UNIVERSITI PUTRA MALAYSIA

ASSOCIATIONS OF MILK FEEDING PRACTICE, MILK APPETITE, AND DIETARY INTAKE WITH NUTRITIONAL STATUS AMONG CHILDREN AGED 2-4 IN PERMATA NEGARA ZON TENGAH

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BY

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

ACKNOWLEDGEMENTS

First of all, I would like to express our deepest appreciation to my beloved supervisor, Dr Nurul Husna who guided all the way and never look down on me. I would like to thank her for giving us moral support and where there is a lack of motivation until I am here today. She is indeed my inspiration.

I am also in gratitude of my research partner, Nur Aina Afrina who helped me a lot throughout these 2 semesters. She is a very cooperative team partner and willing to help in times when I need her help when problems arose. This thesis would not have been a success without her assistance.

This is also an appreciation post to my beloved friends who are always by my side when I needed their support. I would never forget their kindness throughout the process of conducting this project

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LIST OF ABBREVIATIONS

AI	Adequate Intake
BAZ	BMI-for-age
BEBQ	Baby Eating Behaviour Questionnaire
BMI	Body mass index
EAR	Estimated Average Requirement
ED	Energy density
EF	Enjoyment of food
ESPGHAN	European Society for Paediatric Gastroenterology, Hepatology and Nutrition
FACE	Family, Adolescent and Child Research Centre of Excellence
FR	Food responsiveness
GA	General appetite
GUM	Growing up milk
HAZ	Height-for-age
HFCS	High- fructose corn syrup
ICP	Infancy, childhood, and puberty
NHMS	National Health and Morbidity Survey
PERMATA	Pusat Anak Permata
PUFAs	Polyunsaturated fatty acids
RNI	Recommended Nutrient Intake
SE	Slowness in eating
SEANUTS	Nutrition Survey of Malaysian Children
SR	Satiety responsiveness
SES	Socio-economic status
SFFQ	Semi-quantitative Food Frequency Questionnaire
SSB	Sugar-sweetened beverage
UNICEF	United Nations Children's Fund
VLDL	Very-low-density lipoprotein
YCF	Young child formula
WAZ	Weight-for-age
WHO	World Health Organization

Abstract

ASSOCIATIONS OF MILK FEEDING PRACTICE, MILK APPETITE, AND DIETARY INTAKE WITH NUTRITIONAL STATUS AMONG YOUNG CHILDREN AGED 2 TO 4 IN PERMATA NEGARA ZON TENGAH

Rasyidah binti Ali

Double burden of malnutrition persists to become a critical issue among children under five. Potential contributing factors include dietary contribution. However, studies among children after two years of life are scarce despite many of them are transitioning from infant to a family diet. Therefore, this study aims to investigate the associations of milk feeding practice, milk appetite, and dietary intake with child nutritional status among young children. A cross-sectional study involving 197 children aged 2 to 4 was conducted in PERMATA Negara Zon Tengah. A self-administered questionnaire comprised sociodemographic characteristics, milk feeding practice, milk appetite, and dietary intake were completed by child's mother. Milk feeding practice included questions on breastfeeding, formula milk, and other milk feeding. Meanwhile, milk appetite was assessed using Baby Eating Behaviour Questionnaire (BEBQ) that consists of scales from 1 (low) to 5 (highest) for appetite traits (Food Responsiveness, Enjoyment of Food, Satiety Responsiveness, Slowness in Eating, and General Appetite). Dietary intake was assessed using the Semi-quantitative Food Frequency Questionnaire (FFQ). Weight and height of the children were measured to calculate for weight-for-age (WAZ), height-for-age (HAZ), and BMI-for-age (BAZ) as nutritional status indicators. Majority of the study population were Malay (97.5%), males (56.9%), with a mean population age of 3.3 ± 0.7 years. 9.5% of children experienced underweight and stunting, meanwhile 6.3% faced possible risk to be overweight. Milk intake was the highest in formula milk feeding with 3.07±1.1 frequency times and 185.4±74.4 ml volume daily. Age of introducing complementary feeding was negatively associated with WAZ (r=-0.152, p=0.038), while breastfeeding duration was negatively associated with WAZ (r=-0.201, p=0.007) and HAZ (r=-0.214, p=0.004). Slowness in Eating (mean score=2.3 ±0.8) showed negative associations with WAZ (r=-0.188, p=0.01) and HAZ (r=-0.161, p=0.027). No association was found between sociodemographic characteristics, formula milk, other milk feeding practices other appetite traits, and dietary intake with nutritional status. Dietary factors specifically milk feeding practice and appetite were associated with nutritional status among children. Interventions should focus on parenting education for early milk feeding practices and appetite for healthy growth.

Abstrak

KAITAN ANTARA AMALAN PENGAMBILAN SUSU, SELERA SUSU, DAN PENGAMBILAN MAKANAN DENGAN STATUS NUTRITSI DI KALANGAN UMUR 2 HINGGA 4 TAHUN DI PERMATA NEGARA ZON TENGAH

Rasyidah binti Ali

Malnutrisi terus menjadi isu kritikal dalam kalangan kanak-kanak bawah usia lima tahun. Antara yang menyumbang adalah pemakanan. Walau bagaimanapun, kajian dalam kalangan kanak-kanak selepas umur dua tahun adalah terhad walaupun ramai antara mereka beralih daripada pemakanan bayi kepada pemakanan keluarga. Justeru, kajian ini bertujuan untuk mngetahui kaitan antara amalam pengambilan susu, selera susu, dan pengambilan makanan dengan status nutrisi kanak-kanak. Kajian rentas keratan yang melibatkan 197 kanak-kanak berumur 2 hingga 4 telah dijalankan di PERMATA Negara Zon Tengah. Soal selidik yang dijalankan termasuk ciri-ciri sosiodemografi, amalan pemakanan susu, selera susu, dan pengambilan makanan untuk dijawab oleh ibu kepada anak tersebut. Amalan pengambilan susu termasuk penyusuan susu ibu, susu formula, dan lain-lain susu. Sementara itu, selera susu dinilai menggunakan *Baby Eating Behavior Questionnaire* (BEBQ) yang terdiri daripada skala 1 (rendah) hingga 5 (tertinggi) untuk *Food Responsiveness, Enjoyment of Food, Satiety Responsiveness, Slowness in Eating, and General Appetite*. Pengambilan makanan dikira menggunakan *Semi-quantitative Food Frequency Questionnaire* (FFQ). Berat dan tinggi kanak-kanak diukur menggunakan berat-untuk-umur (WAZ), tinggi-untuk-umur (HAZ), dan *BMI*-untuk-umur (BAZ) sebagai petunjuk status pemakanan. Majoriti populasi kajian ialah Melayu (97.5%), lelaki (56.9%), dengan umur penduduknya 3.3 ± 0.7 tahun. Seramai 9.5% kanak-kanak mengalami kekurangan berat badan dan pendarahan, manakala 6.3% menghadapi risiko yang mungkin berlebihan berat badan. Pengambilan susu formula adalah yang tertinggi dengan masa kekerapan sebanyak 3.07 ± 1.1 dan jumlah 185.4 ± 74.4 ml setiap hari. Umur memperkenalkan makanan pelengkap dikaitkan secara negatif dengan WAZ ($r = -0.152$, $p = 0.038$), manakala tempoh penyusuan adalah negatif dikaitkan dengan WAZ ($r = -0.201$, $p = 0.007$) dan HAZ ($r = -0.214$, $p = 0.004$). *Slowness in Eating* (purata skor = 2.3 ± 0.8) menunjukkan kaitan negatif dengan WAZ ($r = -0.188$, $p = 0.01$) dan HAZ ($r = -0.161$, $p = 0.027$). Tiada kaitan yang ditemui antara ciri-ciri sosiodemografi, amalan penyusuan susu formula, amalan pemakanan lain-lain susu, selera susu, dan pengambilan makanan dengan status nutritsi. Faktor diet khususnya amalan pengambilan susu dan selera makan menunjukkan kaitan dengan status pemakanan dalam kalangan kanak-kanak. Intervensi harus memberi tumpuan kepada pendidikan keibubapaan untuk amalan penyusuan awal anak dan selera bagi pertumbuhan yang sihat.

CHAPTER 1

INTRODUCTION

1.1 Background

Based on a recent report by Global Nutrition Report (2018), the prevalence of malnutrition among children under five years of age remains a concern as 150.8 million children were stunted, 50.5 million experienced wasting, while 38.3 million children were considered overweight. Similarly, Malaysia is now experiencing a "triple burden" issue when 11.5% of children under 5 were wasted and 20.7% had been recognized as stunted whereas 6.0% were overweight (Global Nutrition Report: Malaysia, 2018). These emerging trend of overnutrition and progressing undernutrition among Malaysian children are subjected to problems in both developing and developed countries and is considered as a challenging situation facing by Malaysia partly due to nutrition transition.

Nutrition in early life plays a critical role for children to grow up as healthy adults. Figure 1.1 shows the infancy, childhood, and puberty (ICP) model that was introduced by Kalberg (1989). This is an illustration of the main role of adequate nutrition which is

critical during the paediatric years as children are still developing their physical, physiological and cognitive potential. Consuming healthy diet based on the recommended guidelines is crucial for maintaining a healthy weight and preventing chronic illnesses throughout life, including in childhood years. Nutritional needs that are met in a supportive event is what required to reach development potential and optimal growth. According to the World Health Organization (2018), inadequate nutrition contributed the most with 45% of mortality cases in children under 5 years old. Developing countries showed a prominent concern due to children's consumption of traditional diets into energy-dense diets that will interfere with their growth and development.

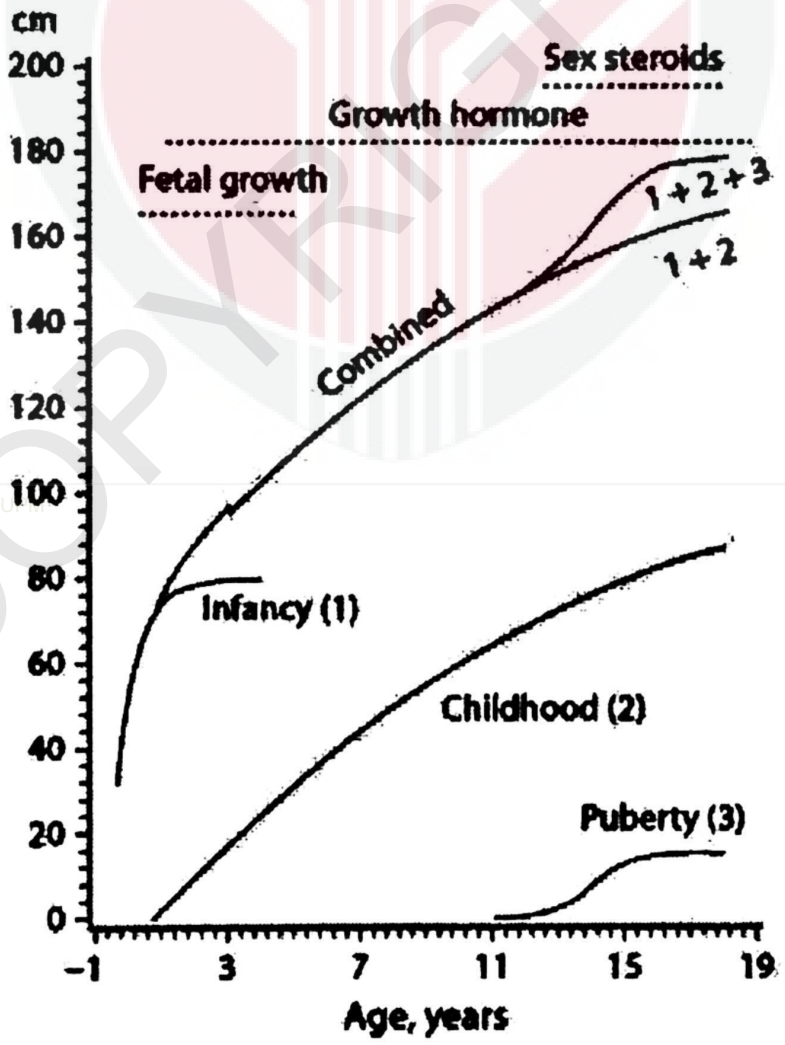

Figure 1.1. ICP model proposed by Karlberg

Exclusive breastfeeding is recommended for infants up to 6 months and is complemented together with solid foods until they reach 2 years. Beer et al. (2015) suggested that it is a critical phase of introducing family diets after the children achieving 6 months from the phase of exclusive breastfeeding or infant formula which has evolved throughout their life. This important decision will develop and set healthy dietary preferences appropriate for their age as well as preventing malnutrition. However, less is known on the contribution of different types of milk particularly formula milk to the nutritional status of the children during this transition period (Scott et al., 2016). In the first 4 years of life, responsibilities and tasks of parental feeding are undergoing a transition to child self-feeding as children are becoming proficient at eating the variety of age-appropriate foods. Food preferences and dietary pattern that were introduced in childhood years contributed to the regulation of later eating habits which are difficult for changes.

Young child formula (YCF) is defined as milk-based or plant protein-based formula that is made to partially satisfy the nutritional requirement of young children aged 1-3 (Hojsak et al., 2018). This study has a similar definition to Khor et al. (2014) although the term is used as growing up milk (GUM). However, we decided to use YCF as it is clearly reviewed by European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) Committee on Nutrition regarding the composition of the formula. ESPGHAN Committee on Nutrition suggested it is unnecessary to consume YCF for normal children but may be a recommendation for those who are having nutrients deficiency to increase intake of iron, vitamin D, polyunsaturated fatty acids (n-3 PUFAs) as another option to supplementation of healthy diets.

Based on Baker et al. in 2016, sales of milk-based formulas for infants and children are getting accepted by populations due to increment in total formula milk consumed per infant or child in a year from 5.5 kg in 2008 to 7.8 kg in 2013 and might be predicted to increase by 10.8 kg in the upcoming 2018. The demand and preferences to YCF are shown by nearly three-quarter of children aged 1-3 and half of children 4-6 years old in Malaysia as consistent consumers (Khor et al., 2014). Therefore, this study is aimed to determine the associations of milk feeding practice, milk appetite, and dietary intake with nutritional status among children aged 2-4 in Pusat Anak Permata Negara (PERMATA Negara) Zon Tengah.

1.2 Problem Statement

Formula-based milk marketing is progressively underway with 43% increase from 2008 until 2013 and Malaysia is listed as one of the countries that possess a rapid sale in formula drinks (Smith, Salmon, & Baker, 2016). Syrad, Van Jaarsveld, Wardle, and Llewellyn (2015) identified that formula milk was chosen as a substitute in their diet rather than acting as a supplement to solid foods. Syrad et al. (2015) further explained that more than 60% of mothers perceived their children consuming YCF due to poor appetite thus led them having low food intake. Parents may assume that YCF is equipped with better ingredients and specially formulated rather than giving their children aged 2 and above a whole cow's milk (Palafox & Harris, 2017). In fact, marketing strategies devoted by formula milk industries are dominating milk industry with the similar packaging, labelling and font sizes choices that probably drive parents with confusion as if this formula

marketed for children are supposed to be continued, thus becoming a necessity for parents to purchase (Baker et al., 2016).

Some of the YCF products also contains ingredients which are not suitable for young children that only require lower energy but higher in nutrient needs. For instance, based on a study made by Palafox and Harris (2017), out of 20 formula products marketed for young children, 80% contain higher sugar amount including corn syrup and sucrose, and 100% are less protein compared to whole dry milk. This will impact their normal growth pattern thus leading them to risk of malnutrition, particularly obesity. Dr. Muhammad Yazid, a paediatric endocrinologist as one of the symposium speakers organized by Malaysian Paediatric Association in 2011 expressed his concern on the high-fructose corn syrup (HFCS) ingredients contained in formula milk (Malaysian Paediatric Association, 2011). HCFC affected body cells to be less sensitive to insulin due to the complex metabolism of fructose that eventually converts to triglycerides and very-low-density-lipoprotein (VLDL) which are the factors of insulin insensitivity. This would likely increase the risk of having high adiposity in young children.

The study that was done by Khor et al. (2014) in Malaysia stated that drinking formula milk at the highest amount among age groups of 1-3 years old as having an average consumption of 700 ml equivalent to 3.5 cups daily. This exceeded the recommendation of 2-3 cups (200ml/cup) a day by the Ministry of Health but there are limited studies investigating local child milk consumption and its link with weight gain. In a westernized study claimed by Vos et al. (2017), higher intake of added sugars will increase adiposity level. Based on 3 longitudinal studies among pre-schoolers aged 2 to 5

suggested sugar-sweetened beverage (SSB) consumption which contains added sugars, including HFCS as the hidden ingredients were associated with higher BMI z-score at the age of 5 to 7 and might pose to obesity risk. (DeBoer Scharf, & Demmer, 2013; Lim et al., 2009; Dubois, Farmer, Girard, & Peterson, 2007).

The dietary intake among 1 in 4 young children in the United States had nutrients inadequacy based on their lower-than-recommended-fat intake, meanwhile 84% and 71% of the total children faced a lower estimated average requirement (EAR) in vitamin D and E respectively, and <1% experienced a lower adequate intake (AI) for fiber and potassium (Ahluwalia et al., 2018). Stunting was previously recognized by Zalilah et al. (2016) to have positive association with higher energy density foods. This finding may postulate the role of higher energy density foods on the double burden of malnutrition. However, these cause mixed findings on body weight status and diet-associated. Thus, there is an urge to carry out comprehensive research on diet-related and advancing more to milk consumption pattern.

1.3 Research Question

i. How milk feeding is being practiced among children aged 2-4 in PERMATA Negara Zon Tengah?

ii. How about the appetite of children aged 2-4 in PERMATA Negara Zon Tengah on their milk consumption?

How about the dietary intake of children aged 2-4 in PERMATA Negara Zon Tengah?

iv. Are there any associations of milk feeding practice, milk appetite, and dietary intake with nutritional status among children aged 2-4 in PERMATA Negara Zon Tengah?

1.4 Significance of Study

Malaysian children are among the consumers of YCF and this would likely increase the prevalence of young children that are consuming the formula milk. Besides that, this is the first cross-sectional study that accumulates the associations between milk feeding practice, milk appetite, and the role of dietary pattern with the body weight status of the study population that has never been performed in Malaysia. It adds a basis for future studies to carry out the unique relationship of YCF consumption and child's health status.

Besides that, this study can establish as a baseline data for the nutritional status of children age 2-4 years old consuming various types of milk in the Klang Valley area. This is crucial to spread information and understanding from the baseline data and will provide insight towards modifiable factors on child feeding practices and weight gain issue. This also can be a mode of reference for other South East Asian countries that own similar cultural preferences to reconstruct and execute the updated policies, interventions, and programs to improve the young children diets and health in the upcoming years.

Besides that, this study serves as a milestone in assisting the program planners in providing the database reference to implement proper prevention strategies and intervention in order to manage the nutritional status of children who are undergoing prolonged formula feeding. As the associations between milk feeding practice, milk appetite, and dietary pattern are found, appropriate implementation can be performed in the future. The finding of the study can suggest healthier dietary guidelines highlighting the recommended milk consumption and feeding practice in young children.

The framework of this study is a manifestation of further actions made by the government to plan the proper evaluation and regulation of enforcing the functionality of YCF in the market. WHO released the International Code of Marketing of Breast Milk Substitute in 1981 for milk manufacturers concerning formulated milk among children who started weaning and stop breastfeeding (follow-up milk) and formulated milk for children aged 1 until 3 years old (growing up milk). However, WHO status report in 2016 regarding the code implementation stated that Malaysia was among the countries that still did not practice the code and there is no clear regulation for ingredients that should be included even though these milk started to replace breastfeeding as the recommended feeding among children aged 2-4.

As for now, no report made by the United States Food and Drug Administration (FDA) regulations or guidance documents to standardize the packaging identity, added ingredients, nutrition labelling, and claim requirements (Pomeranz, Romo, & Harris, 2018). A concrete guideline on YCF consumption should be made to prevent from manipulation of promising benefits given by milk companies to increase their sales profit.

Therefore, standardization of national policies in regard to the actual composition of YCF should be strictly regulated in order for parents to be well-informed with transparent and honest information. Therefore, the gap of this study should be occupied by determining the contribution of milk and diet, including the milk feeding practice and milk appetite, as well as dietary intake to the nutritional status among children up to 2 years old.

1.5 Research Objective

1.5.1 General Objectives

To determine associations of milk feeding practice, milk appetite, and dietary intake with nutritional status among children aged 2-4 in Pusat Anak Permata Negara (PERMATA Negara) Zon Tengah.

1.5.2 Specific Objectives

1. To determine milk feeding practice, milk appetite, dietary intake, and nutritional status among children aged 2-4 in PERMATA Negara Zon Tengah.
2. To determine the association between milk feeding practice and nutritional status among children aged 2-4 in PERMATA Negara Zon Tengah.
3. To determine the association between milk appetite and nutritional status among children aged 2-4 in PERMATA Negara Zon Tengah.
4. To determine the association between dietary intake and nutritional status among children aged 2-4 in PERMATA Negara Zon Tengah.

1.5.3 Null Hypothesis

1. There is no association between milk feeding practice and nutritional status among children aged 2-4 in PERMATA Negara Zon Tengah.
2. There is no association between milk appetite and nutritional status among children aged 2-4 in PERMATA Negara Zon Tengah.
3. There is no association between dietary intake and nutritional status among children aged 2-4 in PERMATA Negara Zon Tengah

1.6 Conceptual framework

Figure 1.6.1 shows the conceptual framework of the study. The dependent variable were nutritional status by using weight-for-age (WAZ), height-for-age (HAZ), and BMI-for-age (BAZ). The independent variables were socio-demographic background, milk feeding practice, milk appetite, and dietary intake.

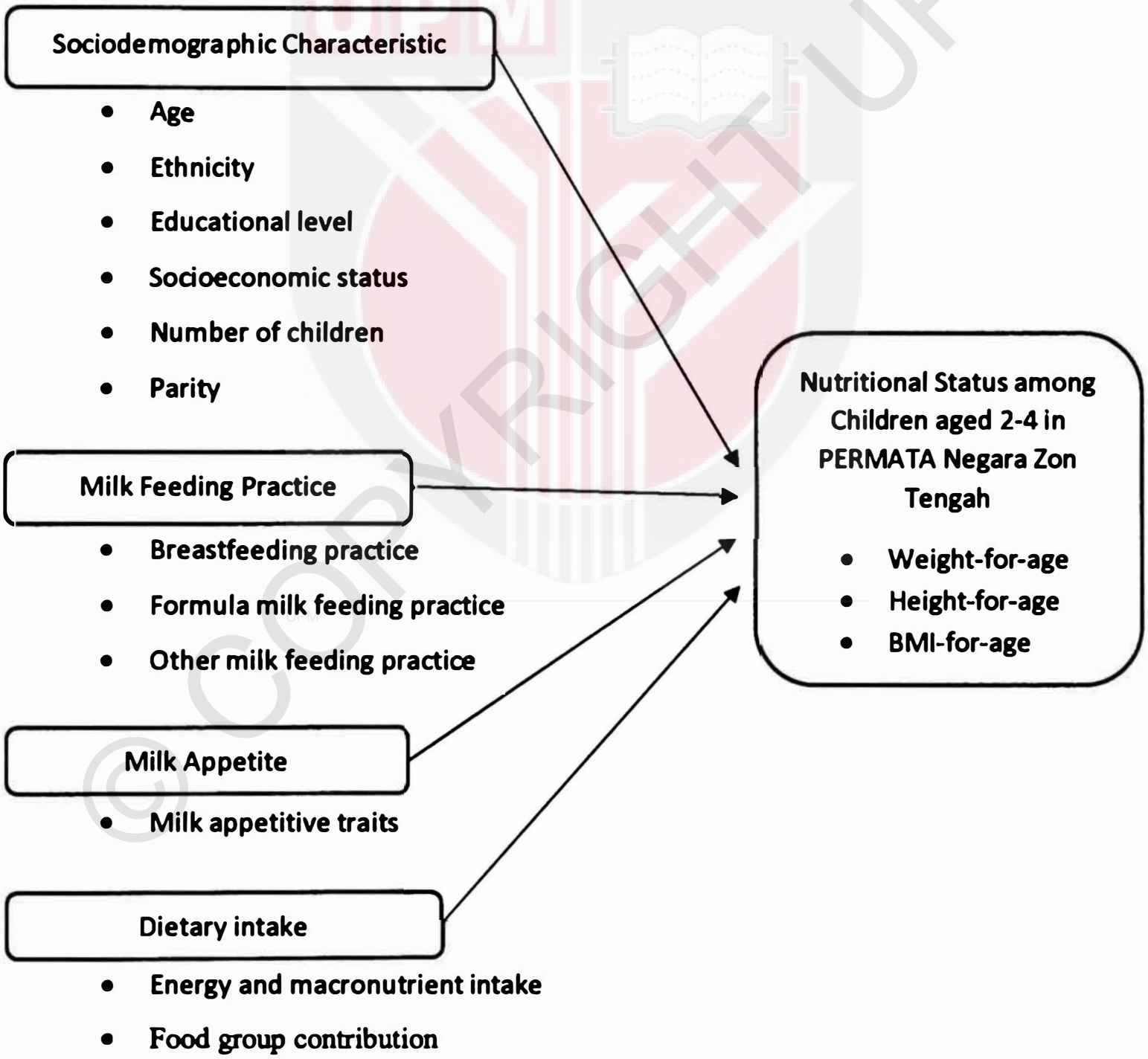

Figure 1.6. 1.Conceptual framework

CHAPTER 2

LITERATURE REVIEW

2.1 Nutritional Status

Under-five-year-old mortality rate has declined by 58% since 1990, from 93 deaths per 1000 live births in 1990 to 39 per 1000 in 2017 (WHO, 2017). However, alarmingly, the problem has greatly influenced the infants and young children as shown by approximately 41 million children under age of 5 have been categorized as overweight or obese in 2014 (WHO, 2016b). Moreover, in low-income countries, the epidemic of obesity in younger population coexists with an undernourished condition. There are still 925 million people who experience undernutrition including stunting and wasting globally (UNICEF). Some of the developing regions presented malnutrition in the face of 'hidden hunger' which means children have adequate access to foods especially high in energy density, but low food security in terms of adequate micronutrients.

There are various dimensional factors including individual, societal, economic, and urbanization that progress to the obesogenic situation (Saveedra & Dattilo, 2017). In the past decade, there were some studies proven that parents play a distinctive role in

lessening the burden of childhood obesity (Cook & Dunifon, 2012; Fulkerson, et al., 2014; Gable, Chang, & Krull, 2007). Young child feeding patterns and practices are the tangible and changeable risk factors for burden of overweight but there were still lacking for effective intervention to reduce the overnutrition problem (Dattilo et al., 2012).

Young children tend to be very selective in their diet intake because this is the time when they start to develop individual preferences before the age of 4. This is called as 'formation years' where all the access that they have will largely determine the physical and mental development (Whiting, Edwards, Ember, & Edwards, 1992). The high access to unhealthy diet which have low nutrient dense, but high calorie dense could give detrimental effects to cognitive performance and physical growth. Welker, Jacquier, Catellier, Anater, and Story (2018) indicated that children rarely consumed healthy diets and the parameter of this misalignment lead to prevalence of childhood overweight and obesity United States in children aged 2–5 which equivalent to 1 in 4 children are faced with overweight or obese issues.

However, since Malaysia is experiencing the double burden of nutrition, factors contributing to this issue need to be listed out as the number of malnutrition is increasing. In fact, this trend of continuously feeding their children with formula milk by dilemmatic parents is not well-explored. Thus, it is an urge to determine the associations between child feeding practices specifically on the milk consumption and appetite among the growing-up children.

2.2 Sociodemographic Characteristics and Nutritional Status

Socioeconomic status (SES) has been shown to have a relationship with nutritional status. (Shi et al., 2005; Tung, 2011). The relationship between lower income, child obesity, and socially disadvantage had been largely studied. A study found that higher obesity levels might relate to poverty status. Similarly, lower and higher SES in developed and developing countries respectively were more likely to be associated with being overweight (O'Dea & Caputi, 2011). Barlow et al. (2007) also stated that higher family background status was reported to be associated with lower obesity prevalence.

In another study made by Keane, Layte, Harrington, Kearney, and Perry (2012), reported that being female, one parent family type, lower household status, lower maternal education, and a heavier parent body weight status significantly increased the odds of childhood obesity. Besides, a highly educated mother was associated with decreases in child overweight at ages 2, 8, and 17, respectively. A study in Iran by Doustmohammadian et al. (2009) also suggested that a significant association between maternal educational level with BMI status of the children. Findings showed that higher proportions of children who were at risk for overweight (25%), overweight (10%), and underweight (12.5%) were those the child of illiterate mothers.

2.2 Milk Feeding Practice and Nutritional Status

Milk feeding practice comprised the practice of the intake of different milk types, the volume and frequencies of milk intake, past history of breastfeeding practices, milk feeding status, and the age of children introduced to different types of milk such as fresh milk, full cream milk, and others. Khor et al. (2015) suggested that milk containing higher fat content contributing extra calories that will lead to weight gain in young consumers. However, they did not emphasize whether it was categorized into whole milk or specially formulated milk or YCF, giving that the age groups were also large.

Children aged 2 and 4 who consumed 1%/ skim milk possessed a higher adjusted odds of being overweight (Scharf, Demmer, & DeBoer, 2013). They attempted another longitudinal evaluation and found that consistent drinker who had normal weight were more likely to become overweight and obese between 2 and 4 year time points after adjusted for baseline BMI. These results actually reflected the parents' decision to introduce their children with low-fat milk as recommended by American Academy Paediatric for children more than 2 years old instead of full cream milk which consists mainly saturated fat.

In a prospective study by De Beer et al. (2015), infants who breastfed more than 6 months were found to have lower fat mass and fat-free mass when achieving 5 years old. Another study claimed that prolong formula feeding (more than12 months) was positively associated with later infant weights at 12 and 18 months if they were initially breastfed since birth, but not with formula introduction from birth (Syrad et al., 2015). This study

demanded further research to indicate the association between extended formula feeding after 2 years old and later childhood weight as this was a new field of study. Jwa, Fujiwara, and Kondo (2014) justified that longer duration of breastfeeding in both boys and girls were found to have a lower protective effect to overweight and obese boys and girls when they reach 8 years old.

In fact, Jwa, Fujiwara, and Kondo (2014) further explained that in regard to feeding type and age interaction in the mixed model, exclusive breastfed boys recorded higher BMI decline, especially from 1.5 to 7 years old and from 1.5 to 8 years old, compared to formula-fed boys. Furthermore, in a longitudinal study in Indonesia found that breastfeeding duration was found to be associated with height-for-age and weight-for-age but no clear data for other milk feeding practices (Susilowati, Kusharisupeni, Fikawati, & Achmad, 2010).

According to Matsuyama, Harb, David, Davies, and Hill (2016), consumption of cow's milk in the westernized countries are more widespread because the countries have more access to the whole milk products. Cow's milk is a rich source of calcium, protein, and fat but poor sources of ferum, vitamin D, and omega-3 polyunsaturated fatty acids (PUFAs). The higher protein in cow's milk if consumed in excessive will interfere with the optimal growth of the child by increasing body fat and leading to the risk of obesity. In fact, the association of milk intake with body weight status is inconsistent as shown in a Germany cohort study that followed up 2 years children until they reached 7 years old (Gunther, Buyken, & Kroke, 2007).

According to Bonuck, Avraham, Lo, Kahn, and Hyden, (2014), prolonged bottle feeding is one such risk factor to excess weight gain in young children, given the ease of consuming excess liquids, most often milk, through bottles. Thus, they came out with an intervention of 1-year follow-up. The intervention group had minimized any bottles use, calories of milk, and total calories but showed no significant difference in control risk of overweight. On the other hand, the size of bottle or amount of milk plays its own role in infants' weight gain as there was limited study revolved among toddlers. A randomized clinical trial by Wood et al. (2016) examined that infants who were fed with large bottles by their parents recorded more change in weight-for-age and more change in weight-to-length than infants fed with regular bottles.

2.3 Milk Appetite and Nutritional Status

Child eating behaviour could be one of the significant factors in influencing body weight. Enjoyment of food and food responsiveness that adhere to food approach in appetitive traits have been associated with higher body weight status in later childhood (Quah et al., 2015). In the role of milk appetite traits among young children, there were no such studies to investigate the linking of it with children weight status, especially among young children. However, different mode of feeding confer different appetite. Mothers who breastfeed their infants may shape the infants into a better responsive of feeding style depending on right timing of cues to hunger and satiety.

Gateshead Millennium Study proposed by Wright, Parkinson, and Drewett (2006) revealed appetitive traits at 6 week-age was predictive of infant weight gain starting birth to 12 months of age, however Parkinson, Drewett, Le Couteur, and Adamson (2010) postulated the association with BMI in children aged 7–8 was concluded as no longer significant. These studies indicated that appetitive traits were prospectively related to weight gain for at least over the medium period, but the studies were bidirectional. In a longitudinal analysis performed by Van Jaarsveld, Llewellyn, Johnson, and Wardle (2011), they explained that the associations between appetitive traits and subsequent weight gain were stronger than between weight gain and subsequent appetite. This finding supported the idea of the relationship between variability in appetitive traits and weight gain in early childhood.

As explained by Quah et al. (2015), Baby Eating Behaviour Questionnaire (BEBQ) is another instrument for measuring appetitive traits in infants particularly on exclusive milk feeding. However, there was no study on measuring milk appetite among children who are started to consume solid foods. Such studies are important to indicate the children preferences including cue to hunger on milk consumed, and this may bring a new finding to the prevention of malnourishment and improving the health and nutritional status in children. Food cue responsiveness is defined as the condition of exerting external food cues, including smell from the food or just a slight of it can influence someone to eat in an extent to become excessive (Carnell, Benson, Pryor, & Driggin, 2013).

In a longitudinal cohort on early childhood appetitive traits by Quah et al. (2015) that was measured using BEBQ, food responsiveness in food approach trait assessed at 3

months infant was prospectively associated with inclining BMI z-scores up to the age of 15 months. Llewellyn and Fildes (2019) mentioned that in the recent progress researchers have established crucial strides in accumulating the evidence on the importance of appetite for risk of both malnutrition in childhood. Evidence from a large population of cohort studies proved that children tend to display large preferences and individual differences in appetitive traits which result in these disparities that prospectively predict early weight increment. However, the interaction between the constructs of appetite behaviour is very limited to predict energy consumption and potential risk for excess weight gain (French, Epstein, Jeffery, Blundell, & Wardle, 2012).

2.4 Dietary Intake and Nutritional Status

Syrad et al. (2015) found that energy intake from food significantly was lower in formula-fed (70%) compared to non-formula fed (74%). However, total energy intake in children beyond than 12 months did not significantly differ between both milk feeding method 1315 kcal versus 1327 kcal. Children at 6 years who breastfed met dietary guidelines for fruits and vegetables compared to children who were bottle fed (Rose, Birch, & Savage, 2017). In another study done by Syrad et al. (2015), percentage represented by formula milk was counted as 65% of total energy intake Other than that, the adequacy probability for vitamin D, iron, zinc, copper, SFA, and PUFA were higher in children consuming YCF and children consuming YCF and complementary foods (Verger, Eussen, & Holmes, 2015). There were some noticeable disparities in dietary

pattern across all the groups, however consumption of water, fruits, vegetables, and fish were having no difference.

Hojsak et al. (2018) added in their review with the current nutritional status in European countries. The actual intake of young children were very limited and a recent systematic review concluded that based on 5 studies in France, Ireland, and Norway, children were reported to have lower intake of vitamin D, iron, and alpha-linolenic acid (Ghisolfi et al. 2013; Kristiansen, Laugsand, & Frost, 2013; Kristiansen et al. 2013, Walton & Flynn, 2013). A similar finding was suggested by European Food Safety Authority (EFSA) that iodine alongside with iron, vitamin D and n-3 PUFAs levels, in particular, were often insufficient among children aged 1-3. Consistently, more than one-third of Malaysian children from 6 months to 12 years old of age failed to reach the Recommended Nutrient Intake (RNI) for energy, calcium and vitamin D where dietary intake of the Malaysian children incompatible with the guidelines (Poh et al., 2013).

A significant association was found between increased adiposity and higher ED in four out of six of the prospective cohort studies reviewed by Perez-Escamilla et al. (2012). In a number of 2,442 U.S. children (2–8 years old) which serves as a nationally representative sample, a significantly lower dietary ED in lean compared in obese children. In Malaysia, Zalilah et al. (2016) in their study suggested that high energy density (ED) intake in children associated with increased risk of obesity, not known if such diets associated with undernutrition. They found that stunting was associated with higher intake of ED foods in 1–10 year olds who reside in urban areas. Higher ED diets were claimed to increase the risk of both double burden or either one, namely childhood

overweight and obesity or wasting, usually, contain lower in fiber and micronutrients but higher in sugars, fats, and sodium (Drewnowski et al. 2007; Ledikwe et al. 2006).

The intake of high energy-dense foods but nutrient-poor among children aged to are particularly problematic given the actual needs in early childhood are low in energy and high in nutrients to support optimal growth (Welker et al., 2018). Based on a study performed by (Rose et al. (2017), 6 months infants with the dietary pattern of foods that are energy-dense including desserts and French fries continued to possess similar but higher consumption of these foods in 6 years old age, thus increasing the prevalence of childhood overweight at 6 years (43%) compared with the other classes of food groups. Formula-fed infants had higher sugar-sweetened beverage intake which is caloric-dense and after controlling for confounding factor which was income, only a few of them achieved the dietary recommendation for vegetables and fruits servings during 6 years of age compared to breastfed infants.

CHAPTER 3

METHODOLOGY

3.1 Study Design

A cross-sectional study was conducted to determine the associations between milk feeding practice, milk appetite, and dietary intake with nutritional status among children 2-4 years in PERMATA Negara Zon Tengah.

3.2 Study Location

The study was conducted in PERMATA Negara Zon Tengah. PERMATA Negara is an established education program that aimed to assist in the development of physical and mental and involving children between 2 to 4 years old. PERMATA Negara is under the supervision of PERMATA Division, Ministry of Education. It consists of 180 centres in Malaysia, including Sabah and Sarawak. Middle Zone of PERMATA Negara that covers Kuala Lumpur, Selangor and Putrajaya were selected which constitutes of 9 centres in total.

3.3 Study Population

Subjects of the study were children 2-4 years old of PERMATA Negara. The subjects that fulfilled the criteria were selected to participate in the study. The exclusion and inclusion criteria for the subjects are shown in Table 3.1.

Table 3.3. 1: Inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
Malaysian	Physically disabled children (ex: unable to move around)
Healthy children	Children who have chronic illnesses which might affect the diet (ex: diabetes, cancer)
Aged 2 to 4 years old	Children on medication that affect their diet routine (ex: hormone-related medicine)
Both sexes	

3.4 Sample Size

The sample size is determined by using the following formula for hypothesis testing of two population proportions and correlation studies (Hulley et al., 2013).

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

where

The standard normal deviate for $\alpha = Z\alpha = 1.96$

The standard normal deviate for $\beta = Z\beta = 1.28$

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

r = the expected correlation coefficient

Table 3.3. 2: Correlation studies calculation

Correlation studies	*r*	*p-value*	*N*
Correlation between breast feeding duration and HAZ	0.403	<0.001	46
Correlation between child appetite and BAZ	0.240	0.001	134
Correlation between energy intake and BAZ	0.380	<0.001	69

By comparing the sample size from the three correlation studies, the highest sample size comes from the study on the association between, which is 134. After taking into account sample design effect (1.1), expected response rate (90%) and expected proportion of eligibility (90%), a total number of **181 subjects** were required for our study.

3.5 Sampling Design

The proportionate sampling method was used to select the subjects based on Figure 3.6.1. Firstly, PERMATA Negara Zon Tengah was proportionately selected. All 9 centres were listed consisted of Selangor state, Kuala Lumpur, and Putrajaya. A simple random sampling was used to select 7 centres out of 9 and all the children in the selected centres were invited to participate.

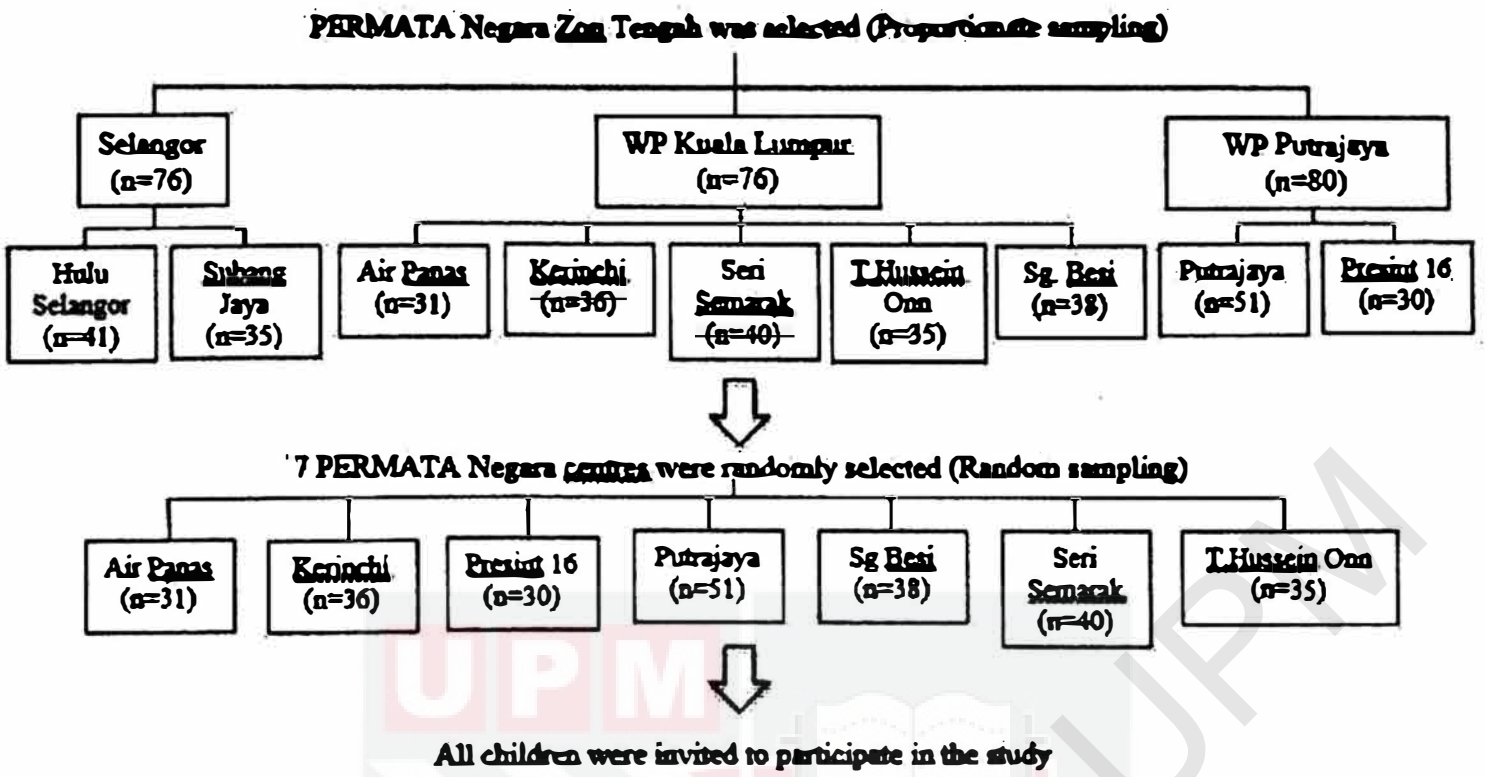

Figure 3.6. 1. Sampling method

3.6 Study Instrument

A set of questionnaire which included questions about socio-demographic characteristics, milk feeding practice, milk appetite, and dietary intake. The questionnaire was self-administered by the mothers or caretakers of the respondent.

3.6.1 Sociodemographic Characteristics

Sociodemographic information of the parents and children were included such as age, sex, occupation, annual and monthly income, number of children and parity (number of child in the family).

3.6.2 Milk Feeding Practice

Milk feeding practice was adapted from the National Health and Morbidity Survey (NHMS 2016). It consists of 17 questions and is categorized into 3 sub-sections including breastfeeding, formula milk, and other current milk feedings. The questions revolve on feeding status, introduction age of consumption, weaning time (breastfeeding only), frequency, volume, and type of milk (other than breastfeeding milk). The frequency and volume of milk feeding were dependent on the past two days (24-48 hours) as to record the intake of milk in the previous day intake and we extended to 2-3 days before if the intake was absent during 24 hour-time.

3.6.3 Milk Appetite

Milk appetite was measured using Baby Eating Behaviour Questionnaire (BEBQ), an 18 item of psychometric measure of child's behaviour in milk feeding period. It was administered among 2 to 24 months in the Gemini Birth Cohort in the paper has defined four scales of BEBQ which are further categorized under "food approach" and "food avoidance" behaviours (Liellwyn et al., 2019). 'Food approach' behaviour consisted of enjoyment of food (EF) and food responsiveness (FR) meanwhile two measures of 'food-avoidant' behaviours are satiety responsiveness (SR) and slowness in eating (SE).

A total of 17 items tapping four distinct feeding traits and one item describing general appetite. GA scale indicated as the general appetite of the milk feeding phase. EF

(4 items) is defined to the child's perceived likeness to milk and feeding time. FR (6 items) relates to the child's responsiveness to milk and feeding cues. SE (4 items) assesses the duration or speed of the child's milk feeding time and lastly, SR (3 items) measures the likeness of the child to get full during feeding time. Cronbach's α for the internal reliability of all scales excluding 'GA' were 'EF' = 0.81, 'FR' = 0.79, 'SE' = 0.76, and 'SR' = 0.73. Response options were from 'never' to 'always' under a 1–5 Likert scale. Mean scores were calculated for each subscale (range: 1–5) if at least 65% of the items were completed. Higher scores for EF and FR indicated greater milk appetite, and higher scores for SR and SE indicated poorer milk appetite.

3.6.4 Dietary Intake

Dietary intake of the children was obtained from a self-administered Semi-quantitative Food Frequency Questionnaire (FFQ) which was obtained from the South East Asian Nutrition Surveys (SEANUTS), a large scale study that was conducted among children aged 0.5 to 12 years across four countries; Malaysia, Indonesia, Thailand and Philippines. The FFQ consisted of 95 food items and 13 food groups to estimate total energy and macronutrients. Frequency food intake from ranges from 1 (never) to 6 (>4 times a day).

The reproducibility of the questionnaire has been validated by Fatihah et.al (2015) for the energy and macronutrients and the respective Cronbach's alpha, energy (α = 0.70), carbohydrate (α = 0.70), protein (α = 0.61), and fat (α = 0.70). Fatihah et al. (2015) further

stated that FFQ is reliable for its minimal loss of information if using food classes to estimate nutrient intakes rather than reporting using the subjective explanation, especially in the short duration period of study. Pre-specified portion sizes are standardized in each food item which makes it easier to administer.

3.6.5 Nutritional Status

Nutritional status was measured using weight-for-age (WAZ), height-for-age (HAZ) and BMI-for-age (BAZ) in z-scores which were calculated respectively, using World Health Organization (WHO) 2006 Child Growth Standards as the reference tool and the WHO Anthro software program version 3.0.1 for data entry. The subjects were measured their weight and height by wearing indoor clothes and no shoes. The weight of the subjects was measured using a TANITA digital weighing scale and was recorded to the nearest 0.1 kg. On the other hand, the height of the subjects was measured by using SECA 213 stadiometer and the reading was recorded to the nearest 0.1 cm. These measurements were done during the visit to their daycare centre in PERMATA Negara. The classification of body weight status in children is specific for age and sex as shown in Table 3.6.5.1.

Table 3.6.5.1: Classification of nutritional status chart

Z-scores	Nutritional Status Indicators		
	WAZ	HAZ	BAZ
<-3SD	Severely underweight	Severely stunted	Severely wasted
≥ -3 SD to <-2SD	Underweight	Stunted	Wasted
≥-2SD to ≤-1SD		Normal	
>+1SD to ≤+2SD			Possible risk of overweight
>+2SD to ≤+3SD	Likely to have growth problem	Normal	Overweight
>+3SD		Very tall	Obese

Source: WHO Child Growth Standard (2006)

3.7 Pre-Testing

Pre-testing was done in Family, Adolescent and Child Research Centre of Excellence (FACE), Universiti Putra Malaysia prior to data collection. The questionnaire was pre-tested among 10 percent of the actual sample size. The subjects for the pre-testing were included in the actual study sample. The calculation below records the number of pre-testing.

10/100 x 181 respondents = 18

Pre-testing was conducted to measure the time taken by the subjects to complete the questionnaire individually, to check the understanding and interpretation of questions as well as to maintain the clarity of the questionnaire prepared. Any problems that arise during this pre-testing were assessed and also revised based on the feedback from the fellow subjects. After pre-testing, the questionnaire was revised accordingly.

3.8 Ethical Approval

Prior to data collection, ethical approval was obtained from Ethics Committee for Research Involving Human Subjects, Universiti Putra Malaysia, with a reference number of JKEUPM-2018-305 (see Appendix A).

3.9 Data Collection Procedure

The duration of the data collection was carried out from December 2018 until March 2019. Prior to the data collection, permission was obtained from PERMATA Division in the Ministry of Education, Putrajaya. The formal letter after obtaining approval from PERMATA Division was distributed to the management of the day care centres. The study was carried out respectively, from one centre to another. Teachers were the intermediate person to disseminate the consent form, as well as the questionnaires to the mothers or caretakers of the study population. After consent form was obtained, self-administered questionnaires consisting of socio-demographic background, milk feeding practice, milk

appetite, and dietary intake of the subjects were distributed and researchers would come to gather all the answered questionnaires after the mothers or caretakers have returned the form to the respective teachers.

3.10 Statistical Analysis

All the data were analyzed using IBM SPSS Statistics 23. Univariate analysis was used to analyze the descriptive data. The results were presented as frequencies and percentages for categorical variables. For continuous variables, results were presented as means and standard deviations. Pearson's product moment correlation for linear distribution and Spearman correlation for non-linear distribution were used for bivariate analysis to determine the associations between continuous variables which are the mean value of milk feeding practice such as volume, frequency, and duration of feeding, and the mean score of milk appetite and FFQ with nutritional status.

CHAPTER 4

RESULTS AND DISCUSSION

The number of subjects who participated in this study was 197 with a response rate of 84.9%. Children-mother pair who did not return the given questionnaire (88.0%), move to the other school (6.0%), and already graduated from PERMATA Negara (6.0%), accounted for total of non-response of 15.1%. Data were presented in descriptive analysis. Associations of milk feeding practice, milk appetite, and dietary intake with nutritional status were presented as bivariate analysis.

4.1 Sociodemographic Characteristics

4.1.1 Demographic Background

The demographic characteristics are described in Table 4.1.1. Out of 197 total number of subjects, 56.9% were male and 42.6% were female. Age of the subjects ranged from 2 to 4 years old with a mean age of 3.27±8.0 years. The mean number of children in

a family was 2.05±1.2 and the mean number of parital for the subjects was the second child (2.57±1.2).

Table 4.1. 1: Demographic background of subjects

Characteristics	n(%)	Mean±SD
Sex of children		
Male	112(56.9)	
Female	85(43.1)	
Age of children (year)		39.14±8.1
2	70(35.5)	
3	99(50.3)	
4	28(14.2)	
Age of mother (year)		32.71±4.2
Ethnicity		
Malay	192(97.5)	
Chinese	1(0.5)	
Indian	1(0.5)	
Others	3(1.5)	
Number of siblings		2.05±1.2
Parity		2.57±1.2

4.1.2 Socioeconomic Background of Parents

Table 4.1.2 shows the socioeconomic background of the subjects' parents. The lowest education level was no formal education meanwhile the highest education level was postgraduate degree. Majority of the subjects' fathers were secondary school graduates (53.3%) and mothers were in certificate or diploma holders (40.6%).

Most of the subjects' fathers (59.9%) and mothers (49.7%) worked in public sectors and only a number of fathers were unemployed (0.5%) and mothers were students (0.5%). Monthly income by both fathers and mothers were not much difference, with fathers' (35.0%) and mothers' (30.5%) majority income was RM2000 – RM3000, followed by 32.0% and 25.4% for both of them in RM1000 – RM2000 category, and minority of fathers (1.5%) and mothers (0.5%) obtained income of more than RM5000. Majority of the parents' household income was in moderate, with a total of RM3000 – RM4000 a month, and only 2 out of 197 families obtained less than RM1000 per month.

Table 4.1. 2: Socioeconomic background of subjects' parents

Socioeconomic background	**n(%)**	
	Father	**Mother**
Education level		
No formal education	1(0.5)	1(0.5)
Pre-school/Primary school	6(3.0)	0
Secondary school/ Pre-University	105(53.3)	74(37.6)
Certificate/ Diploma	58(29.4)	80(40.6)
Bachelor Degree	19(9.6)	37(18.8)
Master/ Doctorate	1(0.5)	5(2.5)
Occupation		
Public sector	118(59.9)	98(49.7)
Private sector	50(25.4)	49(24.9)
Self-employed	21(10.7)	9(4.6)
Unemployed	3(1.5)	38(19.3)
Student	192(97.5)	3(1.5)
Monthly income		
<RM1000	7(3.6)	39(19.8)
RM1000 – RM2000	63(32.0)	50(25.4)
RM2000 – RM3000	69(35.0)	60(30.5)

Table 4.1. 2: Socioeconomic background of subjects's parents (Cont.)

Socioeconomic background	n(%)	
	Father	Mother
Monthly income		
RM3000 – RM4000	36(18.3)	22(11.2)
RM4000 – RM5000	12(6.1)	12(6.1)
>RM5000	3(1.5)	1(0.5)
Household income		
<RM1000		2(1.0)
RM1000 – RM2000		21(10.7)
RM2000 – RM3000		36(18.3)
RM3000 – RM4000		50(25.4)
RM4000 – RM5000		46(23.4)
>RM5000		38(19.3)

4.2 Milk Feeding Practice

4.2.1 Breastfeeding Practice

Breastfeeding practices among mothers of the subjects are explained in Table 4.2.1 as the retrospective data. Majority of the mothers (98.0%) had breastfed their children and only 4 (2.0%) out of 197 who never breastfeed their children. However, there were mothers (13.2%) who were still breastfeeding their children during the time of data collection. The age to start giving liquid other than breastfeeding was 23.27±20.5 weeks and the age to stop breastfeeding was 59.67±43.2 weeks. Meanwhile, the age to start giving the subjects with complementary food was 27.55±10.0 weeks.

Table 4.2. 1: Current and past breastfeeding practice

Characteristics	n(%)	Mean±SD
Ever breastfeed		
Yes	193(98.0)	
No	4(2.0)	
Still breastfeed at the current age (2-4 years old)		
Yes	26(13.2)	
No	171(86.8)	
Age start giving liquid other than breastfeeding (week)		23.27±20.5
Age stop breastfeeding (week)		59.67±43.2
Age start giving solid food (week)		27.55±10.0

4.2.2 Formula Milk Feeding Practice

Table 4.2.2 shows the formula feeding practice among the subjects. The age to start formula feeding was around 8.87±8.6 months, and the age to stop formula feeding was 37.77±10.2 months. Therefore, the duration of formula feeding was 28.74±11.7 months. The proportion of mothers who fed the subjects with formula milk was 80.9% in the 24-48 hour time. The frequency of milk given was 3.07±1.1 times a day and the volume of milk was 185.35±74.4 ml. The type of formula milk given was mostly cow's milk with 95.8% and followed by 3.6% goat's milk. The brand of milk that most consumed by the subjects was Dutch Lady and Dugro, both were 27.3%, followed by Fernleaf (14.9%), Lactokid (7.7%), and others (21.9%).

Table 4.2. 2: Formula milk feeding practice

Characteristics	n(%)	Mean±SD
Age start formula milk feeding (month)		8.87±8.6
Age stop formula milk feeding (month)		37.77±10.2
Still on formula milk feeding (24-48 hours)		
Yes	157(80.9)	
No	37(19.1)	
Frequency of formula milk feeding (24-48 hours)		3.07±1.1
Volume of formula milk feeding (ml) (24-48 hours)		185.35±74.4
Duration of formula milk feeding (month)		28.74±11.7
Type of formula milk		
Cow's milk		161(95.8)
Goat's milk		6(3.6)
Brand of formula milk		
Dutch Lady	45(27.3)	
Dugro	45(27.3)	
Fernleaf	13(7.9)	
Lactokid	25(15.2)	
Others	37(22.2)	

4.2.3 Other Milk Feeding Practice

Other milk feeding comprised the intake of other than breast milk or formula milk such as fresh milk or full cream milk. Table 4.2.3 shows other milk feeding practices than breastfeeding and formula milk feeding. The prevalence of mothers who fed the subjects with other milk in their current age was 70.7%. Starting age for other milk feeding was 20.72±12.28 months and the frequency for other milk feeding was 2.44±1.5 times per day. The volume of other milk feeding was 185.35±74.4 ml, and there were two types of milk consumed by the subjects, namely full cream milk in the first place (67.9%), followed by

fresh milk alone (16.5%), and the combination of fresh milk and full cream came in the third place (15.6%).

Table 4.2. 3: Other milk feeding practice

Characteristics	n(%)	Mean±SD
Ever other milk formula feeding		
Yes	56(29.3)	
No	135(70.7)	
Age start other milk feeding		20.72±12.3
Frequency of other milk feeding (24-48 hours)		2.44±1.5
Volume of other milk feeding (24-48 hours)		185.35±74.4
Type of other milk feeding		
Fresh milk	18(16.5)	
Full cream milk	37.6(67.9)	
Fresh and full cream	17(15.6)	

4.3 Milk Appetite

The following data as shown in Table 4.3.1 is for milk appetite that was based on the Baby Eating Behaviour Questionnaire (BEBQ) subscales. The scoring for FR, SR, and SE contributed to half of the total score which were 2.27±0.8, 2.46±0.8 and 2.31±0.8 respectively. EF showed the highest mean score of 4.41±0.8 which explained most of them were enjoyed the moment of milk feeding. Lastly, GA recorded a score of 3.79±1.0.

Table 4.3. 1: Milk appetite (based on BEBQ score)

Characteristics	Mean±SD
Food Responsiveness (FR)	2.46±0.8
Enjoyment of Food (EF)	4.41±0.8
Satiety Responsiveness (SR)	2.31±0.8
Slowness in Eating (SE)	2.27±0.8
General Appetite (GA)	3.79±1.0

4.4 Dietary Intake

Table 4.4.1 shows the estimated total energy intake and the estimated percentage of energy contribution from macronutrients based on the FFQ data. The total energy intake of the subjects accounted for 1941.00±734.0 kcal. Meanwhile, based on Table 4.4.2, carbohydrate contributed to 233.40±96.1 g/day or 48.0% of energy, followed by fat with 82.82±53.6 g/day or 30.0% of energy and protein 64.91±28.8 g/day or 17.5% of energy. Cereal and cereal products made the first ranking with out of 9 food group, followed by meat and meat products with 696.81±325.7 kcal, and meat and meat products came in third place with 273.12±211.0 kcal. The least food group consumed among the subjects was vegetables that come out with 14.63±17.8 kcal.

Table 4.4. 1: Estimated energy intake and contribution of energy in macronutrients

Characteristics	Mean±SD
Energy intake (kcal/day)	1941.00±734.0
Contribution of macronutrients (g/day)	
Carbohydrate	233.40±96.1
Protein	82.82±53.6
Fat	64.91±28.8

Table 4.4. 2: Food groups contribution to daily energy intake

Characteristics	Mean±SD (kcal)
Cereal and cereal products	696.81±325.7
Meat and meat products	273.12±211.0
Milk and dairy products	234.39±152.7
Beverages	213.71±213.0
Confectionery	162.28±113.6
Soup	107.96±103.6
Fish and seafood	88.72±78.5
Fruits	72.07±83.3
Eggs	55.96±42.0
Legumes and legume products	17.72±26.0
Vegetables	14.63±17.8

Based on the Malaysia RNI for children aged 1-3 (Figure 4.4.1) and 4-6 years old (Figure 4.4.2), the majority of the study population achieved and exceeded RNI for total energy intake with 72.0% and 42.0% for males and 100.0% and 34.0% for females respectively. However, for both age categories, all the subjects for both sexes (100.0%) achieved and exceeded RNI for total protein and fat intake. The RNI of carbohydrate for Malaysian children age 1-6 years old was not available.

Based on a larger sample of a cross-sectional study done by Scott et al. (2016) in Australia, all children aged 1-3 years old achieved the recommended total energy intake and protein intake. However, the data collection method is different from the current study, which 24-hour recall and 2 days of food diary were used.

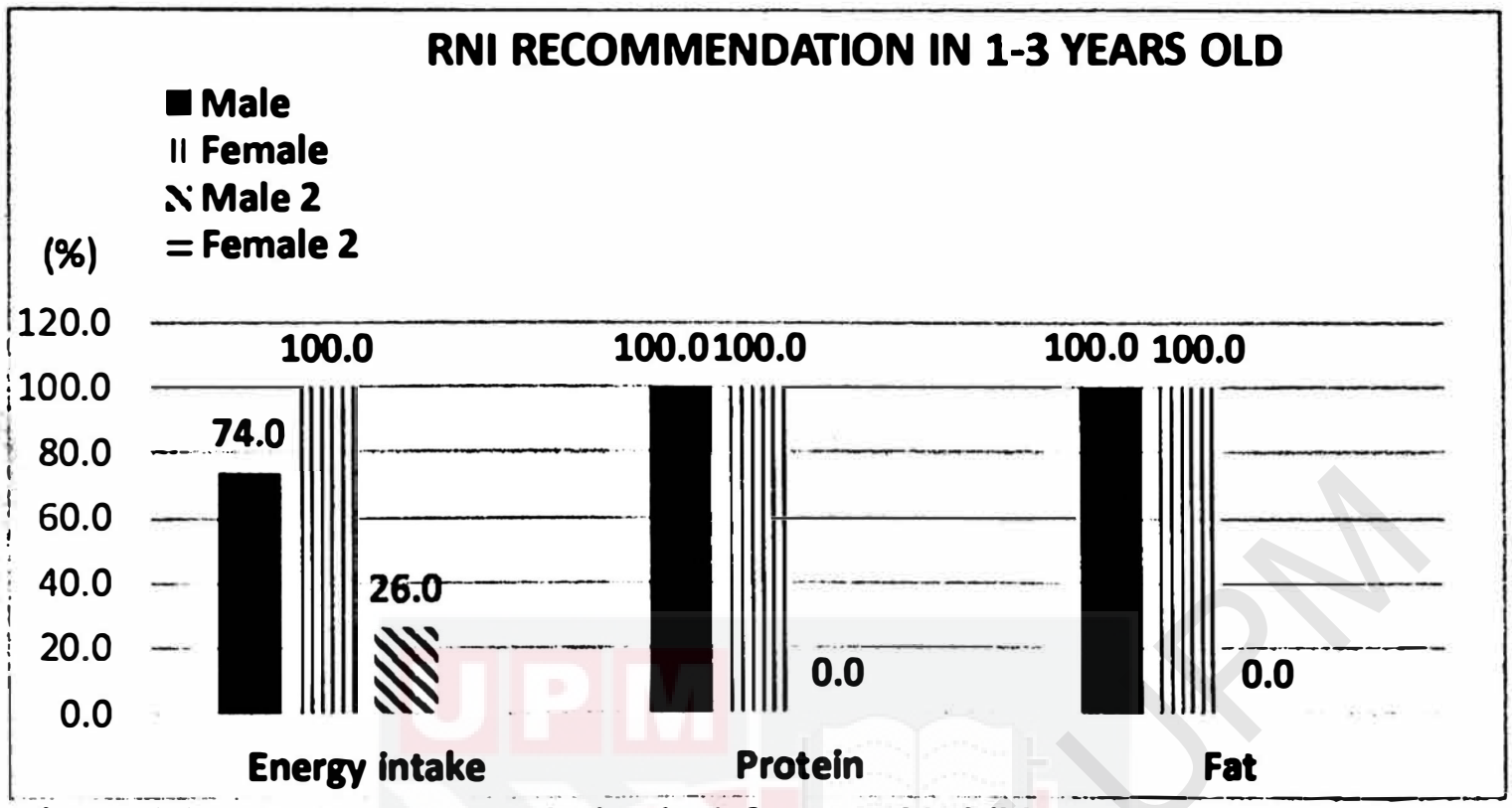

Figure 4.4. 1. RNI recommendation in 1-3 years old children

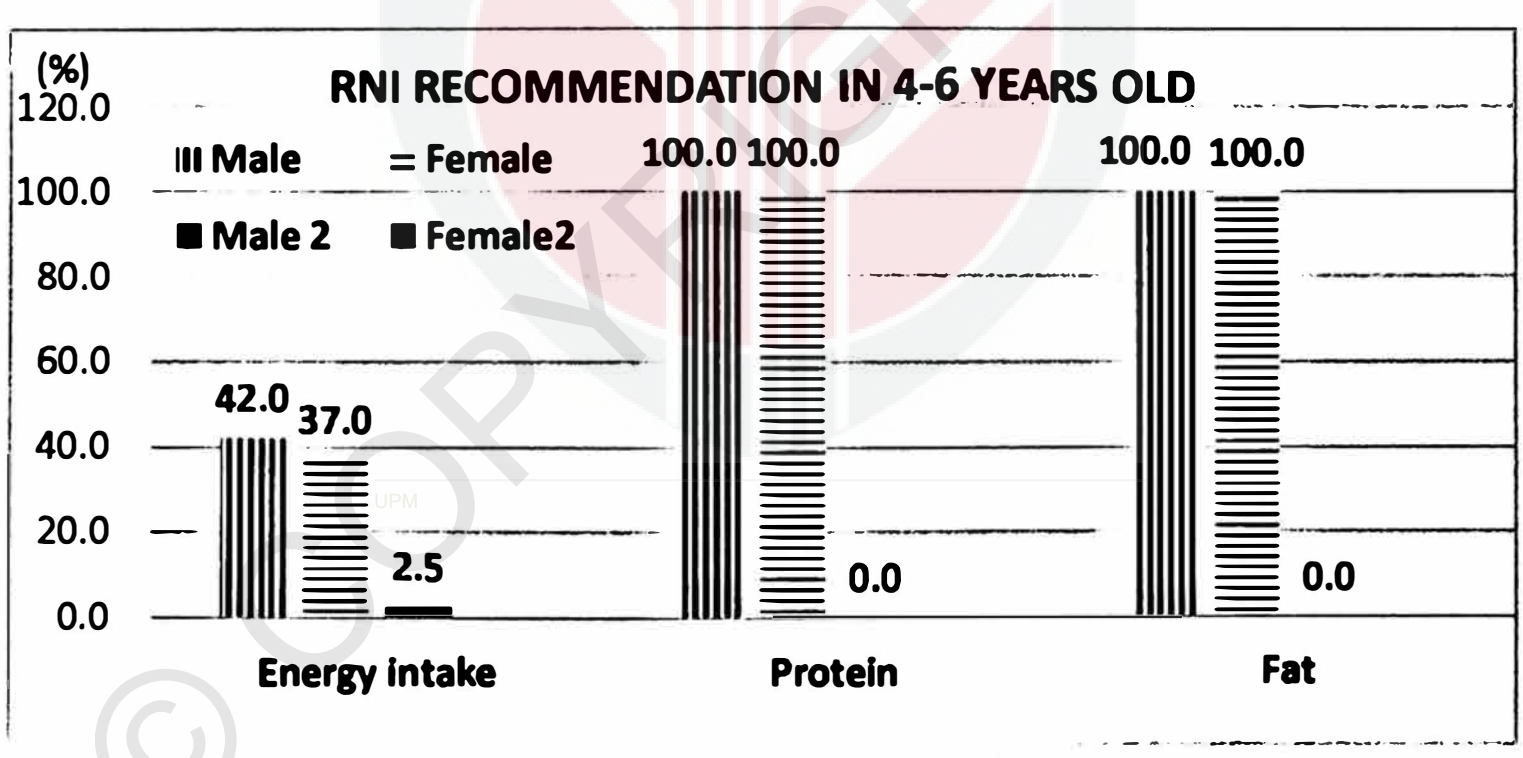

Figure 4.4. 2. RNI recommendation in 4-6 years old children

4.5 Nutritional Status

Based on Table 4.5.1, the proportion of normal weight-for-age (WAZ) from the total subjects was 85.3%. Meanwhile, underweight accounted for 9.5% of the total subjects. Those who have the probability to be overweight and obese also showed a progression as there was 6.5% of the subjects, followed by severely underweight with 0.5%. In the context of height-for-age, the prevalence of stunting was 9.5%, same with the prevalence of underweight. BMI-for-age showed the proportion of overweight and obese was still in the low prevalence, each with 2.1% and 0.5%. Generally, majority of the subjects were in normal categories for all the three nutritional status indicators.

Table 4.5. 1: Nutritional status of subjects

Characteristics	n(%)	Mean±SD
Weight-for-age		-0.73±1.0
Overweight and obese	9(4.7)	
Normal	162(85.3)	
Underweight	18(9.5)	
Severely underweight	1(0.5)	
Height-for-age		-0.80±1.0
Tall	0(0.0)	
Normal	170(89.5)	
Stunted	18(9.5)	
Severely stunted	2(1.1)	
BMI-for-age		-0.37±1.1
Obese	1(0.5)	
Overweight	4(2.1)	
Possible risk of overweight	12(6.3)	
Normal	164(86.3)	
Wasted	7(3.7)	
Severely wasted	2(1.1)	

Malnutrition was more prevalent in stunting and wasting, compared to overweight and obesity. Based on Table 4.1, approximately 1 out of 10 subjects experienced underweight (10.0%) and stunting (10.1%), meanwhile 1 out of 15 (6.3%) faced the possible risk to be overweight. Most of the subjects came urban population which their parents worked in the public sector. The double burden of malnutrition was emerging even in urban area of Kuala Lumpur and Putrajaya. This critical issue owned a similar finding with Global Nutrition Report (2018), where there were 7.5% under 5 children were wasted, and 5.6% were overweight.

WHO/UNICEF/World Bank group also reported that there were 155 million were stunted, with a slower reduction from 2006 of 32.7% to 22.9% in 2016 (WHO, 2017). In spite of the reduction, more than half of the Asia population accounted from 155 million stunted children globally. NHMS (2016) report also revealed that 13.7% children under 5 were underweight, 20.7% were stunted, and 6.4% were overweight. Although the present finding was comparatively lower than NHMS 2016, the number is alarming and the national report actually represents the general population in entire Malaysia. However, this current study can be generalized to Malay population with low- or middle-income and reside in the urban city of Kuala Lumpur and Putrajaya.

4.6 Association between Sociodemographic Characteristics with Nutritional Status

Based on Table 4.6.1 until 4.6.4, there was no association found between sex, ethnicity, parents' education level, type of occupation, monthly income, household

income, subjects' age, maternal age, number of sibling, and parity with nutritional status among the subjects. In this current finding, there was no association found between sociodemographic characteristics with nutritional status among the subjects. However, contradicted to the current study, previous studies found significant associations of sociodemographic background with child's body weight status, which could impact the nutritional status of the child.

Table 4.6. 1: Associations of sex and ethnicity of subjects with WAZ

Characteristic	WAZ (z-score)			x^2	*p-value*
	<-2 (Severe underweight to underweight)	-2 to 1 (Normal)	>1 (Possible risk of overweight to obese)		
Sex				2.509	0.267
Male	14 (73.7)	88(54.7)	5(55.6)		
Female	5(26.3)	73(45.3)	4(44.4)		
Ethnicity					1.000
Malay	19(100.0)	157(96.9)	9(100.0)		
Others	0(0)	5(3.1)	0(0)		

Table 4.6. 2: Associations of sex and ethnicity of subjects with HAZ

Characteristic	HAZ (z-score)			x^2	*p-value*
	<-2 (Severe underweight to underweight)	-2 to 1 (Normal)	>1 (Too tall)		
Sex				1.632	0.299
Male	0(100.0)	5	0(0)		
Female	0(0)	73(45.3)	0(0)		
Ethnicity					0.288
Malay	14(70.0)	93(55.0)	0(0)		
Others	6(30.0)	76(45.0)	0(0)		

Table 4.6. 3: Associations of sex and ethnicity of subjects with HAZ

Characteristic	HAZ (z-score) <-2 (Severe underweight to underweight)	-2 to 1 (Normal)	>1 (Too tall)	x^2	*p-value*
Sex				1.632	0.299
Male	0(100.0)	5	0(0)		
Female	0(0)	73(45.3)	0(0)		
Ethnicity					0.288
Malay	14(70.0)	93(55.0)	0(0)		
Others	6(30.0)	76(45.0)	0(0)		

Table 4.6. 4: Association between socioeconomic status and nutritional status

Characteristics	WAZ		HAZ		BAZ	
	r	*p-value*	*r*	*p-value*	*r*	*p-value*
Father						
Education levels	-0.082	0.266	0.044	0.555	0.021	0.781
Occupation type	-0.050	0.499	0.022	0.762	0.019	0.798
Monthly income	-0.064	0.385	0.019	0.798	0.021	0.774
Mother						
Education levels	0.015	0.838	0.055	0.454	-0.018	0.806
Occupation type	0.050	0.496	-0.087	0.232	0.106	0.147
Monthly income	0.066	0.379	0.129	0.088	-0.026	0.736
Household income	-0.005	0.945	0.044	0.551	-0.052	0.484
Children age	-0.071	0.331	-0.033	0.654	-0.050	0.496
Maternal age	0.049	0.499	0.033	0.648	0.053	0.467
Number of sibling	0.073	0.320	0.097	0.185	0.016	0.828
Parity	0.079	0.277	0.109	0.134	0.016	0.825

*Correlation is significant at $p<0.05$

Malnutrition is affected by poverty but between both of them, there is no a direct relationship. This may be explained by the income of the family to be distributed to other needs, other than the food itself. A study conducted in Van, Turkey indicated there was a positive association between low household income with malnutrition, namely

underweight, stunting and wasting among children (Kizilyildiz et al., 2016). Poor socioeconomic status, including household income and mothers' education, contributed to be among the risk factors of malnutrition in children.

Nasir et al. (2012) in his paper also revealed that household monthly income was positively associated with nutritional status, which was associated with the prevalence of stunting, severe stunting and wasting among children in Indonesia due to paternal smoking (Semba et al., 2007). The situation exacerbates for child malnutrition due to approximately 22% of household expenditure was ended up spening for buying cigarettes.

Previous study associated the number of children in a family with malnutrition among children (Wong et al., 2014). There are certain mechanisms that might explain this condition. The higher the number of children in the family, the higher the needs in food supply demands among family members. Therefore, the economic level will be lowered down due to low purchasing power will occur and this will result in financial constraint, thus food insecurity among children will persist. However, there was no association between the number of children in a family and malnutrition in another study (Kizilyildiz et al., 2016).

4.7 Association between Milk Feeding Practice and Nutritional Status

Based on Table 4.7.1, there was a negative association found between the age of introducing liquid feeding other than breastmilk and WAZ (r=-0.152, p=0.038). Besides that, there were negative associations found between age to stop breastfeeding with WAZ (r=-0.201, p=0.007) and HAZ (r=-0.214, p=0.004) among the subjects. Demographic Health Survey, United States Agency for International Development that recruited 168,000 infants and small children indicated that breastfeeding exclusively for 6 months was significantly associated with lower risk to be stunted (HAZ) and, wasted (BAZ), apart from higher weight, length, and lower infections. Age of introducing complementary foods was found to be not significantly associated with either nutritional status indicators among the subjects

Breastfeeding was found to be positively associated with the age to start complementary feeding (r=0.365, p<0.001). Thus, the longer the duration of breastfeeding, there might be a possibility that the later the mother introduce their child to complementary feeding. This may be due to breastfeeding as perceived by many mothers can fulfil the nutrients requirement of that child. This perception drives the mothers to continue breastfeeding their child and introduce the complementary feeding later. Besides that, the children may experience weight and height reduction as compared to the same age friend.

Table 4.7. 1: Association between breastfeeding practice and nutritional status among subjects

Characteristics	WAZ		HAZ		BAZ	
	r	*p-value*	*r*	*p-value*	*r*	*p-value*
Age introducing liquid other than breastmilk	-0.152	0.038*	-0.121	0.098	-0.083	0.258
Age stop breastfeeding	-0.201*	0.007	-0.214*	0.004	-0.100	0.183
Age start giving solid food	0.118	0.109	0.143	0.052	0.071	0.337

*Correlation is significant at $p<0.05$

Table 4.7.2 showed there was no association found between formula milk feeding practices (ever formula milk feeding, age to start and stop formula milk feeding, frequency, volume, and type of milk) with nutritional status among the subjects. However, previous study showed another finding where volume of milk indicated by the larger bottle size was associated with weight gain in infants (Wood et al., 2015). A cross-sectional study by Bonuck and Kahn (2002) associated prolonged bottled formula feeding with obesity among children aged 18 to 56 months using BAZ as the indicator. The result found a positive association between prolonged bottle feeding and BAZ. An intervention study revealed children who consumed more than 2 bottles a day were reported to reduce the bottle size, volume and total calories from milk, however, these were not associated with reduction in overweight (Bonuck et al., 2014).

Table 4.7. 2: Association between formula milk feeding practice and nutritional status among subjects

Characteristics	WAZ		HAZ		BAZ	
	r	*p-value*	*r*	*p-value*	*r*	*p-value*
Age start formula milk feeding	-0.036	0.627	-0.051	0.493	-0.015	0.841
Age stop formula milk feeding	-0.078	0.297	0.017	0.823	-0.092	0.221
Duration of formula milk feeding	-0.019	0.805	0.044	0.560	-0.045	0.550
Frequency of formula milk feeding	-0.043	0.593	0.030	0.712	-0.044	0.589
Volume of formula milk feeding	0.066	0.415	0.130	0.109	0.003	0.968

*Correlation is significant at $p<0.05$

There was no association found between other milk feeding practices than breastfeeding and formula milk (ever formula milk feeding, age to start other milk feeding, frequency, volume, and type of milk) with nutritional status among the subjects in Table 4.7.3. The findings from other studies showed contrasted results. A study in United States that followed up children from the age 2 to 4 claimed that children who consumed 1% skim milk was associated with reduction of BAZ (Scharf et al., 2013). The deviation of the result may due to the potential confounding factors that lie in between the tested variables. Apart from that, children who consumed more than 3 glasses of whole milk a day in the age of 4 were more likely to be overweight and obese than children who consumed 0.5-2 glasses a day (DeBoer, Agard, & Scharf, 2015). This further explained in this cohort study that higher consumption of milk among children aged 4 years old showed a positive association with BMI-for-age (BAZ), apart from height and weight-for-height.

Table 4.7. 3: Association between other milk feeding practice and nutritional status among subjects

Characteristics	WAZ		BAZ		BAZ	
	r	*p-value*	*r*	*p-value*	*r*	*p-value*
Age start other milk feeding	0.843	0.110	0.017	0.856	0.006	0.951
Frequency of other milk feeding	0.000	0.997	-0.050	0.662	0.047	0.683
Volume of other milk feeding	0.182	0.108	0.142	0.212	0.123	0.280

*Correlation is significant at $p<0.05$

4.8 Association between Milk Appetite and Nutritional Status

Slowness in eating was found to have negative associations with WAZ (r=-0.188, p= 0.010) and HAZ (r=-0.161, p= 0.027) in Table 4.8.1. There were no associations found between other milk appetitive traits (Food Responsiveness, Enjoyment of Food, Satiety Responsiveness, and General Appetite) with nutritional status among the subjects. The previous studies were limited among the subjects' age range. However, several studies were conducted among infants BEBQ as the measurement tool.

A large prospective study among infants were measured using BEBQ on milk appetite. It revealed all BEBQ subscales were related to increased weight gain from 6- to 12-months of pregnancy (van Jaarsveld et al., 2011). Besides that, findings from Gemini Cohort Study showed that a larger appetite (higher FR or lower SR as the indexes) in early infancy was significantly associated with weight gain up to 15 months old that controlled for familial confounding (van Jaarsveld, Boniface, Llewellyn, & Wardle, 2014). BEBQ was adapted from CEBQ which has similar appetite traits. A recent study involving 3-4

years old children from low-income families showed there were no associations found between CEBQ subscales with BMI-for age, which focuses on food eating behaviour apart from considering milk appetite (Brown et al., 2018).

Table 4.8. 1: Association between milk appetite (BEBQ subscales) and nutritional status among subjects

Characteristics	WAZ		HAZ		BAZ	
	r	*p-value*	*r*	*p-value*	*r*	*p-value*
Food Responsiveness	-0.066	0.372	-0.074	0.313	-0.024	0.745
Enjoyment of Food	-0.079	0.278	-0.095	0.195	-0.034	0.645
Satiety Responsiveness	-0.075	0.310	-0.008	0.914	-0.093	0.206
Slowness in Eating	-0.188*	0.010	-0.161*	0.027	-0.110	0.134
General Appetite	0.082	0.263	0.105	0.151	0.015	0.844

*Correlation is significant at $p<0.05$

4.9 Association between Dietary Intake and Nutritional Status

There was no association between the dietary intake (total energy intake, macronutrients, and food item frequency) with nutritional status among the subjects (Table 4.9.1). Children aged 2-4 are at the age where they have the autonomy to make options on what foods they want to eat as they are in the period of transitioning to a family diet (Scaglioni, Salvioni, & Galimberti, 2008). Food neophobia is a term for the avoidance of unfamiliar foods and this is a concern for most parents as these children will become selective in choosing foods. Evidence from a study by Dovey et al. (2008) showed that children who experienced food neophobia were negatively associated with reduced intake

of meat, fruit, and vegetable. Therefore, parenting skills in good eating habits need to be instilled as children are still learning through their five senses.

Therefore, alternative hypothesis milk feeding practice including age of introducing complementary feeding, breastfeeding duration; and milk appetite which was Slowness in Eating subscale was accepted. Alternative hypothesis for associations of other milk feeding practice, milk appetite (BEBQ subscales) and dietary intake with nutritional status was rejected.

Table 4.9. 1: Association between total energy and macronutrients intake with nutritional status among subjects

Characteristics	Weight-for-age		Height-for-age		BMI-for-age	
	R	*p-value*	*R*	*p-value*	*r*	*p-value*
Energy intake (kcal)	-0.055	0.465	0.014	0.848	-0.091	0.225
Carbohydrate intake	-0.101	0.180	-0.002	0.974	-0.137	0.067
Protein intake	-0.021	0.777	0.045	0.551	-0.081	0.284
Fat intake	0.029	0.702	0.086	0.251	-0.039	0.607

*Correlation is significant at $p<0.05$

CHAPTER 5

CONCLUSION

Based on this finding, the prevalence of malnutrition was more prevalent in underweight and stunting which accounted for approximately 1 in 10 children (9.5%). However, the prevalence of possible to be at risk for overweight and obesity was not an exception as 1 out of 5 were in that category (6.5%). This number should not be taken lightly as the probability to develop overweight and even worse for obese is possible if we could not take action on this matter seriously.

The number of those who still breastfeed was 13.8% and this was quite high because there are still mothers who able to breastfeed their child even though the child already exceeded two years which they follow the recommendation provided by WHO to continue breastfeeding up until two years alongside complementary feeding. There were 8 out of 10 children who consumed formula milk, and the frequency for this milk exceeded MOH recommendation of 2 to 3 servings of milk and dairy products.

As for the associations between milk feeding practice and nutritional status, only breastfeeding duration and age to start complementary were significant with the

nutritional status indicators. The number of mothers who stop late in breastfeeding as well as in complementary feeding will have a decline in their child's weight and height as there are no proper nutrients that the child should get at this age. Therefore, mothers should be educated on the appropriate knowledge to start complementary children at the right time. There was only an association between milk appetite indicator, namely Slowness in Eating subscale and nutritional status of the children. Children who take a longer time to finish consuming the milk was associated with lower WAZ and HAZ. This would also result in having less time to eat solid foods and children will be reduced in energy intake.

5.1 Limitation

There were several limitations identified in this study. As this was a cross-sectional study, a causal relationship cannot be established. We were unable to determine the factors that contribute to the issue of malnutrition. The relationship between variables can be done in a longitudinal study which can be done in a larger scale of study. Besides that, the self-administered questionnaire may lead to misinterpretation of data, whether under-reporting or over-reporting. Therefore, future studies may incorporate a short meeting with the parents of the subjects to provide a clear explanation before they started to fill in the questionnaire.

Furthermore, the questionnaire was a parent-reporting and may be subjected to their bias. In the milk feeding practice, present study included retrospective data which reflected on past milk feeding period and dependent on the memory of the mothers.

However, the concurrent data were also available on formula and other milk feeding practices and contributed to the present findings. FFQ that was used for determination of dietary intake in this present study was less accurate to estimate energy intake than dietary recall and food record (Kobayashi et al., 2011). However, FFQ is a pratical tool to estimate nutrient intake and cost-comprehensive in a large-scale survey study (Fatihah et. al., 2015).

Besides that, dietary intake by using FFQ only included foods eaten in a home but school environment in PERMATA Negara was not inclusive. Therefore, future studies may consider the school environment as children in PERMATA Negara spend most of the days in school. FFQ also has its weakness apart from the advantages. It is not suitable to to estimate the calorie intake consumed in a day. However, it can be used to incorporate foods eaten in 30 day time based on the frequency and serving size.

5.2 Recommendation

Based on these findings, future research should include other potential confounding factors that may contribute to child malnutrition, namely parental feeding practice, child's physical activity and screening time. Nutrition interventions are needed through providing education among parents on the importance of proper breastfeeding duration and suggesting an appropriate time to introduce complementary feeding. Besides that, allocation of enough time is required for the children to consume milk and to prevent

the delay in finishing the milk. These are crucial to support for health growth of the children and alleviate the prevalence of malnutrition.

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APPENDICES

Appendix A: Approval Letter from Ethics Committee for Research Involving Human Subjects, Universiti Putra Malaysia

Appendix B: Approval Letter to Conduct Research from PERMATA Division, Prime Minister Department of Malaysia

BAHAGIAN PERMATA
JABATAN PERDANA MENTERI
Aras 3, Blok Podium, Menara Usahawan
Persiaran Perdana, Presint 2
62652 W.P. PUTRAJAYA
MALAYSIA

Tel : 03 - 8880 5151
Faks : 03 - 8880 5166
Web : www.programpermata.my

Rujukan Kami : PERMATA 500-5/5/2 (13)
Tarikh : 12 Jun 2018

Ketua Jabatan
Jabatan Pemakanan dan Dietetik
Fakulti Perubatan dan Sains Kesihatan
Universiti Putra Malaysia
43400 UPM Serdang
Selangor
(u.p.: Puan Nur Aina Afrina Abdul Razak)

Puan,

KEBENARAN MENJALANKAN SOAL SELIDIK BAGI PENYELIDIKAN BERTAJUK *NUTRITIONAL PSYCHOLOGICAL AND ENVIRONMENTAL FACTORS ASSOCIATED WITH EARLY COGNITIVE DEVELOPMENT IN 2 TO 4 YEARS OLD CHILDREN IN SELANGOR, MALAYSIA* DI PUSAT ANAK PERMATA NEGARA LEMBAH KLANG DAN SELANGOR

Dengan hormat saya diarah merujuk kepada perkara tersebut di atas dan emel rujukan puan bertarikh 21 Mei 2018 adalah berkaitan.

2. Dimaklumkan bahawa Bahagian PERMATA telah menerima permohonan pihak puan untuk menjalankan soal selidik bagi penyelidikan bertajuk "*Nutritional Psychological And Environmental Factors Associated With Early Cognitive Development In 2 To 4 Years Old Children In Selangor, Malaysia*" di Pusat Anak PERMATA Negara (PAPN) terpilih di sekitar kawasan Lembah Klang dan Selangor.

3. Sehubungan itu, Bahagian ini bersetuju meluluskan permohonan menjalankan soal selidik tersebut kepada pihak puan dengan syarat hasil kajian dikongsikan bersama untuk tujuan perkongsian hasil kajian untuk manfaat dan penambahbaikan kepada Program PERMATA Negara. Untuk makluman, kelulusan yang diberikan tertakluk kepada tempoh penyelidikan dijalankan sahaja.

4. Justeru itu, adalah dipohon kerjasama pihak puan untuk mengemukakan hasil kajian kepada pihak PERMATA setelah kajian selesai dilaksanakan bagi tujuan penambahbaikan dan perkongsian manfaat. Segala perhatian dan kerjasama pihak puan dalam perkara ini adalah amat dihargai dan didahului dengan ucapan ribuan terima kasih.

Sekian.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah,

(SHAREENA IZZATUL BINTI RAHIM)
b.p. Setiausaha Bahagian
Bahagian PERMATA
Jabatan Perdana Menteri

Appendix C: Information and Consent Form for Parents

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

BORANG PENERANGAN DAN PERSETUJUAN IBUBAPA/PENJAGA

Anda dan anak anda dipelawa untuk menyertai penyelidikan kami. Sebelum anda membuat keputusan untuk mengambil bahagian, adalah penting untuk anda tahu tujuan penyelidikan dan bagaimana pelaksanaan kajian ini. Sila baca lembaran maklumat ini dengan teliti dan berbincang dengan orang lain jika anda mahu. Jika anda inginkan maklumat lanjut, sila kemukakan persoalan atau hubungi penyelidik. Setelah anda berpuas hati bahawa anda memahami kajian ini, dan berkeinginan untuk menyertai, kami memohon anda untuk melengkapkan borang persetujuan penyertaan.

1.TAJUK KAJIAN

Faktor Sosiodemografi, Pemakanan, dan Tingkah Laku yang berkaitan dengan Prestasi Kognitif Awal dalam Kalangan Kanak-kanak Berumur 2 hingga 4 Tahun di Pusat Anak Permata Negara (PERMATA) Zon Tengah, Malaysia.

2. PENGENALAN

Masalah malnutrisi dalam kalangan kanak-kanak terutamanya yang berumur kurang daripada 5 tahun pada hari ini kian membimbangkan. Di Malaysia, kadar malnutrisi tersebut adalah semakin meningkat. Masalah malnutrisi pada zaman awal kanak-kanak boleh mengakibatkan kesan buruk terhadap kognitif kanak-kanak, fungsi otak dan perkembangan mereka terutama ketika peringkat pembangunan kritikal. Oleh itu, adalah penting untuk kajian ini dijalankan bagi mengenalpasti faktor-faktor yang mempengaruhi prestasi kognitif dalam kalangan kanak-kanak yang berumur kurang daripada 5 tahun.

3. APAKAH YANG PERLU ANDA LAKUKAN?

Setelah kebenaran penuh telah diberi oleh penjaga (ibubapa), penyelidik akan mengambil ukuran antropometri anak dan juga mengukur tahap prestasi kognitif, iaitu IQ anak di PERMATA semasa waktu sesi persekolahan:

- Ukuran antropometri seperti ketinggian, berat dan lilitan kepala akan diukur oleh penyelidik dengan menggunakan alat seperti 'SECA Body meter', 'TANITA floor weighing scale' dan pita pengukur.
- Temubual anak oleh penyelidik yang terlatih bagi mengukur prestasi kognitif menggunakan konsep kuiz untuk kanak-kanak menggunakan bahan penyelidikan *Wechsler Preschool and Primary Scale of Intelligence* (WPPSI)

Seterusnya, borang soal selidik akan diberi kepada ibubapa untuk diisi bagi mendapatkan maklumat seperti di bawah:

a) Maklumat sosiodemografi
b) Maklumat berkaitan anak (tingkahlaku harian seperti tabiat pemakanan dan tidur anak)
c) Maklumat berkaitan ibu (tahap stress dan maklumat penyusuan)
d) Maklumat tambahan lain (seperti persekitaran rumah)

Sesi temu bual melalui telefon yang tidak melebihi 20 minit akan diatur terlebih dahulu mengikut kesesuaian ibu. Tujuan temubual adalah bagi mendapatkan maklumat

berkaitan faktor-faktor yang mungkin memainkan peranan terhadap prestasi kognitif dan tumbesaran anak.

4. SIAPA YANG TIDAK BOLEH MENYERTAI KAJIAN INI?
Ibu yang mempunyai diagnosis penyakit mental oleh pakar psikiatri dan kanak-kanak yang menderita penyakit kronik dan kurang upaya.

5. APAKAH FAEDAH MENYERTAI KAJIAN INI?
a) KEPADA ANAK/JAGAAN SAYA SEBAGAI PESERTA?
Anda akan dimaklumkan mengenai faktor-faktor yang berkaitan dengan status zat pemakanan dan prestasi kognitif anak anda. Melalui hasil kajian ini, anda dapat mengetahui tentang status cara pemakanan dan prestasi IQ anak anda.

b) KEPADA PENYELIDIK?
Penyelidik akan mendapat maklumat mengenai latar belakang, faktor-faktor berkaitan dengan status zat pemakanan dan prestasi kognitif anak/ jagaan anda.

6. ADAKAH IA BERISIKO?
Penyertaan anak/ jagaan anda dalam kajian ini tidak akan menghadapi sebarang risiko dan tidak akan mendatangkan kemudaratan.

7. ADAKAH MAKLUMAT DAN IDENTITI SAYA DAN ANAK/JAGAAN SAYA KEKAL RAHSIA?
Semua maklumat dan data peribadi yang diperolehi dalam kajian ini akan digunakan untuk tujuan penyelidikan sahaja dan tidak akan didedahkan ke mana-mana pihak. Maklumat yang diambil daripada anda dan anak anda semasa kajian akan direkod menggunakan kod nombor dan **semua maklumat peribadi akan kekal sulit.**

8. BOLEHKAH SAYA MENARIK DIRI DARIPADA KAJIAN PENYELIDIKAN INI?
Terserah kepada anda untuk kekal atau menarik diri daripada penyelidikan ini. Sekiranya anda enggan mengambil bahagian dan membuat keputusan untuk menarik diri daripada kajian ini, sama ada sekarang atau kemudian adalah merupakan hak anda dan tidak akan memberi kesan kepada penjagaan kesihatan anda atau anak anda pada masa sekarang atau hadapan. Sekiranya anda menarik diri, sebarang data yang dikumpulkan daripada anda dan anak anda akan digunakan selepas mendapatkan kebenaran anda terlebih dahulu.

9. SIAPA YANG SAYA PERLU HUBUNGI SEKIRANYA SAYA MEMPUNYAI SOALAN TAMBAHAN SEPANJANG PENYELIDIKAN INI?
Sekiranya anda mempunyai sebarang pertanyaan atau kemusykilan semasa kajian penyelidikan, sila hubungi para penyelidik:

NUR AINA AFRINA BINTI ABDUL RAZAK
TEL: +60173002144 EMAIL: afrina1495@gmail.com / gs50842@student.upm.edu.my

DR NURUL HUSNA BINTI MOHD SHUKRI
TEL: +03-86092963 ; EMAIL: n_husna@upm.edu.my
FAJULTI PERUBATAN & SAINS KESIHATAN,
JABATAN PEMAKANAN & DIETETIK,
UNIVERISITI PUTRA MALAYSIA

Kajian ini telah mendapat kelulusan etika oleh Jawatankuasa Etika Universiti Penyelidikan Melibatkan Manusia (JKEUPM). Sekiranya anda mempunyai sebarang persoalan berkenaan hak anda sebagai peserta dalam kajian ini, sila hubungi:
EMEL: jkeupm@gmail.com

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

10. PERSETUJUAN

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

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

Saya* berminat / tidak berminat untuk mengetahui keputusan kajian yang **melibatkan** *anak / jagaan saya.

I setuju/tidak bersetuju untuk imej/gambar/rakaman video/ rakaman suara berkaitan dengan anak/ jagaan saya digunakan dalam apa jua bentuk penerbitan atau pembentangan. (sekiranya berkaitan).
*potong yang tidak berkenaan

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

Tarikh :.....
.....

No. K/P: .....

Tandatangan

(*Saksi*)

Nama

Appendix D: Research Questionnaire

FAKULTI PERUBATAN DAN SAINS KESIHATAN,

JABATAN PEMAKANAN DAN DIETETIK,

UPM

BORANG SOAL SELIDIK (IBU)

Tajuk kajian:

Kaitan Antara Amalan Penyusuan, Selera Susu dan Pengambilan Makanan Anak dengan Status Nutritsi dalam Kalangan Kanak-kanak Berumur 2 hingga 4 Tahun di Pusat Anak Permata Negara (PERMATA) Zon Tengah, Malaysia.

Penyelidik: Dr Nurul Husna Mohd Shukri (UPM), Nur Aina Afrina Abdul Razak, (UPM), Rasyidah Ali, (UPM)

Nama anak:

_____

Umur anak (dalam tahun dan bulan):

_____

Sekolah:

_____

No Rujukan: .....

Semua maklumat yang diberikan di sini adalah dirahsiakan dan hanya digunakan untuk tujuan penyelidikan sahaja. Kejayaan kajian ini amat bergantung kepada kerjasama pihak tuan/puan dalam menjawab kesemua soalan yang dikemukakan. Segala kerjasama yang tuan/puan berikan saya didahului dengan ribuan terima kasih

Bahagian A: *Sila isi/ tanda pada pernyataan berikut.*

Maklumat anda (Ibu)		Pilihan jawapan
A1	Taraf perkahwinan	❑ Tidak pernah berkahwin ❑ Berkahwin ❑ Berpisah ❑ Janda / Duda ❑ Balu ❑ Tinggal bersama pasangan
A2	Tarikh lahir	☐☐ / ☐☐ / ☐☐☐☐ *Hari* *Bulan* *Tahun*
A3	Umur	☐☐ Tahun
A4	Warganegara	❑ Warganegara ❑ Permastautin Tetap ❑ Bukan warganegara Malaysia
A5	Etnik	❑ Melayu ❑ Cina ❑ India ❑ Lain-lain Sila tuliskan .....
A6	Agama	❑ Islam ❑ Buddha ❑ Hindu ❑ Kristian ❑ Lain- lain Sila tuliskan: .....

No Rujukan: .....

A7	**Tahap pendidikan** **(sila pilih SATU sahaja)**	❑ Tiada pendidikan formal ❑ Pra-sekolah ❑ Sekolah Menengah ❑ Diploma ❑ Ijazah Sarjana Muda ❑ Ijazah Sarjana/ Ijazah Kedoktoran
A8	**Pekerjaan**	❑ Sektor awam ❑ Sektor swasta ❑ Kerja sendiri ❑ Tidak bekerja ❑ Pelajar
A9	**Pendapatan isi rumah bulanan**	❑ ≤ RM 1000 ❑ RM 1000 – RM 1999 ❑ RM 2000 – RM 2999 ❑ RM 3000 – RM 3999 ❑ RM 4000 - RM 4999 ❑ RM 5000 dan ke atas

Maklumat pasangan (suami ibu)		**Pilihan jawapan**
A10	**Tahap pendidikan** **(sila pilih SATU sahaja)**	❑ Tiada pendidikan formal ❑ Pra-sekolah ❑ Sekolah Menengah ❑ Diploma ❑ Ijazah Sarjana Muda ❑ Ijazah Sarjana/ Ijazah Kedoktoran ❑
A11	**Pekerjaan**	❑ Sektor awam ❑ Sektor swasta ❑ Kerja sendiri ❑ Tidak bekerja ❑ Pelajar

No Rujukan: .....

A12	Pendapatan isi rumah bulanan	❑ ≤ RM 1000 ❑ RM 1000 – RM 1999 ❑ RM 2000 – RM 2999 ❑ RM 3000 – RM 3999 ❑ RM 4000 - RM 4999 RM 5000 dan ke atas

Bahagian B: Maklumat kanak-kanak (yang menyertai kajian)

Maklumat anak		Options
B1	Tarikh lahir anak	☐☐/☐☐/☐☐☐☐ Dd mm yyyy
B2	Umur anak	_____ tahun/ *years* _____bulan / *months*
B3	Jantina anak	❑ Lelaki ❑ Perempuan
B4	Anak anda adalah anak yang ke berapa?	Anak nombor ke _____
B5	Jumlah anak	_____ Anak

Bahagian C: Amalan penyusuan ibu terhadap anak anda yang menyertai penyelidikan ini / *Breastfeeding practices of your child that participate in this research*

	Items	Options
1	Adakah anak anda pernah disusukan dengan susu ibu (susu badan)?	❑ Ya ❑ Tidak
2	Adakah anak anda masih disusukan dengan susu ibu (susu badan)? (jika berkaitan)	❑ Ya ❑ Tidak
3	Bilakah anda mula memperkenalkan cecair lain selain susu ibu?	_____ minggu

	Contoh: air kosong, susu formula, susu soya, susu beras, susu kambing	_____ bulan
4	Berapa umur anak anda apabila anda telah berhenti menyusu susu ibu?	_____ minggu _____ bulan
5	Berapa umur anak anda apabila anda mula memperkenalkan makanan pepejal kepada anak anda?	_____ minggu _____bulan

Bahagian D : Amalan Pengambilan Susu

I. Penyusuan Susu Formula

1	Berapakah umur anak anda pada pertama kali mereka minum susu formula? Jika tidak pernah memberi minum susu formula sila terus ke **soalan 8**	_____ hari _____ minggu _____ bulan
2	Dalam tempoh 24-48 jam yang lepas (siang dan malam), adakah anak anda diberi minuman susu formula / minuman susu botol?	❑ Ya ❑ Tidak **(Terus ke soalan 7)**
3	Berapa kerapkah anak anda minum susu formula dalam masa 24-48 jam yang lepas?	_____ kali
4	Pada masa 24-48 jam yang lepas, berapa ml susu formula yang anak anda minum pada setiap suapan? **1 auns = 30 ml**	_____ ml

No Rujukan: .....

5	Apakah jenis susu formula yang anda berikan kepada anak anda? **(tanda semua yang berkaitan)**	❑ Susu formula biasa (berdasarkan susu lembu) ❑ Susu formula biasa (berdasarkan susu kambing) ❑ Susu formula 'hydrolysed' ❑ Susu formula berasaskan soya ❑ Lain-lain susu formula yang khas: _____
6	Apakah nama jenama susu formula yang anda berikan pada 24-48 jam lepas?	_____
7	Berapakah umur anak anda kali terakhir mereka minum susu formula?	_____ tahun _____ bulan _____ minggu

II. Penyusuan Susu Selain Susu Formula dan Susu Ibu

8	Dalam tempoh 24-48 jam yang lepas (siang dan malam), adakah anak anda diberi susu lain selain susu formula?	❑ *Ya* ❑ *Tidak*
9	Berapakah umur anak anda ketika anda mula memberi anak anda, susu selain susu formula **DAN/ATAU** susu ibu? **(jika berkaitan)**	_____ tahun _____ bulan _____ minggu
10	Berapa kerapkah anak anda minum susu selain susu formula **DAN/ATAU** susu ibu dalam masa 24-48 jam yang lepas?	_____ kali

No Rujukan: .....

11	**Pada masa 24-48 jam yang lepas, berapa ml susu selain susu formula DAN/ATAU susu ibu yang anak anda minum?**	**_____ ml**
12	**Apakah jenis susu yang anda berikan kepada anak anda?** **(tanda semua yang berkaitan)**	**☐ Susu skim** **☐ Susu penuh krim** **☐ Susu soya** **☐ Lain-lain:_____**

No Rujukan: .....

Bahagian E: Tingkah laku Selera Pengambilan Susu Anak

Soalan yang terkandung adalah mengenai tingkah laku atau selera pengambilan susu anak anda. Selera pengambilan susu anak dalam tempoh 2 minggu yang lepas

Bagaimana anda menggambarkan gaya pengambilan susu anak anda kebiasaan hari di waktu siang? (tanda satu kotak sahaja setiap baris)

Bil	Item	Pilihan				
		Tidak Pernah	Jarang	Kadang-Kadang	Kerap Kali	Sentiasa /selalu
1	Anak saya kelihatan kenyang ketika minum susu					
2	Anak saya kerap mahukan susu melebihi dari apa yang saya beri					
3	Anak saya gemarkan susu					
4	Anak saya mempunyai selera yang besar					
5	Anak saya selesai minum susu dengan cepat					
6	Anak saya tertekan semasa minum susu					

No Rujukan: .....

Bil	Item	Pilihan				
		Tidak Pernah	Jarang	Kadang-Kadang	Kerap Kali	Sentiasa /selalu
7	Anak saya mudah kenyang ketika minum susu					
8	Sekiranya membiarkan dengan terus minum susu, anak saya akan minum susu dengan sangat banyak					
9	Anak saya mengambil lebih dari 30 minit untuk menghabiskan satu sesi minum susu					
10	Anak saya kenyang biarpun pada fikiran saya dia masih tidak habis disusukan					
11	Anak saya minum susu dengan perlahan					
12	Biarpun telah selesai minum susu, anak saya gembira untuk diberikan minum susu lagi sekiranya ditawarkan					
13	Anak saya didapati sukar untuk melengkapkan minuman susu					

No Rujukan: .....

Bil	Item	Pilihan				
		Tidak Pernah	Jarang	Kadang-Kadang	Kerap Kali	Sentiasa /selalu
14	Anak saya kerap meminta susu					
15	Anak saya minum susu beransur-ansur perlahan semasa proses minum					
16	Sekiranya diberi peluang, anak saya akan sentiasa diberi minum susu					
17	Anak saya menikmati masa minum susu					
18	Anak saya dengan mudahnya mampu untuk minum susu dalam tempoh 30 minit selepas minum susu sebelumnya					

No Rujukan: .....

Bahagian K: Survei Pemakanan Kanak-Kanak Malaysia

Nombor ID: .....

Sila tandakan ✓ pada ruang pilihan kekerapan pengambilan untuk menunjukkan kekerapan (berapa kali) anak anda mengambil makanan yang dinyatakan dalam satu bulan yang lepas. Sila isikan kuantiti makanan yang biasa diambil untuk setiap kali makan.

KOD	JENIS MAKANAN	KEKERAPAN PENGAMBILAN								SAIZ SAJIAN	KUANTITI SAJIAN (Setiap kali makan)	CARA MASAKAN
	(A) BIJIRIN & PRODUK BIJIRIN	Tidak pernah	1 - 3 kali sebulan	1 kali seminggu	2 - 4 kali seminggu	5 - 6 kali seminggu	1 kali sehari	2 - 3 kali sehari	> 4 kali sehari			
A1	Nasi putih									pinggan		
A2	Nasi goreng									pinggan		
A3	Nasi lemak									bungkus		
A4	Nasi ayam									pinggan		
A5	Bubur kanji (ikan bilis, sayur)									mangkuk cina (sederhana)		
A6	Bubur ayam									mangkuk cina (sederhana)		
A7	Bubur nasi (hati)									mangkuk cina (sederhana)		
A8	Bubur nasi daging lembu									mangkuk cina (sederhana)		
A9	Bubur nasi ikan									mangkuk cina (sederhana)		
A10	Bubur nasi daging khinzir									mangkuk cina (sederhana)		

No Rujukan: .....

KOD	JENIS MAKANAN	KEKERAPAN PENGAMBILAN								SAIZ SAJIAN	KUANTITI SAJIAN (Setiap kali makan)	CARA MASAKAN
	(A) BIJIRIN & PRODUK BIJIRIN	Tidak pernah	1 - 3 kali sebulan	1 kali seminggu	2 - 4 kali seminggu	5 - 6 kali seminggu	1 kali sehari	2 - 3 kali sehari	> 4 kali sehari			
A11	Mee / beehoon / kuey teow goreng									pinggan		
A12	Mee / beehoon / kuey teow sup									mangkuk cina (sederhana)		
A13	Laksa / kari									mangkuk cina (sederhana)		
A14	Spageti / pasta / lasagna									pinggan		
A15	Mee segera									bungkus		
A16	Roti putih / bijirin penuh									keping		
A17	Ban manis / berkrim / berinti									biji		
A18	Sandwich									keping		
A19	Roti canai / roti telur									keping		
A20	Capati / tosai									keping		
A21	Bijirin sarapan *(cth: Koko Krunch®)*									cawan		
A22	Bijirin minuman *(cth: Nestum®)* Lain-lain, nyatakan:									sudu makan		

KOD	JENIS MAKANAN	KEKERAPAN PENGAMBILAN								SAIZ SAJIAN	KUANTITI SAJIAN (Setiap kali makan)	CARA MASAKAN
	(B) DAGING & PRODUK DAGING	Tidak pernah	1 - 3 kali sebulan	1 kali seminggu	2 - 4 kali seminggu	5 - 6 kali seminggu	1 kali sehari	2 - 3 kali sehari	> 4 kali sehari			
B23	Ayam goreng *(termasuk fast food)*									ketul		
B24	Ayam masak kicap									ketul		
B25	Ayam masak merah / sambal									ketul		
B26	Ayam kari / kurma									ketul		
B27	Ayam kukus									ketul		
B28	Daging lembu									ketul		

No Rujukan: .....

KOD	JENIS MAKANAN	KEKERAPAN PENGAMBILAN								SAIZ SAJIAN	KUANTITI SAJIAN (Setiap kali makan)	CARA MASAKAN
	(B) DAGING & PRODUK DAGING	Tidak pernah	1 - 3 kali sebulan	1 kali seminggu	2 - 4 kali seminggu	5 - 6 kali seminggu	1 kali sehari	2 - 3 kali sehari	> 4 kali sehari			
B29	Daging kambing									ketul		
B30	Burger									biji		
B31	Sosej / frankfurter									batang		
B32	Nugget									keping		
B33	Daging khinzir									ketul		
	Lain-lain, nyatakan:											

KOD	JENIS MAKANAN	KEKERAPAN PENGAMBILAN								SAIZ SAJIAN	KUANTITI SAJIAN (Setiap kali makan)	CARA MASAKAN
	(C) IKAN & MAKANAN LAUT	Tidak pernah	1 - 3 kali sebulan	1 kali seminggu	2 - 4 kali seminggu	5 - 6 kali seminggu	1 kali sehari	2 - 3 kali sehari	> 4 kali sehari			
C34	Ikan goreng									ekor		
C35	Ikan masak kicap									ekor		
C36	Ikan kukus									ekor		
C37	Ikan kari / sambal / berada									ekor		
C38	Ikan dalam tin *(termasuk sardin, tuna, makerel)*									sudu makan		
C39	Bebola ikan									biji		
C40	Ikan bilis (goreng / sambal)									sudu makan		
C41	Udang									ekor		
	Lain-lain, nyatakan:											

No Rujukan: .....

KOD	JENIS MAKANAN	KEKERAPAN PENGAMBILAN								SAIZ SAJIAN	KUANTITI SAJIAN (Setiap kali makan)	CARA MASAKAN
	(D) TELUR	Tidak pernah	1 - 3 kali sebulan	1 kali seminggu	2 - 4 kali seminggu	5 - 6 kali seminggu	1 kali sehari	2 - 3 kali sehari	> 4 kali sehari			
D42	Telur mata kerbau / telur goreng / omelet									biji		
D43	Telur rebus									biji		
	Lain-lain, nyatakan:											

KOD	JENIS MAKANAN	KEKERAPAN PENGAMBILAN								SAIZ SAJIAN	KUANTITI SAJIAN (Setiap kali makan)	CARA MASAKAN
	(E) KEKACANG & PRODUK KEKACANG	Tidak pernah	1 - 3 kali sebulan	1 kali seminggu	2 - 4 kali seminggu	5 - 6 kali seminggu	1 kali sehari	2 - 3 kali sehari	> 4 kali sehari			
E44	Dal kekacang									sudu makan		
E45	Tauhu / *tau kua*									keping		
E46	Susu kacang soya									gelas		
	Lain-lain, nyatakan:											

KOD	JENIS MAKANAN	KEKERAPAN PENGAMBILAN								SAIZ SAJIAN	KUANTITI SAJIAN (Setiap kali makan)	CARA MASAKAN
	(F) SUSU & PRODUK TENUSU	Tidak pernah	1 - 3 kali sebulan	1 kali seminggu	2 - 4 kali seminggu	5 - 6 kali seminggu	1 kali sehari	2 - 3 kali sehari	> 4 kali sehari			
F47	Susu tepung									sudu makan		
F48	Susu segar / UHT									gelas		
F49	Susu pekat manis									sudu makan		
F50	Susu kultur *(cth: Vitagen®, Yakult®)*									botol		
F51	Yogurt / dadih									cawan		
F52	Yogurt minuman									gelas		
F53	Keju									keping		
F54	Aiskrim bersusu									batang		
	Lain-lain, nyatakan:											

No Rujukan: .....

KOD	JENIS MAKANAN	KEKERAPAN PENGAMBILAN								SAIZ SAJIAN	KUANTITI SAJIAN (Setiap kali makan)	CARA MASAKAN
	(G) SAYUR-SAYURAN	Tidak pernah	1 - 3 kali sebulan	1 kali seminggu	2 - 4 kali seminggu	5 - 6 kali seminggu	1 kali sehari	2 - 3 kali sehari	> 4 kali sehari			
G55	Sayur berdaun hijau *(cth: sawi, bayam, kangkung)*									sudu makan		
G56	Sayur kacang *(cth: kacang panjang, bendi, taugeh)*									sudu makan		
G57	Sayur berubi *(cth: ubi kentang, keledek, labu)*									sudu makan		
G58	Sayur kobis *(cth: kobis, brokoli, kobis bunga)*									sudu makan		
G60	Lobak / timun / tomato									sudu makan		
	Lain-lain, nyatakan:											

KOD	JENIS MAKANAN	KEKERAPAN PENGAMBILAN								SAIZ SAJIAN	KUANTITI SAJIAN (Setiap kali makan)	CARA MASAKAN
	(H) BUAH-BUAHAN	Tidak pernah	1 - 3 kali sebulan	1 kali seminggu	2 - 4 kali seminggu	5 - 6 kali seminggu	1 kali sehari	2 - 3 kali sehari	> 4 kali sehari			
H60	Epal									biji		
H61	Oren									biji		
H62	Pisang									biji		
H63	Tembikai									potong		
H64	Betik									potong		
H65	Anggur									biji		
H66	Buah lai									biji		
	Lain-lain, nyatakan:											

KOD	JENIS MAKANAN	KEKERAPAN PENGAMBILAN								SAIZ SAJIAN	KUANTITI SAJIAN (Setiap kali makan)	CARA MASAKAN
	(I) KONFEKSI	Tidak pernah	1 - 3 kali sebulan	1 kali seminggu	2 - 4 kali seminggu	5 - 6 kali seminggu	1 kali sehari	2 - 3 kali sehari	> 4 kali sehari			
I67	Kuih-muih *(cth: kuih lapis, kuih talam)*									keping		
I68	Karipap									keping		

No Rujukan: .....

KOD	JENIS MAKANAN	KEKERAPAN PENGAMBILAN								SAIZ SAJIAN	KUANTITI SAJIAN (Setiap kali makan)	CARA MASAKAN
	(I) KONFEKSI	Tidak pernah	1 - 3 kali sebulan	1 kali seminggu	2 - 4 kali seminggu	5 - 6 kali seminggu	1 kali sehari	2 - 3 kali sehari	> 4 kali sehari			
I69	Pisang goreng / cekodok									keping		
I70	Bar coklat									keping		
I71	Keropok / kerepek *(cth: Hota®, Mamee®)*									bungkus		
I72	Keropok lekor									keping		
I73	Biskut berkrim									keping		
I74	Biskut tawar *(cth: marie, krim kraker)*									keping		
I75	Kek / mufin / *swiss roll*									keping		
	Lain-lain, nyatakan:											

KOD	JENIS MAKANAN	KEKERAPAN PENGAMBILAN								SAIZ SAJIAN	KUANTITI SAJIAN (Setiap kali makan)	CARA MASAKAN
	(J) MINUMAN	Tidak pernah	1 - 3 kali sebulan	1 kali seminggu	2 - 4 kali seminggu	5 - 6 kali seminggu	1 kali sehari	2 - 3 kali sehari	> 4 kali sehari			
J76	Teh / kopi									cawan		
J77	Sirap / jus kordial *(cth: Ribena®, Sunquick®)*									gelas		
J78	Minuman bermalt *(cth: Milo®, Horlick®)*									sudu makan		
J79	Jus buah buahan segar									gelas		
J00	Minuman bergas / berkarbonat									tin		
J01	Air kosong									gelas		
	Lain-lain, nyatakan:											

KOD	JENIS MAKANAN	KEKERAPAN PENGAMBILAN								SAIZ SAJIAN	KUANTITI SAJIAN (Setiap kali makan)	CARA MASAKAN
	(K) SUP	Tidak pernah	1 - 3 kali sebulan	1 kali seminggu	2 - 4 kali seminggu	5 - 6 kali seminggu	1 kali sehari	2 - 3 kali sehari	> 4 kali sehari			
K82	Sup sayur *(cth: sup ABC, sup bayam)*									mangkuk cina (sederhana)		
K83	Sup ayam									mangkuk cina (sederhana)		

Appendix E: Poster Presentation (10th National Pacific Paediatric Research Conference)

Date: 9th April 2019

Venue: Auditorium Hospital Canselor Tuanku Mukhriz

Associations of Formula Milk Feeding Practice and Appetite with Body Weight Status among Children Aged 2 to 4 Years Old in PERMATA Negara, Klang Valley: A Study Protocol

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INTRODUCTION

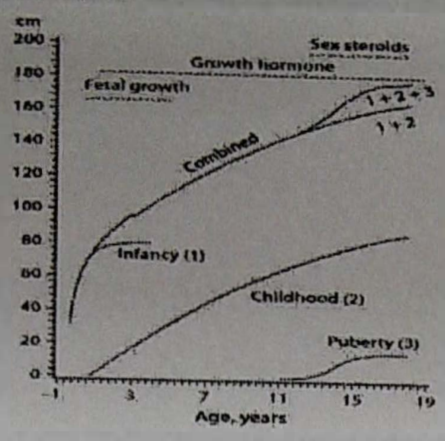

Figure 1: Nutrition is critical due to rapid growth in early years[5]

- Formula milk in young children is deemed as milk-based or plant protein-based formula that is made to partially satisfy their nutritional requirement. [4]
- The demand and preferences to formula milk were shown by nearly three quarters of children aged 1-3 and half of children 4-6 years old in Malaysia as consistent consumers. [6]
- Formula milk feeding in infancy may contribute to rapid weight gain in children and later in adult due to high content of fructose corn syrup. [7]

PROBLEM STATEMENT

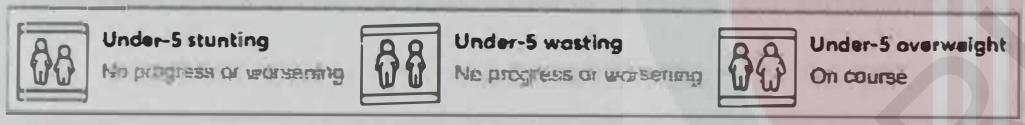

Figure 2: Progress against global nutrition target in Malaysia[3]

- Malaysia is experiencing a "triple burden" issue when 11.5% of children under 5 were wasted and 20.7% had been recognized as stunted whereas 6.0% were overweight. [3]
- Prolonged bottle feeding is one such risk factor to excess weight gain in young children, given the ease of consuming excess milk through bottles. [1]
- Enjoyment of food and food responsiveness that adheres to food approach in appetitive traits have been associated with higher body weight status in later childhood. [8]
- Cue to hunger includes smell from the milk or just a slight of it can increase appetite and drink in an extent to become excessive and lead to weight gain. [2]
- Formula milk contains flavour and high added sugars which may develop child's preference to sweet taste and raise the obesity risk. [9]

OBJECTIVES

- To identify the prevalence of malnutrition among children aged 2-4 in PERMATA Negara Klang Valley.
- To determine the formula milk feeding practice and milk appetite, and their association with body weight status in children.

METHODOLOGY

STUDY DESIGN

Cross-sectional study (January-April 2019)

SETTING

6 PERMATA Negara in Klang Valley, Malaysia

All 181 mother-child pairs will be recruited

SUBJECTS

- Healthy Malaysian children aged 2 to 4
- No chronic illnesses
- Do not undergo medication that affect their dietary routine

MEASUREMENT

1. **Socio-demographic information, milk feeding practice and milk appetite :** Self-administered questionnaire by mother/caretaker
2. **Milk feeding practice:**
   a) Adapted from National Health and Morbidity Survey (NHMS 2016)
   b) Formula milk volume, frequency, brand, and feeding duration
3. **Milk appetite:**
   a) Adapted from Baby Eating Behaviour Questionnaire (BEBQ)
   b) 18 items of 4 subscales: enjoyment of food (EF), food responsiveness (FR), satiety responsiveness (SR) and slowness in eating (SE)
4. **Body weight status:**
   a) Based on World Health Organization (WHO) Growth Standard 2016
   b) Weight-for-Age (WAZ), Height-for-Age (HAZ), and BMI-for-Age (BAZ) for child`

Figure 3 and 4: Measurement of height and weight of children

ETHICAL CONSIDERATION

- Approval from UPM Ethics Committee for Research Involving Human Subjects **(Ref. No : JKEUPM-2018-305)**

STATISTICAL ANALYSIS

- **Descriptive:** mean, standard deviation, frequency & percentage
- **Pearson's Correlation/Chi square:** Associations of formula milk feeding, milk appetite and body weight status

EXPECTED OUTCOME

- This study will serve as a database to implement proper intervention strategies in order to manage nutritional status of children who undergo prolonged formula feeding
- Further actions will be made by government to plan proper regulation of enforcing the functionality of formula milk in the market

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Appendix F: Poster Presentation (Nutrition Society of Malaysia 34th Scientific Conference)

Achievement: 3rd place

Date: 3-4th July 2019

Venue: Hotel Istana Kuala Lumpur

ASSOCIATIONS OF FORMULA MILK FEEDING PRACTICES AND APPETITE WITH NUTRITIONAL STATUS AMONG CHILDREN AGED 2 TO 4 IN PERMATA NEGARA ZON TENGAH

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INTRODUCTION

- Nutrition in early life was associated with subsequent risk of obesity and chronic diseases in later life. (1)
- Children above 2 years are encouraged to consume whole milk via cup feeding but high formula milk intake via bottle was shown by nearly three quarters of children aged 1-3 and half of children aged 4-6 in Malaysia. (2,3)
- Prolonged bottle feeding increased risk to excess weight in infancy, given the ease of consuming excess milk through bottles. This could also influence or shape early appetite or feeding regulation. (4)
- Variability in appetite traits may have consequences to actual food intake and nutritional status of growing children. (5)

OBJECTIVE

- To determine child's milk feeding practices and appetite, and the associations with nutritional status among 2-4 years old children.

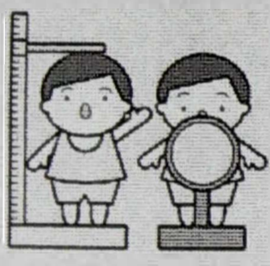
METHODOLOGY

- A cross sectional study was conducted among 197 children aged 2-4 in PERMATA Negara Zon Tengah, Malaysia.

All 6 PERMATA Negara Zon Tengah (multistage random sampling)

Children aged 2-4 were recruited

- ✓ No chronic illness
- ✓ Do not undergo medication that affect their dietary routine



Weight and height of children were measured

A self-administered questionnaire was given to child's mother

Nutritional Status
(WHO Child Growth Standards 2006)
- Weight-for-Age (WAZ)
- Height-for-Age (HAZ)
- BMI-for-Age (BAZ)

Milk Feeding Practices

- Adapted from NHMS 2016 (6)
- Retrospective and concurrent milk feeding (breastfeeding, formula feeding, other milk feeding)
- Volume, frequency, type, of milk and feeding duration

Milk Appetite

- Adapted from BEBQ (7)
- 18 items of 1-5 Likert scale
- Enjoyment of Food, Food Responsiveness, Satiety Responsiveness, General Appetite, and Slowness in Eating

STATISTICAL ANALYSIS

- **Descriptive:** mean, standard deviation, frequency & percentage
- **Pearson/Spearman Correlation (cont.), Chi square (cat.):** Associations of formula milk feeding practices, milk appetite and nutritional status
- Analysis was done using SPSS version 20.0 which p-value was set at 0.05.

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RESULTS & DISCUSSION

Figure 1: Weight-for-age categories of children

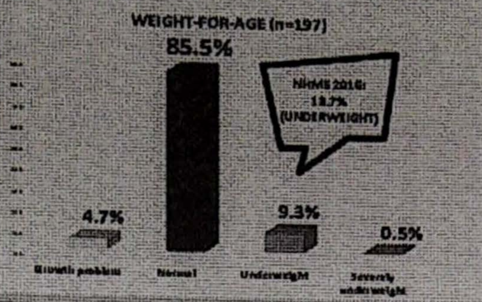


Figure 2: Height-for-age categories of children

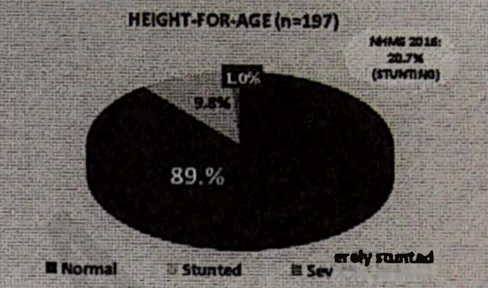
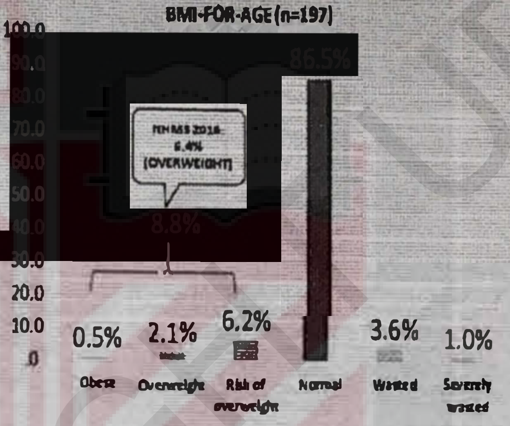


Figure 3: BMI-for-age categories of children



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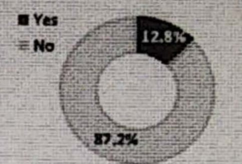

Figure 5: Prevalence of ever formula fed among children

Table 1: The association of milk feeding practices and nutritional status among children

Milk Feeding Practices	Mean score	WAZ	HAZ	BAZ
Age start complementary feeding (month)	5.86±5.1	-0.115	-0.155*	-0.020
Duration of breastfeeding (month)	17.37±10.4	-0.175*	-0.188*	-0.080
Age start formula milk feeding (month)	8.93±8.7	-0.042	0.453	0.803
Duration of formula milk feeding (month)	114.96±49.6	-0.020	0.607	0.574
Daily frequency of formula milk	3.98±2.6	0.066	0.118	0.876
Volume of formula milk (ml)	182.29±74.8	0.013	0.175	0.278
Age start other milk feeding (month)	20.50±12.2	0.026	0.768	0.955
Daily frequency of other milk	2.44±1.6	-0.015	0.534	0.678
Volume of other milk (ml)	191.67±169.1	0.183	0.206	0.276

*Pearson/Spearman product-moment correlation, p< 0.05

Table 2: The association of milk appetite and nutritional status among children

Milk Appetite Subscales	Mean score	WAZ	HAZ	BAZ
Food Responsiveness	2.45±0.8	-0.052	-0.054	-0.023
Enjoyment in Food	4.15±0.8	-0.082	-0.096	-0.035
Satiety Responsiveness	2.32±0.7	-0.075	0.893	-0.092
General Appetite	2.27±0.8	0.079	0.102	0.012
Slowness in Eating	3.80±1.0	-0.182*	-0.153*	-0.108

*Pearson/Spearman product-moment correlation, p<0.05

- Approximately 1 in 10 children faced underweight and stunting which were more prevalent than overweight and obese.
- Children were reported to consume high frequent of formula milk feeding which contributed to high calorie intake compared to whole milk.
- Consistent with other studies, breastfeeding duration were associated with lower WAZ(8) and HAZ.(9)
- Child who breastfed longer was associated to start complementary feeding late that would, possibly lead to lower HAZ and WAZ showing in this study.(10)
- Slowness in eating was associated with reduction in WAZ, which in line with other studies.(11,12)

CONCLUSIONS & RECOMMENDATIONS

- Overall, early nutrition such as milk feeding practices and appetite have shown relations with child nutritional status.
- Malnutrition was prevalent in young children in the urban area in Malaysia (Zon Tengah of Klang Valley) especially stunting and underweight.
- Nutrition intervention targeted for parents should focus on clear information on breastfeeding duration, starting age for complementary feeding, and appropriate milk feeding time for development of healthy growing child.
- Future studies should incorporate other cofactors, such as physical activity and screening time which associated with nutritional status.

Associations of Milk Feeding Practices, Milk Appetite and Dietary Intake with Nutritional Status among Children Aged 2 to 4 in PERMATA Negara Zon Tengah: A Study Protocol

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INTRODUCTION

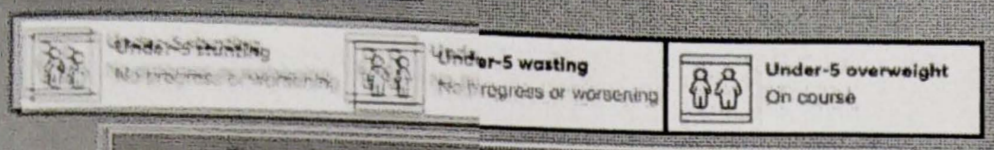


Figure 1: Prevalence of malnutrition in Malaysia[1]

- Malaysia is facing a "triple burden" issue when 11.5% of children under 5 are wasted and 20.7% are stunted whereas 6.0% are overweight (Figure 1). [1]
- Relation between early growth and risk of metabolic syndromes indicating early nutrition as the underlying mechanism. [2]
- Breastfeeding was proven to assist children in achieving optimal growth. [2]
- Formula milk which replaced the role of breastfeeding is defined as a milk-based or plant protein-based formula that is made to partially satisfy their nutritional requirement. [3]

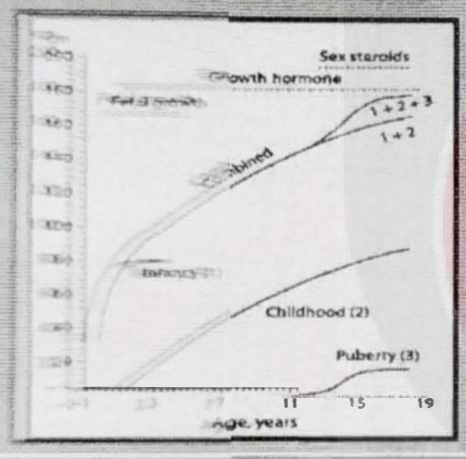


Figure 2: Nutrition is critical due to rapid growth in early years[4]

- Formula milk may not be necessary for young children consumption but high demand was shown by nearly three quarters of children aged 1-3 and half of children 4-6 years old in Malaysia as consistent consumers. [3,5]
- Prolonged bottle feeding increased risk to excess weight in infancy, given the ease of consuming excess milk through bottles. [6]
- Satiety control and interest to food intake of young children is affected by continued preference to formula milk. [7,8]

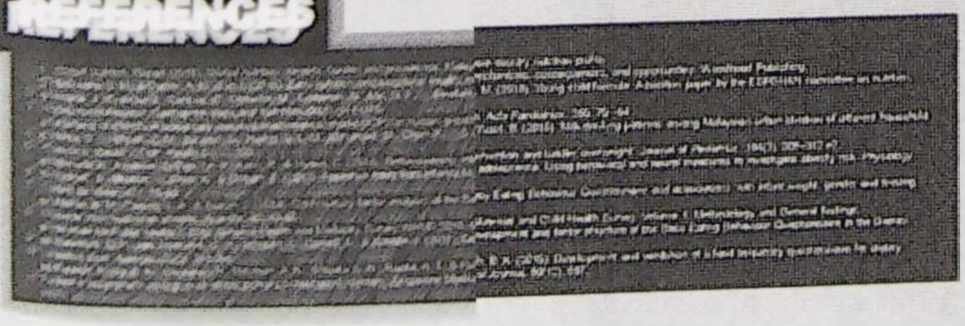
OBJECTIVES

- To identify the prevalence of malnutrition among children aged 2-4 in PERMATA Negara Zon Tengah.
- To determine the milk feeding practices, milk appetite, dietary intake and their association with nutritional status in children.

ETHICAL CONSIDERATION

- Approval from UPM Ethics Committee for Research Involving Human Subjects (Ref. No.: JKEUPM-2018-305)

REFERENCES



METHODOLOGY

STUDY DESIGN

Cross-sectional study (January-April 2019)

6 PERMATA Negara Zon Tengah, Malaysia

All 181 mother-child pairs will be recruited

- Malaysian children aged 2 to 4
- No chronic illness
- Do not undergo medication that affect their dietary routine

MEASUREMENT

Milk Feeding Practices
- Adapted from NHMS 2016[9]
- Retrospective and current milk feeding
- Milk feeding duration, volume, frequency, and type

Milk Appetite
- Tool: Baby-Eating Behaviour Q (BEBQ)[10]
- 18 items of 1-5 Likert scale
- Enjoyment of Food, Food Responsiveness, Satiety Responsiveness, and Slowness in Eating

Dietary Intake
- Tool: Semi-FFQ from SEANUTS Study[11]
- Frequency and serving size of food intake in past 30 days
- 95 food items and 13 food groups

Nutritional Status
- Tool: WHO Child Growth Standards 2006
- Weight-for-Age (WAZ), Height-for-Age (HAZ), and BMI-for-Age (BAZ)

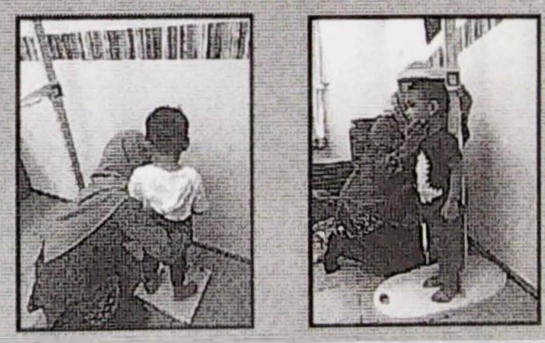


Figure 3 and 4: Measurement of height and weight of children using standardized instruments

STATISTICAL ANALYSIS

- **Descriptive:** mean, standard deviation, frequency & percentage
- **Pearson/Spearman Correlation (cont.), Chi square (cat.):** Associations milk feeding practices, milk appetite, dietary intake and nutritional status

EXPECTED OUTCOMES

- There are associations found between milk feeding practices, milk appetite, and dietary intake with nutritional status in children.
- It will serve as an evidence-based to implement nutrition intervention on proper milk feeding practices and dietary recommendation for young children to grow healthily.

Appendix G: Poster Presentation (1st Scientific Seminar on Body Composition and Nutrition)

Date: 5th July 2019

Venue: Auditorium Hospital Pengajar Universiti Putra Malaysia

ASSOCIATIONS OF FORMULA MILK FEEDING PRACTICES AND APPETITE WITH NUTRITIONAL STATUS AMONG CHILDREN AGED 2 TO 4 IN PERMATA NEGARA ZON TENGAH

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INTRODUCTION

- Nutrition in early life was associated with subsequent risk of obesity and chronic diseases in later life. (1)
- Children above 2 years are encouraged to consume whole milk via cup feeding but high formula milk intake via bottle was shown by nearly three quarters of children aged 1-3 and half of children aged 4-6 in Malaysia. (2,3)
- Prolonged bottle feeding increased risk to excess weight in infancy, given the ease of consuming excess milk through bottles. This could also influence or shape early appetite or feeding regulation. (4)
- Variability in appetite traits may have consequences to actual food intake and nutritional status of growing children. (5)

OBJECTIVE

- To determine child's milk feeding practices and appetite, and the associations with nutritional status among 2-4 years old children.

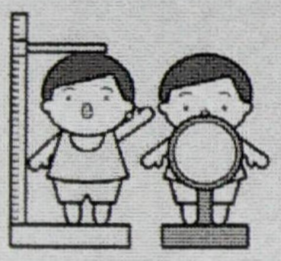
METHODOLOGY

- A cross sectional study was conducted among 197 children aged 2-4 in PERMATA Negara Zon Tengah, Malaysia.

All 6 PERMATA Negara Zon Tengah (multistage random sampling)

Children aged 2-4 were recruited

- ✓ No chronic illness
- ✓ Do not undergo medication that affect their dietary routine



Weight and height of children were measured

A self-administered questionnaire was given to child's mother

Nutritional Status (WHO Child Growth Standards 2006)

Weight-for-Age (WAZ)	Height-for-Age (HAZ)	BMI-for-Age (BAZ)

Milk Feeding Practices

- Adapted from NHMS 2016 (6)
- Retrospective and concurrent milk feeding (breastfeeding, formula feeding, other milk feeding)
- Volume, frequency, type, of milk and feeding duration

Milk Appetite

- Adapted from BEBQ (7)
- 18 items of 1-5 Likert scale
- Enjoyment of Food, Food Responsiveness, Satiety Responsiveness, General Appetite, and Slowness in Eating

STATISTICAL ANALYSIS

- **Descriptive:** mean, standard deviation, frequency & percentage
- **Pearson/Spearman Correlation (cont.), Chi square (cat.):** Associations of formula milk feeding practices, milk appetite and nutritional status
- Analysis was done using SPSS version 20.0 which p-value was set at 0.05.

RESULTS & DISCUSSION

Figure 1:Weight-for-age categories of children

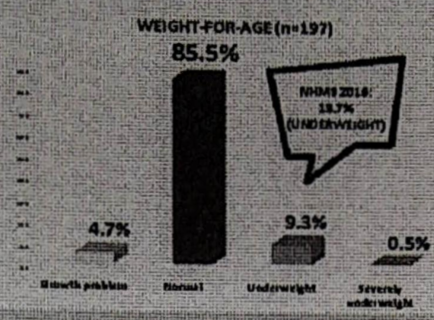


Figure 2: Height-for-age categories of children

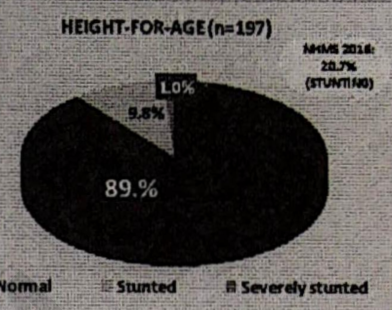


Figure 3: BMI-for-age categories of children

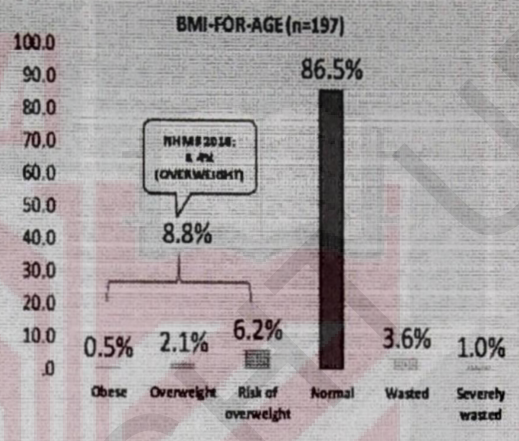


Figure 4: Prevalence of still breastfed among children

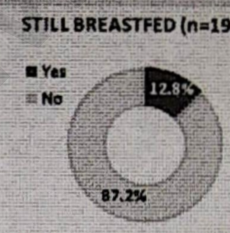


Figure 5:Prevalence of ever formula fed among children

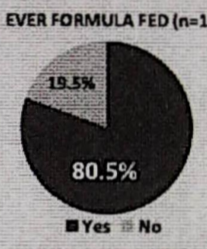


Table 1: The association of milk feeding practices and nutritional status among children

Milk Feeding Practices	Mean score	WAZ	HAZ	BAZ
Age start complementary feeding (month)	5.86±5.1	-0.115	-0.155*	-0.020
Duration of breastfeeding (month)	17.37±10.4	-0.175*	-0.188*	-0.080
Age start formula milk feeding (month)	8.93±8.7	-0.042	0.453	0.803
Duration of formula milk feeding (month)	114.96±49.6	-0.020	0.607	0.574
Daily frequency of formula milk	3.98±2.6	0.066	0.118	0.876
Volume of formula milk (ml)	182.29±74.8	0.013	0.175	0.278
Age start other milk feeding (month)	20.50±12.2	0.026	0.768	0.955
Daily frequency of other milk	2.44±1.6	-0.015	0.534	0.678
Volume of other milk (ml)	191.67±169.1	0.183	0.206	0.276

*Pearson/Spearman product-moment correlation, p< 0.05

Table 2: The association of milk appetite and nutritional status among children

Milk Appetite Subscales	Mean score	WAZ	HAZ	BAZ
Food Responsiveness	2.45±0.8	-0.052	-0.054	-0.023
Enjoyment in Food	4.15±0.8	-0.082	-0.096	-0.035
Satiety Responsiveness	2.32±0.7	-0.075	0.893	-0.092
General Appetite	2.27±0.8	0.079	0.102	0.012
Slowness in Eating	3.80±1.0	-0.182*	-0.153*	-0.108

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- Approximately 1 in 10 children faced underweight and stunting which were more prevalent than overweight and obese.
- Children were reported to consume high frequent of formula milk feeding which contributed to high calorie intake compared to whole milk.
- Consistent with other studies, breastfeeding duration were associated with lower WAZ and HAZ. (8)
- Child who breastfed longer was associated to start complementary feeding late that would, possibly lead to lower HAZ and WAZ showing in this study. (9)
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CONCLUSIONS & RECOMMENDATIONS

- Overall, early nutrition such as milk feeding practices and appetite have shown relations with child nutritional status.
- Malnutrition was prevalent in young children in the urban area in Malaysia (Zon Tengah of Klang Valley) especially stunting and underweight.
- Nutrition intervention targeted for parents should focus on clear information on breastfeeding duration, starting age for complementary feeding, and appropriate milk feeding time for development of healthy growing child.
- Future studies should incorporate other cofactors, such as physical activity and screening time which associated with nutritional status.