

Association of Body Weight Status and Socio-Demographic Factors with Food Habits among Preschool Children in Peninsular Malaysia

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ABSTRACT

Introduction: Changes in children's food habits are largely attributed to changes in the family and social environment. This cross-sectional study was carried out to determine the association of socio-demographic factors with food habits among preschool children in Peninsular Malaysia. **Methods:** A total of 1,933 preschool children aged 4-6 years old participated in the study. Parents or guardians were interviewed on the socio-demographic characteristics and food habits of their children. Height and weight of the preschoolers were measured; BMI-for-age, weight-for-age and height-for-age were determined. **Results:** The mean monthly household income was RM3,610 with 59.6% of parents having attained secondary education. The prevalence of possible risk of overweight, being overweight and obesity were 3.9%, 7.9% and 8.1%, respectively while the prevalence of underweight and stunting was 8.0% and 8.4%. A majority of the preschoolers consumed breakfast, lunch and dinner every day, with the proportion of children skipping their main meals at about 15.0%. Parents' education level and household income were significantly associated with intakes of fruits, vegetables, milk and dairy products, as well as fast food. However, there was no significant association between children's body weight status and frequency of main meals intake, fruits, vegetables, milk and dairy products, and fast food intake. **Conclusion:** The preschoolers demonstrated moderately healthy food habits; nevertheless even at this young age, they were inclined towards fried foods, snacking and fast foods intake. Parents and guardians should play a more significant role in educating and promoting good nutrition and food habits among preschoolers.

Key words: Food habits, Peninsular Malaysia, preschoolers, socio-demographic factors

INTRODUCTION

Healthy eating habits during childhood are important as they can help prevent malnutrition, growth retardation and acute nutrition problems (Nicklas & Hayes, 2008).

Healthful habits and preferences that are learned in childhood could reduce the risk of chronic diseases in adulthood (Nicklas & Hayes, 2008). The family is the most influential entity in the development of

eating behaviours among young children, especially mothers who have been shown to serve as role models for their children's health-related behaviours (Hart *et al.*, 2010). Parents influence children's eating pattern and preferences through the foods they make available and accessible to the child and their own eating behaviour plays just as important a role (Anzman, Rollins & Birch, 2010). General parenting styles and specific food-related parenting styles may also impart an influence (Vereecken *et al.*, 2010).

Socio-demographic factors also influence children's eating behaviours. Several studies have demonstrated that food prices are a major determinant of food consumption and purchasing decisions (Dubowitz *et al.*, 2008; Inglis, Ball & Crawford, 2008). Low-income families have a tendency to buy more energy-dense and fatty foods because these foodstuffs are usually less expensive (Drewnowski, Darmon & Briend, 2004). In addition, increased availability of high sugar and high-fat foods at a lower cost is another factor driving food consumption patterns towards increased sugar and fat intake. Rasmussen *et al.* (2006) reviewed determinants of fruit and vegetable consumption among children and adolescents from 98 journal papers published from 1958 to 2005 and concluded that young people from high socio-economic status have a diet more in line with dietary guidelines than young people of lower socio-economic status.

As children grow up and start with school, their teachers, friends and other people at school, together with the media may become increasingly important in influencing their eating habits (Vereecken *et al.*, 2004). The media, for instance, through advertisements, usually promotes high-fat and high-sugar loaded-foods targeting children (Borzekowski & Robinson, 2001). Continuous exposure to the media may increase children's interest in unhealthy snacks, resulting in them asking their

parents for this type of foods instead of nutritious meals. Taste also plays a significant role in young children's food choices. Foods containing high amounts of fat, sugar or both are the most palatable and have high-energy density (Drewnowski *et al.*, 2004), which may lead to intake of high energy food among children. Since foods have been directly implicated in changing disease patterns in rapidly developing countries (Kourlaba *et al.*, 2009) like Malaysia, it is prudent to assess the food habits of preschool children as it may play an important role in the development of chronic diseases in later life.

Studies on food habits among preschool children have been conducted widely in several countries (Kourlaba *et al.*, 2009; Vereecken *et al.*, 2010). However, to our knowledge, there are only two published studies on food habits among preschool children in the Klang Valley; one by Norimah & Lau (2000) and the other by Poh *et al.* (2012). No nationwide studies have been ever conducted on this topic. Therefore, new and recent information on food habits of preschool children in Malaysia, in particular, their food consumption patterns would be most useful for policy makers and food industries. This study is a nationwide study that evaluated the association between body weight status and socio-demographic factors with food habits. The results from the study will provide an insight towards factors that affect food habits of preschoolers in Peninsular Malaysia. The results will also be useful in developing future nutrition education and health promotion programmes.

METHODS

Study design and sampling

This was a cross-sectional study involving 1,933 preschoolers aged 4-6 years in Peninsular Malaysia. Sample size was calculated based on the proportion of children aged 4-6 years in 12 states

of Peninsular Malaysia (Department of Statistics Malaysia, 2000). Using a multistage sampling, 17 districts were randomly selected. From these 17 districts, 19 locations were randomly selected: 10 urban, 6 sub-urban and 3 in the rural areas. Parents and preschoolers were approached by enumerators who introduced the study and disseminated flyers. The study was conducted over a period of 14 months.

Subjects

The preschoolers were recruited based on the inclusion criteria that their age at the point of data collection was between 4 years 0 months (48 months) and 6 years 11 months (83 months). They were excluded if physical or mental disability was present as reported by their parents. The preschoolers must also be present with either a parent or a guardian and only preschoolers whose parent or guardian had consented to their participation were included in the study. The study protocols and procedures were approved by the Medical Research Ethics Committee, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia.

Socio-demographic data of the preschoolers were obtained through an interview with the parent or guardian who accompanied them during the study. Information obtained about the child included age, sex, ethnicity, religion and number of siblings, while information about parents were their age, educational attainment, occupation, monthly household income and household size.

Anthropometric measurements

Body weight of the preschoolers was measured using SECA Digital Column Scale (SECA 769/220, Germany) to the nearest 0.1 kg. Height was measured using SECA Stand-alone Stadiometer (SECA 214, Germany) to the nearest 0.1 cm. All anthropometric measurements were taken twice and for each measurement, the mean value was used in the analyses. Body

mass index (BMI) was calculated using the formula $BMI = \text{weight (kg)}/\text{height}^2 \text{ (m}^2\text{)}$ (WHO, 1995). Z-scores for weight-for-age, height-for-age, and BMI-for-age were determined using WHO Anthro Version 3.1.0 (WHO, 2010) software for preschoolers aged 5 years 0 month and below, while the WHO AnthroPlus Version 1.0.3 (WHO, 2009) software was used for preschoolers above 5 years.

Food habits

A children's food habits questionnaire (FHQ) was modified and adapted from a study by Norimah & Lau (2000) to include the type of foods and beverages that are usually consumed by the preschoolers at breakfast, lunch and dinner. The FHQ was pre-tested on parents of 35 preschoolers in Makmal Tadika Prasekolah, Universiti Putra Malaysia. The FHQ included some unique and important items in evaluating the food habits of young children such as consumption of snacks, and types of food preferred and disliked. It consisted of 24 questions on frequency of consumption and types of food eaten during the main meals of the day (breakfast, lunch and dinner), intake of fruits, vegetables, milk and dairy products, fast foods and snacks. It also included questions on food preparation methods. In this study, snacks are defined as any foods eaten by the preschoolers in between the three main meals. Fast foods included foods that are sold in fast food restaurants in Malaysia such as McDonalds, Kentucky Fried Chicken (KFC), Pizza Hut, A & W and others. Ready-to-eat foods and processed foods such as nuggets, burgers, pizza, sausages and French fries that are available in supermarkets are also classified as fast foods.

Statistical analysis

Statistical analysis was conducted using Statistical Package for Social Sciences (SPSS) Version 17.0 for Windows (SPSS, Chicago, IL, USA). Distribution on socio-

demographic backgrounds, food habits and body weight status were analysed using descriptive statistics which included frequency, mean, standard deviation and percentage. The association between socio-demographic background and body weight status with food habits was evaluated using chi-square test of independence. For this test, the classification of parents' education level was compressed into three categories; no formal education and primary education, secondary education, and tertiary education. The same procedure was followed with BMI-for-age (underweight, normal, overweight) and food habits (less than five times per day/week/month and five times or more per day/week/month).

RESULTS

Socio-demographic characteristics

A total of 1933 preschoolers aged 4 to 6 years (4.9 ± 0.8) representing urban (48.0%), suburban (38.8%) and rural (13.2%) areas of Peninsular Malaysia were recruited into the study. There was almost an equal proportion of boys (51.9%) and

girls (48.1%), a majority of whom were Malays (81.6%) (Table 1). Most fathers (60.6%) and mothers (58.6%) had attained a secondary level of education. A total of 22.9% of the fathers were technicians and associate professionals, while of the 43.8% of mothers who were not in the labour force, 99.5% were housewives with the remaining being students (Table 2). The mean estimated monthly household income was RM3610, indicating that the children were mostly from middle income families based on the top 20%, middle 40% and bottom 40% of the household income distribution in Malaysia (Department of Statistics Malaysia, 2009). In contrast, 25.3% of the preschoolers were from low income families (monthly household income of less than RM1500) (Table 2).

Body weight status

Mean weight, height, body mass index (BMI), Z-score for BMI-for-age, weight-for-age and height-for-age of the preschoolers by sex are shown in Table 3. A total of 7.1% and 0.9% of the preschoolers were underweight and severely underweight

Table 1. Socio-demographic characteristics of the preschoolers

<i>Preschoolers' Characteristics</i>		<i>Number, N</i>	<i>Percent (%)</i>
Age (years)	4	693	35.9
	5	710	36.7
	6	530	27.4
	Total	1933	100.0
Sex	Male	929	48.1
	Female	1004	51.9
	Total	1933	100.0
Ethnicity	Malay	1577	81.6
	Chinese	304	15.7
	Indian	34	1.8
	Others	18	0.9
	Total	1933	100.0
Area	Urban	927	48.0
	Sub-urban	751	38.8
	Rural	255	13.2
	Total	1933	100.0

Table 2. Socio-demographic characteristics of the parents

<i>Parents' characteristics</i>		<i>Father</i>		<i>Mother</i>	
		<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>
Highest education level	No formal education	6	0.3	6	0.3
	Primary education	58	3.0	54	2.8
	Secondary education	1161	60.6	1128	58.6
	Tertiary education	691	36.1	737	38.3
	Total	1916	100.0	1925	100.0
Classification of occupation (MASCO, 2008)	Managers	89	4.6	34	1.8
	Professionals	258	13.5	401	20.8
	Technicians and associate professionals	438	22.9	160	8.3
	Clerical support workers	74	3.9	234	12.2
	Service and sales workers	421	21.9	152	7.8
	Skilled agricultural, forestry and fishery workers	36	1.9	1	0.1
	Craft and related trade workers	88	4.6	10	0.5
	Plant and machine operators/assemblers	242	12.6	44	2.3
	Elementary occupations	60	3.1	4	0.2
	Armed forces occupation	182	9.5	42	2.2
	Outside labour force (housewife / pensioner / student)	28	1.5	843	43.8
	Total	1916	100.0	1925	100.0
Monthly Household Income (RM)	Father and Mother				
		<i>N</i>	<i>%</i>		
	< 1500	489	25.3		
	1501 - 3500	723	37.4		
	3501 - 5500	405	21.0		
	5501 - 7500	167	8.6		
	>7500	149	7.7		
Total	1933	100.0			

respectively, with a higher prevalence of under-nutrition in boys compared to girls. More boys were stunted (8.7%) and severely stunted (0.9%) in comparison to girls (6.9% stunted and 0.4% severely stunted). There were more overweight girls (9.3%) than boys (6.4%), but more boys were obese (8.5%) compared to girls (7.7%) (Table 3).

Food habits

The majority of the preschoolers (84.9%) reported having three meals per day. Most of them ate breakfast (89.5%), lunch (93.7%) and dinner (85.3%) at least 5 days a week (Table 4). The proportion of children skipping the main meals was about 15.0%. The most common breakfast

foods consumed were bread, rice, noodles, milk and malted drinks. Rice was usually eaten either with chicken or fish and plain water or cordial drinks were the common beverages consumed during lunch and dinner.

The proportion of preschoolers consuming vegetables frequently was unexpectedly higher than fruits. Despite one in three (37.6%) preschoolers eating vegetables more than six times a week compared to one in four (27.5%) for fruits, only 3.8% preschoolers did not take fruits compared with 12.0% for vegetables. Only one in five (22.8%) preschoolers consumed milk or dairy products at least 5 times a day, with growing-up milk being the most

Table 3. Anthropometric measurements and prevalence of malnutrition

Anthropometric measurement	Mean \pm standard deviation		
	Total (n = 1933)	Boys (n = 929)	Girls (n = 1004)
Weight (kg)	18.7 \pm 4.4	18.7 \pm 4.6	18.6 \pm 4.3
Height (cm)	108.6 \pm 6.7	108.6 \pm 6.9	108.6 \pm 6.6
BMI (kg/m ²)	15.67 \pm 2.51	15.7 \pm 2.52	15.65 \pm 2.51
BMI-for-age Z-score ^a	0.16 \pm 1.47	0.09 \pm 1.49	0.24 \pm 1.44
BMI-for-age Z-score ^b	0.03 \pm 1.50	0.13 \pm 1.62	-0.05 \pm 1.38
Wasted ^c /Thinness ^d	3.5%	2.9%	4.0%
Severely wasted ^c /Severe thinness ^d	0.4%	0.6%	0.3%
Possible risk of overweight ^c	3.9%	3.8%	4.1%
Overweight	7.9%	6.4%	9.3%
Obese	8.1%	8.5%	7.7%
Weight-for-age Z-score	-0.35 \pm 1.38	-0.36 \pm 1.44	-0.33 \pm 1.33
Underweight	7.1%	7.5%	6.7%
Severely underweight	0.9%	1.0%	0.8%
Height-for-age Z-score	-0.67 \pm 0.97	-0.71 \pm 0.98	-0.63 \pm 0.96
Stunted	7.8%	8.7%	6.9%
Severely stunted	0.6%	0.9%	0.4%

^a Preschoolers aged 5 years 0 month and below (total, n = 762; boys, n = 391; girls, n = 371).

^b Preschoolers aged 5 years 1 month and above (total, n = 1171; boys, n = 538; girls, n = 633).

^c Term used for children aged 5 years 0 month and below.

^d Term used for children aged above 5 years.

Table 4. Frequency of food consumption among preschoolers

Food intake / frequency (%)	No	1-2 times	3-4 times	5-6 times	>6 times
Main meals (per week)					
Breakfast	0.7	2.6	7.1	6.4	83.1
Lunch	0.3	0.9	5.2	5.3	88.4
Dinner	0.3	2.4	12.1	7.6	77.8
Fruits and vegetables (per week)					
Fruits	3.8	23.0	37.6	8.2	27.5
Vegetables	12.0	20.0	23.8	6.6	37.6
Milk and dairy products (per day)	7.1	36.3	33.8	22.8	-
Fast foods (per month)	6.5	47.9	29.1	6.4	10.1
Snacks (per week)	5.3	32.3	30.7	8.2	23.5
Supplement (per week)	24.4	12.6	12.2	4.8	46.0

common type of milk consumed, followed by fresh milk or Ultra Heat Treatment (UHT) milk (Table 4).

About half of the preschoolers (45.6%) consumed fast food at least 3 times a month. In contrast, 62.0% were snacking at

least 3 times a week. The most frequently consumed fast foods in descending order were fried chicken (58.0%), French fries (36.8%), nuggets (29.6%), burgers (27.0%) and sausages (18.1%). More than half (55.8%) of the preschoolers preferred deep

fried foods. Food preparation by boiling (29.4%) was less favoured, whereas grilling (2.7%) was the least preferred method. Most of the preschoolers (46.0%) took supplements more than 6 times per week. The most common types of supplements taken were vitamin C (49.8%), fish oil (25.0%) and multivitamins (23.1%).

Tables 5 and 6 show the association between parents' education level and household income with food habits using the chi-square test of independence. No association was found between socio-demographic background and BMI-for-age with the consumption of the three main meals and BMI-for-age with other food habits. Therefore the results were not included in both tables. However, for socio-demographic background, there was a significant association between household income and frequency of fruits ($\chi^2 = 12.00$, $p=0.02$) and vegetables consumption ($\chi^2 = 10.53$, $p=0.03$). More children from the higher household income consumed fruits and vegetables more than 5 days a week while more children from the lower household income ate fruits and vegetables on fewer days. Household income was also found to be significantly associated with milk and dairy products intake ($\chi^2 = 27.06$, $p=0.01$) and supplement consumption ($\chi^2 = 26.15$, $p=0.01$).

Father's education level was found to be significantly associated with vegetables intake, ($\chi^2 = 8.19$, $p=0.02$) (Table 5), milk and dairy products intake ($\chi^2 = 3.33$, $p=0.01$), and supplements consumption ($\chi^2 = 11.52$, $p=0.01$) (Table 6). Mother's education level was also significantly associated with fruits ($\chi^2 = 12.01$, $p=0.01$), milk and dairy products ($\chi^2 = 25.90$, $p=0.01$) intake and supplement consumption ($\chi^2 = 27.0$, $p=0.01$) (Table 6).

DISCUSSION

The results of this study showed that a majority of the preschoolers consumed three main meals daily. According to

various studies, children who ate breakfast regularly made good food choices throughout the day such as consuming more vegetables and milk, drinking fewer soft drinks, and eating fewer French fries (Lattimore & Halford, 2003; Rampersaud *et al.*, 2005). The proportion of meal skippers in this study was low, in agreement with previous reported studies in the Klang Valley (Norimah & Lau, 2000; Poh *et al.*, 2012). Studies in the United States (Rampersaud *et al.*, 2005) and Switzerland (Ebenegger *et al.*, 2010) reported a higher proportion of their preschoolers skipping meals. This demonstrates that skipping meals is a common practice among preschoolers. Veugelers, Fitzgerald & Johnston (2005) showed that skipping meals has a negative effect on diet quality, probably because these meals have been replaced by less nutritious snack foods. In other publications related to this topic, we have also found that children who skipped dinner (consumed dinner less than 5 days a week) had lower cognitive functions than children who consumed dinner more than 5 days a week (Mohd Nasir *et al.*, 2012).

In the present study, consumption of monthly fast foods and weekly snacks was quite rampant, with almost a majority of the preschoolers eating these foods at least once or twice monthly for fast foods and once to twice weekly for snacks. Consumption of fast foods and snacks which contain high sugar, fat and salt if eaten habitually may lead to obesity problems among preschoolers. Although this study did not show any significant association between body weight status and food habits, previous studies have reported that poor eating habits of children could increase their body weight (LaRow, Moeller & Adams, 2007); Macfarlane *et al.*, 2009). To overcome this problem, good nutrition knowledge and practice and the importance of consuming main meals at home should be emphasised when promoting healthy food habits in preschoolers.

Table 5. Difference in proportion of children based on frequency of fruit and vegetable intake and socio-demographic characteristics

Variable	Fruits		p	Vegetables		p
	<5 days/week	>5 days/week		<5 days/week	>5 days/week	
Father's education level						
No formal & primary education	3.6	2.9		4.0	2.5	
Secondary education	62.4	57.4		62.3	58.5	
Tertiary education	34.0	39.7		33.7	39.0	
Total	100.0	100.0	0.05	100.0	100.0	0.02
Mother's education level						
No formal & primary education	3.5	2.5		2.7	3.6	
Secondary education	61.0	54.2		60.8	55.9	
Tertiary education	35.5	43.3		36.5	40.5	
Total	100.0	100.0	0.01	100.0	100.0	0.07
Household income (RM)						
< 1500	27.2	21.6		27.3	22.7	
1501 - 3500	36.5	39.0		36.8	38.2	
3501 - 5500	20.7	21.5		20.1	22.0	
5501 - 7500	7.6	10.6		9.2	8.0	
>7500	8.0	7.3		6.6	9.1	
Total	100.0	100.0	0.02	100.0	100.0	0.03

Note: p indicates the level of significance in the difference in proportion assessed by chi-square test of independence. Proportion is stated as percentage (%)

Table 6. Difference in proportion of children based on the consumption of milk and dairy products, fast food and supplements, and socio-demographic characteristics

Variables	Milk and dairy products			Fast food			Supplements		
	<5 times/day	>5 times/day	p	<5 times/month	>5 times/month	p	<5 days/week	>5 days/week	p
Father's education level									
No formal & primary education	4.0	1.1		3.4	3.2		4.2	2.5	
Secondary education	63.1	52.0		61.3	57.1		62.9	58.3	
Tertiary education	32.9	46.9		35.3	39.7		32.9	39.2	
Total	100.0	100.0	0.01	100.0	100.0	0.34	100.0	100.0	0.01
Mother's education level									
No formal & primary education	3.3	2.7		3.3	2.2		4.3	1.9	
Secondary education	61.5	48.6		58.3	59.9		62.6	54.7	
Tertiary education	35.2	48.7		38.4	37.9		33.1	43.4	
Total	100.0	100.0	0.01	100.0	100.0	0.56	100.0	100.0	0.01
Household income (RM)									
< 1500	27.2	18.8		25.3	25.1		29.0	21.6	
1501 - 3500	37.9	35.8		36.9	39.8		38.0	36.9	
3501 - 5500	19.9	24.5		21.5	18.2		19.6	22.3	
5501 - 7500	8.6	8.8		8.7	8.5		8.0	9.2	
>7500	6.4	12.1		7.6	8.4		5.4	10.0	
Total	100.0	100.0	0.01	100.0	100.0	0.67	100.0	100.0	0.01

Note: p indicates the level of significance in the difference in proportion assessed by chi-square test of independence. Proportion is stated as percentage (%)

The socio-demographic background was significantly associated with dinner consumption, and fruits and vegetables intake among the preschoolers. Preschoolers from the higher household income ate dinner, fruits and vegetables more frequently than those in the lower household income. In a study by Zarnowiecki *et al.* (2014), children of low socio-economic position were found to have higher intake of non-core foods and sweetened drinks, and had lower intake of fruits and vegetables. Parents with higher socio-economic status were also found to know more about dietary guidelines than parents with lower socio-economic status (Skårdal *et al.*, 2014). Socio-demographic factors were also found to influence lifestyle behaviours (Fitzgerald & Spaccarotella, 2009). It has been reported that changes in working conditions, dual-income or single-parent households, and lack of time to cook could lead to increased consumption of ready-made and ready-to-eat foods, most of which are rich in added fat and sugar (Tillotson, 2004).

Parents' educational level and household income were found to be positively associated with fruits and vegetables intake in this study. Similar results were reported by Rasmussen *et al.* (2006) who noted that socio-economic status of the family has also been associated with fruits and vegetables consumption. Children of parents with higher occupational status consumed fruits and vegetable more often than children of parents with lower occupational status. Lower frequency of family meals has been reported among children whose mothers worked full-time (versus those whose mothers were not employed) (Neumark-Sztainer *et al.*, 2003). This association might be the result of time constraints to prepare meals due to their employed status. Parents influenced their children's eating habits by controlling availability and accessibility of foods at home and modeling food-related behaviours (Reinaerts *et al.*, 2007).

Repeated exposure to meals that include vegetables at lunch in kindergarten was found to increase vegetable intake and level of liking towards vegetables among preschoolers in Muar, Johor (Noradilah & Zahara, 2012). Low nutrition knowledge has been reported as barriers to fruits and vegetables intake. Food label use, a nutrition-related skill was also positively related to nutrition knowledge and intake of fruits and vegetables (Fitzgerald & Spaccarotella, 2009). This shows that parents' awareness of the benefits of fruits and vegetables in children's diet is important to ensure that the children have adequate intakes daily.

Although the proportion of preschoolers eating vegetables was higher than those consuming fruits, the proportion who did not eat vegetables over fruits was three times higher. Poh *et al.* (2012) also reported that preschoolers preferred to eat fruits (95.1%) over vegetables (65.1%). Bell and Tepper (2006) explained that children disliked vegetables due to their sensitivity towards bitter taste. Fruits are often sweeter, and therefore, more preferred than vegetables. Children's food selection could be improved and influenced by parents who are responsible for preparing the meals and making sure the food is available for children to eat. Accessibility of fruits and vegetables at home was found to be important for children with low preference for fruits and vegetables, for example, children who liked fruits and vegetables were found to consume fruits and vegetables whenever they are available, but children who disliked fruits and vegetables will only consume them when they are both available and easy to access (Reinaerts *et al.*, 2007).

The majority of the preschoolers consumed milk or dairy products at least three times or more daily. This milk consumption pattern suggests that these children might still be transitioning from toddlerhood to childhood eating habits. This might also reflect that the

children were getting more calories from milk, consequently replacing other micronutrient-dense foods resulting in less variety of dietary intake (Skinner *et al.*, 2002). However, in this study, dietary intake of the preschoolers was not assessed. It is important for parents to introduce children to various sources of healthy foods to make their eating experience more enjoyable and nutritious at the same time.

The preschoolers in this study preferred fried foods over the healthier options of boiled or grilled foods. These results were similar to those reported a decade earlier (Norimah & Lau, 2000). The findings demonstrate that the preference for fried foods among preschoolers remains unchanged. This raises doubts as to whether the nutrition quality of the foods consumed by these preschoolers is sufficiently healthy, despite some good food habits that had been demonstrated. In this study, the majority of mothers were working women.

In this study, parents' education level and household income were not related to the frequency of fast food intake. However, fast foods and also snacks remain favourite foods among the preschoolers despite differences in their socio-demographic background. Taste plays an important role since children tend to choose foods high in sugar, sodium and saturated fat (Vereecken *et al.*, 2004). Furthermore, advertisements in the media promote high-energy food intake, especially fast foods targeting children (Borzekowski & Robinson, 2001). The media exposure may increase the tendency of children to request energy-dense snacks rather than healthy foods.

Having family meals frequently at home can be a way out to overcome the habit of eating high-fat foods. Controlling portion sizes of energy-dense foods, frequency of meals and increasing portion sizes of fruits and vegetables may be beneficial in controlling energy intake (Wroten *et al.*, 2012). Children tend to imitate the diets of their parents (Hart *et*

al., 2010). Therefore, parents should play a significant role in setting a good example, providing healthy food choices and also preparing a more nutritious meal at home.

Although the present study had a large sample size and included preschoolers from all states of Peninsular Malaysia, selection bias might have occurred as only interested parents and guardians will consent to their children's participation in the study. This could be a limitation. Besides, this study was only evaluating the frequency of food intake from food groups, and thus the absolute intake of the foods could not be determined. Consequently, comparison of food intake with the Malaysian Dietary Guideline was not possible. Nevertheless, this study provides an insight on the current food habits of preschoolers in Malaysia.

CONCLUSION

The majority of preschoolers consumed their three main meals daily. However, the habit of eating vegetables, fruits and milk daily needs to be inculcated as many were eating these foods less frequently than recommended. Eating dinner, fruits, vegetables and milk were found to be associated with parents' education level and household income but not with the children's body weight status. The results suggest that in improving the food habits of preschoolers, both long-term and short-term nutrition education and promotion among parents and children are required. Parents and guardians should play a more proactive role in promoting good nutrition and food habits among preschoolers. Inculcating good nutrition knowledge and sound eating habits would go a long way through adulthood and life span.

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