

THE ASSOCIATION OF FOOD INSECURITY WITH DIET QUALITY AND MENTAL HEALTH AMONG IIUM KUANTAN STUDENTS

NOR HIDAYATUL BINTI NOR AHMAD
DEPARTMENT OF NUTRITION SCIENCES, KULLIYAH OF ALLIED HEALTH SCIENCES, INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA, JLN SULTAN AHMAD SHAH, BANDAR INDERA MAHKOTA, 25200 KUANTAN, PAHANG, MALAYSIA
norhidayatul1997@gmail.com

NOR AZWANI MOHD SHUKRI , PhD
DEPARTMENT OF NUTRITION SCIENCES, KULLIYAH OF ALLIED HEALTH SCIENCES, INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA, JALAN SULTAN AHMAD SHAH, BANDAR INDERA MAHKOTA 25200 KUANTAN, PAHANG, MALAYSIA
norazwani@iium.edu.my

WAN AZDIE BIN MOHD ABU BAKAR, PhD
(CORRESPONDING AUTHOR)
DEPARTMENT OF NUTRITION SCIENCES, KULLIYAH OF ALLIED HEALTH SCIENCES, INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA, JLN SULTAN AHMAD SHAH, BANDAR INDERA MAHKOTA, 25200 KUANTAN, PAHANG, MALAYSIA
wazdie@iium.edu.my

ABSTRACT

Introduction: Food insecurity is the state of having little or no reliable access to a sufficient quantity of affordable and nutritious food. This study was conducted to find the relationship between food insecurity with diet quality and mental health among students of International Islamic University Malaysia (IIUM) Kuantan, Pahang. **Methods:** This cross-sectional study involved 285 IIUM Kuantan students from six Kulliyahs. Self-administered questionnaires adapted from Food Insecurity Experience Scale (FIES), Malaysian Healthy Eating Index (M-HEI) and Depression, Anxiety and Stress Scale (DASS-21) were used in collecting the data. **Results:** The outcome from the investigation of food insecurity using FIES showed an increase in food insecurity status from 54.4% in 2017 to 63.5% in this recent study. This shows that more than half of IIUM Kuantan students experience food insecurity. Results from M-HEI indicated that a majority of IIUM Kuantan students were having moderate diet quality while DASS-21 showed that a few students having very severe mental health status including depression, anxiety, and stress. However, the relationships between food insecurity and diet quality or mental health were shown to be not significant for IIUM Kuantan students. **Conclusions:** This study indicates that food insecurity among IIUM Kuantan students is substantial and should be monitored regularly since the prevalence shows an increasing pattern.

KEYWORDS: Food Insecurity, FIES, Diet Quality, Mental Health, M-HEI, DASS-21

INTRODUCTION

Food is one of the basic needs of human beings which will provide essential and non-essential nutrients to the body. Therefore, it is very imperative to take care of what they eat to maintain health and strength as well as to give constructive and positive effects on cognitive and feelings. However, eating can be affected by a few factors such as the physical state, financial status, environment, and social. Hence, these factors become a significant challenge to make sure the food is secured nowadays. Food insecurity or frailty is said as sustenance instability where there is the dubious capacity or failure to get food, powerlessness to acquire enough nourishment, not being able to live steadily and healthily, and feeling unsatisfied with the food (Schroeder & Smaldone, 2015).

Food insecurity can influence psychological health and behavior (Pia Chaparro, Zaghoul, Holck, & Dobbs, 2009). Also, the status of health and wellbeing (Dewing, Tomlinson, le Roux, Chopra, & Tsai, 2013; Ramsey, Giskes, Turrell, & Gallegos, 2011). Many factors may lead to food insecurity. For example, the production as well as the availability and accessibility of the food, salary, unpredictability food price, social protection or assurance, access to public services or administration, and numerous others. Previously, there were investigations conducted towards food insecurity especially among women, households as well as university students. Nowadays, food insecurity is affecting university students because of the increase in the cost of living that was caused by the rising of economic status. A study of food insecurity among university students that has been conducted in Terengganu came out with the prevalence of 22% of students experienced food insecurity (Ramlee, Ali, Zalbahar, & Jaafar, 2019). Besides, a previous study on food insecurity among IIUM Kuantan students found that 54.4% of the students were experiencing food insecurity (Wan Azdie et al., 2019). However, those research only focused on the prevalence of food insecurity among students. Therefore, this study was conducted to find the association of food insecurity with diet quality and mental health among IIUM Kuantan students.

This study was very important because food insecurity could affect the diet quality and mental health of university students. Among the factors that may contribute to food insecurity among university students include the income of family, not having any scholarship or loan to support their study, poor time management and high cost of living. Furthermore, restricted food decisions and monetary limitations may be the fundamental driver of food instability that carries the suggestion to the nature of diet among university students. In a past report directed at two state-funded colleges in Terengganu, the prevalence of university students having food insecurity was 22%, where 14% of them were categorized as

low food security and 8% were classified as exceptionally or very low food security (Ramlee et al., 2019). Consequently, it is currently evident that food insecurity truly exists among university students and affects their physical and mental health. There are studies conducted in Malaysia and found that psychological wellness issues had extended from 10.7% in 1996 (NHMS II) to 11.2% in 2006 (NHMS III). It shows that psychological wellness issues become terrible day by day. Food Insecurity Experience Scale (FIES) was used in this study to measure food insecurity because it can evaluate the insecurity of food in individuals including the level of insecurity. Besides, knowing the relationship between food insecurity with diet quality and mental health is very important to find the best solution to solve the problem.

METHODS

Subjects

In total, 285 subjects (male and female) from the International Islamic University Malaysia (IIUM) Kuantan campus were recruited through multistage sampling involving stratified and purposive sampling where the number of subjects had been stratified according to six Kulliyahs which were Kulliyah of Medicine, Kulliyah of Dentistry, Kulliyah of Pharmacy, Kulliyah of Allied Health Sciences, Kulliyah of Science and Kulliyah of Nursing. Informed consent was obtained from the subjects who were interested and willing to join. The protocol of the study was approved by the Kulliyah Postgraduate and Research Committee (KPGRC) and IIUM Research Committee (IREC).

Research Instrument

The questionnaire consisted of four sections which were socio-demographics, Food Insecurity Experience Scale (FIES), Malaysia Healthy Eating Index (M-HEI), and Depression, Anxiety and Stress Scale (DASS-21).

Socio-demographic

This part consisted of age, gender, kulliyah, year of study, parent's income, scholarship status and living arrangement.

Food Insecurity Experience Scale (FIES)

The FIES questionnaire that consists of eight questions was utilized to study food insecurity and should be answered with either "yes" or "no". For the scoring of FIES, the level of severity can be determined through its raw score. If all answer is no or less than four affirmative answers, it is categorized as food secure or mild food insecure, 4 to 6 yes answers is moderate while 7 to 8 yes answers is considered severe food insecurity

Malaysian Healthy Eating Index (M-HEI)

The diet quality has been evaluated using the M-HEI that being adapted from Healthy Eating Index. This instrument was chosen as it has been validated in Malaysian adults. There are nine components with seven food groups that will have a score ranging as shown in Appendix D. The total score is the addition of the overall component and changed into the percentage value. The score which was below 51% recorded as poor diet quality, 51% to 80% considered moderate diet quality and starting from 81% and above indicated as good diet quality.

Depression, Anxiety and Stress Scale (DASS-21)

For the mental health assessment, the DASS-21 that contains 21 questions was used. This instrument was chosen as it has been validated using Confirmatory Factor Analysis (CFA) in Malaysian adults. The scores of Questions 3, 5, 10, 13, 16, 17, and 21 were summed up and multiplied by 2 to get the level for depression. Next, scores of Questions 2, 4, 7, 9, 15, 19, and 20, were summed up and multiplied by 2 to evaluate the anxiety level. Using the same method, scores of Questions 1, 6, 8, 11, 12, 14, and 18, determined the stress level of the participants. The total score for each element of mental health was rated as normal, mild, moderate, severe, and extremely severe.

Statistical analyses

The statistical analyses of results included a descriptive analysis of the percentage of food insecurity, Spearman Rho Correlation to assess association between food insecurity and diet quality as well as Chi-squared test to assess the association between food insecurity and mental health elements including depression, anxiety, and stress.

RESULTS

The Prevalence of Food Insecurity

Figure 1 shows the food security status according to the FIES. From a total of 181 (63.5%) students who were food-insecure, 91 (31.9%) were mildly food-insecure, 73 (25.6%) were moderate food-insecure and 17 (6.0%) were severely food-insecure.

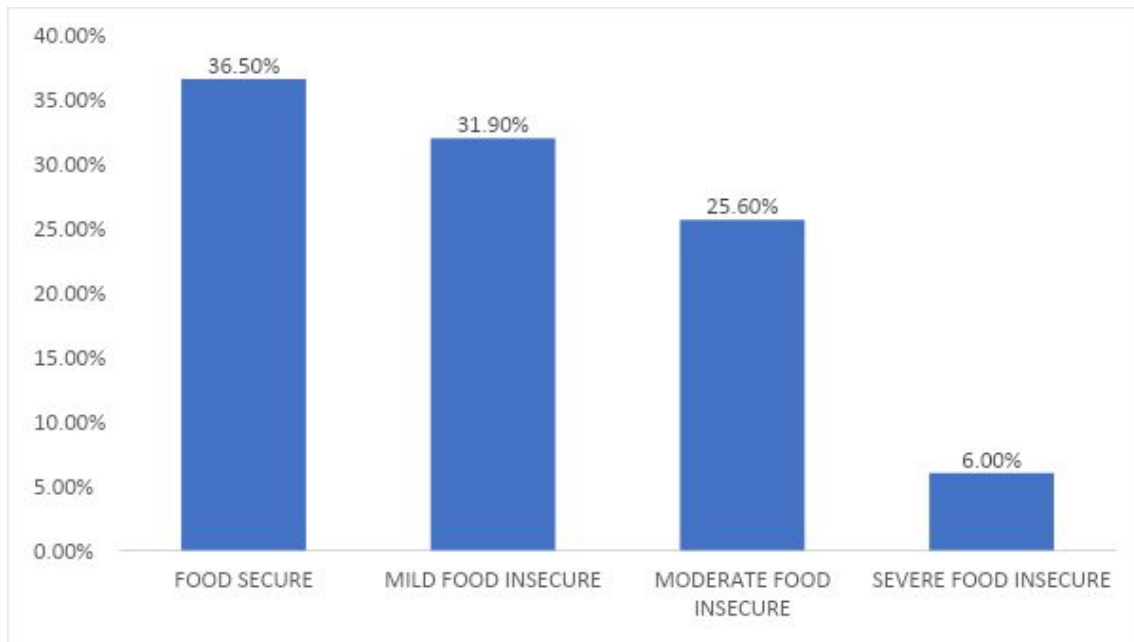


Figure 1 Bar chart of Food Insecurity Status of IIUM Kuantan students (n=285)

The Association between Food Insecurity and Diet Quality

The association between food insecurity and diet quality was studied using the Spearman Rho Correlation test instead of Pearson Correlation Test because the data were not normally distributed. Based on Figure 2, it was shown that there was no significant correlation ($r = 0.004$, $n = 285$, $p = 0.947$) within the FIES and M-HEI scores.

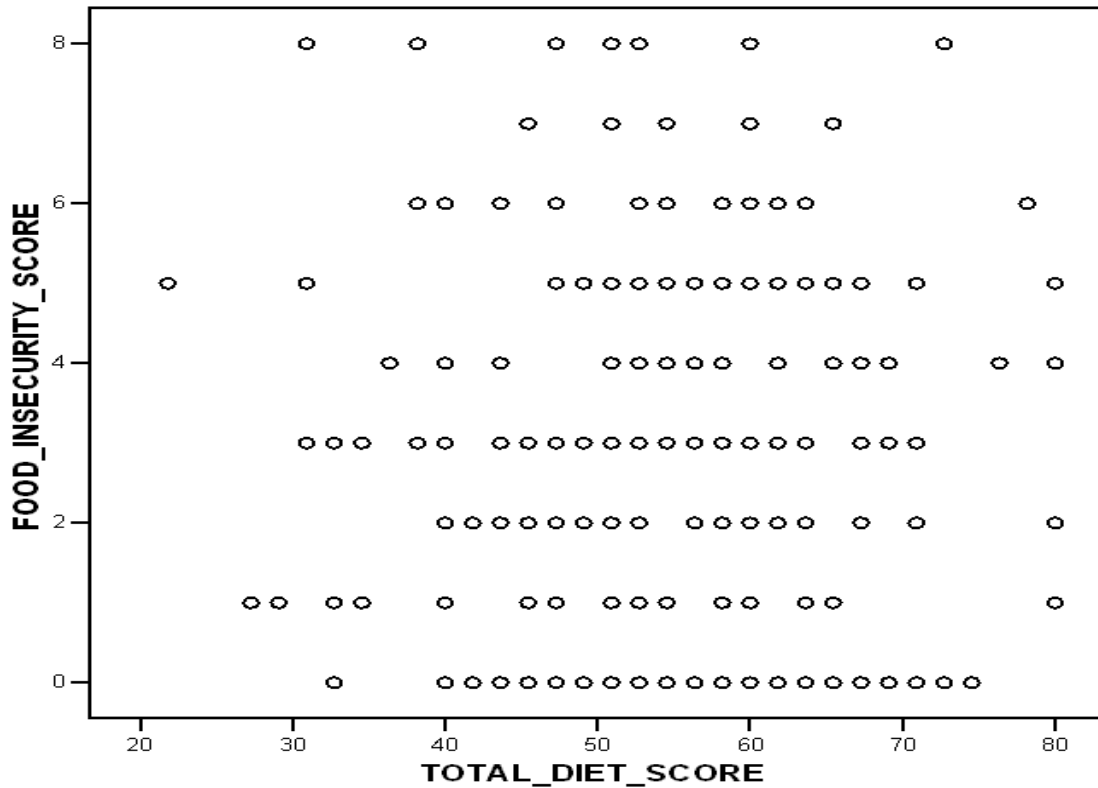


Figure 2 Scatterplot of the Association between Food Insecurity Scores and Diet Quality using M-HEI scores among IIUM Kuantan students (n=285)

The Association between Food Insecurity and Depression

Based on Table 1, 60.6% (63) from the food-secure group were categorized as normal or not having depression, 14.4% (15) of them were having mild depression followed by 18.3% (19) with moderate depression. 4.8% (5) and 1.9% (2) had severe depression and extremely severe depression respectively. On the other hand, 50.3% (91) students from the food insecure group were normal, 17.1% (31) of them were having mild depression. 23.8% (43) and 5.0% (9) under this group were having moderate and severe depression respectively and only 3.9% (7) students were categorized as having extreme depression. There was no relationship between food insecurity and depression ($p=0.508$).

Table 1 Association between Food Insecurity and Depression Status

	Food Secure % (n=104)	Food Insecure % (n= 181)	Chi-square statistics (df)	p-value
Normal	60.6(63)	50.3(91)		
Mild	14.4(15)	17.1 (31)		
Moderate	18.3(19)	23.8(43)	4 (1)	0.508
Severe	4.8 (5)	5.0 (9)		
Extremely Severe	1.9 (2)	3.9 (7)		

Association between Food Insecurity and Anxiety

Table 2 shows that 33.7% (35) students in the food-secure group were having a normal anxiety level, where 10.6% (11) and 29.8% (31) of them were having mild and moderate anxiety respectively. However, 20.2% (21) of the food secure students were having extreme anxiety while 5.8% (6) were having severe anxiety. On the other hand, 27.6% (50) students from the food-insecure group were having normal anxiety followed by 7.7% (14) and 30.4% (55) students from this group were having mild and moderate anxiety levels, respectively. the severe and extremely severe levels of anxiety for the food-insecure group were 13.8% (25) and 20.4% (37). There was no significant association ($p=0.253$) between the insecurity of food and anxiety level among students at IIUM Kuantan campus. Overall, 64.6% of students who were food-insecure experienced moderate, severe, as well as extremely severe anxiety, compared to 55.8% of students who were food-secure.

Table 2 Association between Food Insecurity and Anxiety

	Food Secure % (n=104)	Food Insecure % (n=181)	Chi-square statistics (df)	p-value
Normal	33.7 (35)	27.6 (50)		
Mild	10.6 (11)	7.7 (14)		
Moderate	29.8 (31)	30.4 (55)	4 (1)	0.253
Severe	5.8 (6)	13.8 (25)		
Extremely severe	20.2 (21)	20.4 (37)		

Association between Food Insecurity and Stress

Based on Table 3, majority in both food secure and insecure groups have normal stress level. However, the percentage of severe and extremely severe stress level could be observed slightly higher among food insecure group. Nevertheless, there was no significant association between food insecurity and stress level of the IIUM Kuantan campus students ($p=0.522$).

Table 3 Association between Food Insecurity and Stress

Stress Level	Food Secure % (n=104)	Food Insecure % (n=181)	Chi-square statistics (df)	p-value
Normal	68.3 (71)	59.7 (108)		
Mild	11.5 (12)	17.7 (32)		
Moderate	13.5 (14)	12.7 (23)	4 (1)	0.522
Severe	5.8 (6)	8.3 (15)		
Extremely Severe	1.0 (1)	1.7(3)		

DISCUSSION

Food Insecurity Status

In the current study, the prevalence of students who were food-insecure was 63.5%. Among this, 31.9% was mild food-insecure followed by 25.6% moderate food insecure and 6.0% severe food insecurity. The prevalence of food-insecure students increased from the previous study which was 54.4% (Wan Azdie et al., 2019). However, most of them were experiencing mild food insecurity. By excluding mild food insecurity, the prevalence of moderate and severe insecurity was 31.6%.

Lack of financial stability has been reported as a major reason causing food insecurity among students (Ramlee et al, 2019). Time constraint due to abundant academic workload, accessibility to cafeteria and limited choices of food available were among other factors contributing to food security among this population (Sulaiman et al., 2013; Wan Azdie et al., 2019)

Association of Food Insecurity with Diet Quality and Mental Health.

There was no significant difference between food insecurity status and quality of the diet of IIUM Kuantan students. Approximately 26.0% of students from the food-secure group and 28.7% of students from the food-insecure group were having poor diet quality. This indicated low diversity of food taken by the students (Trijsburg et al., 2019). Poor diet quality will compromise diet diversity and also types and amount of foods taken. This may lead to malnutrition, obesity, and non-communicable diseases, and therefore should be overcome to prevent future comorbidities. Many factors may affect the diet quality of university students including food choices in cafeteria, availability of fast food outlets and absence of storage to store food like vegetables and fruits (Kabir et al., 2018).

Other than that, food insecurity was not associated with mental health among IIUM Kuantan students. The DASS-21 scoring method indicates the whole mental health problem involving depression, anxiety, and stress level. According to the previous study, depression and anxiety can be distinguished through the symptoms experienced by an individual (Tran et al., 2013). The results of this study also showed that food insecurity was not associated with anxiety among IIUM Kuantan students. The majority of IIUM Kuantan students experience normal stress level. The food insecurity maybe not a significant reason for the students to experience the stress as the outcome of the analysis shows the non-significant association between food insecurity with stress level. In a study among Malaysia university students, studies workload has been identified as the main cause of stress, followed by peer pressure, family problems and financial problems (Ramachandiran & Dhanapal, 2018).

CONCLUSIONS

In conclusion, this study showed that the prevalence of food insecurity was 63.5%, where 31.6% were moderate and severe food insecure. However, there was no significant relationship between food insecurity and diet quality as well as the three elements of mental health (depression, anxiety, and stress) among the study population. Nevertheless, the study of food insecurity among university students

need to be further investigated in order to find the solution to curb the problem and its related issues, in line with the goal of the Sustainable Development Goals (SDG) of United Nation towards achieving zero hunger.

ACKNOWLEDGMENT

The authors would like to express appreciation to all the study participants for their full cooperation.

REFERENCES

- Dewing, S., Tomlinson, M., le Roux, I. M., Chopra, M., & Tsai, A. C. (2013). Food insecurity and its association with co-occurring postnatal depression, hazardous drinking, and suicidality among women in peri-urban South Africa. *Journal of Affective Disorders*, 150(2), 460–465. <https://doi.org/10.1016/J.JAD.2013.04.040>
- Kabir, A., Miah, S., & Islam, A. (2018). Factors influencing eating behavior and dietary intake among resident students in a public university in Bangladesh: A qualitative study. *PLOS ONE*, 13(6), e0198801. <https://doi.org/10.1371/journal.pone.0198801>
- Pia Chaparro, M., Zaghloul, S. S., Holck, P., & Dobbs, J. (2009). Food insecurity prevalence among college students at the University of Hawai'i at Mānoa. *Public Health Nutrition*, 12(11), 2097–2103. <https://doi.org/10.1017/S1368980009990735>
- Ramachandiran, M., & Dhanapal, S. (2018). Academic Stress Among University Students : A Quantitative Study of Generation Y and Z ' s Perception. *Pertanika Journal of Social Science and Humanities*, 26(3), 2115–2128. [http://www.pertanika.upm.edu.my/Pertanika_PAPERS/JSSH_Vol.26\(3\)Sep.2018/51JSSH-2949-2018.pdf](http://www.pertanika.upm.edu.my/Pertanika_PAPERS/JSSH_Vol.26(3)Sep.2018/51JSSH-2949-2018.pdf)
- Ramlee, I. S., Ali, A., Zalbahar, N., & Jaafar, S. N. 'Afifah. (2019). Food insecurity among university students at two selected public Universities in Malaysia (March).
- Ramsey, R., Giskes, K., Turrell, G., & Gallegos, D. (2011). Food insecurity among adults residing in disadvantaged urban areas : potential health and dietary consequences, 15(2), 227–237. <https://doi.org/10.1017/S1368980011001996>
- Schroeder, K., & Smaldone, A. (2015). Food Insecurity: A Concept Analysis. *Nursing Forum*, 50(4), 274–284. <https://doi.org/10.1111/nuf.12118>
- Sulaiman, N., Md Jusoh, Z., & Ab Razak, M. (2013). Food Insecurity among Public University Students Receiving Financial Assistance in Peninsular Malaysia. *Malaysian Journal of Consumer and Family Economics*, 16, 78–90.
- Tran, T. D., Tran, T., & Fisher, J. (2013). Validation of the depression anxiety stress scales (DASS) 21 as a screening instrument for depression and anxiety in a rural

community-based cohort of northern Vietnamese women. *BMC Psychiatry*, 13(1), 1.
<https://doi.org/10.1186/1471-244X-13-24>

Trijsburg, L., Talsma, E. F., De Vries, J. H. M., Kennedy, G., Kuijsten, A., & Brouwer, I. D. (2019). Diet quality indices for research in low- and middle-income countries: A systematic review. *Nutrition Reviews*, 77(8), 515–540.
<https://doi.org/10.1093/nutrit/nuz017>

Wan Azdie, M. A. B., Shahidah, I., Suriati, S., & Rozlin, A. R. (2019). Prevalence and factors affecting food insecurity among university students in Pahang , Malaysia. *Malaysian Journal of Nutrition*, 25(1), 59–67.