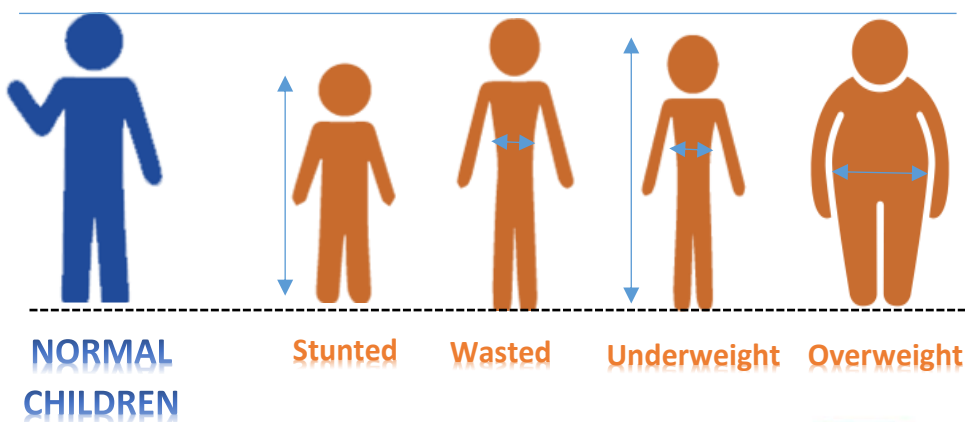




POSSIBLE RISK FACTOR FOR MALNOURISHED CHILDREN UNDER FIVE YEARS OLD IN PUTRAJAYA

[NMRR-18-847-41455]



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Case-Control Study for Malnutrition Among Children Under Five Years Old in Putrajaya
2018/2019

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Competing interests

The authors declare that they have no competing interest.

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Executive Summary

The prevalence of malnutrition among children under age of five in Malaysia was increasing, especially for stunted. State level analysis recorded Putrajaya as one of the highest in the prevalence of malnutrition. This case-control study was designed to determine the factors associated with malnutrition among under five years old children in Putrajaya. This study was conducted from October 2018 until January 2019 in Putrajaya. Total of 8261 children were screened for their weight and height in pre-schools and health clinics to identified case (stunted, wasted, underweight and overweight) and control. At the end of data collection, the study successfully recruited 386 respondents for stunted, 335 respondents for wasted, 364 respondents for underweight and 211 respondents for overweight. The same number for control group which was normal children also being recruited by matching according to sex and age group with the case group. Multiple logistic regression analysis found mother with height less than 150cm, mother with height between 150cm to less than 160cm, father with height less than 160m, Bottom 40% (B40) and Middle 40% (M40) for household income, Intrauterine Growth Restriction (IUGR) and hypertension, pre-term, low birth weight infant, use of bottle feeding, use of pacifier and the protein intake less than Recommended Nutrient Intake (RNI) were the factors associated with stunted for under five years old children in Putrajaya. For wasted, the analysis found primary and secondary education level of the mother and father, father work with private sector, B40 and M40 for household income, low birth weight infant, anaemic children, use of pacifier, do not meet RNI recommendation for protein and screen time more than 60 minutes per day were factors that associated with wasted. Meanwhile, overweight/obese father, mother with pre-pregnancy BMI in overweight/obese and age of stop breastfeeding is within 6 to 14 months were found as factor that less likely associated with wasted with the adjusted odd ratio less than 1. Analysis for underweight found mother who work in private sector, threshold household monthly income B40, mother age during pregnancy more than 30 years old, low birth weight, anaemic children and use of pacifier were factors contribute to underweight. Parental overweight/obese also less likely associated with underweight with the adjusted odd ratio less than 1. Overweight or obese father, gestational diabetes, antenatal visit less than 9 times, and number of siblings less than 4 found as a factor contributed to overweight among children under five years old in Putrajaya. As a conclusion, this study successfully identified several factors that contributed to malnutrition in Putrajaya. Among the identified factors, income, low birth weight, use of pacifier and protein intake less than RNI were highlighted as cross-over factor that associated with the three type of malnutrition (stunted, wasted and underweight).

Table of Summary Results

Summary factors associated with malnutrition (stunted, wasted, underweight & overweight) among children aged below five years old in Putrajaya

Stunted			Wasted			Underweight			Overweight		
Variable		aOR	Variable		aOR	Variable		aOR	Variable		aOR
Mother's height	<150cm	5.99*	Father's BMI	18.5-24.9kgm ⁻²	1	Mother's BMI	18.5-24.9kgm ⁻²	1	Father's BMI	18.5-24.9kgm ⁻²	1
	150 - 159.9cm	1.73*		≥25.0kgm ⁻²	0.60*		≥25.0kgm ⁻²	0.60*		≥25.0kgm ⁻²	1.88*
	≥160cm	1	Mother's education	Pri- & secondary	1.85*	Father's BMI	18.5-24.9kgm ⁻²	1	Pregnancy complication	None	1
Father's height	≤159.9cm	1.95*		Tertiary	1		≥25.0kgm ⁻²	0.57*		GDM	2.93*
Threshold HH income	B40	4.17*	Father's education	Pri- & secondary	1.72*	Mother's occupation	Private servant	2.43*	No. antenatal visit	<9	3.33*
	M40	4.06*		Tertiary	1		Not working	1		9-14	1
	T20	1	Father's occupation	Gov. servant	1	Threshold HH income	B40	2.94*	No. of siblings	1 – 3	2.10*
Pregnancy complication	None	1		Private servant	1.56*		T20	1		4 and above	1
	IUGR & HPT	10.60*	Threshold HH income	B40	3.38*	Mother age at pregnancy	18 - 30 years old	1			
	Delivery status	Term		1	M40		3.29*	Birth weight status			
Pre-term		2.15*		Pre-pregnancy BMI	T20	1	Normal				
Birth weight status	Normal	1	Birth weight status		18.5-24.9kgm ⁻²	1	Child anaemic status	Low birth weight	3.12*		
	Low	2.05*		Normal	1	Normal		1			
Use of bottle feeding	Yes	1.63*	Birth weight status	≥25.0kgm ⁻²	0.57*	Use of pacifier	Yes	1.79*			
	No	1		Low	2.69*		No	1			
Use of pacifier	Yes	3.75*	Child anaemic status	Normal	1						
	No	1		Anaemic	1.55*						
RNI for protein/day	Meet	1	Age stop breastfeeding	6-24 month	0.52*						
	Do not meet	3.30*		>24 month	1						
			Use of pacifier	Yes	2.14*						
				No	1						
			RNI for protein/day	Meet	1						
Do not meet	3.81*										
Screen time in a day	<60 minutes	1									
	≥60 minutes	2.74*									

*significant for multiple logistic regression

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1.0 INTRODUCTION

Malnutrition is defined as inadequacy, deficiency, excess or imbalances in calorie and/or nutrient intake.¹ It consists of under- or overnutrition. Undernutrition is defined as inadequate and/or unbalanced intake and/or absorption of micro- or macronutrients that in turn leads to nutritional deficiency.² Meanwhile, overnutrition is a form of malnutrition, in which the intake of nutrients is oversupplied. In other word, the amount of nutrient intake exceeds the amount required for normal growth, development, and metabolism.³ The existence of both under- and over-nutrition concurrently in a population is recognised as a “nutrition transition”. This term is used to explain the changes in diet, physical activity, health, and nutrition. It has been linked also to a process of rapid economic development, urbanization, and overall modernization in low- and middle-income countries.⁴

Undernutrition is clearly a major contributing factor to child death, illness, and disability. It deteriorates children’s health, particularly by reducing body resistance and increase infections.⁵ Undernutrition among children has been mostly associated with higher family food insecurity, low quality of complementary foods and high burdens of intestinal parasitic and other infections, poor socio-economic background, low birth weight (LBW) and intra-uterine growth retardation (related to maternal malnutrition), and has persisted despite improvement in economic conditions over recent years.⁶ Undernutrition among children composed of stunting, wasting and underweight.⁷ Overweight is defined as abnormal or excessive fat accumulation that presents a risk to health and are likely to stay obese into adulthood and develop non-communicable diseases like diabetes, cardiovascular diseases, and some cancers at a younger age.⁸ Overweight in children was significantly associated with male gender, parental obesity, parental educational level, mother’s history of gestational diabetes, high birth weight, less hours of physical activity per day, urban residence, motorized transportation, and eating food not prepared at home.⁹

Stunting, also known as linear growth failure, is defined as the inability to attain potential height for a particular age, and it is the most common measurement used to identify chronic malnutrition.¹⁰ Stunting is determined using height or length measurement relative to the child’s age. Children are considered as stunted if their height or length-for-age is below -2 SDs of the WHO Child Growth Standards median, and those below -3 SDs are considered as severely stunted.¹¹ The global prevalence of stunting was 22% (151 million children) in 2017. About 50% of the stunted children came from South Asia.¹² Stunted has been pointed as one of the six targets in Global Nutrition Target 2025, which aims to reduce 40% in the number of children under-5 who are stunted.¹³ In Malaysia, the prevalence of stunted was observed to have and had increased from 16.6% in 2011 to 20.7% in 2016, based on the National Health and Morbidity Survey for the respective years.^{14,15}

Wasted is another type of under-nutrition. It is categorised as acute malnutrition. This acute malnutrition is frequently seen in poor countries, and in highly infectious-disease environments.¹⁰ Wasting is usually caused by a recent illness or food shortage that lead to acute and severe weight loss, although chronic undernutrition or illness can also cause this condition.¹⁶ The weight-for-length/height or BMI-for-age charts can help to identify children who are wasted or severely wasted. Children are wasted if their weight-for-length/height or BMI-for-age is below -2 SDs of the WHO Child Growth Standards median, and those below -3 SDs are considered as severely wasted.¹¹ Globally, more children under five years of age are

stunted than wasted, but children are more likely to die from being wasted than stunted.¹⁰ Based on the current prevalence of wasted which is 7.8%, it will require a near 40% reduction in order to achieve the target of 5% by 2025.¹³ In Malaysia, the prevalence of wasting among under five years old was reduced from 12.4% in 2011 to 11.5% in 2016.^{14,15}

Underweight is the situation when body weight relatively low to the child's age. Based on WHO Child Growth Standards median, weight-for-age below -2 SDs and below -3 SDs are considered as underweight and severely underweight, respectively.¹¹ Because weight is relatively easily measured, this indicator is commonly used, but it cannot be relied upon in situations where the child's age cannot be accurately determined, such as refugee situations. Furthermore, children who have low weight for age (underweight) can reflect 'wasting' indicating acute weight loss, or 'stunting', or both.¹⁶ Globally, the prevalence of underweight was projected to decline from 26.5% in 1990 to 17.6% in 2015.¹⁷ In Malaysia, the prevalence of underweight increased from 11.6% in 2011 to 13.7% in 2016.^{14,15}

The use of BMI, calculated as weight (in kg) divided by squared height (in m), as a measure of overweight and obesity for children is a fairly recent development.¹⁸ The WHO has generated two references of BMI: the WHO Child Growth Standards 2006 for children under five years of age and the WHO Child Growth Standards 2007 for children 5 to 19 years. According to these references, for children under five years, BMI-for-age above +2SDs scores are considered as overweight and above +3SD as obese.¹¹ The worldwide prevalence of childhood overweight and obesity increased from 4.2% in 1990 to 6.7% in 2010.^{19,20} In Malaysia, the prevalence of overweight among children under five years old was 6.1% in 2011 and increased to 6.4% in 2016.^{14,15}

National Health and Morbidity Survey (NHMS) is a nationwide cross-sectional study that is carried out yearly. Latest data on nutrition status under five years old was in NHMS 2016 where the scope was on Maternal and Child Health (MCH). Finding from NHMS 2016 found Putrajaya, which is the administrative capital of Malaysia, recorded one of the fourth highest prevalence for stunted children under five years old in the country with 24.3%. Meanwhile the prevalence of wasted, underweight and overweight among children under five years in Putrajaya were 8.7%, 12.9% and 4.5% respectively.¹⁵

Federal Territory of Putrajaya was located at West Coast of Peninsula Malaysia was the administrative capital of Malaysia. Putrajaya was established in 1995 and granted as federal territory in 1 February 2001 had rapid increased in their population. According to Department Statistic of Malaysia, there was about 30,000 residents in Putrajaya in 2007 and the number increased to 90,000 in 2018. Currently, there were about 16,000 children under five years old living in Putrajaya.²¹

Surprisingly, behind of the well-built city of Putrajaya, one out of four children under five years old in Putrajaya was stunted and make Putrajaya one of the highest prevalence in this country. Even though, the population in Putrajaya mostly work as government servant and the facilities in the area among the best in this county, level of nutritional status of them under five years old children was doubted.

This malnutrition issue among children under five years old have been highlighted in the cabinet meeting. From the meeting, top management requested to the Ministry of Health to conduct a comprehensive study to find out the factors contribute to childhood malnutrition

in Putrajaya. Knowing the factors associated with malnutrition in children can shed light on how health care services should be fairly distributed in the community. Therefore, this study conducted with aimed to identify the associated factors to all four categories of malnutrition which is underweight, stunting, wasting and overweight among children aged below five years old in WP Putrajaya.

Associated risk factors to childhood malnutrition have been compiled from several previous local and international studies and it were tabulated in table 1²²⁻²⁶. Based on this table, four main factors were associated with childhood malnutrition which were parental factor, children factor, food intake factor and environmental factor. Aspects from this table was used in this study to identify factors associated to childhood malnutrition in Putrajaya.

2.0 OBJECTIVES

There objectives of this study were:

1. To determine the factors associated with stunting among children aged 6 to 59 months in Putrajaya.
2. To determine the factors associated with wasting among children aged 6 to 59 months in Putrajaya.
3. To determine the factors associated with underweight among children aged 6 to 59 months in Putrajaya.
4. To determine the factors associated with overweight among children aged 6 to 59 months in Putrajaya.

Table 1. Factors associated with malnutrition among children

Identified risk factors*	Stunted	Wasted	Underweight	Overweight
Parental factor				
Maternal height	√			
Maternal underweight		√	√	
Family history of obesity				√
Lower education	√	√	√	
Working mother				√
Low household income		√	√	
Higher household income				√
Pre-pregnancy BMI>25kgm ⁻² & GDM				√
Children factor				
Low birth weight	√	√	√	
High birth weight				√
Male in gender	√	√		
Delayed initiation	√			
More than 4 siblings	√			
Frequent illness (monthly)	√	√	√	
Worm infection	√	√	√	
Anaemia		√	√	
Rapid weight gain under 1 year				√
First born child in family				√
Food intake factor				
Non-exclusive breastfeeding	√	√	√	
Early cessation breastfeeding	√	√	√	√
Complementary feeding not at 6 months of age	√	√	√	√
Received bottle feeding		√	√	√
Using pacifier		√	√	
Infrequent & inadequate feeding	√	√	√	
High calorie and sugar intake				√
Low dietary diversity	√			√
Food insecurity	√	√	√	
Environmental factor				
Inadequate child stimulation and activity	√	√	√	√
Poor care practice	√	√	√	√
Screen time more than 2 hours				√
Long sleep duration				√

*Adapted from: 1. Childhood Stunting-Context, cause and consequences WHO framework 2013 2. UNICEF Conceptual Framework of Malnutrition

3.0 METHODOLOGY

Study Design

This was a case-control study to identify factor associated to malnutrition in Putrajaya. Four cases were form, which was stunted (height-for-age <-2SDs), wasted (BMI-for-age <-2SDs), underweight (weight-for-age <-2SDs) and overweight (BMI-for-age >2SDs) children. The control group was the normal children with all indicator is between 2SDs to -2SDs. The ratio of case and control in this study was 1 to 1.

Study Location

This study was conducted from September 2018 to January 2019 in Putrajaya. It involved 2 phases. Phase I (screening; 12 September - 12 October 2018) was conducted in preschools and all four government health clinics in Putrajaya. Phase II (interview with caregivers; 16 October 2018 - 31 January 2019) was conducted in respondent's house or respondent's office or public area or where ever comfortable for the caregivers.

Study Population

Children aged 6 to 59 months of age, Malaysia citizen and living in Putrajaya for at least for 6 months were the inclusion criteria for being a respondent. The exclusion criteria for this study were children who mentally or physically disabled, ill at the time of data collection and children with chronic disease that make them unable to take part in this study.

Sample Size Estimation

Sample size of this study was calculated based on the objectives which is to identify the associated factors to stunting, wasting, underweight and overweight among under five years old children. Sample size calculation carried out using the formula for comparing two proportions in PS software according to identified risk factors based from NHMS 2016 and other previous studies with α (type 1 error) equal to 0.05, β (power) equal to 0.80 and 1 to 1 ratio for case and control group. From the calculation, the minimum sample size for stunted, wasted, underweight and overweight were 380, 335, 318, and 308 respectively. As ratio 1 to 1 was applied in this study, number control respondents were recruited same as sample size calculated for each case.

Respondent Recruitment

Cases and control children were selected from the phase I result. Data from phase I were divided into 5 datasets (stunted, wasted, underweight, overweight & normal). Random between function in excel was used for randomly select number of case respondent needed. Selected case then tabulated by sex and age group (6 – 11 months, 12 – 35 months and 36 – 59 months). The same function in excel was applied in normal dataset to randomly select control respondent by matching with sex and age group. Ethical approval of the study was obtained from Medical Research Ethic Committee (MREC), Ministry of Health Malaysia (NMRR-18-847-41455). All participated respondent signed the consent form prior to the study.

Questionnaires and Tools

Four instruments were used in this study, which were a set of questionnaires in tablet, anthropometric measurement, finger prick for hemoglobin levels, and three days food diary.

The questionnaire in tablet consists of seven modules which ask about sociodemographic and socioeconomic characteristics, health and medical history of the respondent and his or her mother, knowledge and practice of parents or caregivers towards child's feeding, dietary behavior of the children, infant and young child feeding (IYCF) history, food insecurity security (Radimer/Cornell hunger and food security instrument) and screen time/physical activity. All the questions used were validated in previous study.

Weight and height were measured using Tanita Personal scale HD 319 and SECA Stadiometer 213 for the children and their parents or caregiver. The value of the measurement was rounded to the nearest 0.1 kg for weight and 0.1 cm for height. For baby or children who cannot stand properly, their weight was measured using SECA 354 digital baby scale and length using SECA 210 mobile baby measuring mat.

As anemia is one of the risk factors of undernourished children (wasting, stunting and wasting) and not overweight children, this study only measured hemoglobin level of undernourished children and respective control group. Hemoglobin levels of children were tested from finger prick blood sample on portable HemoCue analyser (HemoCue® Hb 201). Anemia in children was defined by hemoglobin concentration less than 11.0 g/dl as suggested by WHO.²⁷

The three days food diary (two days in weekday and one day in weekend) of children was completed by the parent and caregiver. For children who go to preschool, their teachers were responsible to record the food intake in the food diary. The feedback inside the food diary was probed by the interviewer before sent to the data entry team. Total energy and nutrient intakes were calculated by NutritionistPro software by the data entry team.

All data except for three-day food diary was collected by face to face interview or measured using the tools and the answers directly entered into the tablet. Designed application for all questionnaires and measurements ~~was~~ were created by Survey Creating System (SCS), Institute for Public Health. The application was integrated in the Samsung Tablet S2 that was used during the data collection in the field work.

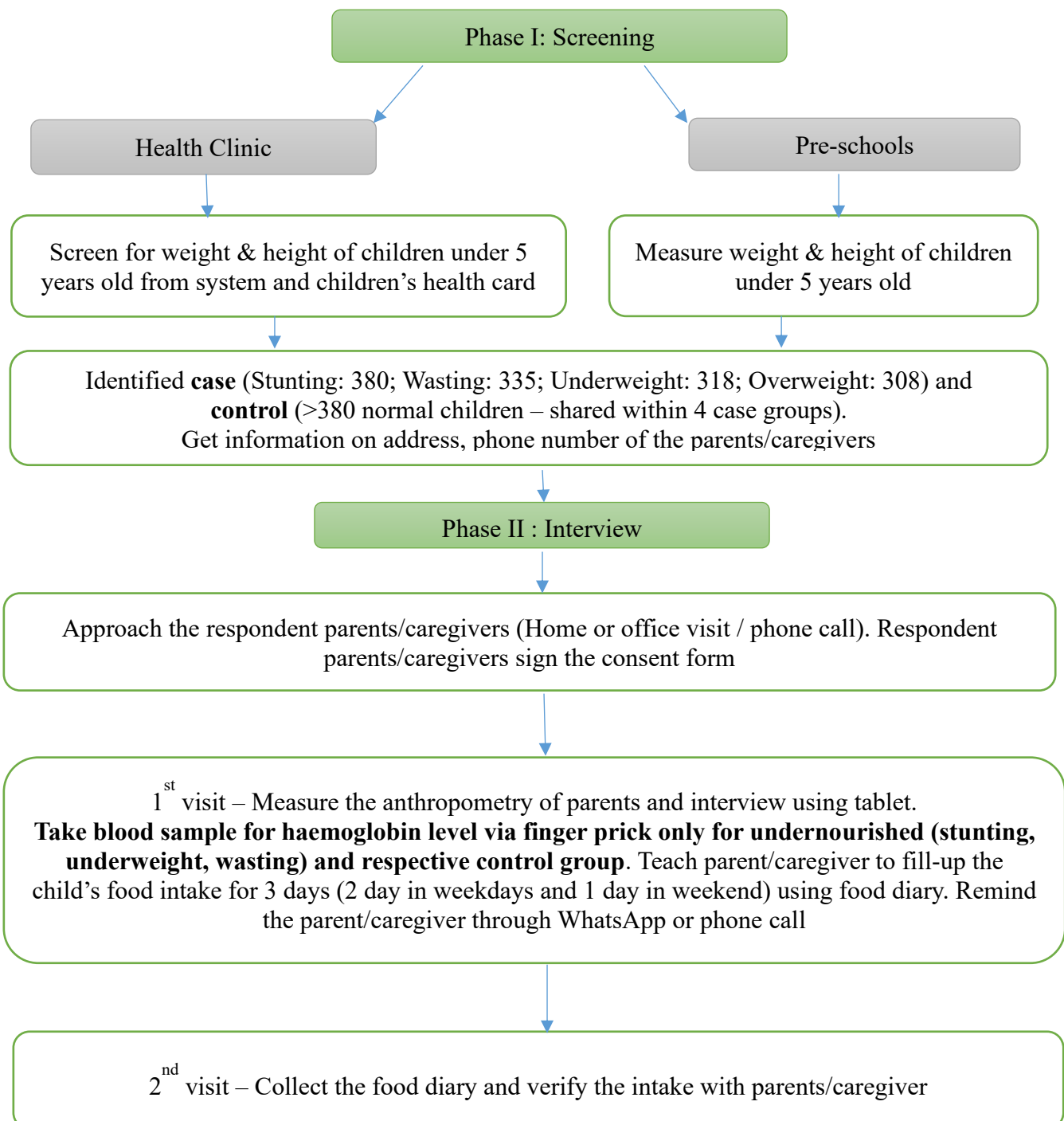
Field Preparation and Logistic Support

The data collection was carried out by 6 teams, each consisted of a team leader, a research assistant, and a nurse. Screening phase took place in preschools and government health clinics in Putrajaya. List of preschools was obtained from Department of Social Welfare. Preschools were informed about the study and formal invitation letter was given to the parents through the managements to inform that their children were selected for the screening. Screening involved measurement of weight and height according to standard methods. Information on children's name, birth of date, gender, name of parents, living address, and contact number of parents were obtained. On the other hand, all four government health clinics in Putrajaya located in Precinct 9, 11, 14, and 18 were visited. The information on latest weight and height, name, birth of date, gender, name of parents, living address, and contact number of parents were obtained from the patient management system or record books at the clinics.

Screened data were compiled. Duplicates and children living outside of Putrajaya were removed. The WHO Anthro Software was used to identify eligible cases and controls. Cases were randomly chosen first, followed by controls matched according to age groups and sex.

Face-to-face interview began after all cases and controls were identified. Parents of the selected children were approached through phone calls and home visits for recruitment into the study. They were interviewed at home. Two clinics were established as interview centers to cater for parents who were unable or reluctant to be interviewed at home. Figure 2 demonstrates data collection flow from screening phase to interview phase.

Figure 2. Data collection flow from the screening phase to interview phase



Data Management and Data Analysis

Each selected respondent was given a unique identification number (ID) prior to phase II data collection. The ID consisted of five fractions beginning with precinct, number of households, number of children in household, code for case (A) or control (B), and binary code to signify specific case (1) and non-case (0). For binary code, the order started with stunting, wasting, underweight, overweight.

Data collected with tablet were sent directly via internet to IKU server located in Bangsar, Kuala Lumpur. The Data manager in IKU monitored the data in the server to ensure all data were received properly. The data were extracted in Microsoft Excel format. The three-day food diaries were delivered to IKU weekly. The data entry team in IKU converted the reported food consumed in the diary into gram based on standard menu or recipe. After conversion, the data were entered into NutritionistPro software 7.5 to produce the calorie and nutrition intake value based on Malaysian Food Composition Database (MyFCD) and another established database.

Descriptive statistics of the study population were computed for all variables. Logistic regression was performed to identify the associated factors. The odd ratio (OR) and its 95% confidence interval (CI) was estimated for each variable. Multiple logistic regression was run by using enter method in order to control for all possible factors. Factor with an adjusted odd ratio (aOR) significantly ($p < 0.05$) higher than 1.00 was taken as risk factors, while OR significantly ($p < 0.05$) less than 1.00 was regarded as protective factors. All statistical analyses were performed using SPSS version 23.

4.0 RESULTS

4.1 PHASE I – SCREENING

Screening phase was carried out in one month starting from 12 September 2018 until 12 October 2018. The total number of children eligible for the phase II sample selection was 8261 and their sociodemographic characteristics were as shown in table 2.

Table 2. Sociodemographic characteristics of the screened children. [n (%)]

Sociodemographic characteristics	Screening location		Total (N=8261)
	Pre-school (n=2993)	Health clinic (n=5268)	
Sex			
Boy	1518 (50.7)	2742 (52.1)	4260 (51.6)
Girl	1475 (49.3)	2526 (47.9)	4001 (48.4)
Age groups*			
6 -11 months	178 (5.9)	901 (17.1)	1079(13.1)
12 – 35 months	1157 (38.7)	2917 (55.4)	4074 (49.3)
36 – 59 months	1658 (55.4)	1450 (27.5)	3108 (37.6)

*age group categorised according to RNI 2017

From 8261 eligible children, 2105 (26.1%) were stunted, 512 (6.2%) were wasted, 1516 (18.5%) were underweight, and 248 (3.0%) were overweight. All forms of malnutrition except overweight was more prevalent among boys in Putrajaya. The prevalence of overweight was also found to increase by age as opposed to the other forms. Total of 5223 (64.0%) children under five years old in Putrajaya had normal nutritional status (Table 3).

Table 3. Nutritional status of the screened children by sex and age groups. [n (%)]

Sociodemographic characteristics	Nutritional status indicator				
	Stunted	Wasted	Underweight	Overweight	Normal
All screened children	2105 (26.1)	512 (6.2)	1516 (18.5)	248 (3.0)	5223 (64.0)
Sex					
Boy	1191 (28.7)	289 (6.8)	845 (19.9)	123 (2.9)	2583 (61.4)
Girl	917 (23.4)	223 (5.6)	671 (16.9)	125 (3.1)	2640 (66.7)
Age groups					
6 -11 months	322 (30.4)	101 (9.4)	224 (20.9)	26 (2.4)	632 (59.2)
12 – 35 months	1126 (27.9)	258 (6.3)	726 (17.9)	90 (2.2)	2566 (63.2)
36 – 59 months	657 (22.2)	153 (5.0)	566 (18.4)	132 (4.3)	2025 (66.7)

4.2 PHASE II - Interview

i. Stunted and its associated factors

Total of 772 children (stunted=386, normal=386) were successfully recruited. The data were tabulated and calculated for the odd ratio as shown in table 4. Multiple logistic regression analysis found mother height less than 150cm, mother height between 150cm to 159cm and father height less than 160cm were significantly associated with stunted among their children with the OR 5.99, 1.73 and 1.95 respectively. Children in B40 and M40 for household income group also had about 4 time more likely to be stunted.

Intrauterine Growth Restriction during pregnancy, pre-term baby, low birth weight baby, use of bottle feeding, use of pacifier and low protein intake were significant associated factors to stunted with OR value 10.60, 2.15, 2.05, 1.63, 3.75 and 3.30 respectively.

Table 4. Stunted and its associated factors

Variables		Stunted, n (%)	Normal, n (%)	Logistic Regression Analysis	
				OR (95% CI)	aOR (95% CI)
Mother's height	<150.0cm	78 (20.2)	26 (6.7)	5.31 (3.304-9.284)*	5.99 (3.099-11.591)*
	150.0cm – 159.9cm	256 (66.3)	268 (69.4)	1.69 (1.155-2.473)*	1.73 (1.102-2.704)*
	≥160.0cm	52 (13.5)	92 (23.8)	1	1
Father's height	≤159.9cm	44 (11.4)	22 (5.7)	2.13 (1.250-3.626)*	1.95 (1.028-3.694)*
	≥160.0cm	342 (88.6)	364 (94.3)	1	1
Mother's education level	Primary & Secondary	83 (21.5)	52 (13.5)	1.76 (1.203-2.573)*	1.52 (0.901-2.575)
	Tertiary	303 (78.5)	334 (86.5)	1	1
Mother's occupation	Government servant	307(79.5)	321 (83.2)	0.70 (0.439-1.108)	0.89 (0.458-1.719)
	Private servant	31 (8.0)	30 (7.8)	0.75 (0.388-1.465)	0.78 (0.323-1.861)
	Not working/housewife	48 (12.5)	35 (9.1)	1	1
Father's education level	Primary & Secondary	104 (26.9)	73 (18.9)	1.58 (1.126-2.221)*	1.28 (0.802-2.039)
	Tertiary	282 (73.1)	313 (81.1)	1	1
Father's occupation	Government servant	234 (60.6)	243 (63.0)	1	1
	Private servant	125(32.4)	105 (27.2)	1.24 (0.902-1.965)	1.53 (0.936-2.253)
	Not working/housewife	27 (7.0)	38 (9.8)	0.74 (0.436-1.247)	0.80 (0.427-1.499)
Threshold household monthly income	<RM7,380 (B40)	254 (65.8)	207 (53.6)	4.21 (1.777-9.959)*	4.17 (1.386-12.563)*
	RM7,380 – RM14,789 (M40)	125 (32.4)	155 (40.2)	2.77 (1.153-6.628)*	4.06 (1.370-12.026)*
	≥RM14,790 (T20)	7 (1.8)	24 (6.2)	1	1
Monthly expenditure for food	<RM1,000	352 (91.2)	355 (92.0)	0.57 (0.164-1.953)	0.27 (0.063-1.146)
	RM1,000 - RM1,999	27 (7.0)	27 (7.0)	0.57 (0.150-2.181)	0.33 (0.068-1.614)
	≥RM2,000	7 (1.8)	4 (1.0)	1	1
Monthly expenditure for childcare	<RM1,000	200 (51.8)	174 (45.1)	2.31 (1.256-3.312)*	1.58 (0.857-2.909)
	RM1,000 - RM1,999	155 (40.2)	157 (40.7)	1.75 (1.070-2.868)*	1.68 (0.938-2.993)

Variables		Stunted, n (%)	Normal, n (%)	Logistic Regression Analysis	
				OR (95% CI)	aOR (95% CI)
	>=RM2,000	31 (8.0)	55 (14.2)	1	1
Monthly expenditure for utility	<RM1,000	298 (77.2)	276(71.5)	1.77 (1.014-3.078)*	1.32 (0.643-2.725)
	RM1,000 - RM1,999	66 (17.1)	74 (19.2)	1.46 (0.781-2.728)	1.09 (0.493-2.394)
	>=RM2,000	22 (5.7)	36 (9.3)	1	1
Monthly expenditure for transport	<RM1,000	258 (66.8)	237 (61.4)	1.41 (0.829-2.403)	0.81 (0.390-1.660)
	RM1,000 - RM1,999	101 (26.2)	114 (29.5)	1.15 (0.650-2.029)	0.72 (0.343-1.494)
	>=RM2,000	27 (6.2)	35 (9.1)	1	1
Mother age during pregnancy	18 - 30 years old	153 (39.6)	161 (41.7)	1	1
	>30 years old	233 (60.4)	225 (58.3)	1.09 (0.818-1.452)	1.04 (0.711-1.531)
Pre-pregnancy BMI	Normal	204 (52.8)	210 (54.4)	1	1
	Underweight	30 (7.8)	49 (12.7)	1.59 (0.969-2.599)	1.55 (0.865-2.790)
	Overweight or obese	152 (39.4)	127 (32.9)	0.79 (0.599-1.100)	0.58 (0.390-1.871)
Weight gain during pregnancy	Sufficient	177 (45.9)	194 (50.2)	1	1
	Insufficient	118 (30.6)	91 (23.6)	1.42 (1.011-1.999)*	1.24 (0.825-1.851)
	Excess	91 (23.5)	101(26.2)	0.99 (0.697-1.400)	1.25 (0.807-1.921)
Complication during pregnancy	None	266 (68.9)	292 (75.7)	1	1
	GDM	48 (12.4)	39 (10.1)	1.35 (0.858-2.127)	1.41 (0.820-2.412)
	Anaemia	59 (15.3)	53 (13.7)	1.22 (0.814-1.835)	0.88 (0.543-1.425)
	Other (IUGR & HPT)	13 (3.4)	2 (0.5)	7.32 (1.595-31.913)*	10.60 (1.871-60.018)*
Number of antenatal visits	<9	22 (5.7)	18 (4.7)	1.26 (0.663-2.407)	1.29 (0.579-2.887)
	9-14	270 (69.9)	279 (72.3)	1	1
	≥15	94 (24.4)	89 (23.0)	1.09 (0.781-1.525)	0.90 (0.596-1.360)
Knowledge	Less satisfied	25 (6.5)	16 (4.1)	1.60 (0.841-3.049)	1.29 (0.586-2.853)
	Satisfied	361 (93.5)	370 (95.9)	1	1

Variables		Stunted, n (%)	Normal, n (%)	Logistic Regression Analysis	
				OR (95% CI)	aOR (95% CI)
Practice	Fair	54 (14.0)	70 (18.1)	0.74 (0.478-1.158)	0.58 (0.337-1.186)
	Good	219 (56.7)	207 (53.6)	1.02 (0.738-1.412)	0.97 (0.654-1.430)
	Excellent	113 (29.3)	109 (28.2)	1	1
Behaviour	Risk of poor food behaviour	343 (88.9)	348 (90.2)	0.87 (0.549-1.381)	0.93 (0.531-1.629)
	No risk of poor food behaviour	43 (11.1)	38 (9.8)	1	1
Delivery method	Normal	250 (64.8)	256 (66.3)	1	1
	Forceps/vacuum	18 (4.7)	30 (7.8)	0.61 (0.334-1.131)	0.48 (0.228-1.006)
	Caesarean	118 (30.5)	100 (25.9)	1.21 (0.879-1.661)	1.11 (0.730-1.688)
Delivery status	Term	364 (94.3)	344 (89.1)	1	1
	Pre-term	22 (5.7)	42 (10.9)	2.20 (1.181-3.454)*	2.15 (1.049-4.398)*
Birth weight status	Normal birth weight	325 (84.2)	362 (93.8)	1	1
	Low birth weight	61 (15.8)	24 (6.2)	2.83 (1.725-4.646)*	2.05 (1.028-4.069)*
Birth length status	Normal	360 (93.3)	377 (97.7)	1	1
	Short	26 (6.7)	9 (2.3)	3.03 (1.398-6.545)*	1.95 (0.743-5.107)
Birth head circumference	Normal	321 (83.2)	347 (89.9)	1	1
	Small	65 (16.8)	39 (10.1)	1.80 (1.178-2.756)*	1.15 (0.667-1.981)
Number of siblings	1 – 3	294 (76.2)	286 (74.1)	1	1
	4 and above	92 (23.8)	100 (25.9)	0.90 (0.646-1.241)	0.90 (0.578-1.405)
Age gap between elder brother/sister	≤24 month	72 (18.7)	79 (20.5)	1.05 (0.752-1.464)	1.38 (0.862-2.217)
	≥25 month	210 (54.4)	202 (52.3)	0.92 (0.605-1.399)	1.17 (0.675-2.013)
	Do not have elder brother/sister	104 (26.9)	105 (27.2)	1	1
Age gap between younger brother/sister	≤24 month	46 (11.9)	52 (13.5)	0.83 (0.569-1.207)	0.73 (0.442-1.189)
	≥25 month	64 (16.6)	73 (18.9)	0.84 (0.543-1.288)	0.75 (0.439-1.276)
	Do not have elder brother/sister	276 (71.5)	261 (67.6)	1	1

Variables		Stunted, n (%)	Normal, n (%)	Logistic Regression Analysis	
				OR (95% CI)	aOR (95% CI)
Frequency of illness	Never	37 (9.6)	45 (11.7)	1	1
	Monthly or once in 2 months	58 (15.0)	41 (10.6)	1.72 (0.953-3.106)	1.18 (0.664-2.105)
	Once in 3 months or more	291 (75.4)	300 (77.7)	1.18 (0.742-1.876)	1.84 (0.890-3.816)
Frequency of injury	Never	254 (65.8)	257 (66.6)	1	1
	Monthly or once in 2 months	31 (8.0)	30 (7.8)	1.05 (0.615-1.778)	1.07 (0.718-1.589)
	Once in 3 months or more	101 (26.2)	99 (25.6)	1.03 (0.744-1.431)	1.36 (0.723-2.575)
Worm infection	No	373 (96.6)	380 (98.5)	1	1
	Yes	13 (3.4)	6 (1.5)	2.21 (0.830-5.869)	1.91 (0.582-6.271)
Children anaemia status	Normal	179 (46.4)	217 (56.2)	1	1
	Anaemic	207 (53.6)	169 (43.8)	1.49 (1.118-1.972)*	1.34 (0.954-1.886)
Initiation of breastfeeding after delivery	Within 1 hour	285 (73.8)	300 (77.7)	1	1
	1-24 hour	72 (18.7)	58 (15.0)	1.31 (0.892-1.914)	1.27 (0.774-2.092)
	After 1 day or Never	29 (7.5)	28 (7.2)	1.09 (0.633-1.878)	0.58 (0.270-1.255)
Breastfeeding status	Ever	381 (98.7)	382 (99.0)	1	1
	Never	5 (1.3)	4 (1.0)	1.25 (0.334-4.703)	1.33 (0.201-8.835)
Exclusive breastfeeding	Yes	248 (64.2)	257 (66.6)	1	1
	No	138 (35.8)	129 (33.4)	1.11 (0.824-1.492)	0.90 (0.447-1.826)
Predominant breastfeeding	Yes	270 (69.9)	285 (73.8)	1	1
	No	116 (30.1)	101 (26.2)	1.21 (0.885-1.660)	1.42 (0.656-3.089)
Age stop breastfeeding	<6 month	59 (15.3)	38 (9.8)	1.62 (0.963-2.711)	1.21 (0.567-2.568)
	6-24 month	253 (65.5)	271 (70.2)	0.97 (0.676-1.395)	0.70 (0.435-1.119)
	>24 month	74 (19.2)	77 (19.9)	1	1
Formula milk feeding	Yes	67 (17.4)	309 (80.1)	1.19 (0.825-1.706)	1.34 (0.827-2.160)
	No	319 (82.6)	77 (19.9)	1	1

Variables		Stunted, n (%)	Normal, n (%)	Logistic Regression Analysis	
				OR (95% CI)	aOR (95% CI)
Use of bottle feeding	Yes	294 (76.2)	274 (71.0)	1.31 (0.947-1.801)	1.63 (1.080-2.446)*
	No	92 (23.8)	112 (29.0)	1	1
Use of pacifier	Yes	354 (91.7)	323 (83.7)	2.16 (1.374-3.389)*	3.75 (2.132-6.608)*
	No	32 (8.3)	63 (16.3)	1	1
Minimum dietary diversity status	Meet	335 (86.8)	353 (91.5)	1	1
	Do not meet	51 (13.2)	33 (8.5)	1.63 (1.025-2.587)*	1.53 (0.858-2.713)
Achievement RNI for Kcal/day	Meet	265 (68.7)	270 (69.9)	1	1
	Do not meet	121 (31.3)	116 (30.1)	1.06 (0.783-1.443)	0.94 (0.646-1.366)
Achievement RNI for protein/day	Meet	371 (96.1)	380 (98.5)	1	1
	Do not meet	15 (3.9)	6 (1.5)	2.56 (0.983-6.671)	3.30 (1.024-10.660)*
Food Insecurity	Food secure	120 (31.1)	132 (34.1)	1	1
	Food insecure	266 (68.9)	254 (65.8)	1.15 (0.852-1.557)	1.32 (0.916-1.910)
Place of stay while parents work	Kindergarten	285 (73.8)	318 (82.4)	1	1
	Babysitter	72 (18.7)	44 (11.4)	1.83 (1.215-2.745)	0.59 (0.275-1.261)
	Relative	29 (7.5)	24 (6.2)	1.35 (0.767-2.370)	1.16 (0.507-2.659)
Sleep time in a day	Optimal health sleep	248 (64.2)	266 (68.9)	1	1
	Below recommendation	130 (33.7)	114(29.5)	1.23 (0.901-1.660)	1.20 (0.827-1.731)
	Above recommendation	8 (2.1)	6 (1.6)	1.43 (0.489-4.180)	0.81 (0.220-2.985)
Screen time in a day	<60 minutes	15 (3.9)	20 (5.2)	1	1
	≥60 minutes	371 (96.1)	366 (94.8)	1.35 (0.681-2.681)	1.22 (0.523-2.824)
MVPA time in a day	<180 minutes	361 (93.5)	363 (94.0)	0.92 (0.510-1.642)	0.90 (0.433-1.862)
	≥180 minutes	25 (6.5)	23 (6.0)	1	1

*p<0.05 for logistic regression analysis

ii Wasted and its associated factors

Data for wasted (n=335) and normal (n=335) children was cross tabulated and calculated for the odd ratio as shown in table 5.

Multiple logistic regression analysis found education status, working status, and household income were the sociodemographic characteristic that significantly associated factors lead to wasting. Other factors that significantly associated with wasted were low birth weight, anaemic status, use of pacifier, low protein intake and screen time more than 60 minutes per day.

Meanwhile, overweight/obese father, mother with pre-pregnancy BMI in overweight/obese category and age of stop breastfeeding is within 6 to 14 months were found as protective to wasting.

Table 5. Wasted and Its Associated Factor

Variables		Wasted, n(%)	Normal, n(%)	Logistic Regression Analysis	
				OR (95% CI)	aOR (95% CI)
Mother's BMI	Normal	159 (47.5)	132 (39.4)	1	1
	Underweight	29 (8.6)	12 (3.6)	2.01 (0.985-4.086)	1.86 (0.750-4.588)
	Overweight / Obese	147 (43.9)	191 (57.0)	0.62 (0.466-0.876)*	0.77 (0.473-1.263)
Father's BMI	Normal	136 (40.6)	98 (29.3)	1	1
	Underweight	18 (5.4)	21 (6.3)	0.84 (0.425-1.661)	0.48 (0.206-1.136)
	Overweight / Obese	178 (53.1)	219 (65.4)	0.57 (0.423-0.812)*	0.60 (0.407-0.891)*
Mother's education level	Primary & Secondary	95 (28.4)	45 (13.4)	2.55 (1.721-3.782)*	1.85 (1.084-3.148)*
	Tertiary	240 (71.6)	290 (86.6)	1	1
Mother's occupation	Government servant	245 (73.1)	259 (77.3)	0.87 (0.576-1.302)	1.14 (0.625-2.071)
	Private servant	31 (9.3)	22 (6.6)	1.29 (0.667-2.494)	1.68 (0.742-3.788)
	Not working/housewife	59 (17.6)	54 (16.1)	1	1
Father's education level	Primary & Secondary	110 (32.8)	66 (19.7)	1.99 (1.400-2.836)*	1.72 (1.047-2.836)*
	Tertiary	225 (67.2)	269 (80.3)	1	1
Father's occupation	Government servant	209 (62.4)	230 (68.7)	1	1
	Private servant	110 (32.8)	97 (29.0)	1.25 (0.896-1.738)	1.56 (1.021-2.382)*
	Not working/housewife	16 (4.8)	8 (2.3)	2.20 (0.923-5.249)	2.39 (0.835-6.822)
Threshold household monthly income	<RM7,380 (B40)	221 (66.0)	172 (51.3)	4.93 (1.962-12.363)*	3.38 (1.015-11.270)*
	RM7,380 – RM14,789 (M40)	108 (32.2)	140 (41.8)	2.96 (1.163-7.517)*	3.29 (1.042-10.361)*
	≥RM14,790 (T20)	6 (1.8)	23 (6.9)	1	1
Monthly expenditure for food	<RM1,000	300 (89.6)	297 (88.6)	1.52 (0.423-5.424)	1.64 (0.133- 3.058)
	RM1,000 - RM1,999	31 (9.3)	32 (9.6)	1.45 (0.374-5.651)	1.62 (0.118-3.223)
	≥RM2,000	4 (1.1)	6 (1.8)	1	1
	<RM1,000	198 (59.1)	150 (44.8)	2.17 (1.259-3.631)*	1.55 (0.790-3.050)

Variables		Wasted, n(%)	Normal, n(%)	Logistic Regression Analysis	
				OR (95% CI)	aOR (95% CI)
Monthly expenditure for childcare	RM1,000 - RM1,999	109 (32.5)	139 (41.5)	1.29 (0.756-2.194)	1.21 (0.635-2.296)
	>=RM2,000	28 (8.4)	46 (13.7)	1	1
Monthly expenditure for utility	<RM1,000	268 (80.0)	247 (73.7)	2.05 (1.029-3.947)*	1.82 (0.742-4.444)
	RM1,000 - RM1,999	53 (15.8)	62 (18.5)	1.59 (0.753-3.348)	1.62 (0.617-4.266)
	>=RM2,000	14 (4.2)	26 (7.8)	1	1
Monthly expenditure for transport	<RM1,000	223 (66.6)	201 (60.0)	1.61 (0.908-2.869)	1.17 (0.549-2.494)
	RM1,000 - RM1,999	90 (26.9)	102 (30.4)	1.28 (0.698-2.368)	1.18 (0.549-2.551)
	>=RM2,000	22 (6.6)	32 (9.6)	1	1
Mother age during pregnancy	18 - 30 years old	131 (39.1)	137 (40.9)	1	1
	>30 years old	204 (60.9)	198 (59.1)	1.08 (0.791-1.468)	1.52 (0.987-2.353)
Pre-pregnancy BMI	Normal	189 (56.4)	174 (51.9)	1	1
	Underweight	53 (15.8)	27 (8.1)	1.81 (1.088-3.001)*	1.49 (0.759-2.906)
	Overweight /Obese	93 (27.8)	134 (40.0)	0.64 (0.457-0.893)*	0.57 (0.342-0.959)*
Weight gain during pregnancy	Sufficient	148 (44.2)	166 (49.5)	1	1
	Insufficient	107 (31.9)	85 (25.4)	1.41 (0.984-2.025)	1.07 (0.679-1.683)
	Excess	80 (23.9)	84 (25.1)	1.07 (0.732-1.559)	1.43 (0.892-2.285)
Complication during pregnancy	None	225 (67.2)	254 (75.8)	1	1
	GDM	43 (12.8)	29 (8.7)	1.67 (1.011-2.771)*	1.64 (0.888-3.035)
	Anaemia	60 (17.9)	50 (14.9)	1.36 (0.894-2.054)	1.07 (0.649-1.751)
	Other (IUGR, HPT, etc)	7 (2.1)	2 (1.0)	3.95 (0.812-19.215)	3.55 (0.531-23.798)
Number of antenatal visits	<9	231 (69.0)	241 (71.9)	1.10 (0.571-2.111)	1.57 (0.676-3.658)
	9-14	20 (6.0)	19 (5.7)	1	1
	≥15	84 (25.0)	75 (22.4)	1.17 (0.815-1.675)	1.05 (0.674-1.624)
Knowledge	Less satisfied	23 (6.9)	15 (4.5)	1.57 (0.806-3.070)	1.03 (0.452-2.366)

Variables		Wasted, n(%)	Normal, n(%)	Logistic Regression Analysis	
				OR (95% CI)	aOR (95% CI)
Practice	Satisfied	312 (93.1)	320 (95.5)	1	1
	Fair	64 (19.1)	56 (16.7)	1.54 (1.010-2.109)*	1.42 (0.801-2.514)
	Good	201 (60.0)	185 (55.2)	1.46 (0.956-2.465)	1.42 (0.909-2.210)
	Excellent	70 (20.9)	94 (28.1)	1	1
Behaviour	Risk of poor food behaviour	301 (89.9)	296 (88.4)	1.17 (0.717-1.898)	1.06 (0.597-1.893)
	No risk of poor food behaviour	34 (10.1)	39 (11.6)	1	1
Delivery method	Normal	230 (68.7)	227 (67.8)	1	1
	Forceps/vacuum	16 (4.8)	20 (6.0)	0.79 (0.399-1.562)	0.77 (0.338-1.760)
	Caesarean	89 (26.6)	88 (26.3)	1.00 (0.705-1.412)	0.84 (0.523-1.347)
Delivery status	Term	299 (89.3)	315 (94.0)	1	1
	Pre-term	36 (10.7)	20 (20.0)	1.90 (1.073-3.350)*	1.28 (0.541-3.046)
Birth weight status	Normal birth weight	277 (82.7)	314 (93.7)	1	1
	Low birth weight	58 (17.3)	21 (6.3)	3.13 (1.853-5.291)*	2.69 (1.217-5.949)*
Birth length status	Normal	307 (91.6)	324 (96.7)	1	1
	Short	27 (8.1)	11 (3.3)	2.59 (1.263-5.313)*	1.28 (0.473-3.454)
Birth head circumference	Normal	271 (80.9)	301 (89.9)	1	1
	Small	64 (19.1)	34 (10.1)	2.09 (1.337-3.270)*	1.35 (0.724-2.499)
Number of siblings	1 – 3	257 (76.7)	247 (73.7)	1	1
	4 and above	78 (23.3)	88 (26.3)	0.85 (0.600-1.210)	0.91 (0.560-1.474)
Age gap between elder brother/sister	≤24 month	56 (16.7)	74 (22.1)	1.20 (0.835-1.729)	0.64 (0.397-1.040)
	≥25 month	197 (58.8)	174 (51.9)	0.80 (0.507-1.272)	0.75 (0.450-1.244)
	Do not have elder brother/sister	82 (24.5)	87 (26.0)	1	1
Age gap between younger brother/sister	≤24 month	34 (10.1)	37 (11.0)	0.70 (0.467-1.038)	1.73 (0.841-3.573)
	≥25 month	53 (15.8)	70 (20.9)	0.85 (0.513-1.392)	1.59 (0.945-2.674)

Variables		Wasted, n(%)	Normal, n(%)	Logistic Regression Analysis	
				OR (95% CI)	aOR (95% CI)
	Do not have elder brother/sister	248 (74.0)	228 (68.1)	1	1
Frequency of illness	Never	223 (66.6)	230 (68.7)	1	1
	Monthly or once in 2 months	23 (6.9)	19 (5.7)	1.25 (0.662-2.356)	1.67 (0.776-3.601)
	Once in 3 months or more	89 (26.6)	86 (25.7)	1.07 (0.753-1.513)	1.37 (0.896-2.088)
Frequency of injury	Never	28 (8.4)	41 (12.2)	1	1
	Monthly or once in 2 months	118 (35.2)	116 (34.6)	1.49 (0.864-2.568)	1.79 (0.893-3.587)
	Once in 3 months or more	189 (56.4)	178 (53.1)	1.56 (0.922-2.621)	1.81 (0.940-3.476)
Worm infection	No	327 (97.6)	329 (98.2)	1	1
	Yes	8 (2.4)	6 (1.8)	1.34 (0.460-3.909)	1.78 (0.219-2.763)
Children anaemia status	Normal	158 (47.2)	187 (55.8)	1	1
	Anaemic	177 (52.8)	148 (44.2)	1.42 (1.044-1.919)*	1.55 (1.059-2.263)*
Time of initiation after delivery	Within 1 hour	248 (74.0)	260 (77.6)	1	1
	1-24 hour	57 (17.0)	50 (14.9)	1.20 (0.787-1.815)	1.26 (0.718-2.221)
	After 1 day or Never	30 (9.0)	25 (7.5)	1.26 (0.720-2.199)	0.74 (0.340-1.592)
Breastfeeding status	Ever	333 (99.4)	334 (99.7)	1	1
	Never	2 (0.6)	1 (0.3)	2.01 (0.181-22.229)	1.41 (0.018-9.562)
Exclusive breastfeeding	Yes	199 (59.4)	221 (66.0)	1	1
	No	136 (40.6)	114 (34.0)	1.33 (0.968-1.814)	1.44 (0.773-2.687)
Predominant breastfeeding	Yes	238(71.0)	251 (74.9)	1	1
	No	97 (29.0)	84 (25.1)	1.22 (0.865-1.714)	0.95 (0.455-1.993)
Age stop breastfeeding	<6 month	46 (13.7)	38 (11.3)	1.12 (0.657-1.909)	0.44 (0.188-1.010)
	6-24 month	209 (62.4)	223 (66.6)	0.87 (0.600-1.253)	0.52 (0.328-0.838)*
	>24 month	80 (23.9)	74 (22.1)	1	1
Formula milk feeding	Yes	283 (84.5)	273 (81.5)	1.24 (0.825-1.852)	1.26 (0.744-2.138)

Variables		Wasted, n(%)	Normal, n(%)	Logistic Regression Analysis	
				OR (95% CI)	aOR (95% CI)
	No	52 (15.5)	62 (18.5)	1	1
Use of bottle feeding	Yes	269 (80.3)	240 (71.6)	1.61 (1.127-2.301)*	1.53 (0.964-2.418)
	No	66 (19.7)	95 (28.4)	1	1
Use of pacifier	Yes	57(17.0)	29 (8.7)	2.16 (1.345-3.481)*	2.14 (1.192-3.843)*
	No	278 (83.0)	306 (91.3)	1	1
Minimum dietary diversity status	Meet	325 (97.0)	328 (97.9)	1	1
	Do not meet	10 (3.0)	6 (1.8)	1.69 (0.606-4.696)	3.46 (0.984-12.149)
Achievement RNI for Kcal/day	Meet	227 (67.8)	240 (71.6)	1	1
	Do not meet	108 (32.2)	95 (28.4)	1.20 (0.864-1.672)	1.11 (0.716-1.708)
Achievement RNI for protein/day	Meet	315 (94.0)	326 (97.3)	1	1
	Do not meet	20 (6.0)	9 (2.7)	2.30 (1.032-5.128)*	3.81 (1.307-11.076)*
Food Insecurity	Food secure	109 (32.5)	116 (34.6)	1	1
	Food insecure	226 (67.5)	219 (65.4)	1.10 (0.797-1.514)	1.09 (0.734-1.614)
Place of stay while parents work	Kindergarten	228 (68.1)	258 (77.0)	1	1
	Babysitter	71 (21.2)	47 (14.0)	1.71 (1.135-2.574)*	1.57 (0.949-2.597)
	Relative	36 (10.7)	30 (9.0)	1.36 (0.810-2.275)	1.31 (0.687-2.489)
Sleep time in a day	Optimal health sleep	208 (62.1)	225 (67.2)	1	1
	Below recommendation	114 (34.0)	104 (31.0)	1.19 (0.856-1.642)	1.19 (0.793-1.789)
	Above recommendation	13 (3.9)	6 (1.8)	2.35 (0.875-6.279)	2.05 (0.623-6.773)
Screen time in a day	<60 minutes	13 (3.9)	21 (6.3)	1	1
	≥60 minutes	322 (96.1)	314 (93.7)	1.66 (0.815-3.366)	2.74 (1.136-6.600)*
MVPA time in a day	<180 minutes	314 (93.7)	313 (93.4)	1.05 (0.566-1.950)	1.20 (0.574-2.513)
	≥180 minutes	21 (6.3)	22 (6.6)	1	1

*p<0.05 for logistic regression analysis

5.3 Underweight and its associated factors

Underweight (n=364) and normal (n=364) children was cross tabulated and calculated for the odd ratio as shown in table 6.

Multiple logistic regression analysis found mothers' and fathers' BMI from overweight/obese category, 39.8% and 42.6% lower risk compared to normal BMI group to have underweight children. Mother's occupation from private servant 2.43 times more likely to have underweight children. Children those from threshold household monthly income less than RM 7,380 (B40) and mother age less than 30 years old during pregnancy 2.94- and 1.54- times higher tendency to be underweight. Low birth weight and anaemic children more likely to be underweight children. Children who are used pacifier 1.79 times significantly higher to be underweight.

Table 6. Underweight and Its Associated Factor

Variables		Underweight, n (%)	Normal, n (%)	Logistic Regression Analysis	
				Crude OR	aOR
Mother's BMI	Normal	189 (51.9)	148 (40.7)	1	1
	Underweight	26 (7.1)	10 (2.7)	2.04 (0.952-4.355)	1.34 (0.485-3.684)
	Overweight/ Obese	149 (41.0)	206 (56.6)	0.57 (0.419-0.765)*	0.60 (0.380-0.954)*
Father's BMI	Normal	159 (43.7)	115 (31.6)	1	1
	Underweight	14 (3.8)	9 (2.5)	1.13 (0.471-2.688)	1.85 (0.295-2.454)
	Overweight/ Obese	191 (52.5)	240 (65.9)	0.58 (0.42-0.782)*	0.57 (0.395-0.834)*
Mother's education level	Primary & Secondary	72 (19.8)	54 (14.8)	1.42 (0.961-2.085)	1.13 (0.668-1.922)
	Tertiary	292 (80.2)	310 (85.2)	1	1
Mother's occupation	Government servant	268 (73.6)	301 (82.7)	0.67 (0.395-1.129)	1.99 (0.923-4.286)
	Private servant	60 (16.5)	36 (9.9)	1.25 (0.654-2.389)	2.43 (1.056-5.611)*
	Not working/housewife	36 (9.9)	27 (7.4)	1	1
Father's education level	Primary & Secondary	89 (24.5)	72 (19.8)	1.31 (0.923-1.866)	1.01 (0.621-1.639)
	Tertiary	275 (75.5)	292 (80.2)	1	1
Father's occupation	Government servant	208 (57.1)	223 (61.3)	1	1
	Private servant	154 (42.3)	138 (37.9)	1.20 (0.889-1.611)	1.48 (1.030-2.122)
	Not working/housewife	2 (0.5)	3 (0.8)	0.72 (0.118-4.320)	0.47 (0.049-4.482)
Threshold household monthly income	<RM7,380 (B40)	230 (63.2)	184 (50.5)	2.31 (1.143-4.658)*	2.94 (1.087-7.933)*
	RM7,380 – RM14,789 (M40)	121 (33.2)	156 (42.9)	1.43 (0.700-2.929)	1.97 (0.760-5.107)
	≥RM14,790 (T20)	13 (3.6)	24 (6.6)	1	1
Monthly expenditure for food	<RM1,000	325 (89.3)	322 (88.5)	1.35 (0.299-6.061)	1.11 (0.167-7.435)
	RM1,000 - RM1,999	36 (9.9)	38 (10.4)	1.26 (0.264-6.040)	1.22 (0.171-8.689)
	≥RM2,000	3 (0.8)	4 (1.1)	1	1
	<RM1,000	200 (54.9)	159 (43.7)	2.21 (1.340-3.651)*	2.45 (1.282-4.671)

Variables		Underweight, n (%)	Normal, n (%)	Logistic Regression Analysis	
				Crude OR	aOR
Monthly expenditure for childcare	RM1,000 - RM1,999	135 (37.1)	154 (42.3)	1.54 (0.925-2.570)	1.63 (0.883-3.019)
	>=RM2,000	29 (8.0)	51 (14.0)	1	1
Monthly expenditure for utility	<RM1,000	279 (76.6)	256 (70.3)	1.47 (0.859-2.505)	1.42 (0.710-2.824)
	RM1,000 - RM1,999	55 (15.1)	72 (19.8)	1.03 (0.555-1.906)	1.08 (0.505-2.293)
Monthly expenditure for transport	>=RM2,000	26 (7.1)	35 (9.6)	1	1
	<RM1,000	241 (66.2)	217 (59.6)	1.26 (0.743-2.150)	0.73 (0.367-1.434)
Mother age during pregnancy	RM1,000 - RM1,999	92 (25.3)	113 (31.0)	0.93 (0.524-1.638)	0.70 (0.347-1.411)
	>=RM2,000	29 (8.0)	33 (9.1)	1	1
Pre-pregnancy BMI	18 - 30 years old	139 (38.2)	150 (41.2)	1	1
	>30 years old	225 (61.8)	214 (58.8)	1.14 (0.843-1.527)	1.54 (1.032-2.304)*
Weight gain during pregnancy	Normal	208 (57.1)	198 (54.4)	1	1
	Underweight	57 (15.7)	25 (6.9)	2.17 (1.305-3.610)*	1.41 (0.712-2.799)
	Overweight/ Obese	99 (27.2)	141 (38.7)	0.67 (0.484-0.923)*	1.05 (0.652-1.691)
Complication during pregnancy	Sufficient	72 (19.8)	170 (46.7)	1	1
	Insufficient	128 (35.2)	95 (26.1)	1.40 (0.993-1.965)	0.99 (0.658-1.500)
	Excess	164 (45.1)	99 (27.2)	0.75 (0.520-1.093)	0.82 (0.521-1.294)
Number of antenatal visits	None	244 (67.0)	258 (70.9)	1	1
	GDM	40 (11.0)	39 (10.7)	1.08 (0.675-1.743)	1.16 (0.653-2.060)
	Anaemia	57 (15.7)	49 (13.5)	1.23 (0.808-1.872)	1.02 (0.622-1.670)
	Other (IUGR, HPT, etc)	23 (6.3)	18 (4.9)	1.35 (0.712-2.565)	0.94 (0.420-2.105)
Knowledge	<9	34 (9.3)	24 (6.6)	1.44 (0.830-2.498)	1.58 (0.816-3.042)
	9-14	249 (68.4)	253 (69.5)	1	1
	≥15	81 (22.3)	87 (23.9)	0.95 (0.667-1.342)	0.99 (0.657-1.502)
	Less satisfied	25 (6.9)	16 (4.4)	1.60 (0.841-3.057)	1.39 (0.609-3.151)

Variables		Underweight, n (%)	Normal, n (%)	Logistic Regression Analysis	
				Crude OR	aOR
Practice	Satisfied	339 (93.1)	348 (95.6)	1	1
	Fair	85 (23.4)	84 (23.1)	1.23 (0.818-1.848)	0.94 (0.578-1.537)
	Good	186 (51.1)	167 (45.9)	1.35 (0.959-1.911)	1.21 (0.804-1.828)
	Excellent	93 (25.5)	113 (31.0)	1	1
Behaviour	Risk of poor food behaviour	324 (89.0)	320 (87.9)	1.11 (0.706-1.756)	0.88 (0.509-1.533)
	No risk of poor food behaviour	40 (11.0)	44 (12.1)	1	1
Delivery method	Normal	253 (69.5)	250 (68.7)	1	1
	Forceps/vacuum	16 (4.4)	22 (6.0)	0.72 (0.369-1.401)	0.86 (0.390-1.884)
	Caesarean	95 (26.1)	92 (25.3)	1.02 (0.729-1.428)	0.88 (0.551-1.389)
Delivery status	Term	316 (86.8)	342 (94.0)	1	1
	Pre-term	48 (13.2)	22 (6.0)	2.36 (1.394-4.001)*	1.35 (0.644-2.833)
Birth weight status	Normal birth weight	286 (78.6)	340 (93.4)	1	1
	Low birth weight	78 (21.4)	24 (6.6)	3.86 (2.382-6.268)*	3.12 (1.574-6.173)*
Birth length status	Normal	324 (89.0)	343 (94.2)	1	1
	Short	40 (11.0)	21 (5.8)	2.02 (1.164-3.494)*	1.11 (0.538-2.280)
Birth head circumference	Normal	288 (79.1)	327 (89.8)	1	1
	Small	76 (20.9)	37 (10.2)	2.33 (1.527-3.562)*	1.71 (0.970-3.007)
Number of siblings	1 – 3	267 (73.4)	274 (75.3)	1	1
	4 and above	97 (26.6)	90 (24.7)	1.11 (0.793-1.543)	0.99 (0.627-1.549)
Age gap between elder brother/sister	≤24 month	70 (19.2)	71 (19.5)	1.21 (0.782-1.886)	1.68 (0.950-2.967)
	≥25 month	212 (58.2)	192 (52.7)	1.36 (0.958-1.931)	1.59 (0.976-2.593)
	Do not have elder brother/sister	82 (22.5)	101 (27.7)	1	1
Age gap between younger brother/sister	≤24 month	39 (10.7)	37 (10.2)	1.04 (0.644-1.686)	1.39 (0.780-2.490)
	≥25 month	60 (16.5)	65 (17.9)	0.91 (0.618-1.348)	1.07 (0.648-1.764)

Variables		Underweight, n	Normal, n	Logistic Regression Analysis	
		(%)	(%)	Crude OR	aOR
	Do not have elder brother/sister	265 (72.8)	262 (72.0)	1	1
Frequency of illness	Never	48 (13.2)	46 (12.6)	1	1
	Monthly or once in 2 months	70 (19.2)	56 (15.4)	1.20 (0.701-2.047)	1.30 (0.679-2.494)
	Once in 3 months or more	246 (67.6)	262 (72.0)	0.90 (0.579-1.397)	0.85 (0.501-1.458)
Frequency of injury	Never	263 (72.3)	254 (69.8)	1	1
	Monthly or once in 2 months	17 (4.7)	15 (4.1)	1.10 (0.535-2.238)	1.24 (0.526-2.898)
	Once in 3 months or more	84 (23.1)	95 (26.1)	0.85 (0.608-1.200)	0.91 (0.600-1.379)
Worm infection	No	356 (97.8)	358 (98.4)	1	1
	Yes	8 (2.2)	6 (1.6)	1.34 (0.461-3.904)	0.71 (0.194-2.619)
Children anaemia status	Normal	174 (47.8)	213 (58.5)	1	1
	Anaemic	190 (52.2)	151 (41.5)	1.54 (1.149-2.064)*	1.65 (1.151-2.371)*
Time of initiation of breastfeeding	Within 1 hour	286 (78.6)	296 (81.3)	1	1
	1-24 hour	47 (12.9)	48 (13.2)	1.01 (0.657-1.564)	1.01 (0.568-1.800)
	After 1 day or Never	31 (8.5)	20 (5.5)	1.60 (0.894-2.880)	1.07 (0.472-2.411)
Breastfeeding status	Ever	361 (99.2)	363 (99.7)	1	1
	Never	3 (0.8)	1 (0.3)	3.02 (0.312-29.137)	1.71 (0.036-13.779)
Exclusive breastfeeding	Yes	232 (63.7)	244 (67.0)	1	1
	No	132 (36.3)	120 (33.0)	1.16 (0.852-1.570)	2.54 (0.998-6.464)
Predominant breastfeeding	Yes	252 (69.2)	254 (69.8)	1	1
	No	112 (30.8)	110 (30.2)	1.03 (0.749-1.407)	0.40 (0.149-1.091)
Age stop breastfeeding	<6 month	46 (12.6)	41 (11.3)	1.21 (0.718-2.024)	1.47 (0.682-3.149)
	6-24 month	237 (65.1)	236 (64.8)	1.08 (0.758-1.534)	1.20 (0.764-1.888)
	>24 month	81 (22.3)	87 (23.9)	1	1
Formula milk feeding	Yes	256 (70.3)	259 (71.2)	0.96 (0.698-1.323)	1.02 (0.631-1.654)

Variables		Underweight, n	Normal, n	Logistic Regression Analysis	
		(%)	(%)	Crude OR	aOR
	No	108 (29.7)	105 (28.8)	1	1
Use of bottle feeding	Yes	275 (75.5)	268 (73.6)	1.11 (0.793-1.546)	1.01 (0.593-1.718)
	No	89 (24.5)	96 (26.4)	1	1
Use of pacifier	Yes	318 (87.4)	296 (81.3)	1.59 (1.058-2.384)*	1.79 (1.109-2.874)*
	No	46 (12.6)	68 (18.7)	1	1
Minimum dietary diversity status	Meet	352 (96.7)	355 (97.5)	1	1
	Do not meet	12 (3.3)	9 (2.5)	1.35 (0.560-3.231)	1.90 (0.624-5.752)
Achievement RNI for Kcal/day	Meet	125 (34.2)	106 (29.1)	1	1
	Do not meet	239 (65.7)	258 (70.9)	1.27 (0.931-1.741)	1.21 (0.823-1.781)
Achievement RNI for protein/day	Meet	11 (3.0)	8 (2.2)	1	1
	Do not meet	353 (97.0)	356 (97.8)	1.39 (0.551-3.488)	1.89 (0.287-2.733)
Food Insecurity	Food secure	128 (35.2)	138 (37.9)	1	1
	Food insecure	236 (64.8)	226 (62.1)	1.13 (0.832-1.523)	1.05 (0.728-1.527)
Place of stay while parents work	Kindergarten	233 (64.0)	290 (79.8)	1	1
	Babysitter	92 (25.3)	42 (11.5)	2.73 (1.821-4.082)	1.78 (0.859-3.694)
	Parent/Relative	39 (10.7)	32 (8.8)	1.52 (0.922-2.497)	0.68 (0.345-1.347)
Sleep time in a day	Optimal health sleep	208 (57.1)	208 (57.1)	1	1
	Below recommendation	148 (40.7)	147 (40.4)	1.01 (0.747-1.357)	0.94 (0.653-1.358)
	Above recommendation	8 (2.2)	9 (2.5)	0.89 (0.336-2.349)	0.70 (0.211-2.297)
Screen time in a day	<60 minutes	58 (15.9)	66 (18.1)	1	1
	≥60 minutes	306 (84.1)	298 (81.9)	1.17 (0.793-1.721)	1.51 (0.938-2.416)
MVPA time in a day	<180 minutes	27 (7.4)	22 (6.0)	1.25 (0.695-2.230)	0.75 (0.353-1.604)
	≥180 minutes	337 (92.6)	342 (94.0)	1	1

*p<0.05 for logistic regression analysis

5.4 Overweight and its risk factors

Total of 422 children (overweight=211 and normal=211) was successfully recruited. The data were cross tabulated and calculated for the odd ratio as shown in table 7.

Multiple logistic regression found, overweight or obese father was 1.87 times more likely to have overweight children compared to normal BMI father. Complication during pregnancy which is Gestational Diabetes Mellitus (GDM) found 2.93 times more likely to produce overweight children compared no complication during pregnancy. Pregnant women who only attend less than 9 time for antenatal visits found to have 3.33 time more likely to have overweight children compared to pregnant women who attend 9 to 14 time for her antenatal visit. Lastly, number of siblings less than 4 found to have 2.10 times to produce overweight children compared to having sibling 4 and above.

Table 7. Overweight and Its Associated Factor

Variables		Overweight, n(%)	Normal, n(%)	Logistic Regression Analysis	
				Crude OR	aOR
Mother's BMI	Normal	60 (28.5)	80 (37.9)	1	1
	Underweight	6 (2.8)	6 (2.8)	1.33 (0.410-4.339)	1.65 (0.290-9.433)
	Overweight/ Obese	145 (68.7)	125 (59.3)	1.55 (1.025-2.334)*	1.54 (0.801-2.978)
Father's BMI	Normal	40 (19.0)	56 (26.5)	1	1
	Underweight	9 (4.3)	14 (6.6)	0.90 (0.355-2.282)	1.05 (0.320-3.426)
	Overweight/ Obese	162 (76.8)	141 (66.8)	1.61 (1.011-2.559)*	1.88 (1.049-3.359)*
Mother's education level	Primary & Secondary	48 (22.7)	32 (15.2)	1.65 (1.004-2.703)*	1.05 (0.518-2.112)
	Tertiary	163 (77.3)	179 (84.8)	1	1
Mother's occupation	Government servant	160 (75.8)	178 (84.4)	0.59 (0.318-1.091)	0.63 (0.248-1.618)
	Private servant	22 (10.4)	14 (6.6)	1.03 (0.425-2.495)	0.79 (0.233-2.701)
	Not working/housewife	29 (13.7)	19 (9.0)	1	1
Father's education level	Primary & Secondary	64 (30.3)	46 (21.8)	1.56 (1.007-2.423)*	1.26 (0.647-2.445)
	Tertiary	147 (69.7)	165 (78.2)	1	1
Father's occupation	Government servant	126 (59.7)	136 (64.5)	1	1
	Private servant	64 (30.3)	58 (27.5)	1.19 (0.775-1.831)	1.27 (0.742-2.187)
	Not working/housewife	21 (10.0)	17 (8.1)	1.33 (0.673-2.642)	1.12 (0.482-2.615)
Threshold household monthly income	<RM7,380 (B40)	134 (63.5)	111 (52.6)	2.01 (0.709-5.709)	2.28 (0.400-12.972)
	RM7,380 – RM14,789 (M40)	71 (33.6)	90 (42.7)	1.32 (0.456-3.791)	1.93 (0.360-10.361)
	≥RM14,790 (T20)	6 (2.8)	10 (4.7)	1	1
Monthly expenditure for food	<RM1,000	189 (89.6)	179 (84.8)	0.63 (0.149-2.690)	0.50 (0.084-2.952)
	RM1,000 - RM1,999	17 (8.1)	29 (13.7)	0.35 (0.075-1.660)	0.24 (0.037-1.520)
	≥RM2,000	5 (2.4)	3 (1.4)	1	1

Variables		Overweight, n(%)	Normal, n(%)	Logistic Regression Analysis	
				Crude OR	aOR
Monthly expenditure for childcare	<RM1,000	119 (56.4)	87 (41.2)	2.02 (1.058-3.841)*	1.45 (0.595-3.544)
	RM1,000 - RM1,999	73 (34.6)	96 (45.5)	1.12 (0.581-2.162)	0.93 (0.404-2.123)
	>=RM2,000	19 (9.0)	28 (13.3)	1	1
Monthly expenditure for utility	<RM1,000	157 (74.4)	157 (74.4)	0.79 (0.387-1.609)	0.54 (0.209-1.373)
	RM1,000 - RM1,999	35 (16.6)	39 (18.5)	0.71 (0.313-1.603)	0.41 (0.141-1.181)
	>=RM2,000	19 (9.0)	15 (7.1)	1	1
Monthly expenditure for transport	<RM1,000	125 (59.2)	122 (57.8)	0.87 (0.436-1.742)	0.54 (0.198-1.452)
	RM1,000 - RM1,999	66 (31.3)	72 (34.1)	0.78 (0.376-1.613)	0.52 (0.192-1.382)
	>=RM2,000	20 (9.5)	17 (8.1)	1	1
Mother age during pregnancy	18 - 30 years old	88 (41.7)	95 (45.0)	1	1
	>30 years old	123(58.3)	116 (55.0)	1.15 (0.779-1.683)	1.28 (0.756-2.159)
Pre-pregnancy BMI	Normal	102 (48.3)	118 (55.9)	1	1
	Underweight	13 (6.2)	16 (7.6)	0.94 (0.432-2.047)	1.08 (0.313-3.688)
	Overweight / Obese	96 (45.5)	77 (36.5)	1.44 (0.967-2.152)	1.05 (0.563-1.940)
Weight gain during pregnancy	Sufficient	95 (45.0)	114 (54.0)	1	1
	Insufficient	50 (23.7)	48 (22.7)	1.25 (0.773-2.021)	1.22 (0.662-2.256)
	Excess	66 (31.3)	49 (23.2)	1.62 (1.021-2.558)*	1.26 (0.702-2.254)
Complication during pregnancy	None	153 (72.5)	166 (78.7)	1	1
	GDM	25 (11.8)	15 (7.1)	1.82 (0.919-3.558)	2.93 (1.239-6.936)*
	Anaemia	25 (11.8)	28 (13.3)	0.97 (0.541-1.734)	0.98 (0.470-2.053)
	Other (IUGR, HPT, etc)	8 (3.8)	2 (0.9)	4.34 (0.907-20.756)	5.99 (0.896-38.841)
Number of antenatal visits	<9	17 (8.1)	9 (4.3)	2.03 (0.877-4.693)	3.33 (1.088-10.174)*
	9-14	148 (70.1)	159 (75.4)	1	1
	≥15	46 (21.8)	43 (20.4)	1.15 (0.717-1.843)	0.95 (0.521-1.747)

Variables		Overweight, n(%)	Normal, n(%)	Logistic Regression Analysis	
				Crude OR	aOR
Knowledge	Less satisfied	10 (4.7)	7 (3.3)	1.45 (0.541-3.884)	1.28 (0.389-4.196)
	Satisfied	201 (95.3)	204 (96.7)	1	1
Practice	Fair	37 (17.5)	36 (17.1)	1.08 (0.602-1.947)	1.01 (0.484-2.099)
	Good	118 (55.9)	116 (55.0)	1.07 (0.686-1.675)	1.16 (0.661-2.040)
	Excellent	56 (26.5)	59 (28.0)	1	1
Behaviour	Risk of poor food behaviour	184 (87.2)	180 (85.3)	1.17 (0.674-2.045)	0.87 (0.428-1.750)
	No risk of poor food behaviour	27 (12.8)	31 (14.7)	1	1
Delivery method	Normal	124 (58.8)	148 (70.1)	1	1
	Forceps/vacuum	13 (6.2)	11 (5.2)	1.41 (0.610-3.260)	0.94 (0.329-2.653)
	Caesarean	74 (35.1)	52 (24.6)	1.70 (1.108-2.604)*	1.28 (0.697-2.362)
Delivery status	Mature	193 (91.5)	197 (93.4)	1	1
	Pre-term	18 (8.5)	14 (6.6)	1.31 (0.635-2.713)	1.69 (0.596-4.775)
Birth weight status	Normal birth weight	190 (90.0)	191 (60.5)	1	1
	Low birth weight	17 (8.1)	16 (7.6)	1.07 (0.524-2.176)	0.45 (0.139-1.467)
	Macrosomia	4 (1.9)	4 (1.9)	1.01 (0.248-4.078)	1.41 (0.207-9.654)
Birth length status	Normal	203 (96.2)	206 (97.6)	1	1
	Short	8 (3.8)	5 (2.4)	1.62 (0.522-5.047)	1.58 (0.366-6.797)
Head circumference	Normal	186 (88.2)	192 (91.0)	1	1
	Small	21 (10.0)	17 (8.1)	1.28 (0.652-2.493)	1.29 (0.516-3.246)
	Large	4 (1.8)	2 (0.9)	2.07 (.374-11.407)	2.50 (0.223-27.864)
Single children	Yes	42 (19.9)	21 (10.0)	2.25 (1.280-3.950)*	1.49 (0.706-3.128)
	No	169 (80.1)	190 (90.0)	1	1
Number of siblings	1 – 3	177 (83.9)	154 (73.0)	1.93 (1.197-3.103)*	2.10 (1.097-4.004)*
	4 and above	34 (16.1)	57 (27.0)	1	1

Variables		Overweight, n(%)	Normal, n(%)	Logistic Regression Analysis	
				Crude OR	aOR
Initiation of breastfeeding	Within 1 hour	147 (69.7)	161 (76.3)	1	1
	1-24 hour	49 (23.2)	31 (14.7)	1.73 (1.048-2.861)*	1.35 (0.666-2.747)
	After 1 day or Never	15 (7.1)	19 (9.0)	0.87 (0.424-1.764)	0.42 (0.157-1.135)
Exclusive breastfeeding	Yes	120 (56.9)	143 (67.8)	1	1
	No	91 (43.1)	68 (32.2)	1.60 (1.072-2.372)*	0.95 (0.392-2.317)
Predominant breastfeeding	Yes	136 (64.5)	163 (77.3)	1	1
	No	75 (35.5)	48 (22.7)	1.87 (1.221-2.873)*	1.46 (0.547-3.919)
Age stop breastfeeding	<6 month	39 (18.5)	21 (10.0)	2.34 (1.225-4.471)*	1.12 (0.455-2.764)
	6-24 month	122 (57.8)	127 (60.2)	1.21 (0.774-1.892)	1.10 (0.620-1.964)
	>24 month	50 (23.7)	63 (29.9)	1	1
Formula milk feeding	Yes	200 (94.8)	179 (84.8)	3.25 (1.591-6.638)*	2.49 (0.910-6.802)
	No	11 (5.2)	32 (15.2)	1	1
Use of bottle feeding	Yes	205 (97.2)	194 (91.9)	2.99 (1.157-7.751)*	2.25 (0.556-9.076)
	No	6 (2.8)	17 (8.1)	1	1
Use of pacifier	Yes	28 (13.3)	24 (11.4)	1.19 (0.666-2.134)	0.87 (0.404-1.886)
	No	183 (86.7)	187 (88.6)	1	1
Minimum dietary diversity status	Meet	205 (97.2)	209 (99.1)	1	1
	Do not meet	6 (2.8)	2 (0.9)	3.06 (0.610-15.330)	5.40 (0.450-64.875)
Achievement RNI for Kcal/day	Meet	147 (69.7)	134 (63.5)	1	1
	Do not meet	64 (30.3)	77 (36.5)	0.76 (0.505-1.137)	0.94 (0.562-1.575)
Achievement RNI for protein/day	Meet	210 (99.5)	207 (98.1)	1	1
	Do not meet	1 (0.5)	4 (1.9)	0.25 (0.027-2.223)	0.38 (0.025-5.659)
Food Insecurity	Food secure	72 (34.1)	69 (32.7)	1	1
	Food insecure	139 (65.9)	142 (67.3)	0.94 (0.626-1.406)	1.19 (0.718-1.953)

Variables		Overweight, n(%)	Normal, n(%)	Logistic Regression Analysis	
				Crude OR	aOR
Place of stay while parents work	Kindergarten	160 (75.8)	171 (81.0)	1	1
	Babysitter	33 (15.6)	26 (12.3)	1.36 (0.777-2.368)	1.62 (0.768-3.432)
	Relative	18 (8.5)	14 (6.6)	1.37 (0.662-2.854)	1.47 (0.487-4.434)
Sleep time in a day	Optimal health sleep	161 (76.3)	154 (73.0)	1	1
	Below recommendation	47 (22.3)	52 (24.6)	0.87 (0.55-1.359)	0.90 (0.510-1.569)
	Above recommendation	3 (1.4)	5 (2.4)	0.57 (0.135-2.443)	0.40 (0.070-2.320)
Screen time in a day	<60 minutes	3 (1.4)	5 (2.4)	1	1
	≥60 minutes	207 (98.1)	206 (97.6)	1.68 (0.395-7.099)	0.77 (0.099-5.970)
MVPA time in a day	<180 minutes	185 (87.7)	187 (88.6)	0.86 (0.397-1.852)	0.73 (0.284-1.883)
	≥180 minutes	15 (7.1)	13 (6.2)	1	1

*p<0.05 for logistic regression analysis

6.0 DISCUSSION

Data obtained from the phase I indicate that the prevalence of malnourished for under five years old children in Putrajaya was comparable with previous data in National Health and Morbidity Survey (NHMS) 2016. Prevalence for stunted was reported at 26.1% in this study, meanwhile in NHMS 2016 it was 24.3%.¹⁵ Other type of malnourished which was wasted, underweight and overweight were reported at 6.2%, 18.5% and 3.0% respectively from this study. Meanwhile, from NHMS 2016, the prevalence for wasted, underweight and overweight were reported at 8.7%, 12.9% and 4.5% respectively.¹⁵ Nowadays, malnourished among children remain alarming especially for stunted as it was globally reported as highest in prevalence and the prevalence rate declining to slow. Currently, the global prevalence of stunted was reported at 20.9%.²³ According to the new prevalence threshold categories for malnourished children, situation for children under five years old in Putrajaya can be classified as high for stunted, medium for wasted and low for overweight.²⁴

From the phase II, parental height was significant factor that contribute to stunted among children in Putrajaya. However, this factor considered as unmodifiable. However, threshold monthly household income, complication during pregnancy, pre-term delivery, low birth weight, use of bottle feeding, use of pacifier and do not achieve protein recommendation were also significant factor that contribute to stunting among children in Putrajaya. These 6 modifiable factors were important aspect to highlight to design program or intervention to reduce prevalence of stunting among children five years old in Putrajaya. A pooled analysis from 5 birth cohort from 5 countries report that factor that contribute to stunted include genetic and non-genetic factors, however nutrition-related intergenerational influences on growth can prevent the attainment of genetic height potential.²⁵

Parental education, father's occupation in private sectors, threshold monthly household income, pre-pregnancy BMI underweight, low birth weight, anaemic children, use of pacifier, do not meet RNI for protein and screen time 60 minutes and more were significantly factor associated with wasted. Meanwhile, mother occupation in private sector, threshold monthly household income, mother age during pregnancy more than 30 years old, low birth weight, anaemic children and use of pacifier were significantly factor associated with underweight.

Previous study also reported that parental education was a strong determinant of wasting, underweight and also other malnourished situation.^{26,27} The study conducted in Karnataka India, also reported that children that were born with low birth weight and low household income were found to be one of the factors associated with wasted among children.²⁸ Low haemoglobin level or anaemia also related with undernutrition among pre-school children.²⁹ Study conducted in India reported that the most common type of anaemia among children was microcytic followed by megaloblastic and they suggest with to add vitamin B12 supplementation to iron and folic acid for children.³⁰ Use of pacifiers was another important factor as previous study constantly reported that pacifiers will disturb meal pattern of the children, make them refuse to eat and can be source of infection.

The number of overweight children successfully recruited was lower than sample size required. Therefore, it probably affects the power of the study and multiple logistic regression analysis unable to detect many significant associations. Only obese father, gestational diabetes, antenatal visit less than 9 times, and number of siblings less than 4 found as a factor associated with overweight among children under five years old in Putrajaya. Based on these factors, environment and pre-pregnancy care is a very important aspect to highlight. Previous study reported that overweight children closely related with the condition during antenatal period, the nourishment during 1000 days of life and the environment where they live.³¹ As children cannot choose the environment in which they live or the food they eat and also have a limited ability to understand the long-term consequences of their behaviour, their close related person such as parent, sibling and teachers play important role to provide special attention to fighting the malnutrition among younger group.³²

7.0 CONCLUSION

In conclusion, B40 and M40 household income group, low birth weight and use of pacifier and low protein intake were the cross-over factors that significantly associated with malnutrition. Intervention that focus on these factors believe can reduce the prevalence of malnutrition. Other modifiable factors such as low haemoglobin level, complication during pregnancy, delivery status, parental weight, use of bottle feeding, parental education and occupation, pre-pregnancy BMI, screen time, mother age during pregnancy and number of antenatal visits could also give an intention in the intervention program as it also significantly associated with malnutrition among children under five years old in Putrajaya.

8.0 RECOMMENDATION

From the result obtained in this study, some recommendation is proposed for authority and individual consideration.

1. Increase socio-economic status of the population in Putrajaya by providing subsidies in type of coupon or discount voucher for buying nutritious food to B40 and M40 household income group.
2. Strengthen the nutrition and health promotion on the importance of appropriate antenatal care among women by creating more support group in community.
3. Increase enforcement on code of ethics for the marketing of infant foods and related products.
4. Improve the children food intake by educate the parent/babysitter/kindergarten to provide more nutritious food and ensure their children consume variety of food daily especially from the fish and meat source.
5. Educate the parents to control body weight and practice healthy lifestyle so they can be icon for their children.
6. Support children's social and physical development by reducing screen by changing to other activities that might offer more benefits such as reading book, play with puzzle or go to play ground.

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BORANG SOAL SELIDIK

CASE-CONTROL STUDY FOR MALNOURISHED AMONG CHILDREN UNDER 5 YEARS OLD IN PUTRAJAYA

ID Responden

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Presint			ID Rumah		No. Anak		Kod Kategori				Kategori Kes		
							A:Kes						
							B:Kawalan						

Tarikh Temuramah

____/____/2018

Individu yang ditemuramah :

<input type="checkbox"/>	Ibu	: Nama
<input type="checkbox"/>	Bapa	: Nama
<input type="checkbox"/>	Penjaga yang sah	: Nama
	Nyatakan hubungan dengan (anak)		

Alamat Rumah :

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No. Tel :

ID Penemuramah :

A9)	Apakah status kediaman tersebut?	<input type="checkbox"/> Kuarters kerajaan <input type="checkbox"/> Menyewa <input type="checkbox"/> Disediakan majikan <input type="checkbox"/> Menumpang <input type="checkbox"/> Hak milik sendiri																																																																																								
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A11)	Berdasarkan buku rekod kesihatan bayi dan kanak-kanak, berapakah bilangan temujanji dan kedatangan untuk pengukuran berat dan tinggi sehingga kini.	Mempunyai buku rekod kesihatan bayi dan kanak-kanak sewaktu temuramah : <input type="checkbox"/> Ya, Berapa kali temujanji : ____ kali Berapa kali kehadiran : ____ kali <input type="checkbox"/> Tidak, terus ke soalan A14																																																																																								
A12)	Isikan maklumat berat dan panjang/tinggi anak dari Buku Rekod Kesihatan Bayi Dan Kanak-Kanak. *Jika lengkap, isikan semuanya *Jika tidak lengkap, isikan berdasarkan lawatan yang dilakukan.	i) Lahir sehingga 2 tahun <table border="1" data-bbox="726 1070 1422 1816"> <thead> <tr> <th>Lawatan</th> <th>Berat (kg)</th> <th>Tinggi/panjang (cm)</th> <th>Tarikh pengukuran</th> </tr> </thead> <tbody> <tr><td>1 bulan</td><td></td><td></td><td></td></tr> <tr><td>2 bulan</td><td></td><td></td><td></td></tr> <tr><td>3 bulan</td><td></td><td></td><td></td></tr> <tr><td>4 bulan</td><td></td><td></td><td></td></tr> <tr><td>5 bulan</td><td></td><td></td><td></td></tr> <tr><td>6 bulan</td><td></td><td></td><td></td></tr> <tr><td>7 bulan</td><td></td><td></td><td></td></tr> <tr><td>8 bulan</td><td></td><td></td><td></td></tr> <tr><td>9 bulan</td><td></td><td></td><td></td></tr> <tr><td>10 bulan</td><td></td><td></td><td></td></tr> <tr><td>11 bulan</td><td></td><td></td><td></td></tr> <tr><td>12 bulan</td><td></td><td></td><td></td></tr> <tr><td>13 bulan</td><td></td><td></td><td></td></tr> <tr><td>14 bulan</td><td></td><td></td><td></td></tr> <tr><td>15 bulan</td><td></td><td></td><td></td></tr> <tr><td>16 bulan</td><td></td><td></td><td></td></tr> <tr><td>17 bulan</td><td></td><td></td><td></td></tr> <tr><td>18 bulan</td><td></td><td></td><td></td></tr> <tr><td>19 bulan</td><td></td><td></td><td></td></tr> <tr><td>20 bulan</td><td></td><td></td><td></td></tr> <tr><td>21 bulan</td><td></td><td></td><td></td></tr> </tbody> </table>	Lawatan	Berat (kg)	Tinggi/panjang (cm)	Tarikh pengukuran	1 bulan				2 bulan				3 bulan				4 bulan				5 bulan				6 bulan				7 bulan				8 bulan				9 bulan				10 bulan				11 bulan				12 bulan				13 bulan				14 bulan				15 bulan				16 bulan				17 bulan				18 bulan				19 bulan				20 bulan				21 bulan			
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A17)	Taraf Perkahwinan	<input type="checkbox"/> Tidak pernah berkahwin <input type="checkbox"/> Berkahwin <input type="checkbox"/> Berpisah <input type="checkbox"/> Janda/Duda/Balu <input type="checkbox"/> Tinggal bersama pasangan <input type="checkbox"/> Tidak berkenaan <input type="checkbox"/> EJ <input type="checkbox"/> TT														
A18)	Taraf Pendidikan	<input type="checkbox"/> Tiada Pendidikan formal <input type="checkbox"/> Sekolah rendah <input type="checkbox"/> Sekolah menengah <input type="checkbox"/> Universiti / Kolej / Politeknik <input type="checkbox"/> EJ <input type="checkbox"/> TT														
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A34)	Pendapatan individu	RM _____, ____ / Bulan <input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
Tambahan maklumat sosioekonomi keluarga / isi rumah		
A35)	Pendapat isi rumah dari sumber lain (Sewaan harta, kerja sambilan, pelaburan, bantuan zakat, dan lain-lain)	RM _____ - ____ / Bulan <input type="checkbox"/> Tidak Tahu <input type="checkbox"/> Enggan Jawab
A36)	Pendapatan isi rumah	RM _____ - ____ / Bulan <input type="checkbox"/> Tidak Tahu <input type="checkbox"/> Enggan Jawab
A37)	Kebiasaannya berapakah anggaran perbelanjaan untuk membeli makanan termasuk bahan mentah/bahan dapur untuk dimasak dalam sebulan?	RM _____ - ____ / Bulan <input type="checkbox"/> Tidak Tahu <input type="checkbox"/> Enggan Jawab
A38)	Kebiasaannya berapakah anggaran perbelanjaan untuk pengurusan jagaan dan keperluan anak-anak dalam sebulan?	RM _____ - ____ / Bulan <input type="checkbox"/> Tidak Tahu <input type="checkbox"/> Enggan Jawab
A39)	Kebiasaannya berapakah anggaran perbelanjaan untuk bayaran perumahan, bil utiliti dan lain-lain pengelenggaraan rumah dalam sebulan?	RM _____ - ____ / Bulan <input type="checkbox"/> Tidak Tahu <input type="checkbox"/> Enggan Jawab
A40)	Kebiasaannya berapakah anggaran perbelanjaan untuk pengangkutan (ansuran kenderaan, petrol, diesel, tol, train, teksi dan lain-lain) dalam sebulan?	RM _____ - ____ / Bulan <input type="checkbox"/> Tidak Tahu <input type="checkbox"/> Enggan Jawab

BAHAGIAN B: SEJARAH KESIHATAN DAN PERUBATAN		
Sejarah Kesihatan Dan Perubatan Anak (Nama Anak :.....)		
B1)	Jenis kelahiran	<input type="checkbox"/> Normal <input type="checkbox"/> Bantuan forcep/vacuum <input type="checkbox"/> Caesarean
B2)	Jangkamasa kandungan semasa melahirkan	<input type="text"/> <input type="text"/> Minggu
B3)	Berat lahir	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> gram
B4)	Panjang lahir	<input type="text"/> <input type="text"/> . <input type="text"/> cm
B5)	Ukur lilit kepala sewaktu lahir	<input type="text"/> <input type="text"/> . <input type="text"/> cm <input type="checkbox"/> Enggan
B6)	Sepanjang 6 bulan lepas, berapa kerap anak anda mengalami sakit (demam, cirit-birit, selesema, dan lain-lain)	<p>B6i) Demam</p> <p><input type="checkbox"/> Tidak pernah <input type="checkbox"/> Enggan jawab</p> <p><input type="checkbox"/> Setiap bulan <input type="checkbox"/> Tidak tahu</p> <p><input type="checkbox"/> Sekali dalam dua bulan</p> <p><input type="checkbox"/> Sekali dalam 3 bulan atau lebih</p> <p>B6ii) Cirit-birit</p> <p><input type="checkbox"/> Tidak pernah <input type="checkbox"/> Enggan jawab</p> <p><input type="checkbox"/> Setiap bulan <input type="checkbox"/> Tidak tahu</p> <p><input type="checkbox"/> Sekali dalam dua bulan</p> <p><input type="checkbox"/> Sekali dalam 3 bulan atau lebih</p> <p>B6iii) Batuk / Selesema</p> <p><input type="checkbox"/> Tidak pernah <input type="checkbox"/> Enggan jawab</p> <p><input type="checkbox"/> Setiap bulan <input type="checkbox"/> Tidak tahu</p> <p><input type="checkbox"/> Sekali dalam dua bulan</p> <p><input type="checkbox"/> Sekali dalam 3 bulan atau lebih</p> <p>B6iv) Lain-lain : nyatakan : Contoh: Serangan asma/semput /alergik/ekzema</p> <p><input type="checkbox"/> Tidak pernah <input type="checkbox"/> Enggan jawab</p> <p><input type="checkbox"/> Setiap bulan <input type="checkbox"/> Tidak tahu</p> <p><input type="checkbox"/> Sekali dalam dua bulan</p> <p><input type="checkbox"/> Sekali dalam 3 bulan atau lebih</p>
B7)	Sepanjang 6 bulan lepas, berapa kerap anak anda mengalami kecederaan ringan (luka ringan, lebam dan lain-lain)	<p><input type="checkbox"/> Tidak pernah</p> <p><input type="checkbox"/> Setiap bulan</p> <p><input type="checkbox"/> Sekali dalam dua bulan</p> <p><input type="checkbox"/> Sekali dalam 3 bulan atau lebih</p>
B8)	Berapa kerap anak anda mengalami kecederaan teruk (patah, luka dengan pendarahan teruk dan lain-lain)	<p><input type="checkbox"/> Tidak pernah</p> <p><input type="checkbox"/> Setiap bulan</p> <p><input type="checkbox"/> Sekali dalam dua bulan</p> <p><input type="checkbox"/> Sekali dalam 3 bulan atau lebih</p>

B9)	Sejarah jangkitan cacing	<input type="checkbox"/> Pernah <input type="checkbox"/> Tidak pernah <input type="checkbox"/> Tidak Tahu
B10)	Adakah anak anda mengidap sebarang penyakit kronik *Boleh jawab lebih dari satu jawapan	<input type="checkbox"/> Tidak menghidap sebarang penyakit kronik (Terus ke B13) <input type="checkbox"/> Penyakit jantung kongenital <input type="checkbox"/> Asma / Penyakit lelah <input type="checkbox"/> Thelisemia <input type="checkbox"/> Penyakit kulit alahan. ekzema <input type="checkbox"/> Kanser <input type="checkbox"/> Lain-lain : Nyatakan
B11)	Jika menghidap penyakit kronik, adakah anak anda mendapat nasihat atau rawatan untuk penyakit yang dihadapi?	<input type="checkbox"/> Ya <input type="checkbox"/> Tidak. Nyatakan kenapa
B12)	Daripada mana anda mendapatkan nasihat atau rawatan kesihatan untuk anak? *Boleh jawab lebih dari satu jawapan	<input type="checkbox"/> Klinik/hospital kerajaan <input type="checkbox"/> Klinik/hospital swasta <input type="checkbox"/> Tempat pengamal kesihatan tradisional atau komplementari <input type="checkbox"/> Lain-lain, seperti farmasi, kedai atau jiran
Sejarah Kandungan, Kesihatan Dan Perubatan Ibu		
B13)	Umur sewaktu melahirkan anak	<input type="text"/> <input type="text"/> Tahun
B14)	Berat badan sebelum hamil	<input type="text"/> <input type="text"/> . <input type="text"/> <input type="text"/> kg
B15)	Berat badan semasa booking/lawatan pertama (1 st trimester)	<input type="text"/> <input type="text"/> . <input type="text"/> <input type="text"/> kg
B16)	Berat badan semasa lawatan terakhir sebelum bersalin (3 rd trimester)	<input type="text"/> <input type="text"/> . <input type="text"/> <input type="text"/> kg
B17)	Status kehamilan dan kelahiran anak	<input type="checkbox"/> Gravida (kehamilan) <input type="checkbox"/> Para (kelahiran hidup)
B18)	Adakah anda mengalami penyakit berikut sewaktu mengandungkan anak? (boleh lebih dari satu jawapan)	<input type="checkbox"/> Tiada penyakit <input type="checkbox"/> Diabetes Mellitus <input type="checkbox"/> Tekanan darah tinggi <input type="checkbox"/> Aneamia <input type="checkbox"/> Intrauterine growth restriction (IUGR) <input type="checkbox"/> Masalah jantung <input type="checkbox"/> Lain-lain. Nyatakan
B19)	Bacaan hemoglobin semasa mengandungkan anak ? (Rujuk buku rekod kesihatan ibu)	1:Hb (Awal kehamilan/booking) (____ minggu Kehamilan) 2:Hb (pertama kali Hb < 11 gm atau pertengahan kehamilan) (____ minggu Kehamilan) 3:Hb (akhir kehamilan) (____ minggu kehamilan)
B20)	Bilangan kedatangan pemeriksaan antenatal	_____ kali

BAHAGIAN C: PENGETAHUAN, SIKAP DAN AMALAN IBU BAPA/PENJAGA TERHADAP PEMAKANAN ANAK		
Pengetahuan		
Arahan : Sila tandakan (✓) pada SATU pilihan jawapan yang paling sesuai bagi tiap-tiap soalan.		
C1)	Sesuatu diet yang seimbang mengandungi zat (nutrient) berikut :	<input type="checkbox"/> Karbohidrat dan lemak <input type="checkbox"/> Vitamin dan mineral <input type="checkbox"/> Karbohidrat, lemak, protein dan mineral <input type="checkbox"/> Karbohidrat, lemak, protein, vitamin dan mineral <input type="checkbox"/> Tidak tahu
C2)	Anak anda boleh mendapatkan semua zat (nutrient) yang diperlukan dengan cara :	<input type="checkbox"/> Memakan banyak makanan <input type="checkbox"/> Memakan banyak daging <input type="checkbox"/> Memakan pelbagai jenis makanan <input type="checkbox"/> Memakan makanan yang mahal <input type="checkbox"/> Tidak tahu
C3)	Mengikut piramid makanan (<i>food pyramid</i>), kumpulan makanan yang anda dinasihatkan makan paling sedikit ialah :	<input type="checkbox"/> Daging, ikan dan ayam <input type="checkbox"/> Sayur dan buah <input type="checkbox"/> Lemak, minyak, gula dan garam <input type="checkbox"/> Nasi, bijirin dan ubi <input type="checkbox"/> Tidak tahu
C4)	Antara senarai di bawah, makanan yang paling tinggi kandungan serat/ gentian/ serabut adalah :	<input type="checkbox"/> Sayur dan kekacang <input type="checkbox"/> Susu dan produk tenusu <input type="checkbox"/> Daging, ayam dan itik <input type="checkbox"/> Ikan dan makanan laut <input type="checkbox"/> Tidak tahu
C5)	Antara berikut, makanan yang manakah mengandungi paling banyak kandungan karbohidrat :	<input type="checkbox"/> Ayam <input type="checkbox"/> Roti <input type="checkbox"/> Sayur-sayuran <input type="checkbox"/> Buah-buahan <input type="checkbox"/> Tidak tahu
C6)	Antara berikut, makanan yang manakah mengandungi paling banyak kandungan protein :	<input type="checkbox"/> Nasi <input type="checkbox"/> Roti dan biskut <input type="checkbox"/> Buah-buahan <input type="checkbox"/> Ikan dan susu <input type="checkbox"/> Tidak tahu
Sikap Dan Amalan		
Arahan : Sila tandakan (✓) pada pilihan jawapan yang paling sesuai		
C7)	Saya memastikan anak saya tidak makan makanan manis seperti gula-gula, kek, aiskrim secara berlebihan.	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
C8)	Saya memastikan anak saya tidak makan makanan tinggi lemak secara berlebihan.	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
C9)	Saya memastikan anak saya tidak makan kesukaannya secara berlebihan.	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah

C10)	Saya bimbang anak saya makan secara berlebihan	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
C11)	Saya tahu apabila anak saya rasa kenyang.	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
C12)	Saya akan sedih jika anak saya makan secara berlebihan	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
C13)	Saya memberi makanan kepada anak saya apabila diminta olehnya tanpa mengira masa	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
C14)	Saya membenarkan anak saya makan mengikut kehendaknya.	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
C15)	Saya membenarkan anak saya memilih makanan semasa waktu makan.]	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
C16)	Saya akan membenarkan anak saya berjalan/bersiar-siar sambil makan.	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
C17)	Saya membenarkan anak saya makan antara waktu hidangan utama	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
C18)	Saya hanya membenarkan anak saya makan mengikut waktu yang ditetapkan	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
C19)	Saya yang akan menentukan sukatan snek yang anak saya makan	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
C20)	Saya akan menetapkan waktu untuk anak saya mengambil snek.	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
C21)	Saya akan menetapkan waktu makan anak saya.	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
C22)	Saya menghadiahkan anak saya gula-gula, aiskrim dan kek apabila berkelakuan baik.	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
C23)	Saya menggunakan makanan kesukaan anak saya sebagai syarat untuk memastikan anak berkelakuan baik.	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah

C24)	Anak saya akan memakan makanan ringan berlebihan jika saya tidak memberi perhatian atau tanpa kawalan.	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
C25)	Saya bimbang anak saya berlebihan berat badan.	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
C26)	Saya tahu apabila anak saya rasa lapar.	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
C27)	Saya menyuap anak saya untuk mengatasi masalah cerewet atau memilih makanan.	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
C28)	Saya akan menyuap anak saya sendiri serta merta apabila anak cerewet dan memilih makanan	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
C29)	Saya bimbang anak saya tidak cukup makan	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
C30)	Saya rasa tertekan apabila memberi makanan kepada anak saya	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
C31)	Saya bimbang jika anak saya kurang berat badan	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
C32)	Anak saya memerlukan galakan untuk menghabiskan makanan	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah

BAHAGIAN D: TABIAT DAN TINGKAH LAKU MAKAN ANAK		
Arahan : Sila tandakan (✓) pada SATU pilihan jawapan yang paling sesuai bagi tiap-tiap soalan. Semak semula		
D1)	Anak saya mengambil makanan manis (Contoh: coklat, gula-gula, biskut, kuih, wafer).	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
D2)	Anak saya mengambil makanan berlemak/berminyak seperti ayam goreng, burger dan pisang goreng.	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
D3)	Anak saya mengambil kordial, minuman bergas, minuman jus buah-buahan, air kotak/tin/botol dan air sirap.	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
D4)	Anak saya mengambil snek masin (jeruk asam).	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
D5)	Anak saya minum kopi atau teh.	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
D6)	Anak saya makan makanan ringan lebih tiga kali sehari.	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
D7)	Anak saya akan meninggalkan meja makan apabila kenyang walaupun keluarga masih makan.	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
D8)	Anak saya akan pilih makanan yang disukai sahaja semasa waktu makan.	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
D9)	Anak saya cerewet memilih makanan.	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
D10)	Anak saya tidak bersarapan.	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah
D11)	Anak saya kurang makan jika kurang perhatian diberi semasa waktu makan.	<input type="checkbox"/> Selalu <input type="checkbox"/> Kadang-kadang <input type="checkbox"/> Tidak pernah

BAHAGIAN E: SEJARAH PENYUSUAN SUSU IBU DAN PEMAKANAN ANAK		
Arahan : Sila tandakan (✓) atau jawab pada kotak jawapan yang disediakan bagi tiap-tiap soalan di bawah		
E1)	Selepas (nama anak) dilahirkan, bilakah bayi puan diletakkan ke payu dara untuk pertama kalinya?	<input type="checkbox"/> Dalam masa 1 jam lepas bersalin <input type="checkbox"/> Antara 1-24 jam lepas bersalin <input type="checkbox"/> Selepas 1 hari bersalin <input type="checkbox"/> Tidak diletakkan ke payu dara selepas dilahirkan <input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
E2)	Adakah (nama anak) pernah diberikan susu ibu (susu badan)?	<input type="checkbox"/> Ya <input type="checkbox"/> Tidak. Terus ke E5 <input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
E3)	Adakah (nama anak) masih disusukan dengan susu ibu (susu badan)?	<input type="checkbox"/> Ya, Terus ke E5 <input type="checkbox"/> Tidak <input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
E4)	Berapa umur (nama anak) semasa berhenti menyusu susu ibu (susu badan)?	<input type="text"/> <input type="text"/> <input type="text"/> Minggu/Week <input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab Nota : 1 bulan = 4 minggu
E5)	Adakah (nama anak) pernah diberikan susu formula bayi?	<input type="checkbox"/> Ya . Bila mula diberi? <input type="checkbox"/> Tidak. Terus ke E8 <input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
E6)	Adakah (nama anak) masih diberikan susu formula bayi?	<input type="checkbox"/> Ya. Terus ke E8 <input type="checkbox"/> Tidak <input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
E7)	Berapa umur (nama anak) semasa berhenti menyusu susu formula bayi?	<input type="text"/> <input type="text"/> <input type="text"/> Minggu/Week <input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab Nota : 1 bulan = 4 minggu
E8)	Adakah (nama anak) pernah menghisap puting kosong?	<input type="checkbox"/> Ya. Bila mula diberi? <input type="checkbox"/> Tidak. Terus ke E11 <input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
E9)	Adakah (nama anak) masih menghisap puting kosong?	<input type="checkbox"/> Ya. Terus ke E11 <input type="checkbox"/> Tidak <input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
E10)	Pada umur berapakah (nama anak) berhenti mengisap puting kosong?	<input type="text"/> <input type="text"/> <input type="text"/> Minggu/Week <input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab Nota : 1 bulan = 4 minggu

E11)	Adakah (nama anak) diberi apa-apa minuman atau makanan menggunakan botol susu dengan puting termasuk susu ibu di dalam botol?	<input type="checkbox"/> Ya. Bila mula botol? <input type="checkbox"/> Tidak <input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
Sejarah penyusuan sewaktu anak berumur bawah 6 bulan		
E12)	Ketika anak anda berumur bawah 6 bulan (siang dan malam), adakah (nama anak) diberi minuman berikut termasuk minuman yang diambil di luar rumah.	
	i) Air kosong / air masak / air mineral / air minuman.	<input type="checkbox"/> Ya. Pada umur berapa mula diberikan? <input type="checkbox"/> Tidak <input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
	ii) Jus segar daripada buah.	<input type="checkbox"/> Ya. Pada umur berapa mula diberikan <input type="checkbox"/> Tidak <input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
	iii) Minuman bergula (jus buah komersial, kordial, air sirap, teh) dan minuman bermalta (milo, vico, ovaltine, horlick).	<input type="checkbox"/> Ya. Pada umur berapa mula diberikan? <input type="checkbox"/> Tidak <input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
	iv) Air Garam / ORS? – DENGAN preskripsi anggota kesihatan (Doktor/PPP)	<input type="checkbox"/> Ya <input type="checkbox"/> Tidak <input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
	v) Air Garam / ORS? – TANPA preskripsi anggota kesihatan (Doktor / PPP)	<input type="checkbox"/> Ya <input type="checkbox"/> Tidak <input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
	vi) Vitamin atau mineral tambahan atau ubat-ubatan? – DENGAN preskripsi anggota kesihatan (Doktor/PPP)	<input type="checkbox"/> Ya <input type="checkbox"/> Tidak <input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
	vii) Vitamin atau mineral tambahan atau ubat-ubatan? – TANPA preskripsi anggota kesihatan (Doktor / PPP)	<input type="checkbox"/> Ya <input type="checkbox"/> Tidak <input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
	viii) Kuah sup (seperti air rebusan ayam, ikan, daging, sayur)	<input type="checkbox"/> Ya. Pada umur berapa mula diberikan? <input type="checkbox"/> Tidak <input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab

	ix) Susu formula bayi	<input type="checkbox"/> Ya. Pada umur berapa mula diberikan <input type="text"/> <input type="text"/> <input type="text"/> Minggu/Week Berapa kerap sehari <input type="text"/> <input type="text"/> Kali/hari <input type="checkbox"/> Tidak	<input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
	x) Susu selain susu ibu dan susu formula bayi seperti susu tepung atau susu segar daripada sumber haiwan contohnya susu kambing/susu lembu segar?	<input type="checkbox"/> Ya. Pada umur berapa mula diberikan <input type="text"/> <input type="text"/> <input type="text"/> Minggu/Week Berapa kerap sehari <input type="text"/> <input type="text"/> Kali/hari <input type="checkbox"/> Tidak	<input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
	xi) Selain daripada susu badan / susu lain / susu botol, Adakah (nama anak) diberi makan (makanan utama dan/atau snek)?	<input type="checkbox"/> Ya. Pada umur berapa mula diberikan <input type="text"/> <input type="text"/> <input type="text"/> Minggu/Week Berapa kerap sehari <input type="text"/> <input type="text"/> Kali/hari <input type="checkbox"/> Tidak	<input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
Pengambilan makanan anak pada masa kini/sekarang			
E13)	Adakah (nama anak) diberi makanan berikut termasuk makanan yang diambil di luar rumah :		
	i) Hasil tenusu (seperti dadih, yogurt, keju)?	<input type="checkbox"/> Ya <input type="checkbox"/> Tidak	<input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
	ii) Makanan khas untuk bayi yang dikomersialkan (seperti makanan bayi berasaskan bijirin)?	<input type="checkbox"/> Ya <input type="checkbox"/> Tidak	<input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
	iii) Makanan berasaskan bijirin (seperti nasi, roti, mee, bubur)?	<input type="checkbox"/> Ya <input type="checkbox"/> Tidak	<input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
	iv) Labu manis, lobak merah, keledak yang berwarna kuning atau oren?	<input type="checkbox"/> Ya <input type="checkbox"/> Tidak	<input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
	v) Ubi ubian yang berwarna putih (seperti ubi kentang, ubi keladi putih, keladi Sarawak, ubi kayu)	<input type="checkbox"/> Ya <input type="checkbox"/> Tidak	<input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
	vi) Sebarang sayuran berdaun hijau?	<input type="checkbox"/> Ya <input type="checkbox"/> Tidak	<input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab

	vii) Buah-buahan yang kaya kandungan vitamin A seperti mangga, betik, tembikai, pisang, tembikai susu, rock melon?	<input type="checkbox"/> Ya <input type="checkbox"/> Tidak	<input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
	viii) Buah-buahan dan sayur-sayuran lain (seperti rambutan, belimbing, tomato, kobis, bunga kobis dan jagung)?	<input type="checkbox"/> Ya <input type="checkbox"/> Tidak	<input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
	ix) Hati atau organ dalaman haiwan?	<input type="checkbox"/> Ya <input type="checkbox"/> Tidak	<input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
	x) Sebarang daging (seperti ayam, itik, lembu, kambing)?	<input type="checkbox"/> Ya <input type="checkbox"/> Tidak	<input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
	xi) Telur (seperti ayam, itik, puyuh, angsa)?	<input type="checkbox"/> Ya <input type="checkbox"/> Tidak	<input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
	xii) Ikan segar, ikan kering, ikan bilis atau makanan laut (seperti sotong, udang)?	<input type="checkbox"/> Ya <input type="checkbox"/> Tidak	<input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab
	xiii) Makanan berasaskan kacang dan kekacang (seperti kacang hijau, kacang pis, kacang dhal dan lain-lain kekacang)?	<input type="checkbox"/> Ya <input type="checkbox"/> Tidak	<input type="checkbox"/> Tidak tahu <input type="checkbox"/> Enggan jawab

BAHAGIAN F: KEJAMINDAPATAN MAKANAN		
Arahan : Bagi setiap situasi pemakanan keluarga berikut, sila nyatakan samada ianya 'tidak betul atau tidak pernah terjadi' atau 'kadang-kala betul atau kadang-kadang pernah terjadi' atau 'selalu betul atau selalu terjadi' kepada anda dan keluarga.		
F1)	Saya risau sekiranya makanan atau bahan-bahan mentah untuk dimasak habis sebelum saya sempat mendapatkan bekalan yang lain.	<input type="checkbox"/> Tidak betul atau tidak pernah terjadi. <input type="checkbox"/> Kadangkala betul atau kadang-kadang pernah terjadi. <input type="checkbox"/> Selalu betul atau selalu terjadi
F2)	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	<input type="checkbox"/> Tidak betul atau tidak pernah terjadi. <input type="checkbox"/> Kadangkala betul atau kadang-kadang pernah terjadi. <input type="checkbox"/> Selalu betul atau selalu terjadi
F3)	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 makan tersebut.	<input type="checkbox"/> Tidak betul atau tidak pernah terjadi. <input type="checkbox"/> Kadangkala betul atau kadang-kadang pernah terjadi. <input type="checkbox"/> Selalu betul atau selalu terjadi
F4)	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.	<input type="checkbox"/> Tidak betul atau tidak pernah terjadi. <input type="checkbox"/> Kadangkala betul atau kadang-kadang pernah terjadi. <input type="checkbox"/> Selalu betul atau selalu terjadi
F5)	Saya selalu berasa lapar tetapi saya tidak makan kerana tidak mempunyai keupayaan untuk mendapatkan makanan.	<input type="checkbox"/> Tidak betul atau tidak pernah terjadi. <input type="checkbox"/> Kadangkala betul atau kadang-kadang pernah terjadi. <input type="checkbox"/> Selalu betul atau selalu terjadi
F6)	Saya hanya makan sedikit sahaja daripada apa yang sepatutnya saya makan kerana saya tidak berupaya untuk mendapatkan makanan.	<input type="checkbox"/> Tidak betul atau tidak pernah terjadi. <input type="checkbox"/> Kadangkala betul atau kadang-kadang pernah terjadi. <input type="checkbox"/> Selalu betul atau selalu terjadi
F7)	Saya tidak mampu untuk makan dengan kenyang atau makan dengan puas kerana saya tidak berupaya untuk mendapatkan makanan	<input type="checkbox"/> Tidak betul atau tidak pernah terjadi. <input type="checkbox"/> Kadangkala betul atau kadang-kadang pernah terjadi. <input type="checkbox"/> Selalu betul atau selalu terjadi
F8)	Anak-anak saya tidak makan dengan cukup atau sentiasa kekurangan makanan kerana saya tidak mampu untuk mendapatkan makanan yang cukup	<input type="checkbox"/> Tidak betul atau tidak pernah terjadi. <input type="checkbox"/> Kadangkala betul atau kadang-kadang pernah terjadi. <input type="checkbox"/> Selalu betul atau selalu terjadi
F9)	Saya tahu anak-anak saya kadang-kala berasa lapar tetapi saya tidak boleh berbuat apa-apa kerana saya tidak mempunyai keupayaan untuk mendapatkan makanan berlebihan daripada apa yang selalu saya dapat	<input type="checkbox"/> Tidak betul atau tidak pernah terjadi. <input type="checkbox"/> Kadangkala betul atau kadang-kadang pernah terjadi. <input type="checkbox"/> Selalu betul atau selalu terjadi
F10)	Saya tidak berupaya memberi sajian makanan yang seimbang kepada anak-anak saya kerana saya tidak mempunyai keupayaan untuk menyediakan makanan tersebut	<input type="checkbox"/> Tidak betul atau tidak pernah terjadi. <input type="checkbox"/> Kadangkala betul atau kadang-kadang pernah terjadi. <input type="checkbox"/> Selalu betul atau selalu terjadi

BAHAGIAN G : AKTIVITI FIZIKAL DAN MASA SKRIN			
Arahan : Sila tandakan (✓) atau jawab pada kotak jawapan yang berkenaan			
G1)	Adakah anda menghantar anak anda ke kelas yang melibatkan aktiviti fizikal (seperti kelas berenang, kelab bola sepak, kelas silat/taekwondo/karate)	<input type="checkbox"/> Ya <input type="checkbox"/> Tidak, terus ke G3	<input type="checkbox"/> Tidak Tahu <input type="checkbox"/> Enggan Jawab
G2)	Jika Ya (G1), berapa anggaran jam sehari anak anda menghadiri kelas tersebut?	<input type="text"/> <input type="text"/> Jam	<input type="checkbox"/> Tidak Tahu <input type="checkbox"/> Enggan Jawab
G3)	Adakah (nama anak) ada pendedahan kepada televisyen?	<input type="checkbox"/> Ya <input type="checkbox"/> Tidak, terus ke G5	<input type="checkbox"/> Tidak Tahu <input type="checkbox"/> Enggan Jawab
G4)	Jika Ya (G3), berapa anggaran jam sehari anak anda menonton televisyen?	<input type="text"/> <input type="text"/> Jam	<input type="checkbox"/> Tidak Tahu <input type="checkbox"/> Enggan Jawab
G5)	Adakah (nama anak) ada pendedahan kepada gadget berskrin seperti tablet, computer, telefon pintar?	<input type="checkbox"/> Ya <input type="checkbox"/> Tidak, terus ke G7	<input type="checkbox"/> Tidak Tahu <input type="checkbox"/> Enggan Jawab
G6)	Jika Ya (G5), berapa anggaran jam sehari anak anda terdedah kepada gadget berskrin seperti tablet, computer, telefon pintar?	<input type="text"/> <input type="text"/> Jam	<input type="checkbox"/> Tidak Tahu <input type="checkbox"/> Enggan Jawab
G7)	Berapa lama pada kebiasaannya anak (nama anak) tidur pada waktu malam?	<input type="text"/> <input type="text"/> Jam	<input type="checkbox"/> Tidak Tahu <input type="checkbox"/> Enggan Jawab
G8)	Berapa lama pada kebiasaannya anak (nama anak) tidur pada waktu siang?	<input type="text"/> <input type="text"/> Jam	<input type="checkbox"/> Tidak Tahu <input type="checkbox"/> Enggan Jawab

BAHAGIAN H : AKTIVITI FIZIKAL

Arahan : Soal selidik ini bertanyakan tentang aktiviti yang anak anda lakukan dalam tempoh sebulan yang lepas, kekerapan dan tempoh masa yang diambil untuk setiap aktiviti. Soal selidik ini mengandungi tiga (3) bahagian dan anda diminta untuk menjawab semua soalan dengan jawapan yang paling tepat bagi menggambarkan aktiviti anak anda. Tiada jawapan betul atau salah dalam soal selidik ini dan jawapan anda akan dirahsiakan.

1) Dalam tempoh 30 hari / sebulan yang lepas, berapa harikah dalam satu minggu dan berapa lamakah dalam satu hari anak anda melakukan aktiviti berikut di rumah atau taska?

Kekerapan Aktiviti	Lebih dari sekali dalam seminggu (Ya / Tidak)	Kekerapan	Masa yang diambil dalam sehari untuk melakukan aktiviti (tandakan ✓ pada berkenaan)				
		Hari dalam seminggu (Jika tiada, tulis 0)	15 minit atau kurang	16 – 30 minit /hari	31 – 60 minit /hari	Lebih dari 60 minit sehari (Anggaran masa)	
						Jam _____	Minit _____
a. Mewarna/melukis/ melakukan aktiviti kraf		___/7 hari				_____	_____
b. Duduk bermain dengan permainan seperti anak patung/ lego/ mainan pendidikan		___/7 hari				_____	_____
c. Menonton televisyen/DVD		___/7 hari				_____	_____
d. Bermain permainan komputer/video (tidak termasuk permainan yang melibatkan pergerakan fizikal secara aktif seperti <i>Nintendo</i>)		___/7 hari				_____	_____
e. Duduk mendengar muzik dan menyanyi		___/7 hari				_____	_____
f. Membaca atau mendengar bacaan/membaca bersama		___/7 hari				_____	_____
g. Bermain aktif di dalam rumah (menari, merangkak, berlari/ bermain, bermain kereta mainan kayuhan kaki (<i>sit and ride toys</i>), bermain permainan komputer/video yang melibatkan pergerakan aktif untuk bermain seperti <i>Nintendo</i>)		___/7 hari				_____	_____

h. Bermain dengan aktif di halaman rumah		___/7 hari				Jam _____	Minit _____	
i. Melakukan aktiviti fizikal/aktif bermain sehingga anak anda berpeluh atau menyebabkan mereka bermafas dengan kuat/laju		___/7 hari				Jam _____	Minit _____	
2) Dalam tempoh 30 hari / sebulan yang lepas, berapa hari dalam satu minggu dan berapa lamakah dalam satu hari anak anda melakukan aktiviti berikut untuk bergerak dari satu tempat ke tempat yang lain:								
Kekerapan Aktiviti	Kurang dari sekali dalam seminggu (Ya / Tidak)	Kekerapan	Masa yang diambil dalam sehari untuk melakukan aktiviti (tandakan ✓ pada berkenaan)					
		Hari dalam seminggu (Jika tiada, tulis 0)	15 minit atau kurang	16 – 30 minit /hari	31 – 60 minit /hari	Lebih dari 60 minit sehari (Anggaran masa)		
j. Di dalam kereta sorong bayi		___/7 hari				Jam _____	Minit _____	
k. Berjalan		___/7 hari				Jam _____	Minit _____	
l. Didukung		___/7 hari				Jam _____	Minit _____	
m. Di dalam kereta		___/7 hari				Jam _____	Minit _____	
n. Di dalam pengangkutan awam		___/7 hari				Jam _____	Minit _____	
3) Dalam tempoh 30 hari / sebulan yang lepas, berapa hari dalam satu minggu dan berapa lamakah dalam satu hari anak anda melakukan aktiviti berikut:								
Kekerapan Aktiviti	Kurang dari sekali dalam seminggu (Ya / Tidak)	Kekerapan	Masa yang diambil dalam sehari untuk melakukan aktiviti (tandakan ✓ pada berkenaan)					
		Hari dalam seminggu (Jika tiada, tulis 0)	15 minit atau kurang	16 – 30 minit /hari	31 – 60 minit /hari	Lebih dari 60 minit sehari (Anggaran masa)		
o. Bermain di taman rekreasi/ taman permainan		___/7 hari				Jam _____	Minit _____	
p. Bermain di tempat permainan tertutup (<i>indoor</i>)		___/7 hari				Jam _____	Minit _____	

BAHAGIAN I : PENGUKURAN ANTROPOMETRI DAN HAEMOGLOBIN
(Tarikh pengukuran : ____/____/2018)

Anak			
11)	Berat badan	i) Bacaan pertama : [] [] . [] kg ii) Bacaan kedua [] [] . [] kg	
12)	Panjang / tinggi	i) Bacaan pertama [] [] [] . [] cm ii) Bacaan kedua [] [] [] . [] cm	
13)	Ukur lilit kepala	i) Bacaan pertama [] [] [] . [] cm ii) Bacaan kedua [] [] [] . [] cm	<input type="checkbox"/> Tidak layak <input type="checkbox"/> Enggan
14)	Ukur lilit pergelangan lengan atas	i) Bacaan pertama [] [] [] . [] cm ii) Bacaan kedua [] [] [] . [] cm	<input type="checkbox"/> Tidak layak <input type="checkbox"/> Enggan
15)	Haemoglobin	[] [] . [] g/dL	<input type="checkbox"/> Tidak layak <input type="checkbox"/> Enggan
Ibu			
14)	Berat badan	i) Bacaan pertama : [] [] . [] kg ii) Bacaan kedua [] [] . [] kg	<input type="checkbox"/> Tidak layak <input type="checkbox"/> Enggan
15)	Tinggi	i) Bacaan pertama : [] [] [] . [] cm ii) Bacaan kedua [] [] [] . [] cm	<input type="checkbox"/> Tidak layak <input type="checkbox"/> Enggan
Bapa			
16)	Berat badan	i) Bacaan pertama : [] [] . [] kg ii) Bacaan kedua [] [] . [] kg	<input type="checkbox"/> Tidak layak <input type="checkbox"/> Enggan
17)	Tinggi	i) Bacaan pertama : [] [] [] . [] cm ii) Bacaan kedua [] [] [] . [] cm	<input type="checkbox"/> Tidak layak <input type="checkbox"/> Enggan



DIARI PENGAMBILAN MAKANAN

PENILAIAN STATUS PEMAKANAN KANAK-KANAK
BERUMUR BAWAH 5 TAHUN DI PUTRAJAYA

iku
INSTITUTE FOR PUBLIC HEALTH



INSTITUT KESIHATAN UMUM • KEMENTERIAN KESIHATAN MALAYSIA

ID: - -

NAMA ANAK:


NAMA IBUBAPA/PENJAGA:

NO. TELEFON:

NAMA TASKA:

Saiz Hidangan Makanan


Sudu & Senduk



A B C

A Sudu teh
B Sudu sup
C Sudu makan


Mangkuk




D E F

D Mangkuk Kecil
E Mangkuk Cina
F Mangkuk Besar


Senduk



Cawan



Gelas A



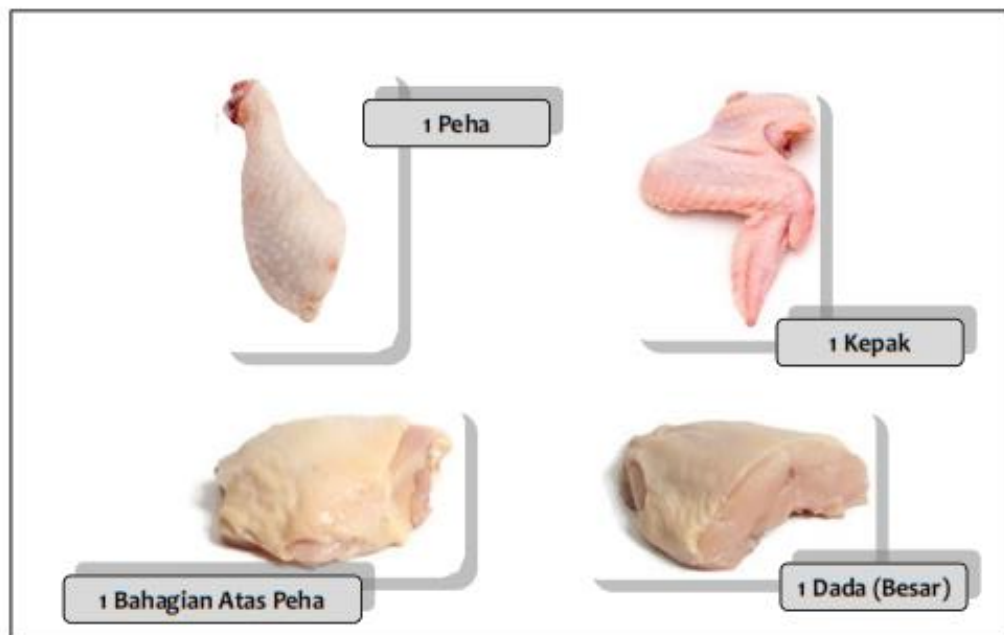
* Untuk menganggarkan pengambilan sayur-sayuran

* Untuk menganggarkan pengambilan cecair

Saiz Hidangan Makanan

Ayam

* Untuk menganggarkan pengambilan makanan



Bahagian dada ayam



Saiz Hidangan Makanan

Daging



Untuk menganggarkan pengambilan daging

Ikan



1 Ekor



1/2 Ekor



1 Keping



1/2 Keping

• BAHAGIAN 2

Contoh Diari Pengambilan Makanan/Minuman

HARI PERTAMA

HARI : KHAMIS

TARIKH : 3/10/2013

Waktu : SARAPAN	Tempat	Jenis Makanan/ Minuman	Kuantiti
7.30 pagi	Taska	Bubur nasi	1 cawan
		- lobak merah	1/2 sudu makan
		- sawi	1 sudu makan
		Susu ibu (di pam)	1 botol 4 oz

Waktu : MINUM PAGI	Tempat	Jenis Makanan/ Minuman	Kuantiti
10.00 pagi	Taska	Betik	1/2 potong
		Biskut Tiger	2 keping
		Susu jenama X	1 botol (8 oz)
		- 5 scoop susu X	
		- air suam	

Contoh Diari Pengambilan Makanan/Minuman

HARI PERTAMA

HARI : KHAMIS

TARIKH : 3/10/2013

Waktu : TENGAHARI	Tempat	Jenis Makanan/ Minuman	Kuantiti
12.00 tengahari	Taska	Nasi putih kosong	1 Senduk
		- ayam sup (bahagian dada)	1 ketul kecil
		- ubi kentang	1 sudu teh
		Bayam tumis air	1 sudu makan
		Air kosong	1 gelas A

WAKTU : MINUM PETANG	Tempat	Jenis Makanan/ Minuman	Kuantiti
4.30 petang	Taska	Cucur labu	3 ketul saiz sederhana
		Susu jenama X	1 botol (8 oz)
		- 5 scoop susu X	
		- air suam	

• BAHAGIAN 2

Contoh Diari Pengambilan Makanan/Minuman

HARI PERTAMA

HARI : KHAMIS

TARIKH : 3/10/2013

Waktu : MAKAN MALAM	Tempat	Jenis Makanan/ Minuman	Kuantiti
7.30 petang	Rumah	Nasi putih kosong	1 Senduk
		- ikan tenggiri masak kicap	1/2 keping
		- kangkung goreng	1 sudu makan
		Air kosong	1 gelas A

Waktu : MINUM MALAM	Tempat	Jenis Makanan/ Minuman	Kuantiti
9.00 malam	Rumah	Susu ibu	30 minit

Diari Pengambilan Makanan/Minuman

CARA MENGISI :

1. Tulis **SEMUA** makanan, snek atau minuman yang anak anda ambil dalam **2 hari di antara Isnin sehingga Jumaat dan 1 hari hujung minggu/hari bercuti.**
2. Catat segera sebaik sahaja anak anda mengambil sebarang makanan/minuman.
3. Nyatakan dengan terperinci makanan/minuman diambil termasuk sukatan kuah dan sos.
4. Nyatakan anggaran kuantiti diambil dengan menggunakan peralatan rumah tangga seperti di **BAHAGIAN 1.**

HARI PERTAMA (Isnin—Jumaat):

HARI : _____ **TARIKH :** _____

Waktu : SARAPAN	Tempat	Jenis Makanan/ Minuman	Kuantiti

Waktu : MINUM PAGI	Tempat	Jenis Makanan/ Minuman	Kuantiti

• **BAHAGIAN 2**

Diari Pengambilan Makanan/Minuman

CARA MENGISI :

1. Tulis **SEMUA** makanan, snek atau minuman yang anak anda ambil dalam **2 hari di antara Isnin sehingga Jumaat dan 1 hari hujung minggu/hari bercuti.**
2. Catat segera sebaik sahaja anak anda mengambil sebarang makanan/minuman.
3. Nyatakan dengan terperinci makanan/minuman diambil termasuk sukatan kuah dan sos.
4. Nyatakan anggaran kuantiti diambil dengan menggunakan peralatan rumah tangga seperti di **BAHAGIAN 1.**

HARI PERTAMA (Isnin—Jumaat):

HARI : _____ **TARIKH :** _____

Waktu : TENGAHARI	Tempat	Jenis Makanan/ Minuman	Kuantiti

Waktu : MINUM PETANG	Tempat	Jenis Makanan/ Minuman	Kuantiti

Diari Pengambilan Makanan/Minuman

- CARA MENGISI :**
1. Tulis **SEMUA** makanan, snek atau minuman yang anak anda ambil dalam 2 hari di antara Isnin sehingga Jumaat dan 1 hari hujung minggu/hari bercuti.
 2. Catat segera sebaik sahaja anak anda mengambil sebarang makanan/minuman.
 3. Nyatakan dengan terperinci makanan/minuman diambil termasuk sukatan kuah dan sos.
 4. Nyatakan anggaran kuantiti diambil dengan menggunakan peralatan rumah tangga seperti di **BAHAGIAN 1**.

HARI PERTAMA (Isnin—Jumaat):

HARI : _____ **TARIKH :** _____

Waktu : MAKAN	Tempat	Jenis Makanan/ Minuman	Kuantiti

Waktu : MINUM MALAM	Tempat	Jenis Makanan/ Minuman	Kuantiti

• **BAHAGIAN 2**

Diari Pengambilan Makanan/Minuman

CARA MENGISI :

1. Tulis **SEMUA** makanan, snek atau minuman yang anak anda ambil dalam **2 hari di antara Isnin sehingga Jumaat dan 1 hari hujung minggu/hari bercuti.**
2. Catat segera sebaik sahaja anak anda mengambil sebarang makanan/minuman.
3. Nyatakan dengan terperinci makanan/minuman diambil termasuk sukatan kuah dan sos.
4. Nyatakan anggaran kuantiti diambil dengan menggunakan peralatan rumah tangga seperti di **BAHAGIAN 1.**

HARI KEDUA (Isnin—Jumaat):

HARI : _____

TARIKH : _____

Waktu : SARAPAN	Tempat	Jenis Makanan/ Minuman	Kuantiti

Waktu : MINUM PAGI	Tempat	Jenis Makanan/ Minuman	Kuantiti

Diari Pengambilan Makanan/Minuman

CARA MENGISI :

1. Tulis **SEMUA** makanan, snek atau minuman yang anak anda ambil dalam **2 hari** di antara **Isnin** sehingga **Jumaat** dan **1 hari hujung minggu/hari bercuti**.
2. Catat segera sebaik sahaja anak anda mengambil sebarang makanan/minuman.
3. Nyatakan dengan terperinci makanan/minuman diambil termasuk sukatan kuah dan sos.
4. Nyatakan anggaran kuantiti diambil dengan menggunakan peralatan rumah tangga seperti di **BAHAGIAN 1**.

HARI KEDUA (Isnin—Jumaat):

HARI : _____ **TARIKH :** _____

Waktu : TENGAHARI	Tempat	Jenis Makanan/ Minuman	Kuantiti

Waktu : MINUM PETANG	Tempat	Jenis Makanan/ Minuman	Kuantiti

• **BAHAGIAN 2**

Diari Pengambilan Makanan/Minuman

CARA MENGISI :

1. Tulis **SEMUA** makanan, snek atau minuman yang anak anda ambil dalam **2 hari di antara Isnin sehingga Jumaat dan 1 hari hujung minggu/hari bercuti**.
2. Catat segera sebaik sahaja anak anda mengambil sebarang makanan/minuman.
3. Nyatakan dengan terperinci makanan/minuman diambil termasuk sukatan kuah dan sos.
4. Nyatakan anggaran kuantiti diambil dengan menggunakan peralatan rumah tangga seperti di **BAHAGIAN 1**.

HARI KEDUA (Isnin—Jumaat):

HARI : _____

TARIKH : _____

Waktu : MAKAN	Tempat	Jenis Makanan/ Minuman	Kuantiti

Waktu : MINUM MALAM	Tempat	Jenis Makanan/ Minuman	Kuantiti

Diari Pengambilan Makanan/Minuman Hari Ketiga (Sabtu/Ahad)

- CARA MENGISI :**
1. Tulis **SEMUA** makanan, snek atau minuman yang anak anda ambil dalam **2 hari** di antara Isnin sehingga Jumaat dan 1 hari hujung minggu/hari bercuti.
 2. Catat segera sebaik sahaja anak anda mengambil sebarang makanan/minuman.
 3. Nyatakan dengan terperinci makanan/minuman diambil termasuk sukatan kuah dan sos.
 4. Nyatakan anggaran kuantiti diambil dengan menggunakan peralatan rumah tangga seperti di **BAHAGIAN 1**.

HARI KETIGA (Sabtu/Ahad):

HARI : _____ **TARIKH :** _____

Waktu : SARAPAN	Tempat	Jenis Makanan/ Minuman	Kuantiti

Waktu : MINUM PAGI	Tempat	Jenis Makanan/ Minuman	Kuantiti

BAHAGIAN 2

Diari Pengambilan Makanan/ Minuman Hari Ketiga (Sabtu/Ahad)

CARA MENGISI :

1. Tulis **SEMUA** makanan, snek atau minuman yang anak anda ambil dalam 2 hari di antara Isnin sehingga Jumaat dan 1 hari hujung minggu/hari bercuti.
2. Catat segera sebaik sahaja anak anda mengambil sebarang makanan/minuman.
3. Nyatakan dengan terperinci makanan/minuman diambil termasuk sukatan kuah dan sos.
4. Nyatakan anggaran kuantiti diambil dengan menggunakan peralatan rumah tangga seperti di **BAHAGIAN 1**.

HARI KETIGA (Sabtu/Ahad):

HARI : _____

TARIKH : _____

Waktu : TENGAHARI	Tempat	Jenis Makanan/ Minuman	Kuantiti
Waktu : MINUM PETANG	Tempat	Jenis Makanan/ Minuman	Kuantiti

Diari Pengambilan Makanan/Minuman Hari Ketiga (Sabtu/Ahad)

CARA MENGISI :

1. Tulis **SEMUA** makanan, snek atau minuman yang anak anda ambil dalam 2 hari di antara Isnin sehingga Jumaat dan 1 hari hujung minggu/hari bercuti.
2. Catat segera sebaik sahaja anak anda mengambil sebarang makanan/minuman.
3. Nyatakan dengan terperinci makanan/minuman diambil termasuk sukatan kuah dan sos.
4. Nyatakan anggaran kuantiti diambil dengan menggunakan peralatan rumah tangga seperti di **BAHAGIAN 1**.

HARI KETIGA (Sabtu/Ahad):

HARI : _____ **TARIKH :** _____

Waktu : MAKAN MALAM	Tempat	Jenis Makanan/ Minuman	Kuantiti

Waktu : MINUM MALAM	Tempat	Jenis Makanan/ Minuman	Kuantiti



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