

Examining the Relationship between Food Insecurity and Students' Academic Performance in Public Universities

Nur Farrah Yasmin Abdul Latib¹, Mohd Hairi Jalis^{2*}, Mohammad Hafizi Md Rus³ and Nor Saadah Che Deraman⁴

^{1,2,3,4}Faculty of Hotel and Tourism Management, Universiti Teknologi MARA Cawangan Terengganu, Malaysia

*Corresponding author: ² mohdhairijalis@uitm.edu.my

ABSTRACT

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This study examines the relationship between food insecurity and academic performances among university students in Selangor, Malaysia. Food insecurity exists whenever people have limited food access at all times for an active and healthy life. In the case of Malaysians, their multicultural identity has expanded their palate and surrounded them with various food choices in their daily life. However, only a few are well-informed of the story behind food production and its quality. Limited knowledge and understanding of health, particularly daily dietary food intake, might slowly make people descend to food insecurity. Therefore, it is essential to understand the consequences of this issue. A total of 400 survey data using a self-administrated questionnaire were collected among students across public universities in Selangor, Malaysia. Statistical analysis revealed that food quality significantly influences students' academic performances. Students at a lower risk of food insecurity included those who reported living with their parents and those who received monthly allowances from government agencies and their parents. In addition, food-secure students were more likely than food-insecure students to report a higher GPA versus a lower GPA. These findings compel relevant authorities, including university and food-related service providers, to consider the importance of food quality and students' amount of food intake as these factors significantly influence their academic performances. Therefore, this study suggests further investigation with a combination of various study settings and scope probably could gain a deeper understanding of and refine the existing theory of human belief towards food consumption.

1. INTRODUCTION

Many studies found that food insecurity is a multi-faceted concept that has evolved over time and place. It is conceptualised as limited or uncertain availability of nutritionally adequate and safe food or limited or uncertain ability to acquire acceptable food in socially acceptable ways (Anderson, 1990). This indicates when an individual has uncertain capacity to get food and the uncertain capability to eat nutritious food whenever they wish. The phenomenon of food insecurity has been discussed and debated by scholars within the context of teenagers who pursue their higher education at university and have to live far away from their parents to stay near campus. Food insecurity has extraordinary consequences for university students who are not invulnerable to encountering financial hardship. Numerous studies show both the degree and effects of financial stress during each study. A deficiency of an adequate measure of food prompts weight reduction and poor health, a phenomenon that influences more than a large portion of teenagers in the present day (Cheng & Kamil, 2020; Whitaker et al., 2006). Students' increased financial stress may influence their purchasing priorities, a common scenario being frequently prioritising their limited budget for housing, tuition, and utilities, leaving an insufficient balance for food and thereby putting them at risk of food insecurity (El Zein et al., 2019; Henry, 2017). Thus, many university students struggle to manage their diet while studying at university by worrying about meals or dishes they buy and consume.

In Malaysia, food insecurity has been observed amongst the communities of higher educational institutions, particularly the students. The country is reported to have 20 well-established public universities and a total enrolment of 567, 625 students in 2019 (Malaysia Education Planning and Research Division, 2020). The escalating number of universities opens equilibrium to more opportunities for youngsters from diverse backgrounds to pursue post-secondary education. Those who come from low-income families, on the other hand, may find it difficult to adjust to campus life. As a result, their issues with financial stability, packed daily class schedules and activities, and insufficient attention on proper and balanced food intake to stay fit have become research topics of interest to academics. Furthermore, severe sickness due to the consumption or high intake of low nutrient and quality food among Malaysians, the young age groups included, is the repercussion of food insecurity and poor health (Sulaiman et al., 2021). This was supported by a recent study by Cheng and Kamil (2020), who found that students themselves are the core reason for their altered food consumption behaviour. Often, Malaysian university students who are pressured to study and maintain their academic achievements consume food with low energy, fat and calcium. This behaviour, if continuously practised, would lend a negative impact on both their health as well as their academic performances (Cheng & Kamil, 2020).

In light of the current scenario of Malaysian universities, the rising cost of education imposed by the Malaysian Public Higher Learning Institution is now affecting some students, and most of them come from low and middle-income families. The students' incomes come mainly from study loans or scholarships, allowances provided by their parents or part-time jobs; in other words, they are self-sponsored. The majority of them were said to earn less than Ringgit Malaysia or MYR500.00 (approximately USD119.05) per month (Muniady, 2014). Due to their limited financial resources, students must budget carefully for food, entertainment, transportation, study materials, clothing, electronic devices and rent (Sorooshian & Teck, 2014). Hence, it is difficult for students to choose between textbooks, rent, and consistently eat healthily. Also, a lack of knowledge, rather than a disregard, concerning diet, food intake and nutritional value lead most people to capitulate to food insecurity (Cady, 2014).

The sudden closure of cafeterias, limited access to personal transportation, poor food quality, and time constraints have also exacerbated the situation, further forcing students to resort to alternative methods such as purchasing food off-campus, buying instant and ready-made food from mini-marts, reducing meal portions, and eating at unhealthy food establishments such as Quick Service Restaurants to survive (Shii et al., 2015). Some of them were also discovered to have nutrient intakes lower than the Recommended Nutrient Intakes for Malaysia (Abdull Hakim et al., 2012; Gan et al., 2011; Ganasegeran et al., 2012). Thus, these factors significantly influence students' food choices and create a problem where they have to choose between eating healthily or to survive, which ultimately affects their academic achievements (Cook & Frank, 2008; Gao et al., 2009) as well as their energy and concentration levels (Hamelin et al., 1999; Zekeri, 2007). Evidence from the aforementioned studies indicates that the students' financial management skills and dietary behaviours were unacceptable. Their inconvenient surroundings and living conditions placed them at risk of developing a higher degree of complexity in food insecurity, possibly influencing their academic performances.

Based on the above rationale, there is a need for empirical investigation on food insecurity, particularly among university students. Although a few studies on food insecurity on college campuses have been carried out (Hughes et al., 2011; Patton-López et al., 2014; Pia Chaparro et al., 2009), studies scrutinising the prevalence of food insecurity amongst students and whether food insecurity is associated with academic achievement, concentration ability and energy level receive minimal attention in the syllabus and needs to be conducted. Therefore, this study examines the relationship between public university students' food insecurity and their academic performances in Selangor, Malaysia. There are two food habit predictors: food quality and food quantity, which have been set as the main focus of this study to measure the relationship specifically.

2. LITERATURE REVIEW

Students who do not have learning capability may lack the motivation to adapt and arrange and assess their learning processes as classes become more difficult in increments. This circumstance negatively influences their success in university and their lives after graduation (Pepe, 2012). Although studies on food insecurity and academic performance are limited, exploring the adverse effect of food insecurity on teenagers' academic achievements acted as a catalyst to assess the proposed study hypothesis. In terms of food insecurity and teenage advancement, it was found that most teenagers who experience food insecurity live in developed countries. As Winicki et al. (2003) have indicated, nine percent of their study population experienced food insecurity and that any level of food insecurity strongly influenced academic results within one year of learning.

2.1 Understanding the Concept of Food Insecurity

Many scholars have conducted studies on food insecurity for decades to understand human behaviour towards food consumption. Initially, the term food insecurity was introduced by World Health Organisation as a subset to the concept of food security which specifically focuses on understanding human food consumption behaviour. Wunderlich and Norwood (2006) defined food insecurity as the inadequacy or limited quality and quantity of food resources for consumption. This definition is built on two aspects: 1) quality food resources, and 2) the amount of food available (i.e., food quantity) for human consumption. Thus, food insecurity can be detected whenever there is little nutritional food for consumption, be it intentionally or otherwise. Food insecurity has been recognised as one of the most important

areas of study and has been recognised by many countries worldwide through the second goal of Sustainable Development Goals 2030 (Sulaiman et al., 2021).

Scholars have also found several indicators to measure the condition of food insecurity, including poverty status, real estate values and pressure, unemployment status of a person, lack of food and nutritional knowledge, and food habits (Holben, 2010). Food insecurity does not refer to a household's ability to access foodstuffs, living in a food desert, or insufficient time to shop or cook. It just indicates a lack of food access due to financial matters and other material resources. Because of their life practices, the population that experienced food insecurity indicated a higher risk of chronic diseases (Seligman et al., 2010). Therefore, a study on food insecurity is critical and desires more attention to better understand its condition and the consequences of ignoring its existence. This concept is also believed to apply to various age groups and population segments, especially among university students who are often reported to suffer from a lack of nutrition due to limited food access and the practice of unusual dietary habits.

2.2 Food Quality

The availability of quality food has gained serious attention and has long been discussed by many scholars. There are many studies heavily concentrated on food and service, which includes the hospitality industry. Additionally, food nutrients and food habit studies are often conducted to better understand institutional catering, especially at the school level. However, there is still little known about food quality within the context of food insecurity, particularly the relationship between food quality and students' academic performances. It is a leading public health issue. Food insecurity is identified as a profound level of food issues, while food security is a condition identified with a supply of adequate quality food (Sulaiman et al., 2021).

Within the broad concept of food quality, this is one of the significant aspects that build on food insecurity's conceptual knowledge. This condition was found in students suffering difficulty to manage their finances, which causes them to choose to either buy cheap food or big portions that have value for money (Seligman et al., 2010). This condition caused students to avoid spending an unreasonable amount on acceptable quality food. Moreover, struggling to access eateries and supermarkets restricts students' options and the desire to buy quality food. Nowadays, most food entrepreneurs have increased their prices to an unreasonable level—thus, students choose to purchase affordable food which is typically low in quality (Cheng & Kamil, 2020). These experiences will stress the students because an unbalanced food intake due to financial problems may affect their academic achievements. With little quality food, food insecurity is developed among students (Maroto, 2013; Radimer, 2002).

H1: There is positive relationship between food quality and students' academic performance.

2.3 Food Quantity

The amount of food intake and dietary habits are interrelated to ensure our body has enough nutrition. Food acts as fuel to supply energy to carry out daily life activities and maintain health. Excessive food intake causes many troubles to humans, including obesity, disease, stress, laziness, and poor concentration in class or while studying (Cheng & Kamil, 2020). With increasing financial stress and preparing for university, their finishing rates cannot differentiate them from high-income families or low-income families. Muniady et al. (2014) indicated that students must budget carefully for food, entertainment, transportation, study materials, clothing, electrical equipment, and rent because of their restricted financial resources.

American College Health Association (2011) discovered that 34% of college students found money stressful or extremely hard to handle, and that sums of cash contrarily influenced the academic execution of 6.5% of students in their analysis. The same goes for the researchers Maroto (2013) and Radimer (2002), who observed that consuming too much food causes students to lose focus and feel sleepy while in class. If students continuously practise this, there is a high chance that it would affect their academic performances.

H2: There is negative relationship between food quantity and students' academic performance.

Figure 1 illustrates the focus of this study which situated within the underpinning theories adapted from Maroto (2013) and (Radimer, 2002).

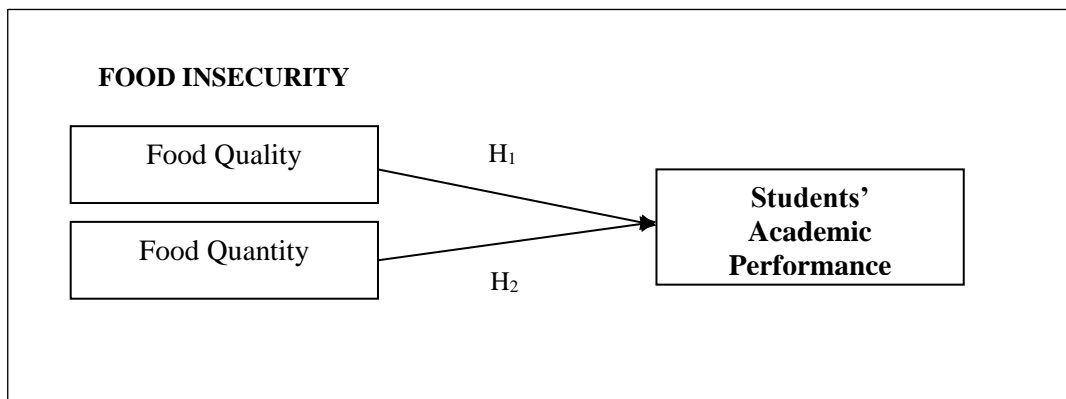


Figure 1. Underpinning Theoretical Framework

3. METHOD

This study employed a descriptive cross-sectional research design through the distribution of a self-administrated questionnaire. Four public universities, namely, Universiti Teknologi MARA Cawangan Selangor, Universiti Pertahanan Nasional Malaysia, Universiti Kebangsaan Malaysia and Universiti Putra Malaysia located in Selangor, were identified from the Malaysian Qualifications Register (MQR) list published by the Malaysian Qualifications Agency (MQA). These universities were approached, and they have agreed to participate in this study. The MQA is an accreditation agency recognised and supported by the Malaysian government for quality assurance at Malaysia's public and private universities. Based on the sample size table recommended by Krejcie and Morgan (1970), the sample size of 381 respondents is considered adequate with a five percent margin error and a 95% confidence level. Nevertheless, it has been increased to 400 to avoid invalid results due to respondent errors when completing the questionnaire.

The self-administrated survey questionnaire consists of four main sections. All four sections measured responses with a 5-point Likert-type scale (1 = strongly disagree, and 5 = strongly agree). The questionnaire was adapted from past studies (Maroto, 2013; Radimer, 2002) with several minor modifications to fit the study. The final section of the questionnaire collected the respondents' demographics and relevant personal information (e.g., age, gender, marital status, living situation, current semester, meal per day, monthly income, and Grade Point Average). This study was focus on public university students located in Selangor, Malaysia. A total of 400 questionnaires were distributed within one month to all four selected public universities. The targeted sample population (e.g., respondents) for this study were undergraduate and postgraduate students enrolled in full-time study. Table 1 summarises the survey distribution activities.

Table 1. A Summary of Self-Administrated Questionnaire Distribution

Public Universities	Number of questionnaires distributed	Duration	Return Rate Percentage (%)
Universiti Teknologi MARA Cawangan Selangor	200		100
Universiti Pertahanan Nasional Malaysia	50	1 month*	100
Universiti Kebangsaan Malaysia	50		100
Universiti Putra Malaysia	100		100
Total	400		100

*All public universities were given one month (November 2019) to distribute and return the completed questionnaires

All questionnaires returned were checked to ensure that participating respondents fully answered every set of questionnaires. The data was transferred and keyed into Statistical Package for the Social Science (SPSS) Version 25.0 for analysis. Descriptive statistics by looking at frequency percentage and inferential test (e.g. Multiple Linear Regression - MLR) were utilised in this study. Frequency percentage enabled researchers to observe the socio-demographic profile of participating respondents. MLR, on the other hand, allowed researchers to statistically examine the relationship between public university students' food insecurity (criteria) and their academic performances (predictors).

4. FINDINGS AND DISCUSSION

4.1 Demographic Information

The demographic data were analysed with descriptive statistics consisting of frequency, percentage, mean and standard deviation using the statistical package for the social science (SPSS) version 25.0 software. All respondents ($n=400$) agreed to participate in this study and answered the questionnaire completely. Based on Table 2, most of the respondents were between 20 and 23 years old, which accounted for 70.5% ($n=282$) of the respondents. Female respondents accounted for 50.8% ($n=286$) while male respondents accounted for 28.5% ($n=114$). With regards to the level of education, the majority of respondents were undergraduate students, who account for 92.5% ($n=370$) of respondents while ($n=30$) postgraduates account for 7.5%. Undergraduate students were often reported as the majority of the university population. Additionally, it was found that there were many undergraduate programs offered at the participating universities. As for the respondents' living situations, the majority of respondents resided on campus, which accounts for 74.75% ($n=299$); followed by renting out, which accounts for 6 percent ($n=2$); living with parents, which accounts for 13.75% ($n=55$); and living with spouses which accounted for 5.5 percent ($n=22$). The majority of respondents, or 27.8% ($n=23$), ate three times per day, whereas the lowest was 10.3 percent ($n=41$), who consumed one meal per day. As for the respondents' income backgrounds, 13.5% ($n=54$) have an income below MYR2,500.00 (approximately USD595.23), followed by 14.75% ($n=59$) with incomes ranging between MYR2,501.00 - MYR3,170.00 (USD595.48 – USD754.76). This was followed by incomes ranging between MYR3,171.00 – MYR3,970.00 (USD755.00 – USD945.24), which accounted for 3.75% ($n=15$), and only two percent ($n=8$) have incomes ranging between MYR3,971.00 – MYR4,850.00 (USD945.48 – USD1,154.76). The majority of respondents, 66% ($n=264$), were not applicable in terms of income because the study reported that the respondents received financial assistance from parents and scholarships

(Economic Planning Unit, 2019). The Grade Point Average (GPA) revealed that the majority of respondents were in the second upper-class, which accounted for 31.5% ($n=126$), and first-class, which accounted for 25.8% ($n=103$). The lowest with less than 1.99 of accumulative points accounted for five percent ($n=20$).

Table 2. Demographic Characteristics of Respondents

Profiles	Categories	<i>n</i>	Percentage (%)
Age	18 - 23 years old	282	70.5
	24 - 28 years old	92	23
	29 - 33 years old	22	5.5
	34 years old and above	4	1
Gender	Male	114	28.5
	Female	286	71.5
Marital Status	Single	375	93.8
	Married	25	6.2
Education Level	Undergraduate	370	92.5
	Postgraduate	30	7.5
Living Situation	Campus residence	299	74.75
	Renting	24	6
	Parents house	55	13.75
	Spouse house	22	5.5
Current Semester	Semester 2-3	279	69.75
	Semester 4-5	98	24.5
	Semester 6-7	23	5.75
Meals Intake per Day	1 time	41	10.3
	2 times	107	59.3
	3 times	237	27.8
	4 times	15	2.6
Monthly Income:	<MYR2,500	54	13.5
	MYR2,501 - MYR3,170	59	14.75
	MYR3,171 - MYR3,970	15	3.75
	>MYR3,971 - MYR4,850	8	2
	Others	264	66
Grade Point Average	Less Than 1.99	20	5
	2.00 - 2.49	69	17.2
	2.50 - 2.99	82	20.5
	3.00 - 3.49	126	31.5
	3.50 - 4.00	103	25.8

4.2 Examining the Relationship by Using Multiple Linear Regression

Table 3 indicates the multiple regression output between variables involved in the study. Food quantity ($b= -.027, p=.714$) had a negative influence on academic performance. However, the value revealed that food quantity was low and did not influence academic performance ($*p>0.05$) as it only accounts for 2.7%. This shows that most students consume sufficient amounts of food daily. In addition, the location of the campus residences, which was in town areas, provided easy access to a wide range of restaurants. Thus, negative relationship between food quantity and students' academic performance has resulted H2 rejection in this study.

Based on the results on food quality ($b = .144, p = .017$), it is a factor that significantly affected academic performance. Food quality was the most influential predictor of the two dimensions of food insecurity ($*p < 0.05$). This was the most pivotal factor of food insecurity that affected academic performance. This particular data disclosed that students of public universities in Selangor tended to buy unhealthy food instead of quality food because insufficient financial sources affected their everyday routines. Patton-López et al. (2014) emphasised that students felt less energetic towards their academic studies when they had unhealthy diets. Meanwhile, Whitaker et al. (2006) rationalised that food insecurity has extraordinary consequences for teenagers' strength in their daily lives, and inadequate food quality increases the risk of sickness. These findings were aligned with The Malaysian Adult Nutrition Survey's countrywide research, which found that Malaysian citizens contributed to food insecurity due to insufficient food sources and availability and the provision and consumption of quality food. Therefore, H1 of this study is accepted with positive relationship between food quality and students' academic performance.

Table 3. Multiple Regression between Food Insecurity and Students' Academic Performance

	Unstandardised Coefficients		Standardised Coefficients	T	Sig.	Hypotheses Testing
	B	Std. Error	Beta			
(Constant)	3.461	.242		14.280	.000	
Food Quality	.161	.067	.144*	2.408	.017	H ₁ = Accepted
Food Quantity	-.034	.094	-.027	-.366	.714	H ₂ = Rejected

*Note: Dependent Variable: Academic Performance

5. CONCLUSION AND RECOMMENDATION FOR FUTURE STUDIES

In conclusion, this study confirmed that there is a positive relationship between food quality and students' academic performance., hence hypothesis 1 was supported. On the other hand, the study failed to provide empirical evidence on the significant effect of food quantity on students' academic performances. Hence, hypothesis 2 was rejected. Regardless, research on food insecurity is critical, especially to better understand the human attitude towards food. As discussed in the literature review section, the majority of students believed that they encountered dilemmas with food insecurity during their pursuit of education at a higher learning institution. Relevant scholars confirmed that food insecurity is a major health issue that has resulted in several negative consequences, including negatively impacted academic performances among students. Therefore, providing better food quality and maintaining the appearance, taste, and balanced nutrients (i.e., food quality) is crucial for students studying at public universities in Selangor, Malaysia. All these could help minimise behaviour related to food insecurity amongst those students and at the same time increase their quality of life and health.

Within the findings of this study, it seems that there are limitations of application and generalizability. Perhaps future scholars could further extend the investigation on food insecurity among university students nationwide. This would allow a better understanding of the food insecurity phenomenon in Malaysia. The findings could be generalised to the entire population of university students in the country rather than a specific area of study. Moreover, it would be more interesting to identify differences in the dietary habits between those enrolled at public and private universities or whether rural or urban areas significantly influence food insecurity among students. Different settings will result in divergent findings, and expansion

of the research is required to strengthen the body of knowledge. Finally, integrating the qualitative and quantitative approach (mixed-method study) on this topic can provide a deeper understanding of the theoretical and conceptual thoughts on food insecurity among university students and studying human behaviour. Furthermore, scholars could discover emerging attributes within the current perspective concerning modern lifestyle and the pressure of restructuring the education system to adapt to the online teaching and learning era due to uncontrollable external forces such as the current pandemic and natural disasters.

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APPENDIX

Appendix 1: Survey Instrument

Variable	Item	Code	Reliability	Sources
Food Quality	The food price was reasonably affordable.	FQL1	0.723	
	I relied on low-cost food because I do not have enough money.	FQL2		
	I could not afford to eat balanced meals.	FQL3		
	The food was eyed appealing.	FQL4		
	The food was fresh and tasty.	FQL5		
Food Quantity	I worried whether my food would run out before I have money to buy more.	FQN1	0.756	Adapted with minor modifications from Maroto (2013) and Radimer (2002)
	The food that I bought just did not last and I did not have money to get more.	FQN2		
	I eat less than I should if there was not enough money to buy the food.	FQN3		
	I will cut my meals' size or skip the meals if there was not enough money.	FQN4		
	I will not eat for the whole day if there was not enough money to buy the food.	FQN5		
Students' Academic Performance	I pay better attention in class and lecture when I eat my meals on time.	AP1	0.650	
	I feel more confident when I eat enough portion meals.	AP2		
	My concentration level in class is very good.	AP3		
	My energy level in class is very good.	AP4		

AUTHOR BIOGRAPHIES

Nur Farrah Yasmin Abdul Latib (M.Gastro., B.Sc.) is currently serving as a lecturer in the Department of Culinary Arts and Gastronomy Management at the Faculty of Hotel and Tourism Management, Universiti Teknologi MARA Terengganu, Malaysia. She obtained her Master's in Gastronomy at Universiti Teknologi MARA, Shah Alam.

Mohd Hairi Jalis (Ph.D., M.Sc., B.Sc.) is a Senior Lecturer at the Faculty of Hotel and Tourism Management, Universiti Teknologi MARA Cawangan Terengganu in Malaysia. He obtained his PhD. in Tourism Management from Southern Cross University, New South Wales, Australia. His research interests are local cuisine and destination marketing strategies. He has participated in several research projects and published articles and chapters in books within gastronomy and tourism studies.

Mohammad Hafizi Md. Rus (M.Hosp.Mgt., B.Sc.) is currently serving as a lecturer in the Department of Hotel Management, Faculty of Hotel and Tourism Management, Universiti Teknologi MARA, Terengganu, Malaysia. He obtained his Master's in Hospitality at Universiti Teknologi MARA, Shah Alam.

Nor Saadah Che Deraman (M.Gastro., B.Sc.) is currently serving as a lecturer in the Department of Culinary Arts and Gastronomy Management at the Faculty of Hotel and Tourism Management, Universiti Teknologi MARA, Terengganu, Malaysia. She obtained her Master's in Gastronomy at Universiti Teknologi MARA, Shah Alam.