UNIVERSITI PUTRA MALAYSIA

FACTORS ASSOCIATED WITH HEIGHT-FOR-AGE AMONG PRE-SCHOOLERS IN TABIKA KEMAS, PUTRAJAYA

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FACTORS ASSOCIATED WITH HEIGHT-FOR-AGE AMONG PRE-SCHOOLERS IN TABIKA KEMAS, PUTRAJAYA

BY

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ABSTRACT

FACTORS ASSOCIATED WITH HEIGHT-FOR-AGE AMONG PRE-SCHOOLERS IN TABIKA KEMAS, PUTRAJAYA.

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Introduction: South Asia bears about 40% of global burden of stunting and the prevalence of stunting among children under 5 years old in Malaysia was rising from 17.0% in 2006 to 20.7% in 2016. Thus, this study determined that association between demographic and socio-economic factors, household food security, parental feeding practices, dietary diversity and height-for-age. Methods: A total of 207 pre-schoolers aged four to six years old from Tabika Kemas, Putrajaya were involved in this study. This cross-sectional study was carried out between February to April 2019. Household food security was measured using Radimer/Cornell hunger and food insecurity instrument while parental feeding practices were measured using the Child Feeding Questionnaire and adapted version of Food Agriculture Organization Diet Diversity Questionnaire was used to measure dietary diversity. Pre-schooler's weight and height were measured using calibrated TANITA digital weighing scale and SECA stadiometer. Result: Data were analysed using SPSS version 22, with $p<0.05$ set as level of significance. The prevalence of stunting among pre-schoolers was 10.6%. Pre-schoolers were categorised into 4 categories of household food security levels; food secure (47%), household food insecure (52.7%), individual food insecure (15.5%) and child hunger (9.2%). The mean for restriction, pressure and monitoring of parental feeding practices were 3.74 ± 0.54, 3.98 ± 0.67 and 3.89 ± 0.82 respectively. The mean for dietary diversity score (DDS) was 5.45 ± 1.20 with the highest mean was cereal and grains food group score (0.97 ±0.15), followed by flesh foods food group score (0.91 ±0.28) meanwhile the lowest mean was nuts and legumes food group score (0.30 ±0.46). There were no significant associations of demographic and socio-economic factors, household food security, parental feeding practices and dietary diversity with height-for-age among pre-schoolers. Conclusion: Prevalence of stunting could be reduced by conducting health promotion and nutrition programs to create awareness among parents related to childhood stunting.

ABSTRAK

FAKTOR-FAKTOR YANG BERKAIT DENGAN TINGGI-UNTUK-UMUR DALAM KALANGAN KANAK-KANAK PRA-SEKOLAH DI TABIKA KEMAS, PUTRAJAYA.

NURUL MADIHAH HASNI

Pengenalan: Asia Selatan menanggung 40% daripada masalah kebantutan dunia dan prevalens kebantutan di kalangan kanak-kanak bawah 5 tahun di Malaysia adalah meningkat dari 17.0% pada 2006 kepada 20.7% pada 2016. Oleh itu, kajian ini telah mengenalpasti perkaitan antara faktor demografi dan socio-ekonomi, sekuriti makanan isi rumah, praktis pemakanan ibubapa, kepelbagaian diet dan tinggi-untuk-umur. Metodologi: Sejumlah 207 kanak-kanak prasekolah berumur empat hingga enam tahun daripada Tabika Kemas, Putrajaya terlibat dalam kajian ini. Kajian keratan rentas telah dijalankan antara Februari hingga April 2019. Sekuriti makanan isi rumah diukur menggunakan Kebuluran dan insekuriti makanan oleh Radimer/Cornell, manakala praktis pemakanan ibubapa menggunakan. Kaji selidik praktis pemakanan kanak-kanak dan skor kepelbagaian makanan oleh Pertubuhan Makanan dan Pertanian telah digunakan untuk mengukur kepelbagaian makanan. Berat dan tinggi kanak-kanak diukur menggunakan penimbang berat digital TANITA dan stadiometer SECA. Hasil: Data telah dianalisis menggunakan SPSS versi 22, dengan $p<0.05$ sebagai tahap keyakinan . Prevalens kebantutan di kalangan kanak-kanak adalah 10.6%. Kanak-kanak prasekolah dikategorikan kepada 4 kategori; makanan yang selamat (47%), makanan isi rumah tidak selamat (52.7%), makanan individu tidak selamat (15.5%) and kebuluran kanak-kanak (9.2%). Min untuk pembatasan, tekanan dan pemerhatian oleh praktis pemakanan ibubapa adalah 3.74 ± 0.54, 3.98 ± 0.67 and 3.89 ± 0.82. Min untuk skor kepelbagaian makanan adalah 5.45 ± 1.20, min tertinggi bagi skor kumpulan makanan bijirin adalah 0.97 ± 0.15, diikuti oleh min skor kumpulan makanan berdaging iaitu 0.91 ± 0.28 manakala min terendah adalah skor kumpulan kekacang (0.30 ± 0.46). Tiada perkaitan yang ketara antara faktor demografi dan socio-ekonomi, sekuriti makanan isi rumah, praktis pemakanan ibubapa kepelbagaian diet dan tinggi-untuk-umur di kalangan kanak-kanak prasekolah. Konklusi: Prevalens kebantutan mungkin boleh dikurangkan dengan mengadakan program promosi pemakanan dan kesihatan untuk menimbulkan kesedaran di kalangan ibubapa berkenaan kebantutan kanak-kanak.

CHAPTER 1

INTRODUCTION

1.1 Background of study

The World Health Organization (WHO) (2018) defines stunting for children as height-for-age is less than negative two standard deviation below the WHO Child Growth Standards median. Stunting nonetheless influences almost one in four children below the age of five years (FAO, IFAD, UNICEF, 2017). Children need adequate nutrition for optimal mental and physical growth especially for the first 2 years of life (Yadav, Gupta, & Shrestha, 2014). As children have increased physiological requirement to support growth and development, they could be vulnerable to poor nutrition.

Globally, the prevalence of stunting among children under 5 years old decreased from 23.2% in 2015 to 22.2% in 2017 (World Bank, 2014). However, the prevalence of stunting in South Asia was the highest compared to other regions of the world which it represents 40% of the global burden of stunted children. The National Health and Morbidity Survey (2015) reported that the prevalence of stunting was highest (17.7%)

among children in Malaysia aged 5 years and below compared to the lowest prevalence of stunting (11.0%) among children aged 10-14 years old. Unlike many other countries, the prevalence of stunting under 5 years of age in Malaysia increased from 17.0% in 2006 to 20.7% in 2016 (UNICEF, 2018).

Stunting is a health problem that affects short-term health and long-term health and has functional consequences such as effect on development of neurodevelopmental, short adult stature and reduced lean body mass (de Onis & Branca, 2016; Hoddinott et al., 2013; Dewey & Begum, 2011). Stunting can also lead to many other consequences such as prone to childhood infection, have poor cognitive development and increased risk of non-communicable diseases (Dewey & Begum, 2011; de Onis & Branca, 2016; FAO, IFAD, UNICEF, 2017).

1.2 Problem statement

Poverty and lack of access to food are important determinants of undernutrition (Reyes et al., 2004). Previous studies reported that household food insecurity was not significantly associated with childhood stunting (Mahmudiono, Nindya, Andrias, Megatsari, & Rosenkranz, 2018; M'Kaibi, Steyn, Ochola, and Du Plessis,2017). However, many studies showed that there was a significant association between childhood stunting and household food insecurity where children from food insecure household were more highly to be stunted than children from food secure household (Ali Naser et al., 2014; Mutisya, Kandala, Ngware, & Kabiru, 2015; Mahmudiono et al., 2018; Singh, Singh, & Ram, 2014). Therefore, there is no clear conclusion on the association between household food insecurity and stunting.

Diversity in food intake of children is important as they need adequate nutrition for growth. M'Kaibi et al. (2017) reported a weak significant correlation between dietary diversity and stunting among children under 5 years of age. This showed that dietary diversity can reduce the risk of being stunted among children (Mahmudiono, Sumarmi, & Rosenkranz, 2017; Rah et al., 2010; Sié et al.,2018). Besides, low intake of animal source food among stunted children can affect the bioavailability of protein since they were more likely consume higher starchy food rather than animal source food (Ogechi & Chilezie, 2017; Darapheak, Takano, Kizuki, Nakamura, & Seino, 2013). However, there are limited studies that determine the association between dietary diversity and stunting among 6 years old children as many studies focused on the association among children under 5 years old.

Parents play an important role in ensuring the quality of children's food intake. Besides, parents also influence their children eating behaviour especially during infancy and early childhood (Birch & Fisher, 2000). Several studies reported that children who were taken care by fathers had higher prevalence of childhood stunting compared to those taken care by mothers (Ban et al., 2017). Besides, non-stunted children have higher positive responsive feeding behaviours from their caregivers compared to stunted children (Abebe, Haki, & Baye, 2017). However, there are limited findings on the association of parental feeding practices with stunting among pre-schoolers in Malaysia. In order to fulfill the gap, further research should be conducted to determine factors that are associated with stunting. Therefore, this study is conducted to answer these questions :

a) What is the prevalence of stunting among pre-schoolers aged 4 to 6 years old?

b) What are the relationships of demographic and socio-economic factors, household food security, parental feeding practices, child dietary diversity with height-for-age among pre-schoolers?

1.3 Significance of the study:

The findings of this study can contribute to information on the prevalence of stunting among pre-schoolers in Malaysia and can be used as reference for the government, non-government organization, and policymakers to plan and implement interventions that address stunting among pre-schoolers. In addition, the government can provide a standard of healthy eating syllabus to preschool teachers to give early exposure to pre-schoolers on healthy eating.

Additionally, the findings of this study can be used by health practitioners such as nutritionists and dietitians in providing advice to the community on creating awareness, improve knowledge and attitude on household food security, dietary intake of children and parental feeding practices. Regular check-up for pre-schoolers could be organized by nutritionists and dietitians to improve and monitor pre-schoolers height-for-age.

As this study determined the association of demographic and socio-economic factors, household food security, parental feeding practices and child dietary diversity with height-for-age among pre-schoolers, the findings can be used by researchers as baseline data for future research. Therefore, the factors associated with stunting can be further identified.

1.4 Objectives of the study

1.4.1 General objectives

To determine factors associated with height-for-age among pre-schoolers in Tabika KEMAS, Putrajaya.

1.4.2 Specific objectives

i. To determine
   a. demographic and socio-economic factors (sex, age, education level of mothers and fathers, income of father and mother, household income and household size),
   b. household food security,
   c. parental feeding practices (monitoring, parent pressure, restriction),
   d. dietary diversity

   of pre-schoolers.

ii. To determine the prevalence of stunting among pre-schoolers.

iii. To determine the association between

a. demographic and socio-economic factors,

b. household food security,

c. parental feeding practices,

d. child dietary diversity

and height-for-age among pre-schoolers.

1.5 Hypotheses

There are significant associations of demographic and socio-economic factors, household food securities, parental feeding practices and child dietary diversity with height-for-age among pre-schoolers in Tabika KEMAS, Putrajaya.

1.6 Research framework

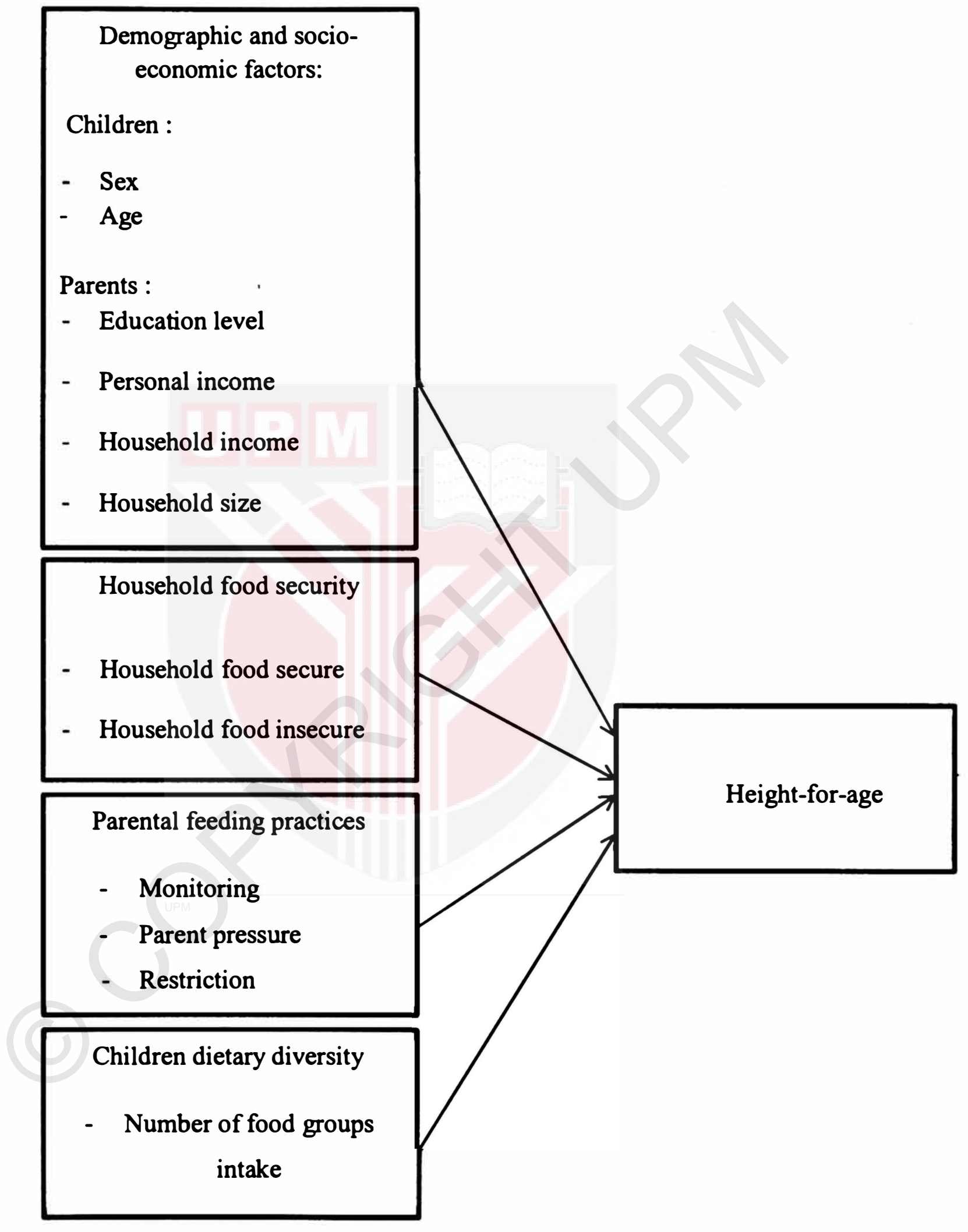

Figure 1.1: Research framework of demographic and socio-economic factors, household food security, children dietary diversity and parental feeding practices with height-for-age.

As shown in Figure 1.1, demographic and socio-economic factors, household food security, children dietary diversity and parental feeding practices are factors that may influence stunting among pre-schoolers in Putrajaya. Studies reported that household size was significantly correlated with stunting in that children of larger household size were more likely to be stunted than those of smaller household size (Fikadu, Assegid, & Dube, 2014; Alemayehu et al., 2015; Bhattarai,2016). Previous studies also reported that household food insecurity was an important determinant of stunting (Ali Naser et al., 2014; Mutisya, Kandala, Ngware, & Kabiru, 2015; Betebo, Ejajo, Alemseged, & Massa, 2017). Besides, children with low dietary diversity were significantly more likely to be stunted (Ahmad, Khalique, Khalil, Urfi, & Maroof, 2018; Motbainor, Worku, & Kumie, 2015; Rah et al., 2010; Motbainor et al., 2015). Several studies reported that parental feeding practices was significantly associated with stunting (Ban et al., 2017; Abebe et al., 2017).

CHAPTER 2

LITERATURE REVIEW

2.1 Height-for-age

Malnutrition is referred to inadequate, imbalance or excessive intake of energy or nutrient. Almost 50% of children under 5 years of age died because of undernutrition (WHO, 2017). Stunting signifies chronic malnutrition which height-for-age of children is less than negative two standard deviations which below the WHO Child Growth Standards median (FAO, IFAD, UNICEF, 2017). UNICEF (2009) reported that stunting is identified as a major global health priority. The first 1000 days is very crucial as poor nutrition can lead to stunted growth and children must meet the nutritional requirement by consuming adequate nutrition.

Globally, the prevalence of stunting has decreased from 198.4 million in 2000 (32.6%) to 150.8 million in 2017(22.2%). However, the number of stunted children is the highest (151 million) compared to wasted (51 million) and overweight (30 million) in 2017 (UNICEF, World Health Organization (WHO), & World Bank Group (WB), 2018). Compared to other regions, Africa (39%) and Asia (55%) have

the greatest percentage of stunted children under 5 years old. UNICEF (2017) reported that stunting occurred 1 in 4 children under 5 years old and the prevalence of stunting in South-eastern Asia was 25.7% (14.9 million). The number of stunted children in South-eastern Asia has decreased from 21.0 million (2000) to 14.9 million (2017). However, National Health and Morbidity Survey (2015) and National Health and Morbidity Survey (2016) reported that the prevalence of stunting below 5 years old had increased from 2015 (17.7%) to 2016 (20.7%).

Women who were stunted during childhood have higher tendency to have stunted offspring which lead to an intergenerational cycle of having low socioeconomic status and the cycle may continue from generation to the next generation (Martorell & Zongrone, 2012). Children who experience retarded growth have increased risk of morbidity and mortality as well as decreased function of the nervous system (Prendergast & Humphrey, 2014). There are several factors that can influence stunting which are anaemic mother, improper sanitation and hygiene, demographic and socio-economic, household food security, parental feeding practices, and children dietary diversity (World Health Organisation, 2013; M'Kaibi et al., 2017; Ali Naser et al., 2014; Ban et al., 2017; Deshmukh et al., 2013; Yalew, 2014; Ogechi & Chilezie, 2017).

2.2 Demographic and socio-economic factors with stunting

2.2.1 Age

Van Stuijvenberg et al. (2015) reported that there was an inverse association between age of child and stunting where 5 years old children (r= -0.207; *P*=0.011) have a higher prevalence of stunting (49%) than 3 years old children (22.6%). A cross-sectional study was conducted among 410 children aged 6 to 59 months and the study reported that children in the age group of 24-59 months had higher chances to be stunted compared to children in the age group of 6-24 months (Abeway, Gebremichael, Murugan, Assefa, & Adinew, 2018). Significant association between age of child in months with stunting was found ($p<0.001$) and younger children were less likely to be stunted compare to older children in Nepal with a mean age of 30 months (Bhattarai, 2016). This could be due to the fact that stunting is a chronic malnutrition and commonly expressed after lack of nutrients in a long-term.

A study involved 1320 children aged 6 to 59 months in Libo-Kemekem reported that age was correlated with stunting as children age 13-24 months were 2.07 times more likely to be stunted compared to 6-12 months [AOR–2.07, 95%CI:(1.34, 3.18)]. Unhygienic preparation of complementary food also can cause stunting as the food had been exposed to bacteria and lead to infections. Besides, consumption of unclean water can also lead to stunting as children will have diarrheal for a long term and cause loss of many nutrient in the body (Geberselassie, Abebe, Melsew, Mutuku, & Wassie, 2018). Breastfeeding was found to exert protective effects since many children were breastfeed more than 1 year and it reduce

the risk of young children being stunted compared to older children. (Chirande et al., 2015).

2.2.2 Sex

Culture or traditional norms play an important role in the prevalence of stunting between female and male children. Attention and care given to female children were different compared to male children in certain cultures (Ado, Region, Demissie, & Worku, 2013; Akombi et al., 2017). Community that used favouritism towards daughter also can lead to higher dietary intake of female children compared to male children (Chirande et al., 2015). This was supported by a cross-sectional study conducted in Ethiopia which the prevalence of stunting in that male children (25.5%) have a higher prevalence of stunting compared to female children (21.8%) (Yalew, 2014).

Male children have been shown to be more vulnerable to health inequalities compared to female children (Raphael, Funke, Segun, Foluke, 2011; Ado et al., 2013). Males tend to have weaker immune system and susceptible to infection, however as they grow older, males achieved similar immunization level as females. As male began to mobile, they tend to contribute higher energy expenditure compared to female (Geik, Sedek, & Awang, 2016a).

However, the National Health and Morbidity Survey (2015) reported that female children (14.1%) have higher prevalence of stunting compared to male children (12.7%). Several studies reported that male children were more likely to consume more meals in a day compared to female children (Bork & Diallo, 2017; Wamani, Åstrøm, Peterson, Tumwine, & Tylleskär, 2007).

2.2.3 Household size

Larger household size contributes to higher reduction of resources in a household which can lead to the introduction of poverty. Higher household size was associated with higher prevalence of childhood stunting ($p<0.01$) (Darapheak, Takano, Kizuki, Nakamura, & Seino, 2013; van Stuijvenberg et al., 2015). A study also reported that children with household size ranged five to seven [AOR = 2.97, 95% CI: 1.41, 6.29] and eight to ten family members [Adjusted Odds Ratio (AOR) = 4.44, 95% CI: 1.65, 11.95] were more likely to be stunted compared to children with households size of less than 4 family members (Fikadu et al., 2014).

Children of mothers who gave birth to one child were less likely to be stunted compared to children from mothers who gave birth to more than four children (Geberselassie et al., 2018). Families with more children are more stretched economically and cannot feed themselves well and face difficulty in providing the proper and nutritious food for their child's physical development. Competition for available food also will occur between the siblings as some of food is limited (Fikadu et al., 2014).

2.2.4 Parents education level

Parents play an important roles in educate and be a good role model to their children. A study showed that education level of mother was associated with nutritional status of children as 40% of children in Kenya were stunted (Abuya, Ciera & Kimani-Murage, 2012). Data from 573 children and mothers were collected in Indonesia and most of the mothers have higher education (86.4%). Significant association between education level of mother and stunting was found (p=0.008). Mothers with higher education level usually have higher knowledge and ability to shape the patterns of child care and better in selection of healthy food (Handayani, Siagian, & Aritonang, 2017).

Parents with lower educational level tend to have low income as well as inadequate of individual care. Mothers frequently provide and serve food to their children and by having higher education level, mothers will be more conscious with health of their children. A study was conducted in Gua Musang, Kelantan which participated by 256 aboriginal pre-schoolers aged one to six years old reported that significant association between father's educational level with stunting was not found (p=0.174) meanwhile significant association between mother's educational level with stunting was found (p<0.001) . Education level of mothers plays a crucial role because educated mother will utilise available food sources wisely and help family in generating more income (Geik, Sedek, & Awang, 2016b) .

2.3 Household food security

Household food security is defined as the ability to access quality and quantity of food which meets the nutritional requirements of family members in a household (Saaka & Osman, 2013). A study by Ali et al. (2013) showed that household food insecurity was significantly correlated with stunting in 3 countries which are Bangladesh ($p<0.001$), Ethiopia ($p<0.001$), and Vietnam ($p<0.001$). In Ethiopia, access to food can be affected by seasonal changes which long rainy season can affect the production of plants and lead to inadequate amount of food consumed in a household.

A cross-sectional study by Saaka and Osman (2013) also reported that food insecure households have more stunted children compared to food secure households and children in food secure households were protected as much as 46% from having chronic malnutrition(OR=0.54,95%CI:0.31–0.94). However, a study reported that food security was not significantly associated with stunting as food security was not the only factors that can cause malnutrition but it is also related with hygiene and sanitation, unclean water and improper care (Kaibi, Steyn, Ochola, & Plessis, 2016).

2.4 Parental feeding practices

Parents manage and control their children's food intake especially young children as well as play a crucial role in monitoring children's eating habit, food preferences and weight status (Carper, Fisher & Birch, 2000; Schwartz, Scholtens, Lalanne, Weenen & Nicklaus, 2011). There were 6136 children aged 0 to 3 years old from China participated in this study which determine the effect of parental who migrate from rural to urban on nutritional status. Ban et al. (2017) showed that there was an association between children cared by fathers with stunting where the prevalence of stunting increased as much as 60% compared to children cared by mothers (OR = 1.60, 1.26–2.01). This might be related to better intake of fortified food and increased milk consumption by the children.

Besides, children cared by father or grandparents had shorter breastfeeding periods and less likely to receive age-appropriate breastfeeding compared to children cared by mother (Ban et al., 2017). In attempt to influence the amount of their children food consumption, reward, threat and forced compliance were not been practiced by Mexican American mothers because they frequently offer their children food (Cullen, 2000). This shows that different culture have different feeding practices.

2.5 Child dietary diversity

Intake of different types of food groups is very important for children as they need an adequate amount of nutrients for growth. A study reported that children with higher dietary diversity score were less likely to be stunted (OR: 0.89; 95% CI=0.80–0.98) as high consumption of fish (p=0.003), spices (p=0.04) and meat or poultry (p=0.04) can reduce the risk of stunting (Mahmudiono et al., 2017). Darapheak et al., (2013) reported that food high in protein can help children to have a better growth. Consumption of milk is important for children as calcium is essential for the formation and strengthening of bone.

There was a significant difference between the consumption of milk between stunted and non-stunted children where stunted children have a lower intake of calcium compared to stunted children (van Stuijvenberg et al., 2015). There were 182 caregivers and school-age children were participated in this study and school feeding programme were conducted in two public schools in Ghana. School feeding meals that provide vegetables as well as legumes may have the potential of increasing dietary diversity scores among children especially when the food was absent in their diet (Owusu et al., 2017)

CHAPTER 3

METHODOLOGY

3.1 Study design

This was a cross-sectional study to determine the associations of demographic and socio-economic factors, household food security, parental feeding practices and dietary diversity with height-for-age among pre-schoolers in Tabika KEMAS, Putrajaya.

3.2 Study location

This study was conducted in the Federal Territory of Putrajaya which is located 25km from Kuala Lumpur and 20km to the Kuala Lumpur International Airport (KLIA) (Perbadanan Putrajaya, 2014). As the New Federal Government Administrative Centre, Putrajaya is consisted of 4931 hectares of land with a total population of 90,000 people in 2017 (Perbadanan Putrajaya, 2014). There are 19 kindergartens (Taman Bimbingan Kanak-Kanak (TABIKA)) managed by Jabatan

Kemajuan Masyarakat in Putrajaya and the estimated total number of pre-schoolers is 475.

3.3 Sample size

The sample size in this study was determined using the formula by Hulley, Cummings, Browne, Grady and Newman (2013);

$$N = [(Z_\alpha + Z_\beta)/C]^2 + 3$$

$$C = 0.5 * \ln [(1+r)/1-r)]$$

The standard normal deviate for $\alpha = Z_\alpha = 1.645$

The standard normal deviate for $\beta = Z_\beta = 1.282$

r = (0.23) (Gray, Cossman, & Powers, 2006); the correlation between household food security with stunting

Based on the sample size calculation in Table 3.1 (Appendix 1); the highest sample size was 159.

Adjust for the estimated sample design effect:

DEFF = 1.3

n*DEFF

= 159 x 1.3

= 207

Another 10% was added to the sample size to account for misreporting of information. Hence, a total number of 228 respondents were required in this study.

3.4 Respondents

The subjects of this study were pre-schoolers. The inclusion and exclusion criteria for pre-schoolers selected into this study;

Inclusion criteria	Exclusion criteria
Malaysian	Non-Malaysian
Aged 4 to 6 years old	Have physical disability and chronic disease
Female or male	

3.5 Sampling design

The study was conducted in Putrajaya which has 19 kindergartens (Tabika KEMAS). The number of children in each kindergarten was 25 to 35 persons. Five kindergartens were purposely given permission by the Jabatan Kemajuan Masyarakat (KEMAS), Putrajaya to conduct this research. All children who met the inclusion criteria were invited to participate in the study.

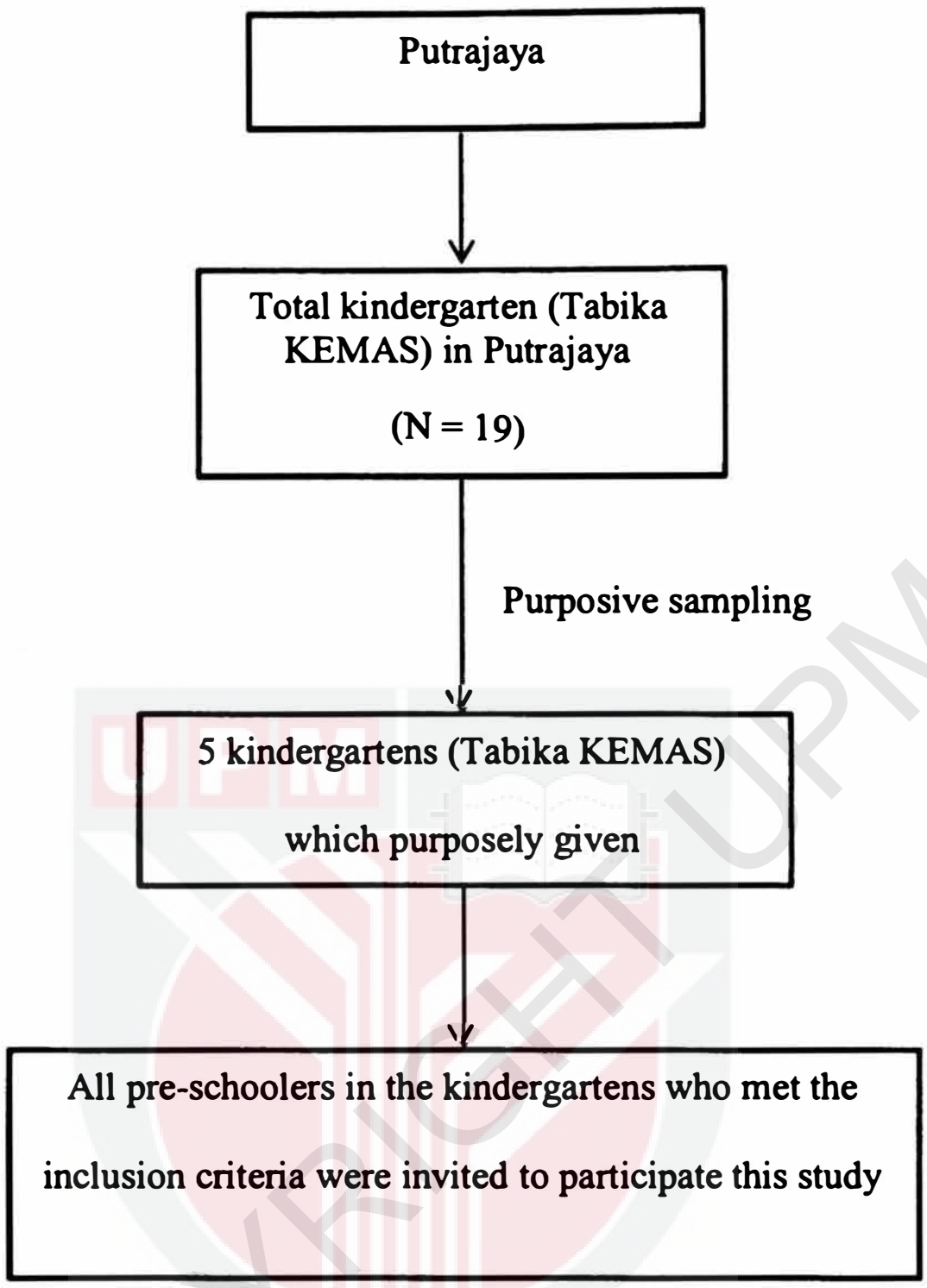

Figure 3.1: Sampling Design

3.6 Measurements

Parents or caregivers answered a self-administered questionnaire that consisted of demographic and socio-economic factors, household food security, parental feeding practices and dietary diversity. Weight and height of children were measured by the researcher at the kindergartens.

3.6.1 Demographic and socio-economic factors

Parents or caregivers of pre-schoolers provided the information on respondent's sex, age, parental education level and income, household income and household size.

3.6.2 Household food security

Household food security was measured using Radimer/Cornell hunger and food insecurity instrument by Radimer, Olson, and Campbell (1990). The Cronbach's alpha of the instrument was 0.8 and all 10 items from the instruments were answered by mothers (Shariff & Khor, 2005). Firstly, items number one to four indicate household-level items. Secondly, items number five to eight indicate adult-level items. Lastly, items number nine to ten indicate child-level items. Positive answer whether "sometimes true" or "often true" while negative answer is "not true". Table 3.2 shows that classification of individuals by severity of food insecurity.

Table 3.2: Classification of individuals by severity of food insecurity

Status	Description
Food secure	Negative answer to all hunger and food insecurity items
Household food insecurity	Positive answers to one or more item (1-4)
Individual food security	Positive answers to one or more item (5-8)
Child hunger	Positive answers to items (9-10)

3.6.3 Parental feeding practices

The child feeding questionnaire (CFQ) by Birch et al. (2001) was used to measure parental feeding practices. The instrument consisted of 7 factors with 31 items and the Cronbach's alpha for seven factors were above 0.70 (Birch et al., 2001). However, this study only utilise 3 factors which were monitoring, pressure to eat and restriction. Monitoring involved parents monitoring child's eating (3 items). Pressure involved parents pressuring their children to consume more food at meals (4 items) and restriction involved parents restricting child's access to foods (8 items). A 5-point Likert-type scale from "disagree (1)" to "agree (5)" was used to assess restriction and pressure while "never (1)" to "always (5)" was used to assess monitoring. The mean score for each factor was calculated by adding the scores for each factor and divide it with total number of items within the factor. The range of possible mean was from 1 to 5 (Mohd Nasir et al., 2012).

3.6.4 Child dietary diversity

The adapted version of Food Agriculture Organization Diet Diversity Questionnaire was used to measure child dietary diversity (Kennedy, Ballard, & Dop, 2011). Parents or caregivers reported the frequency of food groups or sub-food groups taken by their children for the past 7 days including inside and outside the home. There were 15 food groups and it grouped into 7 main food groups which were cereal and grains, vitamin A rich vegetable and fruits (vegetable and tuber and green leafy vegetable), other vegetable and fruits, flesh foods (meat, poultry, fish, internal organs), eggs, nuts and legumes, and milk and milk products. Food group taken less than 3 times in the past 7 days was given "0" score while food group taken 3 times or more was given "1" score. The total dietary diversity score ranged from 0 to 7 (WHO, UNICEF, IFPRI, UC Davis, USAID, FANTA, 2008).

Dietary diversity score were divided into 2 groups which were low (consumed less 4 food groups in the past 7 days) and high (consumed equal or more than 4 food groups in the past 7 days) dietary diversity score. Oil and fats, malt drinks, coffee or tea, sweets, and processed food were not included in the dietary diversity score as these food groups were provided in questionnaire as place to mark these foods (FAO & FHI 360, 2016).

3.6.5 Anthropometric measurements:

Respondent's height were measured using SECA stadiometer meanwhile, TANITA digital weighing scale were used to measure body weight. Height was recorded to the nearest 0.1 cm and weight to the nearest 0.1 kg. Height and weight of respondent were taken twice and calibration of instrument was done daily. Height-for-age of respondent was classified based on WHO Child Growth Standard (2006) and WHO Reference (2007). Table 3.4 shows the classification of height-for-age.

Table 3.3: Classification of height-for-age

Z-score	Height-for-age
>+ 2SD	High
≤ + 2SD to ≥ - 2SD	Normal
< -2SD	Moderate stunting
< -3SD	Severe stunting

3.7 Pre-testing

A pre-testing of self-administered questionnaire was conducted on parents or caregivers of 10 pre-schoolers who met the criteria of this study. The pre-test was conducted to identify the understanding of parents or caregivers in answering the questionnaire and time needed by the parents or caregivers to answer the full set of questionnaire. Modification of questionnaire was done to ensure the questionnaire was understood by parents of caregivers during data collection.

3.8 Study approval

Approval of this study was obtained from Universiti Ethics Committee for Research Involving Humans, Universiti Putra Malaysia (UPM) and Jabatan Kemajuan Masyarakat (KEMAS), Kementerian Pembangunan Luar Bandar. Permission from respective preschools also was obtained before the study was conducted.

3.9 **Data collection**

Before the data collection, consent form and information sheet was given to the parents or caregivers through preschool teachers. Data collection was conducted from February 2019 to April 2019. Parents were given the questionnaire and 2 days were allocated for parents to answer the questionnaire. Measurement of height and weight of children were conducted during the visit on the day of data collection.

3.10 **Data analysis**

Data were analysed using IBM SPSS version 22.0 software. The level of statistical analysis was set at $p<0.05$. For continuous variables, the results were presented as mean and standard deviation while categorical variables as frequencies and percentage. Chi-square test was used to test association between categorical variables, whereas Pearson correlation was used to test association between continuous variables.

CHAPTER 4

RESULT AND DISCUSSION

4.1 Demographic and socio-economic factors:

Table 4.1 shows the demographic and socio-economic factors of preschoolers in Tabika Kemas. A total of 207 preschoolers (49.3% boys and 50.7% girls) with a mean age of 4.68±0.64 participated in this study. Almost half of the preschoolers (48.8%) aged 5 years old, whereas (41.5%) aged 4 years old and (9.7%) aged 6 years old. The mean of household size was 4.66±1.36, where almost half of the preschoolers (48.3%) have equal or less than 4 family members. More than half of the mothers (69.6%) completed college or university level whereas 30.4% of the mothers completed secondary school. Fathers that completed college or university (58.9%) have a higher percentage than fathers that completed secondary school (41.1%). Mean income of mothers was RM 275.42±1291.90 while mean income of fathers was RM 2588.84±1218.21. The mean of household income was RM 4854.71±1776.93) and M40 (69.1%) category has the highest percentage compared to B40 (26.6%) and T20 (4.3%) category.

Table 4.1: Demographic and socio-economic factors of pre-schoolers in Tabika Kemas (n=207)

Variables	n (%)	Mean ± SD
Children		
Sex		
Male	102 (49.3)	
Female	105 (50.7)	
Age		4.68 ± 0.64
4 years old	86 (41.5)	
5 years old	101 (48.8)	
6 years old	20 (9.7)	
Household size		4.66 ± 1.36
< 4	100 (48.3)	
5 - 6	93 (44.9)	
> 7	14 (6.8)	
Parents		
Education level of mothers		
Secondary school	63 (30.4)	
College / University	144 (69.6)	
Education level of fathers		
Secondary school	84 (41.1)	
College / University	122 (58.9)	
Income of mothers (RM)		2275.42 ± 1291.90
Income of fathers (RM)		2588.84 ± 1218.21
Household income (RM)[a]		4854.71 ± 1776.93
B40	55 (26.6)	
M40	143 (69.1)	
T20	9 (4.3)	

[a] Household income (B40: <RM3860.00, M40: RM3860-RM8319.00, T20: >RM8319.00)

4.2 Household food security

As shown in Table 4.2, pre-schoolers were categorised into one of four food insecure categories using the Radimer/Cornell measures. A total of 109 pre-schoolers (52.7%) were categorised as household food insecure where these households unsure about their capability to obtain sufficient food meanwhile almost quarter of pre-schoolers (22.7%) were categorised as food secure. 32 pre-schoolers (15.5%) were in individual food insecure category meanwhile 19 pre-schoolers (9.2%) were categorised as child hunger where this is the most severe level of food security. Similarly, Ali Naser et al.(2014) and Pei, Appannah, and Sulaiman, (2018) reported that households categorised as household insecure (29.6% and 29.3% respectively) have a higher percentage than households categorised as individual food insecure (19.3% and 23.4% respectively). The percentage of child hunger category from previous studies also were higher (35% and 30.2%) than the percentage of child hunger category (9.2%) in this study (Ali Naser et al., 2014; Pei, Appannah, & Sulaiman, 2018).

Table 4.2: Prevalence of household food insecurity (n=207)

Variables	n (%)
Food secure	47 (22.7)
Household food insecure	109 (52.7)
Individual food insecure	32 (15.5)
Child hunger	19 (9.2)

4.3 Parental feeding practices

As shown in Table 4.3, the mean restriction factors was 3.74±0.54. More than half of mothers agreed that children should not eat too many sweets (72.5%) and high-fat foods (56.5%). Many mothers (36.7%) were neutral on restricting children from eat too much of his/her favourite foods. More than quarter of mothers disagreed that they intentionally keep some foods out of children's reach (25.1%) and offer sweets as a reward for good behavior (27.5%) meanwhile 30.9% of mothers agreed that children should be offered their favourite foods in exchange of good behavior. Majority of the mothers agreed that by not guiding or regulating child's eating, he/she would eat too many snacks (62.8%) and favourite foods (42.4%). Mohd Nasir et al. (2012) reported that the mean restriction was 3.68±0.57.

Table 4.3: Distribution of mothers according to response to each item related to restriction factor (n=207)

No	Statements	Disagree	Slightly disagree	Neutral	Slightly agree	Agree
		n (%)	n (%)	n (%)	n (%)	n (%)
Restriction factor						
1	I have to be sure that my child does not eat too many sweets	1(0.5)	0(0)	32(15.5)	24(11.6)	150(72.5)
2	I have to be sure that my child does not eat too many high-fat foods	1(0.5)	3(1.4)	48(23.2)	38(18.4)	117(56.5)
3	I have to be sure that my child does not eat too much of her favourite foods	3(1.4)	28(13.5)	76(36.7)	42(20.3)	58(28.0)
4	I intentionally keep some foods out of my child's reach	32(15.5)	52(25.1)	39(18.8)	36(17.4)	48(23.2)
5	I offer sweets to my child as a reward for good behaviour	57(27.5)	47(22.7)	56(27.1)	37(17.9)	10(4.8)
6	I offer my child her favourite foods in exchange for good behaviour	9(4.3)	18(8.7)	59(28.5)	64(30.9)	57(27.5)
7	If I did not guide or regulate my child's eating, she would eat too many junk foods	5(2.4)	9(4.3)	25(12.1)	38(18.4)	130(62.8)
8	If I did not guide or regulate my child's eating, she would eat too much of her favourite foods	7(3.4)	18(8.7)	43(20.8)	51(24.6)	88(42.5)
	Mean ± SD			3.74 ± 0.54		

Scoring: Disagree=1, slightly disagree=2, neutral=3, slightly agree=4, agree=5

As shown in Table 4.4, the mean of pressure factors was 3.98±0.67. More than half of the mothers agreed that children should always eat all of the food on their plate (62.3%) and mothers agreed to make sure the children eat enough (71.5%). Most of the mothers were neutral in trying to get their children to eat even though they are not hungry (32.9%). Almost half of the mothers agreed that children will eat lesser than they should if mothers not guide or regulate children's eating (35.3%). Mohd Nasir et al. (2012) reported that the mean pressure factor was 3.95±0.75.

Table 4.4: Distribution of mothers according to response to each item related to pressure factor (n=207)

No	Statements	Disagree	Slightly disagree	Neutral	Slightly agree	Agree
		n (%)	n (%)	n (%)	n (%)	n (%)
	Pressure factor					
1	My child should always eat all of the food on her plate	2(1.0)	8(3.9)	39(18.8)	29(14.0)	129(62.3)
2	I have to be especially careful to make sure my child eats enough	0(0)	1(0.5)	28(13.5)	30(14.5)	148(71.5)
3	If my child says "I'm not hungry", I try to get her to eat anyway	19(9.2)	31(15.0)	68(32.9)	54(26.1)	35(16.9)
4	If I did not guide or regulate my child's eating, she would eat much less then she should	10(4.8)	16(7.7)	58(28.0)	50(24.2)	73(35.3)
	Mean ± SD			3.98 ± 0.67		

Scoring: Disagree=1, slightly disagree=2, neutral=3, slightly agree=4, agree=5

As shown in Table 4.5, the mean of monitoring factors was 3.89±0.82. Almost half of the mothers occasionally kept track of sweets (43.5%) that their children ate. More than quarter of mothers mostly kept track of snack food (34.3%) and high-fat foods (32.9%) that their children ate. Mohd Nasir et al. (2012) reported that the mean was 3.82±0.83.

Table 4.5: Distribution of mothers according to response to each item related to monitoring factor (n–207)

No	Statements	Never n(%)	Rarely n(%)	Someti-mes n(%)	Mostly n(%)	Always n(%)
Monitoring factor						
1	How much do you keep track of the sweets?	13 (6.3)	36 (17.4)	90 (43.5)	68 (32.9)	68 (32.9)
2	How much do you keep track of the snack food?	1(0.5)	18(8.7)	54 (26.1)	71 (34.3)	63 (30.4)
3	How much do you keep track of the high-fat foods that your child eats?	3(1.4)	18(8.7)	58 (28.0)	68 (32.9)	60 (29.0)
	Mean ± SD			3.89 ± 0.82		

Scoring: Never=1, rarely=2, sometimes=3, mostly=4, always=5

4.4 Children dietary diversity

Table 4.6 shows the mean of dietary diversity score was 5.45±1.20. More than three quarters of pre-schoolers were classified in high dietary diversity score category (93.2%) while less than one quarter of pre-schoolers were classified in low dietary diversity score category (6.8%). Food group score of cereals and grains had the highest mean (0.97±0.15) and it followed by mean of flesh foods food group (0.91±0.28). Vegetable and fruits that rich in vitamin A had higher mean (0.87 ±0.32) compared to mean of other vegetable and fruits food group (0.79 ±0.40). Food group score of nuts and legumes food group (0.30±0.46) had the lowest mean among the 7 main food groups.

Khor, Tan, Tan, Chan, and Amarra (2016) reported that 78% of children in Kuala Lumpur and Putrajaya consumed more than 4 food groups within a week. This is supported by Bong, Norimah and Ismail (2018) which 76% of Penan children in Sarawak consumed 4 or more food groups in a week. These shows that consistent results was found in two different areas where many children consumed 4 or more food groups within a week.

Table 4.6: Food group score of pre-schoolers in Tabika Kemas (n–207)

	n (%)	Mean ± SD
Dietary diversity score (DDS)		5.45 ± 1.20
Low (< 4)	14 (6.8)	
High (4-7)	193 (93.2)	
Food group score (FGS)		
Cereal and grains		0.97 ±0.15
Vitamin A-rich fruits and vegetable		0.87 ±0.32
Other fruits and vegetables		0.79 ±0.40
Flesh foods (internal organs, meat, poultry, and fish)		0.91 ±0.28
Eggs		0.71 ±0.45
Nuts and legumes		0.30 ±0.46
Milk and milk products		0.86 ±0.33
Oil and fats*		0.68 ±0.46
Malt drinks*		0.76 ±0.42
Processed food*		0.53 ±0.50
Sweets*		0.82 ±0.37
Coffee/tea*		0.30 ±0.46

DDS: Sum of food group score (possible DDS= 0-7)

Possible FGS= 0-1

*Not included in DDS

4.5 Body weight status

As shown in table 4.7, the mean weight of the total pre-schoolers was 17.35±3.25 kg where mean weight of boys was 17.54±3.15 kg and mean weight of girls was 17.18±3.36 kg. The mean height of the total pre-schoolers was 107.06± 6.30cm where mean height of boys and girls were 107.78±6.48cm and 106.37±6.07cm respectively. The mean weight-for-age was -0.64±1.22 SD which 25 pre-schoolers (12.1%) were categorised as underweight, meanwhile 5 pre-schoolers (2.4%) were categorised as overweight. NHMS (2015) reported similar result where the prevalence of underweight and obesity for weight-for-age less than 5 years old were 12.4% and 4.0%.

The mean height-for-age was -0.74±1.09 SD, in which 22 pre-schoolers (10.6%) were categorised as stunted. NHMS (2015) reported that prevalence of stunting and tall for height-for-age under 5 years old were 17.7% and 4.3%. Poh et al. (2013) also reported that prevalence of stunting among children 4 to 7 years old in urban and rural area were 9.9% and 10.8% respectively. Prevalence of stunting (76.2%) among aboriginal pre-schoolers from Gua Musang, Kelantan was higher compared to prevalence of stunting (10.6%) in this current study. This might due to poverty, geographical settlements and remain of food taboos within the aborigines' family (Geik, Sedek, & Awang, 2016c).

The mean BMI-for-age was -0.511±1.185 SD, in which 18 (8.7%) were categorised as wasting or thinness meanwhile 4 pre-schoolers (2.4%) were categorised as overweight or obesity. Fauzi and Mohd Zulkefli (2017) reported that prevalence of underweight and obese for BMI-for-age of pre-schoolers in Putrajaya were 12.9% and 7.3% which both show higher prevalence compared to prevalence of thinness (8.7%) and overweight/obesity (2.4%) of this study. NHMS (2015) also reported that prevalence of thinness and obesity for BMI-for-age less than 5 years old was 8.1% and 7.6%.

Table 4.7: Nutritional status of pre-schoolers in Tabika Kemas.

Anthropometric measurements	Mean ± SD		
	Boys (n=102)	Girls (n=105)	Total (n=207)
Weight (kg)	17.54±3.15	17.18±3.36	17.35±3.25
Height (cm)	107.78±6.48	106.37±6.07	107.06±6.30
Weight-for-age (WAZ)[a b]	-0.77±1.09	-0.72±1.20	-0.64±1.22
-age(z-score value)[a]	-0.72±1.20	-0.57±1.25	-0.74±1.09
MI-for-age (BAZ)[a b]	-0.61±1.14	-0.42±1.23	-0.51±1.18
	n (%)		
	Boys (n=102)	Girls (n=105)	Total (n=207)
Weight-for-age (WAZ)[a b]			
Underweight (<-2SD)	14 (13.7)	11 (10.5)	25 (12.1)
Normal (≥-2SD to ≤+2SD)	86 (84.3)	91 (86.6)	177 (85.5)
Overweight (>+2SD)	2 (2.0)	3 (2.9)	5 (2.4)
Height-for-age(z-score value)[a b]			
High (>+2SD)	0 (0)	2 (1.9)	2 (1.0)
Normal (≥-2SD to ≤+2SD)	92 (90.2)	91 (86.7)	183 (88.4)
Stunted (<-2SD)	10 (9.8)	12 (11.4)	22 (10.6)
BMI-for-age (BAZ)[a b]			
Wasting/ Thinness (<-2SD)	8 (7.8)	10 (9.5)	18 (8.7)
Normal (≥-2SD to ≤+2SD)	93 (91.2)	92 (87.6)	185 (89.4)
Overweight/Obesity (>+2SD)	1 (1.0)	3 (2.9)	4 (1.9)

[a] WHO Child Growth Standards (2006) for children ≤ 5 years old of age
[b] WHO Growth Reference (2007) for children > 5 years old of age
Hypothesis testing

4.6 Association between demographic and socio-economic factors and height-for-age among pre-schoolers.

As shown in Table 4.8, there was no significant association between sex (X^2=0.144, p=0.705) and height-for-age of pre-schoolers. This is supported by previous studies which showed there was no significant association between sex and height-for-age among children less than 5 years old (Ying Gan, Fatihah Murtaza, Sulaiman, & Mohd Shariff, 2018; El Kishawi, Soo, Abed, & Muda, 2017). However, there was a study reported that sex was associated with stunting which male children had higher tendency to stunting compared to female children. This might due to male children were more physically active than female children which lead to higher expenditure of energy in large amount (Akombi et al., 2017).

Based Table 4.8, mother's education level (X^2=0.409, p=0.523) was not significantly associated with height-for-age. This finding is well supported by Kaibi, Steyn, Ochola, and Plessis (2016) which also showed that no significant association was found between mother education level and stunting. In contrast, Sedek et al. (2016) reported that education level of mothers was significantly associated with stunting since belief, culture and knowledge related to food can influence women's perception in choosing healthy and unhealthy food to their children.

This analysis did not show any significant association between education level of father and height-for-age (X^2=0.0001, p=0.988). Similar finding was reported in previous study which found no significant association between education

level of father and stunting (Sedek et al., 2016). However, previous studies reported that the higher the education level of father, the greater the reduction in the risk of children stunting (Hossain and Khan , 2018; Semba et al., 2008).

There was no significant association between household size and height-for-age (X^2= 0.466, p=0.792). The finding is in line with previous findings which significant association between household size and stunting was not found (Owusu et al., 2017, Geik et al., 2016a). In contrast, Geberselassie et al.(2018) showed bigger family size were likely to have stunted children compared to smaller family size. Shortage for household consumption can occur within family with more children as well as having difficulty in supply enough nutrition requirements.

According to Table 4.8, it was found there was no significant association between household income with height-for-age (X^2 =0.363, p=0.834), on the other hand Gan et al.(2018) found that household income was significantly associated with stunting. Purchasing power of nutritious foods for their children was reflected by household income (Geik et al., 2016). Eating low quality food, reducing portion size of food and reducing frequency of meals taken are the coping strategies of family with low household income which can lead to nutritional status problem within long term (Shahraki, Amirkhizi, Amirkhizi, & Hamedi, 2016).

Table 4.8: Association between demographic and socio-economic factors and household food security with height-for-age.

Variables	Height-for-age		X^2	*p value*
	Normal (n= 185) n(%)	Stunted (n=22) n(%)		
Sex			0.144	0.705
Male	92 (49.7)	10 (43.5)		
Female	93 (50.3)	12 (56.5)		
Mother education level			0.409	0.523
Secondary school	55 (29.7)	8 (36.4)		
University/college	130 (70.3)	14 (63.6)		
Father education level			0.0001	0.988
Secondary school	76 (41.1)	9 (40.9)		
University/college	109 (58.9)	13 (59.1)		
Household size			0.466	0.792
≤ 4	88 (47.6)	12 (54.5)		
5 - 6	84 (45.4)	9 (40.9)		
–	13 (7.0)	1 (4.6)		
Household income [a]			0.363	0.834
B40	48 (26.0)	7 (31.8)		
M40	129 (69.7)	14 (63.6)		
T20	8 (4.3)	1 (4.6)		

[a] Household income (B40: <RM3860.00, M40: RM3860-RM8319.00, T20: >RM8319.00)

Based on Table 4.9, there was no significant association between age and height-for-age (r=0.042, p=0.549). This finding was consistent with previous studies that had been conducted in Kelantan and Negeri Sembilan, Malaysia (Geik et al., 2016; Gan et al., 2018). However, few studies in Southern Ethiopia reported significant association between age with stunting as older children have higher tendency to be stunted compared to younger age group (Tariku, Abebe, Melketsedik, & Gutema, 2018; Lisanu Mazengia & Andargie Biks, 2018).

According to Table 4.9, income of mother was not significantly associated with height-for-age (r=0.127, p=0.068). Inconsistent finding was found by Handayani, Siagian, and Aritonang (2017) which the needs of primary and secondary children can be met as adequate income can support the development of children. Kamiya et al. (2018) reported that mothers with independent income were more likely to spend money on their child's well-being.

This analysis did not show significant association between income of father with height-for-age (r=-0.420, p=0.550). This is supported by previous study where significant association between income of father and height-for-age was not found among preschool children. This might due to fathers tend to spend more money for house and family necessity instead of provide and prepare nutritious food to children and mostly mothers will be the person who buy groceries and prepare food for the children (Balogun and Yakubu, 2015).

Table 4.9: Pearson correlation between age and income of mother and father with height-for-age.

Variables	Height-for-age	
	r	*p value*
Age	0.042	0.549
Income of mother	0.127	0.068
Income of father	-0.420	0.550

4.7 Association between household food security levels and height-for-age among pre-schoolers.

Based on Table 4.10, there was no significant association between household food security level and height-for-age (p=0.288). This finding is in line with previous findings which having adequate nutrition only is insufficient and non-food factors such as hygiene and sanitation, unclean water and improper care also important to prevent malnutrition (Kaibi et al., 2016; Owusu et al., 2017). However, there were few studies reported that children from food insecure households were more likely to be stunted compared to children from food secure households (Tiwari, Ausman, & Agho, 2014; Agho et al., 2019). Skipping meals, having lack of nutritious food and reduce the meals taken to meet the dietary needs of family members can be led by food insecurity (Mutisya, Kandala, Ngware, & Kabiru, 2015).

Table 4.10: Association between household food security and height-for-age.

Variables	Height-for-age		X^2	*p value*
	Normal (n= 185) n(%)	Stunted (n=22) n(%)		
Household food security level				0.288[a]
Food secure	40 (21.6)	7 (31.8)		
Food insecure	145 (78.4)	15 (68.2)		

[a] Fisher's Exact Test

4.8 Association between parental feeding practices and height-for-age

According to Table 4.11, there was no significant association between restriction (r=0.026, p=0.714), pressure (r=-0.099, p=0.158) and monitoring (r=0.082, p=0.239) factors with height-for-age. Parents play important roles in ensuring their children consume enough nutritious food. Restriction, pressure and monitoring from parents are crucial in order to maintain or reduce child's weight and prevent overweight or obesity. However, there was no study investigating association between parental feeding practices with height-for-age as many previous studies focusing parental feeding practices with body mass index (Birch et al., 2001)

Table 4.11: Association between parental feeding practices and height-for-age.

Variables	Height-for-age	
	r	*p value*
Parental feeding practices		
Restriction	0.026	0.714
Pressure	-0.099	0.158
Monitoring	0.082	0.239

4.9 Association between dietary diversity and height-for-age

Based on Table 4.12, there was no significant association between dietary diversity and height-for-age (r = -.0043, p=0.538). In contrast with earlier finding, Agho et al.(2019) explained that parents simply feed their children with one kind of food as they lack of knowledge or consciousness related to balanced diets. The study also explained that products of agricultural were sold for better income rather than feeding their children with these nutritious foods. Kaibi et al.(2016) reported that higher dietary diversity can lead to lower stunting levels as it meets the nutritional requirement for growth. Lack of protein intake especially from animal protein can increase the risk of micronutrient deficiency and stunting (Chua et al., 2012).

Table 4.12: Association between dietary diversity with height-for-age.

Variables	Height-for-age	
	r	*p value*
Dietary diversity score	-0.043	0.538

CHAPTER 5

CONCLUSION, LIMITATIONS AND RECOMMENDATIONS

5.1 Conclusion

This cross-sectional study was conducted among pre-schoolers in Tabika KEMAS, Putrajaya. There were 207 pre-schoolers who were Malaysian and aged 4 to 6 years old from 5 Tabika Kemas from Putrajaya involved in this study. This study was conducted to determine the factors associated with height-for-age among pre-schoolers in Tabika Kemas, Putrajaya. Demographic and socio-economic factors, household food security, parental feeding practices, and dietary diversity of pre-schoolers were determined. This study also determined the prevalence of stunting among pre-schoolers. The association of demographic and socio-economic factors, household food security, parental feeding practices, dietary diversity with height-for-age among pre-schoolers were determined.

The prevalence of household food insecurity was the highest (52.7%) compared to child hunger (9.2%) and individual food insecurity (15.5%). Pressure factor of parental feeding practices had the highest mean (3.98±0.67) compared to restriction (3.74±0.54) and monitoring factor (3.89±0.82). This study showed that the

mean of dietary diversity score was 5.45±1.20 which 6.8% were categorised as low dietary diversity score while 93.2% were categorised as high dietary diversity score. The present study showed that the prevalence of stunting (10.6%) was higher compared to the prevalence of overweight (2.4%) among pre-schoolers in Tabika Kemas, Putrajaya.

This study also showed that there was no significant association between demographic and socio-economic factors, household food security level, parental feeding practices, and dietary diversity with height-for-age.

5.2 Limitations

There are several limitations in this study which must be acknowledged. First, sample in this study only involved pre-schoolers in Tabika Kemas, Putrajaya. The results cannot be generalised to all Malaysian pre-schoolers. Different pre-schools have different environment as well as different types of food serve during school sessions. This can influence the dietary diversity findings as different types of food will be eaten by pre-schoolers.

Second, causal relationship between demographic and socio-economic factors, household food security levels, parental feeding practices, dietary diversity and height-for-age cannot be established since cross-sectional study was implemented in this study. Third, there was high risk of being over-reporting or

under-reporting as parents were not aware of child's food consumption during school session. Parents tend to answer questionnaire related to dietary diversity by assuming the menu and preferences of their child. Parents have difficulties in remembering the type of foods that had been consumed by their children for the past 7 days. This also can lead to over-reporting or under-reporting on child's food consumption.

Fourth, researcher gets less cooperation from parents since the questionnaire was redundant with other researchers. Some of the questionnaire was given to parents who already participate with other researchers' study. Therefore, few preschools had been added to get enough sample size.

5.3 Recommendations

The prevalence of childhood stunting was rising and it occurs in every state in Malaysia. This current study only involved pre-schoolers from Tabika Kemas in Putrajaya. Therefore, samples from other types of preschools from other states should be included in future study. This is to make sure the findings can be generalised to larger population of pre-schoolers in Malaysia. Preschool administration should involve in this study by providing monthly menu during school session to parents to prevent over-reporting or under-reporting of dietary diversity questionnaire as parents may not aware of children's food consumption during school session. List of available preschools also should be taken earlier from agencies or government that manage the approval for preschools to prevent redundant with other researchers study.

Future study should include face-to-face interview with parents for 24 hour re-call for dietary diversity questionnaire to prevent misreporting of food consumption of children. Campaign on buying affordable, safe and nutritious food should be uplifted by government to give awareness among parents to provide their children variety and nutritious food. Health practitioners also should take an action by conducting health promotion and nutrition programs to parents and children regarding malnutrition and its factors.

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APPENDICES

APPENDIC A

Table 3.1 : Sample size calculation

Variables	Correlation, r	Sample size calculation
Household size (Marjan, Mohd Nasir, & Siong, 1998)	-0.26	$C = 0.5 \times \frac{1+(-0.26)}{1-(-0.26)}$ n = 124
Children dietary diversity (Steyn, Nel, Nantel, Kennedy, & Labadarios, 2006)	0.23	$C = 0.5 \times \frac{1+(0.23)}{1-(0.23)}$ n = 159
Household food security (Gray et al., 2006)	0.23	$C = 0.5 \times \frac{1+(0.23)}{1-(0.23)}$ n = 159

APPENDIX B

QUESTIONNAIRE

No Rujukan

UNIVERSITI PUTRA MALAYSIA

BERILMU BERTAKTI

JABATAN PEMAKANAN DAN DIETETIK

FAKULTI PERUBATAN DAN SAINS KESIHATAN

UNIVERSITI PUTRA MALAYSIA

BORANG SOAL SELIDIK

FAKTOR-FAKTOR YANG MEMPENGARUHI KEBANTUTAN DI KALANGAN KANAK-KANAK PRASEKOLAH DI TABIKA KEMAS, PUTRAJAYA

Penyelidik :

Nurul Madihah binti Hasni

Diselia oleh :

Prof. Dr. Zalilah Mohd Shariff

Nota :

Segala maklumat yang diberikan adalah sulit dan hanya untuk kegunaan penyelidikan sahaja. Kejujuran dan keikhlasan responden dalam memberikan maklumat amatlah diharapkan. Segala kerjasama dari pihak responden amat dihargai dan didahului dengan ucapan terima kasih.

BAHAGIAN A : Faktor demografi dan socioekonomi

1. Tarikh lahir anak (hh/bb/tttt) : ___/___/_____
2. Jantina anak : Lelaki / Perempuan
3. Bilangan ahli keluarga : _____

Kenyataan	Maklumat ibu	Maklumat bapa
Peringkat pendidikan	Tiada pendidikan formal Sekolah rendah Sekolah menengah Universiti/kolej	Tiada pendidikan formal Sekolah rendah Sekolah menengah Universiti/kolej
Pendapatan individu (bulanan)	RM_____	RM_____
Pendapatan isi rumah (bulanan)	RM_____	

BAHAGIAN B : Tiada Jaminan Kedapatan Makanan (Radimer et al., 1990)

Arahan: Bagi tiap-tiap soalan, anda perlu memilih salah satu yang berikut:

1. Tidak betul atau tidak pernah terjadi
2. Kadangkala betul atau kadangkala pernah terjadi
3. Selalu terjadi atau selalu betul

Item	Soalan	1	2	3
1	Saya risau sekiranya makanan atau bahan-bahan mentah untuk dimasak habis sebelum saya sempat mendapatkan bekalan yang lain			
2	Makanan atau bahan-bahan mentah untuk dimasak bagi ahli keluarga saya di rumah selalu cepat habis dan saya tidak mempunyai keupayaan untuk mendapatkan makanan lagi			
3	Saya tidak mempunyai makanan atau bahan-bahan mentah yang cukup untuk dimasak atau disediakan sebagai sajian makanan keluarga (untuk makan pagi, tengahari atau malam) dan saya tidak mempunyai keupayaan untuk menyediakan barang makanan tersebut			
4	Kami sekeluarga makan makanan/lauk yang sama untuk beberapa hari berturut-turut kerana kami hanya mempunyai sedikit sahaja makanan dan kami tidak berupaya untuk menyediakan makanan tersebut.			
5	Saya selalu berasa lapar tetapi saya tidak makan kerana tidak mempunyai keupayaan untuk mendapatkan makanan			
6	Saya hanya makan sedikit sahaja daripada apa yang sepatutnya saya makan kerana saya tidak berupaya untuk mendapatkan makanan			
7	Saya tidak mampu untuk makan dengan kenyang			

	atau makan dengan puas kerana saya tidak mempunyai keupayaan untuk mendapatkan makanan			
8	Saya tidak berupaya memberi sajian makanan yang seimbang kepada anak-anak saya kerana saya tidak mempunyai keupayaan untuk menyediakan makanan tersebut			
9	Anak-anak saya tidak makan dengan cukup atau sentiasa kekurangan makanan kerana saya tidak mampu untuk mendapatkan makanan yang cukup			
10	Saya tahu anak-anak saya kadangkala berasa lapar tetapi saya tidak boleh berbuat apa-apa kerana saya tidak mempunyai keupayaan untuk mendapatkan makanan berlebihan daripada apa yang selalu saya dapat.			

BAHAGIAN C : Praktis Pemakanan Kanak-Kanak (Birch et al., 2001)

Dengan menggunakan skala di bawah, sila bulatkan satu nombor yang paling bertepatan dengan jawapan anda bagi setiap soalan. Sila jawab tentang anak anda yang terlibat dengan penyelidikan kami.

Soalan	Tidak setuju	Kurang setuju	Neutral	Sedikit setuju	Setuju
Saya mesti pastikan anak saya tidak makan terlalu banyak manisa (contoh: gula-gula, air gas, donut).	1	2	3	4	5
Saya mesti pastikan anak saya tidak makan terlalu banyak makanan tinggi lemak.	1	2	3	4	5
Saya mesti pastikan anak saya tidak makan terlalu banyak makanan kegemarannya.	1	2	3	4	5
Saya sengaja menyimpan sebahagian makanan jauh dari anak saya.	1	2	3	4	5

Saya menawarkan manisan (contoh: gula-gula, air gas, donut) kepada anak saya sebagai hadiah berkelakuan baik.	1	2	3	4	5
Saya menawarkan makanan kegemaran anak saya kepadanya sebagai balasan berkelakuan baik	1	2	3	4	5
Jika saya tidak memberikan panduan atau mengawal pemakanan anak saya, dia akan makan terlalu banyak makanan tidak berkhasiat	1	2	3	4	5
Jika saya tidak memberi panduan atau mengawal pemakanan anak saya, dia akan makan terlalu banyak makanan kegemarannya.	1	2	3	4	5
Anak saya perlu menghabiskan makanan di dalam pinggannya	1	2	3	4	5
Saya perlu lebih berhati-hati untuk memastikan anak saya makan secukupnya.	1	2	3	4	5
Saya cuba untuk menyuruh anak saya makan walaupun dia tidak lapar.	1	2	3	4	5
Jika saya tidak memberi panduan atau mengawal pemakanan anak saya, dia akan makan kurang dari yang sepatutnya	1	2	3	4	5
	Tidak pernah	Sekali sekala	Kadang kala	Agak selalu	Selalu
Setakat mana anda mengawasi pengambilan manisan (contoh: gula-gula, air gas, donut) oleh anak anda ?	1	2	3	4	5
Setakat mana anda mengawasi pengambilan makanan ringan (kentang goreng, keropok, karipap) oleh anak anda ?	1	2	3	4	5
Setakat mana anda mengawasi pengambilan makanan berlemak tinggi oleh anak anda ?	1	2	3	4	5

BAHAGIAN D : Skor Kepelbagaian Diet (FAO, 2008)

Arahan : Sila nyatakan kekerapan anak anda makan makanan berikut selama 7 hari yang lepas (di rumah/ luar rumah)

No. soalan	Kumpulan makanan	Contoh	Kekerapan (kali)		
			Sehari	Seminggu	Tidak pernah
1	Bijirin dan hasil bijirin	Beras biasa, beras pulut, pulut, mee kuning, mee hoon, kueh teow, mee segera, jagung, roti putih, roti canai, roti manis, bijirin sarapan pagi (nestum, oats, cornflakes), lempeng, emping			
2	Sayur dan ubi-ubian yang kaya dengan vitamin A	Labu, lobak merah, ubi keledek, tomato, cili dan sayuran tempatan lain yang kaya dengan vitamin A			
3	Sayuran berubi dan berakar putih	Ubi kentang, ubi kayu, ubi wau, ubi takup, ubi sual, lobak putih			
4	Sayuran berdaun hijau	Bayam, sawi, kangkung, kalian, pucuk ubi kayu, pucuk paku			
5	Sayuran biasa	Kobis, kobis bunga, brokoli, bendi, taugeh, kacang panjang/buncis, terung, timun, peria, jantung pisang, jering, petai, cendawan sisir, umbut pisang			
6	Buah kaya vitamin A	Mangga, bacang, kuinin, betik, durian, nangka, cempedak, oren, limau kasturi/purut			
7	Buah-buah lain	Ciku, duku, langsat, manggis, pulasan, mata kucing, rambutan, pisang, belimbing, jambu batu, jambu air, tembikai, tembikai susu, pir, epal, isi kelapa			
8	Organ dalaman	Hati, ginjal, peparu, limpa dan organ dalaman yang lain atau daging			

	(sumber besi)	berdarah			
9	Daging	Lembu, kambing, ayam, itik, arnab, rusa			
10	Telur	Telur puyuh, ayam, labi-labi, telur masin,			
11	Ikan atau makanan laut	Ikan sungai atau ikan laut, ketam, sotong, udang, lala, kerang, ikan kering masin, dalam tin (sardin), ikan bilis			
12	Kekacang, kacang dan biji-bijian	Kuaci, kacang tanah, kacang hijau, biji cempedak, biji nangka, mentega kacang			
13	Susu dan hasil tenusu	Susu : susu segar, UHT, tepung			
		Hasil tenusu : Keju, dadih			
14	Minyak dan lemak	Minyak, lemak, mentega, margerin, santan yang ditambah semasa masakan			
15	Minuman malt	Milo, Vico, Ovaltine, Horlicks			
16	Makanan segera	Nugget, bebola ikan/ayam/ketam/udang, keropok lekor, keropok, satey, hotdog			
17	Manisan	Gula : gula putiih, gula merah, kabung, madu			
		Minuman : minuman bergas, minuman kotak, sirap cordial			
		Sapuan coklat : coklat, gula-gula, jam, kaya			
		Susu tin : pekat dan cair			
18	Minuman panas	Teh (hitam/herba/hijau), kopi			

BAHAGIAN E : Ukuran Antropometri (Diisi oleh penyelidik)

Tarikh ukuran diambil : ___/___/_____

Status berat badan	Ukuran
Berat (kg)	1. 2. Purata :
Tinggi (cm)	1 2. Purata :
Body mass index (BMI)(kgm^{-1})	

-SOALAN BERAKHIR-

Terima kasih atas kerjasama anda

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

Research title	:	**Factors Associated with Stunting Among pre-Schoolers in Tabika KEMAS, Putrajaya**
Study Site	:	**Tabika KEMAS, Putrajaya**
JKEUPM Ref No.	:	**JKEUPM-2019-057**
Researcher	:	**Nurul Madihah binti Hasni**
Supervisor	:	**Prof. Dr. Zalilah binti Mohd Shariff**

Documents received and reviewed with reference to the above study:

1. Ethics Application Form, Version 1 dated 11/2/2019
2. Respondent Information Sheet & Consent (Malay), Version 1 dated 11/2/2019
3. Proposal (English), Version 1 dated 11/2/2019
4. Questionnaires/ Interviews (Malay), Version 1 dated 11/2/2019
5. Curriculum Vitae of:
    a. Prof. Dr. Zalilah binti Mohd Shariff

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 5 MARCH 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.

III. Applicable for Clinical Trial Studies and Clinical interventional Studies only: Progress Report has to be submitted to JKEUPM at every 6 months from the date of approval (Form 3.1). Report occurrences of all Serious Adverse Events (SAEs), Suspected Unexpected Serious Adverse Reaction (SUSARs) and Protocol Deviation/ Violation at all JKEUPM approved sites to JKEUPM.

APPENDIX D

PERMISSION LETTER

IBU PEJABAT
JABATAN KEMAJUAN MASYARAKAT (KEMAS)
KEMENTERIAN PEMBANGUNAN LUAR BANDAR
Aras 5-9
No. 47, Persiaran Perdana, Presint 4
Pusat Pentadbiran Kerajaan Persekutuan
62100 PUTRAJAYA

Telefon : 03 - 8891 2612
Faks : 03 - 8889 2296
Laman Web : www.kemas.gov.my

Ruj.Kami : KEMAS.BPAK 620-02/01/01 Jld 12 (27
Tarikh : 28 Februari 2019
: 22 Jamadil Akhir 1440H

Dr. Nurzalinda binti Zalbahar,
Jabatan Pemakanan Dan Dietetik,
Universiti Putra Malaysia,
43400 UPM Serdang,
Selangor Darul Ehsan

Tuan / Puan,

PERMOHONAN KEBENARAN UNTUK MENJALANKAN KAJIAN DI TABIKA DAN TASKA KEMAS SEKITAR PUTRAJAYA

Dengan hormatnya saya merujuk kepada perkara di atas adalah berkaitan.

2. Sukacita dimaklumkan bahawa Bahagian Pendidikan Awal Kanak-kanak, Ibu Pejabat KEMAS bersetuju dengan permohonan di atas bagi tujuan menjalankan kajian bermula **Januari 2019 hingga April 2019** dengan mematuhi peraturan berikut :

i. Mendapat kebenaran daripada KEMAS di peringkat Ibu Pejabat, Negeri dan Daerah yang terlibat sebelum kajian bermula;
ii. Tidak melanggar dasar dan peraturan yang telah ditetapkan oleh Kerajaan dan jabatan;
iii. Mendapat kebenaran daripada ibu bapa/ penjaga kanak-kanak yang terlibat (sekiranya melibatkan kanak-kanak);
iv. Memelihara tatasusila/ tingkah laku/ imej yang sopan sepanjang kajian dilaksanakan;
v. Mematuhi segala peraturan dan displin sepanjang tempoh kajian;
vi. Tidak menyentuh isu-isu sensitif seperti agama, perkauman dan politik atau imej jabatan dalam kajian yang dijalankan;
vii. Tidak mengganggu proses pengajaran dan pembelajaran serta jadual harian kanak-kanak di Tabika KEMAS;

..2/-

APPENDIX E

INFORMATION SHEET AND CONSENT FROM

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

Faktor-faktor yang mempengaruhi kebantutan di kalangan kanak-kanak prasekolah di Tabika KEMAS, Putrajaya.

2. PENGENALAN

Kanak-kanak yang terbantut adalah kanak-kanak yang lebih rendah berbanding ketinggian yang sepatutnya. Kebantutan telah mempengaruhi satu dalam empat kanak-kanak berumur 5 tahun ke bawah. Kanak-kanak memerlukan pemakanan yang mencukupi untuk pembesaran fizikal dan mental secara optimum terutama 2 tahun yang pertama. Kadar kebantutan di Malaysia meningkat daripada 17.0% pada 2006 kepada 20.7% pada 2016. Kebantutan juga akan memberi kesan pendek dan panjang kepada kanak-kanak yang terbantut seperti mudah untuk mendapat jangkitan, pembetukan kognitif yang lemah dan mempunyai ketinggian yang rendah setelah dewasa.

Oleh itu, tujuan kajian ini dijalankan adalah untuk menentukan faktor-faktor yang mempengaruhi kebantutan di kalangan kanak-kanak prasekolah di Tabika KEMAS, Putrajaya. Kajian ini merupakan Projek Ilmiah Tahun Akhir untuk pelajar Bacelor Sains (Pemakanan dan Kesihatan Komuniti), Universiti Putra Malaysia dan telah diluluskan oleh Jawatankuasa Etika Universiti untuk Penyelidikan Melibatkan Manusia Universiti Putra Malaysia.

3. APAKAH YANG PERLU ANDA LAKUKAN?

Anak/jagaan tuan/puan perlu mendapatkan kebenaran daripada tuan/puan sebelum mengambil bahagian dalam penyelidikan ini. Kajian ini memerlukan tuan/puan untuk menjawab satu set borang soal selidik dan anak/jagaan tuan/puan akan diukur tinggi dan berat badan oleh penyelidik. Kedua-dua proses ini akan mengambil masa kurang daripada 30 minit.

Borang soal selidik ini mengandungi 5 bahagian. Bahagian (A= Demografi dan socioekonomi, B= Tiada Jaminan Kedapatan Makanan, C= Praktis Pemakanan Kanak-Kanak, D= Skor Kepelbagaian Diet) perlu dilengkapkan oleh tuan/puan(penjaga responden) manakala, bahagian E=Ukuran Antropometri (berat badan dan tinggi responden) akan dilengkapkan oleh penyelidik.

4. SIAPA YANG TIDAK BOLEH MENYERTAI KAJIAN INI?

Anak/jagaan tuan/puan tidak dibenarkan untuk menyertai kajian ini sekiranya mereka bukan warganegara, tidak hadir semasa pengumpulan data atau menghidapi penyakit kronik dan mengalami kecacatan.

5. APAKAH FAEDAH MENYERTAI KAJIAN INI?

a) KEPADA ANAK/JAGAAN SAYA SEBAGAI PESERTA?

Faedah yang akan diperolehi dengan menyertai kajian ini adalah tuan/puan dapat mengetahui berat badan dan tinggi anak/jagaan. Setelah selesai menyiapkan borang soal selidik dan ukuran berat badan dan tinggi diambil, anak/jagaan tuan/puan akan mendapat token sebagai tanda penghargaan melibatkan diri dalam kajian ini.

b) KEPADA PENYELIDIK?

Faedah yang akan diperolehi sebagai penyelidik adalah dapat mengetahui kadar kebantutan di kalangan kanak-kanak Tabika KEMAS, Putrajaya. Penyelidik juga dapat mengetahui faktor-faktor yang mempengaruhi kebantutan di kalangan kanak-kanak Tabika KEMAS, Putrajaya.

6. ADAKAH IA BERISIKO?

Anak/jagaan tuan/puan yang melibatkan diri dalam kajian ini tidak akan menghadapi sebarang risiko dan tidak mengalami kemudaratan. Untuk makluman, penyertaan di dalam kajian ini adalah secara sukarela dan sebarang penarikan diri daripada kajian ini adalah hak anak/jagaan tuan/puan dan boleh dilakukan pada bila-bila masa.

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

Ya, segala maklumat yang diberikan adalah sulit, tidak akan didedahkan kepada umum dan digunakan untuk tujuan penyelidikan sahaja. Maklumat lengkap mengenai keputusan soal selidik hanya akan diberikan di atas permintaan responden atau ibubapa/penjaga.

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

Jika terdapat sebarang pertanyaan berkaitan penyelidikan ini, sila hubungi saya, Nurul Madihah Binti Hasni di talian 019-5669700 atau email: madihahhasni@gmail.com atau penyelia kajian saya, Prof.Dr. Zalilah Mohd Shariff di talian 03-89472472 atau email: zalilahms@upm.edu.my

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

4. SIAPA YANG TIDAK BOLEH MENYERTAI KAJIAN INI?

Anak/jagaan tuan/puan tidak dibenarkan untuk menyertai kajian ini sekiranya mereka bukan warganegara, tidak hadir semasa pengumpulan data atau menghidapi penyakit kronik dan mengalami kecacatan.

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