UNIVERSITI PUTRA MALAYSIA

FACTORS ASSOCIATED WITH FOOD NEOPHOBIA AND FRUIT AND VEGETABLE CONSUMPTION AMONG PRESCHOOLERS IN KUANTAN

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BY

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ABSTRACT

FACTORS ASSOCIATED WITH FOOD NEOPHOBIA AND FRUIT AND VEGETABLE CONSUMPTION AMONG PRESCHOOLERS IN KUANTAN

Chai Wen Shin

The prevalence of inadequate consumption of fruit and vegetable has become a common problem in developed and developing countries. One of the factors which may contribute to this problem is food neophobia. Food neophobia is characterized as a personality trait which place people in term of their tendency to accept or avoid new foods. A cross-sectional study was conducted in 13 randomly selected preschools in Kuantan to examine the factors associated with food neophobia and fruit and vegetable consumption among preschoolers aged 4 to 6 years old. A total of 240 preschoolers (137 boys and 103 girls) with a mean age of 5.11 ± 0.62 years participated in this study. A self-administered questionnaire assessing personal characteristics, infant feeding practices, maternal feeding practices, and food neophobia was completed by the mothers. Frequency of fruit and vegetable consumption was measured using a self-administered questionnaire. A 3-day food record was recorded to measure the number of servings of food and vegetable consumption by their mothers. Height and weight of the preschoolers were measured. About 8.7% of the respondents were wasted/thinness, 10.1% were overweight, 11.3% were underweight, and 11.7% were stunted. Majority of the preschoolers consumed fruit (85.9%) and vegetable (75%) less than once per day. The means consumption of fruit and vegetable were 0.63 ± 0.51 and 1.30 ± 0.91 servings per day respectively. Of 240 preschoolers, 96.7% and 94.2% did not consume the recommended 2 servings of fruit and vegetable daily, respectively. Some (15.8%) were classified as food neophobia. There were no significant associations between food neophobia behaviour with fruit consumption (χ^2=1.462, p=0.481) and vegetable consumption (χ^2=5.098, p=0.078). Mother's age groups were associated significantly with food neophobia (χ^2=11.111, p=0.025) and fruit consumption (χ^2=15.044, p=0.001) but not vegetable consumption (χ^2=5.383, p=0.068). Mother's use of autonomy promoting practices of involvement were negatively associated with food neophobia (r=-0.156, p=0.016) and vegetable consumption (r=-0.145, p=0.024) but not fruit consumption (r=-0.111, p=0.087). Besides, exclusive breastfeeding was positively correlated with vegetable consumption (r=0.155, p=0.016) only. This study demonstrated a high prevalence of inadequate consumption of fruit and vegetable among preschoolers and different factors exhibited different associations on fruit and vegetable consumption separately. Hence, conducting a need assessment before implementation of intervention by health professionals is important in order to evaluate the consumption of fruit and vegetable of the children and thus tailor specific strategies responding to their condition.

ABSTRAK

FAKTOR-FAKTOR YANG BERKAITAN DENGAN NEOFOBIA MAKANAN DAN PENGAMBILAN BUAH-BUAHAN DAN SAYUR-SAYURAN DALAM KALANGAN KANAK-KANAK PRASEKOLAH DI KUANTAN

Chai Wen Shin

Kadar pengambilan buah-buahan dan sayur-sayuran yang rendah merupakan masalah serious di negara maju dan negara membangun. Salah satu faktor yang menyumbang kepada masalah ini adalah neofobia makanan. Neofobia makanan merupakan sifat personaliti yang meletak seseorang dari segi kecenderungan untuk menerima atau mengelakkan dari makanan baru. Satu kajian keratan rentas telah dijalankan di 13 buah prasekolah yang dipilih secara rawak di Kuantan untuk mengkaji faktor-faktor yang berkaitan dengan neofobia makanan dan pengambilan buah-buahan dan sayur-sayuran dalam kalangan kanak-kanak prasekolah yang berumur 4 hingga 6 tahun. Seramai 240 kanak-kanak prasekolah (137 lelaki dan 103 perempuan) dengan min umur 5.11 (*SD*=0.62) telah mengambil bahagian dalam kajian ini. Ibu kepada responden telah mengisi satu soal selidik tentang faktor peribadi, amalan ibu dalam pemberian makanan kepada anak, amalan pemberian makanan bayi, dan neofobia makanan anak. Kekerapan pengambilan buah-buahan dan sayur-sayuran diukur dengan menggunakan soal selidik. Hidangan pengambilan buah-buahan dan sayur-sayuran diukur dengan menggunakan rekod makanan 3 hari oleh ibu. Ketinggian dan berat kanak-kanak prasekolah telah diukur. Kira-kira 8.7% daripada responden adalah kurus, 10.1% adalah berat badan berlebihan, 11.3% mengalami kekurangan berat badan, dan 11.7% adalah terbantut. Majoriti kanak-kanak prasekolah makan buah-buahan (85.9%) dan sayur-sayuran (75%) kurang daripada sekali sehari. Min pengambilan buah-buahan dan sayur-sayuran adalah 0.63 sajian (*SD*=0.51) dan 1.30 sajian (*SD*=0.91) masing-masing. Daripada 240 kanak-kanak prasekolah, 96.7% dan 94.2% tidak mengambil 2 sajian buah-buahan dan 2 sajian sayuran-sayuran masing-masing. Sebanyak 15.8% daripada 240 kanak-kanak prasekolah telah diklasifikasikan sebagai neofobia makanan. Tiada hubungan didapati antara neofobia makanan dengan pengambilan buah-buahan (χ^2=1.462, p=0.481) dan sayur-sayuran (χ^2=5.098, p=0.078). Umur ibu didapti berkaitan signifikan dengan neofobia makanan (χ^2=11.111, p=0.025) dan pengambilan buah-buahan (χ^2=15.044, p=0.001) tetapi tidak berkaitan dengan pengambilan sayur-sayuran (χ^2=5.383, p=0.068). Penggunaan autonomi dengan mengalakkan amalan penglibatan dalam kalangan ibu berkaitan dengan neofobia makanan (r=-0.156, p=0.016) dan pengambilan sayur-sayuran (r=-0.145, p=0.024) tetapi tidak berkaitan dengan pengambilan buah-buahan (r=-0.111, p=0.087). Selain itu, penyusuan susu ibu secara eksklusif berkaitan dengan pengambilan sayur-sayuran (r=0.155, p=0.016) sahaja. Kajian ini menunjukkan bahawa pengambilan buah-buahan dan sayur-sayuran amat rendah dalam kalangan kanak-kanak prasekolah dan faktor-faktor yang berkaitan adalah berbeza dengan buah-buahan dan sayur-sayuran masing-masing. Oleh itu, penilaian keperluan harus dijalankan sebelum aktiviti intervensi dijalankan untuk menilai strategi yang paling sesuai untuk kanak-kanak berikutan dengan keadaan mereka.

CHAPTER 1

INTRODUCTION

Background

"Noncommunicable diseases" (NCDs) are defined as chronic diseases which are not passed from person to person and is generally slow in progression. The four main types of NCDs are cardiovascular diseases (such as heart attacks and stroke), cancers, chronic respiratory diseases (such as chronic obstructive pulmonary disease and asthma) and diabetes (WHO, 2013). A total of 57 million deaths occurred in the world during 2009 in which an estimated 35 million (63%) deaths were due to NCDs (WHO, 2014). Five of the ten leading global disease burden risk factors identified by the World Health Report 2002, which are high blood pressure, high cholesterol, obesity, physical inactivity and insufficient consumption of fruit and vegetable, are the major causes of the NCDs (WHO, 2002). Together with alcohol and tobacco use, these preventable risks play a key role in developing NCDs, which frequently involve overlapping risk factors and chronic conditions. Eating a diet high in fruit and vegetable can help decrease the risk of these NCDs including heart disease (Hu, 2003), stroke (He, Nowson, & MacGregor, 2006), high blood pressure (Fung et al.,

2008), diabetes (Montonen, Knekt, Jarvinen, & Reunanen, 2004), and some cancers (Wiseman, 2008). This is because fruit and vegetable can provide many important nutrients for human body, including potassium, vitamin C, folate, fiber, and numerous phytochemicals (CDC, 2011). Thus, parents should incorporate fruit and vegetable into their child's daily diet since dietary patterns mainly develop within the context of the family (Vereecken, Rovner, & Maes, 2010).

There are a few papers and guidelines published on the recommended number of servings of consumption of fruit and vegetable in order to reduce the risk of developing NCDs (NCCFN, 2013; NHMRC, 2013; United States Department of Agriculture, 2014; WHO, 2004). A published report by the World Health Organization (WHO) on diet, nutrition and the prevention of chronic diseases recommends the intake of a minimum of 5 servings or 400g of fruit and vegetable per person per day but excluding potatoes and other starchy tubers (WHO, 2004). Besides, United State Dietary Guidelines and MyPlate Food Guide recommends eating 1 to 1½ cups of fruit and 1½ cups of vegetable for children aged 4 to 8 years (United States Department of Agriculture, 2014). In Malaysia, the recommended intake of fruit and vegetable for children aged 4 to 6 years is four servings, which are two servings of fruit and two servings of vegetable per day (NCCFN, 2013).

However, there is consistent picture shows that many children do not consume the recommended number of servings of fruit and vegetable and thus affect their normal healthy development as fruit and vegetable play a main role in supplying micronutrient and fiber for human body. In Netherlands, only 25% of children aged between 4 and 6 years met the recommendation of 50-100g of fruit and

less than 1% met the recommendation of 50-100g of vegetable a day (Van Rossum et al., 2008). Similarly, only 21% of both British boys and girls aged 5-15 years achieved the target of five servings of fruit and vegetable per day (Craig & Shelton, 2008). Besides, the trend in consumption of fruit and vegetable does not show a pleasing picture. An interim analyses which utilized existing data reported that the average fruit intake among persons aged more than 2 years remained the same from 1994-1996 to 1999-2002 (1.6 servings per day) and average vegetable consumption declined from 3.4 to 3.2 servings per day during the same period, with no noted change in the daily consumption of dark green or orange vegetable (0.3servings) (CDC, 2007).

Fruit and vegetable consumption in Malaysia also shows a consistent picture with United States and London. Consumption of vegetable among Malaysia preschoolers was reported to be low with more than 75% did not consume vegetable in their daily diet (Norimah et al., 2009). Besides, a study conducted among primary school children found that the mean number of servings of fruit was 0.29 ± 1.62 and vegetable was 0.30 ± 0.35, in which both fruit and vegetable consumption did not achieve the recommended serving size (Zalilah, Khor, Mirnalini, & Sarina, 2005). Another study conducted by Aziz and Devi (2012) in Selangor, Malaysia found that there was low percentage of preschoolers aged 4 to 6 years who consumed vegetable every day, in which only 32% of the urban and 38.1% of the rural preschoolers consumed vegetable every day.

Most of the vegetable have a bitter taste due to the presence of thioureas and related compounds that make it unpalatable for children (Steiner, 1979). One of the

child related factors which has been found to be associated with this natural response is food neophobia (Cooke, Wardle, & Gibson, 2003; Galloway, Lee, & Birch, 2003).

Food neophobia is generally characterized as a personality trait, a continuum along which people can be placed in term of their tendency to accept or avoid new foods (Pliner & Salvy, 2006). At the same time, food neophobia has been discussed as a form of behaviour, involving the avoidance of novel foods in a particular situation (Pliner & Salvy, 2006). The association between fruit and vegetable consumption and food neophobia can be described as an evolutionarily beneficial survival mechanism which helps children to avoid from ingesting noxious or toxic chemicals once they are adept and mobile enough to consider, pick up and consume 'objects' found in their immediate environment but outside of their parental guidance (Birch, Gunder, Grimm, Laing, 1998). Thus, in order to avoid potentially poisonous plants (Glander, 1982), children will naturally reject bitter tasting foods (McBurney & Gent, 1979). Since most of the vegetable have a bitter taste, it is thus unpalatable for children (Steiner, 1979).

Problem Statement

The cost of low fruit and vegetable consumption has become an important issue in which approximately 16 million (1.0%) Disability Adjusted Life Years (DALYs) and 1.7 million (2.8%) deaths worldwide are attributable to low fruit and vegetable consumption (WHO, 2009). According to the World Health Report 2002, low fruit and vegetable intake is estimated to cause about 31% of ischemic heart disease and 11% of stroke worldwide. Overall, it is estimated that up to 2.7 million

lives could potentially be saved each year if fruit and vegetable consumption was sufficiently increased (WHO, 2002). Children are a particular target group for the promotion of increased consumption, because the protective properties of fruit and vegetable may need to be present in early stages of life to be effective in adulthood in reducing the risks of cancer (Willett, 2010).

Fruit and vegetable consumption among preschoolers is below the recommended level. An earlier study conducted in Bradford among preschoolers aged 3 to 4 years reported that the proportion of children eating five-a-day of fruit and vegetable was only 16% (Cockroft, Durkin, Masding, & Cade, 2005). In Malaysia, the National Health and Morbidity Survey (NHMS) in 2011 reported that 9 in 10 of Malaysian children did not take 5 servings of fruit and vegetable daily as recommended (IPH, 2011). Thus, it is important to conduct more researches to study fruit and vegetable consumption among preschoolers.

The cost of high exhibition of food neophobia has also become an important issue. Previous studies have evidenced that high exhibition of food neophobia was associated with lack of dietary variety in children's diets and the replacement of healthy food with unhealthy processed foods which are high in sugar, fat and salt content (Dennison, Rockwell, & Baker, 1998; Fisher & Birch, 1995). The issue of food neophobia should be noted as it is a common problem of an unhealthy eating habit in children. This can be evidenced by an earlier study, which was conducted among children aged 2 to 5 years in Australia which showed that children were moderately food neophobic (34.5%) (Russell & Worsley, 2008). There were only a few published studies on food neophobia in Malaysia. One of the studies was

conducted among children aged 7-9 years old (Zalilah, Khor, Mirnalini, & Sarina, 2005) which found that 18.4% of the children were neophobic and 64.5% were in the average category. To date, research on food neophobia among Malaysian preschoolers is scarce. Hence, the problem of food neophobia among preschoolers should be investigated.

Several studies showed that food neophobia was one of the few related factors which has been associated with fruit and vegetable consumption among children (Cooke, Wardle, & Gibson, 2003; Galloway, Lee, & Birch, 2003). However, the relationship between food neophobia and fruit and vegetable consumption varies greatly in different researches. Wardle, Carnell, and Cooke (2005) showed that the level of the children's food neophobia was the next strongest predictor of children's fruit and vegetable consumption after parental fruit and vegetable consumption. However, Coulthard and Blisset (2009) found that food neophobia though significantly correlated with taste or smell sensitivity, was not a strong predictor of children's fruit and vegetable consumption as children may eat sufficient servings of familiar fruit and vegetable since children with food neophobia are more likely to reject new fruit and vegetable only. The relationship between food neophobia and children's fruit and vegetable consumption remains unclear. Hence, it is important to conduct more researches to examine the relationship between food neophobia and fruit and vegetable consumption among preschoolers.

Maternal feeding practices play an important role in the development of food neophobia behaviour and the consumption of fruit and vegetable among preschoolers. Controlling feeding practices were positively associated with children's food

neophobia (Wardle, Carnell, & Cooke, 2005) and fruit and vegetable consumption (Bourcier, Bowen, Meischke, & Moinpour, 2003). On the other hand, pressuring feeding practices were found to be not associated with children's food neophobia (Tan & Holub, 2012) and fruit and vegetable consumption (Vereecken, Keukelier, & Maes, 2004). The inconsistent findings from these studies require further research in order to examine the associations between maternal feeding practices with food neophobia and fruit and vegetable consumption among preschoolers.

Infant feeding practices play an important role in determining eating habits of children in later life. Infant feeding practices in children 0-23 months of age are crucial for the health and development of children as the practices will directly affect the nutritional status of children under two years of age (WHO, 2008). A study conducted by Shim, Kim, and Mathai (2011) showed that breastfed infants more readily accepted novel food than formula fed infants, showing a lower level of food neophobia. Breastfeeding was also found to be related to higher intake of fruit and vegetable among children (Cooke et al., 2004). On the other hand, Russell and Worsley (2008) found no significant difference in food neophobia scores by history of breastfeeding. The associations between infant feeding practices with food neophobia and fruit and vegetable consumption still remains unclear. Thus, further research is needed to examine these associations.

Food neophobia and low fruit and vegetable consumption are prevalent during childhood and are often linked to nutritional problems. However, information on the factors associated with food neophobia and low fruit and vegetable consumption is limited. Therefore, this study aimed to examine the association

between food neophobia with fruit and vegetable consumption among preschoolers and their associated factors (personal factors, body weight status, maternal feeding practices and infant feeding practices).

Research questions

a) What is the association between food neophobia and fruit and vegetable consumption among preschoolers?
b) What are the associations between personal factors, body weight status, maternal feeding practices and infant feeding practices with food neophobia among preschoolers?
c) What are the associations between personal factors, body weight status, maternal feeding practices and infant feeding practices with fruit and vegetable consumption among preschoolers?

Significance of the study

This study was conducted to investigate the association between food neophobia and fruit and vegetable consumption among preschoolers and their associated factors (personal factors, body weight status, maternal feeding practices and infant feeding practices). The problems of low consumption of fruit and vegetable and food neophobia are common among preschoolers. More information on their associated factors are needed in order to increase the consumption of fruit and vegetable and reduce the unhealthy eating behaviours. Additionally, the findings can be used as reference for future studies on food neophobia and fruit and vegetable consumption among preschoolers.

By understanding the factors that specifically play a role in food neophobia and fruit and vegetable consumption, effective interventions can be implemented in order to increase awareness of parents about the negative consequences of these unhealthy behaviours. Additionally, effective health promotion programs can be implemented in order to decrease the prevalence of food neophobia and increase fruit and vegetable consumption among preschoolers.

Objectives

General Objective

To determine factors associated with food neophobia and fruit and vegetable consumption among preschoolers aged 4 to 6 years in *Tabika Perpaduan* in Kuantan.

Specific Objectives

a) To examine child personal factors (age, sex, ethnicity), maternal personal factors (age, maternal age, household income, maternal education, and maternal employment), body weight status, maternal feeding practices, and infant feeding practices among preschoolers.

b) To assess food neophobia and fruit and vegetable consumption among preschoolers.

c) To determine the association between food neophobia and fruit and vegetable consumption among preschoolers.

d) To determine the associations between personal factors, body weight status, maternal feeding practices and infant feeding practices with food neophobia among preschoolers.

e) To determine the associations between personal factors, body weight status, maternal feeding practices and infant feeding practices with fruit and vegetable consumption among preschoolers.

Research Hypotheses

a) There is significant association between food neophobia and fruit and vegetable consumption among preschoolers.
b) There are significant associations between personal factors, body weight status, maternal feeding practices and infant feeding practices with food neophobia among preschoolers.
c) There are significant associations between personal factors, body weight status, maternal feeding practices and infant feeding practices with fruit and vegetable consumption among preschoolers.

Conceptual Framework

Figure 1.1 shows the conceptual framework of this study. Food neophobia was studied to determine its association with fruit and vegetable consumption among preschoolers. Besides, personal factors, body weight status, maternal feeding practices, and infant feeding practices were studied to determine their associations with food neophobia and fruit and vegetable consumption among preschoolers. The independent variables in this study were personal factors, body weight status, maternal feeding practices and infant feeding practices, while the dependent variables were food neophobia and fruit and vegetable consumption.

Studies showed that there was a negative association between food neophobia and fruit and vegetable consumption (Cooke, Wardle, Gibson, 2003; Coulthard & Blissett, 2009; Galloway, Lee, & Birch, 2003; Wardle, Carnell, & Cooke, 2005). Besides, personal factors, such as age was significantly related with food neophobia (Pelchat & Pliner, 1995; Pliner, 1994; Pliner & Loewen, 1997) but not significantly related with fruit and vegetable consumption (Wyse, Campbell, Nathen, & Wolfenden, 2011). Besides, sex was significantly related with food neophobia (Tuorila, Lahteenmaki, Pohjalainen, & Lotti, 2001) and fruit and vegetable consumption (Reinaerts, de Nooijer, Candel, & de Vries, 2007). Maternal feeding practices, such as maternal pressure to eat were significantly related with food neophobia (Wardle, Carnell, & Cooke, 2005) and fruit and vegetable consumption (Bourcier, Bowen, Meischke, & Moinpour, 2003). Last but not least, there was a relationship between infant feeding practices, such as breastfeeding initiation with food neophobia (Sullivan & Birch, 1994) and fruit and vegetable consumption (Cooke et al., 2004).

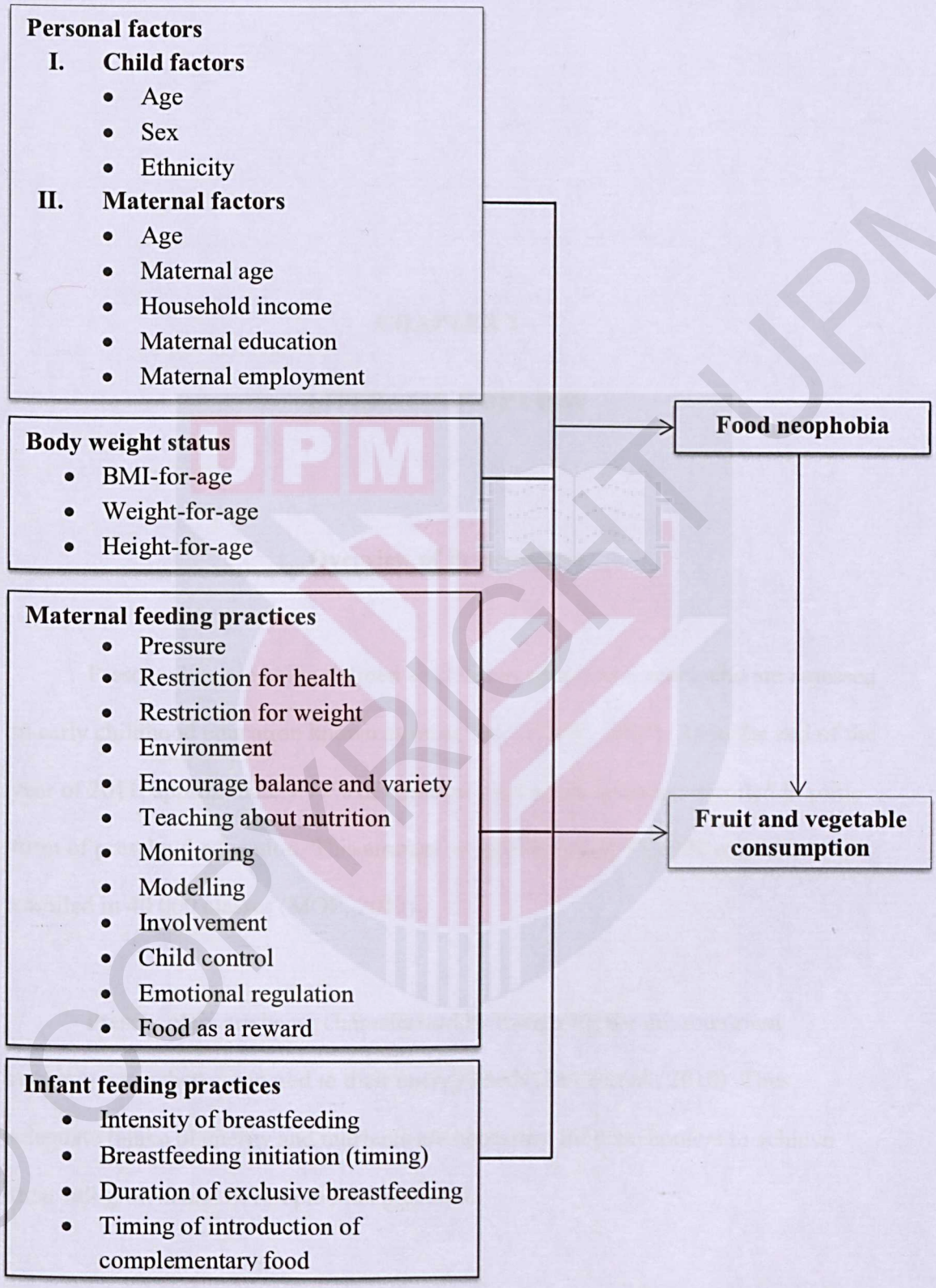

Figure 1.1: Conceptual framework

CHAPTER 2

LITERATURE REVIEW

Overview of Preschoolers

Preschoolers are being defined as children aged 4 to 6 years who are assessed to early childhood education known as preschools (MOE, 2012). As in the end of the year of 2011, approximately 77% of children aged 4 to 6 years are enrolled in some form of preschool education. This amount to approximately 733 000 children enrolled in 40 000 classes (MOE, 2012).

Preschoolers are being characterized by having higher micronutrient requirements when compared to their energy needs (Butte et al., 2010). Thus, adequate intake of energy and nutrients are necessary for preschoolers to achieve their full growth and developmental potential.

Adequate of protein intake is essential for preschoolers' growth and tissue repair rather than for energy. Most children from birth to 5 years are able to meet the targeted levels of consumption of most nutrients, except for iron, calcium, and zinc.

Adequate iron uptake is important to prevent iron deficiency. Besides, ample dietary fiber intake is important to prevent them from developing heart diseases, certain cancers, diabetes and hypertension in adulthoods. Incorporating fiber in preschoolers' diet helps prevent constipation. Meanwhile, an appropriate amount of dietary fat is necessary to meet preschoolers' needs for calories, essential fatty acids, and fat soluble vitamins (Lee, Lim, Ahn, & Chang, 2006). Last but not the least, adequate of calcium intake in childhood is crucial for the development of peak bone mass. A high peak bone mass is thought to be protective against osteoporosis and fracture later in life (Bischoff-Ferrari et al., 2005). Table 2.1 shows the Recommended Nutrient Intakes (RNI) for Malaysia 2005, specifically children aged 4 to 6 years (NCCFN, 2005).

However, many preschoolers are adopting unhealthy eating patterns. Preschoolers prefer foods with higher energy density, such as fatty food and sugar-sweetened beverages. The higher preference for high energy density food was mainly due to the positive physiological consequences, in which the high energy food provides in relation to satiety and energy input (Andrieu, Darmon, & Drewnowski, 2005; Uauy & Díaz, 2005). In addition, Krebs-Smitch et al. (1996) found that the amount of fruit and vegetable consumed frequently by children and adolescents in United State consists of fruit juice and potatoes that are often fried. According to a previous study conducted in the year of 2009 by Lorson, Melgar-Quinonez, and Taylor, french fried constituted approximately 25% of the vegetable consumed by children and adolescents in United State. The finding from these two studies showed that there appeared to be no sign of an improvement of fruit and vegetable by children in the United State, despite of the ubiquitous 5-a-day messages.

Table 2.1: Recommended Nutrient Intakes (RNI) for Malaysia 2005 (children aged 4 to 6 years)

	Children (boys)	Children (girls)
Energy (kcal)	1340	1290
Protein (g)	23	23
Calcium (mg)	600	600
Iron Bioavailability- 10% (mg)	6	6
Iron Bioavailability- 20% (mg)	4	4
Iodine (µg)	108	108
Zinc (mg)	5.1	5.1
Selenium (µg)	21	21
Thiamin (mg)	0.6	0.6
Riboflavin (mg)	0.6	0.6
Niacin (mg NE)	8	8
Folate (µg)	200	200
Vitamin C (mg)	30	30
Vitamin A (µg)	450	450
Vitamin D (µg)	5	5
Vitamin E (mg)	5	5

Besides, Falcigia et al. (2000) found that when ready-to-eat cereal was removed from the dietary analysis, there were only a small proportion of children met 2/3 of the RDA/DRI recommendation for nutrients such as vitamin A, C, B6, folate, iron, fiber and zinc.

Malaysia also shows a consistent picture with United State, in which, Malaysia is now experiencing nutritional transition among preschoolers. The dietary intake trend in Malaysia has transformed into higher consumption of animal source foods, refined grains, higher intake of sugar and salts and lower consumption of fruit and vegetable (Ministry of Health, 1999; Mohd Ismail, 2002; Tee, 1999). By considering the findings from previous studies, it can be hypothesized that preschoolers are now vulnerable to the development of obesity and micronutrient deficiency. Thus, the nutritional requirement and eating practices among preschoolers should not be neglected.

In the year 2014, the Centers for Disease Control and Prevention (CDC) explained that the early years of preschoolers are very important for his or her health and development and to meet their social, emotional and education needs (CDC, 2014). In this study, several issues of preschoolers were examined, including personal factors, body weight status, maternal feeding practices, and infant feeding practices. The associations between food neophobia and fruit and vegetable consumption with these associated factors among preschoolers were also investigated. First, it was hypothesized that preschoolers were at risk of food neophobia and low fruit and vegetable consumption. Secondly, it was hypothesized that food neophobia was associated with fruit and vegetable consumption among preschoolers. Thirdly, it was hypothesized that personal factors, body weight status, maternal feeding practices and infant feeding practices were associated with food neophobia among preschoolers. Fourthly, it was hypothesized that personal factors, body weight status, maternal feeding practices and infant feeding practices were associated with fruit and vegetable consumption among preschoolers.

Food Neophobia

Food neophobia is generally characterized as a highly heritable personality trait, a continuum along which people can be placed in terms of their tendency to accept or reject novel foods (Cooke, Haworth, & Wardle, 2007; Faith, Heo, Keller, & Pietrobelli, 2013; Pliner & Salvy, 2006). The high prevalence of food neophobia among preschoolers is predictable due to the adaptive mechanism of a child.

Food neophobia is described as an adaptive behavior (Benton, 2004; Pliner & Hobden, 1992; Rozin & Vollmecke, 1986) to avoid children from consuming foods that are poisonous once they are adept and mobile enough to consider, pick up and consume 'objects' found in their immediate environment but outside of their parental guidance (Birch, Gunder, Grimm Thomas, & Laing, 1998; Cashdan, 1998; Wright, 1991). Thus, children will naturally reject potential food sources that they have no experience with (Zajonc, 1968). Although this trait may once have been described as an adaptive in an evolutionary sense by reducing ingestion of potentially noxious or toxic chemical, much of the risk associated with the consumption of new types of food has been removed in current Western culture. Thus, food neophobia may now be maladaptive, hindering the development of a range of preferences and hence consumption of a varied diet (Falcigia, Couch, Gribble, Pabst, & Frank, 2000; Howard, Mallan, Byrne, Magarey, & Daniels, 2012; Pliner, Pelchat, & Grabski, 1993; Russell & Worsley, 2008).

A population-based cross sectional study was conducted by Russell and Worsley (2008) to investigate the relationship between food preferences, food neophobia, and children's characteristics among preschoolers. A total of 371 Australian children aged two to five years were recruited from child-care centers, kindergardens, playgroups, day nurseries, and swimming centers. One of the variables assessed in this study was food neophobia. The Children's Food Neophobia Scale (CFNS) was used to measure the trait of food neophobia. The average food neophobia score for the sample was 36.59, with standard deviation of 14.05. Overall, the children were moderately food neophobic, in which 34.5% of the children were in the average category. The finding from this study was consistent with the result

from a previous study (Galloway, Lee, & Birch, 2003), which suggested that a moderate level of food neophobia was present in the age group of 2 to 5 years old.

A cross sectional study was conducted by Tan and Holub (2012) which recruited a relatively small sample size of respondents to examine children's food neophobia. A total of 85 mothers of children aged three to twelve years completed a self-administered questionnaire. Children's food neophobia was the outcome variable investigated in this study. In term of food neophobia variable, unlike Russell and Worsley (2008) study, this variable was not treated as categorical data, instead it was analysed as continuous data. The mean score for children's food neophobia in this study was 3.9 with a standard deviation of 1.5. The range scored from 1.6 to 7.0 and indicated that some children showed high food neophobia, while others did not. There was a sampling method related limitation in this study. This study used snowball and convenience sampling method. Thus, it would be more interesting if the researchers use random sampling or clustered sampling method to ensure the generalizability of the findings.

There were only a few published papers on food neophobia among children in Malaysia. One of the study was conducted by Zalilah et al. (2005) to investigate food neophobia and nutritional outcomes of primary school children. The sample of this study consisted of 332 primary school children from six randomly selected schools in the district of Hulu Selangor, Selangor. The children were classified into three groups (neophillic, average and neophobia). This study found a similar results with Russell and Worsley (2008), in which majority of the children (64.5%) were in

the average category. These findings suggested that most of the children were in moderate levels of food neophobia.

Taken together, the results of these literature reviews on the food neophobia among preschoolers indicate that preschoolers may be at risk of food neophobia. By taking account of the health consequences brought by food neophobia and limited studies examining on food neophobia among preschoolers conducted in Malaysia, more researches should be conducted in the future, especially in Malaysia.

Fruit and Vegetable Consumption

The term "vegetable" refers to the edible plants, commonly collected or cultivated for their nutritional value for human. Vegetable include all fresh, green leafy vegetable (such as spinach and lettuce), coloured vegetable (such as red spinach), fruit vegetable (such as gourd or melons, pumpkin, *loofah* (*petola*) and cucumber), bean vegetable (such as long beans), cruciferous vegetable (such as cabbages and broccoli), *ulam-ulam* (such as *pegaga* and *ulam raja*) and edible plant stems (such as celery and asparagus) (NCCFN, 2013). In the Malaysian Dietary Guidelines, tubers (such as potatoes, tapioca and yam) are not included as vegetable (NCCFN, 2013).

Fruit is a subset of vegetable in which it is generally used to describe the sweet, fleshy edible portion of a plant that arises from the base of the flower and surrounds the seeds (NCCFN, 2013). Examples of fruit are bananas, papayas, apples, oranges and others. Most fruits are eaten fresh and raw. Sometimes, fruit can be

consumed as canned fruit, dried fruit and fruit juice, preferably without added sugar and preservatives. When defined in botanical term, there are true fruit, which are treated as vegetable in cooking, for example tomatoes and brinjals (NCCFN, 2013).

The low fruit and vegetable consumption among preschoolers is predictable due to the bitter taste of fruit and vegetable. The presence of thioureas and related compounds make vegetable taste bitter and thus make it unpalatable for children (Steiner, 1979). Rejecting green leafy vegetable is known as an adaption strategy when the child is at the age of exploring environment. This adaption strategy keeps children away from plants that might contain dangerous toxins (Cashdan, 1998). This reaction of rejection and distaste may also prevent parents from reoffering those food, especially vegetable (Maier, Chabaner, Schaal, Leathwood, & Issanchou, 2008).

Rasmussen et al. (2006) conducted a systematic review study to provide a comprehensive review of potential determinants of fruit and vegetable consumption in children and adolescents. A total of 98 papers were included in this study. This study found that a huge number of potential determinants have been studied among children and adolescents in the previous year. However, the paucity of studies had caused many controversial finding on these determinants. The determinants which were best supported by evidence were age, gender, socio-economic position, preferences, parental intake and home availability. However, the authors found some general issues in design and methodology in previous studies and thus affect the validity of the generated results. Firstly, the inclusion of small or non-representative respondent in the previous studies produced a non-generalized result for the whole population. Secondly, the possibility for the production of compromising result was

due to the lacking of operationalizing outcome variables (fruit and vegetable consumption), which can be further divided into three aspect: 1) Fruit and vegetable consumption was analysed as one combined measure in some previous studies, whereas others conducted the analyses as separate outcomes; 2) Potatoes were included in the vegetable measurement, while others did not; 3) Some papers assessed fruit and vegetable consumption in term of frequency of intake, while others considered amount of intake. Thus, the inclusion of larger sample size and a standardized method in measuring fruit and vegetable consumption should be considered in future studies.

A cohort study nested in a randomized trial study was conducted by Valmorbida and Vitolo (2014) in order to examine the factors associated with low consumption of fruit and vegetable among preschoolers in Porto Alegre, state of Rio Grande do Sul, Brazil. The authors attempted to overcome the limitations of previous studies by having a large sample size and conducted a cohort study. The authors recruited 388 pregnant mothers who were in their third trimester of pregnancy at health centers in the eight district areas of the city of Porto Alegre, state of Rio Grande do Sul, Brazil. The children's fruit and vegetable consumption were recorded at 12 months after birth (T1) and 2-3 years after birth (T2). Results showed that 87% of the children consumed less than one serving of vegetable and 58% did not consume one serving of fruit a day. However, the findings were not able to analyze the association between fruit and vegetable consumption at 12 months with consumption at 2-3 years as the percentage of children who reached the recommended serving size of fruit and vegetable was very low and not sufficient to analyze the association, which was 9% and 0.2% respectively. Despite of this, the

finding of this study demonstrated a high prevalence of inadequate consumption of fruit and vegetable among young children.

A cross-sectional study conducted by Wardle, Carnell, and Cooke (2005) on 564 children aged two to six years who were recruited from 22 London nursery schools found that 31.4% of the children ate fruit less than once per day and 40.8% of children ate vegetable less than once per day. Findings from this study showed a higher consumption of fruit and vegetable when compared with study conducted by Valmorbida and Vitolo (2014). The difference of finding between these two studies was due to the difference in the family background of the children recruited in the studies. Children recruited in Wardle, Carnell and Cooke (2005) study were predominantly from middle-class and highly educated family, while the children recruited in Valmorbida and Vitolo (2014) study were from low socioeconomic level. To some extent, this may explain the skewed distribution of fruit and vegetable consumption in Wardle, Carnell and Cooke (2005) study because higher socioeconomic status has been associated with higher intake of fruit and vegetable. Therefore, a more generalized sample which includes an equal distribution of socioeconomic status among preschoolers should be considered for future research.

Coulthard and Blissett (2009) conducted a cross-sectional study to examine the ascertain relative contribution of food neophobia and taste sensitivity to the amount of fruit and vegetable consumed in a typical day. A total of 73 children aged two to five years attending nurseries in the South Birmingham area, United Kingdom were recruited. One of the evaluated variables in this study was fruit and vegetable consumption of children. The number of serving of fruit and vegetable consumption

was relatively high in this sample, with the mean consumption of fruit and vegetable met the government guideline for the consumption of fruit and vegetable, which was 4 servings per day. The authors explained that this probably due to the fact that there were higher levels of maternal education in the sample. However, the finding also indicated that 51% of the children did not eat the recommended five servings of fruit and vegetable in a typical day. This finding further showed a high prevalence of inadequate of fruit and vegetable consumption among preschoolers.

Taken together, the results of these literature reviews on the fruit and vegetable consumption among preschoolers indicate that preschoolers may be at risk of low fruit and vegetable consumption. By taking account of the limitations of the past studies, a longitudinal study with larger and more generalized sample of preschoolers should be studied in order to get representative result. Also, there are limited studies examining fruit and vegetable consumption among preschoolers conducted in Malaysia. Thus, more researches should be conducted in the future, especially in Malaysia.

Food Neophobia and Fruit and Vegetable Consumption

Food neophobia has been examined with fruit and vegetable consumption among preschoolers by a number of researchers (Cooke, Carnell,& Wardle, 2006; Cooke, Wardle,& Gibson, 2003; Jones, Steer, Rogers, & Emmett, 2010; Russell & Worsley, 2008). To date, it is documented that food neophobia are significantly associated with fruit and vegetable consumption among preschoolers (Carruth et al. 1998; Cooke, Wardle, & Gibson, 2003; Falcigia, Pabst, Couch, & Goody, 2004;

Galloway, Lee, & Birch, 2003). Few studies showed contradictory results whereby food neophobia is not significantly associated with fruit and vegetable consumption among preschoolers (Coulthard & Blissett, 2009; Zalilah et al., 2005).

The first topic of attachment of food neophobia in relation to fruit and vegetable consumption among preschoolers is addressed by hypothesizing food neophobia as the mediating variable between parental control and children fruit and vegetable consumption. Wardle, Carnell, and Cooke (2005) carried out a cross-sectional study in London on food neophobia and fruit and vegetable consumption. The authors hypothesized that children's food neophobia mediated the association between parental control and fruit and vegetable consumption. A total of 564 pupils in the age range of two to six years from 20 nursery schools in London were recruited. Assessments included the intake of fruit and vegetable by children and parents, parental control of feeding and child's food neophobia. Results showed that level of child's food neophobia was the next strongest predictor of children's fruit and vegetable consumption after parental fruit and vegetable consumption. There is no additional effect when parental control is included. This result accepted the hypothesis since the strong power of child's food neophobia in predicting their fruit and vegetable consumption explained part of the parental control effect on low levels of fruit and vegetable consumption among children.

The second topic of attachment of food neophobia in relation to fruit and vegetable consumption among preschoolers is addressed by hypothesizing food neophobia as the mediating variable between parental and children fruit and vegetable consumption. In a cross-sectional study conducted by Coulthard and

Blissett (2009), 73 children aged two to five years attending nurseries in the South Birmingham area, United Kingdom were recruited. In this study, it was hypothesized that the association between child and parent fruit and vegetable consumption would be moderated by food neophobia. The fruit and vegetable consumption among children was measured using a likert type scale, which has been used in previous study conducted by Wardle, Carnell, and Cooke (2005). Hierarchical moderated regression was carried out to examine the association between maternal, child fruit and vegetable consumption and food neophobia. The result from this study showed a contradictory result with the study of Wardle, Carnell, and Cooke (2005) which showed that food neophobia was not a strong predictor of child fruit and vegetable consumption. This result rejected the hypothesis since food neophobia did not add to the variance explained by maternal fruit and vegetable consumption. The authors explained that whilst children with food neophobia were more likely to reject new fruit and vegetable, they might eat sufficient servings of familiar fruit and vegetable. Besides, this study found a similar result with the study of Wardle, Carnell, and Cooke (2005), in which fruit and vegetable consumption in both studies was relatively high when compared with other studies. Authors of these two studies explained these results with two reasons. First, the maternal education level and socioeconomic status in both samples were relatively high. Secondly, both studies used the same likert type scale in assessing the fruit and vegetable consumption, in which one of the response category "three or more times a day" might have provided more variability in the data. Therefore, larger sample size and using 24 hour dietary recall or food record in assessing fruit and vegetable consumption should be considered in future.

Cooke, Carnell, and Wardle (2006) carried out an experimantal study in London on child's food neophobia and fruit and vegetable consumption. The authors hypothesized that higher scores on the Child Food Neophobia Scale (CFNS) would negatively associated with consumption of fruit and vegetable. A total of 109 children aged 4 to 5 years took part in a series of 3 test lunch meals weekly intervals at school. They were presented with few types of food, in which grapes, tomatoes or carrot sticks represented the fruit and vegetable group. The consumption of fruit and vegetable were then assessed by using the weight before the meal substracted the weight after the meal. The findings showed that food neophobia was significantly associated with lower consumption of grapes, tomatoes or carrots, chicken and cheese. Findings accepted the hypothesis. In spite of this, this study had a number of limitations in term of the content, procedure and atmosphere. First, children were aware of being observed by the researchers and thus might affect the result. Second, the setting for this study took place in classroom rather than in school dining rooms. This different setting from normal school meals would cause bias to the results. Third, fruit and vegetable provided in this study was only grapes, tomatoes and carrot sticks, and thus not able to resemble the entire fruit and vegetable group. Thus, it is recommended to include a measure of children's familiarity with and liking for the foods offered in order to permit researchers to evaluate whether the differences in food intake observed are a product of simple preference rather than of neophobia. Despite of these limitations, the result of this study was consistent with Wardle et al. (2005) where food neophobia was significantly associated with lower fruit and vegetable consumption.

In contrast, Zalillah et al. (2005) found that there was no significant difference in the number of serving consumed from fruit and vegetable among neophillic, average and neophobia groups. Zalilah et al. (2005) hypothesized that children with food neophobia would have inadequate servings from all food groups. A total of 332 primary school children from 6 randomly selected schools in the district of Hulu Selangor, Selangor were interviewed to obtain demographic, socio-economic, food neophobia and dietary intake information. The authors explained that the insignificant finding may be attributed to the overall low consumption of fruit and vegetable among children. There were a number of limitations in this study. First, the use of food neophobia scale from a different culture may contribute to response bias among the respondents. Second, the misinterpretation of items in the Child Food Neophobia Scale into language "Malay" and "Tamil" may affect the categorization of the children according to their willingness to try new foods. Despite of all these limitations, this study was the first published paper on food neophobia among children in Malaysia and could contribute to the literature on the potential role of food neophobia in child health and nutrition.

Taken together, the results from these literature reviews on the association between food neophobia and fruit and vegetable consumption among preschoolers showed that there are contradictory findings on the association. The major reasons for this contradictory finding might be due to the lack of operationalizing outcome variables of fruit and vegetable, the lack of standardization method in measuring the fruit and vegetable consumption, inclusion of small or non-representatives respondents, and others. Thus, it is recommended to measure fruit and vegetable consumption in multiple aspects which include both the frequency and amount of

intake using self-administered questionnaire and food record respectively and analysed the data according to specific dietary guideline in respective countries in future studies.

Personal Factors and Food Neophobia

There are only a few sources of personal data on food neophobia with nationally representative samples (Cassells, Magarey, Daniels, & Mallan, 2014; Faith, Heo, Keller, & Pietrobelli, 2013; Russell & Worsley, 2008; Wardle, Carnell, & Cooke, 2005). Surprisingly, there is very little published data on personal data on food neophobia from developing countries including Malaysia. The following literature review attempts to discuss the limited data on the association between personal factors with food neophobia.

In a cross-sectional study conducted by Russel and Worsley (2008), a total of 371 Australian children aged 2 to 5 years were recruited from child-care centers, kindergardens, playgroups, day nurseries, and swimming centers. The objective of this study was to examine the relationships between children's characteristics and food neophobia. The children characteristics assessed by the authors included age and sex. One way ANOVA was performed to analyze the relationships between children's characteristics with food neophobia. Finding from this study showed that there was no difference in food neophobia with both child's age and sex. The authors explained that this non-significant finding was due to the limitations of this study. The sample in this study was not randomly recruited and thus this study had more 4 years old children than 2 years old children, which may produce a bias result.

Besides, a larger age difference among the children in a study could result in an obvious decline in food neophobia. Thus, a larger sample size should be considered in future studies.

A cross-sectional study conducted by Faith, Heo, Keller, and Pietrobelli (2013) showed a similar result with Russel et al. (2008) study which stated that there was no significant difference between boys and girls with food neophobia. Faith et al. (2013) recruited 66 same-sex twin pairs aged four to seven years in United States. Personal factors assessed in this study included child's sex and age. The results found that food neophobia did not differ between boys and girls. The authors explained that the sample size of this study was too small to conduct sex or ethnicity specific biometric analyses. By taking the consistent result of this study and Russel and Worsley (2008) study, it is recommended that a larger sample size should be considered in order to examine the association between age, sex and ethnicity with food neophobia.

A cross-sectional study conducted by Hursti and Sjoden (1997) recruited 722 children aged seven to seventeen years in Sweden and this 722 children were divided into 6 age groups, which were aged 7, 9, 11, 13, 15 and 17. The objective of this study was to examine the degree of age, sex differences with respect to food neophobia. This study showed a contradictory result with the studies of Russel et al. (2008) and Faith et al. (2013) which stated that there was a significant difference in food neophobia between boys and girls. The authors found that there was a significant sex difference with respect to food neophobia among the 9 years old group. Boys in the age group of 9 years old had a significantly higher total food

neophobia score than girls. The significant finding from this study might be due to the larger sample and larger age differences between the children as compared with the studies of Russel et al. (2008) and Faith et al. (2013).

A recent study conducted by Cassells, Magarey, Daniels, and Mallan (2014) utilized the data from 244 participants in New Zealand and Australia who were allocated to the control condition of NOURISH randomized controlled trial (RCT). Maternal characteristics (maternal age, level of education, BMI) and child characteristics (age, gender, birthweight, current BMI for age, timing of introduction of complementary food, duration of breastfeeding) were assessed as covariates in this study. The authors found that maternal age was the only covariate which was correlated with child food neophobia. Besides, this finding also explained the reason of a higher level of neophobia among children in this study since the mothers of the children were at an older age range. Thus, it would be recommended to replicate this study in a more diverse sample.

Personal Factors and Fruit and Vegetable Consumption

Dubois, Farmer, Girard, Burnier, and Porcherie (2011) performed analyses using data from the Quesbec Longitudinal Study of Child Development (QLSCD) 1998-2010, which was conducted in Canada. The objective of this study was to examine the association between social and demographic factors with children's food intakes. A total of 1549 children aged 44 to 56 months who participated in the nutrition evaluation phase of the QLSD study were included in this study. The demographic factors assessed in this study were household annual income, mother's

education, mother's age, sex of the child and immigrant status. Besides, fruit and vegetable consumption of children was included as one of the assessment of children's food intake. Results of this study identified that sex of the child, mother's immigrant status, maternal education and household annual income were associated with the fruit and vegetable consumption of children.

Cooke et al. (2004) carried out a cross-sectional study to examine the contribution of potential predictive variables within the domains of demographic characteristics to fruit and vegetable consumption in a large community sample of families with young children. A total of 564 children aged two to six years in 22 London nursery schools were recruited in this study. Sex of child, age, ethnicity, and parent's education level were assessed as demographic characteristics in this study. In term of fruit and vegetable consumption variable, unlike the study of Dubois et al. (2011) and Wyse et al. (2011), this study did not examined combined consumption of fruit and vegetable, but examined the relative associations of demographic characteristics with fruit and vegetable consumption separately, which was fruit consumption and vegetable consumption in two different context. The results of this study found that the demographic characteristics that were significantly correlated with vegetable consumption were sex of child, child's age, and parent's education level. On the other hand, the only demographic characteristic that was significantly correlated with fruit consumption was ethnicity.

A cross-sectional study conducted by Wyse, Campbell, Nathen, and Wolfenden (2011) showed a contradictory results from the studies of Dubois et al. (2011) and Cooke et al. (2004) whereby personal characteristics were not associated

with fruit and vegetable consumption. A total of 396 children aged three to five years from 30 preschools within the Hunter region, New South Wales, Australia were recruited. Similarly with Cooke et al. (2004) study, the personal characteristics assessed in this study included parental education, annual household income, child's age and sex. The authors found that there was no significant association between these four assessed demographic characteristics with fruit and vegetable consumption. The authors explained this contradictory finding by pointing out the limitations of this study. Compared to the sample in the previous studies (Dubois et al., 2011; Cooke et al., 2004), parents in this study were more educated and from higher income households which resulted a higher level of vegetable consumption among children in this study. Thus, it is recommended to consider a larger and generalized sample in future studies.

A recent cohort study was conducted by Valmórbida and Vitolo (2014) to examine factors associated with low consumption of fruits and vegetables among preschoolers. A total of 388 pregnant mothers who were in their third trimester of pregnancy at health centers in the eight district areas of the city of Porto Alegre, state of Rio Grande do Sul, Brazil and their children were followed from the ages of 6 months to 2-3 years. In term of personal factors, unlike studies of Dubois et al. (2011), Cooke et al. and Wise et al. (2011), this study assessed only maternal personal factors, which included maternal age, years of maternal and paternal schooling, family income, maternal occupation, paternal occupation, and number of children. The results found that only family income and paternal education level were significantly negative associated with fruit consumption. Besides, only paternal education level was significantly negative associated with vegetable consumption.

The result of this study showed that children from higher-income families were less likely to consume fruits. The authors explained this finding with the study limitation. The sample of this study was recruited from families of low socioeconomic status, and thus the comparison between the different levels of income was only performed in this group. Thus, it was hypothesized that fruit are replaced by processed foods with higher energy density in this population among families with higher income since they had higher purchasing power and greater capacity for the acquisition of these foods. Thus, it is recommended that a more generalized sample with equal proportion from each socioeconomic status should be considered in order to examine the association between personal factors with fruit and vegetable consumption among preschoolers in future studies.

In summary, the results from these literature reviews on the association between personal factors with food neophobia and fruit and vegetable consumption among preschoolers showed that there are contradictory findings on the associations. The major reason for this contradictory finding might be due to the lack of operationalizing outcome variables of fruit and vegetable, inclusion of small or non-representatives respondents, and the problem in sampling method. Thus, it is recommended to measure fruit and vegetable consumption in separate manners and include a larger sample size with the avoiding of usage of convenience sampling method in future studies.

Food neophobia has been described as one common eating problem among preschoolers that caused the consumption of less varied diet. Thus, the potential influence of neophobia on dietary intake might transform into unhealthy weight outcomes in children either to be underweight or obese. The following literature review attempts to discuss the limited data on the association between body weight status with food neophobia.

Carruth and Skinner (2000) carried out a longitudinal study to examine the difference in characteristics between food neophobic children and non-neophobic children. A total of 71 children aged from 2 to 96 months in United State were recruited in this study. The children's food neophobia behaviour was measured by using qualitative method for the first time when they were aged 24 to 36 months. The mothers were interviewed for the second time when their child aged 42 to 84 months. Anthropometry indicators (weight and height) were assessed as one of the child characteristics in this study. In term of food neophobia variable, this study examined using an open-ended question about whether they considered their children to be neophobic or non-neophobic. The process of asking mothers to verbally described their children's food neophobia was analysed by the researcher to categorized the child into neophobic or non-neophobic group. The results of t test for comparing mean height and weight showed there was no significant difference between neophobic and non-neophobic children. There was one very obvious limitation encountered by this study was the utilization of open ended question to access the food neophobia behaviour of the children which did not have a standardize answer

and thus might resulted a bias result. Thus, a validated questionnaire is recommended for future study to measure the food neophobia behaviour of children such as Child Food Neophobia Scale.

Finistrella et al. (2012) conducted a cross-sectional study to examine the cross-sectional associations of food neophobia in preschoolers with regard to body weight status. Finistrella et al. (2012) recruited 140 children aged 2 to 6 years in 2 kindergartens in Italy. The result of this study found that overweight and obese children were significantly more neophobic than normal weight children. In spite of this, cross sectional nature of this study disallow the determination of direction of causality between body weight status and food neophobia behaviour among children.

Body Weight Status and Fruit and Vegetable Consumption

Obesity in childhood has been identified as a problem in many affluent societies and this might due to the unhealthy eating habit among children. The unhealthy eating habits that are common among preschoolers are consumption of unhealthy foods, snacks or beverages and the low consumption of fruit and vegetable. The following literature review attempts to discuss the limited data on the association between body weight status with fruit and vegetable consumption.

A cross-sectional national study conducted by Vernarelli, Mitchell, Hartmen, and Rolls (2011) among children aged 2 to 8 years in United State recruited 2442 children between 2 and 8 years old who participated in the 2001 – 2004 National Health and Nutrition Examination Survey. The authors aimed to determine the

relationship between dietary energy density and body weight status in children. The result of this study reported that body weight status of children was positively associated with dietary energy density and diets high in energy density were associated with lower consumption of fruit and vegetable. In other words, body weight status of children was negatively associated with fruit and vegetable consumption. Although this study reported a strong association between dietary energy density and body weight status, however the cross-sectional nature of study disallow the determination of causal relationship between dietary energy density and body weight status. Thus, the findings would be strengthened by considering a longitudinal study in future.

Rolls, Drewnowski, and Ledikwe (2005) reviewed the existed data that suggest a role for energy density of foods in the management of body weight. The authors reported that fats should be replaced by food low in energy density such as fruits and vegetables to ensure the diet is nutrient dense and low in fat. Besides, they found that energy density of any mixed dish can be reduced by adding water-rich ingredients, such as fruits and vegetables. Thus, it can be concluded that body weight status was related with fruit and vegetable consumption.

Maternal Feeding Practices and Food Neophobia

There were a few papers published on the associations between maternal feeding practices and children's food neophobia (Cassells, Magarey, Daniels, & Mallan, 2014; Galloway, Fiorito, Francis, & Birch, 2006; Moroshko & Brennan, 2013; Orlet Fisher, Mitchell, Wright, & Birch, 2002; Wardle, Carnell, & Cooke,

2005). The main issue related to maternal feeding practices is the utilization of different measurements to measure these practices and thus producing conflicting results across different studies. Table 2.2 shows the different aspects of maternal feeding practices which had been assessed in previous studies. The following literature reviews attempt to demonstrate the different measurements used in different studies and their results.

In a study by Wardle, Carnell, and Cooke (2005), 564 children aged two to six years from 22 London Nursery schools were recruited. The authors attempted to replicate the finding of a negative association between parental control and fruit and vegetable consumption in girls. Secondly, the authors also hypothesized that children's food neophobia mediated this association. The parental control of feeding in this study was measured using the Parental Control Index, in the "restriction" and "pressure to eat" subscales were measured in one context. Results showed that parental control was positively correlated with children's food neophobia, whereas food neophobia was negatively correlated with children's consumption of fruit and vegetable. Hierarchical multiple regression was used for hypothesis testing purpose. The result showed that parental control ceased to be a significant predictor of children's fruit and vegetable consumption when food neophobia was controlled for. Therefore, this finding supported the previous hypothesis. In spite of this, this study had a number of limitations. First, the children recruited in this study were majority from a high socioeconomic status. Thus, the results may not be able to represent the whole population of children. Second, the measurement of parental control which only comprise of six questions may not been specific or sensitive enough. The insensitivity of the instrument may have artificially decreased the association

Table 2.2: Different aspects of maternal feeding practices assessed in previous studies

Maternal Feeding Practices	Definition
Pressure	The form of the mother pressure the child to consume more foods at meals (Musher-Eizenman & Holub, 2007).
Restriction for health	The form of the mother control the child's food intake with the purpose of limiting less healthy foods and sweets (Musher-Eizenman & Holub, 2007).
Restriction for weight control	The form of the mother control the child's food intake with the purpose of decreasing or maintaining the child's weight (Musher-Eizenman & Holub, 2007).
Environment	The form of the mother make (un)healthy foods available in home (Musher-Eizenman & Holub, 2007).
Encourage balance and variety	The form of the mother promote well-balanced food intake, including the consumption of varied foods and healthy food choices (Musher-Eizenman & Holub, 2007).
Teaching about nutrition	The form of the mother use explicit didactic techniques to encourage the consumption of healthy foods (Musher-Eizenman & Holub, 2007).
Monitoring	The form of the mother keep track of child's intake of less healthy foods (Musher-Eizenman & Holub, 2007).
Modeling	The form of the mother actively demonstrate healthy eating for the child (Musher-Eizenman & Holub, 2007).
Involvement	The form of the mother encourage child's involvement in meal planning and preparation (Musher-Eizenman & Holub, 2007).
Child control	The form of mother allows the child to control his/her eating behaviours and parent-child (Musher-Eizenman & Holub, 2007).
Emotional regulation	The form of the mother use food to regulate child's emotional status (Musher-Eizenman & Holub, 2007).
Food as a reward	The form of the mother use food as reward for child behaviour (Musher-Eizenman & Holub, 2007).
Overt control	The form of food control that can be detected by the child (Ogden, Reynolds, & Smith, 2006).
Covert control	The form of food control that cannot be detected by the child (Ogden, Reynolds, & Smith, 2006).

between parental control, food neophobia and fruit and vegetable consumption. Third, the cross sectional nature of the data was not able to examine the causality relationship between parental feeding practices and food neophobia. Therefore, more generalized population, higher sensitivity of instrument and longitudinal study should be considered for future studies.

In a recent cross-sectional study conducted by Moroshko and Brennan (2013), 90 mothers of children aged two to five years in Melbourne, Australia were recruited from child-care centers, maternal websites and forums, online newsletters and university notice boards. The objective of this study was to examine the relationship between maternal controlling feeding behaviours and child eating behaviours. There were a total of three maternal feeding practices related subscales assessed in this study, which included authoritarian feeding subscale, pressure to eat subscale and restriction subscale. All of these three subscales were assessed in a separate manner. Food neophobia was included as one of the child eating behaviours assessed in this study. Besides using Pearson's correlations to examine the relationships between maternal feeding practices and child eating behaviour, standard multiple regression analysis was used to test feeding practices as a predictor of child's eating patterns. Results showed that authoritarian feeding, pressure to eat, and restriction were significantly correlated with child neophobia. Despite of this statistically significant correlates, the controlling strategies only accounted for a relatively small proportion of variance (adjusted $R^2 = 12.6\%$). Thus, it is suggested that there were other maternal feeding practices factors that may associated or involved in food neophobia, such as environment, encourage balance and variety, monitoring, modelling and involvement factors, which were measured in a study by Musher-Eizenman and

Holub (2007). Thus, it is recommended to consider these factors in future studies. The limitations of this study were underscored which were the under-represented population, lack of sensitivity instrument and cross-sectional nature of the data.

In a cross-sectional study conducted by Brown, Ogden, Vogele, and Gibson (2008), the authors attempted to examine the role of aspects of parental practices on a range of dietary behaviours including intake of fruit and vegetable and food neophobia. A total of 510 parents with children aged four to seven years from 18 primary schools across the South of England completed the survey. Assessments included child's diet and parental control practices. In terms of parental control practices, this study measured meal overt control, snack overt control, meal covert control, snack covert control and pressure to eat. This study found that both meal and snack overt control were positively associated with children's fruit and vegetable consumption. In the meantime, meal covert control was negatively associated with children's food neophobia and pressure to eat was positively associated with children's food neophobia. The findings from this study supported the analysis in Ogden, Reynolds, and Smith (2006) study in which the contradictory findings on the association between parental control practices and dietary behaviours may reflect the complex nature of parental control with some forms of control having beneficial effects whilst others may be detrimental. In spite of this, the limitations of this study were the cross-sectional nature of data and self-reported behaviours. Thus, it is recommended that a longitudinal study should be considered in future study in order to examine the causality relationship between parental control practices and food neophobia.

Tan and Holub (2012) hypothesized that children's food neophobia would positively correlated with controlling feeding practices, but negatively correlated with autonomy promoting feeding practices. A total of 85 mothers of children aged three to twelve years completed the cross sectional questionnaire online about food neophobia and maternal feeding practices. In term of maternal feeding practices, , this study measured controlling feeding practices, which included pressure subscale, restriction for health subscale, restriction for weight subscale; autonomy promoting feeding practices which included environment subscale, encourage balance and variety subscale, teaching about nutrition subscale, monitoring subscale, modelling subscale, involvement subscale, child control subscale; and using food for non-nutritive purposes feeding practices which included emotional regulation subscale, and food as a reward subscale. In term of controlling feeding practices, unlike the study of Wardle, Carnell, and Cooke (2005) which did not distinguish between pressure and restriction, this study measured pressure, restriction for health and restriction for weight in three different subscales. The findings from this study showed that, restriction for health was positively correlated with, but environment and monitoring practices were negatively correlated with children's food neophobia. As a result, it was concluded that only some of the pressure and autonomy promoting feeding practices, but not using food for non-nutritive purposes feeding practices were associated children's food neophobia. Since this study was the first study which utilized multiple aspects of maternal feeding practices in examining the associations between maternal feeding practices and children's food neophobia, thus, future research should be conducted in order to explain the non-significant findings from this study.

In a cross-sectional study by Coulthard and Blissett (2009), 73 children aged two to five years attending nurseries in the South Birmingham area, United Kingdom were recruited. It was hypothesized that high levels of parental control would negatively associates with child's fruit and vegetable consumption. The parental control feeding practices assessed in this study were restriction and pressure to eat. Results showed that only restriction feeding practices was significantly and negatively associated with child's fruit and vegetable consumption. This result supported the previous hypothesis. In spite of this, this study had a number of limitations. First, this study was a cross-sectional and preliminary study which did not allow the examination of causality relationship between parental control feeding practices and child's fruit and vegetable consumption. Second, the sample size was small and the results may not able to generalize to the whole population of children. Third, this study relied on parental report on child's fruit and vegetable consumption and parental control feeding practices. The design of this study, relying on parents to complete and return the questionnaire, possibly biased the sample in favour of the mothers who were interested in healthy eating. However, this study was conducted among children aged 2 to 5 years old. Thus, it was a difficult task if the children were required to fill the questionnaire by themselves. Therefore, a larger sample size and longitudinal study should be conducted to examine the association between parental control feeding practices and child's fruit and vegetable consumption.

Second topic of attachment in relation to maternal feeding practices of children is addressed by a comparison study among three groups of mother with

different education level, which were low, middle and high education levels. In a study by Vereecken, Keukelier, and Maes (2004), it was hypothesized that children of mothers with lower education level would consume less fruit and vegetable consumption than children of mothers with higher education level. Second hypothesis was that mothers of different education level would use different food parenting practices. Third hypothesis was parenting practices would predict the consumption of fruit and vegetable. A total of 316 mothers of children aged 2.5 to 7 years completed a self-administered questionnaire. The parenting practices assessed in this study included permissiveness, pressure, material reward, verbal praise, negotiation encourage through rationale, discouragement through rationale, catering on children's demands, and avoiding negative modelling. Results showed that there was a significant difference in the consumption of fruit and vegetable between the three groups whereby the children of mother with high education level reported higher fruit and vegetable consumption than children of mother with low education level. There were also significant differences in the food parenting practices between the three groups, whereby mothers with high education level were less permissive, praised their children more often for the consumption of fruit and vegetable, and abstained themselves from sweets in front the presence of their children more often than mothers with low education level. Besides, spearman's correlations analysis found that verbal praise, encouragement fruit, and restrain from negative modelling parenting practices were positively correlated with fruit consumption. On the other hand, permissiveness, catering on demand parenting practices were found to be negatively correlated with vegetable consumption but verbal praise and negotiation parenting practices were positively correlated with vegetable consumption. In spite

of this, the study of Vereecken, Keukelier, and Maes (2004) was limited by self-reported bias and cross-sectional nature of data.

The next topic of attachment is addressed by comparing maternal feeding practices in two different aspects, which are parent-centered and child-centered feeding practices. Vereecken, Rovner, and Maes (2010) hypothesized that more adaptive feeding practices (less parent-centered and more child-centered) would be associated with higher consumption of fruit and vegetable. A total of 755 parents of preschoolers in Belgium Flanders completed questionnaire including child's fruit and vegetable food frequency questionnaire and specific food parenting practices. The assessment of parental feeding practices in this study described verbal and physical feeding strategies used by parents and consequently categorized into more parent-centered or more child-centered dimensions. Findings showed that parent-centered feeding practices was negatively associated with children's vegetable consumption, whereas child-centered feeding practices was positively associated with children's vegetable consumption. The strength of this study were clearly shown by its relatively large sample size and the used of validated questionnaire. However, there were some limitations noted. First, a brief food frequency questionnaire (FFQ) was used to estimate fruit and vegetable consumption in this study. The FFQ tend to overestimate the vegetable intake. Second, the higher mother's education level in this study might cause the result could not be generalized to general population. Third, the cross-sectional nature of the data did not able to make the conclusions about causality in parental feeding practices and children's fruit and vegetable consumption. Thus it is recommended to consider dietary recall or food record and a longitudinal design study for future research.

Galloway, Fiorito, Lee, and Birch (2006) attempted to investigate the relationship between mother's use of pressure in the feeding domain and daughter's dietary intake. A total of 173 non-Hispanic white girls aged seven years involved in this longitudinal study. This study followed the participants for 2 years, in which maternal pressure to eat was measured when the girls were 7 years old while the girls' dietary intake were assessed when they were 9 years old. Pressure-to-eat was the only measurement for maternal feeding practices in this study. In term of daughter's dietary intake, fruit and vegetable consumption was assessed. Results found that children who were pressured to eat more consumed fewer fruit and vegetable. The finding of this study concluded that the relationship between maternal use of pressure to eat when girls were 7 years old and girls' picky eating at age 9 years old provided strong evidence that the use of parental pressure in feeding practices may lower the fruit and vegetable consumption in girls. Despite of this, this study used 'picky eating' as the linkage between maternal feeding practices and daughters' fruit and vegetable consumption. It is recommended to use food neophobia as the linkage in future study since feeding problem has been more consistently related to refusal of food and has been differentiated from picky eating as having genetic, rather than environmental causes (Galloway, Fiorita, Lee, & Birch, 2006).

In summary, the results from these literature reviews on the association between maternal feeding practices with food neophobia and fruit and vegetable consumption among preschoolers showed that there are contradictory findings on the associations. The major reason for this contradictory finding might be due to the complex nature of parental control, in which some practices demonstrate beneficial effect whilst others may demonstrate detrimental effect. Thus, it is recommended to

measure maternal feeding practices in multiple aspects which include both the beneficial and detrimental feeding practices in future studies.

Infant Feeding Practices and Food Neophobia

Adopting healthy infant feeding practices have been highlighted as one of the milestone in the Malaysian Dietary Guidelines for Children and Adolescents (NCCFN, 2013). Mothers are recommended to practice exclusive breastfeeding from birth until 6 months and continue to breastfeed until 2 years of age. Besides, appropriate complementary food should be given to children between age of 6 months to 2 years (NCCFN, 2013).

A population-based cross-sectional study was conducted by Russell and Worsley (2008) hypothesized that food neophobia would be lower in breast-fed children. The authors recruited Australian children from child-care centers, kindergardens, playgrounds, day nurseries and swimming centers through convenient sampling. A total of 700 questionnaires were distributed to the parents of the chidren and only 405 questionnaires were returned. Out of the 405 returned questionnaires, there were only 371 were usable, representing a response rate of 53%. A self-administered questionnaire was answered by parents to assess the children's characteristics, which included child's sex, age, and infant feeding practices. In term of infant feeding practices, the children were assessed in whether or not they were breast-fed or formula-fed. One way ANOVA test was carried out to analyse the differences between child's characteristics with food neophobia. Results showed that there was no significant difference in food neophobia with the history of being

breast-fed. The authors explained this non-significance finding with the limitation in the measurement of breastfeeding history in which there was no question on duration of breastfeeding. Despite of this limitation, this population-based study enables the examination of large sample which resemble a more generalized population. Thus, it is recommended to include a more detailed questionnaire in assessing infant feeding practices in future studies.

The next topic of attachment of food neophobia in relation to infant feeding practices is addressed by Shim, Kim, and Mathai (2011) study which attempt to overcome the limitation of Russell and Worsley (2008) study by utilize a detailed questionnaire on infant feeding practices. This cross-sectional baseline study investigated the associations between infant-feeding practices and picky eating behaviours in preschool-aged children. A total of 204 primary caregivers of preschool-aged children from Illinois, United States completed a self-administered survey. The authors hypothesized that 6 months of exclusive breastfeeding and delaying in the introduction of complementary foods until 6 months of age could have a positive influence on food acceptance among preschool-aged children. Food neophobia was assessed as one of the variable for picky eating. In term of infant feeding practices, unlike the Russell and Worsley (2008) study, this study assessed not only the adoption of breastfeed practices or formula-fed practices, but also assessed the intensity and duration of breastfeeding, as well as timing of the introduction of complementary foods. Results showed a controversial finding with the study of Russell and Worsley (2008). In this study, it showed that exclusive breastfeeding during the first 6 months had lowered the odd ratio of food neophobia by 75%. Besides, it was found that introduction of complementary foods before 6

months of age engaged the children to 2.5 times more likely to exhibit food neophobia than their counterparts. However, this study found that breastfeeding initiation showed only a statistically insignificant tendency of risk reduction in the development of food neophobia behaviours among preschoolers. As a result, it was concluded that infant feeding practices was associated with food neophobia among preschool-aged children. In spite of this, this study had some limitations related to the measurement of infant feeding practices, in which, the infant feeding practices were self-reported and measured retrospective which cost a heavy burden on parent's memory to recall. Besides, this study used only one simple question in assessing the food neophobia behaviour of the children. Thus, a longitudinal study which follows the respondents from his birth until preschool-age and inclusion of validated questionnaire should be considered in future studies.

Infant Feeding Practices and Fruit and Vegetable Consumption

Valmorbida and Vitolo (2014) conducted a cohort study nested in a randomized field trial. The authors attempted to investigate factors associated with low consumption of fruit and vegetable among preschoolers from families treated at basic health centers in Brazil. The sample of this study consisted of 201 children, which had been followed for 3 years. During 6 to 9 months after the live birth, data related to exclusive breastfeeding were obtained. Fruit and vegetable consumption data were obtained twice when the participants aged 12 to 16 months for the first time and 2 to 3 years for the second times. The findings from this study found that there was no significant association between time of exclusive breastfeeding with fruit and vegetable consumption. The authors explained the insignificant finding in

this study with limitation of study. The study population in this study was from low socioeconomic level, thus resulted a lower prevalence of adopting exclusive breastfeeding among the mothers.

In a longitudinal study by Scott, Chih, and Oddy (2012), the longitudinal relationships between breastfeeding duration with food variety were investigated. The samples consisted of 2804 women who had live births, and the children continued to be followed up at regular intervals for 2 years following the live birth. A diary was given to the mothers to record various infant events including the time that breastfeeding ceased. Mothers had to complete a 24-hour food recall of their child's food and beverage intake when their child reached two years of age. In this study, infant feeding practices was assessed in term of breastfeeding duration. Fruit and vegetable variety score (CFVS) was calculated. Results showed that breastfeeding duration was positively associated with children's fruit and vegetable consumption. As a result, it was concluded that infant feeding practices had an impact in a child's future eating pattern.

From the literature review above, it can be observed that most of the studies on the relationship between infant feeding practices and fruit and vegetable consumption was in the mode of longitudinal study. According to the previous studies (Mannino, Lee, Mitchell,Smiciklas-Wright,& Birch, 2004; Nicklas, Webber,& Berenson, 1991; Nicklaus, Boggio, Chabanet, & Issanchou, 2005), food preferences and eating habits were formed in early of life and have been shown to track into later childhood. However, most of the longitudinal studies conducted followed only the children until 2 or 3 years old, thus, it is important to conduct a

study to investigate the relationship between infant feeding practices with fruit and vegetable consumption among preschoolers in order to understand the effect of infant feeding practices in future life.

In summary, the results from these literature reviews on the association between infant feeding practices with food neophobia and fruit and vegetable consumption among preschoolers showed that there are contradictory findings on the associations. The major reason for this contradictory finding might be due to the limitation in the measurement of breastfeeding history. Thus, it is recommended to measure infant feeding practices with a more detailed questionnaire in future studies, which included the information on breastfeeding initiation, breastfeeding, exclusive breastfeeding, and introduction of complementary food.

Summary

By taking all the results from previous studies, it was hypothesized that preschoolers may be at risk of food neophobia and inadequate fruit and vegetable consumption. Some of the factors such as personal factors, maternal feeding practices and infant feeding practices were correlated with both food neophobia and fruit and vegetable consumption. Large sample of preschoolers should be recruited so that the results can be generalized to the entire population of preschoolers. Besides, longitudinal studies should be considered to examine the causality relationship of associated factors with food neophobia and fruit and vegetable consumption. In addition, a standardized operational outcome variable should be considered for the measurement of fruit and vegetable consumption and maternal

feeding practicing in future studies. Moreover, there was lack of study on food neophobia and fruit and vegetable consumption among preschoolers in Malaysia. Thus, more local researches are needed to examine food neophobia, fruit and vegetable consumption and their associated factors among preschoolers.

CHAPTER 3

METHODOLOGY

Study Design

This was a cross-sectional study aimed to determine the association between food neophobia and fruit and vegetable consumption and their associations with personal factors, body weight status, maternal feeding practices, and infant feeding practices among preschoolers in Kuantan.

Study Location

This study was conducted in selected preschools in the city of Kuantan, Pahang. Pahang is located in the east of Peninsular Malaysia and bounded by Kelantan in the north, Perak, Selangor and Negeri Sembilan in the West, Johor in the south and Terengganu and South China Sea in the east (Department of Statistics Malaysia, 2014). Kuantan is a state capital of Pahang and situated on the east of Peninsular Malaysia and is located 250 km away from the federal capital of Kuala Lumpur. Kuantan District, of which the city is a part, covers an area of 2, 967 square

kilometres (Asian Urban Information Center of Kobe, 2005) with a total population of 443, 796 people, which is 30.8% of the total Pahang's population in the year of 2010 (Department of Statistics Malaysia, 2010).

Tabika Perpaduan (Taman Bimbingan Kanak-kanak) has been chosen as the study location. *Tabika Perpaduan* was first introduced in 1967 under *Rancangan Perhubungan Masyarakat* and established in urban and suburban areas. It is implemented to provide early education for preschoolers aged 4-6 years. There are a total of 126 *tabika perpaduan* in Pahang in which the majority of the preschoolers are Malay (85.0%), followed by Indian (7.1%), Chinese (6.9%), and other indigenous (1.0%) (Department of National Unity and Integration, 2004).

Sample Size Determination

Since this was a cross-sectional study the minimum sample size needed in this study was determined based on the following formula (Cole, 1997):

$$n = \frac{\left(Z_{1-\alpha/2} + Z_{1-\beta}\right)^2}{d^2/(1-d^2)} + 5$$

Where,

$Z_{1-\alpha/2}$ = significance level at 5% (1.96)

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

d = correlation between associated factors with food neophobia and fruit and vegetable consumption from a previous study

According to a cross-sectional study done by Gregory, Paxton, and Brozovic (2011), correlation between pressure to eat with vegetable consumption and fruit consumption among young children in Australia was -0.23 and 0.33 respectively. The average of both sample size calculated using two different correlation values above was obtained.

Using d = -0.23 (correlation between pressure to eat and vegetable consumption),

$$n_1 = \frac{(1.96 + 1.28)^2}{(-0.23)^2 / 1 - (-0.23)^2} + 5$$

$$= 192.9$$

$$\approx 193$$

Using d = 0.33 (correlation between pressure to eat and fruit consumption),

$$n_2 = \frac{(1.96 + 1.28)^2}{(0.33)^2 / 1 - (0.33)^2} + 5$$

$$= 90.90$$

$$\approx 91$$

By taking the average value of n_1 and n_2,

$$n_{average} = (193 + 91) / 2$$

$$= 142$$

According to a study conducted in Malaysia which utilized food record in recording the food intake of preschoolers, the response rate was 64.4%, which showed a low response rate (Adnan & Muniandy, 2012). Since a 3-day unweighed food record was used in this study to assess fruit and vegetable consumption among preschoolers, thus a 40% non-response rate of the respondents was considered. Therefore, the sample size needed in the current study was increased to a minimum of **199 respondents**.

Sampling Design

As shown in Figure 3.1, clustered sampling was used in this study. Kuantan district council administration area is divided into six subdivisions, which are Sungai Karang, Berserah, Kuala Kuantan, Penor, Ulu Lepar and Ulu Kuantan. There are a total of 42 preschools (*Tabika Perpaduan)* in Kuantan District. Simple random sampling was used to select two subdivisons (Ulu Kuantan and Berserah) from the six subdivisions. All of the 13 *Tabika Perpaduan* in these two subdivisions were included in this study. All preschoolers in the *Tabika Perpaduan* were invited to participate.

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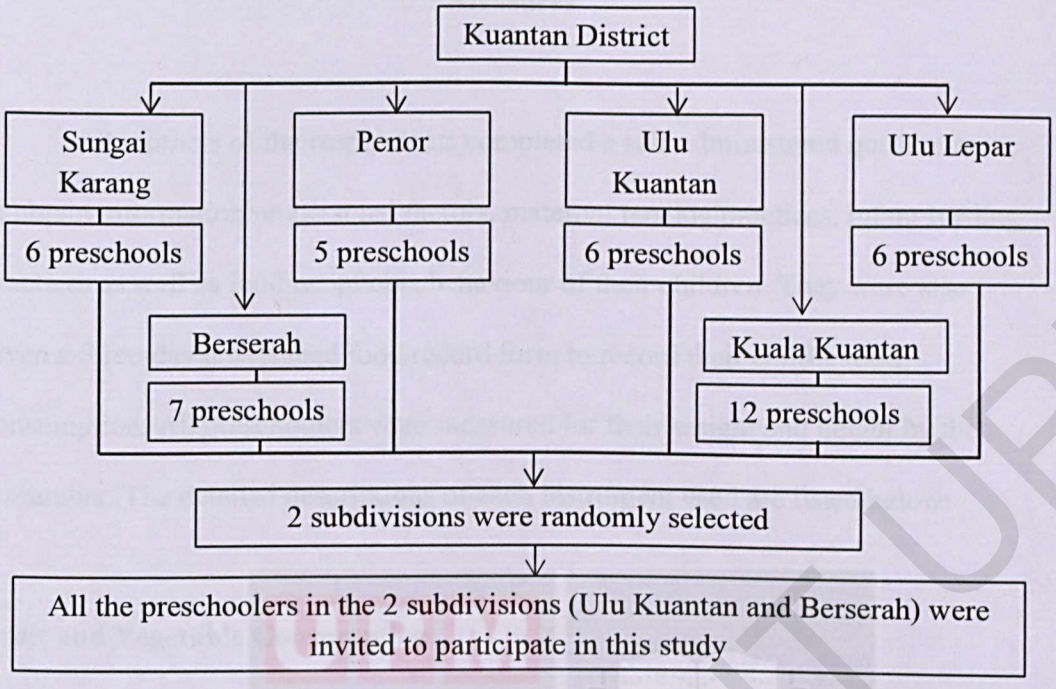

Figure 3.1: Flow chart of sampling design and selection of respondents

Respondents

Respondents of this study were preschoolers in *Tabika Perpaduan* at Kuantan who met the following inclusion and exclusion criteria with their mothers or caregivers:

The inclusion criteria:

a) Malaysian boy or girl

b) Preschoolers aged 4 to 6 years

c) Preschoolers living with biological mother

d) Absence of severe food allergies or chronic medical problems affecting food intake, especially fruit and vegetable

The exclusion criteria:

a) Vegetarian

Measures

All mothers of the respondents completed a self-administered questionnaire to obtain information on personal factors, maternal feeding practices, infant feeding practices as well as food neophobia behaviour of their children. They were also given a three-day unweighed food record form to record their child's food consumption. All preschoolers were measured for their weight and height by the researcher. The detailed descriptions of each instrument used are listed below:

Fruit and Vegetable Consumption

Fruit and vegetable consumption among preschoolers were assessed in two aspects, which were frequency of intake and amount of intake using a self-administered questionnaire and a 3-day unweighted food record respectively:

a) Self-administered questionnaire

The frequency of fruit and vegetable consumption among preschoolers was measured using a likert type scale, which has been used in other studies (Coulthard & Blissett, 2009; Wardle, Carnell, & Cooke, 2005), and has been validated against 4-day food diaries (Bingham et al., 1994). Mothers or caregivers of the preschoolers were asked to rate how often, in a typical week; their children ate fruit and vegetable. There was a total of 7-item response scale (1= never, 2= 1 to 3 times during the past 7 days, 3= 4 to 6 times during the past 7 days, 4= 1 time per day, 5= 2 times per day, 6= 3 times per day, 7= 4 or more times per day).

b) 3-day unweighed food record

A 3-day unweighed food record (Marr, 1971) was used to measure the preschoolers' fruit and vegetable consumption in this study. Food record has been used widely in recording daily dietary intake. This can be evidenced by a previous study in United Kingdom, whereby food record was used in assessing eating context and fruit and vegetable consumption among children (Mak et al., 2012). Meanwhile, in two previous studies conducted in Malaysia, food record has been used to measure dietary fiber intake among Malaysians (Ng et al., 2010) and preschoolers (Adnan & Muniandy, 2012).

Mothers were given instruction to record all food and beverages consumed by the participating child in and out of the home over three separate days – 2 weekdays and one weekend using unweighed food record. Food intake for each day was divided into six different meals, namely breakfast, morning tea, lunch, afternoon tea, dinner, and supper. Detailed descriptions of all foods and beverages including brand names and the preparation method were recorded. For composite dishes, the amount of each ingredient in the recipe and the amount consumed by the respondents were recorded. The amount of fruit and vegetable, whether in raw or cooked forms, in single or mixed dish was calculated. Examples of one serving of fruit and vegetable stated in the Malaysian Dietary Guidelines for Children and Adolescents (NCCFN, 2013) were as follows: (1) one cup of raw *ulam*; (2) half cup of cooked fruit vegetable such as tomatoes and carrots; (3) half cup of dark green leafy-vegetable (4) one medium size piece of fruit such as orange, banana, and apple; (5) 2 whole *Banana emas*; (6) 3 *ulas* Durian; (7) 8

small grapes; (8) 1/2 whole guava or pear; (9) 1 slice of papaya or pineapple or watermelon; (10) 4 small prunes; (11) 1 dessert spoon of Raisins. Fruit and vegetable consumption in the present study were measured in three different aspects, which are (1) fruit consumption, (2) vegetable consumption, and (3) total fruit and vegetable consumption. Table 3.1 shows the criteria of categorization of adequate and inadequate consumption of fruit and vegetable in 3 different aspects according to guidelines stated in NCCFN (2013).

Table 3.1: Criteria of categorization of adequate and inadequate consumption of fruit and vegetable

Aspects	Adequate consumption	Inadequate consumption
Fruit consumption	Consumed at least 2 servings of fruit	Consumed less than 2 servings of fruit
Vegetable consumption	Consumed at least 2 servings of vegetable	Consumed less than 2 servings of fruit
Total fruit and vegetable consumption	Consumed at least 4 servings of fruit and vegetable	Consumed less than 4 servings of fruit and vegetable

Child Food Neophobia

The Child Food Neophobia Scale (CFNS) was used to assess food neophobia behaviour of the preschoolers in this study based on maternal reports (Pliner, 1994). It measured the children's willingness to try novel foods in which the scores are highly correlated with behavioral measure of neophobia (Pliner, 1994). It consisted of 10 items with a 7-point rating scale (1= agree extremely, 2=agree, 3= agree slightly, 4= neutral, 5= disagree slightly, 6= disagree, 7= disagree extremely). For a negative answer question, the subscales were rated with reverse scoring method (1= disagree extremely, 2= disagree moderately, 3= disagree slightly, 4= neither agree nor disagree, 5= agree slightly, 6= agree moderately, 7= agree). The score for each item was then summed up giving the total scores ranging from 10 to 70.

The study sample were categorized into three groups, namely neophobic, average, and neophillic. Food neophobia is defined as children who are unwilling to try new foods and is indicated by a scoring greater than 1.0 standard deviation above the mean. On the other hand, children with average willingness to try new food are categorized as average with the indication of scoring within 1.0 standard deviation below the mean. Food neophillic is defined as children who are very willing to try new food and is indicated by a scoring greater than 1.0 standard deviation below the mean of the study sample (Falcigia, Gribble, Pabst, & Frank, 2000). The validated Malay version of CFNS (Zalilah, Khor, Mirnalini, & Sarina, 2005) was used in this study.

Body Weight Status

Body weight and height were measured by the researcher to determine body mass index (BMI) of the preschoolers. The body weight and height were measured by using a TANITA Digital Balance HD312 (Tanita Corp, Japan) and a SECA Mechanical Measuring Tape (SECA 206, Germanay), respectively. All anthropometric measurements were taken twice and for each measurement, the mean value was used in the analyses. The BMI was calculated by using the formula BMI = weight (kg)/ height^2 (m). The z-score for Body Mass Index for age (BMI-for-age), weight-for-age, and height-for age were used to determine body weight status of the preschoolers. Two classifications were used in this study. Table 3.2 shows the classification of anthropometric indicators based on WHO (2006) and WHO (2007).

Table 3.2: Classification of anthropometric indicators

Z-score	Anthropometric Indicators			
	Weight-for-age	Height-for-age	BMI-for-age[a]	BMI-for-age[b]
< - 3SD	Severely underweight	Severely stunted	Severely thinness	Severely wasted
≥ -3SD to < -2SD	Underweight	Stunted	Wasted	Thinness
≥ -2SD to < -1SD	Normal	Normal	Normal	Normal
≥ -1SD to ≤ 2SD	Not underweight		Possible risk of overweight	Overweight
> 2SD to ≤ 3SD			Overweight	Obese
> 3SD		Not stunted	Severely overweight	Severely obese

[a] Applicable for preschoolers aged 5 years 0 month and below (WHO, 2006)
[b] Applicable for preschoolers aged 5 years 1 month and above (WHO, 2007)

Personal Factors

Personal factors were divided into two parts, child factors and maternal factors and are assessed using a self-administered questionnaire. There were five items in the child factors which were date of birth, age, sex, ethnicity, and religion. Meanwhile, maternal factors which were included in this section were date of birth, age, ethnicity, religion, maternal age, monthly household income, maternal education level, maternal employment status, and occupation.

Maternal Feeding Practices

The Comprehensive Feeding Practices Questionnaire (CFPQ) was used to measure maternal feeding practices (Musher-Eizenman & Holub, 2007) in this study. It consisted of 49 items measuring 12 factors including different maternal feeding practices. The 12 factors consisted of three controlling subscales (pressure, restriction for health, and restriction for weight), seven autonomy promoting subscales (environment, encourage balance and variety, teaching about nutrition,

monitoring, modeling, involvement and child control), and two using food for non-nutritive purpose subscales (emotional regulation and food as a reward). The details of each subscale are listed in Table 3.3.

All items in the child control subscale, monitoring subscale and emotional regulation subscale were rated on a 5-point Likert scale (1= never, 2= rarely, 3= sometimes, 4= mostly, 5= always). The remaining subscales were rated on another 5-point Likert scale (1= disagree, 2= slightly disagree, 3= neutral, 4= slightly agree, 5= agree) for positive answer questions. For negative answer questions, the subscales were rated with reverse scoring method. The score for each item was then summed up giving a total scores ranging from 3 to 15 for teaching about nutrition subscale, involvement subscale, emotional regulation subscale and food as a reward subscale, respectively. Meanwhile, the total scores for pressure subscale, restriction for health subscale, environment subscale, encourage balance and variety subscale, monitoring subscale, and modelling subscale, ranged from 4 to 20. The restriction for weight control subscale had a total score ranging from 8 to 40, while, 5 to 25 for the child control subscale. Higher scores indicated greater adoption of these feeding practices. The validated Malay version of the CFPQ (Shamarina, Wong, & Zalilah, 2014) was used in this study.

Table 3.3: Description of 12 subscales in CFPQ

Feeding Practices	Subscales	Items	Measurement
Controlling	**Pressure**	4	Measures the extent of the mother pressure the child to consume more foods at meals.
	Restriction for health	4	Measures the extent of the mother control the child's food intake with the purpose of limiting less healthy foods and sweets.
	Restriction for weight control	8	Measures the extent of the mother control the child's food intake with the purpose of decreasing or maintaining the child's weight.
Autonomy promoting	**Environment**	4	Measures the extent of the mother make (un)healthy foods available in home.
	Encourage balance and variety	4	Measures the extent of the mother promote well-balanced food intake, including the consumption of varied foods and healthy food choices.
	Teaching about nutrition	3	Measures the extent of the mother use explicit didactic techniques to encourage the consumption of healthy foods.
	Monitoring	4	Measures the extent of the mother keep track of child's intake of less healthy foods.
	Modeling	4	Measures the extent of the mother actively demonstrate healthy eating for the child.
	Involvement	3	Measures the extent of the mother encourage child's involvement in meal planning and preparation.
	Child control	5	Measures the extent of mother allows the child to control his/her eating behaviours and parent-child.
Using food for non-nutritive purposed	**Emotional regulation**	3	Measure the extent of the mother use food to regulate child's emotional status.
	Food as a reward	3	Measure the extent of the mother use food as reward for child behaviour.

Infant Feeding Practices

In this section, mothers were asked to report the history of breastfeeding initiation, duration of breastfeeding, duration of exclusive breastfeeding and the timing of the introduction of complementary food (Shim, Kim, & Mathai, 2011). Multiple binary variables (yes or no) of these feeding practices were created according to the corresponding American Academy of Paediatrics (AAP) guidelines (Ketan & Ketan, 2005). These feeding practices included breastfeeding initiation, any breastfeeding (for 6 months), exclusive breastfeeding (for 3 months and for 6 months), and early introduction of any complementary foods except formula milk (before 6 months or before 4 months).

Pre-test

Pre-testing of the questionnaire was conducted in one of the non-selected *Tabika Perpaduan* among 10 preschoolers' mothers who met the selection criteria for this study. All of these preschoolers were not included in the sample of this study. The purpose of conducting this pre-testing was to test the appropriateness, ambiguity as well as the understanding of the mothers. The mothers took approximately 30 minutes to complete the questionnaire.

Procedures

Data collection was conducted from January to February 2015. Prior to the commencement of the study, ethnical clearance (see Appendix A) was sought from the *Jawatankuasa Etika Universiti untuk Penyelidikan Melibatkan Manusia* (JKEUPM) from University Putra Malaysia (UPM). The approval letter to conduct this study in the selected preschools was obtained from the Department of National Unity and Integration (see Appendix B) prior to data collection. After getting the approval letters, the person in charge of the preschools was approached in the first instance and the nature of this study was explained. Person in charge was then received information sheet (see Appendix C) and consent form (see Appendix D) from researcher and subsequently distributed to the mothers of the preschoolers. The consent form was then be returned to the preschool's person in charge and subsequently returned to the researcher prior to data collection. Respondents who were eligible and agreed to participate in this study were given a set of questionnaire (see Appendix E). The questionnaire were took back to home and answered by preschooler's mother and returned to the preschool's teacher after completing it. Following the completion of the questionnaire, weight and height of the preschoolers were measured by the researcher in the preschools. Upon study completion, each respondent received an incentive for their participation.

Statistical Analysis

The WHO Anthroplus software version 3.2.2 was used to measure the z-score for BMI-for-age, weight-for-age and height-for-age of the respondents. All data were analyzed using IBM SPSS Statistics 22.0 (SPSS Inc, Chicago USA). Descriptive statistics (mean, standard deviation and frequency) were presented for all variables. The Pearson's product moment correlation was used to determine the correlation between continuous variables. The chi-square test was used to examine the association between categorical variables. The level of statistical significance was set at $p < 0.05$.

CHAPTER 4

RESULTS AND DISCUSSION

Personal Background

All preschoolers (n= 319) aged 4 to 6 years from 13 selected *Tabika Perpaduan* in Kuala Kuantan, a subdivision in the district of Kuantan were invited to participate in this study. Participation in this study was voluntary and parents were requested to sign the consent forms if they agreed to participate on behalf of their children. The final sample consisted of 309 preschoolers. Of the 309 questionnaires returned, there were only 240 usable. The non-usable questionnaires were incomplete due to several food record related problems. Firstly, some of the mothers in the present study only achieved primary education and thus they did not possess the literacy skill to record their children's food consumption. Secondly, some of the working mothers were unable to complete the 3-day food record. Table 4.1 shows the personal background of respondents which consists of child's and mother's characteristics.

Table 4.1: Personal background of the respondents (n = 240)

Variables	n (%)	Mean ± SD
Child's characteristics		
Age (years)		5.11 ± 0.62
4 years old	6 (2.5)	
5 years old	79 (32.9)	
6 years old	155 (64.6)	
Sex		
Boy	137 (57.1)	
Girl	103 (42.9)	
Ethnicity		
Malay	236 (98.3)	
Indian	4 (1.7)	
Religion		
Islam	236 (98.3)	
Hindu	4 (1.7)	
Mother's characteristics		
Age (years)		34.00 ± 5.79
20 – 24	6 (2.5)	
25 – 29	52 (21.7)	
30 – 34	84 (35.0)	
≥ 35	98 (40.8)	
Ethnicity		
Malay	235 (97.9)	
Indian	4 (1.7)	
Others	1 (0.4)	
Religion		
Islam	236 (98.3)	
Hindu	4 (1.7)	
Maternal age (years)		28.36 ± 5.76
< 20	14 (5.8)	
20 – 24	51 (21.3)	
25 – 29	84 (35.0)	
30 – 34	54 (22.5)	
≥ 35	37 (15.4)	
Highest level of education		
Primary school	18 (7.5)	
Secondary school	173 (72.1)	
Tertiary education	49 (20.4)	
Employment status		
Employed	106 (44.2)	
Unemployed	134 (55.8)	

Table 4.1: Personal background of the respondents (n = 240) (*cont.*)

Variables	n (%)	Mean ± SD
Mother's characteristics		
Monthly household income		
≤ RM 500.00	9 (3.8)	
RM 500.01 – RM 1000.00	40 (16.7)	
RM 1000.01 – RM 3000.00	130 (54.2)	
RM 3000.01 – RM 5000.00	51 (21.3)	
RM 5000.01 – RM 7000.00	8 (3.3)	
> RM 7000.00	2 (0.8)	
Highest level of education		
Primary school	18 (7.5)	
Secondary school	173 (72.1)	
Tertiary education	49 (20.4)	
Employment status		
Employed	106 (44.2)	
Unemployed	134 (55.8)	

Child's Characteristics

As shown in Table 4.1, a total of 240 preschoolers (57.1% boys and 42.9% girls) participated in this study. The mean age of the respondents was 5.11 ± 0.62 years, ranging from 4 to 6 years, with majority aged 6 years (64.6%), followed by 5 years (32.9%) and 4 years (2.5%). Almost all of the respondents were Malay (98.3%) and the remaining were Indian (1.7%).

Mother's Characteristics

The mean age of mothers was 34 ± 5.79 years which ranged from 22 to 49 years. Majority of the mothers (40.8%) were in the age group of more than 35 years old. The mean maternal age was 28.36 ± 5.76 years, with about one third of the mothers (35%) who gave birth to their child when they were in the age group of 25 to 29 years.

A majority of the mothers (72.1%) completed secondary education, followed by tertiary education (7.5%) and primary education (7.5%). Less than half of the

mothers (44.2%) were employed. More than half of the respondents (54.2%) came from family with monthly household income ranged from RM1000.01 to RM3000.00.

Body Weight Status

Weight and height of the respondents were measured by the researcher in order to calculate the z-scores of BMI-for-age, weight-for-age, and height-for-age. By using the WHO classification (WHO, 2006; WHO, 2007), body weight status of the respondents was determined. The mean values for weight, height, body mass index (BMI), z-scores for BMI-for-age, weight-for-age and height-for-age by sex are shown in Table 4.2.

As shown in Table 4.2, the mean weight of the respondents was 17.72 ± 3.11 kg, in which boys (18.10 ± 3.27 kg) were heavier than girls (17.22 ± 2.82 kg). The mean height of the respondents was 107.63 ± 7.46 cm, in which boys (108.35 ± 7.21 cm) were taller than girls (106.67 ± 7.72 cm). The mean BMI of the respondents was 15.28 ± 1.92 kg/m^2.

The overall mean z-score of BMI-for-age was -0.20 ± 1.40SD. More than two third of the respondents (70.4%) had normal BMI-for-age with slightly more girls (70.9%) than boys (70.1%) were normal weight. However, there were 21 respondents (8.7%) who were classified as wasted or thinness. Out of these 21 respondents (8.7%), 11 of them were boys and 10 of them were girls. On the other

Table 4.2: Mean values and distribution of body weight, height, and z-scores for weight-for-age, height-for-age, and BMI-for-age of the respondents (n = 240)

Anthropometric measurements	Mean ± SD		
	Total (n=240)	Boys (n=137)	Girls (n=103)
Weight (kg)	17.72 ± 3.11	18.10 ± 3.27	17.22 ± 2.82
Height (cm)	107.63 ± 7.46	108.35 ± 7.21	106.67 ± 7.72
BMI (kg/m^2)	15.28 ± 1.92	15.35 ± 1.94	15.19 ± 1.91
BMI-for-age Z-score[a]	-0.02 ± 1.34	0.00 ± 1.38	-0.04 ± 1.30
BMI-for-age Z-score[b]	-0.20 ± 1.40	-0.14 ± 1.50	-0.27 ± 1.28
Severely wasted[c]/ severely thinness[d]	1 (0.4)	1 (0.7)	0 (0.0)
Wasted[c]/ thinness[d]	21 (8.7)	11 (8.0)	10 (9.7)
Normal	169 (70.4)	96 (70.1)	73 (70.9)
Possible risk of overweight[c]	16 (6.7)	11 (8.0)	5 (4.9)
Overweight	24 (10.1)	10 (7.3)	14 (13.6)
Obese	7 (2.9)	7 (5.1)	0 (0.0)
Severely obese[d]	2 (0.8)	1 (0.7)	1 (1.0)
Weight-for-age z-score	-0.45 ± 1.31	-0.32 ± 1.37	-0.63 ± 1.22
Severe underweight	5 (2.1)	3 (2.2)	2 (1.9)
Underweight	27 (11.3)	14 (10.2)	13 (12.6)
Normal	169 (70.4)	93 (67.9)	76 (73.8)
Not underweight	39 (16.3)	27 (19.7)	12 (11.7)
Height-for-age z-score	-0.56 ± 1.58	-0.40 ± 1.53	-0.79 ± 1.63
Severely stunted	12 (5)	5 (3.6)	7 (6.8)
Stunted	28 (11.7)	13 (9.5)	15 (14.6)
Normal	199 (82.9)	118 (86.1)	81 (78.6)
Not stunted	1 (0.4)	1 (0.7)	0 (0.0)

[a] Preschoolers aged 5 years 0 month and below (total, n = 91; boys, n = 53 ; girls, n = 38).
[b] Preschoolers aged 5 years 1 month and above (total, n = 149; boys, n = 84 ; girls, n = 65).
[c] Term used for children aged 5 years 0 month and below.
[d] Term used for children aged above 5 years.

hand, some of the respondents were identified as overweight (10.1%), possible risk of overweight (6.7%), obese (2.9%), and severely obese (0.8%). Parents should pay more attention on the dietary intake of this group of respondents as childhood obesity may track into adulthood.

The overall mean z-score of weight-for-age was -0.45 ± 1.31SD. Low weight-for-age is an indicator for underweight (WHO, 2006). More than two third of the respondents (70.4%) had a normal weight-for-age with slightly more girls (70.8%) than boys (67.9%) were normal. However, there were 27 respondents (11.3%) categorized as underweight with slightly more girls (12.6%) than boys (10.2%) were underweight. The nutritional status of respondents who were underweight should be given more attention by their parents as an underweight condition may be due to either wasting or stunting or a combination of both conditions.

The overall mean z-score of height-for-age was -0.56 ± 1.58SD. Low height-for-age is an indicator for stunting (WHO, 2006). A total of 82.9% of the respondents had normal height-for-age with slightly more boys (86.1%) than girls (78.6%) who were normal. However, about one in ten of the respondents (11.7%) were identified as stunted. Out of these 28 preschoolers who were stunted, 15 of them were girls and 13 of them were boys. They should be given more attention by their parents as stunting may be irreversible by two years of age.

A cross-sectional study conducted by Mohd Nasir et al. (2012) among 1933 preschoolers aged 4 to 6 years old in Peninsular Malaysia found that the prevalence of wasting, stunting and underweight were 3.5%, 7.8%, and 7.1% respectively in which the prevalence of undernutrition was lower than in the present study. Besides, the prevalence of possible risk of overweight (3.9%) and overweight (7.9%) reported by Mohd Nasir et al. (2012) were also lower than the prevalence reported in the present study. This may be due to the difference of the coverage of these two studies. This study was conducted only among preschoolers in Kuantan, however the study

conducted by Mohd. Nasir et al. (2012) was conducted among preschoolers in Peninsular Malaysia which originated from various rural, sub-urban and urban areas and thus producing a more generalized result.

Besides, the prevalence of undernutrition of the present study also shows disparity with the finding reported by Khor et al. (2009) which reported on the nutritional status of children aged 0 to 59.9 months based on the Third National Health and Morbidity Survey (NHMS III). According to Khor et al.'s (2009), the national prevalence of underweight, stunting, and thinness were 12.9%, 17.2% and 14.9% respectively. The lower prevalence of undernutrition reported in the present study when compared with the national study conducted by Khor et al. (2009) was suggested to be due to the different study locations. The present study was conducted in Kuantan which is considered as a developing city, while Khor et al. study included both Sabah and Sarawak, thus having a larger proportion of children from rural areas. According to a local study conducted by Khambalia, Lim, Gill, and Bulgiba (2012), children in rural areas were more likely to be undernourished than urban area children.

On the other hand, Khor et al. (2009) reported that the national prevalence of overweight among children below 5 years was 5.3% and 3.6% of the children were at risk of overweight. The prevalence of overweight and at risk of overweight reported in the present study shows a higher prevalence as compared to that of Khor et al.'s (2009) study. As a majority of the respondents in the present study (98.3%) were Malay, this may explain the high prevalence of obesity in the present study because Malay children had been reported to have the highest prevalence of obesity

among the three major ethnic groups in Malaysia in a local study conducted by Ghazali et al. (2006).

Maternal Feeding Practices

Maternal feeding practices were determined by using the Comprehensive Feeding Practices Questionnaire (CFPQ; Musher-Eizenman & Holub, 2007). There were a total of 12 subscales including child control, emotional regulation, encourage balance and variety, involvement, environment, pressure, restriction for health, restriction for weight control, teaching about nutrition, modelling, monitoring and lastly food as a reward. Each subscale has different minimum and maximum scores, with higher scores indicating greater adoption of the particular practices. Maternal feeding practices by each statement are illustrated in Table 4.3.

Monitoring Subscale

Monitoring subscale was used to measure the extent to which the mother in keeping track of her child's intake of less healthy foods. It was found that majority of the mothers reported that they would "mostly" monitor their childen's consumption of snack foods (43.3%), sweets (41.3%), sugary drinks (37.5%), and high fat foods (35.0%). Meanwhile, only a few mothers reported that they "never" monitor their children's consumption of these less healthy foods. Thus, it can be concluded that the extend of monitoring the children's consumption of less healthy foods was moderately high among the mothers of the respondents in the present study. This is probably due to the reason of high preference for foods with higher energy density such as fatty foods and sugar-sweetened beverages among children.

Table 4.3: Distribution of the respondents by each item in CFPQ (n = 240)

Items	n (%)				
	Never	Rarely	Sometimes	Mostly	Always
Monitoring subscale					
How much do you keep track of the sweets (candy, ice cream, cake, pies, pastries) that your child eats?	4 (1.7)	17 (7.1)	69 (28.8)	99 (41.3)	51 (21.3)
How much do you keep tract of the snack food (potato chips, Twisties, Mamee) that your child eats?	3 (1.3)	22 (9.2)	59 (24.6)	104 (43.3)	52 (21.7)
How much do you keep track of the high fat foods that your child eats?	6 (2.5)	28 (11.7)	79 (32.9)	84 (35.0)	43 (17.9)
How much do you keep track of the sugary drinks (carbonated drinks, syrup, milk shake) this child drinks?	7 (2.9)	26 (10.8)	48 (20.0)	90 (37.5)	69 (28.8)
Mean ± SD	14.81 ± 3.112				
Range	4 – 20				
Child control subscale					
Do you let your child eat whatever s/he wants?	24 (10)	70 (29.2)	97 (40.4)	39 (16.3)	10 (4.2)
At dinner, do you let this child choose the foods s/he wants from what is served?	22 (9.2)	52 (21.7)	100 (41.7)	51 (21.3)	15 (6.3)
If this child does not like what is being served, do you make something else?	11 (4.6)	46 (19.2)	97 (40.4)	70 (29.2)	16 (6.7)
Do you allow this child to eat snacks whenever s/he wants?	3 (1.3)	51 (21.3)	121 (50.4)	58 (24.2)	7 (2.9)
Do you allow this child to leave the table when s/he is full, even if your family is not done eating?	12 (5.0)	36 (15.0)	82 (34.2)	84 (35.0)	26 (10.8)
Mean ± SD	15.21 ± 2.728				
Range	8 – 21				
Involvement subscale					
I involve my child in planning family meals.	5 (2.1)	16 (6.7)	53 (22.1)	80 (33.3)	86 (35.8)
I allow my child to help prepare family meals.	25 (10.4)	33 (13.8)	47 (19.6)	76 (31.7)	59 (24.6)
I encourage my child to participate in grocery shopping.	7 (2.9)	11 (4.6)	58 (24.2)	88 (36.7)	76 (31.7)
Mean ± SD	11.30 ± 2.029				
Range	3 – 15				

Table 4.3: Distribution of the respondents by each item in CFPQ (n = 240) (*cont.*)

Items	n (%)				
	Never	**Rarely**	**Sometimes**	**Mostly**	**Always**
Encourage balance and variety subscale					
Do you encourage this child to eat healthy foods before unhealthy ones?	5 (2.1)	13 (5.4)	40 (16.7)	83 (34.6)	99 (41.3)
Items	***n* (%)**				
	Disagree	**Slightly disagree**	**Neutral**	**Slightly agree**	**Agree**
I encourage my child to try new foods.	11 (4.6)	31 (12.9)	64 (26.7)	76 (31.7)	58 (24.2)
I tell my child that healthy food tastes good.	3 (1.3)	0 (0)	20 (8.3)	49 (20.4)	168 (70.0)
I encourage my child to eat a variety of foods.	9 (3.8)	20 (8.3)	40 (16.7)	55 (22.9)	116 (48.3)
Mean ± SD	16.28 ± 2.302				
Range	10 – 20				
Environment subscale					
Most of the food I keep in the house is healthy.	1 (0.4)	6 (2.5)	45 (18.8)	84 (35.0)	104 (43.3)
I keep a lot of snack food (potato chips, Twisties, Mamee) in my house. (R)[a]	73 (30.4)	87 (36.3)	49 (20.4)	27 (11.3)	4 (1.7)
A variety of healthy foods are available to my child at each meal served at home.	3 (1.3)	6 (2.5)	65 (27.1)	72 (30.0)	94 (39.2)
I keep a lot of sweets (candy, ice cream, cake, pies, pastries) in my house. (R)[a]	130 (54.2)	51 (21.3)	34 (14.2)	17 (7.1)	8 (3.3)
Mean ± SD	16.20 ± 2.184				
Range	11 – 20				
Teaching about nutrition subscale					
I discuss with my child why it's important to eat healthy foods.	0 (0)	24 (10.0)	49 (20.4)	80 (33.3)	87 (36.3)
I discuss with my child the nutritional value of foods.	8 (3.3)	18 (7.5)	77 (32.1)	54 (22.5)	83 (34.6)
I tell my child what to eat and what not to eat without explanation. (R)[a]	38 (15.8)	46 (19.2)	52 (21.7)	58 (24.2)	46 (19.2)
Mean ± SD	10.62 ± 1.956				
Range	7 – 15				

Table 4.3: Distribution of the respondents by each item in CFPQ (*n* = 240) (*cont.*)

Items	n (%)				
	Never	Rarely	Sometimes	Mostly	Always
Modelling subscale					
I model healthy eating for my child by eating healthy foods myself.	6 (2.5)	12 (5.0)	53 (22.1)	62 (25.8)	107 (44.6)
I try to eat healthy foods in front of my child, even if they are not my favourite.	10 (4.2)	18 (7.5)	50 (20.8)	73 (30.4)	89 (37.1)
I try to show enthusiasm about eating healthy foods.	1 (0.4)	9 (3.8)	25 (10.4)	53 (22.1)	152 (63.3)
I show my child how much I enjoy eating healthy foods.	3 (1.3)	2 (0.8)	27 (11.3)	62 (25.8)	146 (60.8)
Mean ± SD	16.82 ± 2.828				
Range	6 – 20				
Pressure subscale					
My child should always eat all of the food on his/her plate.	7 (2.9)	42 (17.5)	40 (16.7)	78 (32.5)	73 (30.4)
If my child says, "I'm not hungry," I try to get him/her to eat anyway.	44 (18.3)	60 (25.0)	44 (18.3)	37 (15.4)	55 (22.9)
If my child eats only a small helping, I try to get him/her to eat more.	37 (15.4)	26 (10.8)	56 (22.3)	57 (23.8)	64 (26.7)
When he/she says he/she is finished eating, I try to get my child to eat more (two more, etc.) bites of food.	67 (27.9)	52 (21.7)	39 (16.3)	42 (17.5)	40 (16.7)
Mean ± SD	12.78 ± 3.420				
Range	5 – 20				
Restriction for health subscale					
If I did not guide or regulate my child's eating, s/he would eat too much of his/her favourite foods.	12 (5.0)	21 (8.8)	31 (12.9)	54 (22.5)	122 (50.8)
If I did not guide or regulate my child's eating, s/he would eat too many junk foods.	24 (10.0)	19 (7.9)	23 (9.6)	76 (31.7)	98 (40.8)
I have to be sure that my child does not eat too much of his/her favourite foods.	3 (1.3)	14 (5.8)	36 (15.0)	68 (28.3)	119 (49.6)
I have to be sure that my child does not eat too many sweets (candy, ice cream, cake, or pastries).	6 (2.5)	8 (3.3)	20 (8.3)	52 (21.7)	154 (64.2)
Mean ± SD	16.52 ± 2.594				
Range	8 – 20				

Table 4.3: Distribution of the respondents by each item in CFPQ (n = 240) (*cont.*)

Items	n (%)				
	Never	Rarely	Sometimes	Mostly	Always
Restriction for weight control subscale					
I have to be sure that my child does not eat too many high-fat foods.	3 (1.3)	12 (5.0)	45 (18.8)	46 (19.2)	134 (55.8)
I encourage my child to eat less so he/she won't get fat.	19 (7.9)	30 (12.5)	49 (20.4)	52 (21.7)	90 (37.5)
I give my child small helpings at meals to control his/her weight.	61 (25.4)	68 (28.3)	48 (20.0)	37 (15.4)	26 (10.8)
If my child eats more than usual at one meal, I try to restrict his/her eating at the next meal.	22 (9.2)	27 (11.3)	55 (22.9)	68 (28.3)	68 (28.3)
I restrict the food my child eats that might make him/her fat.	22 (9.2)	27 (11.3)	43 (17.9)	61 (25.4)	87 (36.3)
There are certain foods my child shouldn't eat because they will make him/her fat.	18 (7.5)	25 (10.4)	50 (20.8)	54 (22.5)	93 (38.8)
I don't allow my child to eat between meals because I don't want him/her to get fat.	57 (23.8)	43 (17.9)	58 (24.2)	50 (20.8)	32 (13.3)
I often put my child on a diet to control his/her weight.	46 (19.2)	51 (21.3)	48 (20.0)	45 (18.8)	50 (20.8)
Mean ± SD	27.31 ± 6.592				
Range	11 – 40				
Emotional regulation subscale					
When this child gets fussy, is giving him/her something to eat or drink the first thing you do?	36 (15.0)	75 (31.3)	79 (32.9)	39 (16.3)	11 (4.6)
Do you give this child something to eat or drink if s/he is bored even if you think s/he is not hungry?	51 (21.3)	74 (30.8)	81 (33.8)	29 (12.1)	5 (2.1)
Do you give this child something to eat or drink if s/he is upset even if you think s/he is not hungry?	72 (30.0)	75 (31.3)	74 (30.8)	15 (6.3)	4 (1.7)
Mean ± SD	7.25 ± 2.5				
Range	3 – 15				

Table 4.3: Distribution of the respondents by each item in CFPQ (n = 240) (*cont.)*

Items	n (%)				
	Never	Rarely	Sometimes	Mostly	Always
Food as a reward subscale					
I offer my child his/her favourite foods in exchange for good behaviour.	22 (9.2)	42 (17.5)	44 (18.3)	56 (23.3)	76 (31.7)
I offer sweets (candy, ice cream, cake, pastries) to my child as a reward for good behaviour.	45 (18.8)	55 (22.9)	54 (22.5)	56 (23.3)	30 (12.5)
I withhold sweets/dessert from my child in response to bad behaviour.	72 (30.0)	50 (20.8)	44 (18.3)	43 (17.9)	31 (12.9)
Mean ± SD	9.02 ± 2.639				
Range	3 – 15				

(R)[a] reversed scoring

Child Control Subscale

Child control subscale was used to measure the extent to which the mother allowing her child to control his/her eating behaviours. There were only a few mothers who reported that they "always" allow their children to eat snacks (2.9%) and whatever they want (4.2%). Besides, it was found that only a few of the mothers reported that they "always" allow their children to choose the foods they want from what is served (6.3%) and make something else for their children when they do not like what is being served (6.7%). Thus, it can be concluded that mothers in the present study exhibited a low extend in allowing their children to control their eating behaviour. This is probably due to perception of mothers on their children who are not capable of reasoning or organizing concepts along logical lines.

Involvement Subscale

Involvement subscale was used to measure the extent to which the mother in encouraging her child's involvement in meal planning and preparation. There were 24.6% of the mothers who "agreed" that they allow their children to help to prepare family meals. Besides, there were only some of the mothers who "agreed" that they involve their children in planning family meals (35.8%) and encourage their children in participating in grocery shopping (31.7%). This clearly shows that not all the mothers allow their children to be involved in the preparation of family meals. This was probably due to the perception of mothers on their children who have attention span lasting for five to ten minutes only and thus may affect the family meal preparation.

Encourage Balance and Variety Subscale

Encourage balance and variety subscale was used to measure the extent to which the mother promotes well-balanced food intake, including the consumption of varied foods and healthy food choices. Majority of the mothers "agreed" that they always tell their children that healthy food tastes good (70%). Besides, almost half of the mothers "agreed" that they always encourage their children to eat healthy foods before unhealthy ones (41.3%) and eat a variety of foods (48.3%). However, when asked on the encouragement to consume new foods, only 24.2% of the mothers "agreed" that they will encourage their children to try new foods. This shows that the mothers in the present study would put more effort in promoting healthy food choices than in promoting the consumption of varied foods especially when it comes to new foods.

Environment Subscale

Environment subscale was used to measure the extent to which the mother makes healthy and unhealthy foods available in home. It was found that majority of mothers ensure the food they kept in the house is healthy with 43.3% "agreed" and 35.0% "slightly agreed". Besides, more than half of the mothers "slightly disagreed" and "disagreed" that they keep a lot of snack foods (66.7%) and sweets (75.5%) in their house. Thus, it can be concluded that the mothers in the present study are paying a lot of effort in making healthy food available in their house and at the same time keeping unhealthy food away from their house.

Teaching about Nutrition Subscale

Teaching about nutrition subscale was used to measure the extent to which the mother uses explicit didactic techniques to encourage the consumption of healthy foods. Majority of the mothers said they would discuss the importance of eating healthy foods with their children with 36.3% "agreed", and 33.3% "slightly agreed". Besides, 34.6% of the mothers "agreed" that they discussed the nutritional value of foods with their children and 22.5% "slightly agreed". It can be seen that mothers were less likely to discuss the nutritional value of food when compare with the importance of healthy eating as this may require more knowledge on nutrition for the mothers. Besides, only 19.2% of the mothers "agreed" that they would tell their children what to eat and what not to eat without explanation. Thus, we can see that the mothers in the present study were more likely to use education method by providing explanation in guiding their children to eat healthily.

Modelling Subscale

Modelling subscale was used to measure the extent to which the mother actively demonstrates healthy eating for her child. Majority of the mothers "agreed" and "slightly agreed" that they show enjoyment (60.8%) and enthusiasm (63.3%) about eating healthy food. However, there were only 44.6% of the mothers "agreed" that they would model healthy eating by eating healthy foods by themselves. We can see that the mothers in the present study believed that the enjoyment and enthusiasm they showed to their children on eating healthy food would be more effective than just eat the healthy food by themselves in encouraging their children to eat healthily. Lastly, only 37.1% of the mothers "agreed" that they try to eat healthy food in front of their children even if they are not their favourite.

Pressure Subscale

Pressure subscale was used to measure the extent to which the mother pressures her child to consume more foods at meals. Majority of the mothers said that their children should alway eat all of the food in the plate with 30.4% "agreed" and 32.5% "slightly agreed". There were only one fifth of the mothers "agreed" that they would get their children to eat if their child eats only a small helping (26.7%) and not hungry (22.9%).

Restriction for Health Subscale

Restriction for health subscale was used to measure the extent to which the mother controls her child's food intake with the purpose of limiting less healthy foods and sweets. It was found that 64.2% of the mothers "agreed" that they have to make sure that their children do not eat too may sweets. However, when asked about restriction on child's favourite food, only 49.6% of the mothers "agreed" that they have to make sure that their children do not eat too much of his/her favourite foods. This shows that mothers in the present study placed less restriction on their children's favourite foods. Besides, majority of the mothers "agreed" that if they did not guide or regulate their children's eating, they would eat too much of their favourite foods (50.8%) and junk foods (40.8%).

Restriction for Weight Control Subscale

Restriction for weight control subscale was used to measure the extent to which the mother controls the child's food intake with the purpose of decreasing or maintaining the child's weight. It was found that more than half of the mothers (55.8%) "agreed" that they have to make sure that their children do not eat too much

high-fat foods. Besides, majority of the mothers believed that there are certain foods that their children should not eat because they will make their children fat with 38.8% "agreed" and 22.5% "slightly agreed". This shows that the mothers in the present study placed more restriction on high fat foods in order to control their children's weight. Only a few mothers "agreed" that they would give their children small helpings at meals (10.8%), disallow their children to eat between meals (13.3%), put their children on a diet (20.8%) and restrict their children eating at the next meal if their children eats more than usual at one meal (21.7%) to control their weight. Instead, there were more mothers "agreed" that they would encourage their children to eat less (37.5%) to control his/her weight. This shows that mothers in the present study were more likely to use encouragement method instead of using their autonomy in reducing their children's meal portion to control their children's weight.

Emotional Regulation Subscale

Emotional regulation subscale was used to measure the extent to which the mother uses food to regulate child's emotional status. It was found that only a few mothers reported that they "always" give their children something to eat or drink when their children gets fussy (4.6%), bored (2.1%), and upset (1.7%). Overall, the extent of mother of respondents in using food to regulate their children's emotional status was considered low in the present study.

Food as a Reward Subscale

Food as a reward subscale was used to measure the extent to which the mother uses food as reward for child behaviour. It was found that majority of the mothers would offer their children's favourite foods in exchange for good behaviour

with 31.7% "agreed" and 23.3% "slightly agreed". However when asked about utilization of sweets in response to their children's behaviour, only a few mothers "agreed" that they offer sweets (12.5%) and withhold sweets (12.5%) in response to their children's good and bad behaviour respectively. Thus, we can see that the mothers in the present study were more prone to use favourite food rather than sweets as reward for their children behaviour since favourite food can be come from either healthy or unhealthy food.

Infant Feeding Practices

Infant feeding practices were determined by using a self-administered questionnaire adapted from the study by Shim, Kim, and Mathai (2011). There were a total of 4 components measured in determining the infant feeding practices of the mothers, including breastfeeding initiation, breastfeeding duration, exclusive breastfeeding duration, and timing of introduction of complementary food. The infant feeding practices of the respondents are shown in Table 4.4.

Breastfeeding Initiation

Breastfeeding initiation is defined as the time at which the first breastfeed is given to the newborn infant. Mothers are recommended to initiate breastfeeding within one hour of birth (NCCFN, 2013). This is because early initiation of breastfeeding can ensure that the newborn receives colostrum which contains abundant antibodies and lymphocytes to protect the baby from infection. Most of the mothers in the present study (88.3%) initiated breastfeeding within one hour of birth.

Table 4.4: Infant feeding practices of respondents (n = 240)

Variables	n (%)	Mean ± SD	Range
Breastfeeding initiation	212 (88.3)		
Breastfeeding duration (months)		20.32 ± 11.15	0 – 48
During the first 6 months of life	207 (86.3)		
Exclusive breastfeeding duration (months)		5.16 ± 2.94	0 – 12
During the first 3 months of life	194 (80.8)		
During the first 6 months of life	139 (57.9)		
Timing of introduction of complementary food (months)		6.56 ± 2.29	2 – 13
Before 4 months of age	19 (7.9)		
Before 6 months of age	42 (17.5)		

However, nearly one in ten of the mothers (11.7%) did not initiate breastfeeding within the first hour of birth.

A study conducted by Tengku Alina, Wan Manan, and Mohd Isa (2013) found that 46.1% of the mothers initiated breastfeeding within one hour of birth in Kelantan. Besides, the prevalence of breastfeeding initiation within one hour of birth reported in the NHMS III was 63.7% (Fatimah, Siti, Tahir, Hussain, & Ahmad, 2010). The higher prevalence of breastfeeding initiation reported in the present study (88.3%) demonstrates the effectiveness of implementation of Baby Friendly Hospital Initiative in government hospitals in Kuantan area. Despite this, the benefits of breastfeeding, as well as patient education, counselling, and support strategies should be emphasized during the visit to health care facilities of pregnant mothers such as clinics and hospitals. Besides, ongoing education should be promoted for all women's health care providers and health care staff involved in childbirth to achieve 100% of breastfeeding initiation among mothers in Malaysia.

The prevalence of timely initiation of breastfeeding in the present study (88.3%) is higher than in some South East Asian countries such as Philippines

(53.5%), Cambodia (65.8%), Indonesia (44%), and Vietnam (39.7%) as reported in a study conducted by Amarra and Chan (2013). Besides, the prevalence of timely initiation of breastfeeding in the present study is higher than some western countries such as England (83%), Scotland (74%), Wales (71%), and Northen Ireland (64%) (UNICEF, 2015). This result however does not indicate that the prevalence of timely initiation of breastfeeding is higher in Malaysia than in other South East Asian and western countries as this study covered only one subdivision in Kuantan, whereas the previous studies were conducted in the whole nation of the particular countries, thus representing a more generalized result.

Breastfeeding Duration

Mothers are recommended to breastfeed their child until the child is aged 2 years (24 months) and above along with the feeding of nutritious complementary foods (NCCFN, 2013). Overall, the mean duration of breastfeeding of the respondents in this study was 20.32 ± 11.15 months, which ranged from 0 to 48 months. There were four mothers who reported that they did not breastfeed their child at all. These four mothers gave birth to their child in private hospitals which are not recognized as "Baby Friendly Hospitals" and thus did not encourage the adoption of breastfeeding practices among mothers. Thus, the implementation of baby-friendly hospital initiative should not be focusing only on governmental hospitals but also should focus on private hospitals to achieve a 100% of ever breastfeeding prevalence among mothers in Malaysia. Besides, this finding might be due to the limitation in the instrument in measuring infant feeding practices. The present study used the self-administered question "how many months did you breastfed your child" in measuring the duration of breastfeeding, in which the words "month" might

restrict the answer of the mothers who stopped breastfeeding their child after first few days of labouring due to the breastfeeding challenges such as sore nipples, low milk supply, breast engorgement and plugged ducts.

As shown in Table 4.4, it was found that majority of the mothers in the present study (86.3%) breastfed their child during the first 6 months of life. A local study conducted by Amin et al. (2011) among working women found that only 12% of the mothers breastfed their child during the first 6 months of life. The prevalence of breastfeeding during the first 6 months of life is higher in the present study as compared to the results by Amin et al. (2011). The huge difference of finding between these two studies may be due to the difference in the family background of the respondents recruited in these studies. Mothers of the respondents recruited in Amin et al. (2011) were all employed and thus make breastfeeding less convenient for them. Whereas, only 44.2% of respondent's mothers in the present study were employed and thus generating a higher prevalence of 6 months breastfeeding among the respondents.

Besides, the prevalence of breastfeeding during the first 6 months of life was higher in the present study as compared to the national prevalence as reported in NHMS II (46.9%) (Fatimah et al., 1999) and NHMS III (52.2%) (Fatimah, Siti, Tahir, Hussain, & Ahmad, 2010). This may be due to the difference of the coverage of studies. This study was conducted only in Kuantan, however the two national studies was conducted in whole Malaysia which covered various rural, sub-urban and urban areas and thus producing a more generalized result.

The prevalence of breastfeeding during the first 6 months of life (86.3%) was higher in the present study as compared to other South East Asian countries such as Philippines (61.7%), Indonesia (72.1%), and Vietnam (61.3%) as reported in a study conducted by Amarra and Chan (2013). Besides, the prevalence of breastfeeding during the first 6 months of life in the present study is also higher than in western country. Statistics from the 2010 Australian National Infant Feeding Survey 2010 showed that only 60% of children still received some breastmilk at aged of first 6 months (Australian Institute of Health and Welfare, 2010). The high prevalence of breastfeeding during the first 6 months of life in the present study however is not representative to resemble a good adoption of infant feeding practices in Malaysia since it only covers one subdivision in Kuantan. Thus, a nation wide study should be conducted in future time to evaluate the adoption of correct infant feeding practices among Malaysian.

Exclusive Breastfeeding

Exclusive breastfeeding is defined as feeding an infant nothing except breast milk from his or her mother or a wet nurse, or with expressed breast milk. Infants should not receive other fluids including water or solids, with the exception of drops or syrups consisting of vitamins, mineral supplements or medicine in the first 6 months of life. It is recommended that infants be exclusively breastfed for the first 6 months of life (NCCFN, 2013). In this study, the mean duration of the exclusive breastfeeding of the respondents was 5.16 ± 2.94 months which ranged from 0 to 12 months. Even though more than 80% of the preschoolers were initiated early for breastfeeding and almost all infants were ever-breastfed, the prevalence of mothers who were compliant to the recommendation of breastfeeding their child for the first 6

months of life was only 57.9%. Thus, the current breastfeeding patterns are still far from the recommended levels.

Previous studies reported that employed mothers often find that returning to work was a barrier for them to continue breastfeeding their child as they faced inflexibility in their work hours, lack of privacy for breastfeeding or expressing milk, have no place to store expressed breast milk and have limited maternity leave benefits (Tan, 2009; Tengku Alina, Wan Manan, & Mohd Isa, 2013). Since, 44.2% of the mothers in the present study were employed, thus making these working mothers difficult to continue breastfeeding their child when they returned to work. Thus, it will be better for future policy to make it compulsory for working sector to provide facilities such as a private corner for the mothers to express breast milk and refrigerator for the mothers to store their breast milk in order to promote the adoption of exclusive breastfeeding during the first six months of life.

A local study conducted by Tan et al. (2011) which consisted of 60.9% of Malay respondents showed that the prevalence of exclusively breastfeeding during the first 3 months of life was 28.0% and during the first 6 months of life was 23.6%. In the NHMS III , it was found that the prevalence of exclusively breastfeeding during the first 4 months of life was 19.3% and during the first 6 months of life was 14.5% (Fatimah, Siti, Tahir, Hussain, & Ahmad, 2010). Since majority of the respondents in the present study (98.7%) were Malays, this may explain the higher prevalence of exclusive breastfeeding before 4 and 6 months of life as compared to other local studies. According to a local study conducted by Radzniwan, Azimah,

Zuhra, and Khairani (2009), Malay women more commonly practiced breastfeeding as compared to other ethnic groups.

The prevalence of exclusive breastfeeding during the first 6 months of life (57.9%) in the present study was lower than in Egypt (61.7%) (Ghwass & Ahmed, 2011) but higher than in Bangkok (11%) (Laisiriruangrai, Wiriyasirivaj, Phaloprakarn, & Manusirivithaya, 2008). Besides, the prevalence of exclusive breastfeeding during the first 6 months of life in the present study (57.9%) was higher than in other South East Asian countries such as Philippines (34.0%), Indonesia (32.0%), and Vietnam (17.0%) but lower than Cambodia (73.5%) as reported in a study conducted by Amarra and Chan (2013). Thus, policy makers should take infant feeding policy adopted in Egypt and Cambodia as reference to increase the prevalence of exclusive breastfeeding during first 6 months of life among mothers in Malaysia.

Timing of Introduction of Complementary Food

Complementary foods are defined as any foods or nutritive liquids, besides breast milk, that are given to young children when breast milk alone is no longer sufficient to meet the nutritional requirements of infants. It is recommended for the mothers to introduce appropriate nutritionally adequate and safe complementary foods when the child is at the age of 6 months (NCCFN, 2013). The mean timing of introduction of complementary food in the present study was 6.56 ± 2.29 months which ranged from 2 to 13 months. There were only a few of the mothers who introduced complementary food to their child before 4 months of age (7.9%) and before 6 months of age (17.5%).

A randomized study conducted in the United States of America found that there was no growth advantage in introducing solids food earlier or at 6 months (SACN, 2003). Instead, the early introduction of complementary foods below 6 months of age attempt to shorten the duration of breastfeeding and thus reducing the ingestion of protective nutrients found in breast milk, such as iron and zinc in which might increases infant morbidity and mortality. Thus, it should be noted that there was a portion of mothers introduced complementary food to their child during the first 2 months of life (2.5%), first 3 months of life (5.4%), first 4 months of life (4.2%), first 5 months of life (5.4%) in the present study.

Besides, there were a proportion of mothers in the present study who introduced complementary food to their child as late as 12 months of age (8.3%) and 13 months of age (1.3%). This finding should be noted as this may increase the risk of feeding difficulties for the child in their later life (Agostoni et al., 2008). Besides, breast milk alone is insufficient to meet the growing children's requirements of energy and several nutrients, such as protein, zinc, iron and some fat-soluble vitamins (A and D) when the infants reach the age of 6 months onwards (WHO, 2005). Thus, the delay in introduction of complementary food for children might increase their risk for growth failure, deficiencies of certain micronutrients and common childhood illnesses in later life.

The prevalence of introduction of complementary food to child before 6 months of age reported in this study (17.5%) is higher than in Philippines (11%) and Cambodia (12.3%), but lower than in Indonesia (25%), and Vietnam (49.6%) as reported in a study conducted by Amarra and Chan (2013). Besides, the NHMS III

showed a similar condition with present study in which there were only 41.5% infants received timely complementary feeding which between ages of 6 to 10 months (IPH, 2008). Besides, the national study also showed that complementary food was given to infants as early as 2 months of age. Therefore, education should be provided to mothers in delivering the information on appropriate timing in introducing complementary food for children.

Food Neophobia

Food neophobia of the respondents was determined by using the Child Food Neophobia Scale (CFNS) based on maternal reports. It measured the children's willingness to try novel foods in which the scores are highly correlated with behavioral measures of neophobia (Pliner, 1994). Food neophobia behaviours by each statement is illustrated in Table 4.5.

According to Table 4.5, it was found that majority of the mothers felt "neutral" that their child is constantly sampling new and different foods (27.5%) and 14.6% "disagreed". On the other hand, 21.7% of the mothers "agreed slightly" that their child does not trust new foods. The mean score of food neophobia in the present study was 4.29 ± 0.71 with a minimum score of 2.6 and a maximum score of 6.1.

The mean score of CFNS in the present study was higher than other studies. Mean score for CFNS among children aged 2 to 5 years in Australia reported by Russell and Worsley (2008) was 3.66 ± 1.41. Another longitudinal study in New Zealand conducted by Cassells, Magarey, Daniels, and Mallan (2014) among

Table 4.5: Distribution of the respondents by each items in CFNS (n = 240)

Statement	n (%)						
	Agree extremely	Agree	Agree slightly	Neutral	Disagree slightly	Disagree	Disagree extremely
My child is constantly sampling new and different foods.	25 (10.4)	57 (23.8)	36 (15.0)	66 (27.5)	20 (8.3)	35 (14.6)	1 (0.4)
My child doesn't trust new foods. (R)[x]	8 (3.3)	23 (9.6)	52 (21.7)	60 (25.0)	46 (19.2)	40 (16.7)	11 (4.6)
If my child doesn't know what is in a food, s/he won't try it. (R)[x]	14 (5.8)	47 (19.6)	54 (22.5)	35 (14.6)	22 (9.2)	36 (15.0)	32 (13.3)
My child likes foods from different countries (example: Arab, Indonesia, Thailand).	26 (10.8)	46 (19.2)	35 (14.6)	47 (19.6)	19 (7.9)	48 (20.0)	19 (7.9)
My child finds ethnic food (Indian, Chinese and others) too weird to eat. (R)[x]	26 (10.8)	51 (21.3)	44 (18.3)	36 (15.0)	37 (15.4)	35 (14.6)	11 (4.6)
At dinner parties, my child will try a new food.	22 (9.2)	47 (19.6)	39 (16.3)	52 (21.7)	21 (8.8)	44 (18.3)	15 (6.3)
My child is afraid to eat things s/he has never had before. (R)[x]	31 (12.9)	64 (26.7)	53 (22.1)	47 (19.6)	23 (9.6)	18 (7.5)	4 (1.7)
My child is very particular about the foods s/he will eat. (R)[x]	54 (22.5)	60 (25.0)	65 (27.1)	42 (17.5)	9 (3.8)	8 (3.3)	2 (0.8)
My child will eat almost anything.	7 (2.9)	20 (8.3)	45 (18.8)	41 (17.1)	42 (17.5)	59 (24.6)	26 (10.8)
My child likes to try new ethnic restaurants (Indian, Chinese, mamak and others).	5 (2.1)	10 (4.2)	35 (14.6)	49 (20.4)	40 (16.7)	63 (26.3)	38 (15.8)
Mean ± SD	4.2908 ± 0.70852						
Range	2.6 – 6.1						

(R)[x] reversed scoring

toodlers aged 4 months to 2 years reported the mean score of CFNS was 2.17 ± 0.67. The higher mean score of CFNS in the present study may be due to the inclusion of older children as study respondents as compared to other studies (Cassells, Magarey, Daniels, and Mallan, 2014; Russell & Worsley, 2008). Thus, this suggested that food neophobia score might positively associated with age.

Respondents were further classified into 3 different categories (neophillic, average and neophobia) based on their mean score on CFNS. As shown in Figure 4.1, a majority of the respondents (70.4%) were classified as average and 15.8% as neophobia. This result is consistent with a previous cross-sectional local study conducted in Hulu Selangor whereby majority of the primary school children (64.5%) were classified as average and 17.2% as neophobia (Zalilah et al., 2005). Besides, the result of the present study is also consistent with by a study by Russell and Worsley (2008) which was conducted among 371 Australian children aged 2 to 5 years in which majority children (34.5%) were in average category and 32.5% of children were neophobic.

However, this result is inconsistent with a study conducted by Brown, Ogden, Vogele and Gibson (2008) which measured the food neophobia behaviours using the four highest factor loading items from MacNicol, Murray, and Austin (2003). The distribution of food neophobia behaviour among children aged 4 to 7 years reported by Brown, Ogden, Vogele and Gibson (2008) was almost equally distributed with 25.3% in the average category and 35.4% in the neophobia category. This may be due to the different instruments used in assessing the food neophobia behaviour among respondents in these two studies.

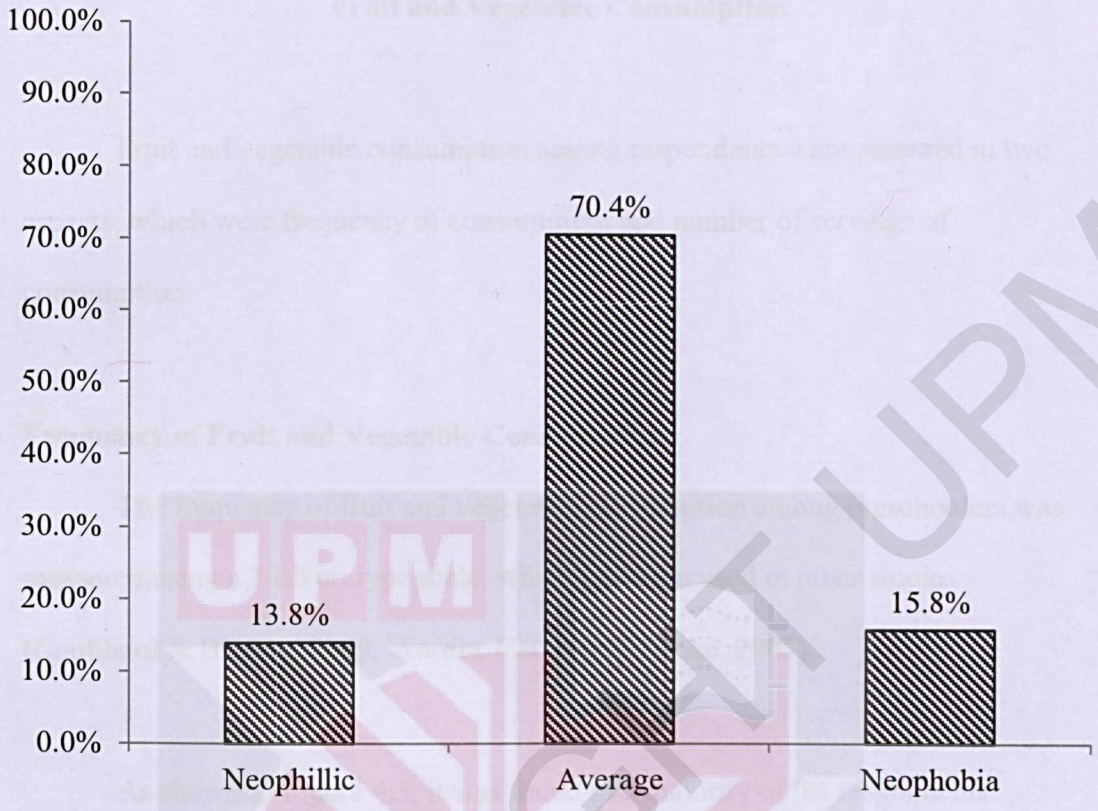

Figure 4.1: Distribution of respondents in food neophobia behaviour (n = 240)

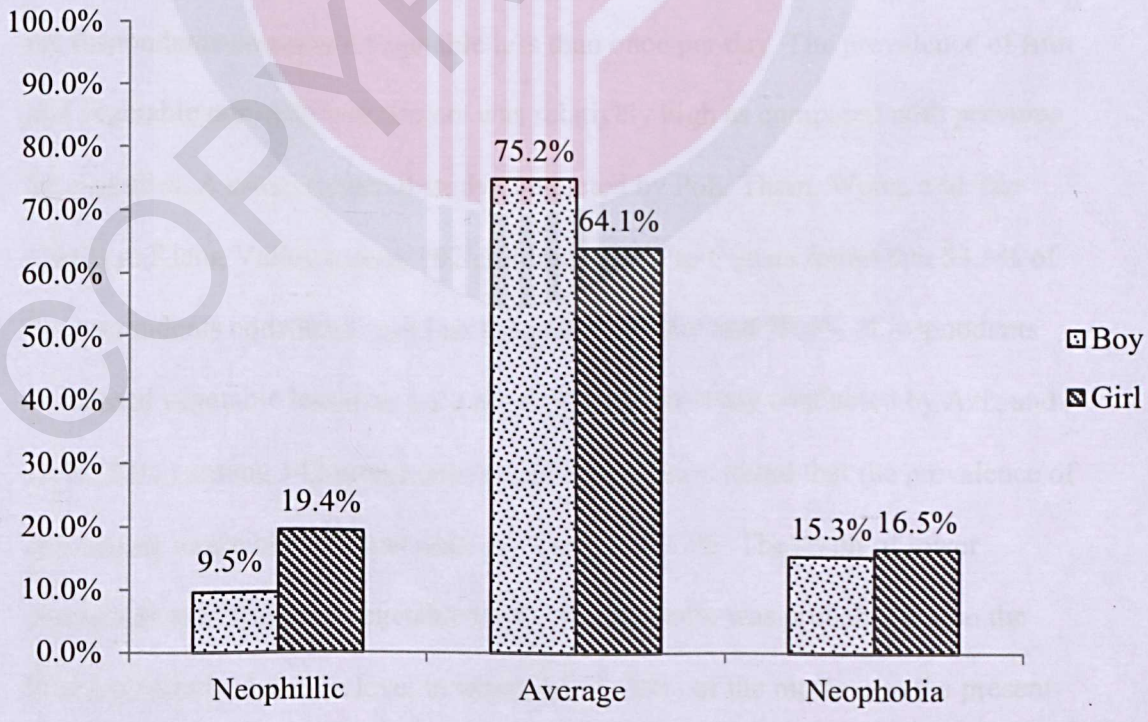

Figure 4.2: Distribution of respondents in food neophobia behaviour by sex (boys, n = 137 ; girls, n = 103)

Fruit and Vegetable Consumption

Fruit and vegetable consumption among respondents were assessed in two aspects, which were frequency of consumption and number of servings of consumption.

Frequency of Fruit and Vegetable Consumption

The frequency of fruit and vegetable consumption among preschoolers was measured using a 7 Likert type scale, which has been used in other studies (Coulthard & Blissett, 2009; Wardle, Carnell, & Cooke, 2005).

As shown in Figure 4.3, it was found that majority of the respondents consumed fruit (47.9%) and vegetable (41.7%) 1 to 3 times during the past 7 days. Besides, 85.9% of the respondents consumed fruit less than once per day and 75% of the respondents consumed vegetable less than once per day. The prevalence of fruit and vegetable non-daily consumers was relatively high as compared with previous local studies. A cross-sectional study conducted by Poh, Tham, Wong, and Tee (2012) in Klang Valley among 992 children aged 5 to 6 years found that 53.1% of the respondents consumed fruit less than once per day and 59.4% of respondents consumed vegetable less than once per day. Another study conducted by Aziz and Devi (2012) among 142 preschoolers aged 4 to 6 years found that the prevalence of consuming vegetable less than once per day was 63.7%. The result of lower consumption of fruit and vegetable in the present study was probably due to the lower mother's education level in which only 20.4% of the mothers in the present study achieve tertiary educational level when compared with Poh et al. study

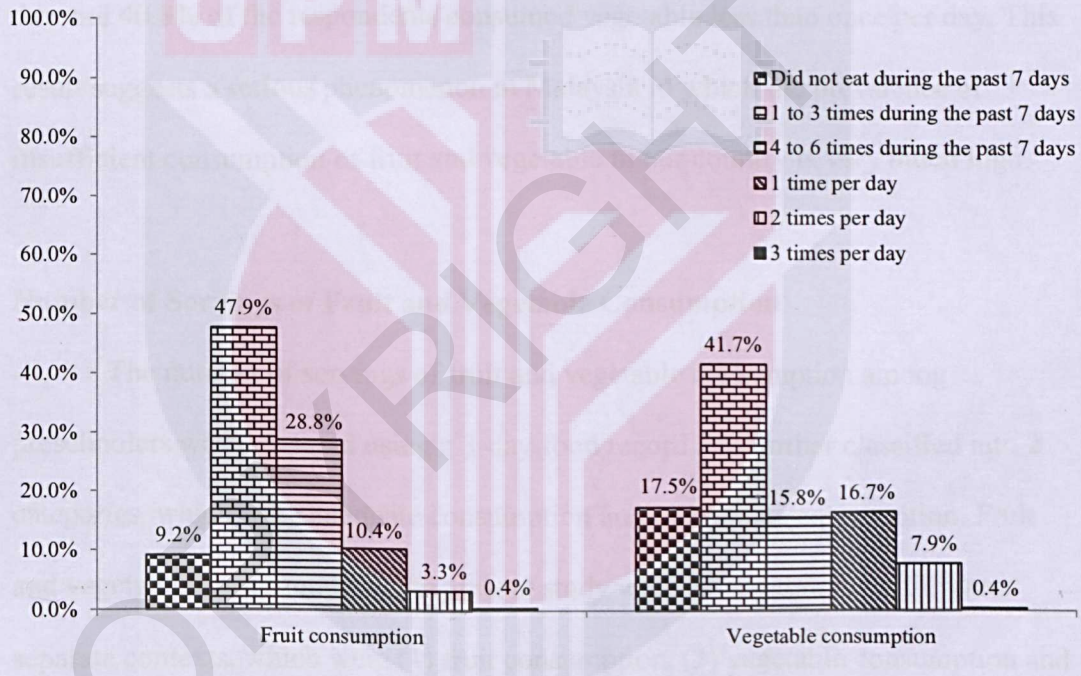

Figure 4.3: Distribution of respondents in frequency of fruit and vegetable consumption (n = 240)

(34.7%). According to a recent cross-sectional study conducted by Valmorbida et al (2014), lower mother's educational level has reported to be significantly associated with lower children's fruit and vegetable consumption.

Besides, the prevalence of consuming less than once per day of fruit and vegetable in the present study was relatively high as compared with western countries. A cross-sectional study conducted by Wardle, Carnell, and Cooke (2005) in London found that 31.4% of the respondents consumed fruit less than once per day and 40.8% of the respondents consumed vegetable less than once per day. This result suggests a serious phenomenon in Malaysia in which the prevalence of insufficient consumption of fruit and vegetable in our country is very much high.

Number of Servings of Fruit and Vegetable Consumption

The number of servings of fruit and vegetable consumption among preschoolers was measured using a 3-day food record and further classified into 2 categories, which were adequate consumption and inadequate consumption. Fruit and vegetable consumption in the present study were assessed in three different separate contexts, which were (1) fruit consumption, (2) vegetable consumption and (3) total fruit and vegetable consumption. Respondents who consumed at least 2 servings of fruit daily and 2 servings of vegetable daily are considered as adequate consumption of fruit and vegetable respectively, wheareas respondents who consumed less than 2 servings of fruit daily and 2 servings of vegetable daily are considered as inadequate consumption of fruit and vegetable respectively. Besides, adequate consumption of total fruit and vegetable was indicated by consuming at least four servings of fruit and/or vegetable daily, while, inadequate consumption of

fruit and vegetable was indicated by consuming less than four servings of fruit and/or vegetable daily.

As shown in Figure 4.4, the mean fruit consumption among respondents was 0.63 ± 0.51 serving and the mean vegetable consumption was 0.67 ± 0.60 serving. It was found that most of the respondents did not eat the recommended two servings of fruit (96.7%) and two servings of vegetable (94.2%) a day. Besides, almost all of the respondents (98.3%) did not meet the recommended 4 servings of fruit and vegetable a day with the mean consumption of fruit and vegetable was 1.30 ± 0.91 serving per day. This shows a high prevalence of inadequate consumption of fruit and vegetable consumption among the preschoolers in this study.

The finding was consistent with a local cross-sectional study conducted by Zalilah, Khor, Mirnalini, and Sarina (2005) in Selangor among 332 primary school children, which reported that a total of 98.2% of respondents did not eat the recommended 2 servings of fruit and 99.7% of respondents did not eat the recommended 2 servings of vegetable.

Besides, another local cross-sectional study conducted by Zalilah and Tham (2002) in Orang Asli (Temuan) households at Hulu Langat among 64 preschoolers aged 3 to 6 years old found that 92.2% of the respondents did not eat the recommended 2 servings of fruit and 78.1% of respondents did not eat the recommended 2 servings of vegetable. The prevalence of inadequate consumption of fruit and vegetable was higher in the current study. This indicates that inadequate consumption of fruit and vegetable prevails among preschoolers in urban area.

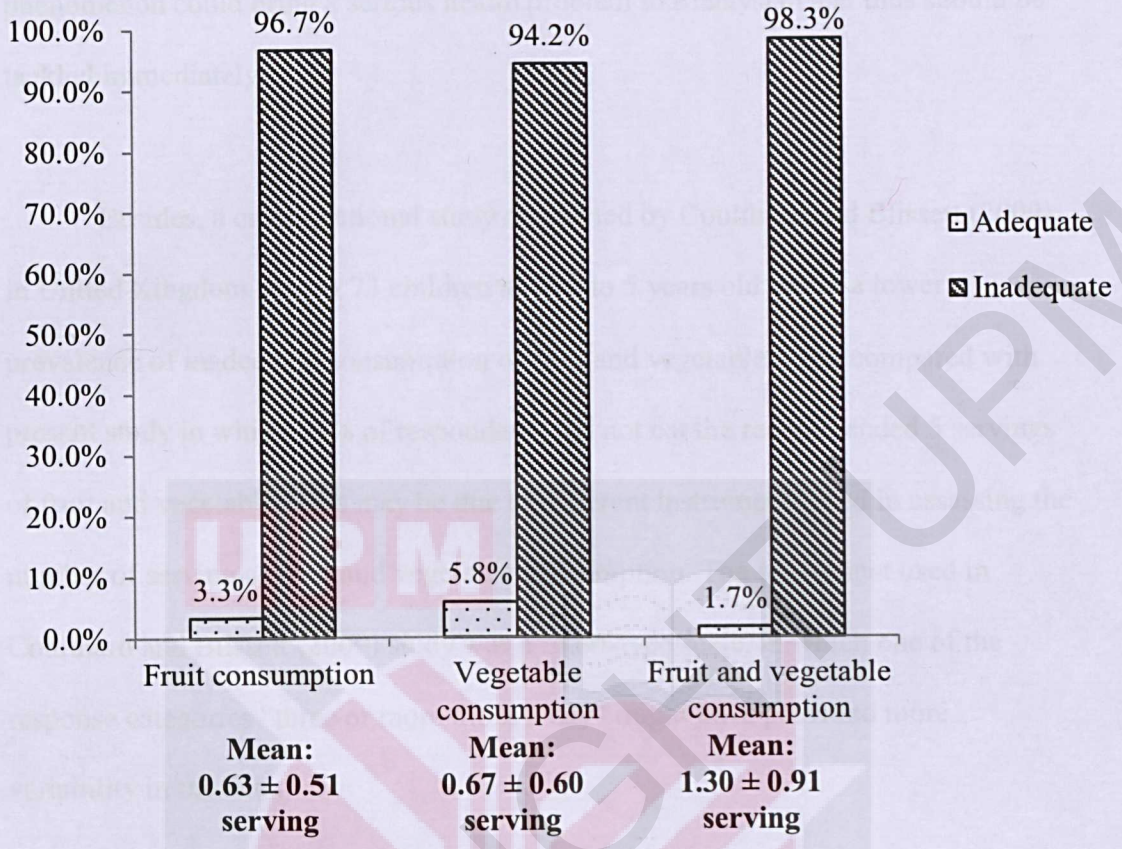

Figure 4.4: Distribution of respondents in number of serving of fruit and vegetable consumption (n = 240)

The mean servings of fruit (0.63 ± 0.51 servings) and vegetable (0.67 ± 0.60 servings) in the present study are relatively low as compared with the results reported in western countries. A cross sectional study conducted by Fisher, Mitchell, Smiciklas, and Birch (2002) in Pennsylvania, United States found that the mean servings of fruit consumption was 1.5 ± 1.0 servings and the mean of servings of vegetable consumption was 1.5 ± 1.0 servings. Besides, the mean vegetable consumption reported in Cooke et al. (2003) study which was conducted in London (1.8 ± 0.6 servings) are much higher when compared with the present study (0.67 ± 0.6 servings). This indicates that the consumption of fruit and vegetable are far lower in Malaysia than in western countries especially among preschoolers. This

phenomenon could bring a serious health problem to Malaysian and thus should be tackled immediately.

Besides, a cross-sectional study conducted by Coulthard and Blissett (2009) in United Kingdom among 73 children aged 2 to 5 years old found a lower prevalence of inadequate consumption of fruit and vegetable when compared with present study in which 51% of respondents did not eat the recommended 5 servings of fruit and vegetable. This may be due to different instruments used in assessing the number of serving of fruit and vegetable consumption. The instrument used in Coulthard and Blissett (2009) study was a likert-type scale, in which one of the response categories "three or more times a day" might have provided more variability in the data.

Hypotheses Testing

$H_0$1: There was no significant association between food neophobia and fruit and vegetable consumption among preschoolers.

Food Neophobia and Frequency of Fruit and Vegetable Consumption

The association between food neophobia and frequency of fruit and vegetable consumption was analysed by using chi-square tests. As shown in Figure 4.5 and 4.6, there were no significant associations between food neophobia behaviour with frequency of fruit ($\chi^2 = 1.462$, $p = 0.481$) and vegetable consumption ($\chi^2 = 5.098$, $p = 0.078$).

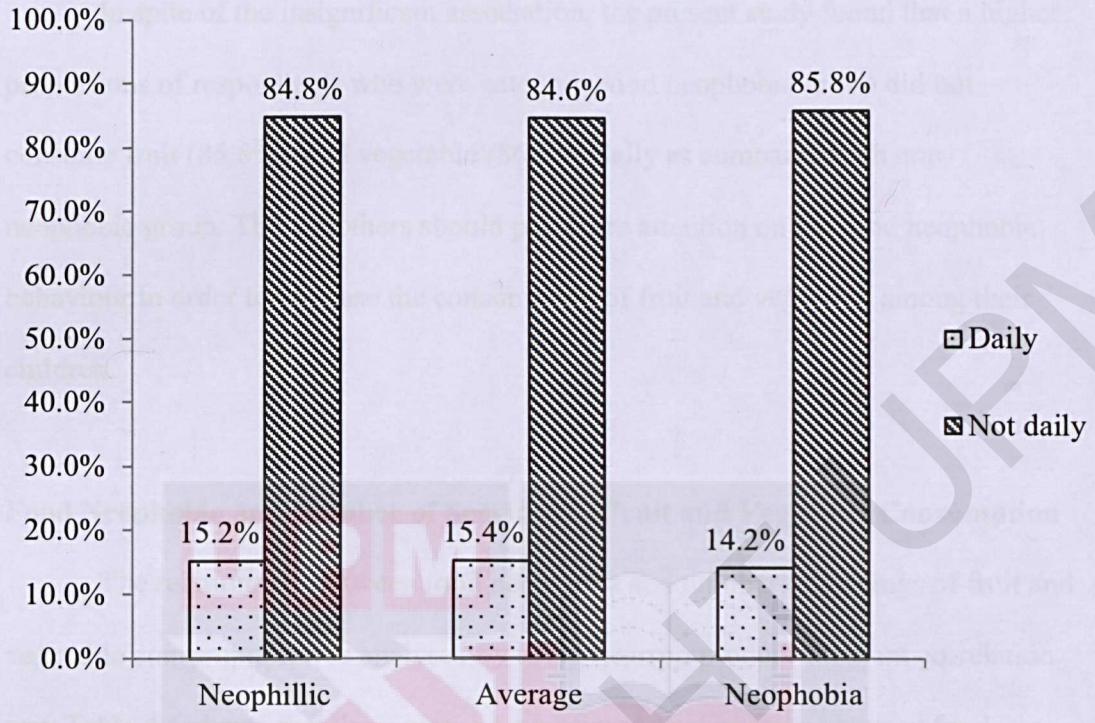

Figure 4.5: Food neophobia behaviour according to frequency of fruit consumption (n = 240)

Note: $\chi^2 = 1.462$, $p = 0.481$

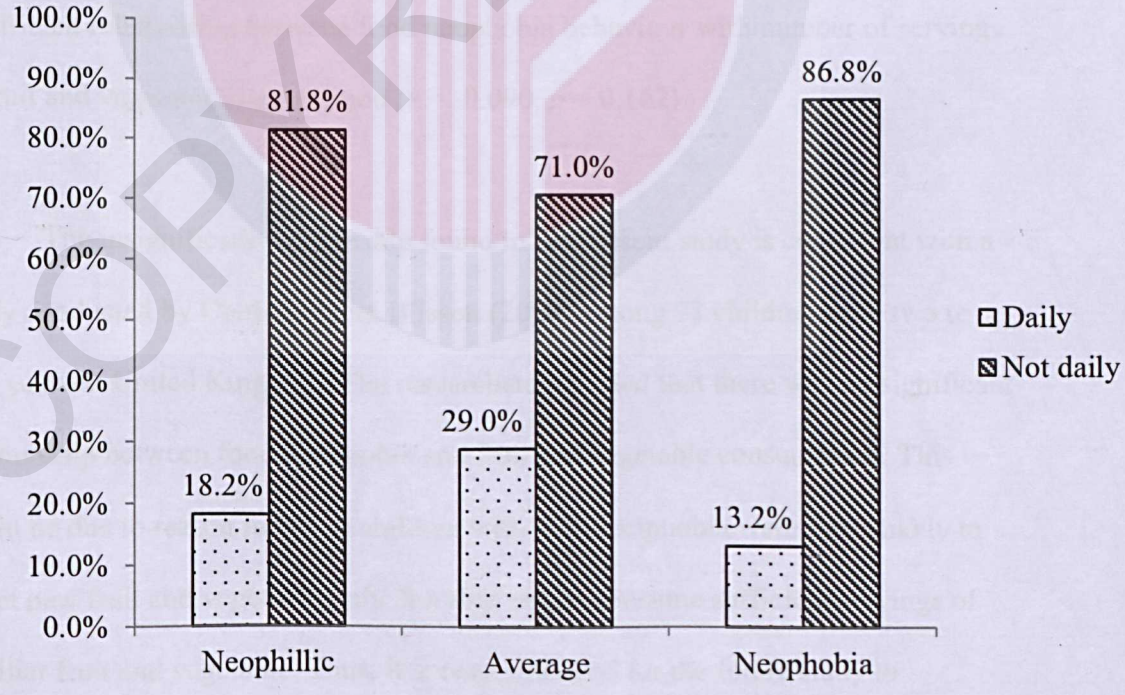

Figure 4.6: Food neophobia behaviour according to frequency of vegetable consumption (n = 240)

Note: $\chi^2 = 5.098$, $p = 0.078$

In spite of the insignificant association, the present study found that a higher proportions of respondents who were categorized in neophobic group did not consume fruit (85.8%), and vegetable (86.8%) daily as compared with non-neophobic group. Thus, mothers should pay more attention on the food neophobia behaviour in order to increase the consumption of fruit and vegetable among their children.

Food Neophobia and Number of Servings of Fruit and Vegetable Consumption

The relationship between food neophobia and number of servings of fruit and vegetable consumption was analysed by using Pearson product-moment correlation test. Table 4.6 shows that there were no significant relationships between food neophobia behaviour with number of servings of fruit (r = -0.047, p = 0.464) and vegetable consumption (r = -0.098, p = 0.132). Besides, there was also no significant relationship between food neophobia behaviour with number of servings of fruit and vegetable consumption (r = -0.090, p = 0.162)

The insignificant relationship found in the present study is consistent with a study conducted by Coulthard and Blissett (2009) among 73 children aged two to five years in United Kingdom. The researchers reported that there was no significant relationship between food neophobia and fruit and vegetable consumption. This might be due to reason in which children with food neophobia were more likely to reject new fruit and vegetable only, but they might consume sufficient servings of familiar fruit and vegetable. Thus, it is recommended for the future study to investigate the relationship between food neophobia and the variety of type of fruit

Table 4.6: Results of Pearson-moment correlations test between food neophobia with number of serving of fruit and vegetable consumption (n = 240)

Variables	Fruit consumption		Vegetable consumption		Fruit and vegetable consumption	
	r	*p*	*r*	*p*	*r*	*p*
Food neophobia	-0.047	0.464	-0.098	0.132	-0.090	0.162

and vegetable consumption instead of only examine the frequency and number of serving of consumption.

This finding is however inconsistent with the finding from previous studies (Cooke, Wardle, Gibson, 2003; Galloway, Lee, & Birch, 2003; Wardle, Carnell, & Cooke, 2005) which reported that higher levels of food neophobia in children were related with lower consumption of fruits and vegetables as these foods are consider to be novel food groups among children. The insignificant finding in the present study was suggested to be attributed by the overall low consumption of fruit and vegetable of the study respondents in the present study (mean serving of vegetable consumption =0.67 ± 0.6 servings) when compared with Galloway et al. (2003) (mean serving of vegetable consumption =1.7 ± 0.9 servings) and Cooke et al (2003) (mean serving of vegetable consumption =1.8 ± 0.6 servings).

In Malaysia, there are only a few published studies on food neophobia and fruit and vegetable consumption. A local study showed that there was no significant difference in fruit and vegetable consumption between neophobic and non-neophobic children (Zalilah, Khor, Mirnalini, and Sarina, 2005). Despite of the different objectives examined in Zalilah et al. (2005) study and the present study, it can still suggest that the reason behind these insignificant findings between food neophobia and fruit and vegetable consumption was due to the low consumption of fruit and

vegetable among the study respondents in the present study (mean=1.30 ± 0.91 servings) and Zalilah et al. (2005) study (mean=0.6 ± 0.5 servings).

Thus, we cannot ignore the negative direction between food neophobia with number of serving of fruit and consumption and the low consumption of fruit and vegetable consumption among the respondents in present study since increasing the variety of fruit and vegetable consumption in children does not only provide them with nutrient for optimal healthy but also result in decreasing fat intake (Dwyer, 2000).

$H_0$2: There were no significant associations between personal factors, anthropometry indicators, maternal feeding practices and infant feeding practices with food neophobia among preschoolers.

Personal factors and food neophobia

The null hypothesis was analysed by using chi-square test. As shown in Table 4.7, child's age group, mother's age group, and maternal age group were associated with food neophobia behaviour (neophillic, average, and neophobia). On the other hand, chi-square test shows a non-significant association result between child's sex, monthly household income, highest level of education and employment status with food neophobia behaviour (neophillic, average, and neophobia).

One in five of the respondents aged 4 and 5 years (24.7%) had the problem of food neophobia, while one in ten of the respondents aged 6 years (11%) had the problem of food neophobia. There was a significant association between child's age

Table 4.7: Association between personal factors and food neophobia behaviour (n = 240)

Variables	n	Food neophobia, n (%)			χ^2	p
		Neophillic	Average	Neophobia		
Child's age					7.822*	0.020
4 & 5 years old	85	11 (12.9)	53 (62.4)	21 (24.7)		
6 years old	155	22 (14.2)	116 (74.8)	17 (11.0)		
Sex					5.296	0.071
Boy	137	13 (9.5)	103 (75.2)	21 (15.3)		
Girl	103	20 (19.4)	66 (64.1)	17 (16.5)		
Mother's age					11.111*	0.025
< 29	58	5 (8.6)	48 (82.8)	5 (8.6)		
30 – 34	84	10 (11.9)	63 (75.0)	11 (13.1)		
≥ 35	98	18 (18.4)	58 (59.2)	22 (22.4)		
Maternal age					13.875*	0.031
< 24	65	5 (7.7)	54 (83.1)	6 (9.2)		
25 – 29	84	10 (11.9)	61 (72.6)	13 (15.5)		
30 – 34	54	9 (16.7)	31 (57.4)	14 (25.9)		
≥ 35	37	9 (24.3)	23 (62.2)	5 (13.5)		
Monthly household income					1.977	0.372
≤ RM 3000	179	26 (14.5)	128 (71.5)	25 (14.0)		
> RM 3000	61	7 (11.5)	41 (67.2)	13 (21.3)		
Highest level of education					0.345	0.842
Secondary education and below	191	26 (13.6)	136 (71.2)	29 (15.2)		
Tertiary education	49	7 (14.3)	33 (67.3)	9 (18.4)		
Employment status					0.150	0.928
Employed	106	14 (13.2)	76 (71.7)	16 (15.1)		
Unemployed	134	19 (14.2)	93 (69.4)	22 (16.4)		

*significant at $p < 0.05$

with food neophobia behaviour ($\chi^2 = 7.822$, $p = 0.02$). Result found in this study is similar with a previous study conducted by Hursti and Sjoden (1997) among children aged 7 to 17 years in Swedish families, in which older children had lower scores on neophobia scales than the younger children. In contrast, this result is inconsistent with previous studies which were conducted among children aged below 5 years old (Cassells, Magarey, Daniels, & Mallan, 2014; Russell, & Worsley, 2008) in which

they reported that there was no significant difference on CFNS score with child's age. The significant finding reported in the present study and Hursti et al. (1997) study suggested that the significant association between child's age and food neophobia can only be found if the study recruited children aged 6 years and above.

Chi-square test shows a significant association between mother's age with food neophobia ($\chi^2 = 11.111$, $p = 0.025$). A higher proportion of mothers who aged more than 35 years (22.4%) were reported to have their child categorized as neophobia when compared with mothers younger than 35 years old (21.7%). Similarly, a significant association was found between maternal age group with food neophobia behaviour ($\chi^2 = 13.875$, $p = 0.03$). In other words, a higher proportion of respondents who were born when their mothers aged 30 – 34 years (25.9%) were categorized in neophobia group than the respondents who were born when their mothers aged younger than 30 years old (24.7%). This result is consistent with a previous study conducted by Cassells, Magarey, Daniels, and Mallan (2014), in which mothers who gave birth to their child in older age were reported to have their child exhibit higher food neophobia behaviour. Therefore, this result indicates that food neophobia behaviour may be increases with mother's age and maternal age. However, the older maternal age of the mothers at delivery in the present study (mean maternal age = 28.4 ± 5.8) may contribute to a relatively high level of food neophobia in the present study in which the mean CFNS score (4.28 ± 0.71) was relatively high when compare with other previous studies conducted by Russell et al. (2008) (3.66 ± 1.41) and Cassells et al. (2014) (2.17 ± 0.67). Thus, replication of study in a more diverse sample would be of value.

Table 4.7 shows that there was no significant association between child's sex with food neophobia behaviour ($\chi^2 = 5.296$, $p = 0.071$). Despite of this, slightly more girl (16.5%) categorized as neophobia as compared to boy (15.3%). Result found in this study is similar with a previous study conducted by Cooke, Wardle, and Gibson (2003) among 464 children of ages 2 to 6 years in London, in which they found that there was no significant association between child's sex with food neophobia. A previous study conducted by Hursti and Sjoden (1997) among 722 children aged 7 to 17 years in Sweden which examined the sex differences on food neophobia behaviour reported an important findings in which boys had a significantly higher total FNS score than girls. In spite of the different objectives of present study with previous studies, the insignificant finding from the present study and Russel and Worsley (2008) as compared with the significant finding from Hursti, and Sjoden (1997) suggests that a larger sample size may needed in order to analyse the association between child's sex with food neophobia behaviour.

Body Weight Status and Food Neophobia

The relationships between body weight status such as weight-for-age, height-for-age, and BMI-for-age with food neophobia were investigated using Pearson product-moment correlation test. Table 4.8 shows that there were no significant relationships between BMI, weight-for-age and BMI-for-age with food neophobia behaviour. In other words, the BMI, weight-for-age and BMI-for-age were not correlated with food neophobia behaviour.

However, there was a significant negative correlation between height-for-age with food neophobia behaviour ($r = -0.015$, $p = 0.016$). In other words, the height-

Table 4.8: Results of Pearson-moment correlations test between BMI, weight-for-age, height-for-age, BMI-for-age with food neophobia (n = 240)

Variables	Food neophobia	
	r	*p*
BMI	-0.001	0.984
Weight-for-age	- 0.118	0.068
Height-for-age	- 0.155*	0.016
BMI-for-age	0.004	1.000

*significant at $p < 0.05$

for-age decreased with increase in CFNS score, in which stunting is very weakly correlated with food neophobia behaviour. Adoption of proper infant feeding practices such as exclusive breastfeeding during the first 6 months of life and introducing complementary food at the age of 6 months is critical to child health and development (NCCFN, 2013). In other words, the consequences of poor nutrition during the first 2 years of life might cause an irreversible stunting status of children. Thus, stunted respondents in the present study which were determined by height-for-age z score were more likely to receive an improper infant feeding practices during their first two years of life. A previous study conducted by Shim et al. (2011) found that children who were exclusively breastfed during the first 6 months were less likely to exhibit food neophobia, whereas children who were introduced to complementary foods before 6 months of age were 2.5 times more likely to develop food neophobia behaviour.

Maternal Feeding Practices and Food Neophobia

The relationships between maternal feeding practices (monitoring, child control, emotional regulation, encourage balance and variety, involvement, environment, pressure, restriction for health, restriction for weight control, teaching about nutrition, modelling and food as a reward) with food neophobia were

investigated using Pearson product-moment correlation. As shown in Table 4.9, autonomy promoting practices such as child control (r = -0.131, p = 0.042), encourage balance and variety (r = -0.159, p = 0.014), involvement (r = -0.156, p = 0.016) and environment (r = -0.146, p = 0.023) were negatively associated with food neophobia. There were no significant relationships between control feeding practices (pressure, restriction for health and restriction for weight control) with food neophobia. This finding is inconsistent with previous studies (Moroshko & Brennan, 2013; Wardle, Carnell, & Cooke, 2005) in which reported that there was a positive significant association between parental control which included both pressure to eat and restriction feeding practices with food neophobia behaviour. The present study shows a consistent result with a previous study conducted by Tan and Holub (2012) in which there was no significant association between using food for non-nutritive purposes subscales (emotion regulation and food as a reward) with food neophobia behaviour.

Mother's use of the autonomy promoting feeding practice of child control was negeative significantly related to children's food neophobia (r = -0.131, p = 0.042). In other words, children who are given more autonomy in controlling their eating behaviour are less likely to exhibit food neophobia behaviour. Mogharreban, and Nahikian-Nelms (1996) reported that children who were given more autonomy at mealtime by taking the responsibility to choose which foods are to be eaten could help in building healthy eating behaviours and thus supported the development of a variety of food preference.

Table 4.9: Results of Pearson-moment correlations test between maternal feeding practices with food neophobia (n = 240)

Variables	Food neophobia	
	r	*p*
Monitoring	-0.084	0.197
Child control	-0.131*	0.042
Encourage balance and variety	-0.159*	0.014
Involvement	-0.156*	0.016
Environment	-0.146*	0.023
Teaching about nutrition	0.045	0.489
Modelling	-0.022	0.731
Pressure	-0.087	0.177
Restriction for health	0.000	0.999
Restriction for weight control	-0.096	0.138
Emotional regulation	-0.027	0.680
Food as a reward	0.049	0.449

*significant at $p < 0.05$

Besides, mother's use of autonomy promoting practices of involvement on their child was significantly negative related to children's food neophobia (r = -0.156, p = 0.016). In other words, children who were given more autonomy in involving in the meal preparation and planning were less likely to exhibit food neophobia behaviour. This is because the practices of presenting novel food in a positive way, such as highlighting the fun of preparation and cooking food have been reported to be effective in encouraging children to accept new food (Dovey, Staples, Gibson, & Halford, 2008).

Besides, parents who paid more effort in encouraging their child to consume a variety of foods and make healthy food choices were reported to have their child exhibit low food neophobia behaviour (r = -0.159, p = 0.014). This is not overly surprising as encouraging children to eat a variety of food by many times is an effective feeding practice that results in children being more likely to accept the food

(Birch, McPhee, Shoba, Pirok, & Steinberg, 1987; Wardle, Herrera, Cooke, & Gibson, 2003).

Parents who were less likely to make healthy foods readily available and easily accessible to their child were reported to have their child score higher in CFNS (r = -0.146, p = 0.023). This is not surprising considering that research suggests that 5 to 8 exposures are necessary for a child to accept new food (Birch, McPhee, Shoba, Pirok, & Steinberg, 1987). The finding from present study suggests that neophobic children might not be getting enough exposure to a wide variety of healthy foods. Besides, exposure has been shown to work better than teaching to get children to eat new or disliked foods in previous experimental studies (Wardle et al. 2003; Wardle, Herrera, Cooke, & Gibson, 2003). Thus, it is not surprise with the finding of insignificant relationship between teaching about nutrition practices with food neophobia behaviour.

Surprisingly, parents using more pressure to eat did not report with increasing food neophobia behaviour among their children (r = -0.087, p = 0.177). However, pressure includes parents' attempts to get their children to eat more food at mealtimes, not necessarily their attempts to get them to eat novel foods. Previous studies suggest that children's food neophobia was associated with parents serving less new foods and with less exposure to dietary variety (Koivisto, & Sjoden, 1996; Pelchat, & Pliner, 1986). Since the mean score of CFNS in the present study was higher when compared with previous studies (Cassells, Magarey, Daniels, & Mallan, 2014; Russell, & Worsley, 2008), therefore, it is likely that the foods served during

mealtimes are foods that parents know that their child will accept and consume, making pressure obsolete among preschoolers in the present study.

Besides, restriction for weight control was not significantly correlated with children's food neophobia in the present study (r = -0.096, p = 0.138). This is not surprising since children's food neophobia was not correlated with either BMI, BMI-for-age, or weight-for-age in this study.

However, the result of present study shows that mothers' use of feeding practices of restriction for health (r = -0.084, p = 0.197) and monitoring (r = -0.084, p = 0.197) were not related significantly with children's food neophobia. In other words, parents who were more likely in controlling and monitoring their child's consumption of less healthy food did not report with decreasing food neophobia behaviour among their child. This may be suggested by the trend of high preference on foods with preferred flavors, like sweets or high fat foods among children in Malaysia (MOH, 1999; Noor, 2002; Tee, 1999). This might lead to parental concerns about the side effect brought by the less healthy food, which could be manifested through high extent in monitoring and restricting on their child's consumption of these less healthy foods regardless of their child's food neophobia behaviour.

The difference in findings between different aspects of maternal feeding practices with food neophobia reflect the complex nature of feeding practices with some forms having beneficial effects whilst some having detrimental effects on the preference of food among preschoolers. Thus, future intervention should incorporate the differentiation of beneficial and detrimental feeding practices in educating

mothers to minimize the exhibition of food neophobia behavior and maximize the dietary variety among preschoolers.

Infant Feeding Practices and Food Neophobia

The null hypothesis was analysed by using chi-square test. As shown in Table 4.10, there were no significant association between infant feeding practices (breastfeeding initiation, breastfeed, exclusive breastfeed, and timing of introduction of complementary foods) with food neophobia behaviour among children ($p > 0.05$).

Result found in this study is similar with a previous cross sectional study conducted by Russell and Worsley (2008) among 371 children aged 2 to 5 years in Australia in which there was no significant difference in food neophobia score with history of children being breast-fed either breast-fed only, bottle-fed only or breast- and bottle-bed.

However, result in present study was inconsistent with a cross-sectional study conducted by Shim et al. (2011). Shim et al. (2011) reported that there were significant associations between infant feeding practices (exclusive breastfeed, timing of introduction of complementary foods) with food neophobia. This may be due to the different instrument used to measure child food neophobia in which Shim et al. (2011) used only one simple question, "does your child accept new foods readily", to measure the food neophobia behaviour among the children but not on a validated instrument. The utilization of validated questionnaire (CFNS) in the present study is one of the strength of study.

Table 4.10: Association between infant feeding practices and food neophobia behaviour (n = 240)

Variables	n	Food neophobia, n (%)			χ^2	p
		Neophillic	Average	Neophobia		
Breastfeeding initiation					0.626	0.731
Yes	212	29 (13.7)	148 (69.8)	35 (16.5)		
No	28	4 (14.3)	21 (75.0)	3 (10.7)		
Any breastfeeding during the first 6 months of life					2.373	0.305
Yes	207	31 (15.0)	145 (70.0)	31 (15.0)		
No	33	2 (6.1)	24 (72.7)	7 (21.2)		
Exclusive breastfeeding during the first 3 months of life					4.536	0.104
Yes	194	27 (13.9)	141 (72.7)	26 (13.4)		
No	46	6 (13.0)	28 (60.9)	12 (26.1)		
Exclusive breastfeeding during the first 6 months of life					4.618	0.099
Yes	139	23 (16.5)	99 (71.2)	17 (12.2)		
No	101	10 (9.9)	70 (69.3)	21 (20.8)		
Introduction of complementary foods before 4 months of age					1.615	0.446
Yes	19	4 (21.1)	11 (57.9)	4 (21.1)		
No	221	29 (13.1)	158 (71.5)	34 (15.4)		
Introduction of complementary foods before 6 months of age					1.144	0.565
Yes	38	4 (10.5)	26 (68.4)	8 (21.1)		
No	202	29 (14.4)	143 (70.8)	30 (14.9)		

There was evidence available that mother's diet was reflected in alterations to the flavour of her breast milk thus making children who were breastfed were familiar with the flavours of foods eaten by the mother (Mennella, & Beauchamp, 1999; Sullivan, & Birch, 1994). Despite of this, the insignificant finding reported in the present study suggests that rejection of novel food as described by food neophobia behaviour does not occur during tasting of the food, which would risk poisoning; rather it happens primarily within the visual domain. According to an experimental study conducted by Pliner, Pelchat, and Grabski (1993), people who had higher food neophobia were more likely to reject food items before tasting them. Both of the inference made in the present study and Plinner et al. (1993) study suggests that children build up schemata of how an acceptable food should look and the taste will only be then assessed for its subjective value.

$H_0$3: There were no significant associations between personal factors, anthropometry indicators, maternal feeding practices and infant feeding practices with fruit and vegetable consumption among preschoolers.

Personal Factors and Frequency of Fruit and Vegetable Consumption

The null hypothesis was analysed by using chi-square test. Table 4.11 shows that mother's age ($\chi^2 = 15.044$, $p = 0.001$), maternal age ($\chi^2 = 8.964$, $p = 0.030$) and mother's highest level of education ($\chi^2 = 6.515$, $p = 0.011$) were significantly associated with fruit consumption. However, there were no significant associations between these personal factors with vegetable consumption. The difference finding on the association between personal factors with fruit consumption (significantly associated) and vegetable consumption (non-significantly associated) was due to the

Table 4.11: Association between personal factors with frequency of fruit and vegetable consumption ($n = 240$)

Variables	n	Fruit consumption		χ^2	p	Vegetable consumption		χ^2	p
		Daily	Not daily			Daily	Not daily		
Child's age				0.044	0.834			1.366	0.242
4 & 5 years old	85	11 (12.9)	74 (87.1)			17 (20.0)	68 (80.0)		
6 years old	155	23 (14.8)	132 (85.2)			43 (27.7)	112 (72.3)		
Sex				0.001	0.973			0.051	0.821
Boy	137	20 (14.6)	117 (85.4)			33 (24.1)	104 (75.9)		
Girl	103	14 (13.6)	89 (88.4)			27 (26.2)	76 (73.8)		
Mother's age				15.044*	0.001			5.383	0.068
< 29	58	17 (29.3)	41 (70.7)			17 (29.3)	41 (70.7)		
30 – 34	84	6 (7.1)	78 (92.9)			26 (31.0)	58 (69.0)		
≥ 35	98	11 (11.2)	87 (88.8)			17 (17.3)	81 (82.7)		
Maternal age				8.964*	0.030			4.621	0.202
< 24	65	16 (24.6)	49 (75.4)			20 (30.8)	45 (69.2)		
25 – 29	84	7 (8.3)	77 (91.7)			24 (28.6)	60 (71.4)		
30 – 34	54	8 (14.8)	46 (85.2)			10 (18.5)	44 (81.5)		
≥ 35	37	3 (8.1)	34 (91.9)			6 (16.2)	31 (83.8)		
Monthly household income				2.691	0.101			0.183	0.669
≤ RM 3000.00	179	21 (11.7)	158 (88.3)			43 (24.0)	136 (76.0)		
> RM 3000.00	61	13 (21.3)	48 (78.7)			17 (27.9)	44 (72.1)		
Highest level of education				6.515*	0.011			0.419	0.518
Secondary education and below	191	21 (11.0)	170 (89.0)			50 (26.2)	141 (73.8)		
Tertiary education	49	13 (26.5)	36 (73.5)			10 (20.4)	39 (79.6)		
Employment status				2.793	0.095			0.360	0.548
Employed	106	20 (18.9)	86 (81.1)			29 (27.4)	77 (72.6)		
Unemployed	134	14 (10.4)	120 (89.6)			31 (23.1)	103 (76.9)		

*significant at $p < 0.05$

higher consumption of vegetable in the present study in which 25% of the respondents consumed vegetable daily when compared with fruit consumption (14.1%).

Table 4.11 shows that mothers who aged 30 to 34 years and gave birth to their child in the age of more than 35 years old were more likely to have their child not consuming fruit daily when compared with younger mothers. This finding is not surprising as there is an increment in food neophobia behaviour among children that occurs with mother's age and maternal age as reported in present study and Cassells, Magarey, Daniels, and Mallan (2014) study.

As shown in Table 4.11, mothers who received tertiary education as their highest level of education (26.5%) tend to have their children consumed fruit daily when compared with mothers who received secondary education or below as their highest level of education (11.0%). This finding is consistent with the finding reported in the study by Vereecken, Keukelier, and Maes (2004). Mothers with higher level of education tend to be more alert with the benefit of healthy eating and thus encouraging and educating their child to eat more fruit.

However, child's age and child's sex were not significantly associated with fruit and vegetable consumption. The insignificant associations between child's age and child's sex reported in this study were inconsistent with the findings reported by Smithers et al. (2000). Smithers et al. (2000) found that there were significant differences on the consumption of fruit and vegetable as defined by child's age and child' sex among children aged 4 to 18 years. This may be due to the finding of the

present study applied to younger children who aged 4 to 6 years old than previous study and thus generate an insignificant result. Thus, it is suggested that a larger age difference with the inclusion of older children in a study could result in an obvious increases in fruit and vegetable consumption.

Personal Factors and Number of Servings of Fruit and Vegetable Consumption

Table 4.12 shows the Pearson product-moment correlation between personal factors (child's age, mother's age, and maternal age) with number of servings of fruit and vegetable consumption. There were no significant relationships between personal factors (child's age, mother's age, and maternal age) with number of servings of fruit and vegetable consumption. This result is consistent with the finding in previous study done by Valmorbida and Vitolo (2014). This result could probably due to the low consumption of fruit and vegetable consumption reported in present study (mean fruit consumption = 0.63 ± 0.52 servings, mean vegetable consumption = 0.67 ± 0.60 servings) and Valmorbida et al. (2014) study (median fruit consumption = 55 g , median vegetable consumption = 5 g) which originated to be due to low mother's education level and household income among respondents in both the present study and Valmorbida and Vitolo (2014) study.

Table 4.12: Results of Pearson-moment correlations test between personal factors (child's age, mother's age, maternal age) with number of servings of fruit and vegetable consumption (n = 240)

Variables	Fruit consumption		Vegetable consumption		Fruit and vegetable consumption	
	r	*p*	*r*	*p*	*r*	*p*
Child's age	0.033	0.607	-0.070	0.281	-0.041	0.529
Mother's age	0.037	0.568	-0.059	0.364	-0.031	0.634
Maternal age	0.035	0.588	-0.052	0.418	-0.028	0.666

Body Weight Status and Frequency of Fruit and Vegetable Consumption

The association between body weight status with frequency of fruit and vegetable consumption were investigated using chi-square test. As shown in Table 4.13, there were no significant associations between body weight status with frequency of fruit and vegetable consumption.

Body Weight Status and Number of Servings of Fruit and Vegetable Consumption

The relationship between body weight status such as weight-for-age, height-for-age, and BMI-for-age with number of servings of fruit and vegetable consumption were investigated using Pearson product-moment correlation test (Table 4.14). There were no significant relationships between BMI, weight-for-age, height-for-age, and BMI-for-age with fruit and vegetable consumption. In other words, the BMI, weight-for-age, height-for-age, and BMI-for-age were not correlated with fruit and vegetable consumption.

This non-significant result between body weight status with both frequency and number of servings of fruit and vegetable consumption is inconsistent with a study conducted by Vernarelli, Mitchell, Hartmen, and Rolls (2011) among children aged 2 to 8 years in United State. Vernarelli et al. (2011) found that body weight status of children was positively associated with dietary energy density and diets high in energy density were associated with lower intake of fruit and vegetable. In other words, Vernarelli et al. (2011) reported that body weight status of children was negatively associated with fruit and vegetable consumption. The inconsistent finding may be due to the low mother's education level and household income which lead to

Table 4.13: Association between body weight status and frequency of fruit and vegetable consumption (n = 240)

Variables	n	Fruit consumption		χ^2	p	Vegetable consumption		χ^2	p
		Daily	Not daily			Daily	Not daily		
Weight-for age				0.706	0.702			1.273	0.529
Underweight/ severely underweight	32	3 (9.4)	29 (90.6)			8 (25.0)	24 (75.0)		
Normal	169	25 (14.8)	144 (85.2)			45 (26.6)	124 (73.4)		
Not underweight	39	6 (15.4)	33 (84.6)			7 (17.9)	32 (82.1)		
Height for age				0.685	0.408			0.640	0.424
Stunted / severely stunted	40	4 (10.0)	36 (90.0)			12 (30.0)	28 (70.0)		
Normal	200	30 (15.0)	170 (85.0)			48 (24.0)	152 (76.0)		
BMI-for-age				5.201	0.074			0.649	0.723
Severely wasted/ severely thinness/ wasted/ thinness	22	0 (0.0)	22 (100.0)			4 (18.2)	18 (81.8)		
Normal	169	24 (14.2)	145 (85.8)			44 (26.0)	125 (74.0)		
Possible risk of overweight/ overweight/ obese/ severely obese	49	10 (20.4)	39 (79.6)			12 (24.5)	37 (75.5)		

Table 4.14: Results of Pearson-moment correlations test between body weight status with number of servings of fruit and vegetable consumption (n = 240)

Variables	Fruit consumption		Vegetable consumption		Fruit and vegetable consumption	
	r	*p*	*r*	*p*	*r*	*p*
BMI	-0.012	0.853	-0.054	0.403	-0.045	0.485
Weight-for-age	0.037	0.564	-0.068	0.296	-0.031	0.628
Height-for-age	0.061	0.349	-0.041	0.525	-0.001	0.992
BMI-for-age	-0.004	0.955	-0.053	0.415	-0.041	0.532

low consumption of fruit and vegetable among respondents in the present study since fruit and vegetables which are classified as low energy density foods are more costly when compared with high energy density foods. Thus, the consumption of fruit and vegetable among the respondents remained low regardless of the body weight status and thus generating a non-significant association between body weight status with fruit and vegetable consumption.

Maternal Feeding Practicces and Frequency of Fruit and Vegetable Consumption

The associations between maternal feeding practices with frequency of fruit and vegetable consumption cannot be investigated using chi-square test. Thus, the present study was not able to determine the associations between maternal feeding practices with frequency of fruit and vegetable consumption.

Maternal Feeding Practicces and Number of Servings of Fruit and Vegetable Consumption

The relationships between maternal feeding practices (monitoring, child control, emotional regulation, encourage balance and variety, involvement,

environment, pressure, restriction for health, restriction for weight control, teaching about nutrition, modelling and food as a reward) with number of servings of fruit and vegetable consumption were investigated using Pearson product-moment correlation. As shown in Table 4.15, involvement (r = -0.145, p = 0.024) and teaching about nutrition (r = -0.143, p = 0.027) were negatively associated with number of servings of vegetable consumption. Besides, only involvement were negatively associated with number of servings of fruit and vegetable consumption (r = -0.157, p = 0.015). None of the twelve subscales of maternal feeding practices was found to be significantly correlated with number of servings of fruit consumption.

Parents who exhibited higher extent in autonomy promoting practices of involvement and teaching about nutrition were reported to have their child consuming less serving of fruit and vegetable. This result is inconsistent with the findings from previous studies (Dovey, Staples, Gibson, & Halford, 2008; Mogharreban & Nahikian-Nelms, 1996) which reported that autonomy promoting practices were beneficial for the children in terms of developing healthier food preference such as consuming more fruit and vegetable. This might be due to the bidirectional effect between maternal feeding practices with fruit and vegetable consumption of children. Future research should examine whether high adoption of autonomy promoting practices of involvement and teaching about nutrition among mothers are a reason of low consumption of fruit and vegetable consumption of children or vice versa.

As shown in Table 4.15, there were no significant relationships between control feeding practices (pressure, restriction for health and restriction for weight

Table 4.15: Results of Pearson-moment correlations test between maternal feeding practices with number of servings of fruit and vegetable consumption (n = 240)

Variables	Fruit consumption		Vegetable consumption		Fruit and vegetable consumption	
	r	*p*	*r*	*p*	*r*	*p*
Monitoring	-0.060	0.357	0.023	0.723	-0.018	0.781
Child control	-0.018	0.783	-0.015	0.821	-0.020	0.763
Encourage balance and variety	0.047	0.465	0.058	0.371	0.064	0.320
Involvement	-0.111	0.087	-0.145*	0.024	-0.157*	0.015
Environment	0.055	0.395	0.101	0.120	0.097	0.135
Teaching about nutrition	0.085	0.189	-0.143*	0.027	-0.047	0.470
Modelling	0.009	0.894	-0.077	0.232	-0.018	0.781
Pressure	-0.047	0.468	0.006	0.928	-0.022	0.731
Restriction for health	-0.065	0.313	-0.066	0.307	-0.800	0.218
Restriction for weight control	0.010	0.884	0.058	0.368	0.044	0.501
Emotional regulation	-0.028	0.663	0.036	0.577	0.008	0.901
Food as a reward	0.079	0.222	-0.040	0.534	0.017	0.789

*significant at $p < 0.05$

control) with number of servings of fruit and vegetable consumption. This insignificant relationships are inconsistent with previous studies (Coulthard & Blissett, 2009, Vereecken, Keukelier, & Maes, 2004; Vereecken, Rovner, & Maes, 2010). Researches reported that there were negative significant relationships between parental control which include both pressure to eat and restriction feeding practices with fruit and vegetable consumption among children. According to a previous study conducted by Vereecken, Keukelier, and Maes (2004), there were a significant differences in the adoption of maternal feeding practices with different mother's educational level. Since the 72.1% of the mothers from present study achieved same highest educational level, which is secondary education level and below, thus

generating a less generalized result in term of maternal feeding practices and producing a non-significant finding.

Infant Feeding Practices and Frequency of Fruit and Vegetable Consumption

The associations between infant feeding practices (breastfeeding duration, exclusive breastfeeding, timing of introduction of complementary foods) with frequency of fruit and vegetable consumption were investigated using chi-square test. Table 4.16 showed that there were significant associations between exclusive breastfeeding during the first 6 months of life and introduction of complementary foods before 6 months of age with frequency of vegetable consumption.

There was a higher percentage of respondents who were exclusively breastfed during the first 6 months of life (32.7%) consumed vegetable daily when compared with respondents who were not exclusively breastfed during the first 6 months of life (19.4%). Therefore, exclusive breastfeeding during the first 6 months of life was significantly associated with frequency of vegetable consumption (χ^2 = 4.792, p = 0.029) but not fruit consumption (χ^2 = 3.789, p = 0.052). The significant finding reported in the present study is consistent with a longitudinal study conducted by Burnier, Dubois, and Gizard (2011) among preschool children in Canada in which exclusive breastfeeding is a predictive factor for higher vegetable consumption among preschoolers. The significant finding from present study and previous study was suggested to be due to the reason reported in previous studies (Mennella & Beauchamp, 1999; Sullivan & Birch, 1994) in which infants will gets exposed to different flavours from the breast milk that come from the mother's diet when they are breastfed and thus increase their acceptance of fruits and especially

Table 4.16: Infant feeding practices according to frequency of fruit and vegetable consumption (n = 240)

Variables	n	Fruit consumption		χ^2	*p* value	Vegetable consumption		χ^2	*p* value
		Daily	Not daily			Daily	Not daily		
Breastfeeding initiation[a]					0.388			0.054	0.816
Yes	212	32 (15.1)	180 (84.9)			52 (24.5)	160 (75.5)		
No	28	2 (7.1)	26 (92.9)			8 (28.6)	20 (71.4)		
Any breastfeeding during the first 6 months of life				9.804	0.002			0.000	1.000
Yes	207	23 (11.1)	184 (88.9)			52 (25.1)	155 (74.9)		
No	33	11 (33.3)	22 (66.7)			8 (24.2)	25 (75.8)		
Exclusive breastfeeding during the first 3 months of life				0.214	0.644			0.143	0.705
Yes	194	26 (13.4)	168 (86.6)			50 (25.8)	144 (74.2)		
No	46	8 (17.4)	38 (82.6)			10 (21.7)	36 (78.3)		
Exclusive breastfeeding during the first 6 months of life				3.789	0.052			4.792*	0.029
Yes	139	14 (10.1)	125 (89.9)			33 (32.7)	68 (67.3)		
No	101	20 (14.3)	81 (86.7)			27 (19.4)	112 (80.6)		
Introduction of complementary foods before 4 months of age[a]					0.738			0.934	0.334
Yes	19	3 (15.8)	16 (84.2)			7 (36.8)	12 (63.2)		
No	221	31 (14.0)	190 (86.0)			53 (24.0)	168 (76.0)		
Introduction of complementary foods before 6 months of age				13.529*	<0.001			7.542*	0.006
Yes	42	20 (10.1)	178 (89.9)			42 (21.2)	156 (78.8)		
No	198	14 (33.3)	28 (66.7)			18 (42.9)	24 (57.1)		

[a] The chi square test is not valid because more than 20% of the expected count is less than 5, therefore Fisher Exact test was used
*significant at $p < 0.05$

vegetables. However, the present study found no significant association between exclusive breastfeeding with frequency of fruit consumption. This might be due to the sweet flavour of fruit causes a higher preference for fruit than vegetable among children (Baranowski et al., 1993; Cillen et al,. 1998).

Besides, significant associations were found between introduction of complementary foods before 6 months of age with both frequency of fruit consumption ($\chi^2 = 13.529$, $p < 0.001$) and vegetable consumption ($\chi^2 = 7.542$, $p = 0.006$). In other words, a higher proportion of respondents who were being introduced complementary foods before 6 months of age not consumed fruit and vegetable daily. This significant finding reflected on the disadvantages of early introduction of complementary foods. Naylor and Morrow (2001) reported that most of the infants gradually develop the ability to chew at 6 months of age. Thus, the infants might get choke on complementary food such as fruit and vegetable if they were feeded on complementary food before the 6 months of age and thus generating a negative experience for them. Eventually, they tend to reduce the consumption of the particular food.

Infant Feeding Practices and Number of Servings of Fruit and Vegetable Consumption

The relationships between infant feeding practices (breastfeeding duration, exclusive breastfeeding, timing of introduction of complementary foods) with number of servings of fruit and vegetable consumption were investigated using Pearson product-moment correlation. As shown in Table 4.17, duration of exclusive breastfeeding was positively correlated with vegetable consumption among children

Table 4.17: Results of Pearson-moment correlations test between infant feeding practices with number of servings of fruit and vegetable consumption (n = 240)

Variables	Fruit consumption		Vegetable consumption		Fruit and vegetable consumption	
	r	*p*	*r*	*p*	*r*	*p*
Breastfeeding duration	-0.094	0.147	-0.008	0.907	-0.057	0.378
Exclusive breastfeeding duration	0.061	0.346	0.155*	0.016	0.136*	0.035
Timing of introduction of complementary foods	0.025	0.703	0.031	0.638	0.034	0.602

*significant at $p < 0.05$

($r = 0.155$, $p = 0.016$) but not with fruit consumption ($r = 0.061$, $p = 0.346$). Besides, duration of exclusive breastfeeding duration was also positively correlated with number of servings of fruit and vegetable consumption among children ($r = 0.136$, $p = 0.035$). In other words, the longer the children who were breastfed by their mother, the more the children consumed fruit and vegetable in the future.

The finding of this study is consistent with previous longitudinal studies conducted by Scott, Chih, and Oddy (2012), in which the study reported that breastfeeding duration was positively associated with children's fruit and vegetable consumption. Thus, it can be assured that infant feeding practices had an impact in a child's future eating pattern.

In contrast, the finding of this study was inconsistent with a study conducted by Valmorbida and Vitolo (2014) in which the authors reported that there was no significant relationship between duration of exclusive breastfeeding with fruit and vegetable consumption. The insignificant result reported by Valmorbida and Vitolo

(2014) was due to the limitation of study in which there was a lower prevalence of adopting exclusive breastfeeding among the mothers in the study (24%). This limitation is overcome in the present study as the prevalence of mothers who adopt exclusive breastfeeding was high (57.9%).

Limitations

There are several limitations in the present study that could influence the study findings. First, this was a cross-sectional study in which the direction of causality was not able to be determined. A cohort study should be conducted in the future to explore the causal relationships and long-term consequences. This is particularly important to determine the association between maternal feeding practices and food neophobia behaviour as this association is likely to be bidirectional. That is, whether maternal feeding practices contributed to food neophobia and low fruit and vegetable consumption, or whether child's limited food acceptance and low consumption of fruit and vegetable elicited maternal feeding practices in an attempt for mothers to manage these behaviours.

Second, the present finding was reported among preschoolers in Kuantan, Pahang and thus cannot be generalized to preschoolers in Malaysia. Besides, the comparable low educational level and household income in the present study does not allow for the extrapolation of the present result to other populations. However, this population is more likely to have greater biological and social vulnerability when compared with the population with higher socioeconomic status and thus require more care and effective health promotion strategies. In spite of this, it is

recommended to consider a longer data collection duration in future studies to cover a larger area which consisted of population with all types of socioeconomic status to produce a generalized result.

Third, all data were collected via self-report due to time constraint and thus the accuracy of result was highly dependent on the honesty and ability of the mothers to comprehend the questions addressed in the questionnaire. Besides, the mothers may prone to give socially desirable responses in answering the questions especially in the section of maternal feeding practices and food neophobia in order to impress the researcher. Furthermore, infant feeding practices were measured retrospectively in the present study which depends heavily on the mothers' memory to recall their child's feeding practices during infancy. Hence, the data collected may not reflect the actual feeding practices and food neophobia behaviour of their children. Thus, it is recommended for future studies to consider longer time duration to conduct face-to-face interview with the mothers.

Fourth, a 3-day food record which required literacy and skill from the mothers was used in the present study. This could result in under-reporting and over-reporting result due to the low education level among the mothers in the present study which limit their ability to record their child's food consumption. Besides, the high prevalence of employed mothers in the present study also make it troublesome for them to record their child's food consumption. Thus, longer study duration should be considered in future study in allowing home visit in order to get a more accurate result.

Fifth, present study used only maternal reports, which could lead to bias result. Studies (Blissett, Meyer, & Haycraft, 2006; Zhang, & Mclntosh, 2011) showed that mothers and fathers differed significantly in their reports of children's unhealthy eating attitudes. So, it would be worthwhile for the future studies to examine at the association between paternal feeding practices with child's eating behaviour.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

Conclusion

Noncommunicable diseases (NCDs) have become one of the main causes of death and disability in the world. One of the major causes of NCDs is inadequate consumption of fruit and vegetable. The prevalence of inadequate consumption of fruit and vegetable has grown at an alarming rate and becoming a common problem in developed and developing countries. In Malaysia, the problem of inadequate consumption of fruit and vegetable especially among children has burdening the health status of Malaysia. Thus, problem of inadequate consumption of fruit and vegetable have to be solved by looking at the contributing factors.

This cross-sectional study was conducted in 13 selected preschools in Ulu Kuantan and Berserah in the district of Kuantan. A total of 240 preschoolers (57.1% boys and 42.9% girls) aged 4 to 6 years participated in this study. This study determined the factors associated with food neophobia and fruit and vegetable consumption among preschoolers aged 4 to 6 years in *Tabika Perpaduan* in Kuantan.

This study demonstrated a high prevalence of inadequate consumption of fruit and vegetable among preschoolers. In the present study, mother's age, maternal age, and mother's highest level of education were significantly associated with fruit consumption but not vegetable consumption. In other words, inadequate fruit consumption was more significant at preschoolers of whom mothers aged more than 30 years with lower educational level.

Besides, autonomy promoting practices of involvement and teaching about nutrition were negatively associated with vegetable consumption but not fruit consumption. In other words, the higher the extent of mothers in allowing their child to involve in meal preparation and encouraging their child to consume healthy foods, the lower the consumption of vegetable among their child.

Significant correlation was found between exclusive breastfeeding duration with vegetable consumption but not fruit consumption. It means that increased in the duration of breastfeeding was associated with higher vegetable consumption. Besides, introduction of complememtary food before 6 months of age were found to be significantly associated with non-daily fruit and vegetable consumption.

Besides, it is believed that the rejection of fruit and vegetable among children is a natural response. This natural response is described as food neophobia which characterized as a personality trait which place people in term of their tendency to accept or avoid new foods. Thus, food neophobia is one of the child related factors which contributed to the problem of high prevalence of inadequate consumption of fruit and vegetable among children. In the present study, there was no significant

association between food neophobia and fruit and vegetable consumption. In spite of this insignificant finding, present study found that a higher proportion of respondents who categorized in neophobic group did not consume fruit and vegetable daily as compared with non-neophobic group. Future intervention should combat the problem of high food neophobia behaviour among preschoolers in order to increase fruit and vegetable consumption. Thus, factors associated with food neophobia should be investigated in order to increase the consumption of fruit and vegetable among preschoolers.

Overall, preschoolers in the present study exhibit high food neophobia behaviour. In the present study, child's, mother's age, and maternal age were significantly associated food neophobia behaviour. In other words, exhibition of food neophobia behaviour was more significant at preschoolers aged 4 and 5 years old of whom mothers aged more than 35 years. Besides, stunting was found to be weakly correlated with food neophobia behaviour. In other words, stunted preschoolers were more likely to reject novel foods.

Autonomy promoting practices of child control, involvement, encourage balance and variety, and environment were negatively associated with food neophobia. In other words, the higher the extent of mothers in allowing their child to control what they eat and involve in meal preparation, promoting their child to consume varied healthy foods, and making healthy available in home, the lower the exhibition of food neophobia behaviour among their child. No significant association was found between infant feeding practices with food neophobia. This result

suggests that rejection of novel food happen primarily within visual domain instead of the taste of the food.

Recommendations

The present study provided valuable information on food neophobia behaviour and fruit and vegetable consumption issues among preschoolers. First, this study examined fruit and vegetable consumption in separate context and thus providing valuable data in Malaysia. Findings of the present study demonstrated that different factors exhibited different associations on fruit and vegetable consumption separately. Thus, conducting a needs assessment before implementation of intervention by health professionals is important in order to evaluate the consumption of fruit and vegetable of the children and thus tailor specific strategies responding to their condition.

Second, this study examined maternal feeding practices in multiple aspects and thus providing an in-depth insight into the assoiciation of different feeding practices on children's food habits. The different findings between different aspects of maternal feeding practices with food neophobia and fruit and vegetable consumption may reflect the complex nature of feeding practices with some forms having beneficial effects in reducing food neophobia behavior among preschoolers whilst some does not. Thus, future intervention should incorporate the differentiation of maternal feeding practices in educating mothers to minimize the exhibition of food neophobia behavior and increase the consumption of fruit and vegetable.

Third, this study found a valuable insight into infant feeding practices issue. Exclusive breastfeeding duration was positively associated with vegetable consumption. Besides, stunted preschoolers were found to be weakly correlated with food neophobia behaviour. These issue, taken together, showed that adoption of correct infant feeding practices is very important to ensure optimal health of a children in their future life. Thus, it is important for future health promotion to stress on the importance and the correct method of infant feeding practices among pregnant mothers.

Fourth, the insignificant associations between infant feeding practices with food neophobia suggested that visual domain is the primary factor that affect how a child accept new foods. Thus, future intervention program should educate mothers on preparing food in a more appealing appearance way such as incorporating fruit and vegetable into their child's favourite food in order to increase the variety of food consumed by their child and thus increase the consumption of fruit and vegetable.

Last but not the least, there are limited studies which focused on food neophobia and fruit and vegetable consumption issues among preschoolers in Malaysia. Thus, cohort study should be conducted to investigate the causal relationship of various risk factors of food neophobia and low consumption of fruit and vegetable. Cohort studies should be conducted to follow the children from time to time determine the causal direction of maternal feeding practices with food neophobia and fruit and vegetable consumption.

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APPENDICES

Appendix C – Information sheet

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

BORANG B2: PENERANGAN DAN PERSETUJUAN IBUBAPA/PENJAGA

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

1.TAJUK KAJIAN

Neofobia makanan dan pengambilan buah-buahan dan sayur-sayuran serta faktor-faktor yang berkaitan dalam kalangan kanak-kanak prasekolah di Kuantan.

2. PENGENALAN

Tujuan kajian ini adalah untuk menilai neofobia makanan dan pengambilan buah-buahan dan sayur-sayuran dalam kalangan kanak-kanak prasekolah. Maklumat yang berkenaan boleh mengkaji hubungan antara faktor peribadi, amalan ibu dalam pemberian makanan kepada anak dan amalan pemberian makanan bayi dengan neofobia makanan dan pengambilan buah-buahan dan sayur-sayuran dalam kalangan kanak-kanak prasekolah.

3. APAKAH YANG PERLU ANDA LAKUKAN?

Anda dikehendaki menjawab borang soal selidik yang merangkumi maklumat peribadi, amalan pemberian makanan kepada anak, dan neofobia makanan anak anda. Anda juga dikehendaki untuk merekod pengambilan diet anak anda selama 3 hari, iaitu dua hari minggu (Isnin-Jumaat) dan satu hari hujung minggu (Sabtu atau Ahad). Berat badan dan ketinggian anak anda akan diukur oleh penyelidik.

4. SIAPA YANG TIDAK BOLEH MENYERTAI KAJIAN INI?

Kanak-kanak prasekolah yang merupakan:

- Vegetarian
- Mempunyai alahan makanan atau penyakit kronik yang mempengaruhi pengambilan makanan, terutamanya buah-buahan dan sayur-sayuran.

5. APAKAH FAEDAH MENYERTAI KAJIAN INI?

a) KEPADA ANAK/JAGAAN SAYA SEBAGAI PESERTA?

Anda akan mengetahui status berat badan anak anda berdasarkan indeks jisim tubuh (IJT).

b) KEPADA PENYELIDIK?

Maklumat yang diperolehi akan digunakan oleh penyelidik untuk menentukan faktor yang berkaitan dengan neofobia makanan dan pengambilan buah-buahan dan sayur-sayuran. Maklumat ini dapat membantu dalam menentukan program yang efektif bagi mengurangkan prevalens neofobia makanan dan meningkatkan pengambilan buah-buahan dan sayur-sayuran dalam kalangan kanak-kanak prasekolah.

Appendix D – Consent form

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 :.....

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

No. Rujukan

UNIVERSITI PUTRA MALAYSIA
BERILMU BERBAKTI

Fakulti Perubatan dan Sains Kesihatan

Jabatan Pemakanan dan Dietetik

PKK 4999
PROJEK ILMIAH TAHUN AKHIR

Soal Selidik

Neofobia makanan dan pengambilan buah-buahan dan sayur-sayuran serta faktor-faktor yang berkaitan dalam kalangan kanak-kanak prasekolah di Kuantan

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Tarikh	:

Semua maklumat yang diberikan di sini adalah dirahsiakan dan hanya digunakan untuk tujuan akademik 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

No.	Informasi	Pilihan
	Informasi Anak	
1	Tarikh lahir	☐☐ / ☐☐ / ☐☐☐☐ hh bb tttt
2	Umur	☐☐ tahun
3	Jantina	☐ Lelaki ☐ Perempuan
4	Kaum	☐ Melayu ☐ Bumiputera Sabah ☐ Cina ☐ Bumiputera Sarawak ☐ India ☐ Lain-lain, sila nyatakan : .....
5	Agama	☐ Islam ☐ Kristian ☐ Buddha ☐ Lain-lain, sila nyatakan : ..... ☐ Hindu
	Informasi Ibu	
6	Nombor telefon bimbit	☐☐☐☐☐☐☐☐☐☐
7	Tarikh lahir	☐☐ / ☐☐ / ☐☐☐☐ hh bb tttt
8	Umur	☐☐ tahun
9	Kaum	☐ Melayu ☐ Bumiputera Sabah ☐ Cina ☐ Bumiputera Sarawak ☐ India ☐ Lain-lain, sila nyatakan : .....
10	Agama	☐ Islam ☐ Kristian ☐ Buddha ☐ Lain-lain, sila nyatakan : ..... ☐ Hindu
11	Umur ibu semasa melahirkan anak ini	☐☐ tahun
12	Pendapatan isi rumah bulanan	☐ ≤ RM 500.00 ☐ RM 5000.01 – RM 7000.00 ☐ RM 500.01 – RM 1000.00 ☐ RM 7000.01 – RM 9000.00 ☐ RM 1000.01 – RM 3000.00 ☐ > RM 9000.00 ☐ RM 3000.01 – RM 5000.00
13	Tahap pendidikan tertinggi	☐ Tiada pendidikan formal ☐ Sekolah Menengah ☐ Sekolah Rendah ☐ Pengajian Tinggi
14	Status bekerja	☐ Bekerja ☐ Tidak bekerja
15	Pekerjaan	.....

Bahagian B

Ibu bapa menggunakan pelbagai jenis cara untuk memberi makanan kepada anak-anak dan berkemungkinan mempunyai perhatian yang berbeza untuk anak-anak. **Sila jawab semua soalan-soalan berikut sendiri dengan membulatkan nombor yang paling sesuai bagi anak anda.**

Soalan 1 hingga 13:

1 = Tidak pernah **2** = Jarang **3** = Kadang-kala **4** = Selalu **5** = Sentiasa

1	Berapa kerapkah anda memantau makanan manis (gula-gula, aiskrim, kek, kuih muih) yang dimakan oleh anak anda?	1	2	3	4	5
2	Berapa kerapkah anda memantau snek (kerepek kentang, keropok leko, *Twisties, Mamee)* yang dimakan oleh anak anda?	1	2	3	4	5
3	Berapa kerapkah anda memantau makanan berlemak tinggi yang dimakan oleh anak anda?	1	2	3	4	5
4	Berapa kerapkah anda memantau minuman manis (minuman bergas, sirap, *milk shake*) yang diminum oleh anak anda?	1	2	3	4	5
5	Adakah anda membenarkan anak anda makan apa-apa sahaja yang diinginginya?	1	2	3	4	5
6	Semasa makan malam, adakah anda membenarkan anak anda ini memilih makanan yang diinginginya selain makanan yang disediakan?	1	2	3	4	5
7	Apabila anak anda menunjukkan kerenah, adakah pemberian makanan/ minuman perkara pertama yang anda lakukan?	1	2	3	4	5
8	Adakah anda memberi anak anda makanan/ minuman apabila dia berasa bosan walaupun anda berasa bahawa dia tidak lapar?	1	2	3	4	5
9	Adakah anda memberi anak anda makanan/ minuman apabila dia berasa susah hati walaupun anda berasa bahawa dia tidak lapar?	1	2	3	4	5
10	Kalau anak anda tidak suka akan makanan yang disediakan, adakah anda membuat makanan yang lain?	1	2	3	4	5
11	Adakah anda membenar anak anda makan snek apabila dia menginginginya?	1	2	3	4	5
12	Adakah anda membenar anak anda meninggalkan meja makan apabila dia telah kenyang walaupun anggota keluarga yang lain belum selesai makan?	1	2	3	4	5
13	Adakah anda mengalakkan anak anda makan makanan berkhasiat sebelum makan makanan yang tidak berkhasiat?	1	2	3	4	5

Soalan 14 hingga 49:

1 = Tidak bersetuju **2** = Sedikit tidak bersetuju **3** = Neutral **4** = Sedikit setuju **5** =Bersetuju

14	Kebanyakan makanan yang saya sediakan di rumah berkhasiat.	1	2	3	4	5
15	Saya melibatkan anak saya dalam perancangan makanan keluarga.	1	2	3	4	5
16	Saya menyediakan banyak snek (kerepek kentang, keropok leko, *Twisties, Mamee*) di rumah saya.	1	2	3	4	5
17	Anak saya harus sentiasa menghabiskan makanan di dalam pinggannya.	1	2	3	4	5
18	Saya perlu memastikan anak saya tidak makan makanan berlemak tinggi secara berlebihan.	1	2	3	4	5

1 = Tidak bersetuju **2** = Sedikit tidak bersetuju **3** = Neutral **4** = Sedikit setuju **5** =Bersetuju

19	Saya memberi anak saya makanan kegemarannya sebagai ganjaran tingkah laku yang baik.	1	2	3	4	5
20	Saya mengizinkan anak saya untuk menolong penyediaan makanan di rumah.	1	2	3	4	5
21	Jika saya tidak memimpin atau mengaturkan pemakanan anak saya, dia akan makan makanan kegemarannya secara berlebihan.	1	2	3	4	5
22	Pelbagai makanan yang berkhasiat senang diperoleh oleh anak saya pada setiap hidangan di rumah.	1	2	3	4	5
23	Saya memberikan makanan manis (gula-gula, aiskrim, kek, kuih-muih) kepada anak saya sebagai ganjaran berkelakuan baik.	1	2	3	4	5
24	Saya mengalakkan anak saya mencuba makanan yang tidak pernah dicubanya sebelum ini.	1	2	3	4	5
25	Saya berbincang dengan anak saya tentang kepentingan memakan makanan yang berkhasiat.	1	2	3	4	5
26	Saya memberitahu anak saya bahawa makanan yang berkhasiat lebih sedap.	1	2	3	4	5
27	Saya mengalakkan anak saya supaya mengurangkan makanan supaya dia tidak menjadi gemuk.	1	2	3	4	5
28	Jika saya tidak memimpin atau mengaturkan pemakanan anak saya, dia akan makan makanan ringan secara berlebihan.	1	2	3	4	5
29	Saya memberi anak saya sedikit makanan semasa makan untuk mengawal berat badannya.	1	2	3	4	5
30	Jika anak saya berkata: "Saya tidak lapar," saya tetap juga menyuruhnya makan.	1	2	3	4	5
31	Saya berbincang dengan anak saya tentang nilai nutrisi makanan.	1	2	3	4	5
32	Saya menggalakkan anak saya turut serta dalam pembelian bahan makanan.	1	2	3	4	5
33	Jika anak saya makan berlebihan dalam satu hidangan makanan, saya cuba menghadkan pemakanannya pada hidangan makanan yang berikutnya.	1	2	3	4	5
34	Saya menghadkan makanan anak saya jika makanan itu mungkin menjadikannya gemuk.	1	2	3	4	5
35	Terdapat makanan tertentu yang tidak sepatutnya dimakan oleh anak saya kerana makanan itu akan menjadikannya gemuk.	1	2	3	4	5
36	Saya tidak memberikan makanan manis/ pencuci mulut kepada anak saya sebagai balasan perlakuan yang buruk (malas, melawan kata ibu bapa).	1	2	3	4	5
37	Saya menyimpan banyak makanan manis (gula-gula, aiskrim, kek, kuih-muih) di rumah saya.	1	2	3	4	5
38	Saya menggalakkan anak saya supaya makan pelbagai jenis makanan.	1	2	3	4	5
39	Jika anak saya makan sedikit makanan sahaja, saya menyuruhnya supaya makan lebih banyak.	1	2	3	4	5
40	Saya perlu memastikan anak saya tidak makan makanan kegemarannya secara berlebihan.	1	2	3	4	5
41	Saya tidak mengizinkan anak saya makan antara waktu makan utama kerana saya tidak mahu dia menjadi gemuk.	1	2	3	4	5
42	Saya memberitahu anak saya benda yang tidak sepatutnya dimakan dan yang tidak sepatutnya dimakan tanpa memberikan penerangan.	1	2	3	4	5
43	Saya perlu memastikan agar anak saya tidak makan makanan manis (gula-gula, aiskrim, kek, kuih-muih) secara berlebihan.	1	2	3	4	5

1 = Tidak bersetuju **2** = Sedikit tidak bersetuju **3** = Neutral **4** = Sedikit setuju **5** =Bersetuju

44	Saya menjadi model pemakanan yang sihat kepada anak saya dengan sendiri makan makanan yang berkhasiat.	1	2	3	4	5
45	Saya selalu menyuruh anak saya berdiet untuk mengawal berat badannya.	1	2	3	4	5
46	Saya cuba makan makanan yang berkhasiat di depan anak saya walaupun makanan tersebut bukan makanan kegemaran saya.	1	2	3	4	5
47	Saya cuba menunjukkan minat dalam pemakanan yang berkhasiat.	1	2	3	4	5
48	Saya cuba menunjukkan betapa saya menikmati makanan yang berkhasiat.	1	2	3	4	5
49	Apabila anak saya sudah selesai makan, saya cuba menyuruhnya supaya makan lebih banyak sama ada satu suapan, dua atau seterusnya.	1	2	3	4	5

Bahagian C

Sila pilih tindak balas yang paling sesuai untuk menggambarkan tahap kesetujuan untuk setiap soalan berikut.

1 = Sangat bersetuju **2** = Setuju **3** = Agak setuju **4** = Neutral
5 = Agak tidak setuju **6** = Tidak setuju **7** = Sangat tidak setuju

1	Anak saya selalu mencuba makanan baru dan berlainan.	1	2	3	4	5	6	7
2	Anak saya tidak percaya kepada makanan baru.	1	2	3	4	5	6	7
3	Jika anak saya tidak tahu apa yang terdapat dalam sesuatu makanan, dia tidak akan mencuba makanan tersebut.	1	2	3	4	5	6	7
4	Anak saya suka mencuba makanan dari Negara-negara lain (contoh: Arab, Indonesia, Thailand).	1	2	3	4	5	6	7
5	Anak saya berpendapat makanan kaum lain (India, Cina dan lain-lain) kelihatan pelik untuk dimakan.	1	2	3	4	5	6	7
6	Dalam sesuatu majlis, anak saya akan mencuba makanan yang baru.	1	2	3	4	5	6	7
7	Anak saya berasa sangsi untuk mencuba makanan yang dia tidak pernah lihat sebelum ini.	1	2	3	4	5	6	7
8	Anak saya sangat prihatin terhadap makanan yang akan dia makan.	1	2	3	4	5	6	7
9	Anak saya makan hampir semua jenis makanan.	1	2	3	4	5	6	7
10	Anak saya suka cuba makanan di restoran dari pelbagai kaum (India, Cina, mamak dan lain-lain).	1	2	3	4	5	6	7

Bahagian D

Sila jawab semua soalan-soalan berikut sendiri.

No.	Informasi	Pilihan
1	Adakah anda memberi susu ibu kepada anak ini dalam 1 jam yang pertama selepas kelahiran?	☐ Ya ☐ Tidak
2	Berapa lamakah tempoh anda menyusukan anak ini (termasuk susu ibu dan susu formula)?	☐☐ bulan
3	Berapa lamakah tempoh anda **menyusukan anak ini secara eksklusif**? *Penyusuan susu ibu secara eksklusif ditakrifkan sebagai bayi hanya diberi susu ibu sahaja tanpa makanan atau minuman lain termasuk tidak memberi air kosong.	☐☐ bulan
4	Berapakah umur anak ini apabila anda mula memperkenalkan makanan pelengkap kepadanya (kecuali susu formula)? *Makanan pelengkap ditakrifkan sebagai makanan yang diberikan kepada bayi dalam bentuk pepejal atau separuh pepejal selain daripada susu ibu.	☐☐ bulan

Bahagian E

Kami berminat tentang pengambilan makanan anda. **Sila jawab ke semua soalan-soalan ini sendiri dengan membulatkan nombor yang paling sesuai bagi anak anda.**

1 = Tidak makan pada minggu lepas
2 = 1 – 3 kali dalam seminggu
3 = 4 – 6 kali dalam seminggu
4 = 1 kali sehari
5 = 2 kali sehari
6 = Tiga kali seminggu
7 = 4 kali atau lebih sehari

1	Berapa kerap, dalam satu minggu, anak ini makan buah-buahan?	1	2	3	4	5	6	7
2	Berapa kerap, dalam satu minggu, anak ini makan sayur-sayuran?	1	2	3	4	5	6	7

Bahagian F

	Bacaan 1	Bacaan 2	Purata
Berat badan (kg)			
Ketinggian (m)			

Bahagian G

1. Lengkapkan borang diari pemakanan dengan menulis menu dan jumlah setiap makanan yang dimakan oleh anak anda. Rekodkan semua makanan dan minuman yang diambil oleh anak anda selama TIGA (3) hari termasuk dua hari minggu dan satu hari hujung dalam borang yang dilampirkan.
2. Sila jawab mengikut pengambilan makanan semasa makan pagi, minum pagi, makan petang, minum petang, makan malam, dan minum malam.
3. Sila rekod masa makan dan minum, serta makanan dan minuman yang diambil.
4. Sila terangkan semua makanan dan minuman yang diambil secara terperinci dan anggarkan kuantiti makanan dan minuman yang dimakan dan diminum oleh anak anda. Sebagai contoh, ½ cawan nasi, 10 kerepek kentang, dan 250ml susu.
5. Anda mungkin perlu menyenaraikan ramuan bahan-bahan yang terkandung dalam makanan anak anda. Sebagai contoh, sandwich tuna boleh disenaraikan sebagai "2 keping roti gandum, 1 sudu besar mayonis, 1 sudu teh marjerin, dan ¼ cawan tuna dalam tin (*Ayam Brand*)".
6. Catatkan jumlah makanan yang dimakan dalam saiz hidangan: cawan, sudu teh, sudu besar, potong/keping, ml, dan lain-lain.
7. Sila rujuk kepada contoh di bawah.

Contoh Diari Pemakanan

Tarikh: *20-9-2014* **Hari**:Jumaat

Masa	**Makanan dan minuman**	**Penjelasan terperinci bahan makanan dan minuman**	**Jumlah pengambilan**
Makan pagi Masa: 7:30am	Sandwic	Roti (*Gardenia)*	2 keping
		Strawberi Jam	1 sudu besar
	Susu penuh krim *(Dutch Lady)*		1 gelas
Minum pagi Masa: 10:00am	Epal	-	1 biji
	Biskut (*Julie*)	-	3 keping
Makan petang Masa: 1:00pm	Nasi campur	Nasi putih	¾ cawan
		Ikan kembung, masak kicap	½ ekor
	Sayur goreng	Sawi	½ cawan
		Ubi kentang	½ cawan
	Air kosong	-	1 gelas
	Tembikai	-	1 keping
Minum petang Masa: 3:30pm	Kuih kasturi	-	1 keping
Makan malam Masa: 6:00pm	Nasi berlauk	Nasi putih	¾ cawan
		Ayam (paha), masak kunyit	1 paha
	Sup sayur campur	Sawi	¼ cawan
		Kailan	¼ cawan
Minum malam Masa: 10:00pm	Susu	Tepung susu (Dutch Lady)	4 sudu

Diari Pemakanan– Hari Pertama

Tarikh:_____ **Hari:**_____

Masa	Makanan dan minuman	Penjelasan terperinci bahan makanan dan minuman	Jumlah pengambilan
Makan pagi Masa: ……			
Minum pagi Masa: ……			
Makan petang Masa: ……			
Minum petang Masa: ……			
Makan malam Masa: ……			
Minum malam Masa: ……			

Diari Pemakanan– Hari Kedua

Tarikh:_____ **Hari:**_____

Masa	Makanan dan minuman	Penjelasan terperinci bahan makanan dan minuman	Jumlah pengambilan
Makan pagi Masa: ……			
Minum pagi Masa: ……			
Makan petang Masa: ……			
Minum petang Masa: ……			
Makan malam Masa: ……			
Minum malam Masa: ……			

Diari Pemakanan– Hari Ketiga

Tarikh:_____ **Hari:**_____

Masa	Makanan dan minuman	Penjelasan terperinci bahan makanan dan minuman	Jumlah pengambilan
Makan pagi Masa: ……			
Minum pagi Masa: ……			
Makan petang Masa: ……			
Minum petang Masa: ……			
Makan malam Masa: ……			
Minum malam Masa: ……			

-Terima kasih atas kerjasama anda-