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Financial problems associated with food insecurity among public university students in Peninsular Malaysia

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ABSTRACT

Introduction: Food is a necessity for students. Yet, students' food expenditure is anticipated to be restrained by their financial status. This cross-sectional study aims to determine the prevalence of food insecurity and its determinants among university students attending public universities in Peninsular Malaysia. **Methods:** Multistage random sampling was used to select respondents from public universities in Peninsular Malaysia. A total of 427 undergraduate students completed a self-administered questionnaire at four randomly selected universities (Universiti Utara Malaysia, Universiti Kebangsaan Malaysia, Universiti Malaysia Pahang and Universiti Teknologi Malaysia). The questionnaire consisted of information concerning demographic and socioeconomic backgrounds, food security status, eating behaviour, financial literacy, and financial problem among university students. Frequency, chi-square, and logistic regression were used to analyse the variables. **Results:** Mean age of the respondents was 21.6 years, and 60.9% were found to be food insecure. Gender (χ^2=5.415), origin (χ^2=3.871), number of siblings (χ^2=4.521), financial problem (χ^2=42.364), and regular breakfast intake (χ^2=5.654) were associated with food security status (p<0.05). Male respondents had 1.5 times (AOR=1.547, 95% CI: 1.006-2.380) the risk of having low food security status. Those with higher financial problems (AOR=3.575, 95% CI: 2.332-5.481) were 3.5 times more likely to be food insecure. **Conclusion:** The prevalence of food insecurity among public university students in Peninsular Malaysia was significantly high. Thus, intervention studies should focus on students with financial problems. Moreover, establishing a better system for an on campus food pantry or food bank is needed to counter the high prevalence of food insecurity among university students.

Keywords: Food insecurity, financial literacy, financial problem, meal skipping, university students

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INTRODUCTION

Obtaining sufficient food is a fundamental human right. As stated in the Universal Declaration of Human Rights, Article 25: food and shelter are for all (OHCHR, 1948). Everyone has the right to a standard of living adequate for health and well-being, including food. Food is a vital necessity of life. However, more than 800 million people in developing countries are not getting enough of it (WFP, 2020).

Food security is known as a significant concern at the individual, household, national, regional, and worldwide level. Food security exists when people can acquire safe, nutritionally adequate, and culturally acceptable foods at all times in a manner that maintains human dignity (FAO, 2008). On the other hand, food insecurity was initially defined in 1990 by Life Sciences Research Office (LSRO, 1990). It stated that food insecurity happens when the food systems are stressed, causing food to be not accessible, available, and enough quality, or the ability to acquire acceptable food in a socially acceptable way is limited or uncertain.

Published studies have addressed the high prevalence of food insecurity among university and college students. Based on a systematic review done by Bruening *et al.* (2017), the prevalence of food insecurity among the students ranged from 14.1% to 58.8% in the United States, 46.5% to 47.6% in Australia, 82.8% in Canada, and 12.5% to 84.0% in South Africa. Meanwhile, in Malaysia, the prevalence of food insecurity among university students ranges from 43.5% to 67.1% (Norhasmah, Zuroni & Marhana, 2013; Nur Atiqah *et al.*, 2015; Wan Azdie *et al.*, 2019), which is at an alarming rate. Combating food insecurity is real, getting enough and healthy food is a struggle.

A study was done by Norhasmah *et al.* (2013), focusing on the coping strategies and consequences of food insecurity among university students in four public universities namely, University Malaysia Perlis (UNIMAP), Universiti Malaya (UM), Universiti Teknikal Malaysia Melaka (UTeM), and University Sultan Zainal Abidin (UNiSZA). It also reported on the correlation between expenditure and food security status among students. Nur Atiqah *et al.* (2015) stated the consequences of food insecurity, focusing on its association with lipid profile among university students in Universiti Teknologi MARA (UiTM) Puncak Alam, while Wan Azdie *et al.* (2019) studied the determinants of food insecurity, focusing on the demographics, spending patterns, living arrangements, and time constraints among university students in International Islamic University Malaysia (IIUM), Kuantan. All these three studies were done in public universities within Peninsular Malaysia, focused on the prevalence of food insecurity among university students. Yet, none of these studies focused on financial literacy, financial problem, and eating behaviour as determinants of food insecurity among university students across Peninsular Malaysia. Among university students, food insecurity is consistently associated with financial independence, therefore they are required to start managing their money at this instance (Bruening *et al.*, 2017). According to Mohamad Fazli *et al.* (2008), university students are not prepared to manage their money on campus when they enroll into university. Students with food insecurity are significantly associated with those who are renting, boarding or sharing accommodation, having low incomes or are receiving government financial assistance (Hughes *et al.*, 2011; Norhasmah *et al.*, 2013).

According to Mohamad Fazli & MacDonald (2010), financial literacy among university students was defined based on their knowledge regarding financial goals, financial records, savings, investments, retirement, banking system, time value of money, wills, insurance, education loan, and general knowledge on personal finance. The study also stated that university students with better financial literacy were less likely to report having financial problems. Hogarth & Hilgert (2002) also reported that university students aged between 18 to 24 years were those with the least financial literacy compared to other age groups. Low financial literacy eventually leads to financial problems (Md Hafizi, 2013). To cope with financial problems, university students have reportedly reduced their meal sizes or skipped meals altogether throughout an entire day (Hanna, 2014). Food security status can be influenced by several factors, such as lack of food and money management skills, including budget planning and expenditure management skills, which arise from having low financial literacy. A more detailed and wide study is needed to provide an in-depth explanation on the patterns of prevalence and determinants of food insecurity among university students in Peninsular Malaysia. Thus, this study aims to identify the prevalence and determinants (demographics and socioeconomic characteristics, financial literacy, financial problem and the eating behaviour) of food insecurity among public university students in Peninsular Malaysia.

METHODOLOGY

Study design and samples

A cross-sectional study was conducted in public universities located in Peninsular Malaysia. Data collection was done throughout semester two (April-May 2015/2016). Prior to data collection, permission to carry out the study was obtained from the selected universities. Multistage random sampling was employed for recruitments. All 18 public universities were categorised into four zones, that were northern, east coast, central, and southern zones. One university was randomly selected to represent each of the four zones, which were Universiti Utara Malaysia (UUM) for northern, Universiti Malaysia Pahang (UMP) in the east coast, Universiti Kebangsaan Malaysia (UKM) for central and Universiti Teknologi Malaysia (UTM) in the southern zone, respectively. Then, one faculty was randomly chosen to represent each university, followed by a random selection of two programmes in each faculty. Finally, respondents aged between 19 to 25 years old from each faculty were selected using random systematic sampling based on odd number sequence of a name list provided by the university. All respondents were Malaysian undergraduate students. Undergraduate students were chosen as respondents because they are at the age of transitioning from parental supervision to independent living and developing their own food patterns.

Ethical clearance was obtained from the Ethics Committee for Research Involving Human Subject (JKEUPM) of Universiti Putra Malaysia [Reference No: FPSK(EXP16) P071]. The permission to carry out the study within the university campus was granted by each of these universities. Written informed consent was obtained from all respondents.

Measurements

The survey was conducted using a structured questionnaire to obtain information on the demographics and socioeconomic characteristics, food security status, eating behaviour, financial literacy, and financial problem among the respondents. Food security

status of university students was assessed during the past semester. The 10-item Adult Food Security Survey Module (USDA, 2012) was used to classify food security status among the respondents. Low food security and very low food security groups were merged into the food insecure category. All items were scored based on the Guide to Measuring Household Food Security and classified under the recommendations by USDA, Economic Research Service. Table 1 provides the definitions for each food security category and their corresponding scores.

Financial literacy was measured based on the total score of correct answers out of 25 questions concerning financial goals, financial records, savings, investments, retirement, banking system, time value of money, wills, insurance, education loan, and general knowledge of personal finance. This part consisted of 25 close-ended questions with true/false answers. One point was given to each correct response, thus, the total score was 25. This score was used to determine the level of financial literacy among students. This instrument has been developed and validated by Mohamad Fazli & MacDonald (2010) based on the Malaysian context.

Meanwhile, financial problem was measured by using an instrument validated by Mohamad Fazli *et al.* (2008). Ten questions on financial problem were asked on a 5-point Likert scale ranging from never (1) to every day (5). The financial problem questions were focused on problems such as: uncertain about where the money is spent; owe friend(s) money; spend more than can afford; borrow money to buy food; skip meals to save money; take money without permission from parents/others; upset when cannot buy things; shopping to relieve tension/ stress; impulsive shopping, and lending money to friends. The range in total scores for financial problems was from a low of zero to a high of 50. The mean score for overall financial problem was used to determine the status of financial problems among university students in Peninsular Malaysia.

The eating behaviour questionnaire (EBQ) was used to assess the frequency of meal intake among the respondents. This EBQ was adopted from a study done in Malaysia (Chin & Mohd Nasir, 2009). There were six items on how frequent the respondents consumed each meal daily (breakfast, morning snack, lunch, evening snack, dinner, and supper). It ranged from never (zero)

Table 1. Classification of food security status

Food security status	*Cumulative response score*	*USDA definition*
High food security	0	No food access problems or limitations
Marginal food security	1 to 2	Anxiety over food sufficiency or shortage of food in the house, with little or no indication of changes in food intake
Low food security	3 to 5	Reduced quality, variety or desirability of diet
Very low food security	>5	Disrupted eating patterns and reduced food intake

Source: USDA (2012)

to every day (seven times) a week. This study categorised the frequency of meal intakes into two categories: 'frequently skipped' with intakes less than five days per week for each meal, and 'regular intake' for intakes of five to seven days per week.

Statistical analysis

All data obtained were analysed using IBM SPSS version 23.0. All variables were presented as descriptive statistics that included frequency, percentage, mean, and standard deviation (SD). Chi-square was used to assess the association between all categorical variables with food security status. Binary logistic regression was used to determine the factors associated with food security status among respondents. Covariates were based on bivariate analysis, whereby only those with *p*-value of <0.05 were included in the adjusted model. The significance level of the analysis was based on a *p*-value of <0.05.

RESULTS

Distribution of the respondents' demographics and socioeconomic characteristics, financial literacy, financial problem, and eating behaviour are presented in Table 2. A total of 427 respondents from selected universities, namely UUM (Sintok), UMP (Gambang), UKM (Bangi), and UTM (Skudai) participated in this study with a 100% response rate. More than half of the respondents (60.2%) were female students, in line with the current situation at public universities in Malaysia, which are monopolised by female students (MOE Malaysia, 2013).

Majority of the respondents were of Malay ethnicity (83.6%), followed by Chinese (6.2%), Indian (4.7%), and others that included Bumiputera Sabah/ Sarawak and mixed (3.0%). The age of all respondents ranged from 19 to 25 years old. The mean age was 21.56±1.35 years old, with more than half of the respondents aged 19-21 years (males 51.2% and females 56.4%). One third of the respondents (39.8%) were in their first year of study (36.5% males and 42.0% females), followed by second year (25.8%) (21.8% males and 28.4% females), third year (24.4%) (26.5% males and 23.0% females), and a few in their final year (10.0%) (15.3% males and 6.6% females). Public universities in Malaysia offer comfortable accommodations to the students, thus, most of the respondents (96.5%) were staying on campus (93.5% males and 98.4% females). Furthermore, all the respondents (100%) were single. More than half of the respondents (59.7%) originated from a rural area (55.3% males and 62.7% females), while the rest were from an urban area (40.3%) (44.7% males and 37.4% females). The mean number of sibling(s) among respondents was 4.66±2.19. Only a few respondents (8.0%) were working as a part-timer (10.0% males and 6.6% females). Based on family background, majority of the respondents (83.4%) were from the household income category of Bottom 40% (B40) group (78.2% males and 86.8% females), 12.2% from the Middle 40% (M40) group (15.9% males and 9.7% females) and <5.0% from the Top 20% (T20) group (5.9% males and 3.5% females) (DOS Malaysia, 2017).

Female respondents (50.6%) had a higher financial literacy compared to male respondents (47.6%). At the same time, female respondents (56.0%) reported having lower financial problems compared to males (46.5%). Breakfast was the most skipped meal among the respondents (63.2%). However, female respondents tended to skip breakfast more (63.4%) compared to male respondents (53.5%). Contrarily, both genders frequently took lunch (80.3%) and dinner (72.4%). Male respondents consumed food regularly (81.8% for

Table 2. Background of the respondents (*N*=427)

Characteristics	*n (%)*			*Mean±SD*
	Male (n=170)	*Female (n=257)*	*Total*	
University				
UUM	32 (18.8)	75 (29.2)	107 (25.1)	
UMP	37 (21.8)	71 (27.6)	108 (25.3)	
UKM	37 (21.8)	69 (26.9)	106 (24.8)	
UTM	64 (37.7)	42 (16.3)	106 (24.8)	
Ethnicity				
Malay	136 (80.0)	221 (86.0)	357 (83.6)	
Chinese	16 (9.4)	16 (6.2)	32 (7.5)	
Indian	13 (7.7)	12 (4.7)	25 (5.9)	
Bumiputra Sabah/ Sarawak/Mixed	5 (2.9)	8 (3.1)	13 (3.0)	
Age (years)				
19-21	87 (51.2)	145 (56.4)	232 (54.3)	21.6±1.4
22-25	83 (48.8)	112 (43.6)	195 (45.7)	
Years of study				
1st	62 (36.5)	108 (42.0)	170 (39.8)	
2nd	37 (21.8)	73 (28.4)	110 (25.8)	
3rd	45 (26.5)	59 (23.0)	104 (24.4)	
4th	26 (15.3)	17 (6.6)	43 (10.1)	
Residence				
In campus	159 (93.5)	253 (98.4)	412 (96.5)	
Out campus	11 (6.5)	4 (1.6)	15 (3.5)	
Origin†				
Rural	94 (55.3)	161 (62.7)	255 (59.7)	
Urban	76 (44.7)	96 (37.4)	172 (40.3)	
Number of siblings				
1-3	61 (35.9)	77 (30.0)	138 (32.3)	4.7±2.2
4-6	71 (41.8)	157 (61.1)	228 (53.4)	
>6	38 (22.4)	23 (9.0)	61 (14.3)	
Working part-time				
Yes	17 (10.0)	17 (6.6)	34 (8.0)	
No	153 (90.0)	240 (93.4)	393 (92.0)	
Household income‡				
B40 (<RM 4360)	133 (78.2)	223 (86.8)	356 (83.4)	3444.3±3979.4
M40 (RM 4360- 9619)	27 (15.9)	25 (9.7)	52 (12.2)	
T20 (≥RM 9620)	10 (5.9)	9 (3.5)	19 (4.5)	
Financial literacy				
Lower than median	89 (52.4)	127 (49.4)	216 (50.6)	
Higher than median	81 (47.6)	130 (50.6)	211 (49.4)	
Financial problem				
Lower than mean	79 (46.5)	144 (56.0)	223 (52.2)	24.5±5.3
Higher than mean	91 (53.5)	113 (44.0)	204 (47.8)	

(to be continued)

Table 2. Background of the respondents (*N*=427) [Cont'd]

Characteristics	*n (%)*			*Mean±SD*
	Male (n=170)	*Female (n=257)*	*Total*	
Eating behaviour				
Breakfast				
Frequently skipped	107 (62.9)	163 (63.4)	270 (63.2)	
Regular intake	63 (37.1)	94 (36.6)	157 (36.8)	
Lunch				
Frequently skipped	31 (18.2)	53 (20.6)	84 (19.7)	
Regular intake	139 (81.8)	204 (79.4)	343 (80.3)	
Dinner				
Frequently skipped	29 (17.1)	89 (34.6)	118 (27.6)	
Regular intake	141 (82.9)	168 (65.4)	309 (72.4)	
Food security status				
High food security	15 (8.83)	27 (10.5)	42 (9.8)	
Marginal food security	40 (23.5)	85 (33.1)	125 (29.3)	
Low food security	77 (45.3)	91 (35.4)	168 (39.3)	
Very low food security	38 (22.4)	54 (21.0)	92 (21.6)	

†Origin refers to the hometown of the respondents
‡Household Income and Basic Amenities (HIS/BA) survey of 2016

lunch and 82.9% for dinner) compared to female respondents (79.4% for lunch and 65.4% for dinner). The prevalence of food insecurity was 60.9% among public university students in Malaysia, with 39.3% of them having low food security and 21.6% with very low food security (Table 2).

Table 3 shows that there were several significant associations (p<0.05) between gender, origin, and the number of siblings with food security status. Females (67.1%) were more food secured compared to males (32.9%). Meanwhile, the origin from rural vs. urban (63.5% vs. 36.5%), having >4 siblings vs. lesser (71.5% vs. 28.5%), skipped breakfast frequently vs. regular breakfast intake (58.5% vs. 41.5%) (p<0.05), and having high vs. low financial problem (60.4% vs. 39.6%) (p<0.001) were significantly more prevalent among the food insecure respondents compared to the food secured respondents.

After controlling for covariates (Table 4), there were only two factors that significantly contributed to food security status. The model showed that according to gender, male respondents were 1.5 times more likely to suffer from food insecurity than females (AOR=1.547, 95% CI: 1.006-2.380)(p<0.05), and respondents with higher financial problems had the highest odds of being 3.5 times more likely to experience food insecurity compared to those with low financial problems (AOR=3.575, 95% CI: 2.332-5.481) (p<0.001).

DISCUSSION

There is a high prevalence of food insecurity (60.9%) among university students in Peninsular Malaysia included in this study. Findings from this study are similar to previous studies done in Peninsular Malaysia (Norhasmah *et al.*, 2013; Nur Atiqah *et al.*, 2015; Wan Azdie *et al.*, 2019). The trend of food

Table 3. Association between factors and food security status among students (*N*=427)

Characteristics	*n (%)*		χ^2	*p-value**
	Food secure	*Food insecure*		
University				
UUM	36 (21.6)	71 (27.3)	5.42	0.12
UMP	36 (21.6)	72 (27.7)		
UKM	49 (29.3)	57 (21.9)		
UTM	46 (27.5)	60 (23.1)		
Ethnicity				
Malay	132 (79.0)	225 (86.8)	5.46	0.14
Chinese	18 (10.8)	14 (5.4)		
Indian	12 (7.2)	13 (5.0)		
Bumiputra Sabah/ Sarawak/Mixed	5 (3.0)	8 (3.1)		
Gender				
Male	55 (32.9)	115 (44.2)	5.42	0.02*
Female	112 (67.1)	145 (55.8)		
Age (years)				
19-21	100 (59.9)	132 (50.8)	3.40	0.07
22-25	67 (40.1)	128 (49.2)		
Years of study				
1st	69 (41.3)	101 (38.9)	0.84	0.84
2nd	43 (25.8)	67 (25.8)		
3rd	37 (22.2)	67 (25.8)		
4th	18 (10.8)	25 (9.6)		
Residence				
In campus	164 (98.2)	248 (95.4)	2.38	0.12
Out campus	3 (1.8)	12 (4.6)		
Origin†				
Rural	90 (53.9)	165 (63.5)	3.87	0.05
Urban	77 (46.1)	95 (36.5)		
Number of siblings				
1-3	64 (38.3)	74 (28.5)	4.52	0.03*
≥4	103 (61.7)	186 (71.5)		
Working part-time				
Yes	9 (5.4)	25 (9.6)	2.48	0.12
No	158 (94.6)	235 (90.4)		
Household income‡				
B40 (< RM4360)	131 (78.4)	225 (86.5)	4.93	0.09
M40 (RM 4360-9619)	27 (16.2)	25 (9.6)		
T20 (≥ RM9620)	9 (5.4)	10 (3.8)		
Financial literacy				
Lower than median	83 (49.7)	133 (51.2)	0.09	0.77
Higher than median	84 (50.3)	127 (48.9)		
Financial problem				
Lower than mean	120 (71.9)	103 (39.6)	42.36	<0.01*
Higher than mean	47 (28.1)	157 (60.4)		

(to be continued)

Table 3. Association between factors and food security status among students (*N*=427) [Cont'd]

Characteristics	*n (%)*		χ^2	*p-value**
	Food secure	*Food insecure*		
Eating behaviour				
Breakfast				
Frequently skipped	89 (53.3)	108 (41.5)	5.65	0.02*
Regular intake	78 (46.7)	152 (58.5)		
Lunch				
Frequently skipped	140 (83.8)	226 (86.9)	0.79	0.74
Regular intake	27 (16.2)	34 (13.1)		
Dinner				
Frequently skipped	130 (78.3)	208 (80.0)	0.18	0.68
Regular intake	36 (21.7)	52 (20.0)		

*p-value <0.05
†Origin refers to the hometown of the respondents
‡Household Income and Basic Amenities (HIS/BA) survey of 2016

insecurity prevalence is seen to be more significant when multiple universities from different locations were involved, as shown by Norhasmah *et al.* (2013) at 67.1% compared to studies that only focused on one location, such as those done by Wan Azdie *et al.* (2019) at 54.4% and Nur Atiqah *et al.* (2015) at 43.5%, respectively. This is because of the mixture of urban and rural locations of the universities, which might influence food accessibility. For example, the high cost of food transportation from rural to urban areas. Food items in

Table 4. Factors associated with food security status among students (*N*=427)

Variable	*Adjusted OR† (95% CI)*	*p-value*
Gender		
Male	1.55 (1.01-2.38)	0.05
Female	1.00 (ref)	
Origin		
Rural	1.38 (0.90-2.12)	0.14
Urban	1.00 (ref)	
Number of siblings		
1-3	1.00 (ref)	
≥4	0.99 (0.61-1.60)	0.96
Financial Problem		
Lower than median	1.00 (ref)	
Higher than median	3.58 (2.33-5.48)	<0.01*
Eating Behaviour		
Breakfast		
Frequently skipped	1.30 (0.85-2.0)	0.23
Regular intake	1.00 (ref)	

*p-value <0.05
†Adjusted for gender, origin, number of siblings, financial problem, and breakfast intake

the university located in an urban area costs more compared to a rural area. Fresh food items such as vegetables and fish can also be one of the most expensive items in urban areas, given the costs acquired in their marketing, in terms of transportation from production areas, with some that perished during transportation process (Armar-Klemesu, 2000; Rose *et al.*, 2008).

Even though there was a high percentage of food insecurity reported from the respondents that came from B40 families, there was no association between household income and food security status in this study (Table 3). On the contrary, as reported by Wan Azdie *et al.* (2019), respondents with parental income of more than RM 5000 were food secured (41.3%). Despite the difference in food costs between these university locations, students get the same amount of funds from family members, education loan or scholarships, depending on their family's financial status. Wan Azdie and collegues (2019) also reported high food insecurity among respondents with Perbadanan Tabung Pendidikan Tinggi Nasional (PTPTN) loan compared to those on Jabatan Perkhidmatan Awam Malaysia (JPA) scholarship. A study conducted by Meldrum & Willows (2006) reported that there was a relationship between higher food costs with the money received from financial aids. Healthy food costs more to the students with an economical diet, with lower financial aid. Thus, regardless of household income and types of scholarship, the lack of financial literacy and management will contribute to higher financial problems among students, which later leads to food insecurity.

Moreover, studies done by Thanthida (2010) stated that people, particularly those originating from rural areas with limited purchasing power, are more likely to be confronted by the problem of food insecurity. The basis of the problem most likely stems from poverty or a low-income family. Hence, it explains how the origin is somehow associated with food insecurity status among university students. Respondents originating from rural areas who are enrolled in universities located in the urban areas with higher food costs to bear may face food insecurity due to lack of financial sources, management and literacy.

A bigger family and low-income households have been associated with prevalent food insecurity. Those having more than four siblings have a higher tendency to be food insecure, as supported by Costa *et al.* (2017). A study done by Nur Hafizah *et al.* (2013) stated that socio-economic level affects eating behaviour, in which students who come from lower or middle-income families spend less on food compared to those from high-income families.

This study documented a significant association between male students and food insecurity, even though male respondents spent more on food (Meldrum & Willows, 2006). These findings are supported by studies done by Hughes *et al.*, (2011). This was due to the spending behaviour among the students, in which, female students were more likely to create monthly savings and budgeting (Danek, 2017). In contrast, male students spent more on food. A study conducted by Hayhoe *et al.* (2000) stated that females spend more on clothing and appearance items, compared to males who spend on leisure items such as electronics, entertainment and food when they are away from home. The findings also showed that female students tended to cut their daily necessities and save regularly compared to male students.

Danek (2017) reported an association between female students with food insecurity. However, Hughes *et al.*, (2011) reported that no association between gender and food insecurity

among university students. Thus, both genders are exposed to food insecurity. Based on the report by Amare (2010), students tended to have a late breakfast or might combine it with lunch, or have an early dinner as a coping strategy by means of skipping meals. A review done by Pendergast *et al.* (2016) detailed that students tended to take late breakfast or combine breakfast with lunch as brunch because of time constraints, cost, and weight control, which is most prominent among female students.

This study also recorded that male students had low financial literacy and were reported to engage in high financial problems. Furthermore, respondents who were dealing with financial problems were almost thrice as likely to report experiences with food insecurity, suggesting that financial assistance was short of meeting their financial demands of attending university (Meldrum & Willows, 2006; Norhasmah *et al.*, 2013). Conversely, according to Mohamad Fazli *et al.* (2008), most students used education funding for purposes other than for academic expenses. This showed that there is less awareness on financial literacy and management among the students (Dahlia, Rabitah & Zuraidah, 2009; Md Hafizi, 2013), indicating that students are somewhat unprepared in managing their money on campus. Prominent financial problem among students increases their risk of engaging with low food security status. Insufficient money was reported as the primary contributor to the prevalence of food insecurity among students (Hanna, 2014). Due to financial stress and as a strategy to cope with food insecurity, some tend to borrow money to buy food and might even buy on credit (Mohamad Fazli *et al.*, 2008; Norhasmah *et al.*, 2013).

Nevertheless, it is important to highlight that regardless of gender, students with financial problems were more likely to be food insecure. Since university students have more independence while living away from their family for the first time, they need to manage the demands of both financial and studies at the same time. Furthermore, Darmon & Drewnowski (2008) stated that the strategy of food insecure consumers in saving money is by selecting high energy-dense foods instead of nutrient-dense foods. These foods are low in nutritional quality and have a higher level of calories, which may contribute to overweight, obesity, and abdominal adiposity. With this alarming prevalence of food insecurity among university students, actions must be made before it becomes detrimental to their health and leads to negative impacts on their academic performances.

One of the limitations of this study was its cross-sectional study design. Thus, the causal relationship between the variables could not be traced. Other possible factors of food security status among university students in Peninsular Malaysia that focus on financial aspects should be covered in future studies.

CONCLUSION

A high prevalence of food insecurity (60.9%) denotes that it is a major problem among the university students studied. This study revealed that every three out of five university students in Malaysia are food insecure. Gender and financial problem were the main factors contributing to food insecurity among public university students in Peninsular Malaysia. Intervention studies are essential to scale down the prevalence of food insecurity, such as by increasing food availability and accessibility on campus. Every public university in Malaysia should provide and establish food banks or pantry around the campus for students. Despite the fact that some of the universities have already

implemented this, a proper system should be applied to make it work. Development studies focusing on food consumption and the cost of healthy foods should be conducted, providing the basis between the different needs of food for each gender, on whether to provide more food for males compared to female students, since males need more calories than females. At the same time, a better system to control food price on campus should be one of the efforts from the university authorities.

Other than that, an in-depth qualitative study can be done to unroot the issues of food insecurity among the students, focusing on financial issues. Intervention studies focusing on students with financial problems is a must. Moreover, there is a need to prepare students on how to properly manage their financial resources. University authorities, relevant policymakers, and professionals can also help by conducting talks to educate students on financial literacy in the early years of university enrolment. Increasing the education fund will also lessen the financial burden of the students.

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Authors' contribution

NMJ, collected and analysed the data, as well as wrote the manuscript; NS, supervised the flow of the research and reviewed the manuscript; SNA, reviewed the manuscript; SAZB, reviewed the manuscript.

Conflict of interest

All the authors declare no conflict of interests.

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