

SHORT COMMUNICATION

## Factors Associated with Breakfast Skipping among School-going Adolescents in Sarawak, Malaysia

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### ABSTRACT

**Introduction:** Breakfast skipping is an unhealthy eating behaviour reportedly common among adolescents. A cross-sectional study was carried out to determine the differences in body weight status, socio-demographic, behavioural, and psychological characteristics between daily breakfast takers and breakfast skippers. **Methods:** Data were collected from four students of four randomly selected secondary schools in Sibul, Sarawak using a self-administered questionnaire. Body weight and height were measured using standard procedures and BMI-for-age z-scores were determined. **Results:** A total of 375 students were recruited (male: 32.0%, female: 68.0%; Chinese: 39.5%, Iban: 26.4%, Malay: 17.1% and Melanau: 17.1%; mean age = 16.45 ± 0.53 years). The prevalence rate of breakfast skippers at 40.3% was higher compared to the national prevalence of 32.7%. About 19.7% of the students were found to be at risk of eating disorders. In addition, the prevalence rates of overweight and obesity were 10.9% and 7.7%, respectively. Significant associations were found between breakfast skipping with sex, lunch skipping, dinner skipping, eating attitudes, and body weight status. Binary logistic regression analysis showed that female students and those who skipped lunch or dinner were more likely to skip breakfast. **Conclusion:** Breakfast skipping was quite common in this sample of adolescents in Sarawak. As frequent breakfast skipping has negative health and academic performance implications, increased nutrition education and health awareness campaigns on the importance of breakfast taking among school students should be undertaken.

**Key words:** Adolescents, breakfast skipping behaviour, socio-demography, Sarawak

### INTRODUCTION

Breakfast skipping is an unhealthy eating behaviour reportedly common among adolescents. Among Finnish adolescents, the percentages of breakfast skipping were 25.3% for boys and 38.4% for girls

respectively. In addition, the percentages for breakfast skipping among Greek adolescent boys and girls were considered high, with 51.2% among boys and 55.9% among girls respectively (Veltsista *et al.*, 2010). In Malaysia, the prevalence of breakfast skipping among adolescents (13 to less than

18 years old) was reported to be 32.7% (IPH, 2011).

Several factors have been linked with breakfast skipping behaviour. According to Tin *et al.* (2011), breakfast skipping behaviour among primary four students (mean age: 9.85 years) in Hong Kong was positively associated with health outcomes (overweight and obesity) and unhealthy eating behaviours which included frequent snacking, less vegetable and fruit consumption, and low milk consumption. In addition, Gross *et al.* (2004) reported that urban fourth grade school students (mean age: 9 years) were twice more likely than suburban and rural students to skip their breakfast.

Information about breakfast skipping among Malaysian adolescent school students is scarce and limited as most of the studies were carried out among adults. Thus, the present study was conducted to determine the prevalence of breakfast skipping among adolescents and factors associated with it.

## METHODS

This cross-sectional study was conducted at four multi-ethnic national public schools in Sibul, Sarawak. Malaysia is a multi-ethnic nation and is known for its cultural diversity. However, due to the vast differences in ethnic distribution and geographical factors between Peninsular Malaysia, Sarawak, and Sabah, it was considered timely and appropriate to study the breakfast habits of adolescents in Sibul, Sarawak to determine if these habits are similar or different from the breakfast habits of their Peninsular Malaysia counterparts. Sibul as the third biggest town in Sarawak, with a multi-ethnic background consisting of Iban, Melanau, Chinese, and Malay ethnic groups, is considered appropriate as a study location.

Ethical approval was granted by the Medical Research Ethics Committee, Faculty

of Medicine and Health Sciences, Universiti Putra Malaysia. Approval letters for conducting the survey in schools were obtained from the Ministry of Education, Malaysia and the State Education Department, Sarawak. Four schools were randomly selected from a list of 27 schools in the Sibul Division, Sarawak. All form four (year 2010) and form five students (year 2011) who were 15 to 17 years old of different ethnic backgrounds at the selected schools were invited to participate in the survey. Informed consent forms were distributed to both the students and their parents. Students who agreed to participate and received consent from their parents were included in the study. The final sample size comprised 375 students.

Socio-demographic characteristics of the students were determined using a socio-demographic questionnaire. Data collected included date of birth, sex, ethnicity, family income and number of siblings.

Eating behaviours of the adolescents were assessed by using Eating Behaviour Questionnaire (EBQ) (Chin & Mohd Nasir, 2009). The students were asked about the frequency of meal consumption (breakfast, lunch and dinner) for the last seven days. Respondents were categorised into two groups, namely 'daily' or 'non-daily' consumption of breakfast, lunch and dinner. Non-daily breakfast takers were categorised as breakfast skippers. For intake of supplements, the respondents were asked whether they were taking any form of supplements.

The Eating Attitudes Test (EAT-26) (Garner *et al.*, 1982) is the most widely used standardised measure of symptoms and concerns characteristic of eating disorders. The respondents were requested to rate their agreement or disagreement on the 26 statements and six response options were prepared for each statement. The scoring of EAT-26 was based on a 4-point Likert scale. A composite score ranging from 0 to 78 points was calculated. A score at or above 20 on the

EAT-26 indicates a high level of concern about dieting, body weight or problematic eating behaviours. The internal consistency of the EAT-26 in the present study was adequate (Cronbach's  $\alpha=0.734$ ).

Nutrition knowledge is defined as the ability to recall information about nutrient contents of foods and the sources and forms of nutrients present in foods. The Nutrition Knowledge (NK) test consists of 23 dichotomously scored items (adapted from Sapp & Jensen, 1997). The respondents were asked about the amount of fibre, energy, cholesterol and fat in various foods and food categories. A correct answer was assigned a score of one point, whereas a wrong answer was scored as zero point. A total score ranging from 0 to 23 was computed for each respondent which equaled the sum of correct responses to the 23 items. A higher score indicated a higher nutritional knowledge. The total scores were further divided into three categories, namely low nutrition knowledge (0-7.66), moderate nutrition knowledge (7.67-15.33), and high nutrition knowledge (15.34-23.00). In this study, the Kuder-Richardson's KR-20 reliability coefficient for the NK test equaled 0.625.

Weight was measured using a TANITA electronic weighing scale to the nearest 0.1 kilogram (kg). Height was measured using a SECA portable body meter to the nearest 0.1 centimeter (cm). The classification of body weight status among the adolescents was based on WHO growth reference of 2007 (de Onis *et al.*, 2007).

### Statistical analysis

SPSS 17.0 was used to analyse the data. Univariate results are presented either as means and standard deviations (SD) or as proportions (%). Chi-squared test was used to determine associations between categorical variables with breakfast skipping. Binary logistic regression (Enter method) was performed on the independent variables which were found to be significant on bivariate analysis, with breakfast

skipping as the dependent variable. Odds ratios and 95% confidence intervals are reported. Level of significance was set at 0.05.

### RESULTS

The respondents comprised 375 students from four schools with females outnumbering male students (Table 1). The mean age of students was  $16.45 \pm 0.528$  years. The percentage of Chinese students (39.5%) was highest compared to Iban (26.4%), Melanau and Malay (17.1% respectively) students.

The prevalence of breakfast, lunch and dinner skipping was found to be 40.3%, 23.7% and 35.2%, respectively. The prevalence of lunch skipping for males and females was almost equal. Supplement intake was prevalent in 15.7% of the students. The percentages of students taking supplements were almost equal between males and females.

Furthermore, about 19.7% of the students were categorised as at risk of having eating disorders. Almost equal percentages of male and female students were found to be at risk of having eating disorders. For nutrition knowledge, most of the students were categorised as having a moderate level of nutrition knowledge. A higher percentage of male students was categorised as having low nutrition knowledge compared to female students. For body weight status, 4.5% of the students were categorised as thin, 0.5% as severely thin, 10.9% as overweight and 7.7% were categorised as obese.

Results of Chi-Square test of independence showed that variables such as sex, lunch skipping, dinner skipping, body weight status, and EAT-26 score were found to be significantly associated with breakfast skipping. No association was found between ethnicity, age, nutrition knowledge and supplement intake with breakfast skipping (Table 1).

From Table 2, after adjusting for other variables, female students and those who

**Table 1.** Association of variables with breakfast skipping (n = 375)

Variable		Sex		Total	Breakfast skipping		$\chi^2$	p
		Male n (%)	Female n (%)		No n (%)	Yes n (%)		
Ethnicity	Malay	20 (16.7)	44 (17.3)	64 (17.1)	35 (54.7)	29 (45.3)	1.128	0.770
	Chinese	55 (45.8)	93 (36.5)	148 (39.5)	92 (62.2)	56 (37.8)		
	Iban	25 (20.8)	74 (29.0)	99 (26.4)	58 (58.8)	41 (41.4)		
	Melanau	20 (16.7)	44 (17.3)	64 (17.1)	39 (60.9)	25 (39.1)		
Age (years)	15	26 (21.7)	38 (14.9)	64 (17.1)	39 (60.9)	25 (39.1)	3.382	0.147
	16	75 (62.5)	172 (67.5)	247 (65.9)	151 (62.4)	91 (37.6)		
	17	19 (15.8)	45 (17.6)	64 (17.1)	34 (49.3)	35 (50.7)		
Sex	Male			120 (32.0)	81 (67.5)	39 (32.5)	3.964	0.034
	Female			255 (68.0)	143 (56.1)	112 (43.9)		
Lunch skipping	No	88 (73.3)	198 (77.6)	286 (76.3)	188 (65.7)	98 (34.3)	17.774	0.0001
	Yes	32 (26.7)	57 (22.4)	89 (23.7)	36 (40.4)	53 (59.6)		
Dinner skipping	No	90 (75.0)	153 (60.0)	243 (64.8)	163 (67.1)	80 (32.9)	15.385	0.0001
	Yes	30 (25.0)	102 (40.0)	132 (35.2)	61 (46.2)	71 (53.8)		
Supplement intake	Yes	18 (15.0)	41 (16.1)	59 (15.7)	183 (57.9)	18 (30.5)	2.851	0.091
	No	102 (85.0)	214 (83.9)	316 (84.3)	41 (69.5)	133 (42.1)		
Body weight status	Normal	87 (72.5)	199 (78.0)	286 (76.3)	179 (62.6)	107 (37.4)	4.032	0.045
	Abnormal	33 (27.5)	56 (22.0)	89 (23.7)	45 (50.6)	44 (49.4)		
Nutrition knowledge	Low	27 (22.5)	27 (10.6)	54 (14.4)	22 (40.7)	32 (59.3)	0.096	0.953
	Moderate	82 (68.3)	194 (76.1)	276 (73.6)	110 (39.9)	166 (60.1)		
	High	11 (9.2)	34 (13.3)	45 (12.0)	19 (42.2)	26 (57.8)		
EAT-26 score*	<20	98 (81.7)	203 (79.6)	301 (80.3)	39 (52.7)	35 (47.3)	5.833	0.016
	20	22 (18.3)	52 (20.4)	74 (19.7)	112 (37.2)	189 (62.8)		

\*A score <20 indicates not at risk of having eating disorders while a score 20 indicates at risk of having eating disorders.

**Table 2.** Crude and adjusted odds ratio (O.R.) on breakfast skipping

Variable	Crude O.R.	Adjusted O.R.
Sex		
Female	1.627 (1.032-2.564)	1.654 (1.018 - 2.685)
Male*	1.00	1.00
Lunch skipping		
Yes	2.824 (1.732 - 4.604)	2.327 (1.362 - 3.977)
No*	1.00	1.00
Dinner skipping		
Yes	2.372 (1.536 - 3.662)	1.645 (1.019 - 2.655)
No*	1.00	1.00
EAT-26 score		
≥20	1.880 (1.126 - 3.140)	1.687 (0.986 - 2.885)
<20*	1.00	1.00
Body weight status		
Thinness/Overweight/Obese	1.636 (1.013-2.642)	1.496 (0.900 - 2.485)
Normal*	1.00	1.00

\* Reference group.

skipped lunch or dinner were more likely to skip breakfast. The findings indicate that females are 1.65 times more likely than males to skip breakfast. Besides, students who skipped lunch and dinner are 2.33 times and 1.65 times more likely to skip breakfast respectively.

## DISCUSSION

The results showed that 40.3% of the secondary students in the present study did not take their breakfast daily. The prevalence of breakfast skipping was slightly lower when compared to the prevalence (47.4%) reported in a local study that involved female secondary school students in Kuantan (Chin & Mohd Nasir, 2009). However, compared to the national prevalence of 32.7% for breakfast skippers among adolescents between 13 to less than 18 years old (IPH, 2011), our data showed a higher prevalence.

A significant association was found between sex and breakfast skipping. This supports the finding by Shaw (1998) who showed that females were more vulnerable to breakfast skipping. This might be due to

the higher concern for body shape among females compared to males and breakfast skipping was used as a method to control body weight.

Another factor found to be significantly associated with breakfast skipping was body weight status. This finding supports those of Maddah *et al.* (2009). It is believed that breakfast consumption may be merely a marker for other healthful lifestyles (having greater physical activity, larger morning meals, better diet quality) which contribute to a healthy body weight status (Rampersaud, 2009).

Moreover, breakfast skipping was found to have significant associations with lunch and dinner skipping. This is consistent with the findings of Tin *et al.* (2011). These findings are crucial as children who skip meals regularly tend to have a higher vulnerability for nutrient inadequacy (Utter *et al.*, 2007).

Our results showed that being at risk of eating disorders was another factor found to be associated with breakfast skipping. Our findings support the study by Fernández-Aranda *et al.* (2007) who reported

that regular breakfast consumption was negatively associated with eating disorders among adolescents.

Age was found to be an important predictor to breakfast skipping among adolescents by Videon & Manning (2003). However, in the present study, no association was found between age and breakfast skipping. The possible explanation may be due to the small margin in age as the highest reported age was 17 while the lowest age was 15.

Ethnicity was among the factors found to have no association with breakfast skipping. This was in contrast to Moy *et al.*'s (2009) study which found that Malays, Indians, and indigenous communities from Sabah and Sarawak (university undergraduates) tended to have a higher tendency than their Chinese counterparts to skip breakfast. The difference in the findings possibly reflected existence of contrasting beliefs, norms, and attitudes towards breakfast consumption between the two populations in the two studies, but a conclusive explanation cannot be drawn and further studies are necessary.

The logistic regression analysis, after adjusting for other variables, indicated that being female had an influence on the likelihood of breakfast skipping. This interaction supports the findings by Zapata *et al.* (2008). Students, who skipped lunch and dinner, were also more likely to skip breakfast. This is consistent with findings reported by Tin *et al.* (2011).

This study has a number of limitations.. As the study was cross-sectional, it did not allow for causal inferences. Furthermore, directionality of relationship between the factors that were studied and breakfast skipping cannot be determined in a cross-sectional study. Socio-demographic, psychological and behavioural data in the present study were collected through a single self-reported survey, so the data being prone to misclassification bias is a possibility. In addition, the study did not look at other information related to breakfast

skipping such as type of breakfast available at home or served by the caregiver that might affect the decision to eat/or not to eat breakfast among adolescents. Besides, the small total sample size may affect generalisability.

## CONCLUSION

Breakfast skipping among adolescents in Sarawak is relatively high and should be taken seriously. Three factors were found to be associated with breakfast skipping, namely being female, lunch skipping and dinner skipping. The findings may be used to plan health awareness campaigns or school breakfast programmes among school students in order to increase the frequency of breakfast intake as breakfast consumption is known to be a healthy lifestyle that can contribute beneficially to health and well-being of the adolescents as well as to their cognitive function and academic performance.

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