

Eating Patterns of School Children and Adolescents in Kuala Lumpur

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ABSTRACT

Eating patterns such as eating frequency, skipping of breakfast, and frequency of meals eaten away from home might influence school-going children's nutritional status, which will then influence their health and academic performance. This article reports the findings of a survey on the eating patterns of the school children and adolescents in Kuala Lumpur. A total of 3620 school children studying in Primary 5, Secondary 2 and Secondary 4 were selected using multi-stage sampling. The students were surveyed using a pre-tested questionnaire while their weights and heights were measured in the field. It was found that 19.9% skipped at least one meal a day with the youngest group having the lowest prevalence. The most frequently missed meal is breakfast (12.6%) followed by lunch (6.7%) and dinner (4.4%). The school is an important provider of breakfast and lunch for the students. As the students' age increased, the prevalence of eating breakfast and lunch in school increased. The youngest age group had the highest prevalence of snacking and taking of nutritional supplements ($p < 0.05$). Fast food and local hawker food were also consumed by about 60–70% of the students. Logistic regression analysis showed that skipping of breakfast is significantly associated with age, sex, BMI and taking of nutritional supplements. Promotion of healthy eating should be targeted at students in primary and secondary schools as they tend to depend on outside food.

INTRODUCTION

Increasing awareness of the importance of diet for health promotion and disease prevention has led to a greater concern about the diet and eating patterns of school children and adolescents. Eating patterns such as eating frequency, skipping of breakfast, and frequency of meals eaten away from home might influence school-going children's nutritional status, which then influences their health and academic performance (Shaw, 1998). Eating patterns established during adoles-

cence shape the diet later in life (Dwyer *et al.*, 2001). Eating breakfast is important for the health and development of children and adolescents. Evidence suggests that breakfast is a central component of nutritional well-being, contributing to total daily energy and nutrient requirements (Nicklas *et al.*, 1993). Studies have demonstrated that moderate undernutrition affects children's cognitive development and school performance, and skipping meals can adversely affect children's performance in problem-solving tasks (Pollitt, 1995). Skipping breakfast can negatively

affect students' problem-solving ability (Meyers *et al.*, 1989) and low energy intake at breakfast can negatively impact physical endurance, creativity and well-being (Wyon *et al.*, 1997), while other studies showed that students who eat breakfast have improved academic, behavioral and emotional functioning (Bendon & Parker, 1998, Murphy *et al.*, 1998). This paper attempts to report the school children's eating patterns and association between eating patterns with age, gender, ethnicity and body mass index status.

METHODOLOGY

This is a cross sectional study with a multi-stage sampling (Abraham, 1999a) conducted at primary and secondary schools in Kuala Lumpur. Formal permission was obtained from the Ministry of Education, Malaysia and the students' participation was on a voluntary basis. All government-funded schools (153 primary and 59 secondary) scattered in all the six administrative zones of Kuala Lumpur were included in the sampling frame. In order to obtain a sample of school children which reflects as close as possible the population characteristics of Kuala Lumpur, three major factors were taken into consideration in sampling: gender, ethnicity and socio-economic status. A set of pre-tested questionnaires written in the Malay language was self-administered by the students. For the Chinese and Tamil schools, the translation was read out to students.

The weights of the students without shoes were taken using a bathroom scale while heights were measured using a microtoise tape. The weighing scale was calibrated daily with a standard weight before going to the schools. Trained field workers took both the measurements of weight and height.

The data was entered and analysed using the SPSS 10.0 windows version. A

significant level of 0.05 was pre-set. The chi-square test and Student's t test were used for categorical and continuous data respectively. Multivariate Logistic Regression analysis (Kleinbaum & Klein, 2002) was used to predict the risks (odds ratio) of skipping breakfast and its associated 95% confidence intervals. Factors that were significantly associated with skipping breakfast in the chi-square tests were entered into the Logistic Regression Model. Categories with the lowest proportion of skipping breakfast in the chi-square tests were identified as the reference categories in the Logistic Regression Model.

RESULTS

Socio-demographic characteristic

A total of 3620 students from 29 schools from all 6 administrative zones of Kuala Lumpur responded with only 13 students declining to participate. Of the 3620 respondents, there were 1871 (51.7%) Malays, 1244 (34.4%) Chinese, 441 (12.2%) Indians and a small group of 64 (1.8%) were from other ethnic groups comprising mostly Indonesians. Only the three main ethnic groups in Peninsula Malaysia totaling 3556 students were included in the analysis as the numbers in the minority groups were too small for comparisons to be made. The ratio of boys to girls was 1 to 0.95. There were 3 groups of students who participated in this survey; they were from primary 5 (average age of 11 years), secondary 2 (average age of 14 years) and secondary 4 (average age of 16 years).

The students came from a range of socio-economic backgrounds (as indicated by their fathers' occupations [Abraham 1999b] with the majority of them being semi-skilled and skilled workers). There were more primary 5 students with professional fathers compared to the older age groups. The primary 5 students also

had significantly higher proportion of both parents working (44.5%) compared to secondary 2 (28.6%) and secondary 4 students (27.6%) ($p < 0.01$). This may reflect the current situation in Kuala Lumpur, with increasingly both spouses working.

The majority of students (43.7%) came from families with 4 or 5 siblings, approximately 20.8% had more than 5 siblings in the family, and 35.5% had 3 or fewer siblings. Only 21.0%, 11.1% and 12.2% of the primary 5, secondary 2 and secondary 4 students respectively were staying with their extended family members such as their grandparents.

Places of meal consumption

The place of meal consumption was enquired and it was found that the majority of students had dinner at home, while some children had breakfast and lunch at school (Figure 1).

Most of the youngest students (primary 5) consumed their three main meals at home with about 12 – 18 % of

them taking breakfast and lunch in school. The secondary 2 students were the largest group consuming lunch in school, while the secondary 4 students were the largest group consuming breakfast in school. There were quite a substantial number of older students who consumed lunch out, mainly at hawker stalls (Table 1).

Eating pattern

It was found that out of a total of 3508 students (with 48 missing values), 19.9% ($n=699$) of them skipped at least one meal a day. There was an ascending trend in this particular behaviour as their age increased, with primary 5 students having a prevalence of 13.0%, followed by secondary 2 and secondary 5 with 21.5% and 26.7% respectively ($p < 0.001$). By ethnicity, there were no significant differences in the primary 5 group; however, the Chinese students persistently had the lowest prevalence of skipping meals in the secondary 2 ($p=0.01$) and secondary 4 groups ($p=0.01$).

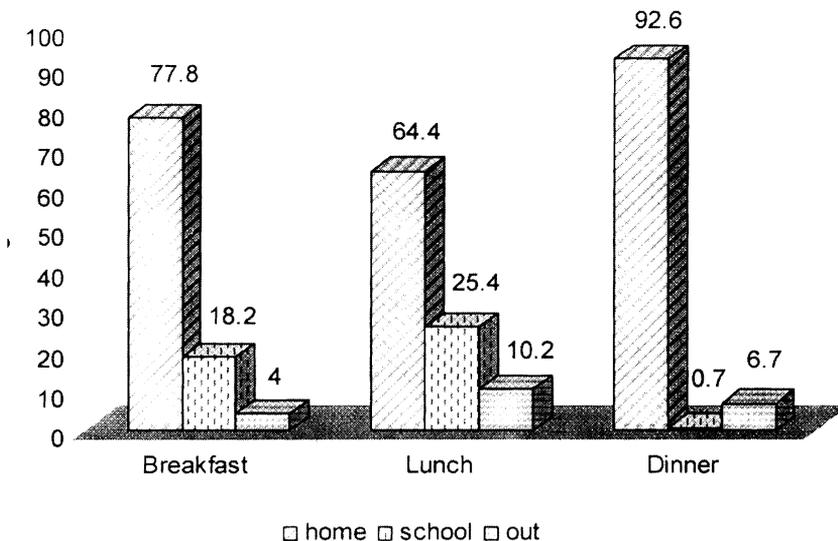


Figure 1. Places of meal consumption

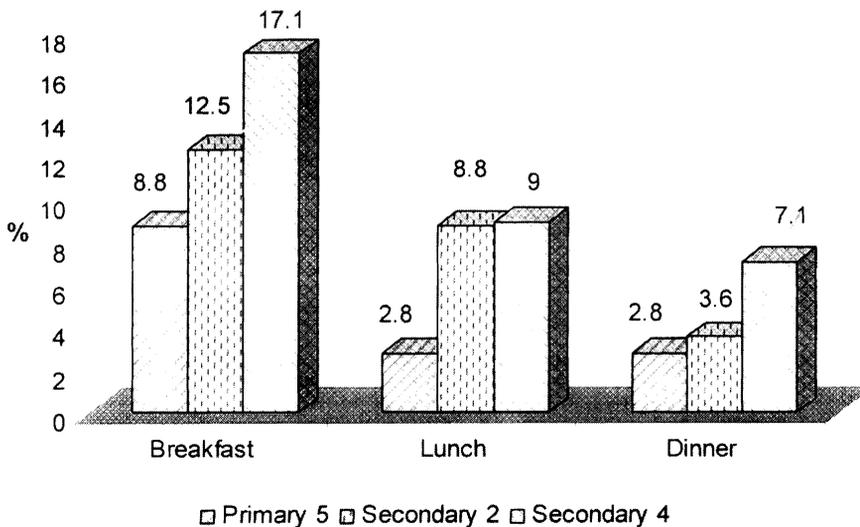
Table 1. Places of meal consumption by age groups

Age group	Meal	Home n (%)	School n (%)	Out n (%)	Total n (%)
Primary 5	breakfast	992(82.9)	151(12.6)	54(4.5)	1197(100)
	lunch	935(73.2)	229(17.9)	113(8.9)	1277(100)
	dinner	1169(91.7)	2(0.1)	106(8.2)	1275(100)
Secondary 2	breakfast	870(83.5)	133(12.8)	38(3.7)	1041(100)
	lunch	575(52.9)	418(39.0)	86(8.2)	1079(100)
	dinner	1072(93.9)	17(1.4)	53(4.7)	1125(100)
Secondary 4	breakfast	584(64.5)	291(31.9)	32(3.6)	907(100)
	lunch	652(65.3)	203(20.5)	139(14.1)	994(100)
	dinner	936(92.0)	9(0.8)	70(7.0)	1006(100)

It was found that the most frequently missed meal is breakfast (12.6%), followed by lunch (6.7%) and dinner (4.4%). The breakdown among the different age groups is as shown in Figure 2.

The above figure shows that the youngest age group (primary 5) persistently had the lowest prevalence of meal skipping and this difference is highly significant for breakfast, lunch and dinner ($p < 0.001$).

Apart from the three main meals, the students were surveyed as to whether they took any other food or snacks besides the three main meals. The youngest students (primary 5) were found to be the largest group who snacked (68.6%), followed by secondary 4 (44.7%) and secondary 2 (41.1%). The types of snacks that they usually took were *keropok* (local chips made of shrimp/fish and rice flour), biscuits and bread followed by some local cakes.

**Figure 2.** Prevalence of meal skipping among different age groups

Besides meal skipping, the consumption pattern of nutritional supplements was also surveyed. There were 63.8% taking some kind of nutritional supplements with multivitamins (57.1%) and cod liver oil (17.4%) being the most frequently-mentioned supplements. The primary 5 students were found to be the largest group of taking supplements (72.3%), followed by secondary 2 (61.5%) and secondary 4 (56.1%) ($p < 0.001$). There were significant differences in the consumption of nutritional supplements between ethnicity in the groups of primary 5 and secondary 4 students ($p < 0.05$). Chinese students had the highest prevalence of taking nutritional supplements in the primary 5 and secondary 4 groups (Figure 3).

Western fast foods are very popular among the children and adolescents. Our findings showed that about 60 to 70% of the children consumed fast food in the week prior to the interview. As their age increased, the percentage of fast food con-

sumption also increased. For the younger children, the family members were the one taking them to the fast food outlets while the older ones frequented these outlets with their friends as well as their family members (Figure 4). The children were also enquired on the consumption of local hawker foods (such as fried noodles, chicken rice, nasi lemak etc). A trend similar to the consumption of western fast food was observed with the local hawker foods as well, where the younger children ate out with their families while the older children preferred to eat out with their peers (Figure 4).

Body Mass Index Status

Based on the cut-offs of < 5 th and ≥ 95 th percentile of the BMI-for-age (WHO 1995) for underweight and overweight respectively, 7.3% of the students were overweight and 14.8% underweight in this sample. When analysed by gender, 7.5% of the boys and 7.1% of the girls were

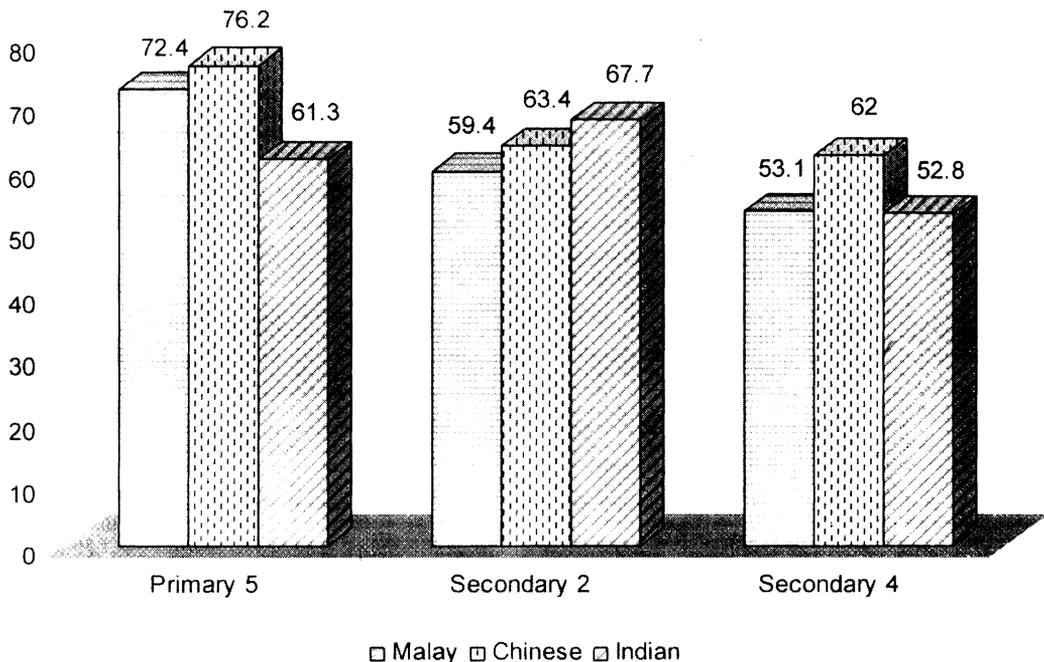


Figure 3: Patterns of consumption of nutritional supplementation by age groups

It was found that skipping of breakfast had a significant association with body mass index ($p=0.04$) where the overweight students had a higher prevalence of skipping breakfast. By comparing age groups and meals, the oldest age group (Secondary 4) who was overweight had a significantly higher prevalence of skipping breakfast and dinner ($p<0.05$).

Other factors associated with skipping of breakfast

Other factors such as father's occupation, whether both parents were working, staying with extended family members (grandparent/s), and number of siblings in the family were not significantly associated with the prevalence of skipping breakfast ($p>0.05$).

Logistic regression analysis was then used to estimate the risks of some of the factors mentioned above which were significant ($p<0.05$) for skipping breakfast. Factors that were significantly associated with breakfast skipping (such as sex, race, age group, BMI groups, taking nutritional

supplementation) were included into the Logistic Regression model. The following table shows the crude and adjusted Odds Ratio (O.R.) of those factors (Table 3).

The factors found significant in the Multivariate Logistic Regression model were age group, sex, BMI and nutritional supplementation. The oldest students (secondary 4) had 2.08 times the risk of skipping breakfast compared to the primary 5 students, while the girls were 1.71 times more prone to skipping breakfast than the boys. Those who were overweight were 1.83 times more likely to skip breakfast while those who were not on nutritional supplements were more likely to skip breakfast (O.R. =1.28).

DISCUSSION

Our results suggested that school is an important source of meals for school-going children and adolescents. Breakfast and lunch were quite frequently consumed in school for reasons such as students attending extra-curricular activities

Table 3. Factors predicting the risks of skipping breakfast using the Logistic Regression Model

		Crude OR (95% C.I.)	Adjusted OR (95% C.I.)
Age group	Primary 5	1.00*	1.00*
	Secondary 2	1.49 (1.15 - 1.94)	1.43 (1.10 - 1.86)
	Secondary 4	2.15 (1.68 - 2.76)	2.08 (1.61 - 2.68)
Sex	Male	1.00*	1.00*
	Female	1.78 (1.45 - 2.18)	1.71 (1.39 - 2.11)
Race	Chinese	1.00*	1.00*
	Malay	1.32 (1.05 - 1.65)	1.17 (0.93 - 1.47)
	Indian	1.48 (1.08 - 2.04)	1.44 (1.04 - 1.99)
BMI	Normal &	1.00*	1.00*
	Underweight		
	Overweight	1.66 (1.19 - 2.30)	1.83 (1.31 - 2.57)
Nutritional supplements	Yes	1.00*	1.00*
	No	1.46 (1.20 - 1.79)	1.29 (1.05 - 1.59)

* reference category

either in the mornings or afternoons, depending on the timing of their formal classes. Majority of the primary 5 and secondary 4 students were in the morning sessions while the secondary 2 students were in the afternoon sessions. Thus, we observed that only 53% of the secondary 2 students had lunch at home, and school was an important source of lunch for them (39%). This could be due to various reasons, including that they had to attend extra-curricular activities in the mornings, nobody cooked lunch for them at home if both parents were working, or that it was their personal choice to consume lunch at the school canteen. Only about 65% of the secondary 4 students had breakfast and lunch at home, and school was also an important source of breakfast and lunch for them. Their preference of having breakfast in school could be due to their having to leave home early to reach school on time or that they preferred to have breakfast with their peers. Having lunch in school might be due to their having to stay back in school for other activities, nobody to cook for them at home or their personal choice. There were 14% of them taking lunch at hawker stalls or shops. This is the highest prevalence of eating out among the three age groups and this also shows that the prevalence of eating out increases with age. On the other hand, the proportion of primary 5 students having breakfast and lunch in school was low. This could be due to parents/care-takers not wanting to let the children, being still young, to take their meals outside the home.

Prevalence of meal skipping ascended as age increased. Parents tend to be more concerned over the younger children's eating patterns and they make sure children take their meals by preparing and supervising them. The fact that consumption of nutritional supplements was most prevalent among the youngest students indicates further the concern of parents for the younger group. For the older children, the parents might be more

open to their choices of skipping meals.

Since school is the place where many students consume breakfast and lunch, the authorities should ensure that: a) the school environment supports the development of healthy eating patterns; b) food served in the school canteen is healthy and nutritious, fulfilling the recommendations from the Food Guide Pyramid and; c) students and teachers who practise healthy eating are encouraged to serve as role models in the school canteen. The above steps will expose students who consume breakfast and lunch in school to an environment which supports healthy eating.

Breakfast was the most frequently skipped meal and this trend is worrying since breakfast is the meal that replenishes the body and brain with energy after a night's fast. Although this study did not investigate further as to why did they skip breakfast, other studies had elucidated reasons such as no time, no appetite or overslept as the reasons (Shaw, 1998). These students and their parents need to be educated on the importance of breakfast.

The trend of eating out at hawker stalls or fast food chains was observed in our results, suggesting that this generation of parents have better financial status and/or have less time to prepare food since both parents were working. The children were introduced to eating out, whether at fast food chains or local hawker food stalls, by their family members when young. It is unlikely the children's food choices will change, unless they are supported by their parents who themselves need to be encouraged to make more healthy food choices.

Body mass index was significantly associated with skipping of meals, especially breakfast, for the whole sample. However the secondary 4 students who were overweight had significantly higher prevalence of skipping breakfast and dinner. They might have the misconception that skipping meals could reduce

one's body weight; however studies have shown that skipping of breakfast is significantly associated with obesity (Ma *et al.*, 2003). One could hypothesise that individuals who do not eat breakfast tend to be hungry and may consume a greater number of calories during the later part of the day. If these unhealthy eating habits persist into adulthood, problems of overweight could arise in the future.

Girls were found to have a higher risk of skipping breakfast in our study. Similar results were seen in another study (Shaw, 1998). This could be due to body image dissatisfaction and their trying to lose weight by skipping meals. Although they were not surveyed as to their satisfaction with their body shape, it was found that those who perceived themselves to be fat tend to skip breakfast more than their counterparts (results not shown).

Chinese students were found to have the lowest risk of skipping breakfast. This could be due to their culture of eating as one of the important aspects in life (Chang, 1997); so that the parents made sure their children did not miss any of the main meals of the day.

When all the above factors were included into the Logistic Regression Model, it was found that all the above factors remained significant after they were adjusted for each other (except race, which became marginally insignificant). Our results could be used in the planning of healthy eating programmes targeting school children as they are a nutritionally vulnerable group.

CONCLUSIONS

School was found to be an important source of breakfast and lunch for the school children. The prevalence of skipping at least one meal a day is 19.9%, with breakfast having the highest prevalence (12.6%) for the whole sample. Multivariate Logistic Regression showed that factors

such as age, sex, body mass status and nutritional supplementation could predict the risks of skipping breakfast among the school children in Kuala Lumpur.

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