



UNIVERSITI PUTRA MALAYSIA

***FACTORS ASSOCIATED WITH RISK OF MALNUTRITION AMONG
PAEDIATRIC OUTPATIENTS IN HPUPM***

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**FACTORS ASSOCIATED WITH RISK OF MALNUTRITION AMONG
PAEDIATRIC OUTPATIENTS IN HPUPM**

BY

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Abstract

FACTORS ASSOCIATED WITH RISK OF MALNUTRITION AMONG PAEDIATRIC OUTPATIENTS IN HPUPM

INTAN NURZAHIRAH BINTI ABDUL ZAHID

Childhood malnutrition is one of the nutritional problems that occur mostly in low- and middle-income countries, and this issue is experienced by paediatric outpatients. Childhood malnutrition imposes various negative health impacts such as complications, longer hospital stays, and quality of life reduction. However, little is known about the association between factors with the risk of malnutrition among paediatric outpatients. Therefore, this study aims to determine the association between sociodemographic, medical background, dietary intake, breastfeeding practices and household environment with the risk of malnutrition among paediatric outpatients in Hospital Pengajar Universiti Putra Malaysia (HPUPM). This is a cross-sectional study that involved 66 paediatric outpatients in HPUPM. The pre-testing was sent to some of the paediatric outpatients attending HPUPM. Nutritional risk screening tools for children (STRONG kids) was used to identify the risk of malnutrition among the study population. This study used the self-administered questionnaire which consists of a few sections; sociodemographic, breastfeeding practices and household environment. Medical background was assessed using the HPUPM data system and dietary intake was obtained via 24-hour diet recall. The findings showed that the majority of the children were boys (56.1%) and Malays (92.4%). Majority of the children have not met a dietitian before (80.3%), and most of them were the follow-up cases from the paediatric outpatient department (60%). More than half of the children (53%) did not achieve the RNI recommendation of energy intake. While majority of the children (93.9%) achieved the RNI recommendation for protein intake. The mean value of the food security score was 0.29 ± 0.84 . Most of the children have a low risk of malnutrition (80.3%), followed by medium risk of malnutrition (19.7%). There was no association between sociodemographic, dietary intake, breastfeeding practices, and household environment with risk of malnutrition. Meanwhile, dietitian intervention ($X^2= 7.164$, $p=0.007$) was significantly associated with risk of malnutrition.

Abstrak

FAKTOR BERKAITAN DENGAN RISIKO MALNUTRISI DALAM KALANGAN PESAKIT LUAR PEDIATRIK DI HOSPITAL PENGAJAR UNIVERSITI PUTRA MALAYSIA

INTAN NURZAHIRAH BINTI ABDUL ZAHID

Malnutrisi kanak-kanak merupakan salah satu masalah pemakanan yang kebanyakannya berlaku di negara berpendapatan rendah dan sederhana, dan isu ini dialami oleh pesakit luar kanak-kanak. Malnutrisi kanak-kanak menimbulkan pelbagai kesan kesihatan negatif seperti komplikasi, penginapan hospital yang lebih lama, dan pengurangan kualiti hidup. Walau bagaimanapun, sedikit yang diketahui tentang faktor-faktor berkaitan dengan risiko malnutrisi dalam kalangan pesakit luar kanak-kanak. Oleh itu, kajian ini bertujuan untuk menentukan perkaitan antara sosiodemografi, latar belakang perubatan, pengambilan pemakanan, amalan penyusuan susu ibu dan persekitaran isi rumah dengan risiko malnutrisi dalam kalangan pesakit luar kanak-kanak di Hospital Pengajar Universiti Putra Malaysia (HPUPM). Ini adalah kajian keratan rentas yang melibatkan 66 pesakit luar kanak-kanak di HPUPM. Ujian pra telah dihantar kepada beberapa pesakit luar kanak-kanak yang menghadiri HPUPM. Alat pemeriksaan risiko pemakanan untuk kanak-kanak (STRONG kids) digunakan untuk mengenal pasti risiko malnutrisi dalam kalangan populasi kajian. Kajian ini menggunakan soal selidik yang ditadbir sendiri yang terdiri daripada beberapa bahagian; sosiodemografik, amalan penyusuan susu ibu dan persekitaran isi rumah. Latar belakang perubatan dinilai menggunakan sistem data HPUPM dan pengambilan pemakanan diperoleh melalui 24 jam *diet recall*. Dapatan kajian menunjukkan majoriti kanak-kanak adalah lelaki (56.1%) dan Melayu (92.4%). Majoriti kanak-kanak tidak pernah berjumpa *dietitian* sebelum ini (80.3%), dan kebanyakannya adalah kes susulan daripada jabatan pesakit luar kanak-kanak (60%). Lebih separuh daripada kanak-kanak (53%) tidak mencapai pengambilan tenaga cadangan RNI. Manakala majoriti kanak-kanak (93.9%) mencapai pengambilan protein cadangan RNI. Nilai min skor keselamatan makanan ialah 0.29 ± 0.84 . Kebanyakan kanak-kanak mempunyai risiko malnutrisi rendah (80.3%), diikuti oleh risiko malnutrisi sederhana (19.7%). Tiada kaitan antara sosiodemografi, pengambilan diet, amalan penyusuan susu ibu, dan persekitaran isi rumah dengan risiko malnutrisi. Sementara itu, intervensi *dietitian* ($X^2= 7.164, p=0.007$) berkait secara signifikan dengan risiko malnutrisi.

CHAPTER 1

Introduction

1.1 Background

According to Sobotka (2011) malnutrition is defined as “a state resulting from lack of intake or uptake of nutrition that leads to altered body composition (decreased fat free mass) and body cell mass leading to diminished physical and mental function and impaired clinical outcome from disease”. A.S.P.E.N. has defined pediatric malnutrition (undernutrition) as “an imbalance between nutrient requirement and intake, resulting in cumulative deficits of energy, protein or micronutrients that may negatively affect growth, development and other relevant outcomes” (Mehta et al., 2013).

Malnutrition issues are prevalent among children from low and middle-income countries in which about 45% of children under 5 deaths were associated with undernutrition. Meanwhile statistics of malnutrition for children aged below 5 in Malaysia shows there was improvement in wasting. However, the percentage of stunting among children aged below 5 was worsening from 2006 to 2016. In 2006, 17% of children were stunted while in 2016 20.7% were stunted. Putrajaya, the most affluent district in Malaysia, records 24% of the children aged 5-19 years old were stunted. Meanwhile, Kelantan recorded the highest level of stunting among all states in Malaysia, which is 34% of children aged 5-19 years old were stunted (*Children Without*, 2018). Kelantan, a poverty-stricken state in Malaysia, has a worse level of child stunting compared to low-income countries such as Zimbabwe and Swaziland. Therefore, the malnutrition issue remains a massive threat in the Malaysian community (Wan Muda et al., 2019).

“Women, infants, children, and adolescents are at particular risk of malnutrition,” (World Health Organisation, 2021). United Nations Children's Funds (2017) explains that the most critical time for good nutrition is during the first 1,000 days of pregnancy until the child reaches 2 years old. Besides, right nutrition prevents nutrient deficiency and reports show it can enhance brain development. Adolescence phase is defined as a physiological and social process of a child maturing into an adult. Adolescents are at higher risk of getting malnutrition because during the adolescence period, their body is rapidly growing hence increasing their nutrient requirements (World Health Organization, 2014). Since the 1980s, paediatric patients admitted to the hospital were at high risk of acute and chronic malnutrition particularly those with health problems and diseases (Joosten & Hulst, 2011). Tuokkola et al., (2021) found that in a tertiary hospital, one out of 100 paediatric outpatients are at high risk of malnutrition. Meanwhile acute malnutrition has no great difference between the outpatient and inpatients. About 3.7% of outpatients and 4.5% of inpatients are experiencing acute malnutrition.

Childhood malnutrition imposes various negative health impacts. John Hopkin medicine stated that infants, children, and adolescents suffer the most when they are malnourished as compared to other age groups. Children who experience this issue may have more complications, longer hospital stays, and quality of life reduction. Other than that, they may have poor cognitive ability and comorbidities. These conditions increase the cost of health care and mortality rates rise among this age group (Fuchs et al., 2014). Being undernourished increases the risk of children getting diseases and dying. Previous research has established the relationship between malnutrition and infection. Children who are undernourished are prone to get infections such as gastrointestinal and respiratory tract infections (Rodríguez et al.,

2011). A study shows a high fatality rate due to pneumonia among children who are having severe malnutrition as compared to those who are well-nourished (Ehsanul Huq et al., 2021). As malnourished children grow older, their survival, growth, and development may be harmed (World Health Organization, 2021). Therefore, this study will determine the association between sociodemographic, medical background, dietary intake, breastfeeding practices and household environment with the risk of malnutrition among paediatric outpatients.

1.2 Problem Statement

Childhood malnutrition is one of the nutritional problems that occur mostly in low- and middle-income countries. Malnutrition is one of the major risk factors associated with child mortality and illness in adulthood. The Global Nutrition Report demonstrates the significant and universal problem of nutrition in 2017. Globally, 3.1 million deaths among children are caused by underlying malnutrition (Global Nutrition Report, 2017).

Low socioeconomic status is widespread among malnourished children (Kikafunda et al., 1998; Wong et al., 2014). It is now well established from a variety of studies about the relationship between malnutrition, low maternal schooling, and poverty (Abuya et al., 2012; Mohsena et al., 2010; Silveira et al., 2010). Besides, children with malnutrition have a greater chance of dying when they experience diarrhoea, pneumonia and malaria. A report found that most childhood malnutrition cases were likely to be females, have more siblings, poor and have families who experience food insecure (Wong et al., 2014). Besides, it is now well established from a variety of studies about the relationship between malnutrition, low maternal schooling, and poverty (Abuya et al., 2012; Mohsena et al., 2010; Silveira et al., 2010).

Moreover, a study shows that malnutrition problems occur among paediatric outpatients (Huynh et al., 2019). Malnutrition among paediatric outpatients impose some complication risks that will require them to be admitted. According to Cao et al. (2014), STRONG kids score were correlated with increase complications, prolongs hospital stays and increase the health care cost among hospitalized children in China. A study shows that hospitalized paediatric patients in Europe who are moderately and severely malnourished show a longer length of hospital stay where the median of period staying in hospital was 5 days and 7 days respectively. Besides, complications such as diarrhoea and vomiting are significantly higher among paediatric patients with malnutrition compared to the well-nourished patients (Hecht et al., 2015).

Some diseases put the child at risk of getting malnutrition. It has previously been observed that diseases such as cystic fibrosis and inflammatory bowel disease in children are known to be associated with malnutrition in United Kingdom (Hendrikse et al., 1997). Therefore, nutritional intervention is a crucial element in the treatment. Moreover, the paediatric population has poor clinical outcomes when they are malnourished upon admission or their nutritional status worsens during hospitalization (McCarthy et al., 2019). Being malnutrition will increase the risk of getting infections such as respiratory infections, diarrhoea, and measles. Malnourished children are prone to get communicable and non-communicable diseases in Vietnam (Huynh et al., 2019). Several studies suggest that malnourished patients have disrupted immunological response thus resulting in poor wound healing, developing infections, and complications of their underlying medical condition (Cao et al., 2014).

Other than that, the food-insecure family may lead to poor nutritional status among children. Being undernourished will badly impact the growth and development of children as children need proper nutrition to grow (Huynh et al., 2019). Besides,

inadequate access to nutritious food in the household may result in poor intellect, cognitive, and education of children as children require proper nutrition for their brain development. The negative effects of food insecurity among children nowadays will eventually result in a future society with lower working productivity and reduced total working years (Momanyi et al., 2019). In Malaysia, the food availability is not the main concern however household's food accessibility is always an issue and worsen due to increasing food prices recently (Malaysia Department of Statistics, 2013). However, there is a limited study on factors associated with the risk of malnutrition among paediatric outpatients in Malaysia.

1.3 Significant of Study

This study aims to fill the gap in determining the risk of malnutrition among paediatric outpatients and factors associated with it in the local context.

By conducting this study, new knowledge regarding factors associated with the risk of malnutrition among paediatric outpatients can be obtained. This can be used by the dietitians and nutritionist in the nutrition counselling with the parents or caregivers. Dietitians can present the results of the study to increase the awareness regarding malnutrition risk among paediatric outpatients among parents or caregivers. Besides, dietitians can address the significant factors associated with malnutrition and guide them to overcome the issues.

Other than that, malnutrition risk screening using the STRONGkids tool may provide information to the healthcare workers regarding the child's risk of malnutrition; at low, medium or high risk. Since malnutrition may result in poor clinical outcomes, risk of malnutrition identified in the study will assist physicians to plan appropriate management for patients who are at high risk of malnutrition. Patients

with a high risk of malnutrition should be referred to the dietitian and receive nutritional support to prevent themselves from getting malnutrition. Moreover, by identifying the significant factors that are associated with risk of malnutrition among the study population, healthcare workers, parents and/or caregivers can address the issues that are related to the child hence prevent the child from developing malnutrition.

1.4 Research questions

Study about malnutrition risk and its related factors among paediatric outpatients in Malaysia are limited hence this study wants to answer these questions.

1. What is the proportion of risk of malnutrition (low, medium and high) among paediatric outpatients in HPUPM?
2. What is the association of sociodemographic, medical background, dietary intake, breastfeeding practices and household environment with the risk of malnutrition among paediatric outpatients in HPUPM?

1.5 Objectives

General objective

To determine the factors associated with risk of malnutrition among paediatric outpatients in Hospital Pengajar Universiti Putra Malaysia.

Specific objectives

1. To determine sociodemographic (child's age, ethnicity, parent's education, parent's marital status, monthly family income, parent's employment status), medical background, dietary intake, breastfeeding practices and household environment of paediatric outpatients.
2. To identify the risk of malnutrition among paediatric outpatients.

3. To determine the associations of sociodemographic, medical background, dietary intake, breastfeeding practices and household environment with the risk of malnutrition among paediatric outpatients

1.6 Research Hypothesis

There is a significant association between sociodemographic, medical background, dietary intake, breastfeeding practices and household environment with the risk of malnutrition among paediatric outpatients in HPUPM.



1.7 Conceptual framework

The conceptual framework shows the association of sociodemographic, medical background, dietary intake, breastfeeding practices and household environment with risk of malnutrition among paediatric outpatients in HPUPM. This conceptual framework is adapted from the United Nations Children’s Fund (UNICEF) conceptual framework of undernutrition (United Nations Children’s Fund, 2013).

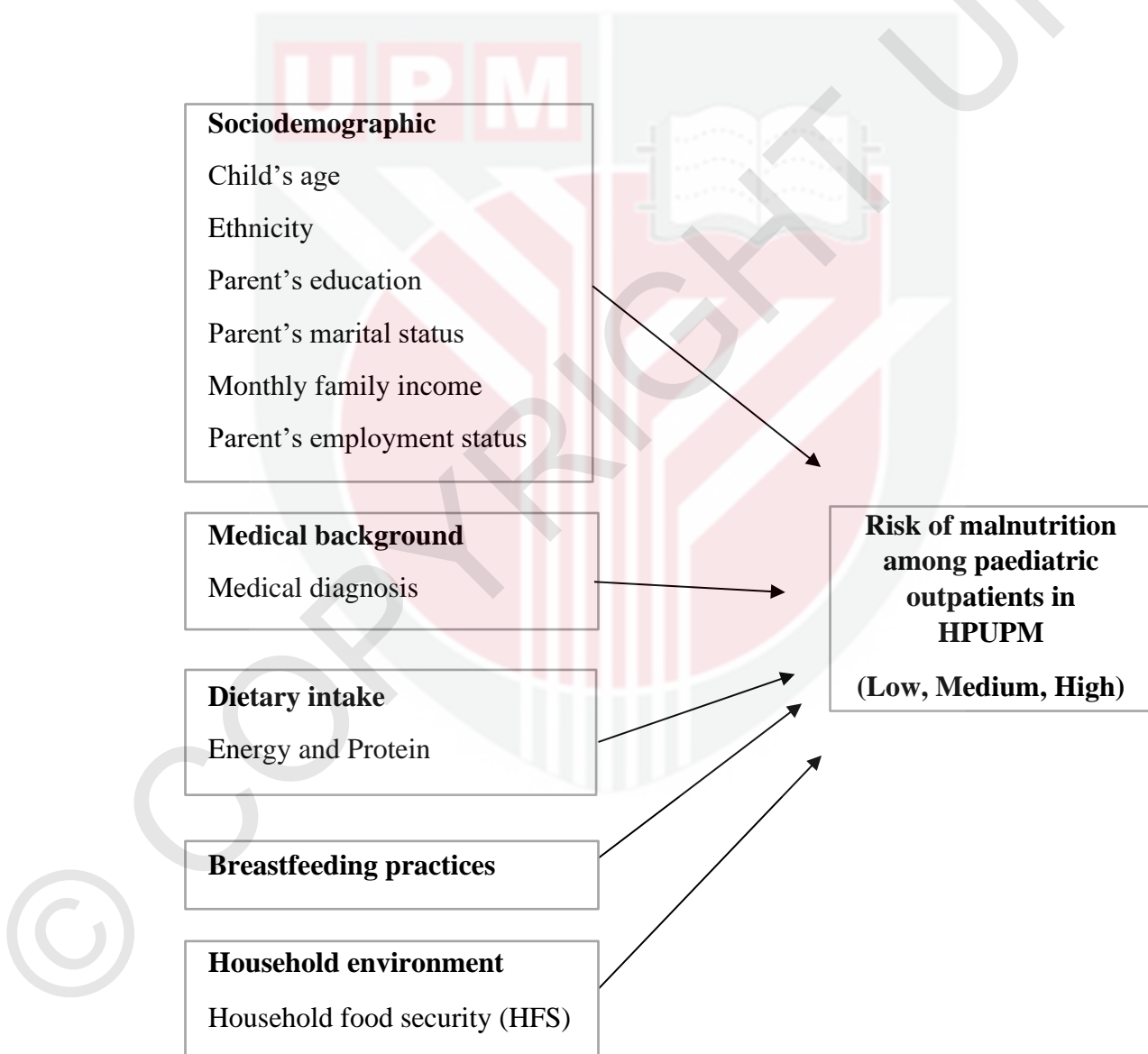


Figure 1.1: Conceptual framework of the study

CHAPTER 2

Literature Review

2.1 Malnutrition

A relative or absolute vital nutrients deficiency may result in a pathological condition called malnutrition. Malnutrition is further categorized into three groups which are undernutrition, micronutrient-related malnutrition and overweight, obesity, and diet-related non-communicable diseases. Wasting, stunting, underweight, and vitamins and minerals deficiencies are four sub-forms of undernutrition (World Health Organization, 2021). Malnutrition is a nutritional state in which the weight for age, height for age, weight for height indices is below -2 Z-score based on the The National Center for Health Statistics (NCHS) reference.

Malaysia bears a significant double burden of malnutrition, while 20.7% of children under five suffer from stunting and 11.5% from wasting, children with obesity are 12.7% aged from 5 to 19-year-olds (Adams et al., 2010). According to the study conducted among paediatric outpatients, those children with anaemia or other illnesses persist in experiencing malnutrition issues; 8.4% underweight, 9.8% stunting and 4.4% wasting. Nevertheless, healthy kids record lower rates of underweight and stunting which are 7.0% and 4.9% respectively (Huynh et al., 2019).

Unfortunately, the study shows only 33% of patients who have high nutritional risk had received nutritional support. Meanwhile the rest of the patients may struggle to recover due to lack of nutritional support in their medical treatment (Zhu et al., 2021). Hence, it is important to determine the risk of malnutrition among patients in order to provide enough nutritional support for those who need it (Reber et al., 2019). Early detection of children who are at high risk of malnutrition will reduce

the cost of treatment and improve the effectiveness of the treatment (Huysentruyt et al., 2013).

The risk of malnutrition among paediatric outpatients can be assessed using several nutritional risk screening tools for children that have been developed in Netherlands, United States of America (USA) and United Kingdom (UK). However, there is no screening tool that is globally accepted. Huysentruyt et al. (2013) agree that STRONGkids tool is very quick and simple nutritional risk screening tool for the hospital staff such as nurses to screen the nutritional risk among the paediatric outpatients.

2.3 Factors Associated with Risk of Malnutrition

2.3.1 Sociodemographic

Sociodemographic background such as child's age, ethnicity, parents' education, parent's marital status, monthly family income and parent's employment status may be associated with the risk of malnutrition among the paediatric outpatients. Education and poverty are significant in determining the health outcome of people in low-income countries (Mohsena et al., 2010). Children from low socioeconomic households were 2.5 times more likely to experience malnutrition as compared to the children from middle and upper socioeconomic households (Kikafunda et al., 1998). The finding of research in Terengganu has supported those children from the lower socioeconomic background may experience malnutrition issues (Wong et al., 2014). This may be due to children from low socioeconomic household status being at higher risk of experiencing food insecurity since it is related to their purchasing power (Asim & Nawaz, 2018).

Child's age

Malnutrition is significantly associated with child's age (Darsene et al., 2017; Gebre et al., 2019). Darsene et al. (2017) reported there is increase prevalence of child undernutrition when the age increases. Younger age has less prevalence compared to older age which is 36–47 months. A similar finding was reported by *Children Without* (2018), the prevalence of malnutrition is higher among older children who are weaned off from exclusively breastfed and were fed with solid food. About 23% of 4-year-olds are stunted compared to 15% of 2-years-old kids. 2 and 3 years old children were about 3.5 times higher risk of stunting compared to 0 to 5 months infants (Shinsugi et al., 2015). However, Cao et al. (2014) reported younger children has higher nutritional risk. Other than that, children who suffer from double burden malnutrition were aged 4 to 5 years with about 33% more likely compared to 1 year old children or less (Patel et al., 2020).

Ethnicity

Ethnic group of mothers is significantly associated with stunting among children (Abuya et al., 2012; Kassahun Alemu, 2013; Ola et al., 2011). A study on childhood malnutrition, conducted in Fars province, Iran has reported Khamse ethnicity children has higher risk of stunting and underweight as compared to Fars ethnicity children. This is because the Khamse ethnicity is one of the minority ethnic groups in Iran (Kavosi et al., 2014a). In Malaysia, Baharudin et al., (2019) reported children from other ethnic groups have significantly higher risk of underweight and stunted compared to children from Malay ethnic group. According to Phengxay et al. (2007), there are multiple food consumption patterns, eating habits, living conditions, and other environmental elements that vary among diverse ethnic groups which is based on their traditional cultures.

Parent's education

Heads of households who have a higher level of education, particularly women, may lead to proper food preparation and good nutrition habits at home (Rohana AJ, 2014). Mothers who received high education tend to have more awareness about the sanitation practices, healthy lifestyle and well manage their household resources (Lisa C. S. & Lawrence H., 1999). Meanwhile, paternal education plays a major role to provide adequate nutrition to their children (Rahman et al., 2009). Studies among preschool in India reported children of educated mothers have a lower rate of malnutrition (Sen et al., 2011). Meanwhile, children are at higher risk of stunting when maternal do not receive universal education. Highly educated mothers may lower the odds of children stunting, wasting, and being underweight compares to uneducated mothers. Besides, illiterate mothers may have less awareness in preparing nutrient-dense food for their children. Tariq et al. (2018) stated the odds were 3.33 times higher (95% CI: 1.41–7.90) in children with mothers who had no education. However, some researchers reported that paternal education is not significantly associated with childhood malnutrition (Kavosi et al., 2014a; Wong et al., 2014).

Parent's marital status

Mother's marital status are independently associated with child stunting. Children who born with mother who never married have odd of stunting 56% more relative than mothers who currently in union (Abuya et al., 2012). Amadu et al. (2021) reported single mothers experience socioeconomic difficulties which influent the quality of taking care of their child than mothers who currently married. Children who have single mother are prevalent of underweight since it is challenging for single mothers to work and at the same time maintain the child's nutritional status. Besides, marital status is one of the determinants of undernutrition and micronutrient

deficiencies among adolescents (Madjdian et al., 2018).

Monthly family income

Malnutrition is also associated with the monthly family income as many children with malnutrition come from a family with low income (Kassahun Alemu, 2013; Whye Lian et al., 2012). Fuchs et al., (2014) mentioned major factor leads to malnutrition in his study is low-income family. Poverty hurts the nutritional status of the respective household members. Poverty was widespread among families with malnourished children in Malaysia and higher family income showed improved nutritional status (Clarke et al., 2021; Whye Lian et al., 2012). Study concluded that is challenging for family who gain RM 650 to 690 income monthly to provide adequate food to the family for living a healthy life (Whye Lian et al., 2012). Meanwhile study in Iran reported children whose family income is higher than 667 US dollars to have significantly lower chance to experience stunting compared to children who have lower family income which is 334\$ and lower. Better quality of life, better provision of vital health services, and adequate nutritional intake among children who have high family income are a protective factor against stunting (Kavosi et al., 2014a). However, some research found that there were a significant proportion of children with malnutrition came from non-poor families (Wong et al., 2014).

Parent's employment status

Parents who are lack higher education may limit the opportunity to be employed therefore may experience food insecurity and increase the risk of child malnutrition (Clarke et al., 2021). Previous research has found that the majority of malnourished children have housewife mothers (Wong et al., 2014). Unemployed

father is one of the major malnutrition risk factor among paediatric patient in Dhaka hospital, Bangladesh (Fuchs et al., 2014).

2.3.2 Medical background

A study that aims to identify the nutritional risk among hospitalized children in China found that 3 diseases that are common among patients with high risk of malnutrition are cardiac disease, respiratory disease, and oncologic disease (Cao et al., 2014). Meanwhile study in Uganda determine that the prevalence of malnutrition among paediatric patient with congenital heart disease are 6 times higher than in normal children (Batte et al., 2017).

2.3.3 Dietary intake

Huge number of children with malnutrition may experience macro and micronutrient deficiency. The study found that many has less intake of staple food such as rice, noodles and bread and has low calorie intake might due to low food accessibility (Whye Lian et al., 2012; Wong et al., 2014). Besides, malnourished children had low energy and vitamin A intake as compared to the requirements stated in the RNI (Wong et al., 2014). Poor diet quality such as consuming high sodium snacks and sugary beverages are seen among malnutrition children. They have non optimal intake in fruits, vegetables and dairy products hence have reduce micronutrients received by the body. A study conducted in Kelantan reported the mean of calorie intake which compared to RNI was very low meanwhile the mean of protein intake was high (Whye Lian et al., 2012).

2.3.4 Breastfeeding practices

As World Health Organisation (WHO) had mentioned “Exclusive breastfeeding for 6 months has many benefits for the infant and mother”, breast milk provides energy and vital nutrients to children aged 6 to 23 months. One of the advantages of breastfeeding among kids is decrease the risk of overweight as well as undernutrition. Campos et al. (2021) hypothesized that children who are breastfed for more than 6 months have decreased risk of stunting when compared to those who were never breastfed.

Poor breastfeeding is one of the important risk factor associated with acute malnutrition among children admitted in a hospital in Bangladesh (Fuchs et al., 2014). Study in a Vietnam hospital reported that underweight is less prevalent among children who had breastfeeding in the first hour after birth (Huynh et al., 2019). Fuchs et al., (2014) mentioned that poor breastfeeding practices is significant factor which leads to malnutrition and breastfeeding also affects the survival of undernourished children as it lowers the mortality rate among them. Darsene et al. (2017) reported children who breastfed in duration less than 2 years are prevalent of having undernutrition. Poor feeding leads to inadequate intake of staple foods like rice, noodles and breads. Meanwhile Latin American region recorded higher rate of stunted children due to stopped breastfed which result in the duration of breastfeeding is lower than 6 months. However, studies found that prolonged breast-feeding duration which is more than 18 months up to 24 months associated with increased risk of child malnutrition (Aheto et al., 2015; Kikafunda et al., 1998)

2.3.5 Household environment

Food Security

Food security is defined as having physical, social, and economic access to safe and adequate nutritious food to meet the daily dietary requirements and food preferences for a healthy and active life (Russell et al., 2011). Previous pioneers emphasized food security as the ability of a region or nation to provide sufficient food supply for the population. However, the food security term lately has been used to address inadequate food intake at the local, household, or individual level since it become prevalent in the population. Households that are food secured able to access and consume food and have a consistent food supply. Meanwhile food insecurity is described as having inadequate food supply for the family members.

Several studies have explored the educational status and family income found to be influencing food insecurity (Drammeh et al., 2019). Sub-Saharan Africa records drastic increment in total population who experiencing food insecurity within 10 years period which is from 5.5million of the population are food insecure into 30million (Drammeh et al., 2019). Although food is widely available in most of the area in Malaysia, some households still lack of access to food due to increase in food price (Malaysia Department of Statistics, 2013).

Food insecurity may result in poor nutritional status among a child of the affected household as the intake of calories and nutrients was reduced and are prone to malnutrition issues. There is a significant association between the household food security status and child stunting rates. Besides, food insecurity increases the tendency of eating unhealthy food which may cause negative effects on the nutritional and health status (Clarke et al., 2021). Severe consequences of food insecurity are micronutrient

deficiency (vitamins or minerals), undernutrition, diseases, and death. Besides, food insecurity among children may reduce the productivity of future society (Momanyi et al., 2019).

Other than that, poor food security results in underweight caregivers and the child. Food insecurity is common among low socioeconomic positions because purchasing power is a major factor to afford nutritious food. A study in Terengganu found that malnourished children come from poor and food-insecure families. However, in some situations, food insecurity is not the main factor that influences the health status of the paediatric population such as it is influenced by diet inadequacy, recurrent infections, birth weight and socio-economic status (Wong et al., 2014).

CHAPTER 3

Methodology

3.1 Study Design

This cross-sectional study aimed to investigate the associations of sociodemographic, medical background, dietary intake, breastfeeding practices and household environment with risk of malnutrition among paediatric outpatients.

3.2 Study Location

The study was conducted at Hospital Pengajar Universiti Putra Malaysia (HPUPM). HPUPM is a teaching hospital for the Faculty of Medicine and Health Sciences (FHMS), UPM and is located at Serdang, Selangor. The HPUPM consists of tertiary care of Allergy and Clinical Immunology, Endocrinology, Infectious Disease, Neonatology, Cardiology and Intensive Care.

3.3 Sample Size Determination

The sample size calculation was determined using a correlation sample size formula as shown below (Hulley, Cummings, Browner, Grady & Newman, 2013).

$$\text{Total sample size} = N = [(Z_{\alpha} + Z_{\beta})/C]^2 + 3$$

Where,

N = number of respondents

$\alpha = Z_{\alpha} = 2.58$ for 95% confidence level

$\beta = Z_{\beta} = 0.842$ for 80% power

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

r = the expected correlation coefficient

Table 3.1: Calculation of sample size based on relevant studies

Independent Variables		Correlation coefficient, r	Sample size, n
Medical background	Diarrhoea and Stunting, Underweight (Mwaniki & Makokha, 2013)	0.82	9
Dietary intake	Energy intake (8-11 years old) and Underweight, Wasting (Mwaniki & Makokha, 2013)	0.47	43
	Protein intake with stunting (Nelly SD Situmeang et al., 2020)	0.354	60

Based on table 3.1, the highest sample size was 60. Non-response rate was considered hence 10% of the total number of respondents was added. Therefore, the minimum sample size was 66 subjects.

3.4 Sampling Design

The non-probability sampling method was used as a sampling design in this study. Purposive sampling was applied to select respondents from all paediatric outpatients' parents or caregivers attending HPUPM. This study includes paediatric outpatients from two departments in HPUPM which are Department Paediatrics and Dietetics. Patients from all paediatric outpatients that meet the inclusion criteria were invited to participate in this study. However, this study excludes patients from the Neonatology Unit, Department of Paediatrics because they are not meeting the study aged group.

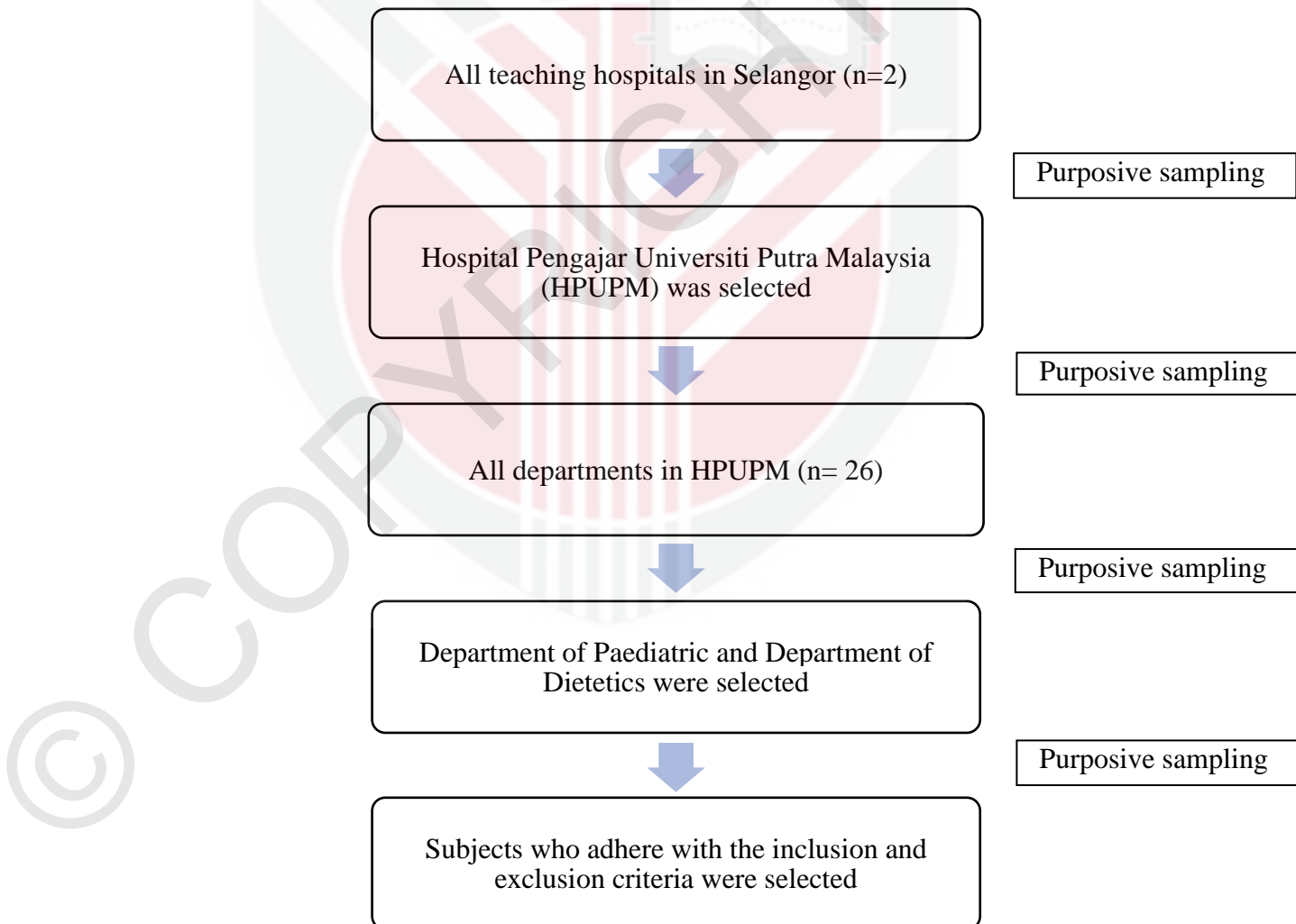


Figure 3.1: Flow chart of the sampling method to select subjects

3.5 Study population

The study population was the paediatric outpatients in HPUPM. The respondents for this research are the parents (father or mother) or the caregivers which are someone that gives care, support and help with activities such as daily living of the paediatric outpatients attending the outpatient clinic in HPUPM. The study population was selected based on the inclusion and exclusion criteria as in diagram below. The questionnaire was answered by the parents or caregiver of the patient since paediatric population are unable to answer the self-administered questionnaire by themselves.

Table 3.2: Inclusion and exclusion criteria of the study subjects

Inclusion Criteria	Exclusion Criteria
a) Children attended outpatient departments in HPUPM	a) Parents who were not able to give informed consent
b) Paediatric outpatients aged 1 months to 18 years old	b) Children with active malignancy during the period of data collection
	c) Critically ill children due to limited feasibility to measure the anthropometric data
	d) Children who received steroids and other appetite stimulant drugs or enteral nutrition treatment due to malnutrition in previous 3 months

3.6 Study Instruments

This study used the self-administered questionnaire which consist of a few sections; sociodemographic (child's age, parental age, ethnicity, parent's education, parent's marital status, monthly family income, parent's employment status), medical background, dietary intake, breastfeeding practices and household environment. These study instruments were discussed in the following section.

3.6.1 Sociodemographic

The self-administrated questionnaire on sociodemographic was used in this study. The questionnaire consists of the child's age, parental age, ethnicity, parent's education, parent's marital status, monthly family income and parent's employment status.

3.6.2 Medical background

The medical diagnosis of the study population was assessed using the hospital medical records. Then, the individual medical diagnosis was categorized into four categories which are respiratory, congenital malformations, deformations and chromosomal abnormalities, gastrointestinal, and others.

3.6.3 Dietary intake

A 24-hour diet recall was performed via interviewing the parents or caregivers to obtain the dietary intake of the study population. Respondents aged 6 years old and below requires the caregiver to recall their dietary intake in the previous day. Although 24-hour diet recall is challenging as it depends on the recall ability of the caregivers or respondents, education tools such as household measuring tools can be used to ease the estimation of the quantity of food consumed. Besides, probing questions such as where they ate can help in the food recall process. Other than that, 24-hour diet recall

may indicate their usual dietary intake. Then, the intake of respondents will be compared with the nutrient requirement based on Malaysian Recommended Nutrient Intake (RNI) 2005. Total calorie intake per day as well as total macronutrients (carbohydrate, protein and fat) intake per day were calculated and categorized into 2 categories which meet RNI and do not meet RNI.

3.6.4 Breastfeeding practices

The breastfeeding factor that is associated with risk of malnutrition was assessed using two follow up questions. 'Have you ever breastfeed your child?' require yes or no answer. If the answer is yes, the question on the duration of breastfeeding the child required the respondent to choose two answers which are less than or more than six months. The feeding variable was categorized into four categories which are breastfed, never breastfed, breastfeeding for less than six months, and breastfeeding for more than six months. Breastfeeding includes mothers who exclusively breastfed their children or having other milks while breastfeeding (predominant and partial breastfeeding/ breastmilk).

3.6.5 Household environment

The household environment factor which is food security among paediatric outpatients was evaluated using the Six-Item Short Form Food Security Scales of the Economic Research Service, USDA. It was a validated questionnaire which was used in several research in Malaysia. The questionnaire has both Malay and English versions. There are six items in this questionnaire and for item number 1-2, the scales used are often true, sometimes true, not true and do not know or refuse. As for item number three until five (not included 3a), the respondents are required to answer either yes, no or do not know. Only respondents who have responded "yes" for item number 3 are required to answer 3a. For the scoring, score 0-1 indicates high or marginal food

security, score 2-4 are considered low food security and score 5-6 indicates very low food security.

3.6.6 Risk of Malnutrition

The malnutrition risk scores among paediatric outpatients are measured by the researchers using the Screening Tool for Risk On Nutritional status and Growth (STRONGkids). The STRONG kids nutritional screening tool assessed the clinical signs of the paediatric outpatients. This screening tool is fast, more convenient, more accurate, easier to corporate, and suitable to be performed among children. STRONGkids was used in a national wide setting and it comprise of four parameters: (1) subjective global assessment; (2) high risk disease; (3) nutritional intake and loss; and (4) weight loss or poor weight gain. All items require a “Yes” and “No” answers and the total score for the screening tool is five points. Children who score 0 points are considered at low risk of malnutrition. While children who score 1-3 points are at medium risk and children who score 4-5 points are considered at high risk of malnutrition.

STRONGkids was developed and validated in Netherlands. The inter-rater reliability of STRONGkids nutritional risk screening tool was substantial ($k = 0.61$) when applied by nursing staff (Huysentruyt, 2013). It is proved to be a feasible tool to identify risk of malnutrition among children ($kappa = 0.65$) (Moeeni, 2014).

3.7 Study Approval

Before conducting the data collection of the study, the ethical approval for the study was obtained from the Ethics Committee for Research Involving Human Subjects UPM (JKEUPM) (Reference no: - JKEUPM-2021-892) (APPENDIX A). Other than that, this study seeks approval for permission in conducting the study from

Clinical Research Center (CRC) of Hospital Pengajar Universiti Putra Malaysia (HPUPM) prior to data collection (APPENDIX B). After receiving the approval from JKEUPM and CRC HPUPM, data collection was conducted at the Department of Paediatrics and Department of Dietetics in HPUPM.

3.8 Pre-Testing

A pre-testing was conducted among 5% of the total sample size which is three respondents. All respondents of pre-testing were answered the questionnaires and their responses were excluded in the actual data collection. The purpose of conducting the pre-testing was to identify all the problems and errors prior to the implementation of the 24-hour diet recall and self-administered questionnaires. Besides, during the pre-testing, the time taken for the researcher to complete the interview on 24-hour diet recall and time taken for respondents to answer the questionnaire was recorded. Overall respondent's feedback was collected, and the questionnaire was improvised accordingly before conducting the actual data collection.

3.9 Procedures

Data collection was conducted from March to May 2022. First, potential respondents that attended HPUPM on the day of data collection were identified from the system. If the study population meets the inclusion criteria of the study, their medical diagnosis was reviewed from the system. Meanwhile, the study population who met the exclusion criteria of the study were excluded. When children and their parents or caregiver present at the outpatient department of HPUPM, they were introduced about the study, and informed sheets were distributed. When the respondents agreed to participate in the study, consent forms were distributed. After that, the parents or caregivers' phone number was requested. After the parents or caregivers completed the consent form, STRONG kids nutritional risk screening tools

were performed. Parents or caregivers were interviewed, while children watched some YouTube videos, played at the playing area in the paediatric clinic or coloured pictures of cartoons. A coloring book and color pencils were provided by the researcher as a token of appreciation and to grab their attention not to disturb their parents or caregivers while they were being interviewed.

Upon nutritional screening, paediatric outpatients who were identified at high risk of malnutrition were encouraged to set up for an appointment with dietitians in HPUPM. Next, 24-hour diet recall was performed during the interview session. After that, parents scanned the QR code of the questionnaire at the clinic to obtain the link of the questionnaire. Meanwhile the link of the questionnaire was shared via WhatsApp to the parents or caregivers who experienced technical problems in scanning the QR code. They were required to answer the questionnaire during their leisure time, on the same day. Researchers followed up on the next day if the respondents had not answered the questionnaire. The study estimates to have three to five respondents on every weekday. The estimated duration needed to achieve the required sample size (66 respondents) is about 8 weeks. Figure 3.2 shows the whole process of data collection.

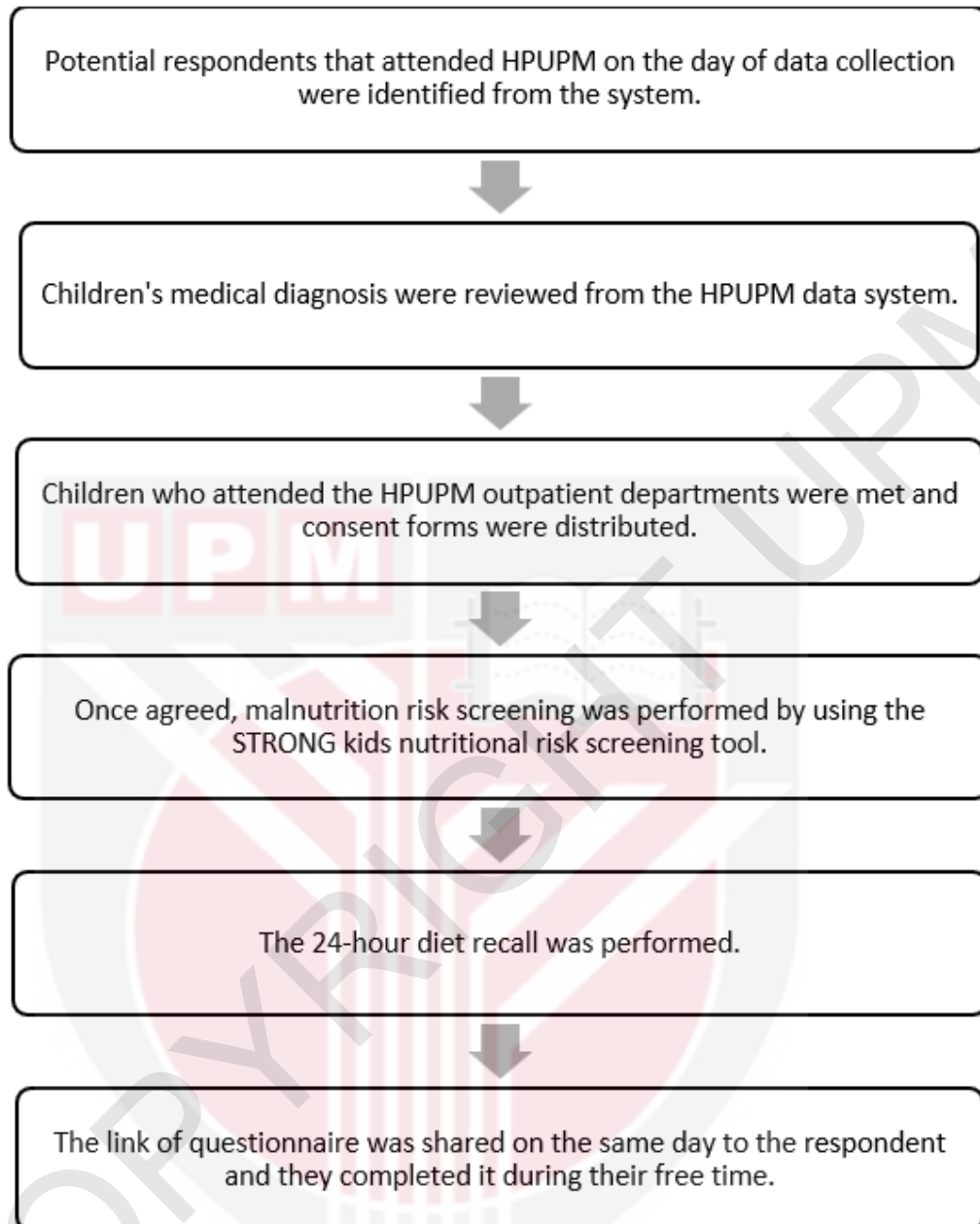


Figure 3.2: Flow chart of the data collection.

3.10 Statistical Analysis

All data collected were analyzed using IBM SPSS Statistic Version 26 with the significance level set at $p < 0.05$ with a 95% Confidence Interval and a 5% margin of error. Normality tests called Kolmogorov-Smirnov Test were conducted to identify the normality distribution of the data. Univariate analysis was performed on the descriptive data. Frequencies and percentages presented the findings for categorical variables, meanwhile means and standard deviations presented the findings for continuous variables. Inferential statistics which was Chi square test was used to test the association between the sociodemographic, medical background, dietary intake, breastfeeding practices and household environment with risk of malnutrition among paediatric outpatients in HPUPM.

CHAPTER 4

Results and Discussion

4.1 Sociodemographic

Table 4.1 presents the sociodemographic of children based on age, gender, ethnicity, parent's education, parent's marital status, monthly family income and family employment status. Based on the results, the mean and SD age for the children was 5.1 ± 3.6 years old. Majority of the children were boys (56.1%) and Malays (92.4%), followed by Indian (3%) and others (3%) and Chinese (1.5%). Besides, most of the parents have tertiary education (90.9%), followed by secondary education (9.1%). The majority of parents are currently married (98.5%). Based on the results, a large proportion of the parents has monthly family income categorised as M40 (71.2%), followed by B40 (28.8%) and most of them are employed (78.8%).

Table 4.1: Sociodemographic of the children and parents (n=66)

Variables	N (%)	Mean \pm S.D.	Range
Child's age (years old)		5.1 \pm 3.6	0.66-14
Infant	1 (1.5)		
Toddler	31 (47.0)		
Preschooler	17 (25.8)		
Children	17 (25.8)		
Child's gender			
Boy	37 (56.1)		
Girl	29 (43.9)		
Ethnicity			
Malay	61 (92.4)		
Chinese	1 (1.5)		
Indian	2 (3.0)		
Others	2 (3.0)		
Parents' education			
Secondary	6 (9.1)		
Tertiary (College/University)	60 (90.9)		
Parent's marital status			
Currently married	65 (98.5)		
Divorced	1 (1.5)		
Monthly family income			

B40	19 (28.8)
M40 and above	47 (71.2)
Parent's employment status	
Employed	52 (78.8)
Unemployed	14 (21.2)

Income threshold according to Household Income and Basic Amenities Survey Report 2019
 B40 = < RM 4850
 M40 = ≥ RM 4850, ≤ RM 10959

4.2 Medical background

Table 4.2 shows the medical background of the children. The medical diagnosis is categorised according to ICD-10 disease classification (World Health Organization, 1993). Majority of the children's medical diagnoses are categorized as others (83.3%), followed by respiratory (10.6%), neurological (3.0%), congenital malformations, deformations and chromosomal abnormalities (1.5%) and Gastro-intestinal (1.5%). Majority of the children have not met a dietitian before (80.3%), and most of them were the follow-up cases from the paediatric outpatient department (60%).

Table 4.2: Medical background (n=66)

Variables	N (%)
Medical background	
Respiratory	7 (10.6)
Congenital malformations, deformations and chromosomal abnormalities	1 (1.5)
Neurological	2 (3.0)
Gastro-intestinal	1 (1.5)
Others	55 (83.3)
Dietitian intervention	
Yes	13 (19.7)
No	53 (80.3)
Case from paediatric outpatient department	
New	10 (40)
Followed up	15 (60)

4.3 Dietary intake

Table 4.3 depicts the mean total energy intake by the children was 1312.83 ± 652.29 kcal/day. More than half of the children (53%) did not achieve the RNI recommendation of energy intake. On top of that, the median value of energy intake per kg body weight was 78.31 ± 57.24 kcal/kg BW. The children's mean total protein intake was 56.07 ± 29.68 g/day. Majority of the children (93.9%) achieved the RNI recommendation for protein intake and the mean value for protein intake per kg body weight was 3.66 ± 2.16 g/kg BW.

Table 4.3: Dietary intake (n=66)

Variables	N (%)	Mean \pm S.D.	Median (IQR)
Total energy (kcal)		1312.83 ± 652.29	
Achieve RNI	31 (47.0)		
Do not achieve RNI	35 (53.0)		
Energy intake (kcal/kg BW)			78.31 ± 57.24
Total protein (g)		56.07 ± 29.68	
Achieve RNI	62 (93.9)		
Do not achieve RNI	4 (6.1)		
Protein intake (g/kg BW)		3.66 ± 2.16	

BW= body weight

RNI= Recommended Nutrient Intake

4.4 Breastfeeding practices

The data about the breastfeeding practices are tabulated in table 4.4. Most of the children (98.5%) had breastfed before and the majority of them (74.2%) had been breastfeeding for more than 6 months.

Table 4.4: Breastfeeding practices (n=66)

Variables	N (%)
Have you ever breastfed your child?	
Yes	65 (98.5)
No	1 (1.5)
How long did you breastfeed your child?	

≤ 6 months	17 (25.8)
> 6 months	49 (74.2)

4.5 Household environment

The food security status of children is presented in table 4.5. The food security status is categorized into three groups which are high or marginal food security, low food security and very low food security. The mean value of the food security score was 0.29 ± 0.84 . High food security was common among the children. Most of the children have high or marginal food security (92.4%), followed by low food security (6.1%) and very low food security (1.5%).

Table 4.5: Food security status (n=66)

Variables	N (%)	Mean ± S.D.	Range
Food security status		0.29 ± 0.84	0-5
High or marginal food security	61 (92.4)		
Low food security	4 (6.1)		
Very low food security	1 (1.5)		

4.6 Risk of malnutrition

The risk of malnutrition is tabulated in table 4.6. The risk of malnutrition is categorized into three groups which are low, medium and high risk of malnutrition. As shown in table 6, the mean score of risk of malnutrition according to the STRONG kids screening tool was 0.32 ± 0.73 . Furthermore, it was found that the majority of the children have a low risk of malnutrition (80.3%), followed by medium risk of malnutrition (19.7%). On top of that, no children identified at high risk of malnutrition upon data collection.

Table 4.6: Risk of malnutrition (n=66)

Variables	N (%)	Mean ± S.D.	Range
Risk of malnutrition		0.32 ± 0.73	0-3
Low	53 (80.3)		
Medium	13 (19.7)		

4.6.1 Association between sociodemographic and risk of malnutrition.

Table 4.7 depicts the association between sociodemographic and risk of malnutrition. Based on the results, there was no significant association between the child's age and risk of malnutrition. This result was contradicted with a previous study that reported smaller age is associated with higher malnutrition score (Mărginean et al., 2014) and age is significantly associated with malnutrition (Kassahun Alemu, 2013; Whye Lian et al., 2012). Meanwhile children aged 12 to 23 months have 7 times more likely to experience malnutrition compared to children aged 6 to 11 months (Kassahun Alemu, 2013). The possible reason is because children develop chronic and acute malnutrition during weaning period and continue to rise drastically after that. However, Cao et al. (2014) reported children aged 4 until 5 years old have 33% more likely to suffer double burden malnutrition compared to 1 years old or less.

There was no significant difference found between the child's gender and risk of malnutrition. This result was supported by previous studies where there was no significant relation between malnutrition and gender (Kavosi et al., 2014b; Mahmood et al., 2016; Mawa, 2018). However, it was contradicted with a study that agreed gender is strongly related to stunting ($p < 0.01$) (Abuya et al., 2012). The differences between the studies were most probably because girls experience malnutrition due to

increase physiological needs while boys need more calories for growing (Khan et al., 2019; Mawa, 2018). Physiological needs which caused by inadequate energy intake

Besides, there was also no significant association between ethnicity and risk of malnutrition. This result was inconsistent with a study conducted in Malaysia that reported children from other ethnic groups have significantly higher risk of underweight and stunted compared to children from Malay ethnic groups (Baharudin et al., 2019). Boulom et al. (2020) find out that child malnutrition among ethnic minority communities who live in Lao are associated with low household food diversity, having food insecurity and poor feeding practices since they have limited food sources. The inconsistency of result might be due to different socioeconomic status of the family among children (Sharif & Merlin, 2001). Furthermore, there was no significant association between parent's education and risk of malnutrition. This contradicted previous studies that reported mother's education level is significantly associated with wasting. Rohana (2014) reported heads of households who have a higher level of education, particularly women, may lead to proper food preparation and good nutrition habits at home. However, few studies supported that paternal education is not significantly associated with childhood malnutrition (Kavosi et al., 2014b; Wong et al., 2014). On the other hand, based on the results, there was no significant association between parent's marital status and risk of malnutrition. This was inconsistent with another study that reported the mother's marital status is significantly associated with the child's nutrition status (Abuya et al., 2012). The possible reason for the insignificant association is because there was a big proportion of parents who were married and a very small proportion of parents who were divorced.

According to table 4.7, there was no significant association between total family income with risk of malnutrition. This result was inconsistent with another study that reported family income was significantly associated with malnutrition admission (Itaka & Omole, 2020). Many children with malnutrition come from a family with low income (Kassahun Alemu, 2013; Whye Lian et al., 2012). The possible reason for inconsistent findings was because a significant proportion of children with malnutrition came from non-poor families (Wong et al., 2014)

Furthermore, there were no significant associations between parent's employment status and risk of malnutrition. This finding was supported by a study that reported there was no association between maternal employment status and child's nutritional status. This might be due to children receiving the same care by their caregivers when their mother is at work (Eshete et al., 2017). However, this finding was contradicted by previous research that has found that the majority of malnourished children have housewife mothers (Wong et al., 2014).

Table 4.7: Association between sociodemographic and risk of malnutrition.

Variables	Risk of malnutrition			
	Low (n=53)	Medium (n=13)	X^2	<i>p-value</i>
Child's age (years old)			0.810	0.847
Infant (< 1 year)	1 (1.5)	0 (0.0)		
Toddler (1-3 years)	26 (39.4)	5 (7.6)		
Preschooler (4-7 years)	13 (19.7)	4 (6.1)		
Children (8-14 years)	13 (19.7)	4 (6.1)		
Child's gender				
Boy	30 (45.5)	7 (10.6)		
Girl	23 (34.8)	6 (9.1)		
Ethnicity				1.000
Malay	49 (74.2)	12 (18.2)		
Non-Malay	4 (6.1)	1 (1.5)		
Parents' education				1.000
Secondary	5 (7.6)	1 (1.5)		

Tertiary (College/University)	48 (72.7)	12 (18.2)		
Parent's marital status				1.000
Currently married	52 (78.8)	13 (19.7)		
Divorced	1 (1.5)	0 (0.0)		
Monthly family income				
B40	15 (22.7)	4 (6.1)	0.031	0.860
M40 and above	38 (57.6)	9 (13.6)		
Parent's employment status				
Employed	43 (65.2)	9 (13.6)	0.885	0.347
Unemployed	10 (15.2)	4 (6.1)		

Chi-square test

*Correlation is significant at $p < 0.05$

4.6.2 Association between medical background and risk of malnutrition.

Table 4.8 shows the association between medical background and risk of malnutrition. Based on the result, there was no significant association between medical background and risk of malnutrition. This result was inconsistent with a study that mentioned there was a significant association between acute respiratory illness (ARI) and indicators of malnutrition based on the Gomez and Welcome anthropometric criteria (Chalabi, 2013). The reason for inconsistent findings may be due to different malnutrition screening tools used in the study. Besides, there was significant association between dietitian intervention with risk of malnutrition. Furthermore, no significant association was found between type of case from paediatric outpatient clinic with risk of malnutrition. This might be due to only a small proportion of children having this data collected hence delineating the possible association between type of case and risk of malnutrition.

Table 4.8: Association between medical background and risk of malnutrition

Variables	Risk of malnutrition			
	Low (<i>n</i> =53)	Medium (<i>n</i> =13)	<i>X</i> ²	<i>p</i> -value
Medical background			3.238	0.519
Respiratory	7 (10.6)	0 (0)		

Congenital malformations, deformations and chromosomal abnormalities	1 (1.5)	0 (0)		
Neurological	2 (3.0)	0 (0)		
Gastro-intestinal	1 (1.5)	0 (0)		
Others	42 (63.3)	13 (19.7)		
Dietitian intervention			7.164	0.007
Yes	7 (10.6)	6 (9.1)		
No	46 (69.7)	7 (10.6)		
Paediatric outpatient department case			3.707	0.054
New	9 (36.0)	1 (4.0)		
Followed up	8 (32.0)	7 (28.0)		

Chi-square test

*Correlation is significant at $p < 0.05$

4.6.3 Association between dietary intake and risk of malnutrition

According to table 4.9, there is no significant association between dietary intake with risk of malnutrition. These results were inconsistent with a study in Terengganu that reported there was significant association found between malnutrition among children and dietary energy intake (Wong et al., 2014). Whye Lian et al. (2012) mentioned that the percentage of calorie intake over RNI was significantly associated with underweight children in the rural district of Kelantan. The inconsistency might be due to the discrepancies of socioeconomic status and the geographical location of the hospital and health clinics.

Furthermore, there was no significant association between total protein intake (g) and protein intake (g/kg BW) with risk of malnutrition. This result was contradictory with previous studies that reported there was significant association found between malnutrition among children and protein intake (Whye Lian et al., 2012; Wong et al., 2014). Lack of statistically significant might be due to discrepancies in dietary intake among children as well as due to geographical and demographic differences in different studies.

Table 4.9: Association between dietary intake and risk of malnutrition

Variables	Risk of malnutrition			
	Low	Medium	χ^2	<i>p-value</i>
Total energy (kcal)			0.992	0.319
Achieve RNI	27 (40.9)	4 (6.1)		
Do not achieve RNI	26 (39.4)	9 (13.6)		
Total protein (g)			2.472	0.116
Achieve RNI	51 (77.3)	11 (16.7)		
Do not achieve RNI	2 (3.0)	2 (3.0)		

Chi-square test

*Correlation is significant at $p < 0.05$

RNI= Recommended Nutrient Intake

4.6.4 Association between breastfeeding practices and risk of malnutrition

According to table 4.10, there was no significant association between breastfeeding practices with risk of malnutrition. This result was inconsistent with another study that reported breastfeeding history is significantly associated with malnutrition admission (Itaka & Omole, 2020). However, one potential reason that resulted statistically insignificant is that the majority of the children have a breastfeeding history (98.5%). For the duration of breastfeeding, there was no significant association with risk of malnutrition based on the finding. This result was contradicted with a study where duration of breastfeeding is significantly associated with child stunting (Kikafunda et al., 1998; Whye Lian et al., 2012). There is 7 times higher prevalence of child stunting when the duration of breastfeeding prolonged from 18 months and up to 24 months. However, the prevalence of stunting reduced when the child continues being breastfeed for more than 24 months. The possible reason behind this is that the child had grown up and able to consume family food normally.

Table 4.10: Association between breastfeeding practices and risk of malnutrition

Variables	Risk of malnutrition			
	Low (n=53)	Medium (n=13)	X ²	p-value
Have you ever breastfed your child?			-	1.000
Yes	52 (78.8)	13 (19.7)		
No	1 (1.5)	0 (0.0)		
Duration of breastfeeding			1.366	0.242
≤ 6 months	12 (18.2)	5 (7.6)		
> 6 months	41 (62.1)	8 (12.1)		

Chi-square test

*Correlation is significant at p<0.05

4.6.5 Association between food security status and risk of malnutrition

Based on table 4.11, there was no significant association found between food security and risk of malnutrition among children. It was incoherent with other study that showed one of the severe consequences of food insecurity is undernutrition (Momanyi et al., 2019). The statistically insignificant association might be due to the small proportion of children categorized as low and very low food security.

Table 4.11: Association between food security status and risk of malnutrition

Variables	Risk of malnutrition			
	Low	Medium	X ²	p-value
Food security status			0.316	0.854
High or marginal food security	49 (80.3)	12 (19.7)		
Low food security	3 (5.7)	1 (7.7)		
Very low food security	1 (1.5)	0 (0.0)		

Chapter 5

Conclusion, Limitations and Recommendations

5.1 Conclusion

In conclusion, there were no paediatric outpatients who were at high risk of malnutrition during data collection. Most paediatric outpatients in HPUPM are at low risk of malnutrition (STRONGkids tool) while 19.7% of them had medium risk of malnutrition. Since malnutrition can lead to negative health outcomes, dietitians, nurses and other healthcare professionals should consider screening for malnutrition risk among children who attended paediatric departments.

This study has proved that dietitian intervention was significantly associated with the risk of malnutrition among paediatric outpatients in HPUPM. Hence, it is crucial to provide nutrition education and nutrition counselling among children and parents or caregivers to prevent paediatric outpatients from getting malnutrition. Meanwhile sociodemographic, medical background, dietary intake, breastfeeding practices and household environment were not significantly associated with risk of malnutrition among paediatric outpatients.

5.2 Strengths

This study has provided new information on risk of malnutrition among paediatric outpatients and its associated factors. In addition, the study instruments used in this study such as STRONG kids and Six-Item Short Form Food Security questionnaire were validated. This study also achieved the sample size determination which were 66 respondents.

5.3 Limitations

This study imposed few limitations. First, there was no adolescent age group that participated in the study hence unequal age distribution of children may limit the statistical power. Besides, this study cannot be generalized to all study populations since the study was conducted in the Paediatric and Dietetics Department of HPUPM only. Lastly, this study does not compare the risk of malnutrition among those who have met dietitians and those who have not. Independence t-test analysis can be done to compare the risk of malnutrition among these two groups of children. However, this study only analyse the factors associated with the risk of malnutrition among them.

5.4 Recommendations

This study recommended that the health practitioners should emphasize malnutrition risk screening during consultations among paediatric outpatients. According to Huysentruyt et al. (2013) STRONG kid's tool is very quick and simple for nurses to screen the nutritional risk among the paediatric outpatients. Besides, further research is needed to determine the risk of malnutrition and its associated factors among paediatric inpatients in HPUPM. According to McCarthy et al. (2019), paediatric populations who are malnourished upon admission or worsen nutritional status during hospitalization has poor clinical outcomes. This study also suggests future research to follow up the study population whether they have improved the risk of malnutrition or not. By having the follow up, intervention study can be conducted among children with medium risk of malnutrition if their nutritional status is not improving. Lastly, patients who are at high risk of malnutrition shall be referred to a dietitian for further nutrition assessment and nutrition counselling to improve the nutritional status and the overall health outcome.

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APPENDICES



Appendix A: Ethical Clearance from JKEUPM

Ref. no: UPM/TNCPI/RMC/JKEUPM/1.4.18.2 (JKEUPM)

Date: 07 February 2022

Dear Prof./Dr./Mr./Ms.,

APPLICATION FOR JKEUPM ETHICAL CLEARANCE: APPROVED

With reference to the above, I am pleased to inform you that your application for ethical clearance for the research project entitled '**FACTOR ASSOCIATED WITH RISK OF MALNUTRIITION AMONG PAEDIATRIC OUTPATIENTS IN HPUPM**' has been approved.

The approval is **valid from 07 FEBRUARY 2022 until 07 FEBRUARY 2023**.

Please note that the official letter of approval will be issued as soon as possible. However, the ethical clearance is considered effective from the date of this email, and you may now proceed with your research.

Kindly remind the ethical approval is required in the case of amendments/ changes to the study documents/ study sites/ study team.

Researchers should also complete a Study Final Report upon study completion. The form can be obtained from the Ethics Committee for Research Involving Human Subjects (JKEUPM) website (<http://www.tncpi.upm.edu.my/faildokumen>).

If you have any enquiries, please contact at number 03-97691244/1602.

Note: Please use this reference number for any transaction:- **JKEUPM-2021-892**

Thank you.

Yours faithfully,

Prof. Dr. Zamberi Sekawi
Chair
Ethics Committee for Research Involving Human Subjects
Universiti Putra Malaysia

Appendix B: HPUPM approval letter

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



**FORM 2.5: RESPONDENT'S INFORMATION SHEET AND
GUARDIAN'S/PARENT'S CONSENT**

Please read the following information carefully. Do not hesitate to discuss any questions you may have with the researcher.

1. STUDY TITLE : Factors Associated with Risk of Malnutrition Among Paediatric Outpatients in HPUPM

2. INTRODUCTION:

Malnutrition among children is one of the major health problems faced by many countries especially those low- and middle-income countries. The paediatric population who are malnourished may have a higher risk of complications, longer hospital stays, and lower quality of life. However, the nutritional risk among paediatric outpatients and its associated factors are not well understood. This study aims to fulfil the research gap. Hence, you are invited to participate in the study and contribute voluntarily in this area of study. The purpose of this study is to determine the associated factors of malnutrition among paediatric outpatients in Universiti Putra Malaysia Teaching Hospital (HPUPM). This study will require the enrollment of 201 respondents.

3. WHAT WILL YOU HAVE TO DO?

First, once the respondent agrees to participate in the study, respondents will be given the consent form and they are required to fill in the form. Next, their phone number will be recorded. During the meeting, malnutrition risk screening will be conducted and respondents are required to answer 3 questions verbally. Besides, researcher will observe any diminished subcutaneous fat/muscle mass/hollow face present as part of the STRONG kids screening tool. Later, a set of questionnaires will be sent and respondents can answer during their free time which will take around 7 minutes. Other than that, respondents will receive a phone call in which respondents need to report their dietary intake in the past 24 hours. 24-hour diet

recall will require approximately 8 minutes of the phone call. Participants are required to answer all

the questions honestly throughout the study. Besides, the respondent's medical condition will be obtained from the medical record of the hospital data system. However, respondent participation is voluntary, and respondents may withdraw anytime without penalty or loss of benefit to which the participant is entitled.

4. WHO SHOULD NOT PARTICIPATE IN THE STUDY?

Paediatric outpatients who are in the neonatology unit aged less than 2 years old or having a serious illness or are currently in the emergency unit are excluded from the study.

5. WHAT WILL BE THE BENEFITS OF THE STUDY:

TO YOU AS THE SUBJECT?

This study results may or may not provide benefits to you. You will be able to identify the malnutrition risk of your child based on the result of the study and be able to access their records. Besides, policymakers and healthcare providers may benefit from this study as this study will identify the issue of malnutrition among paediatric outpatients in HPUPM and they may provide further action plans to cope with this issue. The research gap available in this topic could be filled by this study.

TO THE INVESTIGATOR?

This study is able to provide researchers to determine the association between sociodemographic, medical background, dietary intake, breastfeeding practices, and the household environment with the risk of malnutrition among paediatric outpatients in Universiti Putra Malaysia Teaching Hospital (HPUPM).

6. WHAT ARE THE POSSIBLE RISKS?

There are no possible risks among respondents of the study. This is because this study does not require any invasive procedures or impose any side effects.

7. WILL THE INFORMATION THAT YOU PROVIDE AND YOUR IDENTITY REMAIN CONFIDENTIAL?

All participants' information is confidential and is used for the purpose of this study only. Respondent's identity will not be published or presented throughout this study. All data obtained not be made publicly available, to the extent permitted by law.

8. WHO SHOULD YOU CONTACT IF YOU HAVE ADDITIONAL QUESTIONS DURING THE COURSE OF THE RESEARCH?

If you have any enquiries, please contact the researcher of this study, Intan Nurzahirah at telephone number 013-7173940 or contact the research supervisor, Dr. Nor Baizura Md Yusop, lecturer from Faculty of Medicine and Health Sciences,

UPM at telephone number 013-2094595. JKEUPM Ethics Review Panel has approved the study. Hence, please contact JKEUPM to obtain further information regarding rights of study participants, including grievances and complaints.

Please initial here if you have read and understood the contents of this page_____

9. GUARDIAN'S/PARENT'S CONSENT

I Identity Card No.
address.....
.....hereby
voluntarily agree to allow my *son / daughter /
ward..... to take part in the research stated
above *(clinical/ questionnaire/drug trial/video recording/ focus group/interview).

I have been informed about the nature of the research in terms of methodology, possible adverse effects and complications (as written in the Respondent's Information Sheet). I understand that my *son / daughter / ward has the right to withdraw from this research at any time without giving any reason whatsoever. I also understand that this study is confidential and all information provided with regard to the identity of my* son / daughter / ward will remain private and confidential.

I* wish / do not wish to know the results related to my my *son's / daughter's / ward's participation in the research

I agree/do not agree that the images/photos/video recordings/voice recordings related to my son/daughter/ward be used in any form of publication or presentation. (if applicable).

* delete where necessary

Signature

(Parent/Guardian)

Signature

(Witness)

Date :.....
:.....

Name

Phone number: I/C No.
:.....

I confirm that I have explained to the respondent's parent/guardian the nature and purpose of the above-mentioned research.

Date Signature
(Researcher)



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Appendix D: Subject's Information Sheet and Consent (Malay)

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



BORANG 2.5: PENERANGAN DAN PERSETUJUAN IBUBAPA/PENJAGA

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

1.TAJUK KAJIAN

Faktor-Faktor Berkaitan Dengan Risiko Malnutrisi dalam Kalangan Pesakit Luar Pediatrik Di Hospital Pengajar Universiti Putra Malaysia (HPUPM).

2. PENGENALAN

Malnutrisi dalam kalangan kanak-kanak merupakan salah satu masalah kesihatan utama yang dihadapi oleh banyak negara terutamanya negara berpendapatan rendah dan sederhana. Populasi pediatrik yang kekurangan zat mungkin mempunyai risiko komplikasi yang lebih tinggi, penginapan hospital lebih lama dan kualiti hidup yang lebih rendah. Walaubagaimanapun, risiko pemakanan dalam kalangan pesakit luar kanak-kanak dan faktor yang berkaitan dengannya tidak difahami dengan baik. Kajian ini bertujuan untuk memenuhi jurang kajian. Oleh itu, anda dijemput untuk mengambil bahagian dalam kajian ini dan menyumbang secara sukarela dalam bidang pengajian ini. Tujuan kajian ini adalah untuk mengetahui faktor faktor yang berkaitan dengan risiko malnutrisi dalam kalangan pesakit luar kanak-kanak di Hospital Pengajar Universiti Putra Malaysia (HPUPM). Kajian ini memerlukan penyertaan seramai 201 orang responden.

3. APAKAH YANG PERLU ANDA LAKUKAN?

Pertama sekali, apabila responden bersetuju untuk menyertai kajian, responden akan diberikan borang kebenaran dan mereka dikehendaki mengisi borang tersebut. Seterusnya, nombor telefon mereka akan direkodkan. Semasa perjumpaan tersebut, saringan risiko malnutrisi akan dijalankan dan responden dikehendaki menjawab 3 soalan secara lisan. Selain itu, pengkaji akan memerhatikan sebarang pengurangan lemak subkutan/jisim otot/muka berongga pada responden sebagai sebahagian daripada alat saringan STRONG kids. Kemudian, satu set soal selidik akan dihantar dan responden boleh menjawab pada masa lapang yang mengambil masa sekitar 7

minit. Selain itu, responden akan menerima panggilan telefon yang mana responden perlu melaporkan pengambilan diet mereka dalam tempoh 24 jam yang lalu. Peningkatan semula diet 24 jam akan memerlukan lebih kurang 8 minit panggilan telefon. Peserta dikehendaki menjawab semua soalan dengan jujur sepanjang kajian dijalankan. Selain itu, keadaan kesihatan responden akan diperolehi daripada rekod perubatan sistem data hospital. Walau bagaimanapun, penyertaan responden adalah secara sukarela, dan responden boleh menarik diri pada bila-bila masa tanpa penalti atau kehilangan faedah yang layak kepada peserta.

4. SIAPA YANG TIDAK BOLEH MENYERTAI KAJIAN INI?

Pesakit luar pediatrik yang berada di unit neonatologi yang berumur kurang daripada 2 tahun atau menghidap penyakit serius atau sedang berada di unit kecemasan dikecualikan daripada kajian.

5. APAKAH FAEDAH MENYERTAI KAJIAN INI?

a) KEPADA ANAK/JAGAAN SAYA SEBAGAI PESERTA?

Hasil kajian ini mungkin memberi manfaat atau tidak kepada anda. Anda akan dapat mengenal pasti risiko malnutrisi anda berdasarkan hasil kajian dan dapat mengakses rekod mereka. Selain itu, penggubal dasar dan penyedia penjagaan kesihatan mungkin mendapat manfaat daripada kajian ini kerana kajian ini akan mengenal pasti isu malnutrisi dalam kalangan pesakit luar pediatrik di HPUPM dan mereka mungkin menyediakan pelan tindakan lanjut untuk menangani isu ini. Jurang penyelidikan yang terdapat dalam topik ini boleh diisi oleh kajian ini.

b) KEPADA PENYELIDIK?

Kajian ini mampu memberi pengkaji untuk menentukan perkaitan antara faktor sosioekonomi, faktor perubatan, faktor pemakanan, amalan pemakanan, dan faktor persekitaran isi rumah dengan risiko malnutrisi dalam kalangan pesakit luar kanak-kanak di Hospital Pengajaran Universiti Putra Malaysia (HPUPM).

6. ADAKAH IA BERISIKO?

Tiada kemungkinan risiko dalam kalangan responden kajian. Ini kerana kajian ini tidak memerlukan sebarang prosedur invasif atau mengenakan sebarang kesan sampingan.

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

Semua maklumat dan identiti peserta adalah sulit dan digunakan untuk tujuan kajian ini sahaja. Identiti responden tidak akan diterbitkan atau dibentangkan sepanjang kajian ini. Semua maklumat yang diperolehi tidak boleh didapati secara umum, setakat yang dibenarkan oleh undang-undang.

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

Sekiranya terdapat sebarang pertanyaan, sila hubungi penyelidik kajian ini, Intan Nurzahirah di nombor telefon 013-7173940 atau hubungi penyelia penyelidikan, Dr. Nor Baizura Md Yusop, pensyarah Fakulti Perubatan dan Sains Kesihatan, UPM, di nombor telefon 013- 2094595. Panel Semakan Etika JKEUPM telah meluluskan kajian tersebut. Justeru itu, sila hubungi JKEUPM untuk mendapatkan maklumat lanjut mengenai hak peserta kajian, termasuk rungutan dan aduan.

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

9. PERSETUJUAN

Saya..... No Kad Pengenalan.

.....

beralamat.....

.....dengan ini secara sukarela

bersetuju membenarkan *anak / jagaan saya

menyertai **penyelidikan tersebut di atas *(klinikal/percubaan ubat-
ubatan/rakaman video/kumpulan sasaran/temuduga/ soal selidik).**

Saya telah diberi penjelasan secara menyeluruh mengenai penyelidikan ini dari segi metodologi, risiko dan komplikasi (seperti yang tercatat dalam Helaian Penerangan).

Saya memahami bahawa *anak / jagaan saya berhak menarik diri dari penyelidikan ini pada bila-bila masa tanpa memberi sebarang alasan.Saya juga memahami bahawa sebarang maklumat yang berkaitan identiti *anak / jagaan saya akan dirahsiakan.

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

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)

Tandatangan

(Saksi)

Tarikh :.....

.....

Nama

Nombor telefon:.....
.....

No. K/P:

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

Tarikh
.....

Tandatangan

(Penyelidik)



Appendix E: Questionnaire (English)



**FACULTY OF MEDICINE AND HEALTH SCIENCES
DEPARTMENT OF DIETETICS
RESEARCH QUESTIONNAIRE**

**RESEARCH TITLE: FACTORS ASSOCIATED WITH RISK OF MALNUTRITION
AMONG PAEDIATRIC OUTPATIENT IN HPUPM**

RESEARCHER:

INTAN NURZAHIRAH BINTI ABDUL ZAHID

SUPERVISOR:

DR. NOR BAIZURA BINTI MD YUSOP

This questionnaire is only for research purposes. Please complete ALL the information in this questionnaire. All information is guaranteed confidential. Your involvement and cooperation are much appreciated.

Part 1: CHILDREN INFORMATION

Section A: Sociodemographic	
Instructions: Please answer all the following questions and (/) on the box provided.	
1. Age	<input type="text"/> <input type="text"/> years old
2. Gender	<input type="checkbox"/> Female <input type="checkbox"/> Male
3. Ethnicity	<input type="checkbox"/> Malay <input type="checkbox"/> Indian <input type="checkbox"/> Chinese <input type="checkbox"/> Others Please specify:

Section B: Medical history	
Instructions: Please answer if applicable	
Any medical history/disease:	
Have met a dietitian before <input type="checkbox"/> Yes <input type="checkbox"/> No	
Case <input type="checkbox"/> New <input type="checkbox"/> Followed Up	

Section C: Breastfeeding practices	
1. Have you ever breastfed your child?	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. How long did you breastfeed your children?	<input type="checkbox"/> ≤ 6 months <input type="checkbox"/> > 6 months

Section D: Dietary intake (24 hours dietary recall)

Instructions: List the food/drink that your child take in one usual weekday with the amount.

Meal	Food/drink	Amount		
		/scoop	/tbsp	/ cup
Breakfast				
Morning tea				
Lunch				
Afternoon tea				
Dinner				

Instructions: List the food/drink that your child take in one usual weekend with the amount.

Meal	Food/drink	Amount		
		/scoop	/tbsp	/ cup
Breakfast				
Morning tea				
Lunch				
Afternoon tea				
Dinner				

Section E: Home environment (Food security)

Statement	<i>Often true</i>	<i>Sometimes true</i>	<i>Not true</i>	<i>Do not know or refused</i>
1. "The food that (I/we) bought just didn't last, and (I/we) didn't have money to get more." (In the last 12 months)				
2. "(I/we) couldn't afford to eat balanced meals." (In the last 12 months)				
Statement	<i>Yes</i>	<i>No</i>	<i>Do not know</i>	
3. Did (you/you or other adults in your household) ever cut the size of your meals or skip meals because there wasn't enough money for food? (In the last 12 months)				

3a. [IF YES] How often did this happen ? Please circle the answer below. A. Almost every month B. Some months but not every month C. Only 1 or 2 months D. Do not know			
4. Did you ever eat less than you felt you should because there wasn't enough money for food? (In the last 12 months)			
5. Were you every hungry but didn't eat because there wasn't enough money for food? (In the last 12 months)			

Section F: STRONG kids nutritional screening tool	
1. Is there an underlying illness with risk for malnutrition (see list) or expected major surgery?	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Is the patient in a poor nutritional status judged with subjective clinical assessment: loss of subcutaneous fat and/or loss of muscle mass and/or hollow face?	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Is one of the following items present? ▪ Excessive diarrhoea (≥ 5 per day) and/ or vomiting (> 3 times/ day) during the last 1-3 days ▪ Reduced food intake during the last 1-3 days ▪ Pre-existing nutritional intervention (e.g. ONS or tube feeding) ▪ Inability to consume adequate nutritional intake because of pain	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Is there weight loss (all ages) and/or no increase in weight/height (infants < 1 year) during the last few week-months?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Part 2: PARENT/CAREGIVER INFORMATION

Section A: Sociodemographic characteristics		
Instructions: Please answer all the following questions		
1.	Contact number	
2.	Gender	<input type="checkbox"/> Female <input type="checkbox"/> Male
3.	Employment status	<input type="checkbox"/> Employed <input type="checkbox"/> Unemployed
4.	Total household income	<RM 2,500 RM4,850-RM 10,959 >RM10,961
5.	Parent's education	<input type="checkbox"/> Primary <input type="checkbox"/> Secondary <input type="checkbox"/> Tertiary (College/University)
6.	Parent's marital status	<input type="checkbox"/> Currently married <input type="checkbox"/> Divorced <input type="checkbox"/> Never married

Appendix F: Questionnaire (Malay)



FAKULTI PERUBATAN DAN SAINS KESIHATAN

JABATAN DIETETIK

BORANG SOAL SELIDIK

TAJUK KAJIAN: Faktor-Faktor Berkaitan Dengan Risiko Malnutrisi dalam Kalangan Pesakit Luar Pediatrik Di Hospital Pengajar Universiti Putra Malaysia (HPUPM).

PENYELIDIK:

INTAN NURZAHIRAH BINTI ABDUL ZAHID

PENYELIA:

DR. NOR BAIZURA BINTI MD YUSOP

Borang soal selidik ini hanya untuk tujuan kajian sahaja. Sila lengkapkan semua soalan di dalam borang ini. Semua maklumat tidak akan didedahkan kepada mana mana pihak. Penglibatan dan kerjasama anda amatlah dihargai.

BAHAGIAN 1: MAKLUMAT ANAK

Bahagian A: factor socio-demografi dan antropometri		
Arahan: Sila isi tempat kosong dan tanda (/) pada jawapan yang disediakan.		
1.	Umur	Tahun
2.	Jantina	Perempuan Lelaki
3.	Etnik	Melayu India Cina Lain-lain Sila nyatakan:.....

Bahagian B: Sejarah perubatan	
Arahan: Sila jawab jika berkenaan	
Sebarang sejarah perubatan/penyakit:	
Intervensi dietitan	() Ya () Tidak
Kes di klinik pesakit luar paediatric	() Kes baharu () Kes susulan

Section C: Pengambilan makanan kanak kanak (amalan penyusuan susu ibu)

1. Adakah anda pernah menyusukan anak anda?	() Ya () Tidak
2. Berapa lama anda menyusukan anak anda?	() ≤ 6 bulan () > 6 bulan

Bahagian D: Pengambilan diet (Pengambilan pemakanan dalam 24jam)

Arahan : Senaraikan makanan dan minuman yang diambil anak pada hari minggu biasa dan nyatakan jumlahnya.

Waktu	Makanan/minuman	Jumlah		
		/Senduk	/sudu besar	/ Cawan
Sarapan				
Minum pagi				
Makan tengahari				
Makan petang				
Makan malam				

Arahan : Senaraikan makanan dan minuman yang diambil anak pada hari hujung minggu biasa dan nyatakan jumlahnya

Waktu	Makanan/minuman	Jumlah		
		/Senduk	/sudu besar	/ Cawan
Sarapan				
Minum pagi				
Makan tengahari				
Makan petang				
Makan malam				

Bahagian E: Suasana di rumah (keselamatan makanan)

Pernyataan	Tidak pernah	Ya, sekali dalam tempoh 6 bulan yang lalu	Ya, > sekali dalam tempoh 6 bulan yang lalu
1. Adakah anda ponteng makan atau terlepas makan, kerana tiada makanan atau tiada wang untuk membeli makanan?			
2. Pernahkah anda tidak makan sepanjang hari kerana tiada makanan atau wang untuk membeli makanan?			
3. Adakah anda pernah lapar tetapi tidak makan kerana tiada makanan atau wang untuk membeli makanan?			

4. Adakah anak anda ponteng makan atau terlepas makan/makanan, kerana tiada makanan atau tiada wang untuk membeli makanan			
5. Pernahkah anak anda tidak makan sepanjang hari kerana tiada makanan atau wang untuk membeli makanan?			
6. Adakah anak anda pernah lapar tetapi tidak makan kerana tiada makanan atau wang untuk membeli makanan?			
Pernyataan	Tidak benar	Benar, selalu	Benar, kadang-kadang
7. "Saya bimbang makanan akan habis sebelum kita mendapat wang untuk membeli lebih banyak"			
8. "Makanan yang kami beli tidak bertahan dan kami tidak mempunyai wang yang cukup untuk mendapatkan lebih banyak"			
9. "Anak-anak tidak cukup makan kerana kami tidak cukup makanan dan kami tidak mampu untuk membeli lebih banyak"			
10. "Kami tidak dapat memberi makan anak-anak makanan yang mencukupi kerana kami tidak mempunyai makanan yang cukup dan wang yang cukup untuk membeli makanan lagi"			

Section F: STRONG kids nutritional screening tool	
1. Adakah terdapat penyakit yang berkaitan dengan risiko malnutrisi (lihat senarai) atau pembedahan besar yang dijangkakan?	() Ya () Tidak
2. Adakah pesakit dalam status pemakanan yang lemah dinilai dengan penilaian klinikal subjektif: kehilangan lemak subkutane dan/ atau kehilangan jisim otot dan/atau muka berongga?	() Ya () Tidak
3. Adakah salah satu daripada perkara berikut ada? <ul style="list-style-type: none"> ▪ Cirit-birit yang berlebihan (≥ 5 sehari) dan/atau muntah (> 3 kali/hari) dalam tempoh 1-3 hari yang lalu ▪ Mengurangkan pengambilan makanan dalam tempoh 1-3 hari yang lalu ▪ Intervensi pemakanan yang sedia ada (cth. ONS atau pemberian tiub) ▪ Ketidakupayaan untuk mengambil pengambilan nutrisi yang mencukupi kerana kesakitan 	() Ya () Tidak
4. Adakah terdapat penurunan berat badan (semua peringkat umur) dan/atau tiada peningkatan berat/tinggi (bayi < 1 tahun) dalam beberapa minggu-bulan terakhir?	() Ya () Tidak

PART 2: MAKLUMAT IBUBAPA/PENJAGA

Bahagian A: Ciri-ciri socio-demografi		
Arahan: Sila jawab semua soalan dan tandakan (/) di tempat berkenaan.		
1.	Nombor telefon	
2.	Jantina	<input type="checkbox"/> Perempuan <input type="checkbox"/> Lelaki
3.	Status pekerjaan	<input type="checkbox"/> Bekerja <input type="checkbox"/> Tidak bekerja
4.	Jumlah pendapatan isi rumah	<input type="checkbox"/> <RM 2,500 <input type="checkbox"/> RM4,850-RM 10,959 <input type="checkbox"/> >RM10,961
5.	Pendidikan ibu bapa	<input type="checkbox"/> Rendah <input type="checkbox"/> Menengah <input type="checkbox"/> Tertiar (Kolej/Universiti)
6.	Status perkahwinan ibu bapa	<input type="checkbox"/> Pada masa ini berkahwin <input type="checkbox"/> Bercerai <input type="checkbox"/> Tidak pernah berkahwin

Appendix G: Turnitin Report

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