likert scale and later classified into 3 categories (skipped all meal/week, skipped 2-3 meals/week, never skipped meals/week). The higher the score, the less they skipped their meals in a week. For snacking behaviour, the scoring was based on 8-point likert scale and later classified into 2 categories (do not snacking between main meals/week, snacking between main meals/week). The higher the score, the more frequent they snacked in a week.

For fast food and eating outside consumption the scoring is based on 8-point likert scale classified into 5 categories (daily, 4-6 times/week, 2-3 times/week, once a week, never). For types of dietary practices, the respondents chose the statement which reflects themselves. The scoring and categories of items in the eating behaviors section is shown in Table 3.2.

Table 3.2: Scoring and categories of items in the eating behaviors

Items	Scoring	Category
Meal skipping behaviors (Breakfast, lunch, dinner)	0-11	Skipped all meal or 4-5 meals/week
	12-18	Skipped 2-3 meals/week,
	19-24	Never skipped meals/week
Snacking behaviors (Morning tea, afternoon tea, supper)	0-8	Do not snacking between main meals/week
	9-24	Snacking between main meals/week
Fast food and eating outside consumption	7-8	Daily
	5-6	4-6 times/week
	3-4	2-3 times/week
	2	Once a week
	0-1	Never

Section D: Physical activity level

The Physical Activity Questionnaire for Adolescents (PAQ-A) was used to assess the physical activity level of the respondents at different times and places such as during school, after school, recess, weekend and others for the previous seven days. Scoring was based on a five-point scale, with an overall physical activity score derived from the mean of each scored item. Greater levels of physical activity were indicated by

higher scores and vice versa. The overall physical activity scores were later categorised as low, moderate and high physical activity as shown in Table 3.3.

Table 3.3: Physical activity level categories

Physical activity score	Category
1.00 to 2.33	Low
2.34 to 3.66	Moderate
3.67 to 5.00	High

(Dan, Mohd Nasir & Zalilah, 2011)

Section E: Anthropometric measurements

A TANITA electronic weighing scale was used to measure weight to the nearest 0.1 kilogram (kg). During measurement, the weighing scale was put on a hard and flat surface. The students were asked to wear minimum clothing, empty their pockets, remove their socks and shoes, and to stand still in the middle of the weighing scale's platform. A SECA portable body meter was used to measure height to the nearest 0.1 centimeter (cm). During measurement, the students were requested to take off shoes. The head of the respondent was positioned in the Frankfurt horizontal plane, feet together and the knees straight. Heels, buttocks, and shoulder blades of the respondent were positioned in contact with the wall (Mirnalini, Zalilah, Chan & Hazizi, 2007). Means of 2 measurements for weight and height were used for data analysis. BMI-for-age z-score were calculated using the WHO Anthroplus software and categorisation of BMI levels were done according to the age and gender-specific BMI for adolescents (WHO, 1995). Thus, the BMI categories of UW, NW and OW corresponded to <5th percentile, 5th - 85th percentile and ≥85th percentile, respectively.

3.7 Pre-test

Pre-test on the questionnaire was conducted on 18 respondents (10% of actual sample size) of Form 2 and Form 4 students at the secondary schools in SMK Sri Serdang who met the selection criteria of the study. The researcher took about 10 minutes to explain about the study protocol and the questionnaire. The purpose of this pre-testing was to determine the suitability and ability of the respondents to complete the questionnaire. Errors have been identified and corrections were made.

3.8 Data collection

This study was conducted from January to February 2015. Ethical approvals have been obtained from the Ethics Committee for Research Involving Human Subjects (JKEUPM) (see Appendix A). Permission to conduct the study in schools has been obtained from Ministry of Education (see Appendix B) and State Department of Education (see Appendix C). Information sheet that explained about the study and consent form were given one week prior to the data collection to the respondents (see Appendix D) and to their parents/guardians (see Appendix E). The respondents were required to give the parent's self-administered questionnaire to their parents/caregivers and the questionnaires were collected on the day of data collection (see Appendix F). Self-administered questionnaires were filled by the respondent's and face-to-face interview was conducted for the dietary intake. After completion of the questionnaire, anthropometric measurements were conducted on the respondents.

3.9 Data analysis

Data were analysed by using IBM SPSS Statistics 20.0. Descriptive statistics such as mean, standard deviation, percentage and frequency were used to show the distributions of the variables in this study. Analytical data such as Chi-square and Pearson correlation was used to determine the association between variables. A statistical level of $p < 0.05$ will be considered as significance.

CHAPTER 4

RESULTS AND DISCUSSIONS

4.1 Socio-demographic status

Table 4.1 shows the distribution of respondents by socio-demographic status. The total number of respondents were 180 with 50% of the respondents were males and 50% were females. The age of adolescents in this study ranged from 14-16 years old with an average age of 14.39 ± 1.03 years in which 59.4% were 14 years old while 40.6% were 16 years old. Almost all the respondents (97.2%) were Malays and followed by Indians (2.8%). For education level, fathers have higher proportion of having Pre-U/STPM/Diploma and Degree/Master /PHD (82.8%) compared to mothers (68.9%). There were 17.2% of respondent's fathers and 24.4% respondent's mothers have education attainment until secondary, however only a small proportion of respondents mothers have education attainment until primary (1.1%).

Table 4.1: Distribution of respondents by socio-demographic status

	n (%)
Age	
14	107 (59.4)
16	73 (40.6)
Sex	
Male	90 (50.0)
Female	90 (50.0)
Ethnicity	
Malay	175 (97.2)
Indian	5 (2.8)
Father's Education Level	
Primary	-
Secondary	31 (17.2)
Pre-U/STPM/Diploma	49 (27.2)
Degree/Master/PHD	100 (55.6)
Mother's Education Level	
Primary	2 (1.1)
Secondary and lower	42 (23.3)
Pre-U/STPM/Diploma	54 (23.3)
Degree/Master/PHD	82 (45.6)
Monthly parental income	
Low (<RM 2,300)	3 (1.7)
Medium (RM 2300–RM 5599)	57 (31.7)
High (RM 5600)	120 (66.7)

Parental monthly income was divided into three categories based on Household Income Survey (HIS): Conducted by EPU & DOS (Department of Statistic) which reported in 10MP-Tenth Malaysian Plan where household income of less than RM 2300, was classified as 'low', while household income between RM 2300-RM 5599,

was classified as 'medium', and household income of RM 5600 and above was classified as 'high' (Rancangan Malaysia Kesepuluh, 2011-2015). Table 4.1 also show that, most of the respondents were in high parental income (66.7%), followed by medium income (31.7%) and only (1.7%) was in the low income. The mean of parental income was RM 8261.51 ± 4482.00 with a minimum of RM 880 and a maximum of RM 21000 per month.

4.2 Dietary intake

Energy and macronutrient intakes are shown in Table 4.2. The mean of total energy intake for respondents aged 14 years old were 2118 ± 605 kcal in which male have higher intake (2330 ± 594 kcal) compared to female respondents (1886 ± 520 kcal). Meanwhile, for respondents aged 16 years old, the mean of total energy intake were 2179 ± 593 kcal. The same pattern can be seen as mean of total energy intake among male was higher compared to female respondents with 2416 ± 530 kcal and 1994 ± 580 kcal respectively. In particular, 42.8% of the respondents did not achieve the RNI level for energy with the higher percentage of female respondents (46.7%) compared to male respondents (38.9%). Both respondents in both age groups in this study did not achieve the recommended intake for Malaysian adolescents in which for 13-15 years old male was 2690 kcal and female was 2180 kcal while for 16-18 years old male was 2840 kcal and for female was 2050 kcal.

Macronutrient intakes of the respondents were expressed in grams per day and as percentage of energy intake. The mean intakes of all respondents for carbohydrate and fat were 242 ± 84 g and 93 ± 33g respectively. The mean intakes of carbohydrate for male and female respondents were 261 ± 81 g and 222 ± 83 g respectively. For fat intake, the mean intakes for male respondent's were103 ± 32 g and female respondents were 82 ± 30 g. The mean protein intakes for 14 years old were 86 ± 28 g in which male have higher intake (96 ± 30 g) compared to female respondents (73 ± 20 g). The protein mean intakes for 16 years old were 84 ± 28 and for male and female respondents were 97 ± 27 g and 74 ± 25 g respectively. These finding shows that male respondents have higher macronutrients intake compared to female respondents and this is consistent to the recommended macronutrients intake where males required higher amount as compared to females.

According to the Malaysian Dietary Guidelines, carbohydrates should contribute 55.0-75.0%, protein 10.0-15.0%, and fat 20.0-30.0% of the total daily energy intake. In this study, most of the respondents (88.3%) consumed less than 55.0% of total energy from carbohydrate. Almost half of the respondents (57.85%) had total energy intake between more than 15.0% from protein and majority of them (87.8%) had total energy intake more than 30.0% from fat. Based on the findings, the respondents in this study consumed a high fat but low carbohydrate diet.

Table 4.2: Distribution of respondents by energy and nutrient intakes

	Male n (%)	Female n (%)	Total n (%)	Male Mean ±SD	Female Mean ±SD	Total Mean ±SD
Energy (kcal/d)						
14 years old				2330 ± 594	1886 ± 520	2118 ± 605
16years old				2416 ± 530	1994 ± 580	2179 ± 593
< RNI	55 (61.1)	48 (53.3)	77 (42.8)			
≥ RNI	35 (38.9)	42 (46.7)	103 (57.2)			
Carbohydrate (g/d)				261 ± 81	222 ± 83	242 ± 84
Protein (g/d)				96 ± 29	73 ± 22	86 ± 28
14 years old				96 ± 30	73 ± 20	84 ± 28
16 years old				97 ± 27	74 ± 25	84 ±27
Fat (g/d)				103 ± 32	82 ± 30	93 ± 33
% of energy from Carbohydrate				44.1 ± 8.3	46.2 ± 9.6	45.17 ± 9.0
< 55%	82 (91.9)	77 (85.6)	159 (88.3)			
55-70%	8 (8.9)	10 (11.1)	18 (10.0)			
>70%	-	3 (3.3)	3 (1.7)			
% of energy from Protein				16.5 ± 4.0	15.7± 3.5	16.11 ± 3.8
< 10%	1 (1.1)	4 (4.4)	5 (2.8)			
10-15%	29 (32.2)	42 (46.7)	71 (39.4)			
>15%	60 (66.7)	44 (48.9)	104 (57.8)			
% of energy from Fat				39.6 ± 7.2	38.2± 8.1	38.89 ± 7.7
< 20%	1 (1.1)	6 (6.7)	7 (3.9)			
20-30%	8 (8.9)	7 (7.8)	15 (8.3)			
>30%	81 (90.0)	77(85.6)	158 (87.8)			

Figure 4.1 shows the mean percent of RNI achieved for energy and protein according to sex and age of the respondents. This study found that, protein showed high attainment in both respondents aged 14 and 16 years old in which they have achieved more than 100% for protein intake. Respondents aged 14 years old have achieved 142.7% while respondents aged 16 years old have achieved 134.3% for protein intake. In contrast, both respondents aged 14 and 16 years old did not achieve the RNI levels for energy intake as 14 years old respondents achieved 91.2% while 16 years old respondents achieved 86.6%. Male have achieved more than female for both energy and protein except for the energy intake for the respondents aged 16 years old which female have achieved more than male respondents.

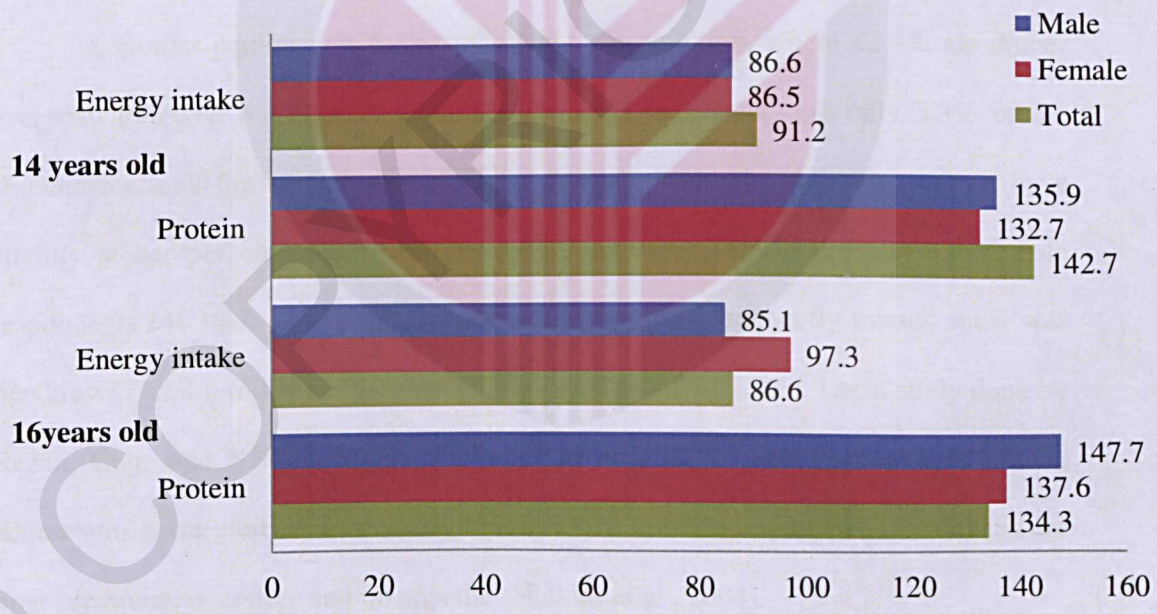

Figure 4.1: Distribution of respondents by mean percent of RNI achieved for energy and protein by aged and sex

4.3 Eating behavior

Table 4.3 shows the distribution of respondents by frequency of meal consumption. Only (22.8%) of respondents took breakfast everyday whereby majority of the respondents (54.5%) took breakfast for 4-6 days and 2-3 days in a week. About 27.8% of the female respondents took breakfast everyday compared to only 17.8% of male respondents. Meanwhile, for the lunch consumption, majority of the respondents (42.8%) having lunch daily. This was followed by 32.8% of the respondents who had lunch for 4-6 days in a week and only 3.9% of the respondents took lunch once a week and 1-3 times a month. However, nearly half of the female (47.8%) and male (36.7%) respondents ate lunch daily.

A similar pattern was found for dinner consumption, where 42.8% ate dinner everyday followed by 33.9% had dinner 4-6 days in a week and only 3.3% of the respondents took lunch once a week and 1-3 times a month. Male respondents have slightly higher percentage in having dinner every day (44.4%) compared to female respondents (41.1%). This findings reflect that the most frequently missed meal was breakfast (77.2%), followed by lunch (57.8%) and dinner (57.2%). Local study done by Rezali, Chin, and Nisak, (2012), also reported that the frequent missed meal among adolescents in the study was breakfast (55.7%). The reasons for skipping breakfast were time constraint, overslept and no appetite (Nicklas et al., 2004).

Table 4.3: Distribution of respondents by eating behaviors

Eating behaviors	Daily			4-6 times/per week			2-3 times/per week			Once a week			1-3 times a month		
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T
Breakfast	16 (17.8)	25 (27.8)	41 (22.8)	26 (28.9)	20 (22.2)	46 (25.6)	26 (28.9)	26 (22.2	52 (28.9)	13 (14.4)	10 (11.1)	23 (12.8)	9 (10.0)	9 (10.0)	18 (10.0)
Lunch	33 (36.7)	43 (47.8)	76 (42.2)	31 (34.4)	28 (31.1)	59 (32.8)	18 (20.0)	13 (14.4)	31 (17.2)	4 (4.4)	3 (3.3)	7 (3.9)	4 (4.4)	3 (3.3)	7 (3.9)
Dinner	40 (44.4)	37 (41.1)	77 (42.8)	34 (37.8)	27 (30.0)	61 (33.9)	11 (12.2)	19 (21.1)	30 (16.7)	2 (2.2)	4 (4.4)	6 (3.3)	3 (3.3)	3 (3.3)	6 (3.3)
Morning tea	22 (24.4)	32 (35.6)	54 (30.0)	35 (38.9)	20 (22.2)	55 (30.6)	19 (21.1)	20 (22.2)	39 (21.7)	9 (10.0)	6 (6.7)	15 (8.3)	5 (5.6)	12 (13.3)	17 (9.4)
Afternoon tea	7 (7.8)	7 (7.8)	14 (7.8)	25 (27.8)	24 (26.7)	49 (27.2)	41 (45.6)	36 (40.0)	77 (42.8)	10 (11.1)	11 (12.2)	21 (11.7)	7 (7.8)	12 (13.3)	19 (10.6)
Supper	4 (4.4)	4 (4.4)	8 (4.4)	16 (17.8)	8 (8.9)	24 (13.3)	37 (41.1)	27 (30.0)	64 (35.6)	20 (22.2)	26 (28.9)	46 (25.6)	13 (14.4)	25 (27.7)	38 (21.1)
Fast food consumptions	20 (22.2)	26 (28.9)	46 (25.6)	3 (3.3)	3 (3.3)	6 (3.3)	19 (21.1)	14 (15.6)	33 (18.3)	24 (26.7)	13 (14.4)	27 (20.6)	24 (26.7)	34 (37.8)	58 (32.2)
Eating outside consumptions	4 (4.4)	7 (7.8)	11 (6.1)	25 (27.8)	28 (31.1)	53 (29.4)	38 (42.2)	25 (27.8)	63 (35.0)	13 (14.4)	12 (13.3)	25 (13.9)	10 (11.1)	18 (20.0)	28 (15.6)

Apart from main meals, the present findings show that the respondents were frequently snacked during morning tea (30.0%) compared to afternoon tea and supper (7.8% and 4.4%), respectively. Table 4.3 also shows that higher proportions of female adolescents (35.6%) compare to male respondents (24.4%) who were snacked daily during morning tea time. More than half of the respondents were snacking during morning tea 4-6 times/week (30.6%) and 2-3 times/week (21.7%), followed by 1-3 times a month (9.4%) and once a week (8.3%). Both afternoon tea and supper shows a similar trend in which most of the respondents were snacked 2-3 times/week (42.8%) and (35.6%) respectively.

Meals skipping behaviors of the respondents in this study are shown in the Figure 4.2. Most of the respondents (40.6%) skipped 2-3 meals/week with higher proportion of female respondents (45.6%) compared to male respondents (35.6%). About one third of the respondents (37.2%) never skipped meals/week with higher proportion male of respondents (38.9%) compared to female respondents (35.6%). A similar trend for skipped all meals or 4-5 meals/week can be seen with higher proportion male of respondents (25.6%) compared to female respondents (18.9%) with the total 22.2% of the respondents in this category.

Figure 4.2: Distribution of respondents by frequency of meal skipping per week

Figure 4.3 summarises the distribution of respondents by frequency of snacking per week. Only 8.9% of the respondents do not snack between main meals/week with higher proportion of female respondents (13.3%) compared to male respondents (4.4%).

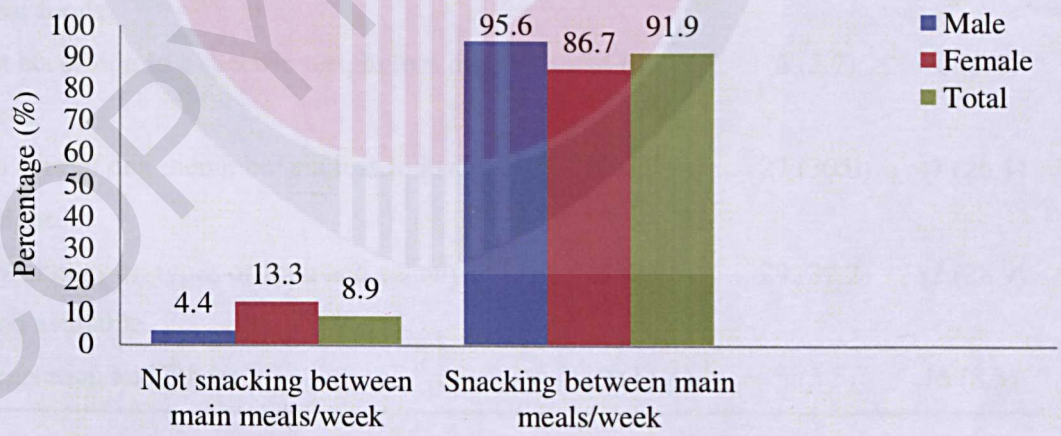

Figure 4.3: Distribution of respondents by frequency of snacking per week

Table 4.4 shows the distribution of type of dietary practices among the respondents. Majority of the respondents (28.9%) were not choosy on types of food and eat any food available with the higher proportion of female adolescents (32.2%) compared to male respondents (28.9%). However, it should be highlighted that 26.1% of respondents do not have special diet menu but eat less to lose weight with a similar pattern in which female have higher proportion (30.0%) compared to male respondents (22.2%). In addition, 5.6% of the respondents ate according to a specific weight loss diet menu with higher percentage of male respondents (5.7%) compared to female respondents (4.4%).

Table 4.4: Distribution of types of dietary practice of respondents

	Male n (%)	Female n (%)	Total n (%)
Types of dietary practices			
Eat less high fat, high sugar foods and red meat foods	33 (36.7)	23 (25.6)	56 (31.1)
Eat according to a specific weight loss diet menu	4 (4.4)	6 (5.7)	10 (5.6)
No special diet menu, but eat less to lose weight	20 (22.2)	27 (30.0)	47 (26.1)
Not choosy on types of food and eat any food available	23 (25.6)	29 (32.2)	52 (28.9)
Vegetarian and others	10 (11.1)	5 (5.5)	15 (8.3)

4.4 Physical activity level

As shown in Figure 4.4, 53.9% of the respondents were categorised in the moderate physical activity level, another 42.8% were categorised as having low physical activity level and only 3.3% were categorised in the high physical activity level. A lower percentage of males (35.6%) was in low physical activity level when compared to females (50.0%) but higher percentages of males were reported having moderate (male: 58.9%, female: 48.9%) and high physical activity levels (male: 5.6%, female: 1.1%).

These findings are similar with other study in which study done by Dan, Nasir and Zalilah, (2011), reported that only 3% of adolescents in their study were in the high physical activity level category, while the remaining 35.3% and 61.5% were in the low and moderate physical activity level categories, respectively. In addition, males were more physically active than females in which study done by Law, Mohd Nasir and Hazizi, (2014), stated that male have higher percentage of high (male: 7.5%, female: 0%) and moderate (male: 36.7%, female: 29.4%) physical activity level compared to female.

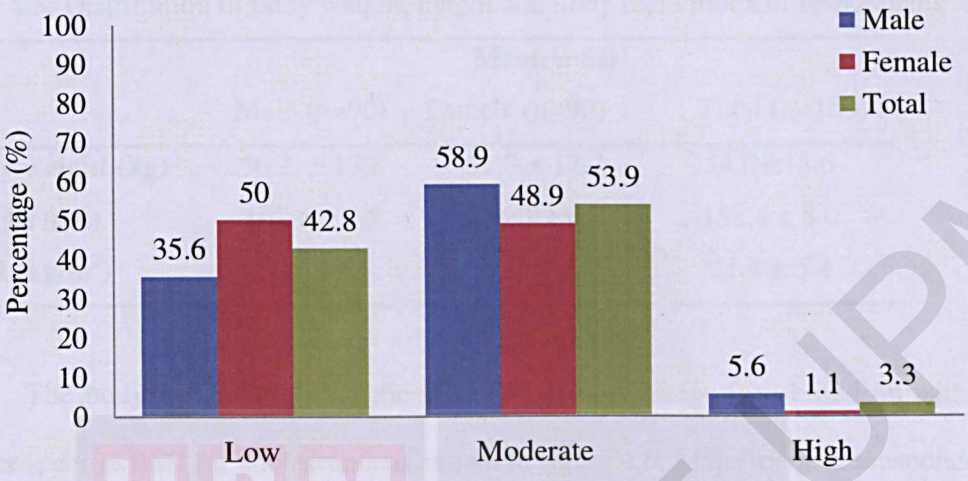

Figure 4.4: Distribution of respondents by physical activity level

4.5 Body weight status

Table 4.5 shows the information on body weight, height and Body Mass Index (BMI) of the respondents. The mean for body weight of the respondents were 54.0 kg while the mean of body weight for male respondents and female respondents were 56.2 kg and 51.8 kg respectively. The body weight of male respondents ranged from 28.4 kg to 115.5 kg and range of body weight for female respondents were 32.4 kg to 95.8 kg. The mean heights of the respondents were 158.4 cm with the mean of male and female respondents were 162.6 cm and 154.3 cm respectively. The height of male respondents ranged from 133.9 cm to 180.0 cm while for female respondents the height ranged from 134.5 cm to 169.2 cm. Mean BMI of all the respondents was 21.4 kg/m^2 with male having a mean BMI of 21.0 kg/m^2 while female having a mean BMI of 21.7 kg/m^2.

Table 4.5: Distribution of body weight, height and body mass index of respondents

	Mean ± SD		
	Male (n=90)	Female (n=90)	Total (n=180)
Body weight (kg)	56.2 ± 17.8	51.8 ± 12.7	54.0 ±15.6
Height (cm)	162.6 ± 7.5	154.3 ± 6.2	158.4 ± 8.0
BMI (kg/m^2)	21.0 ± 5.8	21.7 ± 5.0	21.4 ± 5.4

The body weight status of the respondents was categorised based on age and gender specific BMI for adolescents as shown in figure 4.6. Majority of the respondents were normal weight (66.7%). However, it should highlight that the prevalence of overweight and obese were four times (27.2%) than underweight (6.1%). The prevalence of overweight and obesity in this study have a similar pattern with the study done by Sakinah, Seong-Ting, Rosniza, and Jayah, (2012), which reported that the prevalence of overweight and obesity among 13 to 16 years old in Bachok district were four times than underweight (30.0% and 8.0%) respectively. The prevalence of underweight, overweight and obese was higher among male (10.0% and 28.9%) than female (2.2% and 25.67%) and this finding was consistent with Zalilah et al. (2006), which also reported that the prevalence of underweight and overweight was higher among male than female. It can be concluded that, over nutrition was more prevalent than under nutrition among adolescents and this findings were consistent with previous studies (Woon, Chin, & Nasir, 2014; Muhammad, Omar, Shah, Muthupalaniappen, Arshad, 2008; Tung, Mohd Nasir, & Shamarina, 2011).

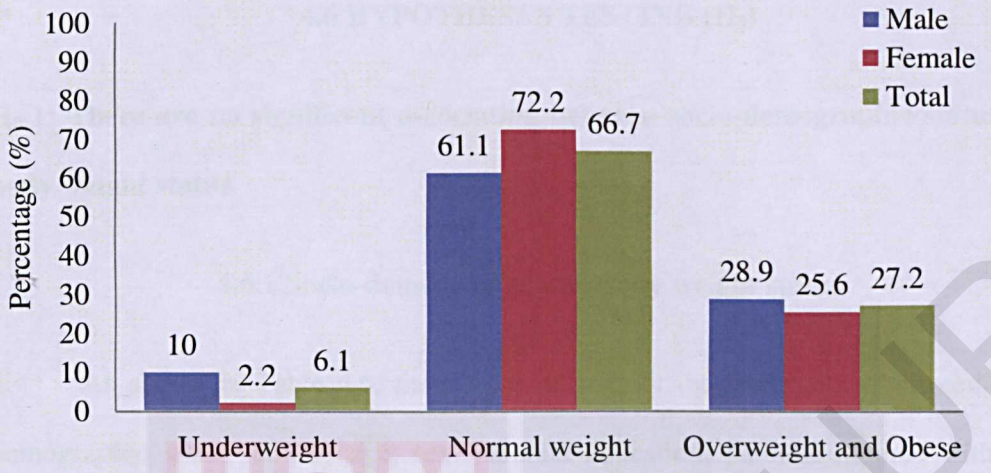

Figure 4.6: Distribution of respondents based on BMI-for-age by sex (WHO, 1995)

4.6 HYPOTHESES TESTING (H_0)

H_0 1: There are no significant association between socio-demographic status with body weight status

4.6.1 Socio-demographic and body weight status

As shown in Table 4.6, there were no significant associations between socio-demographic status namely age, sex, parental education, parental income with body weight status ($p>0.05$). Similar findings also reported that there were no associations between age and sex with body weight status (Rezali, Chin, & Nisak, 2012). For parental education level and income, these results are consistent with another study which reported there were no associations with body weight status (Pon, Kandiah, & Mohd Nasir, 2004).

Table 4.6: Associations between socio-demographic status with body weight status

Socio-demographic background	**Body weight status**				
	UN n (%)	**NW** n (%)	**OW OB** n (%)	χ^2/r	*P*-value
Sex					
Male	8 (8.9)	56 (62.2)	26 (28.9)	2.990	0.224
Female	3 (3.3)	64 (71.1)	23 (25.6)		
Fathers education					
Pre-U/STPM/Diploma and lower	4 (5.0)	55 (68.8)	21 (26.6)	0.435	0.805
Degree/Master/PHD	7 (7.0)	65 (65.0)	28 (28.0)		
Mothers education					
Pre-U/STPM/Diploma and lower	7 (7.1)	63 (64.3)	28 (28.6)	0.702	0.704
Degree/Master/PHD	4 (4.9)	57 (69.5)	21 25.6)		
Age				0.007	0.930
Parental income				-0.011	0.879

H_0 2: There are no significant association between dietary intake with body weight status

4.6.2 Dietary intake and body weight status

Table 4.7 demonstrates the correlation between energy and macronutrient intake with BMI-for-age. Based on the results, there were significant correlations between energy (r=0.229, p=0.01), carbohydrate (r=0.164, p=0.028), protein (r=0.151, p=0.043) and fat (r=0.188, p=0.012) with BMI-for-age. These findings are in line with several studies that reported that overweight adolescents are significantly have higher intake of energy and macronutrient intakes compared to their non-overweight counterparts (Soo et al., 2011; Magbuhat & Villarino, 2011). The causes of increased energy intakes include larger portion sizes, eating in restaurants and away from home, eating late at night, instant-availability of energy-dense foods and fast foods and frequent snacking (Hensrud, 2004).

Table 4.7: Correlation of energy and macronutrient intake with BMI-for-age

Variables	r	P-value
Energy	0.229	0.001*
Carbohydrate	0.164	0.028*
Protein	0.151	0.043*
Fat	0.188	0.012*

*correlation significant at p<0.05 (2-tailed)

H_0 3: There are no significant association between eating behaviour with body weight status

4.6.1 Eating behavior and body weight status

Table 4.8 shows that there were no significant associations between meals skipping with BMI-for-age (r=-0.006, p=0.933). This was supported by study done by Woon, Chin, and Nasir, (2014), that also found no association between meals skipping behavior with the BMI-for-age of the respondents. However, previous studies examining the association between meal skipping and body weight status showed significant association (Zaal, Musaiger & D'Souza, 2009; Franko et al., 2008). A likely explanation for the inconsistent findings may be due to different definition used to define meal skipping across studies. Furthermore, the inconsistent findings may be subjected to self-report bias as the data on meal consumption were self-reported by the respondents.

Table 4.8 Correlation of eating behaviors with BMI-for-age

Variables	r	P-value
Meal skipping behaviors	-.0.006	0.933
Snacking behaviors	-0.171	0.022*
Fast food consumption	0.156	0.036*
Eating outside consumption	0.051	0.493

*correlation significant at p<0.05 (2-tailed)

Table 4.8 also shows that there was a significant inverse correlation of snacking behaviour with BMI-for-age (r=-0.006, p=0.933). Previous study examining the association between snacking behaviors with adolescent's BMI also showed significant association (Musaiger, Al-Roomi, & Bader, 2014). In contrast, other study reported that no significant association between snacking behavior with BMI-for-age of the respondents (Woon, Chin, & Nasir, 2014). This finding may due to eating snacks between meals reduces the risk for obesity since the children will eat fewer food items at the next meal (Vik, Overby, Lien, & Bere, 2010).

As shown in Table 4.8, there were significant associations between fast food consumptions (r=-0.156, p=0.036) but there were no correlation between eating outside (r=-0.051, p=0.493) with BMI-for-age. This finding was consistent with a study done by Sakinah, Seong-Ting, Rosniza ,and Jayah, (2012), which stated that there were significant association between fast food consumption and body weight status. This relationship may be due to the fact that Putrajaya was situated in urban areas where the respondents have better socio-economic status and they are more readily accessible to all kinds of unhealthy foods. They also can easily access to the fast food outlets as their school was near to the shopping mall.

Brug (2007), pointed out that high consumption of energy-dense fast foods was the major cause for body weight problem as deep frying is the main method of cooking that high in saturated fat. Moreover, the food choices in fast food restaurants were nutrient imbalanced as they serve a large amount of carbohydrate source and limited vegetables and fruits. In addition, the 'size-up' effect have a greater risk to the obesity

problem as people can enjoy a bigger serving with just addition of small amount of money.

Table 4.9 show the association between types of dietary practices with body weight status. For fulfilling the chi-square analysis assumption, underweight and normal weight respondents were categorised into non-overweight group and were compared to overweight and obese group. Based on the results, there were significant associations between types of dietary practices (χ^2=32.379, p<0.001) with body weight status.

According to the study done by Dunhan and Kollar, (2006), children and adolescents who follow a vegetarian diet have a lower intake of cholesterol, saturated fat, and total fat and a higher intake of fruit, vegetables, and fiber than their non-vegetarian counterparts. In addition, vegetarian children are leaner than non-vegetarian children. Furthermore, adolescents that were engaged in dieting and unhealthy weight control behaviors had higher BMI values compared with those who did not diet or were engaged in unhealthy weight control behaviors (Neumark-Sztainer, Wall, Story, & Standish 2012).

Table 4.9: Associations between type of dietary practices of respondents with body weight status

Types of dietary practices	Body weight status			
	Non-overweight n (%)	Overweight/ obese n (%)	χ^2	*p*-value
Eat less high fat and high sugar	27 (20.6)	6 (12.2)	32.379	<0.001*
Eat less high fat, high sugar and red meat foods	17 (13.0)	6 (12.2)		
Eat according to a specific weight loss diet menu	3 (2.3)	7 (14.3)		
No special diet menu, but eat less to lose weight	24 (18.3)	23 (46.9)		
Not choosy on types of food and eat any food available	45 (34.4)	7 (14.3)		
Vegetarian and others	15 (11.5)	0 (0.0)		

*significant at $p<0.05$ (chi-square)

H_0 4: There are no significant association between physical activity level with body weight status

4.6.2 Physical activity level and body weight status

Table 4.10 show that there was no significant association between physical activity levels with the BMI-for-age. Several local studies also reported similar findings with no significant associations between physical activity and body weight status of adolescents (Dan, Mohd Nasir, & Zalilah, 2011; Farah Wahida, Mohd, & Hazizi, 2011). However, according to Francisco, Jonatan, and Michael (2007), children and adolescents who had a low level of vigorous physical activity, had four times higher odds of being overweight compared to those who had a high level of vigorous PA. The PAQ-A instrument which was used in the this study only assessed the general form of

physical activity and has its own limitations. Thus, information regarding energy expenditure and patterns of physical activity (frequency, duration, and intensity) cannot be estimated from this assessment.

Table 4.10: Correlation of physical activity level with BMI-for-age

Variables	r	*p*-value
Physical activity level	-0.073	0.329

4.7 STUDY LIMITATIONS

There are several limitations of this study included this study is a cross-sectional study. Thus, it is unable to show any causal relationship between the socio-demographic status, dietary intake, eating behaviors, physical activity and body weight status among respondents. Furthermore, this study was conducted at 1 out of 11 secondary schools in Putrajaya. Hence, the results may not be representative of adolescents from other schools and other states in Malaysia.

Other than that, single 24-hour dietary recall was used and it is unable to measure the degree of intra individual variation among the respondents. However, in order to minimise factors that lead to unusual eating patterns, data collection was not conducted during religious fasting months and festive holidays. Next, the questionnaire in this study was self-administered questionnaire and the reliance on self-reported data depends on the honesty and the ability of the adolescents to understand the questions.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION

This study aimed to determine the associations between socio-demographic status, dietary intake, eating behaviors, physical activity level with body weight status among adolescents in Putrajaya. This study found that, the prevalence of overweight and obesity (27.2%) was about four times than the underweight (6.1%) among the respondents. Energy intake ($r=0.229$, $p<0.05$) and fast food consumption ($r=0.156$, $p<0.05$) were positively correlated with BMI-for-age of the respondents while snacking behaviors was inversely correlated with BMI-for-age of the respondents ($r=-0.171$, $p<0.05$). There were significant association between type of dietary practices and body weight status of the respondents ($p<0.05$). Based on the findings in this study, the need of intervention programs that focused on promoting healthy eating practices should be emphasised among the adolescents in order for them to achieve healthy body weight in the future.

5.2 RECOMMENDATIONS

In order to promote a healthy lifestyle in adolescents, health promotional strategies related to eating behaviors and physical activity should be introduced. Hence, government, non-government agencies and professional bodies should be working together to create an environment that stimulate them to take care of their own health. For example, school authorities can introduces the interventions that included nutrition education, provide healthy menus in the school canteens and provide sufficient amount of equipments for sports to encourage them to be physically active every day.

With the increasing prevalence of overweight and obesity among under 18 years old in Malaysia, there is a need to combat this problems and therefore parents play an important role to stimulate them practicing healthy lifestyle. In terms of physical activity, they should do some activities together instead of letting their children play alone. By this way, a healthier family can be developed and this can give them a lifelong benefits.

In addition, in a future research, larger sample size should be consider in order to represent all adolescent in the Putrajaya, thus the results will be more representative compared to the current study. Several other factors such as body image and environmental factors can also be covered that may be associated with body weight status among the adolescents. Next, for dietary intake measure, food record can be used in the future to avoid bias. By this way, they can write down the food that they eat without missing out any food or drink that they consumed.

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APPENDIX A

Approval Letter from the Medical Research Ethics Committee

APPENDIX B
Approval Letter from Ministry Of Education (MOE)

APPENDIX C

Approval Letter from the Putrajaya State Education Department

APPENDIX D
Subject Information Sheet

JAWATANKUASA ETIKA UNIVERSITI UNTUK PENYELIDIKAN MELIBATKAN MANUSIA (JKEUPM)
UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG.

BORANG B1: PENERANGAN DAN PERSETUJUAN RESPONDEN

Sila baca maklumat berikut dengan teliti. Sekiranya anda mempunyai sebarang pertanyaan, sila kemukakan kepada penyelidik.

1. TAJUK KAJIAN

Pengambilan makanan, tingkah laku pemakanan, tahap aktiviti fizikal dan status berat badan di kalangan remaja di Putrajaya.

2. PENGENALAN

Berat badan berlebihan dan obesiti di kalangan remaja di Malaysia adalah di tahap yang membimbangkan. Oleh itu, pemahaman tentang faktor-faktor yang mempengaruhi status berat badan adalah penting untuk memastikan remaja masa kini mempunyai tahap kesihatan yang baik. Kajian ini bertujuan untuk mengenalpasti pengambilan makanan, tingkah laku pemakanan, tahap aktiviti fizikal dan status berat badan di kalangan remaja di Putrajaya

3. APAKAH YANG PERLU ANDA LAKUKAN?

Anda perlu menjawab borang soal selidik yang telah disediakan seperti maklumat sosio-demografi, pengambilan pemakanan, tingkah laku pemakanan dan tahap aktiviti fizikal. Anda juga akan diukur ketinggian dan berat badan.

4. SIAPA YANG TIDAK BOLEH MENYERTAI KAJIAN INI?

Pelajar tingkatan dua atau empat yang mempunyai kecacatan dan tidak boleh membaca dan menulis.

5. APAKAH FAEDAH MENYERTAI KAJIAN INI?

a) KEPADA ANDA SEBAGAI PESERTA?

Anda dapat mengetahui status berat badan dan tahap aktiviti fizikal anda.

b) KEPADA PENYELIDIK?

Penyelidik dapat mengetahui hubungan antara pengambilan makanan, tingkah laku pemakanan, tahap aktiviti fizikal dan status berat badan di kalangan remaja.

6. ADAKAH IA BERISIKO?

Kajian ini tidak akan membawa sebarang risiko memandangkan anda hanya perlu mengisi borang soal selidik dan diukur ketinggian dan berat badan.

7. ADAKAH MAKLUMAT DAN IDENTITI SAYA KEKAL RAHSIA?

Tiada maklumat peribadi yang akan didedahkan di dalam mana-mana kajian, laporan atau penerbitan. Semua maklumat yang diberikan adalah sulit dan hanya untuk kegunaan kajian semata-mata.

8. SIAPA YANG SAYA PERLU HUBUNGI SEKIRANYA SAYA MEMPUNYAI SOALAN TAMBAHAN SEMASA MENGIKUTI PENYELIDIKAN INI?

Nur Syairah bt Che Noh di 016-9468493 atau nursyairahcn@gmail.com

9. PERSETUJUAN

Saya……No Kad Pengenalan. ……
beralamat……
……..dengan ini bersetuju/tidak bersetuju untuk mengambil bahagian secara sukarela dalam penyelidikan yang tersebut di atas *(soal selidik).

Saya telah diberi penjelasan secara menyeluruh mengenai penyelidikan ini dari segi metodologi, risiko dan komplikasi (seperti tertulis pada Helaian Penerangan Responden). Saya memahami bahawa saya berhak menarik diri dari penyelidikan ini pada bila-bila masa tanpa memberi sebarang alasan.Saya juga memahami bahawa sebarang maklumat yang berkaitan identiti saya akan dirahsiakan.

Saya* berminat / tidak berminat untuk mengetahui keputusan kajian yang melibatkan saya/ setuju/ tidak bersetuju untuk imei/gambar/rakaman video/ rakaman suara digunakan dalam apa jua bentuk penerbitan atau pembentangan. (sekiranya berkaitan).

*potong yang tidak berkenaan

Tandatangan ……..…… Tandatangan ……..……
(*Responden*) (*Saksi*)

Tarikh :…….. Nama :……..

No. K/P: ……..

Saya mengesahkan bahawa saya telah menerangkan kepada responden ini sifat dan tujuan penyelidikan yang tersebut di atas.

Tarikh ……..…… Tandatangan ……..……
(*Penyelidik*)

APPENDIX E
Informed Consent Parents/Guardians

JAWATANKUASA ETIKA UNIVERSITI UNTUK PENYELIDIKAN MELIBATKAN MANUSIA (JKEUPM)
UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG.

BORANG B2: PENERANGAN DAN PERSETUJUAN IBUBAPA/PENJAGA

Sila baca maklumat berikut dengan teliti. Sekiranya anda mempunyai sebarang pertanyaan, sila kemukakan kepada penyelidik.

1. TAJUK KAJIAN

Pengambilan makanan, tingkah laku pemakanan, tahap aktiviti fizikal dan status berat badan di kalangan remaja di Putrajaya.

2. PENGENALAN

Berat badan berlebihan dan obesiti di kalangan remaja di Malaysia adalah di tahap yang membimbangkan. Oleh itu, pemahaman tentang faktor-faktor yang mempengaruhi status berat badan adalah penting untuk memastikan remaja masa kini mempunyai tahap kesihatan yang baik. Kajian ini bertujuan untuk mengenalpasti pengambilan makanan, tingkah laku pemakanan, tahap aktiviti fizikal dan status berat badan di kalangan remaja di Putrajaya

3. APAKAH YANG PERLU ANDA LAKUKAN?

Anak anda perlu menjawab borang soal selidik yang telah disediakan seperti maklumat sosio-demografi, pengambilan pemakanan, tingkah laku pemakanan dan tahap aktiviti fizikal. Anak anda juga akan diukur ketinggian dan berat badan.

4. SIAPA YANG TIDAK BOLEH MENYERTAI KAJIAN INI?

Pelajar tingkatan dua atau empat yang mempunyai kecacatan dan tidak boleh membaca dan menulis.

5. APAKAH FAEDAH MENYERTAI KAJIAN INI?

a) KEPADA ANDA SEBAGAI PESERTA?

Anda dapat mengetahui status berat badan dan tahap aktiviti fizikal anda.

b) KEPADA PENYELIDIK?

Penyelidik dapat mengetahui hubungan antara pengambilan makanan, tingkah laku pemakanan, tahap aktiviti fizikal dan status berat badan di kalangan remaja.

6. ADAKAH IA BERISIKO?

Kajian ini tidak akan membawa sebarang risiko memandangkan anak anda hanya perlu mengisi borang soal selidik dan diukur ketinggian dan berat badan.

7. ADAKAH MAKLUMAT DAN IDENTITI SAYA KEKAL RAHSIA?

Tiada maklumat peribadi yang akan didedahkan di dalam mana-mana kajian, laporan atau penerbitan. Semua maklumat yang diberikan adalah sulit dan hanya untuk kegunaan kajian semata-mata.

8. SIAPA YANG SAYA PERLU HUBUNGI SEKIRANYA SAYA MEMPUNYAI SOALAN TAMBAHAN SEMASA MENGIKUTI PENYELIDIKAN INI?

Nur Syairah bt Che Noh di 016-9468493 atau nursyairahcn@gmail.com

9. PERSETUJUAN

Saya..... No Kad Pengenalan. .....
beralamat.....
.....dengan ini secara sukarela bersetuju membenarkan/ tidak membenarkan *anak/jagaan saya ..... menyertai penyelidikan tersebut di atas *(soal selidik).

Saya telah diberi penjelasan secara menyeluruh mengenai penyelidikan ini dari segi metodologi, risiko dan komplikasi (seperti yang tercatat dalam Helaian Penerangan). Saya memahami bahawa *anak / jagaan saya berhak menarik diri dari penyelidikan ini pada bila-bila masa tanpa memberi sebarang alasan.Saya juga memahami bahawa sebarang maklumat yang berkaitan identiti *anak / jagaan saya akan dirahsiakan.

Saya* berminat / tidak berminat untuk mengetahui keputusan kajian yang melibatkan *anak / jagaan saya/ setuju/ tidak bersetuju untuk imej/gambar/rakaman video/ rakaman suara berkaitan dengan anak/ jagaan saya digunakan dalam apa jua bentuk penerbitan atau pembentangan. (sekiranya berkaitan).

*potong yang tidak berkenaan

Tandatangan .....
(*Ibubapa/ Penjaga*)

Tarikh :.....

Tandatangan .....
(*Saksi*)

Nama :.....

No. K/P: .....

Saya mengesahkan bahawa saya telah menerangkan kepada responden ini sifat dan tujuan penyelidikan yang tersebut di atas.

Tarikh ..... Tandatangan .....
(*Penyelidik*)

APPENDIX F
QUESTIONNAIRE

No. Rujukan ☐☐☐

UNIVERSITI PUTRA MALAYSIA
BERILMU BERBAKTI

PENGAMBILAN MAKANAN, TINGKAH LAKU PEMAKANAN, TAHAP AKTIVITI FIZIKAL DAN STATUS BERAT BADAN DI KALANGAN REMAJA DI PUTRAJAYA

Nama penyelidik: Nur Syairah bt Che Noh

Penyelia : Dr. Zuriati Ibrahim

Nota:

Semua maklumat yang diberikan di sini adalah dirahsiakan dan tidak akan didedahkan kepada pihak ketiga. Ia hanya digunakan untuk tujuan akademik dan penyelidikan sahaja. Kejayaan kajian ini amat bergantung kepada kejujuran dan kerjasama anda dalam menjawab kesemua soalan yang dikemukakan. Segala kerjasama yang anda berikan didahului dengan ribuan terima kasih. Sebarang soalan mengenai kajian ini boleh dikemukan kepada Nur Syairah bt Che Noh di (016-9468493 atau nursyairahcn@gmail.com). Alamat penyelidik : Jabatan Pemakanan dan Dietetik, Universiti Putra Malaysia.

No. Rujukan ☐☐☐

BAHAGIAN A: SOSIO-DEMOGRAFI
(UNTUK DIISI OLEH IBU BAPA ATAU PENJAGA)

Sila isi dan tanda [/] pada ruang yang berkenaan.

I. Pelajar

01	Tarikh lahir: __ __ / __ __/ __ __ __ __ (hh/bb/tt)	02	Jantina: [ ] Lelaki [ ] Perempuan
03	Bangsa : [ ] Melayu [ ] Cina [ ] India [ ] Lain-lain, sila nyatakan:_____		
04	Agama: [ ] Islam [ ] Buddha [ ] Hindu [ ] Kristian [ ] Lain-lain, sila nyatakan: _____		

II. Ibu bapa ATAU penjaga

05	**BAPA** [ ] **PENJAGA** [ ]	11	**IBU** [ ] **PENJAGA** [ ]
06	Umur:	12	Umur:
07	Pekerjaan:	13	Pekerjaan:
08	Status perkahwinan: [ ] Berkahwin [ ] Bercerai [ ] Bapa tunggal [ ] Lain-lain, nyatakan: _____	14	Status perkahwinan: [ ] Berkahwin [ ] Bercerai [ ] Bapa tunggal [ ] Lain-lain, nyatakan: _____
09	Tahap pendidikan: [ ] Sekolah Rendah [ ] Sekolah Menengah: [ ] Pre-U/STPM/Diploma:) [ ] Lain-lain: _____	15	Tahap pendidikan: [ ] Sekolah Rendah [ ] Sekolah Menengah: [ ] Pre-U/STPM/Diploma:) [ ] Lain-lain: _____
10	Pendapatan bulanan : RM _____	16	Pendapatan bulanan : RM _____
17	Jumlah pendapatan isi rumah: RM _____		

No. Rujukan ☐☐☐

BAHAGIAN B: TINGKAH LAKU PEMAKANAN

Berikut adalah soalan mengenai tingkahlaku pemakanan anda. Sila pilih satu jawapan dan bulatkannya.

SKALA	1	2	3	4	5	6	7	8
MAKSUD	Tidak pernah/ kurang daripada sekali sebulan	1 kali semin-ggu	2 kali semin-ggu	3 kali seemin-ggu	4 kali semin-ggu	5 kali semin-ggu	6 kali semin-ggu	7 kali semin-ggu

No	Kenyataan	Skala
1a	Berapa kerapkah anda mengambil sarapan pagi?	1 2 3 4 5 6 7 8
1b	Berapa kerapkah anda mengambil minum pagi?	1 2 3 4 5 6 7 8
1c	Berapa kerapkah anda mengambil makan tengahari?	1 2 3 4 5 6 7 8
1d	Berapa kerapkah anda mengambil minum petang?	1 2 3 4 5 6 7 8
1e	Berapa kerapkah anda mengambil makan malam?	1 2 3 4 5 6 7 8
1f	Berapa kerapkah anda mengambil makan lewat malam?	1 2 3 4 5 6 7 8
2	Berapa kerapkah anda makan di medan selera, kedai kopi, atau gerai makanan?	1 2 3 4 5 6 7 8
3	Berapa kerapkah anda makan di restoran makanan barat (seperti KFC, McDonald's, Pizza Hut dan lain-lain)?	1 2 3 4 5 6 7 8

No. Rujukan ☐☐☐

4. Siapakah yang biasanya makan bersama anda? **(Sila pilih satu jawapan)**

☐ Ahli keluarga saya
☐ Rakan-rakan saya
☐ Bersendirian
☐ Lain-lain, sila nyatakan:_____

5. Yang manakah pernyataan berikut paling tepat menggambarkan pengambilan makanan anda? **(Sila pilih satu jawapan sahaja)**

☐ Saya menjaga pengambilan makanan saya dengan mengurangkan makanan tinggi lemak dan gula.
☐ Saya menjaga pengambilan makanan saya dengan mengurangkan makanan yang tinggi lemak, manis dan juga daging merah (seperti daging lembu dan kambing).
☐ Saya sedang mengambil menu berdiet tertentu untuk mengurangkan berat badan.
☐ Saya mencuba kurangkan makan untuk mengurangkan berat badan walaupun saya tiada menu berdiet tertentu.
☐ Saya tidak memilih jenis makanan dan makan apa sahaja yang ada.
☐ Saya seorang vegetarian dan lain-lain

No. Rujukan ☐☐☐

BAHAGIAN C: TAHAP AKTIVITI FIZIKAL

Bahagian ini adalah untuk mengetahui aktiviti fizikal anda pada 7 hari yang lalu (minggu lepas). Aktiviti fizikal yang dimaksudkan disini ialah termasuk tarian atau senaman yang membuatkan anda berpeluh atau kaki anda lenguh, atau permainan yang membuatkan anda bernafas dengan kuat seperti melompat tali, berlari, memanjat dan lain-lain.

1. Aktiviti fizikal masa lapang: Adakah anda membuat aktiviti berikut pada 7 hari lalu (minggu lepas)? Jika ya, berapa kali? (sila tandakan (/) satu sahaja pada setiap aktiviti)

Bil	Aktiviti	Tiada	1-2	3-4	5-6	7 kali atau lebih
1	Melompat tali					
2	Kayak					
3	Berkasut roda					
4	Berjalan untuk bersenam					
5	Berbasikal					
6	Jogging atau berlari					
7	Aerobik					
8	Berenang					
9	Bola lisut (baseball,softball)					
10	Menari					
11	Ragbi					
12	Badminton					
13	Papan luncur					
14	Bola sepak					
15	Hoki					
16	Bola tampar					
17	Bola keranjang					
18	Luncur ais					
19	Lain-lain, Nyatakan:					

No. Rujukan ☐☐☐

2. Pada 7 hari yang lepas, semasa kelas Pendidikan Jasmani (PJ) anda, berapa aktif anda berlari berlari bersungguh-sungguh, melompat? **Tanda satu sahaja.**

Saya tidak menghadiri kelas PJ	
Jarang	
Kadang kala	
Sering kali	
Selalu	

3.Pada 7 hari yang lepas, apakah perkara biasa yang anda lakukan semasa waktu makan tengahari? (selain makan)? **Tanda satu sahaja.**

Duduk (bercakap, membaca, membuat kerja sekolah)	
Berdiri atau berjalan-jalan	
Berlari atau bermain sedikit	
Berlari atau bermain agak sedikit	
Kebanyakan masa berlari atau bermain	

4.Pada 7 hari yang lepas, berapa hari anda membuat senaman, tarian atau bermain permainan secara sangat aktif **selepas waktu sekolah? Tanda satu sahaja.**

Tiada	
1 kali	
2 atau 3 kali	
4 kali	
5 kali	

5.Pada 7 hari yang lepas, berapa hari anda membuat senaman, tarian atau bermain permainan secara sangat aktif **pada waktu petang? Tanda satu sahaja.**

Tiada	
2 kali	
2 atau 3 kali	
4 kali	
6 kali	

6.Pada hujung minggu yang lepas, berapa hari anda membuat senaman, tarian atau bermain permainan secara sangat aktif? **Tanda satu sahaja.**

No. Rujukan ☐☐☐

Tiada	
3 kali	
2 atau 3 kali	
4 kali	
7 kali	

7.Antara yang berikut, yang manakah paling sesuai anda pada 7 hari yang lalu? Pilih **salah satu** pernyataan dibawah sahaja.

Pada waktu lapang, kebanyakannya saya gunakan untuk melakukan aktiviti fizikal yang ringan.	
Saya jarang (1 – 2 kali) membuat aktiviti fizikal pada waktu lapang (contoh: bersenam, berlari, berenang, berbasikal, senamrobik)	
Saya sering melakukan aktiviti fizikal pada waktu lapang (3 – 4 kali seminggu)	
Saya sering kali melakukan aktiviti fizikal pada waktu lapang (5 – 6 kali seminggu)	
Saya selalunya melakukan aktiviti fizikal pada waktu lapang (7 kali dan lebih dalam seminggu)	

8. Tandakan seberapa kerap anda membuat aktiviti fizikal pada setiap hari pada minggu lepas? (bermain, berlari dan lain-lain)

Hari	Tiada	Jarang	Kadang-kadang	Kerap	Sangat kerap
Isnin					
Selasa					
Rabu					
Khamis					
Jumaat					
Sabtu					
Ahad					

9.Pada minggu lepas, adakah anda jatuh sakit atau apa-apa yang menghalang anda daripada melakukan aktiviti fizikal? **Tanda satu sahaja.**

Tiada	
Ada. Apakah yang menghalang anda?	

Soalan tamat. Terima kasih kerana menjawab!

No. Rujukan ☐☐☐

Bahagian ini diisi oleh penemuduga.

BAHAGIAN E: STATUS PEMAKANAN

i. Ukuran Antropometrik

	Bacaan 1	**Bacaan 2**	**Purata**
Berat badan (kg)			
Tinggi (kg)			

BAHAGIAN F: PENGAMBILAN MAKANAN 24 JAM YANG LEPAS

Hari: _____ Tarikh: _____

Masa	**Lokasi**	**Makanan/Minuman**	**Cara Masakan (Bakar,Goreng, Kukus, Dll)/ Jenama Makanan**	**Kuantiti**