UNIVERSITI PUTRA MALAYSIA

ASSOCIATIONS OF SOCIODEMOGRAPHIC, DIETARY INTAKE, FOOD SECURITY, PHYSICAL ACTIVITY, SLEEP DURATION WITH BODY WEIGHT STATUS AMONG CHILDREN AT PPR PINGGIRAN BUKIT JALIL, KUALA LUMPUR

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BY

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A project submitted as a partial fulfillment of the requirement for the degree of Bachelor of Science (Nutrition and Community Health) from the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

BMI	Body Mass Index
B40	Below 40 income group
DBKL	*Dewan Bandaraya Kuala Lumpur*
NHMS	National Health Morbidity Survey
PAQC	Physical Activity Questionnaire for Older Children
PPR	*Program Perumahan Rakyat*
RNI	Recommended Nutrient Intake
SES	Socioeconomic Status
WHO	World Health Organization

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LIST OF APPENDICES

ABSTRACT

ASSOCIATIONS OF SOCIODEMOGRAPHIC, DIETARY INTAKE, FOOD SECURITY, PHYSICAL ACTIVITY, SLEEP DURATION WITH BODY WEIGHT STATUS AMONG CHILDREN AT PPR PINGGIRAN BUKIT JALIL, KUALA LUMPUR

Nur Nazira Izaty binti Mhd Nazarludin

Children in Malaysia continues to face the burden of malnutrition, which includes both undernutrition and overnutrition problem As children are more vulnerable to any health and nutrition problem that may impair their later life, this age group should be given extra attention on this body weight issue. The objective of this study was to determine the associations of sociodemographic, food security, dietary intake, physical activity, sleep duration with body weight status among children at PPR Pinggiran Bukit Jalil, Kuala Lumpur. The sample size for this cross-sectional study was 137 respondents. The inclusion criteria of respondents were Malaysian children aged 7 to 12 years who live at PPR while the exclusion criteria was children with physical inability that have a limitation on physical functioning and mobility. A face-to-face interview session by using questionnaire was conducted among children along with their parents or caregiver which were divided into seven parts that comprise questions on sociodemographic, food security, physical activity, screen time, duration of sleep and anthropometric measurements of height and weight of the children. BMI-for-age was used to interpret the body weight status of children by using WHO AntroPlus version 1.0.4. Based on the findings, more than half of the boys in this study showed poor body weight status, where 36.5% were obese or overweight, and 25.4% were thinness or severe thinness. In contrast, more than half of the girls showed a normal body weight status (68.5%). Sex (x^2=9.222, p<0.002), age (r=0.271, p<0.001) food security (x^2=10.088, p<0.039), energy intake (r=0.200, p<0.019), carbohydrate intake (r=0.169, p<0.049), protein intake (r=0.179, p<0.036) and sleep duration (r=0.331, p<0.001) were found to be associated with BMI-for-age of children. In conclusion, sex, age, food security, energy intake, carbohydrate intake, protein intake and sleep duration were significantly associated with BMI-for-age of children. A holistic observation should be done to the factors that may associate with body weight status of the children. Also, health promotion and awareness should focus more on promoting health among the low-income community in the urban area.

ABSTRAK

HUBUNGAN ANTARA SOSIODEMOGRAFI, JAMINAN KEDAPATAN MAKANAN, PENGAMBILAN MAKANAN, AKTIVITI FIZIKAL, TEMPOH TIDUR DENGAN STATUS BERAT BADAN DALAM KALANGAN KANAK-KANAK DI PPR PINGGIRAN BUKIT JALIL,KUALA LUMPUR

Nur Nazira Izaty binti Mhd Nazarludin

Kanak-kanak di Malaysia terus menghadapi beban kekurangan zat makanan, yang termasuk masalah kekurangan zat makanan dan terlebih zat makanan. Kanak-kanak merupakan kumpulan umur yang harus diberikan perhatian tambahan terhadap masalah berat badan kerana mereka lebih terdedah kepada masalah kesihatan dan pemakanan yang boleh menjejaskan kehidupan mereka, Objektif kajian ini adalah untuk menentukan hubungan antara sosiodemografi, jaminan kedapatan makanan, pengambilan makanan, aktiviti fizikal, tempoh tidur dengan status berat badan dalam kalangan kanak-kanak di PPR Pinggiran Bukit Jalil, Kuala Lumpur. Antara kriteria pemilihan responden adalah kanak-kanak Malaysia berumur 7 hingga 12 tahun yang tinggal di PPR sementara kriteria pengecualiannya adalah kanak-kanak dengan ketidakmampuan fizikal yang mempunyai batasan terhadap fungsi fizikal dan mobiliti. Seramai 137 responden telah terlibat dalam sesi temubual secara bersemuka dengan menggunakan soal selidik telah dijalankan dalam kalangan kanak-kanak bersama dengan ibu bapa atau penjaga mereka yang dibahagikan kepada tujuh bahagian. Berdasarkan kajian ini, lebih separuh daripada kanak-kanak lelaki dalam kajian ini menunjukkan status berat badan yang buruk, di mana 36.5% adalah obes atau berat badan berlebihan, dan 25.4% mempunyai kekurangan berat badan yang teruk. Sebaliknya, lebih separuh kanak-kanak perempuan menunjukkan status berat badan normal (68.5%). Jantina ($x^2 = 9.222$, $p < 0.002$), umur ($r = 0.271$, $p < 0.001$), jaminan kedapatan makanan ($x^2 = 10.088$, $p < 0.039$), pengambilan tenaga ($r = 0.200$, $p < 0.019$), pengambilan karbohidrat ($r = 9.222$, $p < 0.002$) 0.169, $p < 0.049$), pengambilan protein ($r = 0.179$, $p < 0.036$) dan tempoh tidur ($r = 0.331$, $p < 0.001$) didapati mempunyai kaitan dengan BMI kanak-kanak. Walaubagaimanapun, factor-faktor lain menunjukkan tiada perkaitan dengan BMI kanak-kanak. Sebagai kesimpulan, jantina, umur, keselamatan makanan, pengambilan tenaga, pengambilan karbohidrat, pengambilan protein dan tempoh tidur adalah berkaitan dengan BMI-untuk-umur kanak-kanak. Oleh itu, pemerhatian holistik perlu dilakukan terhadap faktor-faktor yang mungkin dikaitkan dengan status berat badan kanak-kanak. Selain itu, promosi dan kesedaran kesihatan harus memberi tumpuan lebih kepada mempromosikan kesihatan dalam kalangan masyarakat berpendapatan rendah di kawasan bandar.

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Malnutrition is the nutritional problem due to deficiencies, excesses or imbalance of energy and nutrients. There are two conditions of malnutrition, which are over-nutrition and under-nutrition. Over-nutrition is associated with overweight and obesity, while under-nutrition is associated with underweight, stunting, wasting, or micronutrient deficiencies (WHO, 2016). The nutritional issue of children in Malaysia is one of the interesting issues as Malaysia is experiencing a rise in the prevalence of both thinness and obesity among Malaysian children from year to year. These young people and school-age children (below 14 years old) in Malaysia contributes a large proportion which constitutes about 23.8% of its total population (Department of Statistics Malaysia, 2018). It was reported that the prevalence of thinness increased from 6.5% in 2008 to 7.8% in 2015. Besides, the prevalence of obesity was increased as well from 11.2% in 2008 to 11.9% in 2015 (National IDD Survey, 2008; NHMS, 2015). Apart from that, urban children showed higher prevalence of both thinness and obesity when compared to rural area. It was reported

from the National Health Morbidity Survey (2015) that the prevalence of thinness among children in the urban area was 12.1% while the prevalence of thinness among children in the rural area was 11.2%. Meanwhile, the prevalence of obesity among children urban area showed a higher percent as well when compared to rural area, where 8.0% of children in urban area faced the obesity problem while 7.2% of children in rural area faced the obesity problem (NHMS, 2015).

As a developing country that undergoes rapid economic growth and urbanization, the overall trends in the body weight status of children in Malaysia do not show a decrease in thinness with an associated rise in the prevalence of obesity. As it was shown that body weight status is highly correlated with overall health status (Ahmad et al., 2017), thus, it may have a significant effect on social, economic and public health as well. Hence, early detection of poor body mass index (BMI) status during childhood may help to reduce any associated comorbidities or health problem later in life as being severely thin or obese may impose the risk of many health problems (Ahmad et al., 2017).

It was proven by UNICEF (2016) that the risk of being overweight may due to increase access to unhealthy food, physical inactivity and sedentary lifestyle, where this problem is steadily affecting people from all ages group (WHO,2016). The increasing trend of overweight and obesity in Malaysia may contribute to the growing prevalence of chronic diseases such as type 2 diabetes, obesity, stroke, hypertension and cardiovascular disease (McMillen et. al, 2009). Besides, overweight or obese children will likely to stay obese till adulthood and the tendency

to develop these non-communicable diseases at a younger age is not a surprise (WHO, 2016).

Together with over-nutrition, under-nutrition problem is also an issue among children in Malaysia. Under-nutrition may also cause health effect to the children such as delay in physical growth, motor development and cognitive development (Warsito et al., 2012). In addition, The United Nations Food and Agriculture Organization (2015) reported that about 795 million people worldwide were chronically undernourished, where most of them live in developing countries such as Malaysia.

Despite Malaysia's low poverty rate of less than 1.0%, the children in low-cost housing area are still suffering the malnutrition problem due to poverty issue (The World Bank, 2018). The recent study on urban child poverty and deprivation in low cost flats in Kuala Lumpur (UNICEF, 2017) revealed that 15.0% of children below the age of five are stunted, 22.0% are underweight and 23% are either overweight or obese. From this study which involved 2142 children, the number of stunting and wasting in low-cost DBKL flats is twice the average of Kuala Lumpur (UNICEF, 2018). In an urban area with high economic census of 14.9% (Department of Statistics Malaysia, 2016), a fraction of the citizens in Kuala Lumpur (KL) are still live in deprive and poverty. Due to this socio-demographic background, the children in the family with low household income and large household size will face serious under-nutrition problem that might disturb their growth and later life.

Another factor that may associate with body weight status of children is household food security as it is commonly related to low-income group. Based on the recent study by UNICEF (2018) involving 966 households in low-cost DBKL flats, 788 households have three to six family members and 156 households with seven to ten family members. Hence, this overcrowding in a small house might threaten the quality and quantity of food received by each family member especially the children as they tend to have more chance of developing a worse nutritional problem (Ruiz-castell et al., 2015). Food security in a household can be determined by observing the physical, social and economic access to sufficient, safe and nutritious food whether it meet the needs and preferences of food for the children or not (FAO, 2002).

Apart from sociodemographic, the dietary intake of children may also associate with body weight status of children. A balanced, moderate and variety of eating might improve the overall state of well-being and as one of the important aspects of health, development and growth of children. An excessive calorie intake of more than the daily requirement may cause an imbalance of energy (WHO, 2016). Children should consume a variety of nutrient-dense foods across the food groups, especially whole grains, fruits, vegetables, milk products, and protein sources in a day based on their daily requirement. However, based on the Malaysia Active Healthy Kids Report Card 2016, only 13.4% of Malaysian children age 7 to 9 years old consume fruit and 9.5% consume vegetable in a day. Meanwhile, it is recommended for children to eat 2 servings of fruit and 3 servings of vegetable in a day (Malaysian Dietary Guidelines for Children and Adolescents, 2013). Apart from

that, children need to limit the intake of fats, cholesterol, added sugar and salt as well.

Besides, another factor that may associate with body weight status of children is engagement in physical activity. Based on World Health Organization (2011), physical activity provides fundamental health benefits to children such as healthy musculoskeletal, cardiovascular system, neuromuscular awareness and facilitates maintenance of healthy body weight. It is recommended for children age between 5 to 17 years old to accumulate at least 60 minutes of moderate-to-vigorous-intensity physical activity in a day. According to Ickpyo et al. (2016), physical activity may lower the risk of obesity and overweight while improving the overall health of children. Besides, the engagement in physical activity or recreational activity may avoid sedentary lifestyle patterns among children. According to Malaysia's 2016 Report Card on Physical Activity for Children and Adolescents, it was reported that Malaysian children and adolescents are engaging in low levels of physical activity with high levels of sedentary behaviour (Razinah et al., 2016). Besides, sedentary behaviour such as playing video games, using the computer and watching television may increase the risk of obesity as these activities require less body movement (Juan et al., 2008). While from the same report card, only 68.4% of 7 to 12 years old children spent more than 2 hours of screen time per day, where the average duration spent for screen-based activities of the children in this survey is 3.1 hours per day. Screen time is not only decreased physical activity level among children, but it may also influence the dietary intake of children through food advertising and passive overconsumption of food during screen time (USDA, 2012). While according to Shang et al. (2015), screen time also associated with the choices of food, where this

problem usually occurred among overweight and obese children. Hence, this is the reason why screen time may influence the trend of body weight status of the children through lessening of physical activity, engaging in sedentary behaviour and influencing the dietary intake of children too.

Besides, the sleep duration of children may also influence their body weight status, where children age 5 to 10 years old need adequate sleep of more than ten hours per day while children age more than 10 years old need more than nine hours of sleep per day for rapid mental and physical development (Chen et al., 2008). According to a study by Doherty et al. (2015) on sleeping pattern among Hispanic children, sleep duration may contribute to changes in body weight. This study also suggested to improve sleeping patterns and increasing physical activity to prevent obesity problem among children. A study by Khan et al. (2015) on sleep duration and sleep quality also reported that longer sleep duration was associated with better diet quality, higher level of physical activity and decreased the risk of overweight and obesity. This is because sleeping help to regulate hormone secretion where shorter sleep duration will reduced leptin secretion and elevated ghrelin hormone. Leptin hormone would suppress appetite while ghrelin hormone will stimulate the appetite of children (Taheri et al., 2004). Hence, sleep duration of the children should also be observed to determine whether it affects the body weight status of the children or not.

As children are more vulnerable to any health and nutrition problem that may impair their later life, this age group should be given extra attention on this body

weight issue. Besides, poor economic status, poor dietary intake, food insecurity, infrequent physical activity, more screen time and shorter duration of sleep may threaten the overall health of children as well as their nutritional status.

1.2 Problem Statement

The malnutrition problem among children in low-income housing in urban area has caught the attention of the country and a clearer study need to be done to identify the factors that may associate with this problem. A study on the nutritional status of primary school children from low-income household in the urban area revealed a high prevalence of underweight, stunting and wasting with an increasing prevalence in overweight too (Zalilah, Bond, & Johson, 2000). However, this study does not further discussed on the factors that associated with this problem. Hence, due to unclear study on the factors that associates with the body weight status of children in low-cost housing in urban area, the purpose of this study aimed to determine the association of sociodemographic background, food security, dietary intake, physical activity and sleep duration with the body weight status among children at low cost flat in Kuala Lumpur.

Food security is another issue that should be aware as it is one of the risk factors for poor body weight status among children. A local study by Ihab et al. (2014) among children in Northeastern of Peninsular Malaysia showed that household food insecurity is associated with the nutritional status of the children. In addition, a study on Brazillian

children under the age of five (Leornardo & Denise, 2013) showed that children with food insecurity have worse rates of height-for-age or may cause stunting problem. However, a local study by Zalilah and Ang (2001) on food insecurity revealed that there is no association of household income, income per capita, and parents' monthly income with the risk factors of food insecurity and body weight status of children in low-income household in Kuala Lumpur. Thus, further research need to be conducted to observe the association of food insecurity and body weight status among children.

Besides, family with low-income group tend to choose unhealthy food rather than more nutritious food due to low socioeconomic status. A study in Thailand revealed that overweight mother with wasted children tend to control their children's food intake and this will result in high consumption of snack food and low energy intake among these wasted children (Yamborisut et al., 2006). While a study by Michael et al. (2014) revealed that Cypriot children and adolescents will generally consume a diet of poor dietary quality such as higher intake of fat than the recommendation that will expose them to obesity and degenerative disease. However, the current local study by Zalilah et al. (2015) did studied on the association of household income and dietary intake among urban children, but does not further observed on the effect of the diet to their body weight status. Hence, in this study, the association of dietary intake and body weight status should be observed whether it is one of the risk factors that contributes to malnutrition problem of the children in low-cost housing area.

Next, physical activity is another concern when relate with body weight status among children. Due to limited of representative data of physical activity for children

under 12 years old in Malaysia, this study will determine the prevalence of physical activity among children from low-income family and urban areas. The local data from Global School-based Health Survey (GSHS) 2012 only showed the prevalence of physical activity among 13 to 17 years old children and adolescent. Besides, there was limited local study that included sedentary behaviour such as screen time when measured the rate of physical activity among children, thus this study will measure the prevalence of physical activity among children which included the duration of screen time that will associate with their body weight status.

Also, sleep duration of children is another concerned issue that may associate with children's body weight status. In addition, American Association for Cancer Research (2018) states that shorter sleep duration was associated with higher BMI z-score among children. Besides, a study by Firouzi et al. (2014) in Malaysia showed that children who have poor sleep quality and shorter duration of sleep will at risk of overweight and obesity. However, most of the study on sleeping pattern and body weight status were focussed on overweight and obese only, where the association with underweight problem is very limited. Hence, this study will observe how sleeping pattern would affect the body weight status of children in low cost flat.

While a survey by Amina et al. (2012) reported that children in rural area in Malaysia have a higher prevalence of underweight than urban area. This seems to contradict with the recent study by UNICEF (2018), where urban children are facing the same problem as well. On the other hand, a report on the Nutrition Survey of Malaysian Children (SEANUT) revealed that over-nutrition is more prevalent than

under-nutrition problem among children in Malaysia. This shows an inconsistent findings on the body weight status of children, whether there were more prevalent of over-nutrition or under-nutrition among children in Malaysia. Thus, this study will further observe on the current body weight status of children among low-income family living in urban area as there were limited studies on the factors associated with the body weight status of children in low cost flat.

Research Questions:

1. What is the sociodemographic, food security, dietary intake, physical activity, sleep duration and body weight status among children at PPR Pinggiran Bukit Jalil, Kuala Lumpur?
2. What are the associations of sociodemographic, food security, dietary intake, physical activity, sleep duration with body weight status among children at PPR Pinggiran Bukit Jalil, Kuala Lumpur ?

1.3 Significance of the Study

This study will determine the association of socio-demographic, dietary intake, food security, physical activity, sleep duration and body weight status among children at low cost flat in Kuala Lumpur. As there were limited researches on factors that associate with body weight status among children from low-income community in

urban area, the finding from this study will bring new knowledge and idea on the issue of malnutrition among this population.

According to Lowrey (as cited in Anuar Zaini et al., 2005), undernutrition is the major cause of faltering growth in children. Besides, underprivileged family such as low-income family might have problems with purchasing power, food availability and nutrition knowledge. Hence, this study can be used as baseline information for future research to create an awareness among this community for them to be more concern about their health.

The information from this study may also help the policy makers and community to plan for future intervention or research related to this field to improve the nutrition status of children from low income family. An innovative nutrition intervention and education will provide solutions to the health issues, hence individuals will live healthier and more productive (Ohlhorst et al., 2013). Apart from that, this study will be used to enlighten and communicate with policymakers on the need for funding of nutrition research to address the health issue among society.

Besides, poor growth among young children from urban poor might give worse effect on health and nutritional practices in the city (Anuar Zaini et al., 2005). Thus, the information from this study can be used as a material to come up with new strategies to intervene the weight problem arises among children from low income family in urban area. In addition, the information from this study will eventually help the children to achieve a better health status in the future.

1.4 Research Objective

1.4.1 General objective:

To determine the associations of sociodemographic, food security, dietary intake, physical activity, sleep duration with body weight status among children at PPR Pinggiran Bukit Jalil, Kuala Lumpur.

1.4.2 Specific objectives:

1. To examine the sociodemographic, dietary intake, food security, physical activity and sleep duration among respondents.

2. To assess the body weight status among respondents

3. To determine the association between sociodemographic and body weight status among respondents.

4. To determine the association between food security and body weight status among respondents.

5. To determine the association between dietary intake and body weight status among respondents.

6. To determine the association between physical activity and body weight status of children among respondents.

7. To determine the association between sleep duration and body weight status among respondents.

1.5 Hypothesis

1. There is an association between sociodemographic and body weight status among respondents.

2. There is an association between food security and body weight status among children respondents.

3. There is an association between dietary intake and body weight status among respondents.

4. There is an association between physical activity and body weight status of children among respondents.

5. There is an association between sleep duration and body weight status among respondents.

1.6 Research Framework

This study aimed to determine the association of sociodemographic, food security, dietary intake, physical activity, sleep duration and body weight status among children at PPR Pinggiran Bukit Jalil, Kuala Lumpur. The sociodemographic, food security, dietary intake, physical activity and sleep duration were independent variables while the body weight status among children at PPR Pinggiran Bukit Jalil was dependent

variable. The relationship between the factors and body weight status are conceptualized in Figure 1.0.

Based on the conceptual framework in Figure 1.0, the research problem that being studied was body weight status among children at PPR Pinggiran Bukit Jalil. While the relationship between the factors and body weight status of the target group was determined whether there are any associations of these independent and dependent variables. As for sociodemographic, the items that being analyzed were age, sex, ethnicity, household monthly income, parents' occupation, parents' education, household size and health problem among family members. While for dietary intake, the daily intake of energy and macronutrient of the children were observed. As for food security factor, the level of food security of the family was measured. While for physical activity, the items that being studied were physical activities level and duration of screen time in a day of the children. As for sleep duration, the children's bedtime and wake up time were measured. While for the measurement of body weight status of the children, the BMI-for-age of the children was determined. We then assessed whether there were any association between the independent variables with the dependent variable.

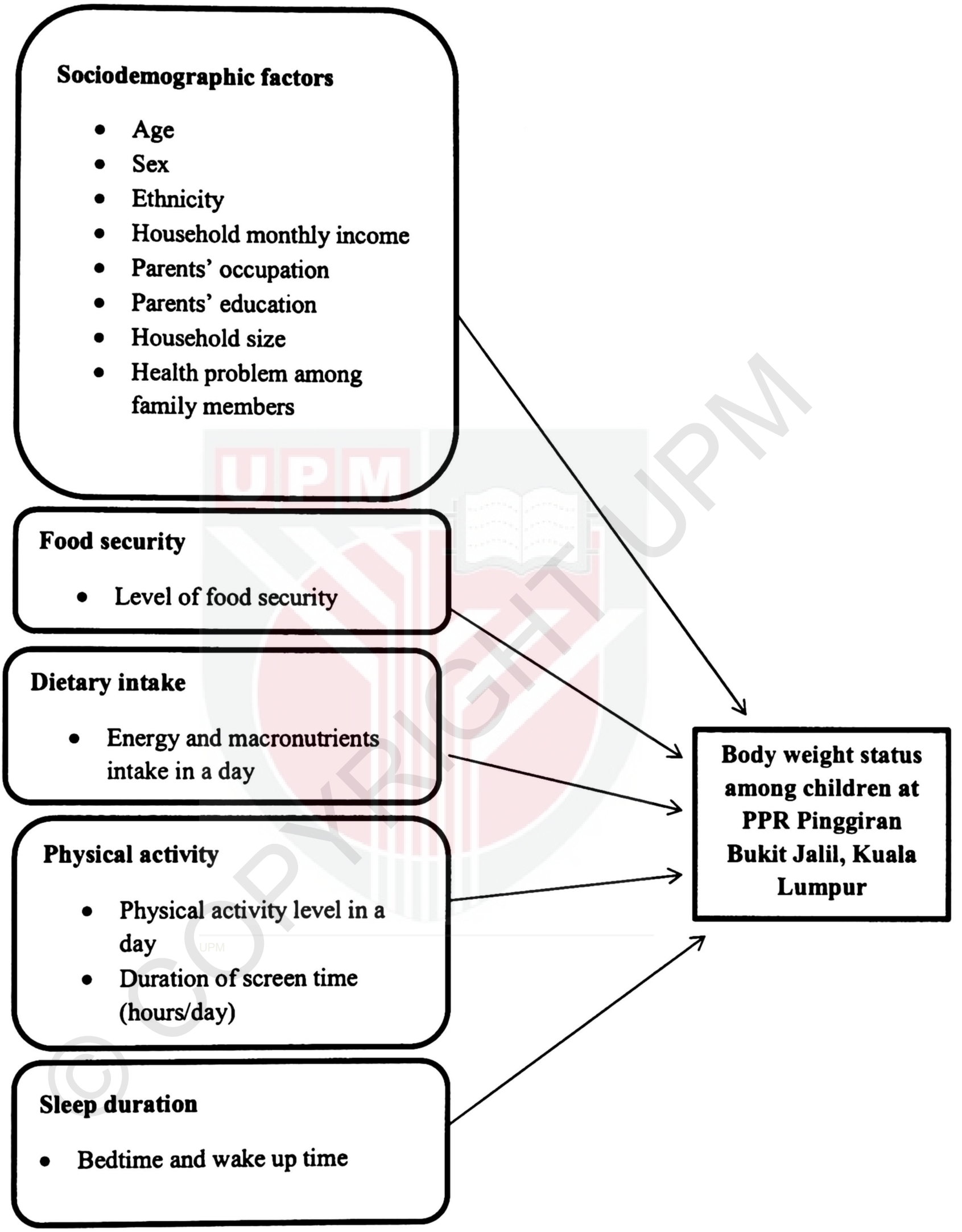

Figure 1.0: Conceptual framework for the association of sociodemographic, food security, dietary intake, physical activity, sleep duration with body weight status among children at PPR Pinggiran Bukit Jalil, Kuala Lumpur.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

Literature review is the reviewing of secondary sources that have been published to give an overview of the research topic. This chapter consists of literature review on the current information and findings from international and local studies. There are five sections in this literature review, which cover on the body weight status of children, sociodemographic, household food security, dietary intake of children, physical activity of children and sleep duration of children.

2.1 Body Weight Status of Children

A cross-sectional study among 8005 urban primary school children from a low-income household in Kuala Lumpur revealed that 52% (n=4149) of the children was underweight, 50% (n=3893) was stunted and 30% (n=2568) was wasted. Apart from that, it was found that 5.8% (n=464) of the sample was overweight. This study demonstrated that there were high prevalence of underweight, wasting and stunting, with an increasing prevalence of overweight among the children among low-income

household in the urban area. However, one of the limitations of this study was the data could not be generalized to all children from low-income family as the research did not further explore on the family socioeconomic status and living condition of these children. Besides, the factors that may contribute to the poor nutritional status of the children were not studied, where poor nutritional status might due to few factors such as physical activity, dietary intake or infections (Zalilah, Bond, & Johson, 2000).

While another finding from 2008 National Iodine Deficiency Disease (IDD) Survey on assessing the current nutritional status of Malaysian school children from rural and urban area reported that Malaysian primary school children were facing both undernourishment and overweight problem. This cross-sectional study included 18708 primary school children from 445 schools in each state and Federal Territory in Malaysia. Besides, it showed that the prevalence of underweight, stunting and thinness among children in rural area were higher than urban area. From the same study, it was found that the urban area children showed a higher prevalence of overweight than in rural area. However, a study by Shariff et al. (2000) showed that urban area children with low-socioeconomic status were also facing the underweight, stunting and thinness problem as well.

Another follow up study was also conducted by Ismail et al. (2009) to determine the prevalence and trend of overweight and obesity among 6-12 years old children in four regions of Peninsular Malaysia from 2002 to 2008 period. This study reported that the prevalence of underweight among children decreased slightly from 9·7% in 2002 to 9·5% in 2008, while the trend of overweight and obesity was increased from 20·7 in

2002 to 26·4% in 2008. While based on National Health Morbidity Survey (NHMS) 2015, it was reported that the current national prevalence of thinness, underweight, wasting, stunting and obesity among children below 18 years old were 7.8%, 13.0%, 7.9%, 13.4% and 11.9% respectively, and the prevalence was higher among children in urban areas than in rural areas. Hence, it showed that the trend of body weight status of children was not static in one population and keep on changing depending on the factors that may influence the changes in the trend among Malaysian children.

2.2 Sociodemographic characteristics

A cross-sectional study by Zalilah et al. (2000) on the study of nutritional status among 8005 primary school children from low- income households in Kuala Lumpur stated that boys were found to be more underweight, stunted, wasted and overweight when compared to girls. Boys were reported to have lower mean z-scores for height-for-age and weight-for-height. This has been supported by the latest study among Chinese primary school children in China showed that the prevalence of obesity and sedentary behaviour was higher among children in urban areas, where boy tend to develop this problem when compared to the girl (Cai, Zhu & Wu, 2017).

Apart from that, older children were shown to have significantly lower mean z-scores for height-for-age but higher mean z-scores for weight-for-height than younger children (Zalilah et al., 2000). However, these older children may experience a pubertal growth spurt and the changes in weight and height might differ from one child to

another. Thus, further study should be done to observe the difference of body weight between younger children and older children and observing any intermediate factors that may influence their body weight status such as pubertal factors.

Besides, a national representative survey of National Health Morbidity Survey (NHMS) 2015 on rural and urban Malaysian children reported that the prevalence of thinness was higher among urban children (8.0%) than in rural areas. Rural children also showed a high prevalence of normal BMI-for-age (81.6%) when compared to children in urban areas (79.8%). In addition, the prevalence of obesity in urban areas was also slightly higher (12.2%) than in rural areas (11.2%). These trends showed that children in urban areas are facing the burden of malnutrition as well and the nutritional status of children in rural area was getting better year by year. This trend also showed how different factors and characteristics will influence the body weight status of children at different locations.

2.3 Food Security

A study by Zalilah and Merlin (2001) on food insecurity and nutritional outcomes among 137 Malay children in low-income household in Taman Sang Kancil, Kuala Lumpur revealed that 34.3% of the households were food secure and more than half of the children (65.7%) experienced some kind of food insecurity, where 27.7 % households were food insecure, 10.9% individuals were food insecure and 27.0% fell into the child hunger category. From the same study, the prevalence of underweight, stunting and wasting of the respondents were 44.5%, 36.5% and 30.7% respectively,

which quite high when compared to the prevalence of overweight (13.1 %). This showed that food insecurity is one of the factors that contributes to poor body weight status of children from low-income family. However, this study was only focused on Malay ethnic, hence the association of food insecurity and nutritional status among another main ethnic in Malaysia is still unclear.

It was also proved by a cross-sectional study by Ihab et al. (2014) on the association of food insecurity and nutritional outcomes among 223 low-income households from the rural area in Kelantan, Malaysia. It was reported that only 16.1% of the households were food secure and majority of them (83.9%) experienced some kind of food insecurity, which were 29.6% households were food insecure, 19.3 % individuals were food insecure and 35.0% were child hunger category. This showed that food insecurity was one of the determinants of poor nutritional status, where the prevalence of underweight, stunting and wasting of the children from the low-income household were 61.0%, 61.4% and 30.6% respectively. Besides, the prevalence of overweight was 1.3%, where a large difference between under-nutrition and over-nutrition problems was seen here. However, another cross-sectional study among 128 urban children in Kuantan, Pahang revealed that food insecurity and childhood obesity is one of the major concern as well. From this study, only 23% of the respondents were food secure and another 77% experienced food insecure. It was reported that the prevalence of overweight and obese children in this study was higher from food insecure household (60.6%) while 38.4% of overweight and obese children from food secure households. These studies proved that the direction of association of food security and body weight status of children differed from one setting to another. Hence,

further observation need to be done to identify the complex interaction and association of food security and body weight status of children in Malaysia.

2.4 Dietary Intake

A Nutrition Survey of Malaysian Children (Poh et al., 2013) was conducted to assess the nutritional status among 3542 children aged 6 months to 12 years. From this study, it was reported that the energy and macronutrient intakes were higher in the older age groups and among boys. The finding from this study has been supported by a cross-sectional study by Zalilah et al. (2015) that study on the relationship between household income and dietary intakes among 1-10 years old urban Malaysian from Wilayah Persekutuan and Selangor. It was reported that older children from low-income family had the lowest energy intake as well as most of the nutrients. Besides, most of them did not meet the recommended energy, nutrient intakes and recommended servings in a day. This shows that older children from low-income group could have limited access to an adequate diet where the quality and quantity of their food intake should be highlighted as well by the parents. This has been supported as well by another study on dietary intake and body weight status among urban Malay primary school children which reported that majority of the children's dietary intakes were less than the national recommendation (Yang et al., 2017). This cross-sectional study that involved 236 primary school children from five primary schools in Malaysia also revealed that there was a positive association between dietary intake and weight status after excluding energy misreported. In this study, the mean energy, carbohydrate, protein, and fat intake

per day by the respondents were 1698 kcal, 229.0 g, 65.0g, and 58.0g, respectively. Despite a relatively high prevalence of overweight and obesity in Malaysia, the majority of children in Malaysia still had dietary intakes below recommended levels, where obese children had the lowest energy intakes relative to body weight (kcal/kg) when compared to children in other weight categories. However, this study only focused on Malay population, where there was limited generalizability of the results beyond this ethnicity (Yang et al., 2017).

Apart from that, a study on dietary intake and body weight status of 236 urban Thailand children age 10 to 12 years old reported that overweight/obese participants consume higher energy and macronutrient intake when compared to non-obese participants (Boonchoo et al., 2017). This shows that these overweight/obese children did consume more cereal grains, meat/fish, flavored milk, and sugar-sweetened beverages (SSB) during main meals and street-side snacks and confectioneries during between meals. This shows that the pattern of dietary intake, type of food and the amount of food that the children consumed will affect the weight status of the children itself.

2.5 Physical Activity

A study that used Malaysian data from the South East Asian Nutrition Surveys (SEANUTS), a nationally representative cross-sectional survey among 1702 children

in Malaysia was conducted on assessing the physical activity of primary school children in Malaysia (Wong et al., 2016). Based on this study, it was reported that younger children aged 7 to 9 years old were more physically active when compared to older children aged 10 to 12 years old. It was shown that one over third (33.6%) of the younger children were categorized into high physical activity while only one out of fifth (17.8%) of the older children were categorized into high physical activity level. This might due to lesser participation of older children in physical activity after the school hour is over. Moreover, from the same study, overweight/obese children tend to participate in low-to-moderate physical activity. As physical activity has shown to provide beneficial health effect, children who were overweight/obese would benefit this better if they participate in physical activity as it will protect them from any associated comorbidities. However, despite this study used a large and nationally representative sample of Malaysian children, this study only classified the children into three levels of physical activity without reported whether the children meet the physical activity recommendations or not.

While another local study was also conducted by Lee et al. (2015) to assess the physical activity level and sedentary behaviour of 1736 Malaysian children aged 7 to 12 years from six regions of Malaysia. The aim of this study is to examine the association of physical activity level with body mass index (BMI), BMI-for-age z-score (BAZ), body fatness and waist circumference of the children. However, it was found that Physical Activity Questionnaire (PAQ) score and pedometer step counts were negatively associated with BMI, BAZ, body fatness and waist circumference after adjusting for covariates. Apart from that, this study also examined the association of sedentary behaviour with body weight status, where screen time showed a positive

association with BAZ and waist circumference. This finding has been supported by a study of obesity among urban primary school children aged 7 to 11 years old in Selangor. It was also shown that obesity was less common among children who watched television of one hour or less (Shariff, Sazlina and Shamsul, 2007). These studies show that watching television or longer screen time will have a positive association with the risk of developing obesity among children.

A cross-sectional was also conducted by Raistenskis et.al (2015) to study on physical activity and physical fitness among obese, overweight, and normal-weight among 532 Lithuania children. The physical activity and physical fitness of children were measured by using The Youth Physical Activity Questionnaire, a 6-min walk test (6MWT) and maximal oxygen consumption. This study reported that obese or overweight children in this study were less physically active, where they engaged in moderate-to-vigorous physical activity 22.4 min less per day and walked 50.9 m less on average during a 6-min test than normal-weight children. However, this study did not include underweight children, hence the association of underweight children with physical activity is unclear from this study.

2.6 Sleep Duration

A cohort study by Taheri et al. (2004) was conducted to determine the association between short duration of sleep with body mass index among 1024 volunteers from the Wisconsin Sleep Cohort Study, a population-based longitudinal

study of sleep disorders. The respondents need to complete the mailed sleep surveys, involved overnight studies and 6-days recorded sleep diaries. The respondents will spend their night in laboratory bedrooms and need to ensure that they recorded their sleep time and wake up time. After they woke up, their fasted blood samples were evaluated for serum leptin and ghrelin (two key opposing hormones in appetite regulation), adiponectin, insulin, glucose, and lipid profile. It was shown that people who slept less than 8 hours will increase their body mass index (BMI) and ghrelin hormone, an appetite hormone that would trigger hunger and higher intake of food.

Another longitudinal study by Lumeng et al. (2014) proved that shorter sleep duration among children age 9-12 years old might increase the risk of overweight. The participants need to complete maternal report, anthropometric measurement and questionnaire on Children's Sleep Habits Questionnaire (CSHQ) on 3rd and 6th grade. It showed that a shorter duration of sleep during 3rd grade was associated with overweight in 6th grade and shorter duration of sleep during 6th grade was associated with a greater risk of overweight in 6th grade. This finding has been supported by another study among children aged 9 to 11 years old from North Italy (Alice et al., 2017). It was proven that the prevalence of overweight and obese was higher among children who slept fewer hours in a night. It showed that when the children have poor and shorter sleep, they may have the tendency to develop the risk of obesity due to possible mechanism such as changes in appetite-regulating hormones. The timing of eating, dietary intake and eating behaviours of the children could be another possible mechanism that proved the association between shorter sleep duration and poor body weight status (Alison, Julie and Monique, 2015).

While a local case-control study was also conducted among 164 children aged 6 to 12 years old to assess the association between sleep habits among normal, overweight and obese Malaysian children from ten primary schools in Malaysia. In this study, the children were categorized into two groups, which are normal weight and overweight/obese. Based on the findings from this study, the mean for bedtime, wake up time and sleep duration in these two groups were almost similar. However, the sleep disorder score was higher among overweight/obese children when compared to normal weight children. This study also reported that sleep disorder score was higher with increasing BMI of the children. This higher sleep disorder score might due to poor sleep quality that has correlation with weight gain and waist circumference as well. Even though the association between sleep duration with BMI status was still in debate world widely, however, this study has confirmed that children who slept less than the recommended amount may have a higher risk of being overweight and obese.

CHAPTER 3

METHODOLOGY

3.0 Introduction

Methodology is the process of gathering data and information to address the research problem. In this study, primary data was gathered from the respondents through face-to-face interview session by using questionnaire. Also, anthropometric measurement was measured after the interview session was conducted.

3.1 Study Design

The design of this study was cross-sectional study. This study was chosen to assess the relationship between the exposures and the outcomes among study participants at one point of time. The aim of this study was to determine the association between sociodemographic, food security, dietary intake, physical activity, sleep duration and body weight status among children at PPR Pinggiran Bukit Jalil, Kuala Lumpur.

3.2 Study Location

This study was conducted at *Program Perumahan Rakyat* (PPR) Pinggiran Bukit Jalil located at urban area of Kuala Lumpur. Kuala Lumpur (KL) is the capital city of Malaysia with an estimation of 1.8 million of population over 243 km^2 (Department of Statistics Malaysia, 2018). People's Housing Program or known as PPR is a housing programme under the government of Malaysia for Malaysian with household income of RM 3,000 per month (Ministry of Housing and Local Government, 2018). *Program Perumahan Rakyat* (PPR) was developed by the Ministry of Housing and Local Government of Malaysia before being handed over to the Local State Authority for the management (Ministry of Housing and Local Government, 2018). *Program Perumahan Rakyat* (PPR) Pinggiran Bukir Jalil, Kuala Lumpur was chosen as it is one of the low income housing area located in an urban settlement and has among the highest number of residents when compared to other PPR in Kuala Lumpur.

3.3 Sample Size Determination

Sample size is the number of respondents to be enrolled in this study. Table 3.0 shows the sample size determination and calculation using the formula by Cole (1997) as below:

$$\mathbf{n} = \frac{(Z_{1-\alpha/2}+Z_{1-\beta})^2}{r^2/(1-r^2)} + 5$$

where,

n = the required sample size

$Z_{1-\alpha/2}$= level of significance (1.96)

$Z_{1-\beta}$ = power set at 90% (1.28)

r = the expected correlation coefficient

Table 3.0: Sample size determination

Correlation Studies	Correlation, r	Sample Size, n	Design Effect For the Sample, DEFF
Dietary intake and body weight status of children (Boonchoo et al., 2017)	0.49	$n = \frac{(1.96+1.28)^2}{0.49^2/(1-0.49^2)} + 5$ = 38	1) Adjust for the estimated sample effect: n = 38 x 1.3 = 50 2) Adjust for the expected response rate (90%): n = 50 ÷ 0.90 = 56 3) Adjust for the expected proportion eligible: n = 55 ÷ 0.9 = 62
Food insecurity and body weight status of children (Pirkle et al., 2014)	0.64	$n = \frac{(1.96+1.28)^2}{0.64^2/(1-0.64^2)} + 5$ = 20	1) Adjust for the estimated sample effect: n = 20 x 1.3 = 26 2) Adjust for the expected response rate (90%): n = 26 ÷ 0.90 = 29 3) Adjust for the expected proportion eligible:

			$n = 29 \div 0.9$ $= 32$
Physical activity and body weight status of children (Foong Yi, 2006)	0.56	$n = \frac{(1.96+1.28)^2}{(0.56)^2/[1-0.56^2]} + 5$ $= 28$	1) Adjust for the estimated sample effect: $n = 28 \times 1.3$ $= 36$ 2) Adjust for the expected response rate (90%): $n = 36 \div 0.90$ $= 40$ 3) Adjust for the expected proportion eligible: $n = 40 \div 0.9$ $= 44$
Sleep duration and body weight status of children (Karen, Dennis & David, 2011)	0.31	$n = \frac{(1.96+1.28)^2}{(0.31)^2/[1-0.31^2]} + 5$ $= 100$	1) Adjust for the estimated sample effect: $n = 100 \times 1.3$ $= 130$ 2) Adjust for the expected response rate (90%): $n = 130 \div 0.90$ $= 144$ 3) Adjust for the expected proportion eligible: $n = 144 \div 0.9$ $= 160$

By comparing the sample size from the four correlation studies, the highest sample size came from the study on sleeping pattern and body weight status of children, which was 160. Therefore, the sample size for this study was **160 participants** after adjusted for the design effect.

3.4 Participants

The participants for this study were children who live in PPR Pinggiran Buki Jalil, Kuala Lumpur and their parent/caregiver. The selection of the children were based on the criteria as listed below in Table 3.1:

Table 3.1: The inclusion and exclusion criteria for the selection of participants

Inclusion criteria	Exclusion criteria
• Malaysian children who live in PPR • Age 7 to 12 years old	• Children with physical inability that have limitation on physical functioning and mobility

In this study, only Malaysian children who live in PPR Pinggiran Bukit Jalil was chosen as respondents. Children age 7 to 12 years old was chosen as respondents because it is the middle-childhood age where the children will experience a major developmental changes in term of physical, mental and social (Eccles, 1999). Hence, the children will become more competent, independent, self-aware and start to explore the world beyond their families. According to Eccles (1999), the children will integrate the transformations they gain during preschool period and start to prepare themselves before entering adolescence phase. Besides, healthy children without any limitation on physical functioning and mobility was selected as participants as this study will study the association of physical activity and body weight status. Hence, the participant should be someone who did not have any limitation on physical functioning and mobility that may restrict them from doing physical activities.

3.5 Sampling Design

Figure 3.0 shows the flow chart of sampling design in choosing the respondents from PPR Pinggiran Bukit Jalil for this study. Firstly, the total number of blocks were identified which consists of block A, B, C, D, E and F. After that, researcher went to entire population and screen for residents who fulfilled the study criteria. The residents who fulfilled the study criteria were selected and invited to join as the respondents of this study.

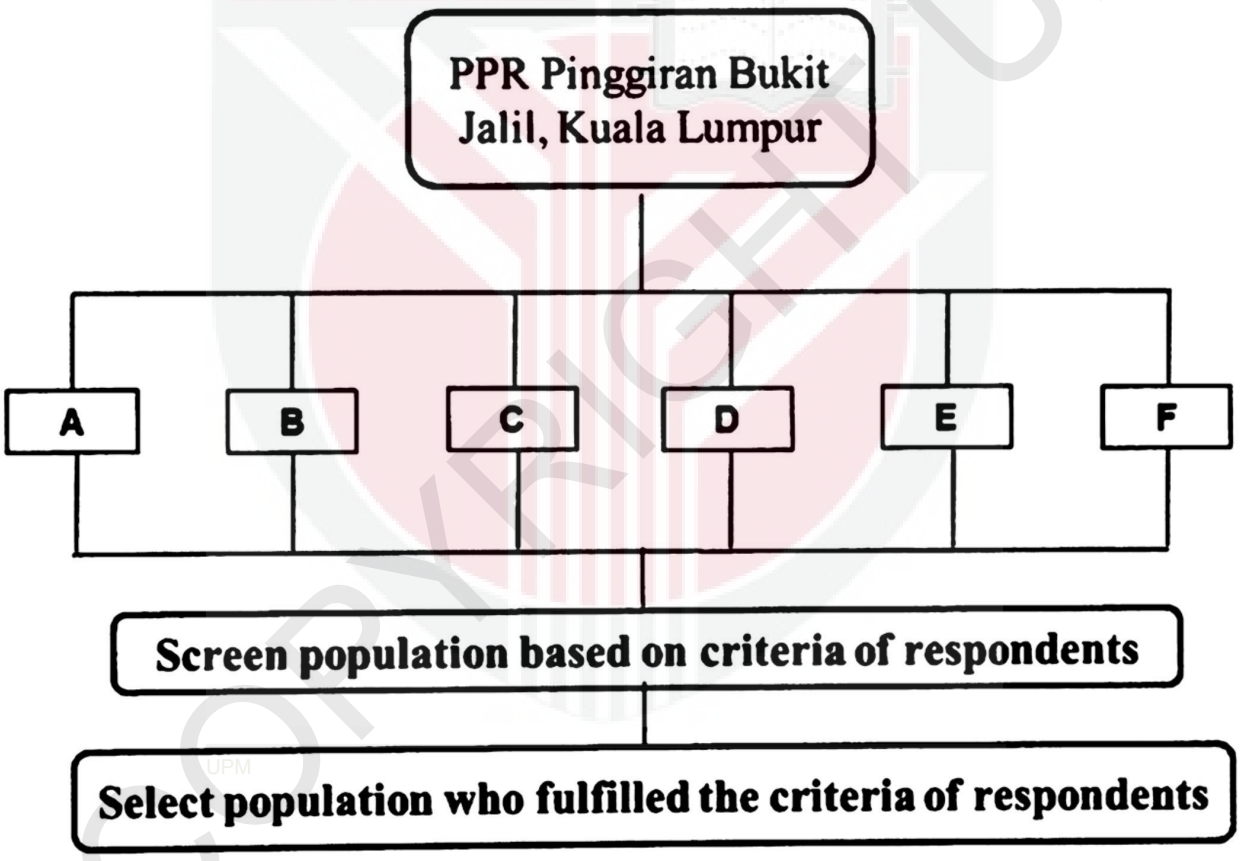

Figure 3.0: Flow chart of Sampling Design

3.6 Instruments

The instruments of this study were divided into two parts. For the first part, the researcher conducted a face-to-face interview with the participants (children and parent/caregiver) by using questionnaire which consists of questions on sociodemographic, food security, dietary intake, physical activity, screen time and sleep duration of the children. As for the second part, anthropometry measurements of the children was measured and filled by the researcher.

3.6.1 Face-to-face Interview

Information on sociodemographic, food insecurity, dietary intake, physical activity, sedentary behaviour and sleep duration of the children was gained from a face-to-face interview that was conducted by the researcher by using questionnaire. This face-to-face interview session involved the participation of both children and parent/caregiver. Questions on sociodemographic, food insecurity, screen time and sleep duration of children were answered by the parent/caregiver. While questions on dietary intake and physical activity were answered by the children with the help of their parent/caregiver.

3.6.1.1 Sociodemographic characteristics

The respondents need to provide information on sociodemographic that include sex, date of birth (age), ethnicity, parents monthly income, parents' occupation, parents' education, household size, household income and health problems among other family members.

3.6.1.2 Food Security

U.S. Household Food Security Survey Module: Six-Item Short Form Economic Research Service, USDA 2012 was used as the instrument to assess the food security of the children. Six questions was asked to the parents or caregiver of the children to assess households' food security status. The food security level of the household was determined based on the raw score. Raw score of 0-1 was categorized as high or marginal food security, raw score of 2-4 was assigned as low food security while raw score of 5-6 was classified as very low food security. The raw scores are based on the number of affirmatives. If the respondents answer "often" or "sometimes" for questions 1 and 2 and "yes" on questions 3, 5 and 6, it will be coded as affirmative. While if the respondents answer "almost every month" and "some month but not every month" on question 4, it will also be coded as affirmative. The sum of affirmative of the six questions will determine the household's food security raw score.

3.6.1.3 Dietary Intake

As for the assessment of dietary intake, 24-hour dietary recall was used to capture the detail information about all the food consumed by the children in a day (Navnit et al., 2014). In this face-to-face interview session, the children need to recall the time, type of food, number of servings and portion size of the food they have eaten for the last 24 hours. The parent/caregiver will help their child to recall their dietary intake in this interview session. A food photo album was provided as a guide to determine the size of portion. The energy intake of the children will be compared with the estimated energy requirement while the macronutrient intake of the children will be compared with the recommended intake. The macronutrients that were explored in this study included carbohydrate, protein and fat intake of the children. The latest Recommended Nutrient Intakes (RNI) for Malaysia 2017 was used as the reference for this assessment.

Besides, the classification of misreported on dietary intake was identified and the respondents were classified into under-reporters, acceptable reporter and over-reporter. The respondents' misreporting were classified based on the calculated values of the ratio of energy intake to basal metabolic rate. Next, the ratio was compared with Torun cut-point for boys and girls (Torun et al., 1996). For boys, if the ratio was less than 1.39, they were classified as under-reporters, 1.39 to 2.24 as acceptable reporter while more than 2.24 as over-reporters. Apart from that, for girls, if the ratio was less than 1.30, they were classified as under-reporters, 1.30 to 2.10 as acceptable reporter while more than 2.10 as over-reporters.

3.6.1.4 Physical Activity

Physical Activity Questionnaire for Children (PAQ-C) will be used to measure the usual physical activity pattern of children during the school year. It was developed and validated by Kowalski et al. (1997). It is a 7-day recall self-administered questionnaire that consists of 10 questions/items. Questions 1 will ask on the activity during spare time for the past 7 days where ''no'' activity being 1 and ''7 times or more'' being 5 for scoring. While question 2 to 7 will measure the activity during Physical Education (PE) class, recess, lunch time, right after school, evenings, weekend and leisure time. For question 2 to 8, each is scored on a 5-point scale, where 1 is the lowest and 5 is the highest. For question 8, respondents will describe their physical activity, where (a) All or most of my free time was spent doing things that involve little physical effort, (b) I sometimes (1-2 times) did physical things in my free time (e.g. played sports, went running), (c) I often (3-4 times) did physical things in my free time, (d) I quite often (5-6 times) did physical things in my free time, and (e) I very often (>7 times) did physical things in my free time. As for question 9, the frequency of physical activities for the past 7 days was measured, were the mean of all days of the week ("none" being a 1, "very often" being a 5) to form a composite score. While for question 10, the respondents were asked on any distraction for them from being involve in physical activity. However, this question was not used as a part of the summary activity score. To get the final PAQ-C summary score, the mean of all 9 items was calculated. From the mean score, the respondents were categorized into three level of physical activity which were low (<2.04), moderate (2.04-2.88) and high level of physical activity (>2.88) (Wong et al., 2016).

Apart from that, the respondents were asked on the screen time (watching television, computer usage, and playing video games) on weekdays and weekend to measure the sedentary behaviour of the children. The average duration of screen time on weekdays and weekend was calculated and compare with the recommendation duration of screen time of 2 hours per day for children (Paulo et al., 2016)

3.6.1.5 Sleep Duration

To assess the sleep duration of the children, parent/caregiver was asked on the bedtime and wake up time of the children on weekdays and weekend days. Next, the duration of sleep of the children was calculated and compared with the recommended sleep duration for children Chen et al. (2008). For children age 7 to 10 years old, the recommended sleep duration hours is more than 10 hours, while for children age more than 10 years old, the recommended sleep duration is more than 9 hours (Chen et al., 2008).

3.6.2 Anthropometric Measurements

For anthropometric measurements, the body weight and height of the children was measured by the researcher. The body weight of the children was measured by using a model HD-382 TANITA digital weighing scale while a roll-up measuring tape

with wall attachment, SECA 206 roll-up measuring tape was used to measure height of the children. Each measurement was measured twice to ensure the accuracy. The digital scale and body meter was routinely calibrated and the weight was recorded to the nearest 0.1 kg and height recorded to the nearest 0.1 cm. BMI-for-age (z-score) was determined by using WHO AntroPlus (version 1.0.4) based on the measured body weight and height. The children were classified into five categories of body weight status based on their BMI-for-age (z-score) that was derived from WHO Growth Reference 2007 as shown in Table 3.2 below.

Table 3.2: BMI-for-age (Z-score) interpretation for children age 5 to 17 years old

BMI-for-age (Z-score)	Interpretation
> +2 SD	Obesity
+1 SD to +2 SD	Overweight
+1 SD to -2 SD	Normal
-2 SD to -3 SD	Thinness
< -3 SD	Severe thinness

3.7 Pre-test

Prior to the study, the questionnaire was pre-tested on 20 respondents from PPR Raya Permai, Sungai Besi, Kuala Lumpur. The pre-test was conducted on December 2018, where the respondents for pre-testing have similar characteristics as study sample. During the pre-testing, time taken to complete the instruments was measured. The clarity of instruction, understanding of questionnaire and any problems faced by

respondents while answering the questionnaire was identified and corrected before the data collection of this study. The feasibility of questionnaire was re-assessed after pre-testing to ensure the validity and reliability of measurement.

3.8 Study protocol

Data collection was carried out from January 2019 to February 2019. Prior to commencement of this study, an approval for the study protocol was obtained from the University Ethics Committee for Research Involving Humans, Universiti Putra Malaysia (UPM). The permission to conduct this study at PPR was also obtained before the data collection from Kuala Lumpur City Hall or known as *Dewan Bandaraya Kuala Lumpur (DBKL)*. During the data collection, respondents' information sheet was distributed to the parent/caregiver of the children who met the study criteria to inform them regarding the purpose of this research. Also, a consent form was distributed to the parent/caregiver to get their approval before their children participating in this study. When they agree to participate in this study, a face-to-face interview session by using questionnaire was conducted by researcher consisting of six sections. Next, anthropometric measurements of the children which include height and body weight was measured by the researcher. Figure 3.2 shows the study protocol that have been conducted in this study.

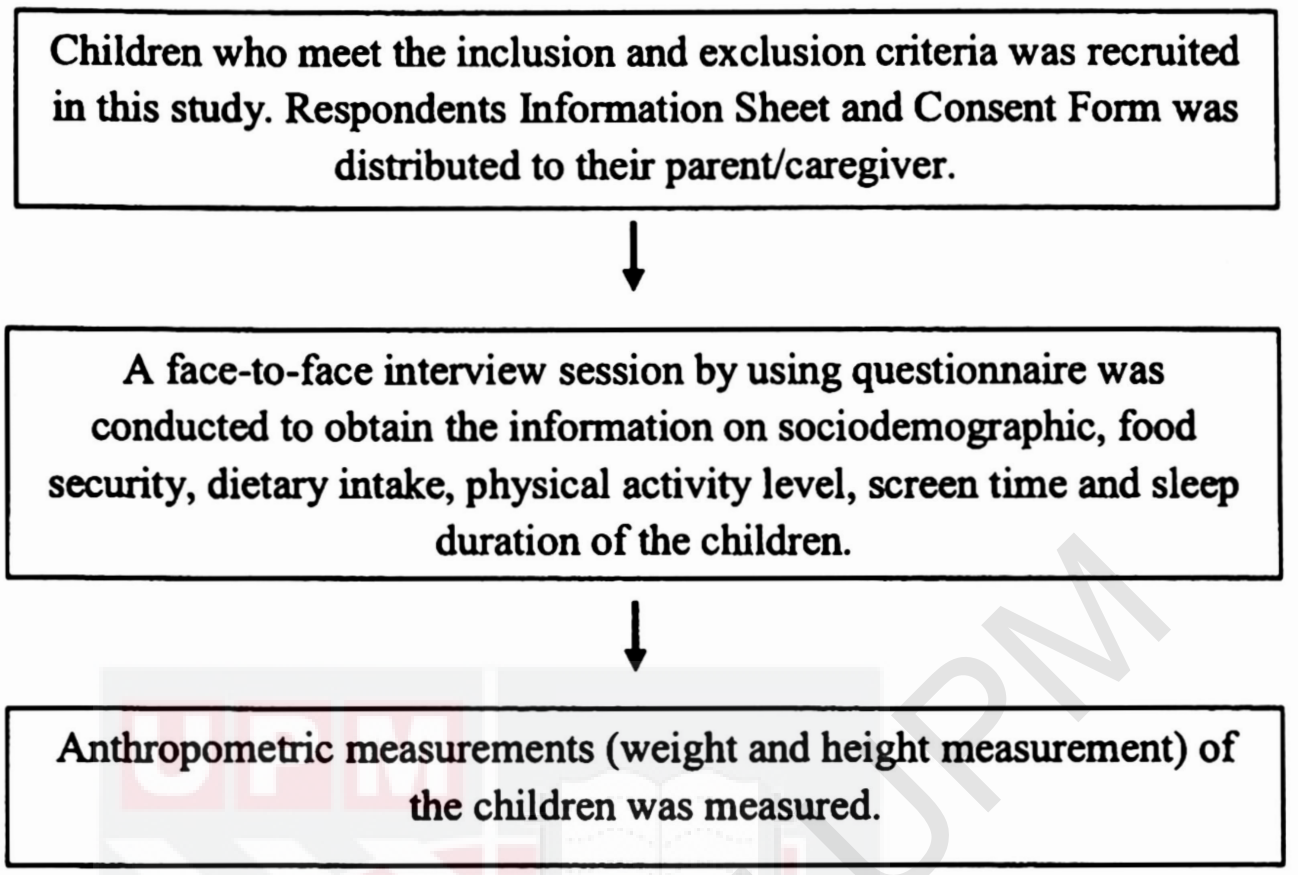

Figure 3.1: Study protocol

3.9 Data analysis

After the data collection have been carried out, statistical analysis was conducted by using IBM SPSS Statistic 22, with statistical significance level set at $p < 0.05$. Descriptive data was analysed by using univariate analysis. The result for categorical variables (sex, ethnicity, family size, family household income, household size, the level of food secure, physical activity level and body weight status categories based on BMI-for-age (z-score)) were presented as frequencies and percentages. Meanwhile, result for continuous variables (age, energy and macronutrient intake, physical activity scores, hours of screen time per day, sleep duration per day, height and weight values) were presented as means and standard deviations. As for inferential statistics, the correlation between categorical variables were tested by using chi-square

test of independence (sex with category of body weight status, ethnicity with category of body weight status, family household income with category of body weight status, household size with category of body weight status, level of food secure and physical activity level with category of body weight status) whereas the correlation between continuous variables (age with z-score value of BMI-for-age, energy intake with z-score value of BMI-for-age, macronutrients intake with z-score value of BMI-for-age, physical activity scores with z-score value of BMI-for-age, hours of screen time per day with z-score value of BMI-for-age and sleep duration per day with z-score value of BMI-for-age) were tested by using Pearson's product moment correlation.

CHAPTER 4

RESULTS AND DISCUSSION

4.0 Introduction

This study aimed to determine the association between sociodemographic, food security, dietary intake, physical activity, sleep duration and body weight status among children at PPR Pinggiran Bukit Jalil. In this chapter, the results and discussions are presented in the sequence starting from sociodemographic, food security, dietary intake, physical activity, sleep duration and ended with the association between the independent variables and dependent variable. The respondents of this study were children age 7 to 12 years old, who lived in PPR Pinggiran Bukit Jalil, Kuala Lumpur that was conducted from January to February 2019. Based on the calculation of sample size, 160 respondents should be recruited in this study. However, only 137 respondents agreed and eligible to participate in this study, where the response rate of this study is 85.6%.

4.1 Sociodemographic Characteristics of Respondents

Table 4.0 shows the sociodemographic characteristics of 137 children and their parents in this study. In this study, 46.0% of the children were boys and 54.0% of them were girls with a mean age of 9.75 ± 1.68 years. Majority of the respondents were Malay (65.0%), 26.2% were Indian and 8.8% were Chinese. More than half of the parents have secondary education with 67.9% fathers and 73.0% mothers. Majority of the father's occupation were self-employed with 37.2%, followed by the private sector (35.8%), unemployed (13.1%), government sector (6.6%) and retires (1.5%). Meanwhile, majority of the mother was unemployed or housewife (60.6%), followed by 18.2% of them were self-employed, 13.9% were in private sector and 6.6% of them works in government sector. Besides, the mean of father's mean monthly income was RM 1701.00 ± 795.68, mother's mean monthly income was RM 1133.93 ± 731.13 and household mean monthly income was RM 1965.47 ± 1003.81. Based on the classification of household income for Kuala Lumpur, majority of the respondents were classified under B40 for the category of household income while the other 5.1% were classified under the M40 category. Almost half of the respondents have household size of three to five members (58.4%), followed by six to eight members (37.2%) and 4.4% of the respondents have household size of more or equal to nine members. On the other hand, 13.3% have household members with health problems while another 86.7% does not have any household members with a health problem.

Table 4.0: Distribution of respondents by socio-demographic characteristics (n=137)

Socio-demographic characteristics	n (%)	Mean ± SD
Sex		
Boy	63 (46.0)	
Girl	74 (54.0)	
Age (years)		9.75 ± 1.68
7 – 9	67 (48.9)	
10 – 12	70 (51.1)	
Ethnicity		
Malay	89 (65.0)	
Indian	36 (26.3)	
Chinese	12 (8.8)	
Father's education level (n=129)		
No formal education	2 (1.5)	
Primary school	13 (9.5)	
Secondary school	93 (67.9)	
Pre-university (STPM / Matriculation / Foundation)	4 (2.9)	
Tertiary education (Diploma/Bachelor/Master/PhD)	17 (12.4)	
Mother's education level (n=136)		
No formal education	5 (3.6)	
Primary school	19 (13.9)	
Secondary school	100(73.0)	
Pre-university (STPM/Matriculation/Foundation)	3 (2.2)	
Tertiary education (Diploma/Bachelor/Master/PhD)	9 (6.6)	
Father's occupation level (n=129)		
Government sector	9 (6.6)	
Private sector	49 (35.8)	
Self-employed	51 (37.2)	
Retirees	2 (1.5)	
Unemployed	18 (13.1)	
Mother's occupation level (n=136)		
Government sector	9 (6.6)	
Private sector	19 (13.9)	
Self-employed	25 (18.2)	
Retirees	0	
Unemployed / Housewife	83 (60.6)	
Father's monthly income (RM)		1701.00 ± 795.68
Mother's monthly income (RM)		1133.93 ± 731.13
Household monthly income (RM)		1965.47 ± 1003.81

Table 4.0 (Cont.)

Classification of household income[1]		
B40	130(94.9)	
M40	7 (5.1)	
Number of household members		3.53± 1.73
3 – 5	80 (58.4)	
6 – 8	51 (37.2)	
>9	6 (4.4)	
House ownership		
Own/Buy	4 (2.9)	
Rent	133(97.1)	
Health problem of household members[2]		
Yes	18 (13.3)	
No	119(86.9)	

[1] Classification based on the report of Household Income and Basic Amenities Survey 2016 (Department of Statistics Malaysia).

[2] Hypertension, diabetes mellitus, gout, asthma, thyroid problem and kidney disease.

4.2 Food Security

Based on Table 4.1, respondents were classified into three levels of household food security level, which were high food security, low food security and very low food security. These classifications were based on questions answered from the U.S. Household Food Security Survey Module. Based on the findings from Table 4.1, only 26.3% of the respondents were categorized into high food security category. Meanwhile, more than half of the respondents were food insecure, where 36.5% of the respondents were categorized into low food security level and 37.2% were categorized into very low food security.

The finding of this study has almost same finding with previous study that was conducted among low-income household at Northeastern of Peninsular Malaysia from November 2009 to June 2010 (Ihab et al., 2014). It was found that 16.1% of the households were food secure while another 83.9% were food insecure. These similar findings might be due to the increase of cost of living that limiting them to have sufficient, safe and nutritious food to meet their nutrition needs.These findings on food security level among low-income household have shown that household food insecurity may be one of the major issue or factors and should be considered in assessing malnutrition among children in Malaysia.

Table 4.1: Distribution of respondents by category of household food security level (n=137)

Category	n (%)
Household food security level[1]	
High food security	36 (26.3)
Low food security	50 (36.5)
Very low food security	51 (37.2)

[1] Classifications were based on U.S. Household Food Security Survey Module.

4.3 Dietary Intake

The dietary intake was assessed by determining the intake of energy and macronutrients intake of the children by using 24-hour dietary recall. The macronutrients consist of carbohydrate, protein and fat intake of the children. Based on Table 4.2, it was found that majority of the children were inadequate in energy intake per day (83.9%) while only 16.1% were adequate in energy intake per day. Apart from that, the carbohydrate intake of the children was categorized into inadequate, adequate

and excessive intake. It was found that almost half of the children were adequate in carbohydrate intake (54.0%), while 27.0% were inadequate in carbohydrate intake and 19.0% were excessive in carbohydrate intake. Besides, majority of the children have an adequate intake of protein (77.4%) and 22.6% were inadequate in protein intake per day. On the other hand, 60.6% were inadequate in fat intake per day, 25.6% were adequate in fat intake per day while 13.8% were excessive in fat intake per day.

Previous study reported that majority of children in Malaysia had dietary intakes below the national recommendations for nutrients and serving sizes (Yang et al., 2017). Also, older age children from low income family had lowest intakes of energy and most nutrients and highest proportions that did not meet recommended energy and nutrient intakes (Zalilah et al., 2015). However, in this present study, the intake of carbohydrate and protein were adequate while energy and fat intake were adequate. The contradict findings from previous study may due to the dietary intake of the children in this study was obtained from only one day of 24-hour dietary recall. Hence, it unable to describe the typical diet of the children with a single day's intake only as the dietary intake of children may vary from day to day.

Apart from that, respondents' misreporting were calculated by using the ratio of Energy Intake to Basal Metabolic Rate (EI: BMR) and were classified into Torun cut-point (Torun et al., 1996). Based on table 4.3, 76.6% were under-reporting regarding their dietary intake, followed by 21.2% were an acceptable reporter and 2.2% were over-reporting. Misreporting of intake is one of the serious problems in studies diet and health of the population as it is marked bias, inaccurate and invalid when the

information derived from the dietary assessment of the respondents were under-estimate or over-estimate.

Table 4.2: Distribution of respondent according to energy and macronutrients adequacy (n = 137).

	Boy	Girl	Total	Mean ± SD
Recommended Nutrient Intake[1]				
Energy (Kcal/day)				1183± 453
Inadequate [a, b]	56 (88.9)	59 (79.7)	115(83.9)	
Adequate	7 (11.1)	15 (20.3)	22 (16.1)	
Carbohydrate (%/day)				56.15 ± 12.25
Inadequate (< 50%)	12 (19.0)	25 (33.8)	37 (27.0)	
Adequate (50 – 65%)	38 (60.3)	34 (45.9)	72 (52.6)	
Excessive (> 65%)	13 (20.7)	15 (20.3)	28 (20.4)	
Protein (g/day)				47.99 ± 24.09
Inadequate [c, d]	19 (30.2)	12 (16.2)	31 (22.6)	
Adequate	44 (69.8)	62 (83.8)	106(77.4)	
Fat (%/day)				33.13 ± 11.40
Inadequate (<25%)	17 (27.0)	15 (20.3)	32 (23.4)	
Adequate (25 – 35%)	26 (41.3)	24 (32.4)	50 (36.5)	
Excessive (>35%)	20 (31.7)	35 (47.3)	55 (40.1)	

[1] Classification of energy and macronutrients requirement were based on Recommended Nutrient Intakes (RNI) for Malaysia 2017.

[a] Boy = < 1750 kcal/day; Girl = < 1610 kcal/day (9 – 7 years)

[b] Boy = < 1930 kcal/day; Girl = < 1710 kcal/day (10 – 12 years)

[c] < 23 g/day (9 – 7 years)

[d] Boy = < 30 g/day; Girl = < 31 g/day (10 – 12 years)

Table 4.3: Classification of respondents according to misreporting on dietary intake (n=137)

Category	n (%)
Classification of Misreporter[1]	
Under-reporters	105 (76.6)
Acceptable reporter	29 (21.2)
Over-reporters	3 (2.2)

[1] Respondents' misreporting were classified based on the calculated values of the ratio EI:BMR (Torun cut-point)

Note. EI = Energy Intake; BMR = Basal Metabolic Rate

4.4 Physical Activity

Physical activity level of the children was classified into three levels, which were low physical activity (<2.04), moderate physical activity (2.04 – 2.88) and high physical activity (≥2.88). Based on the findings from Table 4.4, the mean score of PAQ-C was 3.22 ± 1.14 with minimum score was 1.1 and the maximum score was 5.0. Meanwhile, almost half of the children were categorized in high physical activity level (52.3%) followed by moderate physical activity level (33.6%) and low physical activity level (14.1%).

Apart from that, the duration of screen time was also collected from the respondents to assess the sedentary behavior of the respondents. The screen time consists of the duration of the children spent watching television, computer usage, playing video games and mobile phone during weekdays and weekend. Based on the finding from

Table 4.5, 54.7% of the children were excessive in screen time of more than 2 hours and 45.3% were within the recommended duration of less than or equal to 2 hours of screen time per day during weekdays. Apart from that, 69.3% of the children were excessive in screen time of more than 2 hours and 30.7% were categorized within the recommended duration of less than or equal to 2 hours of screen time per day during the weekend.

Based on previous study from South East Asian Nutrition (SEANUTS) 2013, it was reported that majority of children were moderately active which contradict with this current finding where most of the children were categorized as high physical activity. This might due to the instrument that being used which is Physical Activity Questionnaire for Older Children (PAQ-C) which only detect frequency of a specific behaviour and provides the estimation of physical activity level using a recall memory. Besides, as this is a reported type of questionnaire, the respondents may reported a socially desirable answer when being asked by researcher, which may lead to over-reporting or under-reporting problems. The results of previous study also revealed that Malaysian children spent almost half of their sedentary time on screen activities including watching television, playing video games, and using the computer (Shoo et al., 2015). The average screen time of children in this previous study was 3.1 hours, which is comparable to this present study with average of 3.39 hours, where 2.92 hours on weekdays and 3.86 hours on the weekend.

Table 4.4: Distribution of respondents by category of physical activity level (n=128)

	n (%)	Mean ± SD	Min -Max
Score of PAQ-C		3.22 ± 1.14	1.1 – 5.0
Level of physical activity[1]			
Low physical activity (<2.04)	18 (14.1)		
Moderate physical activity (2.04 – 2.88)	43 (33.6)		
High physical activity (≥ 2.08)	67 (52.3)		

[1]. Classification based on summary activity score from Physical Activity Questionnaire for Older Children (Wong et al., 2016).

Table 4.5: Distribution of respondents according to duration of screen time on weekdays and weekend (n=137)

	n (%)	Mean ± SD
Duration of screen time[1] (hours/day)[2]		3.39 ± 2.25
Weekdays		2.92 ± 2.099
Recommended (≤ 2 hours)	62 (45.3)	
Excessive (> 2 hours)	75 (54.7)	
Weekend		3.86 ± 2.626
Recommended (≤ 2 hours)	42 (30.7)	
Excessive (> 2 hours)	95 69.3)	

[1]Screen time = Used electronic devices such as watching television, computer usage, playing video games and mobile phone.

[2]Recommended duration of screen time for children based on Paulo et al. (2016)

4.5 Sleep Duration

The sleep duration was obtained from the respondents by asking on the bedtime and wakeup time. Based on Table 4.6, it was found that the mean sleep duration of the children was 8.38 ± 1.19 hours per night on weekdays. Majority of the children (75.2%) were inadequate in sleep during weekdays, while 24.8% of the children have adequately slept on weekdays. The mean sleep duration on weekdays was quite similar with another study among Malaysian primary school children which was 8.35 ± 0.98 hours (Firouzi et al., 2012). Besides, the finding showed that the mean sleep duration was 9.70 ± 1.84 hours with more children get adequate sleep on weekend (37.2%), but almost half of them still get an inadequate amount of sleep during the weekend (62.8%). Some possible reason for more children achieved the sleep duration recommendation on the weekend is because they were "catch-up" their sleep time as they did not have to wake up early to go to school on weekend.

Table 4.6: Distribution of respondent according to duration of sleep on weekdays and weekend (n = 137)

	n (%)	Mean ± SD
Duration of sleep (hours/night)		9.04 ± 1.29
Weekdays		8.38 ± 1.19
Adequate [a]	34 (24.8)	
Inadequate [b]	103 (75.2)	
Weekend		9.70 ± 1.84
Adequate [a]	51 (37.2)	
Inadequate [b]	86 (62.3)	

[a] ≥ 10 hours/night (7 – 10 years); ≥ 9 hours/night (11 – 12 years)

[b] < 10 hours/night (7 – 10 years); < 9 hours/night (11 – 12 years)

4.6 Body Weight Status of Children

Table 4.7 shows mean and distribution for body weight status of children which include BMI-for-age to measure thinness among the children. The mean height of the children was 130.75 ± 10.694 cm while the mean weight was 29.32 ± 10.192 kg. For Body Mass Index-for-age (BMI-for-age) of the children, majority of the children have normal BMI (54.7%). Apart from that, 20.4% of the children were classified as overweight and 6.6% were obese. On the other hands, 6.6% of the children were classified as thinness and 11.7% were severe thinness. These classifications were based on Growth Reference for school-age children and adolescents age 5 to 19 years old (WHO, 2007).

Based on the findings from National Health Morbidity Survey (NHMS) 2015, the prevalence of thinness under 18 years old was higher among urban residents (8.0%) than in rural residents (7.2%), with national prevalence of 7.8%. Apart from that, the prevalence of obesity among urban residents under 18 years old was 12.1%, which were higher than in rural residents (11.2%) with national prevalence of 11.9%. The finding from this study showed that there was an increase in the prevalence of thinness and obesity among children, especially from the urban area.

Table 4.7: Body Mass Index-for-age (BMI-for-age) of respondents (n=137)

Variables	n (%)	Mean ± SD
Height (cm)		130.75 ± 10.694
Weight (kg)		29.32 ± 10.192
Body Mass Index-for-age (BMI-for-age/zscore)[1]		-4.32 ± 1.999
Obesity (>2 SD)	9 (6.6)	
Overweight (1 SD to 2 SD)	28 (20.4)	
Normal (-2 SD to 1 SD)	75 (54.7)	
Thinness (-3 SD to -2 SD)	9 (6.6)	
Severe thinness (<-3 SD)	16 (11.7)	

[1] Classification of BMI-for-age were based on Growth Reference for school-age children and adolescents 5-19 years of WHO (2007

4.7 Association of Sociodemographic with Child's Body Weight Status (BMI-For-Age)

Table 4.8 shows the distribution of BMI-for-age of the children by sociodemographic characteristics. According to the findings, sex showed a significant association with BMI-for-age of the children ($x^2 = 9.222$, $p<0.05$). Based on the Chi-square test, almost half of the male (62.3%) were having poor body weight status either thinned, severe thinness, overweight or obese. Apart from that, majority of female were categorized into normal body weight status according to BMI-for-age classification. This finding has been supported by previous studies among children from Malaysia and China where boys were found to be more underweight, stunted, wasted and overweight when compared to girls (Zalilah et al., 2000; Cai, Zhu & Wu, 2017). This might be due to the unconcerned attitude by boys about their physical appearance where boys were

less interest in losing weight. While on the other hand, girls were more aware and concerned about their bodies when compared to boys (Kristy et al., 2014).

Besides, age also showed a significant correlation with BMI-for-age ($r = 0.271$, $p<0.001$). Based on the Pearson Correlation test, the higher the age of the children, the higher the BMI-for-age. The finding was supported by previous study where there was an association between age and body weight status (Shalom et al., 2017). Studies also reported that older children as compared to younger children tend to have poorer diet quality characterized by foods that are low nutrient dense and high in fats, sodium and added sugar and inadequate dietary fiber, which this will affect the weight status as well (Zalilah et al., 2015). Older children experienced pubertal growth spurt and the changes in weight and height will differ from one child to another.

Table 4.8: Association between socio-demographic characteristics and BMI-for-age (z-score) of respondents.

Socio-demographic characteristics	BMI-for-age		x^2	p
	Thinness/ Severe thinness/ Overweight/ Obese n (%)	Normal n (%)		
Sex			9.222	0.002*
Male	33 (62.3)	30 (35.7)		
Female	20 (37.7)	54 (64.3)		
Ethnicity			1.591	0.207
Malay	31 (58.5)	58 (69.0)		
Non-Malay	22 (41.5)	26 (31.0)		

Table 4.0 (Cont.)

Father's education level			1.901	0.168
Primary / tertiary education	10 (20.8)	26 (32.1)		
Secondary school	38 (79.2)	55 (67.9)		
Mother's education level			1.099	0.294
Primary / tertiary education	15 (28.3)	17 (20.5)		
Secondary school	38 (71.7)	66 (79.5)		
Father's occupation level			0.784	0.376
Government / Private sector	24 (50.0)	34 (42.0)		
Self-employed / unemployed	24 (50.0)	47 (58.0)		
Mother's occupation level			0.671	0.413
Working	18 (34.6)	35 (41.7)		
Not working	34 (65.4)	49 (58.3)		
Health problem of household members			1.040	0.308**
Yes	5 (9.4)	13 (15.5)		
No	48 (90.6)	71 (84.5)		

*Significant at p-value<0.05 level (2 tailed)
**Fisher's Exact Test

Table 4.9: Correlation of sociodemographic with BMI-for-age (z-score) of respondents.

Variables	r-value	p-value
Age	0.271	<0.001*
Household income	0.155	0.070
Household size	- 0.053	0.536

*Significant at p-value<0.05 level (2 tailed)

However, the remaining sociodemographic characteristics were not significantly associated with BMI-for-age of the children. It was reported that ethnicity have no

significant association with BMI-for-age ($x^2 = 1.591$, $p>0.05$). Some possible reason is because ethnicity is constantly evolving concepts, which makes the task of comparing groups or following the same group over time quite challenging. Although ethnic groups can share a range of phenotypic characteristics due to their shared ancestry, the term is typically used to highlight cultural and social characteristics instead of biological ones (Sonia et al., 2008).

Besides, there was no significant association between mother's education level ($x^2 = 1.099$, $p>0.05$), father's education ($x^2 = 1.901$, $p>0.05$) and BMI-for-age of the children. Previous study also proved that parents' education had no significant association with BMI-for-age (Sara et al., 2017; Fahad, 2017). It was suggested by previous studies suggested that association between parental education may have significant association with breakfast consumption, sports participation, TV viewing and computer use (Juan et al., 2013). Parents unable to monitor the children' food choices and assess the quality of food intake outside home despite the education of parents (Rodrigo et al., 2015).

Besides, there was no significant association between mother's occupation ($x^2 = 0.671$, $p>0.05$), father's occupation ($x^2 = 0.784$, $p>0.05$) and BMI-for-age of the children. Previous study also proved that BMI-for-age had no significant association with parents' occupation (Sara et al, 2017; Fahad et al., 2017). Some of the reasons is because parents or children's long absence from home (such as going to school) that leads the children to be exposed to unhealthy dietary habits of fast food, snacks and skipped meals despite the occupation of parents (Fahad et al., 2017).

Also, there was no significant correlation between household income and BMI-for-age of the children ($r= 0.155$, $p>0.05$). The finding from this study was contradict with previous studies where there was an association between household income and the weight status of children (Jasmin et al., 2017; Abrar et al., 2018). Some possible reason might be the connections of household income with body weight status of children may vary among families. For example, the financial management and way of live of one family may differ from the other family with the same income (Abrar et al., 2018). Apart from that, there was no significant correlation between household size and BMI-for-age of the children ($r= - 0.053$, $p>0.536$). A previous study also reported that there was no significant association between household size and BMI status of Malaysian school children (Ahmad et al., 2018). Some possible reason because the trend of purchasing power and food affordability are the same despite the number of household members (Ahmad et al., 2018).

Besides, there was no significant association between health problem of household members and body weight status of children ($x^2=1.040$, $p>0.05$). This might because family functioning was more to the structural/organizational properties and the interpersonal interactions of the family group such as problem solving, communication, roles, adaptability, warmth/closeness and behavior control (Jerica et al., 2013). Also, sense of adaptation or resignation to certain situation creates calm emotion if their other family members have health problems (Eve et al., 2013).

4.8 Association of Food Security with Child's Body Weight Status (BMI-For-Age)

The distribution of BMI-for-age of the children by food security level was shown in table 4.10. According to the finding, food security was significantly associated with BMI-for-age of the children ($x^2 = 10.088$, $p<0.05$).

Previous studies from Malaysia and Canada also stated that there was an association between household food security and body weight status of children (Ihab et al., 2014; Jasmin et al., 2017). Based on the Chi-square test, children from very low food secure were more tendency to be overweight or obese. This study showed that the odds of being obese were higher for children from food-insecure households when compared to children from food secure households. This has been proved by other studies from Malaysia and United States that showed the same findings (Tanja et al., 2017; Roselawati et al., 2017). This might be because children from food insecure household were significantly greater external eating, where they tend to eat more when hungry and showed different snacking pattern when compared to food secure children. Also, children from food insecure household tend to take excess energy intake that will result in weight gain over time due to exhibited significantly greater external eating (Tanja et al., 2017).

Table 4.10: Association between category of household food security and BMI-for-age (z-score) of respondents.

Variables	BMI-for-age		x^2	p
	Thinness/ Severe thinness/ overweight/ obese n (%)	Normal n (%)		
			10.088	0.039*
High food security	24 (45.3)	27 (32.1)		
Low food security	14 (26.4)	36 (42.9)		
Very low food security	15 (28.3)	21 (25.0)		

*Significant at p-value<0.05 level (2 tailed)

4.9 Associaton of Dietary Intake with Child's Body Weight Status (BMI-For-Age)

Based on Table 4.11, it was shown the distribution of BMI-for-age of the children by dietary intake of the children. The components that been assessed for the dietary intake were energy and macronutrients intake. There were significant associations of energy ($r=0.200$, $p<0.05$), carbohydrate ($r=0.169$, $p<0.05$) and protein intake ($r=0.179$, $p<0.05$) with BMI-for-age of the children. However, there was no significant association was found between fat intake and BMI-for-age of the children. Some possible reasons may because children from low SES families were found to have an increased energy intake from larger portions of energy-dense foods that increase the risk of unhealthy weight development (Hebestreit et al., 2014). Besides, certain dietary carbohydrates (unrefined

carbohydrates and sugar), have been shown to be positively associated with weight gain, where the type of carbohydrate intake of the children need to be reported as well (Kurt et al., 2018). While high protein intake and high BMI could be explained entirely by increases in fat mass index.

It was shown in this present study that higher intake of energy, carbohydrate, protein and fat intake are related to higher BMI-for-age Z-score. However, previous studies reported that obese children reported significantly lower energy, carbohydrate, protein and fat intakes compared to children in the other weight categories (Yang et al., 2017; Hazel et al., 2017). The divergent findings with our current study might be due to the different methods used to assess dietary intake. Some other possible reason might be due to energy misreporting, where it was found that 76.6% was under-reported, 21.2 was a plausible reporter and 2.2% was over-reported.

Table 4.11: Correlation of energy and macronutrient intake with BMI-for-age (z-score) of respondents.

Variables	r-value	p-value
Energy	0.200	0.019*
Carbohydrate	0.169	0.049*
Protein	0.179	0.036*
Fat	0.148	0.084

*Correlation is significant at the $p<0.05$ level (2-tailed)

4.10 Associaton of Physical Acitivity with Child's Body Weight Status (BMI-For-Age)

According to Table 4.12, physical activity was not significantly associated with BMI-for-age of the children (x^2=2.266, p>0.05). Based on the Chi-square test, it was found that children who were categorized into thinness, severe thinness, normal, overweight and obese tend to have high physical activity. This means that the level of physical activity among children at PPR Pinggiran Bukit Jalil was high regardless of their body weight status. Apart from that, the duration of screen time was also being analysed to assess the sedentary behavior of the children besides being physically active. Based on Table 4.13, there was no significant association was found for the duration of screen time with BMI-for-age of the children (r=0.136, p>0.05). Meanwhile, there was a positive and significant correlation between duration of screen time on weekdays with BMI-for-age of the children (r=0.169, p>0.05) while the duration of screen time on the weekend had no significant association with BMI-for-age of the children (r=0.098, p>0.05).

This study showed that physically active children will have higher BMI-for-age Z-score. However, in this present study, the association between physical activity and body weight status of the children was not significant. The result from this study has been supported by previous study where there was no significant association was found between physical activity and BMI of children (Baards and Mckersie, 2014). There is a good possibility whether overweight and obese children should exceed the standard physical activity recommendation to derive similar benefits as their normal-weight

counterparts. Another possibility to support this finding was that children with higher screen time will have higher BMI-for-age Z-score as well. There could be some possibility that could explain this situation, which children who engaged in active sports and activities also practices sedentary behavior at other times. Parents or caregiver may also over report socially desirable activities and underreport socially undesirable ones (Ajao et al., 2010). Further research is needed to explore the type of activity in overweight/obese children and what factors may be influencing them to be more active.

Table 4.12: Association between category of physical activity and BMI-for-age (z-score) of respondents.

Variables	BMI-for-age			x^2	p
	Thinness/ Severe thinness n (%)	Normal n (%)	Overweight/ Obese n (%)		
				2.266	0.687
Low and moderate physical activity	5 (38.5)	39 (50.6)	17 (45.9)		
High physical activity	8 (61.5)	38 (49.4)	20 (54.1)		

Chi-square Test

Table 4.13: Correlation of duration of screen time with BMI-for-age (z-score) of respondents.

Variables	r	p-value
Duration of screen time	0.136	0.114
Screen time on weekdays	0.169	0.049*
Screen time on weekdays	0.098	0.255

*Correlation is significant at the p<0.05 level (2-tailed)

4.11 ASSOCIATON OF SLEEP DURATION WITH CHILD'S BODY WEIGHT STATUS (BMI-FOR-AGE)

The increasing rates of obesity make it crucial to look at other potential causes as well such as sleep duration beyond physical activity and dietary intake. Based on Table 4.14, it was found that there was a positive and significant correlation between overall duration of sleep ($r=0.331$, $p<0.05$), duration of sleep on weekdays ($r=0.199$, $P<0.05$) and duration of sleep on weekend ($r=0.335$, $p<0.05$) with BMI-for-age among children at PPR Pinggiran Bukit Jalil.

The finding from this present study has shown a contradict finding with previous studies among children from Malaysia and Sweden. It was shown in these previous studies that children who sleep less than normal amounts have higher odds of being overweight and obese (Firouzi et al., 2014; Pemilla et al., 2018). However, in this present study, children who sleep more than the recommendation will have higher BMI-for-age. Some possible reasons of this situation are because there was evidence showing that sleep duration may lead to overweight and obesity when the fat intake increased and the consumption of carbohydrate decreased that will cumulatively affect the energy balance (Weiss et al., 2010). Also, there is a good possibility that children sleeping for a long duration always have an increased time in bed and a reduced energy expenditure, which may affect their weight status. It has also been suggested that self-reported sleep duration may not be accurate when parents reporting the children's bedtime and wake up time and this can affect the validity of parental reports. Nevertheless, children should

be encouraged to have adequate sleep duration and appropriate sleep habits as it may casually affect body weight.

Table 4.14: Correlation of sleep duration with BMI-for-age (z-score) of respondents.

Variables	r	p-value
Duration of sleep	0.331	<0.001*
Sleep duration on weekdays	0.199	0.020*
Sleep duration on weekend	0.335	<0.001*

*Correlation is significant at the p<0.05 level (2-tailed)

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

Maintaining a healthy weight have proven to improve overall health status and to avoid the occurrence of non-communicable disease. Based on the data by National Health Morbidity Survey (NHMS) 2015, the prevalence of thinness under 18 years old was higher among urban residents (8.0%) than in rural residents (7.2%), with a national prevalence of 7.8%. Apart from that, the prevalence of obesity among urban residents under 18 years old was 12.1%, which were higher than in rural residents (11.2%) with national prevalence of 11.9%. Based on this study, the prevalence of thinness and severe thinness were 18.3% and the prevalence of obesity and overweight were 27.0%. This showed that the prevalence of thinness, severe thinness, overweight and obesity among children at PPR Pinggiran Bukit Jalil, Kuala Lumpur were increasing when compared to the prevalence from the survey of NHMS 2015. There could be various factors that could contribute to the increase of these prevalences among children, especially in an urban setting. Realizing the fact that the trend of these number continuously increasing from year to year among children, this study was conducted to determine the association of the factors, which were sociodemographic, food security,

dietary intake, physical activity, sleep duration with body weight status among children at PPR Pinggiran Bukit Jalil, Kuala Lumpur.

A total of 137 children have participated in this study that comprises of 46.0% of boys and 54.0% of girls with a mean age of 9.75 ± 1.68 years. Since this study was conducted at PPR, almost all of the respondents were categorized as B40 based on the report of Household Income and Basic Amenities Survey 2016 from Department of Statistics Malaysia (DOSM). This is because the total household income of below RM3000 was one of the eligibility criteria to apply for PPR flat (Ministry of Housing and Local Government, 2018). Hence, we could see from the finding that majority of the respondents were categorized as food insecure household (73.7%) and the other 26.3% were categorized as food secure household. Apart from that, majority of the children were inadequate in energy intake. However, almost half of the children had an adequate intake of carbohydrate and protein. On the other hand, majority of the children was reported to have excessive fat intake. These inconsistent trends were quite interesting as we could see that the children consumed adequately carbohydrate, protein and fat but still had inadequate energy intake in a day. Meanwhile, almost half of the children were classified as having high physical activity (52.3%) while the rest of them were classified as moderate or low physical activity. Even though majority of the children were physically active, the duration of screen time for weekdays and weekend exceed the recommended 2 hours per day. This screen time included the use of electronic devices such as watching television, computer usage, playing video games and mobile phone. Apart from that, majority of the children were inadequately sleep based on the recommended hours of more than 10 hours of sleep for children aged 7 to 10 years old and more than 9 hours of sleep for children aged 11 to 12 years.

Sex, age, food security, energy intake, carbohydrate intake, protein intake and sleep duration were significantly associated with body weight status (BMI-for-age) among children at PPR Pinggiran Bukit Jalil, Kuala Lumpur. Hence, holistic observations should be done to the factors that may associate with body weight status of the children, especially among children from low-income household in the urban area.

5.2 Limitations

This study assessed the factors that may associate with body weight status among children at PPR Pinggiran Bukit Jalil, Kuala Lumpur. This is an important advantage in this study in which the study only recruited children from the same characteristics of family background. However, there are some limitations which need to be acknowledged in this study.

Firstly, this study is a cross-sectional study where the causal relationship between the independent variable and dependent variable could not be established. This is because this type of study was to assess the frequency, distribution and burden of health needs of a population for one point of time. As this is a cross-sectional study, this study could not determine whether the exposure (factors) or the outcome came first and cross-sectional study can only measure the prevalent rather than incident cases. Hence, the associations could be difficult to be interpreted by the researcher. Besides, cross-sectional study was more susceptible to biases such as recall bias, interview bias

or social acceptability bias. This could lead also to under-reporting or over-reporting finding as the respondents would like to report socially desirable answer when answering questions during the interview session.

Next, this study used a single day 24-hour dietary recall which the respondents need to recall all the food and drink they consumed for the last 24 hours. However, this study only measured one-day dietary recall, a single day's intake was unable to describe the typical diet of an individual where it only focused on short-term intake. Besides, the intake of an individual may vary from day to day, and they might consume more or less than usual for the last 24 hours when the interview session was conducted. To get more accurate details of dietary intake, it needs to be administered more than once for each individual or included other methods of measuring dietary intake as well. Apart from that, as this method required respondents to recall and memorize their dietary intake for the last 24 hours, there could be bias in reporting the dietary details by the respondents. The respondents might be under-reporting or over-reporting on their dietary intakes and may poorly estimate the portion sizes of their food or drink.

Lastly, the respondents were recruited from one geographic area, which this study only involved children from PPR Pinggiran Bukit Jalil. The results were only represented children from PPR Pinggiran Bukit Jalil, hence it may not represent children from other areas. Besides, the small sample size and recruited respondents from one area only will give a less conclusive result and could not be conclusive to other population. Thus, future research is encouraged to include a larger sample size that covers various geographical areas as well as diverse background.

5.3 Recommendations

Despite the limitations of this study that have been discussed earlier, some recommendation should be considered to improve the study. The present findings may be influenced by confounding variables such as socio-demographic characteristics when assessing the factors associated with the body weight status of the children. In order to control the confounding variables, statistical analysis such as multivariate models may be considered to assess the association between the independent variable and dependent variable while controlling the potential confounders. Thus, the regressions may identify the factors that may influence the body weight status among the study population.

Besides, a longitudinal study is recommended to be done by future researcher by conducting observations for the same respondent over a period of time. By this, development or changes in the characteristics of the respondent can be detected and could establish sequences of events. This longitudinal study can also be retrospective or prospective, which means that the researcher can look back in time or collecting new data to observe the factors that may associate with the health status of the respondents.

Next, instead of using a single method for dietary intake, other methods should be used to assess dietary intake of respondents. Future researcher can consider to use other methods such as dietary record or Food Frequency Questionnaire to get more reliable and valid result on the diet of respondents. However, to obtain a more accurate result, dietary biomarkers could also be used to assess objectively the dietary intake of the respondents without bias of self-reported dietary intake. Biomarkers may help to

improve the measurement of dietary intake and to provide other mechanistic insight into the effects of food components and diet.

Lastly, future intervention such as health awareness and promotion should focus more on promoting health among the low-income community. This will provide additional knowledge to these communities on health issues to improve their well-being. Besides, holistic cooperation should be done by the government from different ministries to overcome the health issues that were happening among the low-income community in Malaysia, especially in the urban area. Cooperation from different ministries may help these groups to overcome the health issues that were affecting their quality of life and well-being.

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ETHICS COMMITTEE FOR RESEARCH INVOLVING HUMAN SUBJECTS
(JKEUPM)
UNIVERSITI PUTRA MALAYSIA

Research title	:	**Association Between Socio-Demographic, Dietary Intake, Food Insecurity, Physical Activity, Sleeping Pattern and Body Weight Status Among Children at PPR Pinggiran Bukit Jalil, Kuala Lumpur**
Study Site	:	**PPR Pinggiran Bukit Jalil, Kuala Lumpur**
JKEUPM Ref No.	:	**JKEUPM-2018-406**
Researcher	:	**Nur Nazira Izzaty binti Mhd Nazarludin**
Supervisor	:	**Assoc Prof. Dr. Norhasmah binti Sulaiman**

Documents received and reviewed with reference to the above study:

1. Ethics Application Form, Version 1 dated 8/11/2018
2. Respondent Information Sheet & Guardian's/Parent's Consent (Malay). Version 1 dated 8/11/2018
3. Proposal (English). Version 2 dated 8/1/2019
4. Questionnaires/ Interviews (Malay). Version 1 dated 8/11/2018
5. Curriculum Vitae of:
   a. Assoc Prof. Dr. Norhasmah Sulaiman

The University Research Ethics Committee. Universiti Putra Malaysia (JKEUPM) operates in accordance to the ICH-GCP Guidelines.

Decision by JKEUPM:

[X] Approved

[X] **Permission MUST BE OBTAINED from the respective hospitals/ institutions before conducting the research**

[ ] Disapproved

Please note that the approval is **VALID UNTIL 10 JANUARY 2020**

Researchers should comply with the following:

I. Complete a Study Final Report upon study completion (Form 3.2).

II. Ethical approval is required in the case of amendments/ changes to the study documents/ study sites/ study team.

APPENDIX B (REQUEST PERMISSION FROM DBKL)

FAKULTI PERUBATAN DAN SAINS KESIHATAN
Faculty of Medicine and Health Sciences

Tarikh : 25 Oktober 2018

Pengarah,
Jabatan Pembangunan Komuniti dan Kesejahteraan Bandar,
Dewan Bandaraya Kuala Lumpur,
Menara DBKL 3,
Bandar Wawasan,
Jalan Raja Abdullah,
50300 Kuala Lumpur.

Tuan,

MEMOHON KEBENARAN MENDAPATKAN MAKLUMAT DAN MENJALANKAN PENYELIDIKAN BERKAITAN PROGRAM PERUMAHAN RAKYAT (PPR) DI KUALA LUMPUR.

Dengan segala hormatnya, perkara di atas dirujuk untuk perhatian pihak tuan.

2. Untuk makluman pihak tuan, dua orang pelajar daripada program Bacelor Sains (Pemakanan dan Kesihatan Komuniti), Fakulti Perubatan dan Sains Kesihatan, Universiti Putra Malaysia akan menjalankan kajian penyelidikan seperti perincian berikut:

Tajuk Penyelidikan	: Kajian Kesihatan Berkaitan Status Berat Badan dalam Kalangan Kanak-kanak dan Wanita di Program Perumahan Rakyat (PPR) Kuala Lumpur.
Nama Pelajar	: Nur Fariha binti Abu Bakar Nur Nazira Izaty binti Mhd Nazarludin

3. Tujuan penyelidikan ini adalah untuk mengkaji perkaitan faktor-faktor yang mempengaruhi status berat badan dalam kalangan kanak-kanak dan wanita di Program Perumahan Rakyat (PPR) di Kuala Lumpur. Penyelidikan ini berbentuk soal selidik, temuramah serta pengukuran berat dan tinggi kanak-kanak dan wanita di Program Perumahan Rakyat (PPR). Penyertaan kanak-kanak dan wanita adalah sukarela dan kebenaran bertulis akan diperolehi sebelum mereka menyertai

APPENDIX D
INFORMATION SHEETS AND CONSENT FORM FOR MOTHERS (MALAY VERSION)

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

UPM

UNIVERSITI PUTRA MALAYSIA

BORANG 2.5: PENERANGAN DAN PERSETUJUAN IBUBAPA/PENJAGA

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

1.TAJUK KAJIAN

Hubungan antara sosiodemografi, jaminan kedapatan makanan, pengambilan makanan, aktiviti fizikal, tempoh tidur dengan status berat badan dalam kalangan kanak-kanak di PPR Pinggiran Bukit Jalil

2. PENGENALAN

Penyelidikan ini bertujuan untuk mengetahui status berat badan kanak-kanak dan perkaitannya dengan sosio-demografi, jaminan kedapatan makanan, pengambilan makanan, aktiviti fizikal dan corak tidur kanak-kanak. Penemuan dari penyelidikan ini akan meningkatkan pengetahuan dan idea baru mengenai isu berat badan dalam kalangan kanak-kanak di kawasan Program Perumahan Rakyat (PPR) di bandar. Oleh itu, anak/jagaan anda dijemput untuk menyertai penyelidikan ini. Risalah ini akan menjelaskan hal-hal berkenaan penyelidikan tersebut dengan lebih mendalam dan terperinci. Amat penting untuk anda memahami mengapa penyelidikan ini dilakukan dan apa yang dilakukan dalam penyelidikan ini. Sila ambil masa yang secukupnya untuk membaca dan mempertimbangkan dengan teliti penerangan yang diberi sebelum anda bersetuju untuk menyertai penyelidikan ini..

Penyertaan anak/jagaan anda dalam penyelidikan ini adalah secara sukarela. Anda tidak perlu menyertai penyelidikan ini jika anda tidak mahu. Anda juga mempunyai hak untuk tidak menjawab mana-mana soalan yang anda tidak mahu jawab. Anda juga boleh menarik diri daripada penyelidikan ini pada bila-bila masa sahaja. Jangka masa keseluruhan penyelidikan ini adalah selama setahun, namun penyertaan anak/jagaan anda dalam penyelidikan ini hanyalah 30 minit.

3. APAKAH YANG PERLU ANDA LAKUKAN?

Anda perlu membaca dan memahami penyelidikan ini melalui "Penerangan dan Persetujuan Ibubapa/Penjaga". Sekiranya anda bersetuju untuk menyertai penyelidikin ini, anda perlu menandatangani borang persetujuan responden pada mukasurat 4 dan mengembalikan kepada penyelidik semula.
Anda akan ditemu ramah menggunakan satu set soalan soal selidik yang mempunyai tujuh bahagian yang mengandungi maklumat berkaitan latar belakang sosio-demografik,

pengambilan makanan, taraf kejaminan kedapatan makanan, aktiviti fizikal, aktiviti sedentari dan corak tidur. Selepas sesi temu ramah selesai, berat dan tinggi anak/jagaan anda akan diukur.

4. SIAPA YANG TIDAK BOLEH MENYERTAI KAJIAN INI?

- Bukan warganegara Malaysia
- Tidak tinggal di rumah Program Perumahan Rakyat (PPR)
- Kanak-kanak yang mempunyai halangan fizikal yang boleh menghalang mereka dari melakukan aktiviti fizikal

5. APAKAH FAEDAH MENYERTAI KAJIAN INI?

a) KEPADA ANAK/JAGAAN SAYA SEBAGAI PESERTA?

Anda akan dapat mengetahui berat dan tinggi anak/jagaan anda semasa sesi pengukuran antropometri. Selain itu, anda akan diberi pendedahan mengenai perkaitan antara sosio-demografi, pengambilan makanan, jaminan kedapatan makanan, aktiviti fizikal, corak tidur dan status berat badan. Apabila selesai sesi temuramah dan pengukuran antropometri, anda akan diberi saguhati sebagai tanda penghargaan kerana menyertai penyelidikan ini.

b) KEPADA PENYELIDIK?

Maklumat hasil dari penyelidikan ini akan digunakan untuk mengetahui perkaitan antara latar belakang sosio-demografi, pengambilan makanan, jaminan kedapatan makanan, aktiviti fizikal, corak tidur dan status berat badan dalam kalangan kanak-kanak di PPR Pinggiran Bukit Jalil, Kuala Lumpur. Maklumat ini amat berguna untuk digunakan oleh para penyelidik untuk mengelola program promosi kesihatan pada masa akan datang untuk memberi pendedahan kepada komuniti tentang kepentingan status berat badan yang ideal dalam kalangan kanak-kanak.

6. ADAKAH IA BERISIKO?

Penyelidikan ini tidak akan mendatangkan sebarang risiko kerana peneyelidikan ini hanya melibatkan sesi temuramah dan pengukuran berat dan tinggi sahaja.

7. ADAKAH MAKLUMAT DAN IDENTITI ANAK/JAGAAN SAYA KEKAL RAHSIA?

Segala maklumat yang diperolehi dalam penyelidikan ini akan disimpan dan dikendalikan secara sulit. Sekiranya hasil penyelidikan ini diterbitkan atau dibentangkan kepada orang ramai, identiti anda/jagaan anda tidak akan didedahkan tanpa kebenaran anda terlebih dahulu.

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

Sekiranya anda mempunyai sebarang keperluan atau soalan, anda boleh menghubungi:

Nur Nazira Izaty Mhd Nazarludin

Jabatan Pemakanan dan Dietetik,

Fakulti Perubatan dan Sains Kesihatan,

Universiti Putra Malaysia.

Email : naziraifity@yahoo.com

Nombor telefon : +60196780814

Prof. Madya Dr. Norhasmah Sulaiman

Jabatan Pemakanan dan Dietetik,

Fakulti Perubatan dan Sains Kesihatan,

Universiti Putra Malaysia.
Email : norhasmah@upm.edu.my

Sila tandatangan di sini sekiranya anda telah membaca dan memahami kandungan halaman ini _____

9. PERSETUJUAN

Saya..... **No Kad Pengenalan.** ..... **beralamat**..... .....**dengan ini secara sukarela bersetuju membenarkan *anak / jagaan saya** ..... **menyertai penyelidikan tersebut di atas *(klinikal/percubaan ubat-ubatan/rakaman video/kumpulan sasaran/temuduga/ 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.

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

Tarikh :..... **Nama** :.....

No. K/P: .....

Saya mengesahkan bahawa saya telah menerangkan kepada ibubapa/penjaga responden mengenai sifat dan tujuan penyelidikan tersebut di atas.

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

APPENDIX E
QUESTIONNAIRE (MALAY VERSION)

No. Rujukan : ☐☐☐

UNIVERSITI PUTRA MALAYSIA

JABATAN PEMAKANAN DAN DIETETIK

FAKULTI PERUBATAN DAN SAINS KESIHATAN

Tajuk Kajian:

HUBUNGAN ANTARA SOSIODEMOGRAFI, JAMINAN KEDAPATAN MAKANAN, PENGAMBILAN MAKANAN, AKTIVITI FIZIKAL, TEMPOH TIDUR DENGAN STATUS BERAT BADAN ALAM KALANGAN KANAK-KANAK DI PPR PINGGIRAN BUKIT JALIL

Penyelidik:

Nur Nazira Izaty Binti Mhd Nazarludin

Diselia oleh:

Prof. Madya Dr Norhasmah Sulaiman

Perlaksanaan projek ilmiah ini adalah merupakan salah satu syarat kelayakan bagi mendapatkan Ijazah Bacelor Sains (Pemakanan dan Kesihatan Komuniti), Fakulti Perubatan dan Sains kesihatan (FPSK) di Universiti Putra Malaysia, UPM.

Segala maklumat yang diberikan oleh responden adalah sulit dan hanya untuk tujuan penyelidikan semata-mata. Kejujuran dan keikhlasan dalam memberikan maklumat adalah amat diharapkan bagi kelancaran projek ini. Kejayaan projek ini amatlah bergantung kepada kerjasama yang diberikan oleh pihak berkenaan. Segala kerjasama dari pihak tuan/puan amatlah dihargai dan didaului ucapan terima kasih.

BAHAGIAN A: LATAR BELAKANG SOSIODEMOGRAFI

MAKLUMAT DIRI:

A1	Tarikh lahir	
A2	Jantina	1) Lelaki 2) Perempuan
A3	Agama	1) Islam 2) Hindu 3) Buddha 4) Kristian 5) Lain-lain
A4	Kaum	1) Melayu 2) India 3) Cina 4) Lain-lain

MAKLUMAT ANAK:

A5	Tarikh lahir	
A6	Jantina	1) Lelaki 2) Perempuan
A7	Status persekolahan	1) Bersekolah 2) Tidak bersekolah
A8	Darjah	

A9: Pekerjaan:

Ibu	Bapa
[ ] Pekerja kerajaan	[ ] Pekerja kerajaan
[ ] Pekerja swasta	[ ] Pekerja swasta
[ ] Bekerja sendiri	[ ] Bekerja sendiri
[ ] Pesara	[ ] Pesara
[ ] Surirumah	[ ] Surirumah
[ ] Tidak bekerja	[ ] Tidak bekerja

A10. Tahap pendidikan:

Ibu	Bapa
1. Tiada bersekolah formal 2. Sekolah rendah (1, 2, 3, 4, 5, 6) 3. Sekolah menengah (1, 2, 3, 4, 5) 4. Pra- universiti (Tingkatan 6, Asasi, Matrikulasi) Tempoh pengajian: 5. Diploma, Ijazah, Master, PhD Tempoh pengajian:	1. Tiada bersekolah formal 2. Sekolah rendah (1, 2, 3, 4, 5, 6) 3. Sekolah menengah (1, 2, 3, 4, 5) 4. Pra- universiti (Tingkatan 6, Asasi, Matrikulasi) Tempoh pengajian: 5. Diploma, Ijazah, Master, PhD Tempoh pengajian:

A11. Jumlah pendapatan isi rumah sebulan (RM): _____

Ibu	Bapa
1. Pekerjaan utama: RM 2. Pekerjaan sampingan : RM 3. Lain – lain :	1. Pekerjaan utama: RM 2. Pekerjaan sampingan : RM 3. Lain – lain :

MAKLUMAT LAIN:

A12. Bilangan isi rumah: 1) Keseluruhan isi rumah : _____

2) Masih bersekolah (sekolah rendah, menengah, IPT) : _____

3) Sudah bekerja : _____

4) Belum bersekolah : _____

5) Tidak bersekolah : _____

A13. Masalah kesihatan ahli rumah: 1) Ya, nyatakan : _____

2) Tidak

BAHAGIAN B: STATUS JAMINAN KEDAPATAN MAKANAN

Arahan: Sila tandakan (/) pada jawapan yang menggambarkan diri anda berdasarkan pernyataan di bawah.

B1.	**"Makanan yang (saya/kami) beli tidak mencukupi, dan (saya/kami) tidak mempunyai wang yang cukup untuk mendapatkan lebih makanan"** Adakah keadaan ini selalu, kadang-kadang atau tidak benar untuk (anda/isi rumah) untuk tempoh 12 bulan yang lepas? [ ] Selalu benar [ ] Kadang-kadang benar [ ] Tidak benar [ ] Tidak tahu atau Menolak
B2.	**"(Saya/kami) tidak mampu untuk makan makanan yang seimbang"** Adakah keadaan ini selalu, kadang-kadang atau tidak benar untuk (anda/isi rumah) untuk tempoh 12 bulan yang lepas? [ ] Selalu benar [ ] Kadang-kadang benar [ ] Tidak benar [ ] Tidak tahu atau Menolak
B3.	Sepanjang tempoh 12 bulan yang lepas, adakah (anda/isi rumah dewasa) mengurangkan saiz makanan atau tidak makan kerana tidak cukup wang untuk membeli makanan? [ ] Ya (Terus ke soalan 33a) [ ] Tidak (Terus ke soalan 34) [ ] Tidak tahu

B4.	Jika Ya, berapa kerap perkara seperti ini berlaku? [ ] Hampir setiap bulan [ ] Beberapa bulan tetapi bukan setiap bulan [ ] Hanya 1 atau 2 bulan [ ] Tidak tahu
B5.	Sepanjang tempoh 12 bulan yang lepas, adakah anda makan kurang daripada apa yang anda rasa anda sepatutnya kerana tidak cukup wang untuk membeli makanan? [ ] Ya [ ] Tidak [ ] Tidak tahu
B6.	Sepanjang tempoh 12 bulan yang lepas, adakah anda pernah kelaparan tetapi tidak makan kerana tidak cukup wang untuk membeli makanan? [ ] Ya [ ] Tidak [ ] Tidak tahu

BAHAGIAN C: 24 JAM INGATAN PEMAKANAN (ANAK)

Arahan: Sila rekodkan semua makanan dan minuman yang anda ambil semalam

Hari: Isnin/ Selasa/ Rabu/ Khamis/ Jumaat/ Sabtu/ Ahad **Tarikh:**

Sajian	Jenis makanan / minuman yang diambil	Kuantiti
Sarapan pagi (7 pagi – 10 pagi)		
Minum pagi (snek) (10 pagi – 12 tengah hari)		
Makan tengah hari (12 tengah hari – 2 petang)		
Minum petang (snek) (2 petang – 6 petang)		

Makan malam **(6 petang – 8 malam)**		
Supper **(8 malam – 12 tengah malam)**		

BAHAGIAN D: STATUS AKTIVITI FIZIKAL (ANAK)

Kami berminat untuk mengetahui aktiviti fizikal yang telah anda lakukan dalam tempoh 7 hari lepas (dalam semingggu terakhir). Ini termasuklah aktiviti sukan atau menari yang boleh membuatkan anda berpeluh dan kaki anda terasa letih, atau permainan yang membuatkan anda bernafas dengan lebih kuat dan laju daripada biasa seperti melompat tali skipping, berlari dan lain-lain.

Sila tandakan (／) satu pilihan jawapan sahaja bagi setiap aktiviti dalam jadual di bawah.

D1. Aktiviti fizikal pada masa lapang anda : Adakah anda melakukan mana-mana aktiviti seperti di bawah dalam tempoh 7 hari lepas (dalam minggu terakhir)? Jika ya, berapa kerap?

Aktiviti Fizikal	Tiada	1-2 hari	3-4 hari	5-6 hari	≥ 7 hari
Melompat tali skipping					
Bermain kasut roda					
Bermain kejar-kejar					
Berjalan kaki untuk bersenam					
Berbasikal					
Berlari					
Aerobik					
Bola sepak					
Bola jarring					
Bola tampar					
Menari					
Badminton					
Bermain papan luncur					
Hoki					
Bola keranjang					
Bola baling					
Tenis					
Skuasy					
Futsal					
Berenang					
Lain-lain :					

Sila tandakan (／) pada jawapan yang paling betul. Pilih satu jawapan SAHAJA

D2. Dalam tempoh 7 hari lepas, berapa kerapkah anda terlibat secara aktif semasa dalam kelas Pendidikan Jasmani?

- ☐ Tidak ikut serta
- ☐ Jarang sekali
- ☐ Kadang-kadang
- ☐ Kerap
- ☐ Sentiasa ikut

D3. Dalam tempoh 7 hari lepas, apakah aktiviti yang anda biasa lakukan semasa waktu rehat?

- ☐ Duduk/berbual dengan kawan/membaca buku/membuat kerja sekolah
- ☐ Berdiri atau berjalan
- ☐ Berdiri atau bermain-main sedikit
- ☐ Berlari atau bermain-main sederhana
- ☐ Berdiri dan bermain-main secara aktif

D4. Dalam tempoh 7 hari lepas, apakah yang biasa anda lakukan semasa waktu rehat selain dari waktu makan tengah hari?

- ☐ Duduk/berbual dengan kawan/membaca buku/membuat kerja sekolah
- ☐ Berdiri atau berjalan
- ☐ Berdiri atau bermain-main sedikit
- ☐ Berlari atau bermain-main sederhana
- ☐ Berdiri dan bermain-main secara aktif

D5. Dalam tempoh 7 hari lepas, berapa kerapkah anda melakukan aktiviti sukan, menari atau bermain secara aktif semasa waktu tengah hari selepas sahaja kelas selesai?

- ☐ Tiada aktiviti fizikal
- ☐ Sekali seminggu
- ☐ 2-3 kali seminggu
- ☐ 4-5 kali seminggu
- ☐ 6-7 kali seminggu

D6. Dalam tempoh 7 hari lepas, apakah aktiviti yang anda biasa lakukan semasa waktu petang?

- ☐ Tiada aktiviti fizikal
- ☐ Sekali seminggu
- ☐ 2-3 kali seminggu
- ☐ 4-5 kali seminggu
- ☐ 6-7 kali seminggu

D7. Semasa hujung minggu, berapa kerapkah anda melakukan aktiviti sukan, menari atau bermain secara aktif?

- ☐ Tiada aktiviti fizikal
- ☐ Sekali seminggu
- ☐ 2-3 kali seminggu
- ☐ 4-5 kali seminggu
- ☐ 6-8 kali seminggu

D8. Daripada pernyataan di bawah, yang manakah paling sesuai menunjukkan aktiviti fizikal anda dalam tempoh 7 hari lepas?

☐ Tidak pernah terlibat

☐ Jarang (1-2 kali seminggu)

☐ Kadang-kadang (3-4 kali seminggu)

☐ Kerap (5-6 kali seminggu)

☐ Semua atau hampir kesemua waktu lapang

D9. Bulatkan berdasarkan kekerapan anda melakukan aktiviti fizikal (seperti bersukan, bermain permainan, menari atau sebarang aktiviti fizikal lain) untuk setiap ahri sepanjang minggu lepas.

	Tiada	Sangat sedikit	Sedikit	Kadang-kala	Kerap kali
Isnin					
Selasa					
Rabu					
Khamis					
Jumaat					
Sabtu					
Ahad					

D10. Adakah apa-apa sebab yang menghalang anda melakukan aktiviti fizikal pada minggu lepas atau anda tidak sihat?

☐ Ya

☐ Tiada

Jika ya, apakah yang menghalang anda: _____

BAHAGIAN E: AKTIVITI SEDENTARI KANAK-KANAK

Sila isi waktu kanak-kanak menonton televisyen, bermain permainan video/komputer/alat telekomunikasi pada setiap hari.

Contoh : Menonton televisyen (Isnin) : 2.00 petang – 3.00 petang

Aktiviti	Masa						
	Isnin	Selasa	Rabu	Khamis	Jumaat	Sabtu	Ahad
Menonton televisyen/video							
Menggunakan komputer							
Bermain permainan video/alat telekomunikasi							

E1. Purata masa kesemua aktiviti sedentari pada hari persekolahan (Isnin - Jumaat) : ___ jam

E2. Purata masa kesemua aktiviti sedentari pada hujung minggu (Sabtu – Ahad): ____ jam

BAHAGIAN F: CORAK TIDUR KANAK-KANAK

Sila nyatakan waktu kebiasaan anak/jagaan anda tidur dan bangun pada setiap hari:

Hari	Waktu tidur	Waktu Bangun	Tempoh masa tidur
Isnin			
Selasa			
Rabu			
Khamis			
Jumaat			
Sabtu			
Ahad			

C1. Purata tempoh masa tidur pada hari persekolahan (malam ahad – malam khamis): _____ jam

C2. Purata tempoh masa tidur pada hujung minggu (malam jumaat – malam sabtu): _____ jam

BAHAGIAN G : UKURAN ANTROPOMETRIK (ANAK)

Ukuran Antropometri			
Ukuran	Bacaan 1	Bacaan 2	Purata
Tinggi (cm)			
Berat (kg)			