

Prevalence and factors affecting food insecurity among university students in Pahang, Malaysia

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ABSTRACT

Introduction: Food insecurity exists whenever people are unable to access sufficient food at all times for an active and healthy life. University students are a potentially vulnerable group of people to face food insecurity. This study aimed to identify the prevalence and determinants of food insecurity among a population of university students in Kuantan, in the state of Pahang. **Methods:** Food security status was identified using the United States Adult Food Security Survey Module (USAFSSM). Factors, which include demographic background, spending expenditure pattern and time constraints, were assessed. A total of 316 students were selected through stratified random sampling throughout six faculties of the International Islamic University Malaysia, of whom 307 successfully completed the survey. **Results:** The result shows that 54.4% of the students were experiencing food insecurity, from which 32.9% were sub-categorised as low food security and 21.5% as very low food security. Food insecurity was found to be significantly associated with time constraints ($p<0.05$), spending on books ($p<0.05$), miscellaneous items ($p<0.05$), parents' income ($p<0.001$) and scholarship type ($p<0.001$). **Conclusion:** Apart from the high incidence of food insecurity among the students, time and financial affordability appeared to be critical concerns in this study. Since food insecurity has become a significant issue with university students, it should be addressed and prioritised by the relevant authorities.

Keywords: Food insecurity, students, food security status

INTRODUCTION

The importance of food supply was first highlighted by Food and Agriculture Organization (FAO) and the US Department of Agriculture (USDA) when most of the world's communities were experiencing a global food crisis. Various efforts have been made in formulating the tools needed to measure food insecurity. Early direction was concentrated on the

volume and stability of food supplies (United Nations, 1975). This coverage was expanded to include access to available supplies of food by vulnerable people, which in turn requires supply and demand to be balanced. In 1996, the World Food Summit stated that "food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious

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doi: <https://doi.org/10.31246/mjn-2018-0139>

food that meets their dietary needs and food preferences for an active and healthy life” (Palmer & Groppo, 2002). The process of understanding food security and the means to achieve it is still an ongoing debate worldwide, as it is a multi-dimensional and complex matter (Adeyeye, 2017; Norhasmah, Zalilah & Asnarulkhadi, 2010).

The disruption of optimal development have been associated with food insecurity (Alaimo, Olson & Frongillo, 2002; Cook *et al.*, 2004). Besides physical or physiological effects, Ramsey *et al.* (2011) reported that children living in food-insecure households were known to experience emotional problems and behavioural disorders. Furthermore, physiological and psychological changes resulting from nutrient deficiencies as an outcome of food insecurity may result in increased frequency of illness among children and therefore decreased participation in school and activities (Alaimo, Olson & Frongillo, 2001; Diette *et al.*, 2000).

Various findings have also reported that childhood food deprivation is associated with morbidity and mortality in adulthood in a range of diet-related causes such as cardiovascular diseases, type 2 diabetes and some cancers (Ness *et al.*, 2005; Van Der Pols *et al.*, 2009; Wright *et al.*, 2001). Che & Chen (2001) and Vozoris & Tarasuk (2003) agree in their studies that individuals living within food insecure households were at a higher risk of developing diabetes mellitus, heart disease and other chronic conditions. In the last decade, food insecurity has also been associated with obesity, making it higher as a public health concern (Pan *et al.*, 2012; Roselawati *et al.*, 2017).

Food insecurity occurs not just in low- and middle-income countries. Pockets of food insecurity also exist in developed countries. In Malaysia, a study conducted by Shariff & Khor

(2005) among 200 rural women reported that 42.0% were food secure, 14.0% household-food insecure, 9.5% individual-food insecure and 34.5% suffered child-hunger. Another study done among urban welfare recipient households in Hulu Langat in the state of Selangor, Malaysia, disclosed that 26.3% of the households were food secure, while 39.8% experienced moderate food insecurity, and 34.0% severe food insecurity (Norhasmah *et al.*, 2012). A survey conducted in the district of Kuantan revealed that 77% of the households experienced food insecurity (Roselawati *et al.*, 2017). The Malaysian Adult Nutrition Survey (MANS), which was a nationwide study, discovered that the prevalence of food insecurity in terms of insufficient food quantity was 24.9%, while 21.9% reported reduction of meal sizes due to financial constraints (IPH, 2014).

Food insecurity has many consequences. It causes physical and mental health problems, and reduces academic achievements. Furthermore, its long term consequences not only affect the life choices of individuals and households, but also contributes additional burden to the health care system of the country. Given the likely association between chronic diseases, food insecurity and academic accomplishments, improving food security may have potential role in improving students' grade achievement.

While research on food security in the Malaysian context has been undertaken, the extent to which it exists among university students remain largely unexplored. A study of higher learning institutions done by Sulaiman, Md Jusoh & Ab Razak (2013) reported that 67.1% of the students faced food insecurity. However, the report mainly discussed coping strategies and the consequences of food insecurity, not its determinants. While many studies have looked at the

prevalence and the consequences of food insecurity, few have looked at the influencing factors and determinants of food insecurity. The objective of this study was to investigate the food security status and possible determinants of food insecurity among university students in Kuantan, Malaysia.

MATERIALS AND METHODS

This cross-sectional study employed the stratified random sampling method, which involved undergraduate students from six faculties, namely, Medicine, Dentistry, Allied Health Sciences, Nursing, Pharmacy and Sciences. A total of 316 subjects were selected into the study. Ethical approval was obtained from the International Islamic University Malaysia (IIUM) Research Ethics Committee. Consent from the participants was obtained prior to them answering the questionnaire.

A self-administered questionnaire was developed for this study. It was divided into five sections. The first section comprised the eight items of

the USDA Adult Food Security Survey Module (USDAFSSM) which assesses the food security status of the subjects. The internal consistency (Cronbach's α) of the questionnaire was 0.79. The second section comprised items pertaining to the determinants of food insecurity, that included living arrangement and time constraints. In this section, the subjects were asked whether they felt that they had insufficient time to eat a balanced meal or even went hungry because of it. The third section gathered demographic information while the last section enquired about the spending patterns of the subjects. The questionnaire was piloted to evaluate the clarity, relevance and applicability of the questions. Data were analysed using Statistical Package for the Social Sciences version 12.0 (SPSS 12.0), which involved descriptive analysis and the chi-square test.

RESULTS

From the total of 316 samples selected, 307 completed the survey, making the

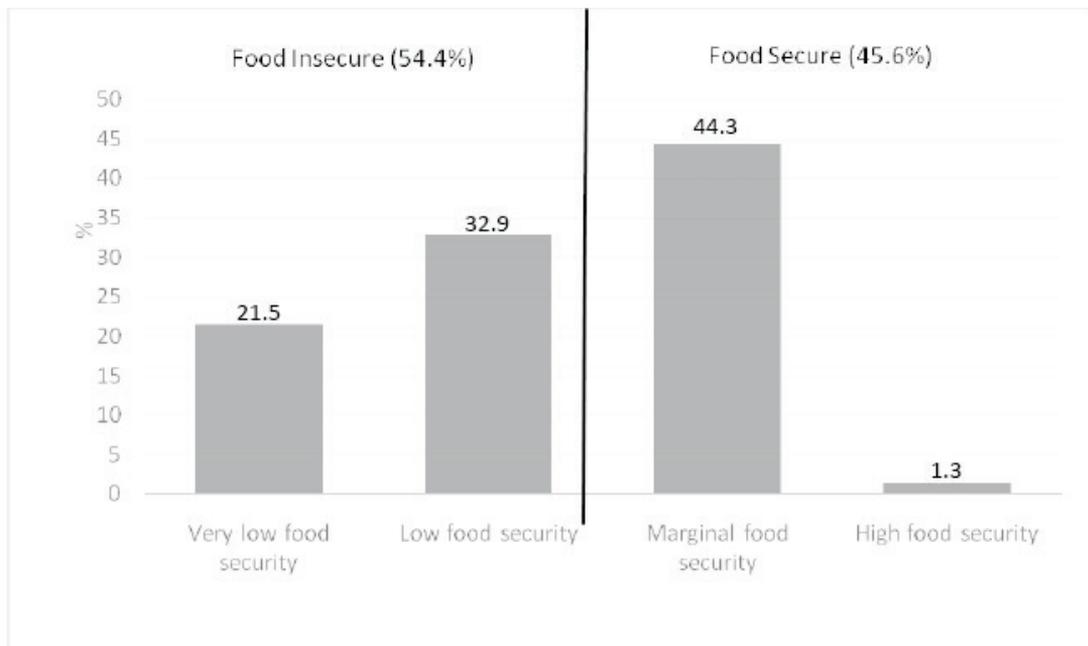


Figure 1. Food security status of the respondents

Table 1. Demographic characteristics of the respondents

<i>Characteristics</i>	<i>n</i>	<i>%</i>
Gender		
Male	95	30.9
Female	212	69.1
Living arrangements		
On-campus	246	80.1
Off-campus	53	17.3
With parents	8	2.6
Financial/loan sponsors		
PTPTN (loans)	92	30.0
JPA (scholarships)	132	43.0
MARA (loans)	8	2.6
Others sponsors	28	9.1
Non-recipients of any kind of sponsorship	47	15.3
Source of income		
Scholarship/Loan solely	172	56.0
Self-sponsored/Parents solely	37	12.1
Scholarship/Loan + Parents' support	97	31.6
Others/Part-time job	1	0.3

response rate 97.0%. Based on faculties, 107 (34.8%) were from Sciences, 61 (19.9%) Medicine, 53 (17.3%) Pharmacy, 46 (15.0%) Allied Health Sciences, 22 (7.2%) Nursing and 18 (5.9%) Dentistry. The majority of the students were females (69.1%, $n=212$) and males were 30.9% ($n=95$), proportions that reflect those of the general student body.

More than half of the students were food insecure giving a prevalence

of 54.4% ($n=167$). Of this proportion, 21.5% ($n=66$) were placed into the category of very low food security and 32.9% ($n=101$) as low food security. For food secure category, marginal food security had largest percentage at 44.3% ($n=136$) and only 1.3% ($n=4$) were highly food secure, as shown in Figure 1.

Many students in the current study received financial support. Overall, 84.7% ($n=260$) were funded with scholarships

Table 2. Association of time constraint with food security status.

<i>Description</i>	<i>Food insecure</i>		<i>Food secure</i>		<i>Chi-square statistics (df)</i>	<i>p-value</i>
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>		
"I couldn't eat balanced meals because I don't have much time to buy and eat the foods." How often did this happen to you in the last 6 months?						
Often true	24	14.4	8	5.7	11.851 (2)	0.003
Sometimes true	104	62.3	78	55.7		
Never true	39	23.4	54	38.6		
In the last 6 months, were you ever hungry but didn't eat because there wasn't enough time to eat?						
Yes	94	56.3	62	44.3	4.389 (1)	0.036
No	73	43.7	78	55.7		

Table 3. Expenses and food security status

Spending items	Food insecure		Food secure		Chi-square (df)	p-value
	n	(%)	n	(%)		
Weekly						
Foods						
< RM 50	47	(28.1)	41	(29.3)	0.049 (1)	0.826
> RM 50	120	(71.9)	99	(70.7)		
Transportation						
< RM 50	133	(79.6)	114	(81.4)	0.155 (1)	0.694
> RM 50	34	(20.4)	26	(18.6)		
Study material						
< RM 50	84	(50.3)	84	(60.0)	2.892 (1)	0.089
> RM 50	83	(49.7)	56	(40.0)		
Cell phone						
< RM 50	137	(82.0)	114	(81.4)	0.019 (1)	0.891
>RM 50	30	(18.0)	26	(18.6)		
Monthly						
Shopping						
< RM 50	76	(45.5)	57	(40.7)	0.713 (1)	0.398
> RM 50	91	(54.5)	83	(59.3)		
Housing / Hostel fees						
< RM 50	8	(4.8)	3	(2.1)	1.545 (1)	0.214
> RM 50	159	(95.2)	137	(97.9)		
Entertainment						
< RM 50	121	(72.5)	99	(70.7)	0.114 (1)	0.736
> RM 50	46	(27.5)	41	(29.3)		
Books*						
< RM 50	80	(47.9)	89	(63.6)	7.554 (1)	0.006
> RM 50	87	(52.1)	51	(36.4)		
Miscellaneous*						
< RM 50	85	(50.9)	93	(66.4)	7.539 (1)	0.006
> RM 50	82	(49.1)	47	(33.6)		

* $p < 0.01$

or received study loan [National Higher Education Fund Corporation (PTPTN) study loans 30.0%; Public Services Department (JPA) scholarships 43.0%; Majlis Amanah Rakyat (MARA) study loans 2.6% & other sponsors 9.1%] while another 15.3% ($n=47$) were self-sponsored. Further demographic characteristics are described in Table 1.

Table 2 shows the association of time constraints with food security status. More than half (56.3%, $n=94$) of food insecure students agreed that time restriction caused them to skip meals even though they were hungry. However,

a lower percentage (44.3%, $n=62$) of food secure students did so for the same reason. A large percentage (76.7%) of the food insecure students agreed that time constraints as the reason for them not to eat balanced meals, compared to 61.4% among the food secure group.

Table 3 shows the expenses of the students in the current study. The major expenses among both groups were mainly for housing rent or hostel fees. The next largest expense was food. The students spent about RM50 to RM150 on foods weekly. When they were asked to specify their miscellaneous expenses,

Table 4. Demographic characteristics and food security status

Demographic characteristics	Food insecure		Food secure		Chi-square statistics (df)	p-value
	n	(%)	n	(%)		
Gender						
Male	58	(34.7)	37	(26.4)	2.456 (1)	0.117
Female	109	(65.3)	103	(73.6)		
Living arrangement						
On-campus	135	(80.8)	111	(79.3)	0.000 (2)	0.983
Off-campus	29	(17.4)	24	(17.1)		
Own-house	3	(1.8)	5	(3.6)		
Faculty of study*						
Medicine	21	(34.4)	40	(65.6)	17.755 (5)	0.003
Nursing	15	(68.2)	7	(31.8)		
Allied Health Sciences	32	(69.6)	14	(30.4)		
Dentistry	12	(66.7)	6	(33.3)		
Pharmacy	26	(49.1)	27	(50.9)		
Sciences	61	(57.0)	46	(43.0)		
Parents income*						
<RM 1000	32	(19.3)	13	(9.4)	18.641 (3)	<0.001
RM1000-RM3000	43	(25.9)	42	(30.4)		
RM3000-RM5000	53	(31.9)	26	(18.8)		
>RM5000	38	(22.9)	57	(41.3)		
Scholarship type*						
JPA	61	(46.2)	71	(53.8)	15.423 (2)	<0.001
PTPTN	66	(71.7)	26	(28.3)		
Others	17	(47.2)	19	(52.8)		

* $p < 0.01$

most of them answered that they spent on supplements, medication, gadgets and broad-band internet access.

Table 4 addresses the relationship between some demographic characteristics of the respondents and their food security status. Significant association was found between food security status of the students with faculty of study, parents' income and scholarship type.

DISCUSSION

Majority of the students were found to be food insecure (54.4%). Those in the food secure category were mainly marginally food secure (44.3%) and only 1.3% were highly food secure. These findings are

similar but slightly lower from what was reported by Sulaiman *et al.* (2013), who found that 67.1% of students from four universities in Malaysia were food insecure. Internationally, studies conducted in a midsize rural university in Oregon, and the University of Hawa'i at Manoa, both in the United States, reported that 59% and 45% of their students, respectively, were food insecure (Chaparro *et al.* 2009; Patton-lópez *et al.* 2014). This is an indicator that the students were facing financial and economic hardships up to a point that they may have compromised their food intake. Food insecurity can adversely affect health behaviour, including healthy eating habits and wellbeing, which subsequently influence

academic performance (Bruening *et al.* 2018).

The majority of the students agreed that time constraint had caused them to face the feeling of hunger and not able to eat balanced meals. This sentiment was more prevalent among the food insecure group. It demonstrates that coping strategy for time management and meal pattern among students play a crucial role in determining student's food security status. This finding is in line with that reported by Abdullah & Ali (2011) who explained that time management and financial problems played a crucial role in determining an individual's food intake. The study claimed that only 57.5% of students had meal at proper times while the rest did not take their meal at the appropriate times. The study further explained that improper meal times among students were caused by time and financial constraints which lead to restrictions on both expenses and irregular timetable, such as having 'brunch', the meal combination between breakfast and lunch. Even worse, when some of the students only had one meal per day often consuming unhealthy foods such as instant noodles or fast food. Abdullah & Ali (2011) in their study also found that 61.5% of students spent <RM10 per day for food in their daily expenditure, and the amount increased during weekends. This amount was low and not enough to have a healthy and balanced meal. However, this was not surprising because students were found to reduce their food expenditure in order to spend on other items such as their mobile phones, gadgets, computers and clothing.

Their financial situation is one of the factors that was consistently related to food insecurity among students (Bruening *et al.*, 2017). In our study, the largest proportion of PTPTN loan recipients was among the students of the Allied Health Sciences programmes, which also had the largest percentage

of food insecure students. In contrast, students of Medical faculty where majority were JPA scholarship recipients, were at the lowest rank of food insecurity. In other words, these students were better off compared to the others. This is because students with PTPTN loans received less funding compared to the JPA scholarship recipients. The incomes of parents were also found to correspond with food security status of the students. These factors clearly demonstrate that food security status of the students was affected by their financial situation.

Although it is uncommon for Malaysian students to have a part-time jobs to support their living cost, the trend is growing due to financial reason. The students at this university also had no access to appropriate food storage and preparation facilities on campus to prepare their own meals which may have helped to reduce their food cost. Relying on insufficient financial resources may be difficult for them to achieve food and nutrition security. The prevailing conditions make it difficult for them to achieve stability for all the main components of food security, namely accessibility to, availability and utilization of food.

CONCLUSION

A significant association was found between food security status with financial affordability, time constraint, scholarship types, academic programme and parents' income. This study ascertained that most of the students at this institution were experiencing or at risk of food insecurity. Thus, financial affordability and time management together with other factors found to be critical in this study may need further attention in order to improve food security among university students.

Food insecurity seems to be a significant problem among university students, which influence not just

their wellbeing but also their academic performance. This study should be repeated at different institutions of higher learning around the country to better understand the issue and further strengthen the support system and introduce intervention programmes to improve access to adequate and nutritious foods for the student population. Hence, addressing food insecurity should be one of the priorities for university authorities and also relevant policy makers.

Acknowledgement

The investigators would like to thank the International Islamic University Malaysia (IIUM) Research Ethics Committee for approving the project and the participants of this study. This work was supported in-part by Ministry of Education research grant FRGS16-054-0553.

Authors' contributions

WAMAB, principal investigator, conceptualised and designed the study, prepared the draft of the manuscript and reviewed it; SI, undertook the data collection and analysis, and reviewed the manuscript; SS, reviewed the manuscript and advised on the data interpretation; RAR, provided advice on the data interpretation and reviewed and proofread the manuscript.

Conflict of interest

There is no conflict of interest to declare.

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