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ORIGINAL ARTICLE

Breakfast Intake and its Association with Body Mass Index among Pre-schoolers in *Taska Permata Keluarga Kuala Nerus, Terengganu*

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Abstract

In Malaysia, breakfast is the most frequently skipped meal. Skipping breakfast has been associated with an increased risk of childhood obesity. However, this relationship has not been investigated widely among preschoolers in Malaysia. Hence, this cross-sectional study aimed to determine the association between breakfast intake and Body Mass Index (BMI) among preschoolers in *Taska Permata Keluarga (TPK)*, Kuala Nerus. A total of 131 Malays preschoolers aged four to six years old were recruited from nine TPK using convenience sampling method. Information on sociodemographic, breakfast intake pattern and anthropometric measurements (weight and height) were obtained. Respondents consisted of 74 (56.5%) boys and 57 (43.5%) girls. Anthropometric results showed that 8.4% preschoolers were overweight and obese. Among the preschoolers, 22.1% of them were breakfast skippers. In terms of gender breakdown, 20.3% boys and 24.6% girls skipped breakfast. There was a significant association between breakfast intake and BMI status among preschoolers ($p = 0.003$). This indicated that preschoolers that skipped breakfast were associated with overweight or obese compared to those who consumed breakfast daily. Breakfast consumption is a marker of a healthy lifestyle which can reduce the risk of childhood obesity. This habit should be inculcated during this critical period of life in which parents play a vital role in promoting breakfast consumption among preschoolers.

Keywords: Breakfast intake; pre-schoolers; overweight; obese

Introduction

Breakfast is definitely considered as the most vital meal of the day for all generation (Nicklas, McQuarrie, Fastnaught, & O'Neil, 2002). Breakfast is widely being promoted as essential for the nutritional well-being of the children as they are still in the growing and developing process. Research conducted to show that breakfast consumption is fundamental to health and

development of adolescents (Nurul-Fadhilah, Teo, Huybrechts, & Foo, 2013). A study carried out by Timlin, Pereira, Story, and Neumark-Sztainer (2008) proved that regular breakfast consumption increase satiety, prevent weight gain and subsequently reduce the likelihood of childhood obesity.

Although breakfast intake contributes a lot of benefits; worldwide, people still skip breakfast and show unhealthy eating practice especially children and adolescents (Affinita, Catalani, Cecchetto, De Lorenzo, Dilillo, Donegani & Zuccotti, 2013). In Malaysia, studies found that breakfast is the most frequently skipped meal among school children and adolescents (Moy, Ying, & Kassim, 2006). Findings from the South East Asian Nutrition Surveys (SEANUTS) conducted among 2797 Malaysian children, reported only three in five children aged two to 12 years eating breakfast every day. The study found that 3% of the children never consumed breakfast. These data suggest that breakfast skipping has become relatively common among Malaysian children (Chong, Wu, Noor Hafizah, Bragt, & Poh, 2016).

A survey carried out in the United States among Hispanic children aged two to five years found that 9.7% of them were at or above the 97th percentile of the BMI-for-age growth chart; 12.1% were at or above 95th percentile and 26.7% were at or above the 85th percentile (Pérez-Morales, Bacardí-Gascón, & Jiménez-Cruz, 2012). Besides, data from the World Health Organization (2018) revealed that the number of overweight or obese children under the age of five had increased from 32 million worldwide in 1990 to 41 million in 2016. Meanwhile, over 340 million children and adolescents aged five to 19 years were overweight or obese in 2016. According to United Nations International Children's Emergency Fund (UNICEF) (2016), more than 7% of Malaysian children less than five years old are overweight. Meanwhile, the Institute for Public Health (IPH) (2016) reported that 1.6% of Malaysian children aged less than five years old were overweight. In fact, there is an increasing evidence demonstrating a positive association between breakfast skipping behaviour and overweight or obesity (Garg, Rajesh, & Kumar, 2014; Papoutsou et al., 2014; Tin, Ho, Mak, Wan, & Lam, 2011). Thus, maintaining a healthy weight by practising breakfast consumption is important to reduce the risk of becoming an overweight or obese adult later in life.

Previously, considerable research has been performed to investigate the breakfast eating pattern among school children and adolescents. Nevertheless, studies in Malaysia examined breakfast intake pattern specifically in preschool-aged children are still scarce. Information on this area is still lacking and limited particularly in the East Coast region of Malaysia. In addition, the relationship between breakfast consumption and obesity in this age group has not been well examined. Thus, this study was carried out to investigate the association between breakfast intake and BMI among preschoolers in TPK Kuala Nerus, Terengganu.

Materials and Methods

Research design

A cross-sectional study with convenience sampling method was conducted among preschoolers from nine TPK Kuala Nerus, Terengganu. Ethical approval was obtained from UniSZA Human Research Ethics Committee (UHREC) and permission to conduct the study was obtained from the *Yayasan Pembangunan Keluarga Terengganu* (YPKT). An information sheet was sent to parents together with standard consent form prior to the commencement of the study. Verbal consent was obtained from the children before collecting their anthropometric measurements.

Sampling method

The sample size was 114 subjects calculated using single proportion formula with obesity proportion of 0.081 among pre-schoolers (Mohd Nasir et al., 2012) and precision decided at 0.05. After considering the drop-out rate at 20%, a total of 143 preschoolers who met the inclusion

criteria were recruited in this study. Inclusion criteria were children aged four to six year from both sexes. Exclusion criteria were children with mental disabilities.

Questionnaire

The questionnaire consisted of three main parts namely Part A (socio-demographic data of the children), Part B (socio-demographic data of the parents) and Part C (children's breakfast intake patterns). This questionnaire comprised of structured questions and is written in the Malay language. Parents were given clear instruction on the correct way to fill in the questionnaire and to be completed in one week's time if they agreed to participate in the study. The questionnaire was then collected back by the respective teachers.

Part A consisted questions on the date of birth, age, birth weight, sex, race, religion, number of siblings and order in the family. Part B was information on the caregivers or parents like sex, age, phone number, address, educational level, total schooling year, occupation and household income. The questions used in Part C was modified and adapted with permission from the Nutritional Status and Dietary Habits of Primary School Children in Peninsular Malaysia Year 2001-2002 (Ismail et al., 2009). This part involves detailed questions on frequency of breakfast intake during weekdays and weekend, place of eating breakfast, reasons for eating and not eating breakfast and consumption of breakfast prepared at the kindergarten.

In this study, breakfast was defined as any food and beverage consumed within 2 hours of waking, before or at the start of daily activities and no more than 10 a.m. (Giovannini et al., 2008). On the other hand, breakfast skipping is defined as breakfast consumption less than seven days per week (Cheng et al., 2008; Dubois et al., 2009; Moy et al., 2009).

Anthropometric measurement

The measurements of body weight and height of the preschoolers were performed according to standard procedure. A portable Electronic Weighing Scale Seca 813 (SECA, Germany) was used to measure the body weight twice to get the mean value and record to the nearest 0.1 kg (Lee & Nieman, 2013). The respondents were asked to remove their footwear and socks, empty their pockets before stepping onto the scale. The respondents should stand still, face forward in the Frankfurt horizontal plane, put the arm on the side and wait until asked to step off (Lee & Nieman, 2013).

The height was measured twice using a portable Stadiometer Seca 217 (Seca, Germany) and recorded to the nearest 0.1 cm. The mean values were calculated to reduce the possible bias. The respondents were asked to remove their footwear and headgear before measuring. They should stand erected facing the researchers, with heels, buttocks, head and shoulder blades in vertical line against the stadiometer with their head in the Frankfurt horizontal plane (Lee & Nieman, 2013).

BMI status was classified using WHO child growth standards for 0 to 5 years (WHO, 2006) and the WHO growth references for 5 to 19 years (WHO, 2007). Z-scores for BMI-for-age was determined using the WHO Anthro software version 3.2.2 for children aged four years (WHO, 2010) while WHO AnthroPlus software version 1.0.4 for children aged five and six years (WHO, 2009).

Statistical analysis

The research data were analysed using IBM SPSS for Windows version 21.0. Data were entered, cleaned and checked before data analysis. The normality of each variable was tested first to examine whether they meet the normal distribution assumptions using the Kolmogorov Smirnov test. Non-parametric tests were used when the data is not normally distributed. Descriptive

statistics were reported as mean (standard deviation) or median (interquartile range) for numerical variables and frequency and percentage for categorical variables.

Besides, Fisher's exact test was performed to evaluate the association between BMI status and breakfast consumption patterns among the preschoolers in Kuala Nerus. The categorical data was labelled with the coded value for data analysis. For this test, BMI status was compressed into two categories namely normal weight and overweight or obese. A two-sided P value of < 0.05 was considered statistically significant.

Results

Sociodemographic characteristics of the pre-schoolers

According to Table 1, the subjects consisted of 74 (56.5%) boys and 57 (43.5%) girls in which all of them were from one ethnicity (Malays). In terms of age breakdown, more than half of the preschoolers (76.3%) were aged 4 years with the remaining of them aged 5 and 6 years. The mean age was 4.3 (0.7) years old. Among the preschoolers, 116 (88.5%) of them were born with normal birth weight and only 15 (11.5%) of them were born with low birth weight. The mean birth weight for the preschoolers was 3.0 (0.4) kg.

Table 1. Sociodemographic characteristics of the pre-schoolers according to sex (n = 131)

Preschoolers' characteristics	Boy (n = 74)	Girl (n = 57)	Total (n = 131)
	n (%)		
Age (years old)^a	4.4 (0.7)	4.2 (0.5)	4.3 (0.7)
4	53 (71.6)	47 (82.5)	100 (76.3)
5	10 (13.5)	7 (12.3)	17 (13.0)
6	11 (14.9)	3 (5.3)	14 (10.7)
Birth weight (kg)^a	3.1 (0.5)	3.0 (0.4)	3.0 (0.4)
Low birth weight (< 2.5)	7 (9.5)	8 (14.0)	15 (11.5)
Normal birth weight (≥ 2.5)	67 (90.5)	49 (86.0)	116 (88.5)

^aMean (Standard deviation)

Sociodemographic characteristics of the parents

As shown in Table 2, most of the preschoolers' parents (98.5%) were married. In terms of educational attainment, more than half of their parents (73.3%) had completed a tertiary level of education. More than half (67.2%) of the parents were a government employee, followed by 16.0% worked in the private sector. About one third (34.4%) of the families earned monthly household income between RM1501 to RM 3500, followed by 27.5% of the families earned monthly household income between RM3501 to RM 5500.

Table 2. Sociodemographic characteristics of the parents according to preschoolers' sex (n = 131)

Parents' characteristics	Boy	Girl	Total
	(n = 74)	(n = 57)	(n = 131)
	n (%)		
Current marital status			
Single	0 (0.0)	2 (3.5)	2 (1.5)
Married	74 (100.0)	55 (96.5)	129 (98.5)
Education levels			
No formal education/Primary school	0 (0.0)	1 (1.8)	1 (0.8)
Secondary school	22 (29.7)	12 (21.1)	34 (26.0)
Tertiary education	52 (70.3)	44 (47.2)	96 (73.3)
Occupation			
Government employees	48 (64.9)	40 (70.2)	88 (67.2)
Private sector workers	11 (14.9)	10 (17.5)	21 (16.0)
Self-employed	12 (16.2)	6 (10.5)	18 (13.7)
Unemployed	3 (4.1)	0 (0.0)	3 (2.3)
Others	0 (0.0)	1 (1.8)	1 (0.8)
Monthly household income (RM)			
< 1500	12 (16.2)	5 (8.8)	17 (13.0)
1501-3500	21 (28.4)	24 (42.1)	45 (34.4)
3501-5500	24 (32.4)	12 (21.1)	36 (27.5)
5501-7500	9 (12.2)	10 (17.5)	19 (14.5)
> 7500	8 (10.8)	6 (10.5)	14 (10.7)

Anthropometric measurements of the preschoolers according to sex

Table 3 shows the median weight, height, BMI and BMI-for-age (z-score) and BMI status of the preschoolers according to sex. The median (IQR) weight, height, BMI and BMI-for-age (z-score) were 14.30 (2.80) kg, 97.90 (8.10) cm, 14.75 (2.10) kg/m² and -0.40 (1.59), respectively. The differences between sex and anthropometric measurements were not significant at p > 0.05. This indicated that both boys and girls had an almost equal weight, height, BMI and BMI-for-age (z-score). Majority of the respondents were having normal weight. There were more preschoolers who were overweight (4.6%) and obese (3.8%) compared to those who were thin (3.1%) and severe thinness (2.3%). However, there was no significant association between sex and BMI status (p = 0.348).

Table 3. Anthropometric assessments according to sex (n = 131)

Anthropometric measurements	Boy	Girl	Total	Z-statistics	P-value ^a
	(n = 74)	(n = 57)	(n = 131)		
	Median (IQR)				
Weight (kg)	14.23 (4.19)	14.30 (2.33)	14.30 (2.80)	-0.799	0.424
Height (cm)	98.18 (13.19)	97.70 (7.00)	97.90 (8.10)	-0.583	0.560
BMI (kg/m²)	15.00 (2.11)	14.70 (1.55)	14.75 (2.10)	-1.379	0.168
BMI-for-age (z-score)	-0.21 (1.76)	-0.41 (1.18)	-0.40 (1.59)	-0.968	0.333
BMI status^b	n				
Severe thinness	1	2	3		0.348 ^c
Thinness	2	2	4		
Normal	62	51	113		
Overweight	5	1	6		
Obese	4	1	5		

^aMann Whitney U test was applied. ^bPreschoolers aged 4 using WHO child growth standard 2006; preschoolers aged 5 and 6 using WHO growth reference 2007. ^cPearson's chi-square test was applied.

Breakfast intake pattern of the pre-schoolers

Since all the preschoolers consumed their breakfast at *TPK*, none of them missed breakfast during weekdays. Meanwhile, for the weekends, the majority (77.9%) of the preschoolers consumed their breakfast for both days with only 6.1% of them reported that they do not consume breakfast at all. Based on the total of 131 preschoolers, about two-third of them (77.9%) consumed breakfast daily whereas the rest of the preschoolers (22.1%) had skipped breakfast which indicated that their breakfast intake were fewer than seven times per week (Table 4 and Figure 1).

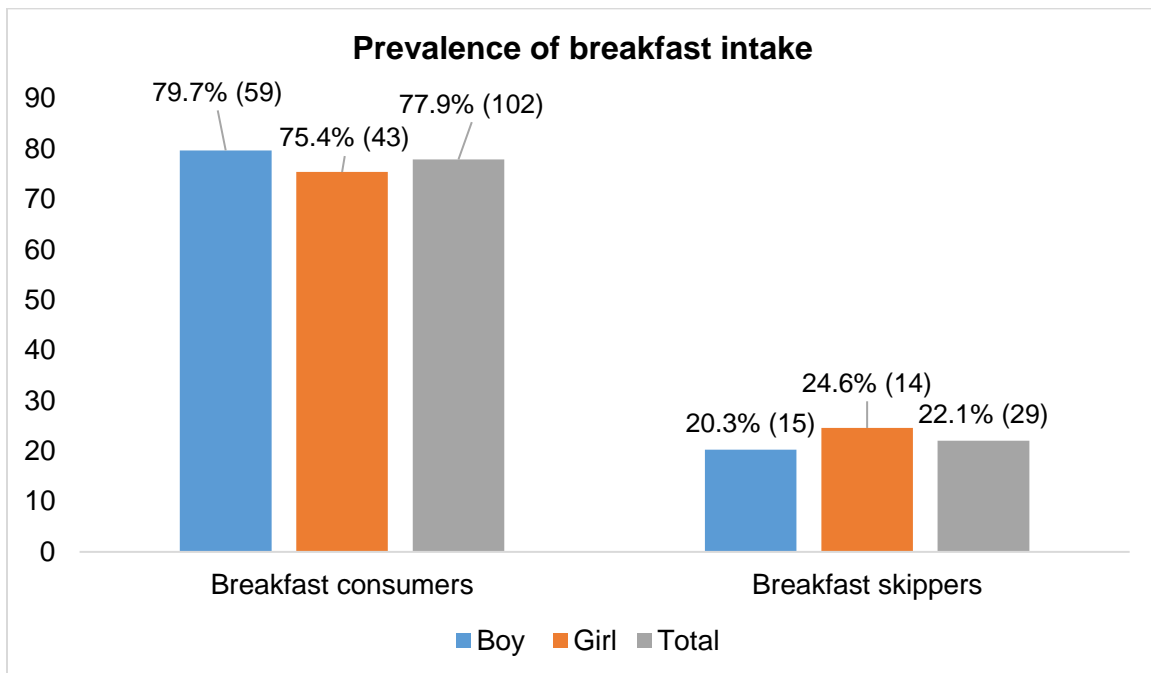


Figure 1. Prevalence of breakfast intake among preschoolers in TPK Kuala Nerus

Besides consumed breakfast at *TPK*, 61.1% preschoolers consumed their breakfast at home before going to *TPK* and about half (43.5%) of the preschoolers consumed breakfast outside. There were more boys consumed their breakfast at home before going to *TPK* (64.9%) and consumed breakfast outside (47.3%) compared to girls with 56.1% and 38.6%, respectively as shown in Table 4.

It is noted that most of the parents reported the reason their children need to consume breakfast was to improve cognitive performance (37.4%), followed by to prevent hunger (34.4%) and to become healthy (25.2%). For parents of the boys, the most common reason for consuming breakfast is to improve cognitive performance (40.5%) while to prevent hunger is the most common reason for consuming breakfast among girls (40.4%). The main barrier provided to explain why the preschoolers skipped breakfast was due to poor appetite (65.5%) and followed by not served (27.6%). Poor appetite is the most common reason for not consuming breakfast for both boys and girls with 66.7% and 64.3%, respectively (Table 4). From the results obtained as shown in Table 4, there was no significant association between breakfast intake pattern and sex ($p > 0.05$).

Table 4. Breakfast intake pattern of the preschoolers according to sex (n = 131)

Variables	Boy (n = 74)	Girl (n = 57) n (%)	Total (n = 131)	X ² -statistics (df)	p-value ^a
Breakfast consumption during weekends					
No	4 (5.4)	4 (7)	8 (6.1)	-	-
1 day	11 (14.9)	10 (17.5)	21 (16.0)		
2 days	59 (79.7)	43 (75.4)	102 (77.9)		
Frequency of breakfast consumption in a week					
Everyday	59 (79.7)	43 (75.4)	102 (77.9)	0.344 (1)	0.558
< 7 days	15 (20.3)	14 (24.6)	29 (22.1)		
Breakfast group					
Breakfast consumers	59 (79.7)	43 (75.4)	102 (77.9)	0.344 (1)	0.558
Breakfast skippers	15 (20.3)	14 (24.6)	29 (22.1)		
Place where breakfast was eaten during weekdays					
At TPK	74 (100)	57 (100)	131 (100)	-	-
At home					
Yes	48 (64.9)	32 (56.1)	80 (61.1)	1.013 (1)	0.310
No	26 (35.1)	25 (43.9)	51 (38.9)		
At outside					
Yes	35 (47.3)	22 (38.6)	57 (43.5)	0.992 (1)	0.319
No	39 (52.7)	35 (61.4)	74 (56.5)		
Reasons for consuming breakfast					
To become healthy	19 (25.7)	14 (24.6)	33 (25.2)		
To prevent hunger	22 (29.7)	23 (40.4)	45 (34.4)		
To improve cognitive performance	30 (40.5)	19 (33.3)	49 (37.4)	-	-
Delicious	1 (1.4)	-	1 (0.8)		
Other	2 (2.7)	1 (1.8)	3 (2.3)		
Reasons for not consuming breakfast (n= 29)					
Poor appetite	10 (66.7)	9 (64.3)	19 (65.5)		
Not served	4 (26.7)	4 (28.6)	8 (27.6)	-	-
Too early	1 (6.7)	0 (0.0)	1 (3.4)		
Other	0 (0.0)	1 (7.1)	1 (3.4)		

^aPearson's chi-square test was applied.

Association between BMI status and breakfast intake

A significant association between breakfast group and BMI status was found in Table 5 with p = 0.003. The prevalence of overweight or obesity (4.2%) among breakfast consumers was lower than breakfast skippers (25.0%). This indicated that breakfast skippers tend to be overweight and obese compared to their counterpart. In terms of sex breakdown, there was also a significant association between breakfast group and BMI status for boys with p = 0.012. However, the breakfast group was found to be not significantly associated with BMI status among girls (p = 0.066).

Table 5. Association between BMI status and breakfast intake (n =124)

Variables	Boy (n = 71)			Girl (n = 53)			Total		
	BF consumer (n = 57) n (%)	BF skipper (n = 14) n (%)	P-value ^a	BF consumer (n = 39) n (%)	BF skipper (n = 14) n (%)	P-value ^a	BF consumer (n = 96) n (%)	BF skipper (n = 28) n (%)	p-value ^a
BMI status	Normal	53 (93.0)	9 (64.3)	39 (100.0)	12 (85.7)	0.066	92 (95.8)	21 (75.0)	0.003**
	Overweight or obese	4 (7.0)	5 (35.7)	0 (0.00)	2 (14.3)		4 (4.2)	7 (25.0)	

^aFisher's exact test was applied.

*Statistically significant at p< 0.05

** Statistically significant at p<0.01

Discussion

Anthropometric assessments of pre-schoolers

The median weight and height of the preschoolers showed no significant difference for both boys and girls in the present study. Besides median weight and height, median BMI, BMI-for-age and BMI status also showed no significant difference among the preschoolers. These results were consistent with the findings from the Nutrition Survey of Malaysian Children (SEANUTS Malaysia) which reported no significant difference of preschoolers' anthropometric characteristics observed between sex (Poh et al., 2013).

For the BMI status, it was demonstrated that the prevalence of severe thinness, thinness, overweight and obese were 2.3%, 3.1%, 4.6% and 3.8%, respectively. For the categories of overweight and obese, it is comparable with the study on Kelantan's preschoolers which reported the prevalence of 5.4% overweight and 2.7% obese, respectively (Ruhaya et al., 2012). Besides, a study carried out in Selangor reported there were 4.8% preschoolers who were overweight and 4.8% of them who were obese, respectively (Aziz & Devi, 2012). This finding was almost similar to the findings of the present study.

The prevalence of overweight and obese was higher than that of thinness in this study. This finding was similar to the previous findings of Pang et al. (2003) reported a higher percentage of overweight (9.3%) than underweight (6.9%) and stunting (4.2%). Besides, a study among preschoolers aged four to six years in Peninsular Malaysia also claimed that higher prevalence of overweight (7.9%) and obesity (8.1%) compared to thinness (3.9%) and stunting (8.4%) (Mohd Nasir et al., 2012). A more recent study revealed that there were 11.8% obese and 9.8% overweight children aged six months to 12 years compared to only 5.4% of children with thinness (Poh et al., 2013). These findings demonstrated that there was a coexistence of both overweight and obese with thinness in the studied age group.

Breakfast intake patterns among pre-schoolers

In the present study, all the preschoolers consumed breakfast during weekdays because the children were attending TPK which the breakfast will be provided. However, only 77.9% of them consumed breakfast during the two weekend days. This finding was supported by Fleig and Randler (2009) and Alexy et al. (2010) which stated that breakfast frequency was lower during the weekends. Hence, it can be seen that 22.1% preschoolers skip breakfast at least once a week. A few studies had been conducted which provided the prevalence of breakfast skipping among

preschoolers. A study was done in Klang Valley on children aged five to six years reported that 13.6% of them do not consume breakfast every day (Poh et al., 2012). Moreover, Norimah et al. (2014) conducted a study on preschool children in Peninsular Malaysia reported that only 0.7% of them skip breakfast.

The prevalence of breakfast consumption differed among different studies. This might be due to different dietary habits and varied breakfast definitions used in different study settings which lead to inconsistencies in results (Alexy et al., 2010). The proportion of breakfast skippers in this study was generally higher than the previous local studies carried out among preschoolers. This indicated that breakfast skipping behaviour has become increasingly prevalent among Malaysian preschoolers. Therefore, the root cause of this unhealthy eating habit must be identified and solved as soon as possible as it can exert important long-term implications.

This study showed that breakfast frequency and sex is not differed significantly. Alexy et al. (2010) also found that there are no significant sex differences in breakfast frequencies among two to 18 years old Germany children. Apart from that, another study also found no sex differences in breakfast intake in Australia population involving children aged two to 18 years old (Dubois et al., 2006). Sex differences in breakfast intake tend to dominate when children grow older. Moy et al. (2006) reported that adolescent girls have a higher risk of skipping breakfast due to body image dissatisfaction. However, girls at preschool age are not too concern of their body image and therefore do not receive any societal pressure and expectations.

The most common barrier why preschoolers skip their breakfast was due to poor appetite (65.5%). This finding is consistent with the other findings from Kuala Lumpur, Malaysia (Lew, 2006; Poh et al., 2012). Besides, finding from SEANUTS also reported that lack of appetite was the major barrier to breakfast eating (Chong et al., 2016). The second most commonly cited reason was that the breakfast was not being served. According to the American Dietetic Association (ADA) (2008), preschoolers are dependent on parents to provide the food during mealtimes. This highlighted the important role of the parents in providing healthy breakfast choice for their children.

Association between breakfast intake and BMI status

This study identified a significant association between breakfast groups and BMI status in which breakfast consumers were less likely to be overweight or obese compared to the breakfast skippers. Previous studies reported an association with breakfast skipping to increased prevalence of becoming overweight or obese (Niemeier et al., 2006; Fabritius & Rasmussen, 2008; Deshmukh-Taskar, Nicklas, et al., 2010; Kontogianni et al., 2010; Szajewska & Rusczyński, 2010; Horikawa et al., 2011; Papoutsou et al., 2014; Ahadi et al., 2015). This is due to the physiologic mechanisms hypothesized to reduce appetite and subsequently risk of obesity (Timlin et al., 2008). Besides, breakfast consumption will also lead to an increased frequency of eating meals in which the daily energy intake can be distributed more evenly (Dubois et al., 2009). This indirectly can increase dietary induced thermogenesis and energy expenditure (Biddle et al., 2004; Drummond et al., 1996). As a result, breakfast consumers tend to have a normal and healthy body weight.

On the other hand, various studies demonstrated that breakfast skipping is associated with overweight (Dubois et al., 2006; Hoyland et al., 2009) or weight gain (Huang et al., 2010). Breakfast skippers tend to be overweight than breakfast eaters because they are making unhealthy food choices after missed the breakfast (Keski-Rahkonen et al., 2003). They tend to eat more low nutrient or high energy density containing food (Nicklas et al., 2000) such as fast food (Niemeier et al., 2006) or consume a large amount of discretionary energy during other meals of the day (Deshmukh-Taskar, Radcliffe, et al., 2010). They usually consume less protein which leads to weight gain (Affenito et al., 2005).

Not only that, breakfast skippers tend to have a lower satiety and more appetite (Miech et al., 2006) which lead to subsequent consumption of meal with large portion sizes (Lioret et al.,

2009). According to Utter et al. (2007), breakfast skippers are more likely to snack throughout the day. Snacking habits might increase energy intake beyond the needs of energy expenditure and induce weight gain (Keast, Nicklas, & O'Neil, 2010). Therefore, instead of controlling other meals of the day, controlling breakfast intake is more likely to exert an effect on obesity prevention (Gleason & Dodd, 2009).

In addition, there is a link between overweight and eating late in the day. It is observed that overweight and obese children tend to consume more energy at dinner compared to non-overweight children (Bellisle et al., 1988). A study conducted by Dubois et al. (2009) also indicated that breakfast skippers have a higher energy intake at snacks later in the day than breakfast consumers. Therefore, breakfast consumption can be an intervention to lower the energy intakes later in a day which can help to reduce the risk of gaining weight (Dubois et al., 2009).

However, in this study, only boys show a significant association between breakfast intake and weight status. The findings of the present study are in line with the study conducted by Mota et al. (2008) which claimed that obese boys were significantly more likely to skip breakfast compared to their normal-weight counterparts. However, such an association was not observed in girls. This might be due to the boys who skip breakfast also tend to be the picky eaters (Cardona Cano et al., 2015). Cooke et al. (2004) revealed that food neophobia is part of picky eating behaviour which can result in less healthy choices. Neophobic children consumed more saturated fat and had less dietary variety (Falciglia et al., 2000). Besides, picky eaters also consumed a diet high in energy and fat (Fisher et al., 1995). This can increase the risk of overweight and obesity. Picky eating is a transient behaviour which is considered as a normal part of development (Cardona Cano et al., 2015).

Conclusion

Breakfast skipping was associated with overweight or obesity. Hence, breakfast consumption is vital in controlling the prevalence of overweight or obesity. As the trend towards breakfast skipping has been increasing among preschoolers, further health promotion efforts should be targeted to encourage healthy and good quality breakfast consumption as behavioural patterns of children begin to establish during this critical stage of life.

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