

**ASSOCIATION OF FINANCIAL LITERACY AND
FOOD INSECURITY AMONG UNDERGRADUATE
STUDENTS IN USM HEALTH CAMPUS**

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**ASSOCIATION OF FINANCIAL LITERACY AND
FOOD INSECURITY AMONG UNDERGRADUATE
STUDENTS IN USM HEALTH CAMPUS**

by

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for the degree of
Bachelor of Health Sciences (Honour) (Dietetics)**

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CERTIFICATE

This is to certify that the dissertation entitled “ASSOCIATION OF FINANCIAL LITERACY AND FOOD INSECURITY AMONG UNDERGRADUATE STUDENTS IN USM HEALTH CAMPUS” is the bonafide record of the research work by Ms. “WONG YONG JIE” during the period from October 2023 to July 2024 under my supervision. I have read this dissertation and it conforms to the acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation to be submitted in partial fulfilment for Bachelor of Health Science (Honours) (Dietetics).

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DECLARATION

I declare that this dissertation results from my investigations, except where otherwise stated and duly acknowledged. I also declare that it has not been previously or currently submitted as a whole for any other degrees at Universiti Sains Malaysia or other institutions. I grant Universiti Sains Malaysia the right to use the dissertation for teaching, research, and promotional purposes.

Wong Yong Jie

Date: 4th July 2024

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TABLE OF CONTENTS

CERTIFICATE	ii
DECLARATION	iii
ACKNOWLEDGEMENT	iv
TABLE OF CONTENTS	v
LIST OF TABLES	ix
LIST OF FIGURES	x
LIST OF SYMBOLS	xi
LIST OF ABBREVIATIONS	xii
LIST OF APPENDICES	xiii
ABSTRAK	xiv
ABSTRACT	xv
CHAPTER 1 INTRODUCTION	1
1.1 Background of Studies	1
1.2 Problem Statement	3
1.3 Research Questions	4
1.4 Study Objectives	5
1.4.1 General Objective	5
1.4.2 Specific Objectives	5
1.5 Research Hypothesis	5
CHAPTER 2 LITERATURE REVIEW	6
2.1 Financial Literacy.....	6
2.1.1 Financial literacy status among university students globally and in Malaysia.....	6
2.1.2 Relationship between demographic and socioeconomic variables and financial literacy	7
2.1.2(a) Gender	7

2.1.2(b)	Age.....	7
2.1.2(c)	Marital status	8
2.1.2(d)	Having Dependent Family Members.....	8
2.1.2(e)	Education level	8
2.1.2(f)	Parental education level.....	9
2.1.2(g)	Income	9
2.1.3	Financial literacy and financial decision making	10
2.2	Food Insecurity	10
2.2.1	Food security status among university students globally and in Malaysia.....	10
2.2.2	Factors of Food Insecurity	11
2.2.3	Consequences of Food Insecurity.....	11
2.2.4	Coping strategies of Food Insecurity.....	12
2.3	Association between Financial Literacy and Food Insecurity.....	13
2.4	Conceptual Framework	14
CHAPTER 3 METHODOLOGY		15
3.1	Study Design.....	15
3.2	Study Area.....	15
3.3	Study Populations	16
3.4	Subject Criteria	16
3.4.1	Inclusion criteria.....	16
3.4.2	Exclusion criteria.....	16
3.5	Sample Size Estimation.....	16
3.6	Sample Size Method and Subject Recruitment.....	17
3.7	Research Instruments	19
3.7.1	Questionnaire design	19
3.8	Operational Definition	20
3.9	Data Collection Method.....	21

3.10	Study Flowchart	22
3.11	Data Analysis	22
3.12	Gantt Chart & Milestone	23
3.12.1	Gantt chart	23
3.12.2	Milestone	24
3.13	Ethical Considerations	24
3.13.1	Subject vulnerability	24
3.13.2	Declaration of absence of conflict of interest	25
3.13.3	Privacy and Confidentiality	25
3.13.4	Community sensitivities and benefits	26
3.13.5	Honorarium and incentives	26
3.13.6	Ethical Review and Board Approval	26
CHAPTER 4	RESULTS	27
4.1	Sociodemographic Data	27
4.2	Prevalence of Food Security Status	31
4.3	Financial Literacy Level among Students	32
4.4	Association between Socioeconomic Factors and Food Security Status among Students	33
4.5	Association between Financial Literacy and Food Security Status among Students	37
CHAPTER 5	DISCUSSION	38
5.1	Prevalence of Food Security Status	38
5.2	Financial Literacy Level	39
5.3	Association between Socioeconomic Factors and Food Security Status among Students	40
5.4	Association between financial literacy and food security status among students	41
CHAPTER 6	CONCLUSION	44
6.1	Summary of the findings	44
6.2	Limitations of the study	44

6.3	Strength of the study	45
6.4	Recommendation	45
	REFERENCES.....	47
	APPENDICES.....	56

LIST OF TABLES

	Page
Table 3.1	Sample Size..... 18
Table 3.2	Operational Definition 20
Table 3.3	Gantt chart..... 23
Table 3.4	Location of Food Bank 25
Table 4.1	Sociodemographic Data..... 27
Table 4.2	Prevalence of Food Security Status 31
Table 4.3	Financial Literacy Status..... 32
Table 4.4	Association between Socioeconomic Factors and Food Security Status among Students (N=169)..... 33
Table 4.5	Association between Financial Literacy and Food Security Status among Students (N=169)..... 37

LIST OF FIGURES

Page

Figure 2.1	Conceptual Framework.....	14
Figure 3.1	Study Flowchart.....	22

LIST OF SYMBOLS

n	Sample size
Z	Value representing desired confidence level
Δ	Precision
p	Anticipated population proportion
i	Stata
N^i	Total number of students from each school
N	Total number of all students from all schools
$\frac{n}{N}$	Sampling fraction
n^i	Sample size from each school

LIST OF ABBREVIATIONS

B40	Bottom 40% of household income
DOSM	Department of Statistics Malaysia
FMI	Fat mass index
FPL	Federal poverty line
GPA	Grade point average
INFE	International Network on Financial Education
JPA	Jabatan Perkhidmatan Awam Malaysia
M40	Middle 40% of household income
OECD	Organisation for Economic Co-operation and Development
PPSK	School of Health Sciences
PPSG	School of Dental Sciences
PPSP	School of Medical Sciences
PTPTN	Perbadanan Tabung Pendidikan Tinggi Nasional
T20	Top 20% of household income
USDA	United States Department of Agriculture
USM	Universiti Sains Malaysia

LIST OF APPENDICES

Appendix A	Questionnaire
Appendix B	Questionnaire link
Appendix C	Recruitment poster
Appendix D	Informed consent form

**KAJIAN MENGENAI HUBUNGAN ANTARA LITERASI KEWANGAN DAN
KETAKJAMINAN MAKANAN DALAM KALANGAN PELAJAR PRASISWAZAH
DI KAMPUS KESIHATAN USM**

ABSTRAK

Peningkatan prevalen ketakjaminan makanan dalam kalangan pelajar universiti adalah isu kritikal. Kekurangan kemahiran pengurusan makanan dan wang, seperti ketidakmampuan merancang bajet dan mengurus perbelanjaan akibat literasi kewangan yang tidak mencukupi, mungkin mempengaruhi tahap jaminan makanan seseorang. Kajian ini menyiasat hubungan antara literasi kewangan dan ketakjaminan makanan dalam kalangan pelajar prasiswazah di Kampus Kesihatan USM. Rekabentuk kajian keratan rentas telah digunakan, melibatkan saiz sampel sebanyak 169 pelajar yang direkrut melalui persampelan rawak berstrata. Data dikumpul menggunakan soal selidik berstruktur yang menilai ciri-ciri demografi dan sosioekonomi, status jaminan makanan, dan literasi kewangan. Data dianalisis menggunakan ujian Chi-square Pearson atau ujian Fisher Exact. Keputusan menunjukkan bahawa 49.8% pelajar mengalami ketakjaminan makanan, dengan perbezaan ketara berdasarkan etnik, tahap pendidikan ibu, dan pendapatan isi rumah. Kajian mendapati bahawa 21.9% pelajar universiti mempunyai tahap literasi kewangan yang rendah, 37.8% mempunyai tahap sederhana, dan 40.2% mempunyai tahap literasi kewangan yang tinggi. Namun, tiada hubungan yang signifikan antara literasi kewangan dan status jaminan makanan dalam kalangan pelajar universiti. Penemuan ini mencadangkan bahawa walaupun meningkatkan literasi kewangan adalah penting, ia mungkin tidak mencukupi secara sendirian untuk menangani ketakjaminan makanan dalam kalangan pelajar. Penyelidikan lanjut diperlukan untuk meneroka faktor-faktor lain yang menyumbang dan membangunkan strategi yang komprehensif untuk mengurangkan ketakjaminan makanan dalam populasi ini.

ASSOCIATION OF FINANCIAL LITERACY AND FOOD INSECURITY AMONG UNDERGRADUATE STUDENTS IN USM HEALTH CAMPUS

ABSTRACT

The increasing prevalence of food insecurity among university students is a critical issue. A lack of food and money management skills, such as the inability to plan a budget and manage expenses due to inadequate financial literacy, might affect one's level of food security. This study investigates the association between financial literacy and food insecurity among undergraduate students at the USM Health Campus. A cross-sectional study design was employed, involving a sample size of 169 students recruited through stratified random sampling. Data were collected using a structured questionnaire that assessed demographic and socioeconomic characteristics, food security status, and financial literacy. The data were analyzed using Pearson's Chi-square test or Fisher Exact test. Results indicated that 49.8% of students experienced food insecurity, with significant differences observed based on ethnicity, mother's education level, and household income. The study found that 21.9% of university students have a low level of financial literacy, 37.8% have a medium level, and 40.2% possess a high level of financial literacy. However, there is no significant association between financial literacy and food security status among university students. These findings suggest that while improving financial literacy is important, it may not be sufficient on its own to address food insecurity among students. Further research is needed to explore other contributing factors and develop comprehensive strategies to mitigate food insecurity in this population.

CHAPTER 1

INTRODUCTION

1.1 Background of Studies

Food security was defined, at the World Food Summit in 1996, as “Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life”. The definition of food security is based on availability, access, food utilization, and stability of the three dimensions over time (Tubiello, 2016). Food insecurity is typically defined as not having consistent access to adequate food for active, healthy lives for all household members (Carman & Zamarro, 2016). There are four categories of food security status, according to the USDA: high food security, marginal food security, low food security, and very low food security (USDA, 2018).

Globally, a recent systematic review of college or university students in the United States found that between 14% and 59 % experienced food insecurity, which was higher than the national level (12.3 %) (Bruening et al., 2017). Similarly, Malaysia’s experience was within the range of 22% to 70.0% of college or university students according to a recent systematic review (Norhasmah et al., 2021), which surpassed the prevalence of food security at the national level (Peninsular Malaysia), which was 11.4% (Institute for Public Health, 2014). University students' financial and demographic background makes them particularly susceptible to food insecurity (Hashim et al., 2014). Many of them struggle financially because they don't have reliable financial resources. They thus rely on financial help, loans, or scholarships to cover the cost of attending university (Broton & Goldrick-Rab, 2016).

Additionally, the rising expenses of living and education burden them and change their spending patterns (Saruchi S et al., 2015). Even though loans are offered, the remaining money after paying for education and accommodation is not enough to finance on-campus living for students (Nisha, 2017). As a result, university students, especially those from low-income

households, experience food insecurity (Munro et al., 2013). B40 (bottom 40% of household income), M40 (middle 40% of household income), and T20 (top 20% of household income) refer to the classification of household income groups in Malaysia. Based on the Household Income Survey Report 2022 conducted by the Department of Statistics Malaysia (DOSM), B40 refers to household income less than RM5,250, M40 refers to household income between RM5,251 and RM11,819, while T20 represents a household income of RM11,820 or more.

It is believed that there will be a positive relationship between income and food security (Leete & Bania, 2010; Dahl et al., 2014). The result of the study shown that a large decrease in income is associated with a 2.1 – percentage point increased probability of food insufficiency, or a 31% higher likelihood of food insufficiency (Dahl et al., 2014). However, income does not always reveal the complete picture. Approximately 6.8% of households with income 185 % above the federal poverty line (FPL) experience food insecurity, while 63% of households below the FPL do not (Rabbitt et al., 2023). It is contradictory and requires an explanation that a significant number of non-poor households experience food insecurity while a substantial fraction of impoverished households have food security (Millimet et al., 2015). It's possible that financial literacy—rather than merely a low income—plays a role in the phenomenon of food insecurity.

Financial literacy is defined as a combination of financial awareness, knowledge, skills, attitudes, and behaviours necessary to make sound financial decisions and ultimately achieve individual financial well-being (OECD, 2022). Family wealth (Behrman et al., 2010), larger retirement savings (Lusardi & Mitchell, 2007c), and better current-cost/current-benefit trade-off decisions (Carlin & Robinson, 2010) are all correlated with indices of financial knowledge and behavior. More financial literacy leads to a better capacity to budget or save for a buffer since those with higher levels of financial literacy have an easier time making financial decisions. Those who are financially literate become less susceptible to food insecurity as they build wealth through their financial knowledge and skills (Ankrah Twumasi et al., 2023).

1.2 Problem Statement

Previous studies revealed coping strategies and consequences of food insecurity among university students in Malaysia (Nor Syaza Sofiah et al., 2021; Law et al., 2015; Norhasmah et al., 2013; Nur Atiqah et al., 2015; Siti Marhana et al., 2014). University students use two different kinds of coping strategies to avoid food insecurity namely food-related coping strategies and non-food coping strategies. Examples of food-related coping strategies are using less expensive food, cutting the portion size or number of dishes for meals, and reducing the number of meals eaten in a day. Meanwhile, they applied several non-foods related coping strategies including budgeting their money, cutting back on expenses like phone bills, credit reload cards, clothes, and cosmetics, making plans for their expenses, and asking friends or family for money (Norhasmah et al., 2013).

Food insecurity in university students triggered anxiety and poor physical health through lack of energy, skipping classes, and elevated levels of fat mass index (FMI) and triglyceride levels (Nur Atiqah et al., 2015). While existing research, such as the study conducted by Mohd Abu Bakar et al. (2019) in International Islamic University Malaysia (IIUM), Kuantan, and the investigation by Nurulhudha Mohd et al. (2020) in multiple Malaysian universities which were Universiti Utara Malaysia, Universiti Kebangsaan Malaysia, Universiti Malaysia Pahang and Universiti Teknologi Malaysia, has explored various determinants of food insecurity among university students, there remains a significant gap in understanding the role of financial literacy specifically in the context of students at Universiti Sains Malaysia (USM) health campus in Kubang Kerian, Kelantan. Mohd Abu Bakar et al. (2019) investigated demographics, spending patterns, living arrangements, and time constraints, while the study by Nurulhudha Mohd et al. (2020) examined financial literacy, financial problems, and eating behaviour, but neither has specifically focused on financial literacy as a determinant of food insecurity among university students. The difference between the USM health campus and other universities is it does not provide any business-related courses as it only includes the School of Health Sciences, Dental Sciences and Medical

Sciences so it is necessary to determine the financial literacy among university students who are not pursuing any business-related courses.

Most students' first encounter with financial independence without parental supervision is when they enroll in university (Hanin et al., 2022). According to the study from Sabri & Macdonald (2010), university students who had higher levels of financial literacy also reported fewer financial problems. Financial problems ultimately result from low financial literacy. In the Malaysian setting, financial literacy is becoming more and more crucial for undergraduate students. They need to be financially capable of making wise financial decisions to deal with the rising living expenses, and the constantly fluctuating cost of products and services (M. H. Ahsan, 2013). Numerous factors, including a lack of food and money management abilities, such as the inability to plan a budget and manage expenses due to inadequate financial literacy, might affect one's level of food security (Nurulhudha Mohd et al., 2020). Therefore, this study aims to better understand the relationship between financial literacy and food insecurity among undergraduate students in USM health campus.

1.3 Research Questions

1. What is the food security status among undergraduate students in USM health campus?
2. What is the financial literacy status among undergraduate students in USM health campus?
3. Is there any association between financial literacy and food insecurity among undergraduate students in USM health campus?

1.4 Study Objectives

1.4.1 General Objective

This study aims to determine the association between financial literacy and food insecurity among undergraduate students in USM health campus.

1.4.2 Specific Objectives

1. To determine the food security status among undergraduate students in USM health campus.
2. To determine the financial literacy status among undergraduate students in USM health campus.
3. To determine the association between financial literacy and food insecurity among undergraduate students in USM health campus.

1.5 Research Hypothesis

Null hypothesis: There is no association between financial literacy and food insecurity among undergraduate students in USM health campus.

Alternative hypothesis: There is an association between financial literacy and food insecurity among undergraduate students in USM health campus.

CHAPTER 2

LITERATURE REVIEW

2.1 Financial Literacy

2.1.1 Financial literacy status among university students globally and in Malaysia

A study surveyed 1493 undergraduate students at a large, private US university and the results showed that the mean score of correct answers of financial literacy is 43.1% (Brau et al., 2019). Another study examined the level of financial literacy among university students in Estonia, Germany, Italy, Netherlands, Poland, Romania, Russian Federation and Turkey (Ergün, 2018). The survey's overall mean percentage of correct answers was 72.2%. This outcome indicates a medium level of financial literacy about personal finance. The findings show that students who are more knowledgeable about personal finance are those who are male, major in business, have a PhD, live in rental properties, have high-income parents, receive financial advice from friends, have taken financial courses in the past, receive financial information about financial issues from universities, and are Poland students (Ergün, 2018). Studies had shown that university students in Malaysia have moderate level of financial literacy (Yakob et al., 2015; Yasmin & Anuar, 2017; Yahaya et al., 2019), while a study revealed that university students generally have low financial literacy (Yew et al., 2017). Female students have a lower level of financial literacy compared to male students. In comparison to students enrolled in other courses, those pursuing bachelor's degrees in accounting and business administration appear to be more financially literate (Jeyaram & Mustapha, 2015). Another study also showed that students who took Financial Management course have higher level of financial knowledge compared to those who did not (Yahaya et al., 2019). Family influence has the highest significant effect on financial literacy compared to personality characteristics (financial attitude and financial behaviour) and financial knowledge according to a study carried out by Sholehah et al. (2017).

2.1.2 Relationship between demographic and socioeconomic variables and financial literacy

2.1.2(a) Gender

According to research by Lusardi and Mitchell (2011), women are much more likely to say they do not know the answer and are significantly less likely to answer the questions correctly. This phenomenon is strikingly comparable in nations with varying financial situations (Lusardi & Wallace, 2013). Furthermore, women also give a more cautious assessment of their financial knowledge. Lusardi & Mitchell (2011) state that this finding is the same both for developed countries and developing countries. Research by Chen and Volpe (1998) adds to the body of research showing women struggle more in performing financial calculations and have less financial literacy, which ultimately prevents them from being able to make wise financial decisions.

Individual socialization may be the cause of gender differences. According to a study by Edwards et al. (2007), parents have different expectations for their sons and daughters. Specifically, parents are more likely to talk about money with their sons because they have higher expectations for their sons' work and savings. The authors noted, however, that since women receive greater financial support from their parents than sons do when they reach university age, parents instill in them to be financially dependent. Therefore, the main distinction between men and women can be attributed to the fact that males typically view money as a source of power and perceive that owning money will make them more socially desirable, whilst women appear to view money more passively (Calamato, 2010).

2.1.2(b) Age

According to a growing body of research, financial literacy is typically lower in young people and the elderly and higher in adults in the middle of their life cycle (Agarwal S et al., 2009). According to research by Lusardi and Mitchell (2011), participants who are between the ages of 25 and 65 tend to answer 5% more questions than those who are either over 65 or under

25. Moreover, Scheresberg (2013) discovered that young adults, ages 25 to 34, had acquired expensive loans.

2.1.2(c) Marital status

Brown and Graf (2013) have found that, in comparison to married people, singles are significantly more likely to have lower levels of financial literacy. Generally, those with low levels of financial literacy are more likely to make poor financial decisions that could eventually lead to debt, which could jeopardize their relationships (Calamato, 2010). Supporting this finding, Dew (2008) discovered that consumer debt poses a significant risk to marital satisfaction and therefore that married people tend to be more financially literate.

2.1.2(d) Having Dependent Family Members

To promote family well-being, people with dependent family members may be more concerned about their finances and, as a result, have higher levels of financial literacy. However, the empirical evidence contradicts this prediction. According to Servon & Kaestner (2008) research, those with a child are less likely than those who have two or three children to exhibit low financial literacy levels. Furthermore, it was discovered by Mottola (2013) that households that had dependent family members had a higher likelihood of low financial literacy. The reverse causation theory could account for these findings, suggesting that people with higher (lower) levels of financial literacy are more (less) concerned about family planning.

2.1.2(e) Education level

Higher-educated people and those with more access to financial information tend to have higher degrees of financial literacy. (Amadeu, 2009) illustrates the point that increased exposure to finance and economics subjects in undergraduate or graduate programmes has a positive impact on students' day-to-day financial behaviour. The level of financial knowledge was higher among students in the accounting, administration, and economics courses. Lusardi and Mitchell (2011) findings, which support this evidence, indicate that people with lower

education levels are less likely to provide correct answers to the questions and are more likely to state they do not know the answer. However, regardless of their educational background, students had an inadequate knowledge level, especially when it came to investments, according to Chen and Volpe (1998) who evaluated students' knowledge of personal finance.

2.1.2(f) Parental education level

Within the same context, research indicates that parents have a significant impact on their children's consumer behaviour. Research has shown that most people obtain financial management knowledge from their parents (Pinto et al., 2005; Clarke et al., 2005). Likewise, research by Jorgensen (2007) and Mandell (2008) revealed that parents have a major impact on their children's knowledge, attitudes, and financial behaviour and that there is a consistent relationship between an individual's financial literacy and their parents' education levels. These arguments suggest that parental education may be quite significant for their children's literacy.

2.1.2(g) Income

Atkinson and Messy (2012) discovered an association between lower income levels and poorer financial literacy levels. According to Monticone (2010), wealth has a modestly positive impact on financial literacy. Conversely, experimental data presented by Mitchell & Lusardi (2011) demonstrates the correlation between wealth and financial literacy. Students from high-income families demonstrated much greater knowledge levels than students from low-income families in research on financial literacy (Johnson & Sherraden, n.d.). Furthermore, people with low incomes have a higher likelihood of dropping out of school, which over time adds to their lack of financial literacy (Calamato, 2010). There is also in this case the possibility of reverse causation: individuals with high financial literacy levels, when making better financial decisions, achieve higher income levels than individuals with low financial literacy levels.

2.1.3 Financial literacy and financial decision making

A high level of financial literacy is linked with sound financial decision making including, saving for emergencies and improving cash flow management (Hilgert et al., 2003), planning for retirement (Lusardi & Mitchell, 2007a; Lusardi & Mitchell, 2007b), contributing more to retirement plans (Clark et al., 2017), investing in stocks (van Rooij et al., 2011), earning higher portfolio returns (Calvet et al., 2009), participating in complex derivatives markets (Hsiao & Tsai, 2018), timing the trades (Guiso & Viviano, 2015), being more cost-conscious when borrowing (Disney & Gathergood, 2013), using less informal borrowing and better budgeting (Klapper et al., 2013), borrowing at a lower cost (Huston, 2012), and having lower financial burdens (Shen et al., 2016).

On the other hand, lower financial literacy results in more mortgage payments (Moore, 2003), increased debt-related financial burdens (Gathergood, 2012), other problems due to higher debt (Lusardi & Tufano, 2015), no intention to control personal budget (Shahrabani, 2012), irresponsible financial management behaviour (Perry & Morris, 2005; Ludlum et al., 2012), poor financial practice behaviour (Robb & Woodyard, 2011), and college students' irresponsible use of credit cards (Robb, 2011).

2.2 Food Insecurity

2.2.1 Food security status among university students globally and in Malaysia

According to a systematic review which include studies from the United States, Australia, Canada and Greece, the prevalence of food insecurity among university students ranged from 21% to 82% (Shi et al., 2021). Malaysia's experience was within the range of 22% to 70.0% of college or university students according to a recent systematic review (Norhasmah et al., 2021).

2.2.2 Factors of Food Insecurity

Prior empirical studies have recognized numerous factors contributing to food insecurity that affect students. Food insecurity is more likely to occur among students who originated from a low-income family (Davidson & Morrell, 2020; Institute for Public Health (IPH), 2014; Norhasmah et al., 2013; Wan Azdie et al., 2019; Whatnall et al., 2019), male students (Nurulhudha Mohd et al., 2020; Rajikan et al., 2019) and those not living with their parents (Gallegos et al., 2014; Maroto et al., 2015; Whatnall et al., 2019). Low-income households and larger families have been linked to a high prevalence of food insecurity. Individuals with more than four siblings are more likely to experience food insecurity (Costa et al., 2017).

Surprisingly, there was a higher probability of food insecurity among the students who received financial aid (Davidson & Morrell, 2020; Norhasmah et al., 2013; Whatnall et al., 2019). Compared to respondents who received ‘Jabatan Perkhidmatan Awam Malaysia’ (JPA) scholarships, respondents with ‘Perbadanan Tabung Pendidikan Tinggi Nasional’ (PTPTN) loans reported higher levels of food insecurity (Wan Azdie et al., 2019). There are several theories that explain why students may face food insecurity, including rising tuition fees, insufficient financial aid, and expensive living expenses (Davidson & Morrell, 2020; Norhasmah et al., 2013; Ramlee et al., 2019). Students’ food insecurity conditions worsen due to the financial difficulties they face which prevent them from buying enough nutritious food to meet their basic needs that allow them to stay healthy and perform well in their studies (Nurulhudha Mohd et al., 2020).

2.2.3 Consequences of Food Insecurity

Food-insecure students were found to have lower intakes of healthy foods (such as fruits, vegetables, and whole grains) and higher intakes of unhealthy foods (such as fast food, added sugars, and beverages sweetened with sugar) in a systematic review that included studies from the United States, Canada, Australia, and Greece. These trends were discovered in the studies that used the most representative samples of the student population. Some food-insecure

students consumed breakfast and evening meals less frequently than food-secure students, but the evidence was limited (Shi et al., 2021). Based on an in-depth interview qualitative research by Law et al. (2015), university students in Malaysia experienced anxiety, lack of energy, inability to focus during classes, and falling ill due to food insecurity. Students experiencing severe food insecurity were more likely to have fair or poor general and mental health, unable to focus on class or an exam, to rely on food hampers, and to consume fewer fruits, vegetables, and legumes regularly than other participating students (Farahbakhsh et al., 2017). A study has shown that high fat mass index and high triglyceride levels among males in the food insecure group (Nur Atiqah et al., 2015). Food insecurity lowered the likelihood of being in the upper 10% GPA and raised the likelihood of being in the bottom 10% (Weaver et al., 2020). In Malaysia, food-insecurity students were reported as less likely to get a pointer more than or equal to 3.7 for their academic performance compared to food-secure students and having higher odds for stress, anxiety, and depression (Nor Syaza Sofiah et al., 2021). Hence, food insecurity compromises students' dietary outcomes, health, and academic quality.

2.2.4 Coping strategies of Food Insecurity

The coping strategies used by university students in Malaysia are categorized into food-related and non-food-related coping strategies. Examples of food-related coping strategies include using less expensive food, cooking alone in a college or rented house, sharing food with friends (Norhasmah et al., 2013; Siti Marhana et al., 2014), cutting the portion size or number of dishes for meals, reducing the number of meals eaten in a day (Law et al., 2015; Norhasmah et al., 2013; Siti Marhana et al., 2014), storing foodstuff, requesting outside food from friends, purchasing food outside the campus (Law et al., 2015). Meanwhile, non-food-related coping strategies are being thrifty in using money, reducing personal expenditures, planning for expenditures, requesting money from relatives or friends, and engaging in odd jobs (Norhasmah et al., 2013; Siti Marhana et al., 2014).

2.3 Association between Financial Literacy and Food Insecurity

There are limiting studies that determine the association between financial literacy and food insecurity (Millimet et al., 2015; Carman & Zamarro, 2016; Nurulhudha Mohd et al., 2020; Nyanzu & Baylis, 2022). The study by Millimet et al. (2015) indicate a statistically and economically large causal effect of financial literacy on the probability of a household being food insecure. A one standard deviation increase in the index of financial knowledge, practices, and beliefs leads to a 18 percentage point decrease in the probability of being food insecure and at least a 20 percentage point decrease in the probability of being very low food secure. Food insecurity is less common in low-income households with financial literacy. (Carman & Zamarro, 2016). This research suggests that food insecurity is not only a result of having insufficient income, but also of lacking financially capability. Households that lack knowledge of basic financial concepts are more likely to experience food insecurity. This is especially true for people who have lower levels of education. It is possible that financial literacy has a special role in assisting low-income households in coping with their limited resources (Carman & Zamarro, 2016). There is a study shown that the combined effect of financial literacy and women's empowerment training has a very significant and large improvement in food security than either training (Nyanzu & Baylis, 2022). There is only one study determine the association between financial literacy and food insecurity among university students in Malaysia, but the result shown no association between these two variables (Nurulhudha Mohd et al., 2020).

2.4 Conceptual Framework

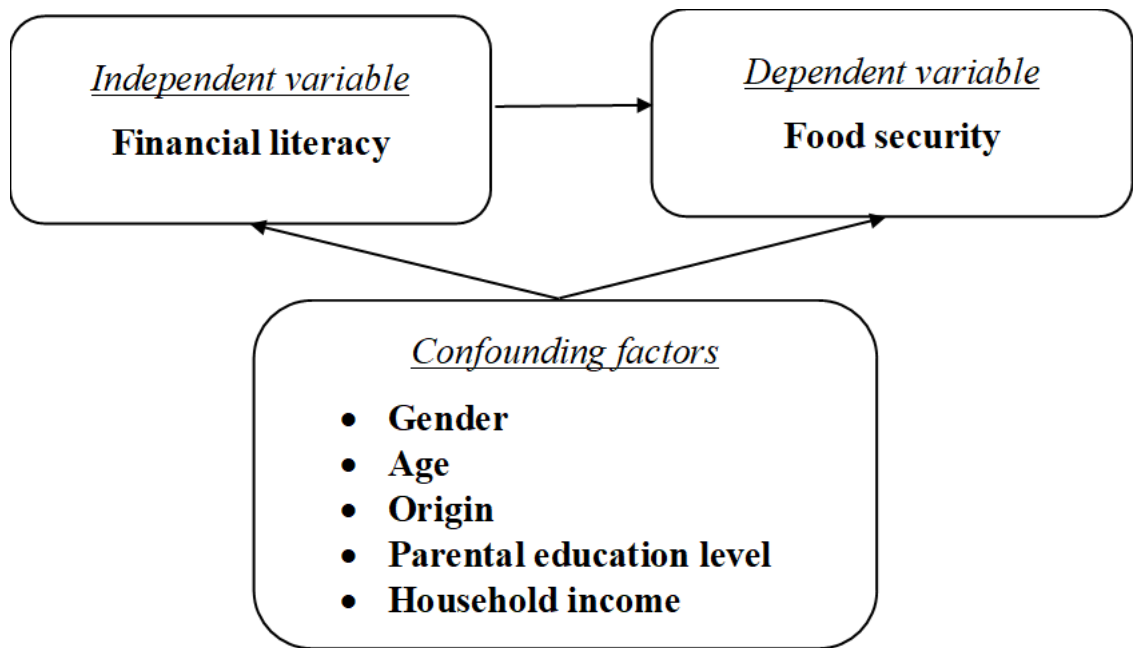


Figure 2.1 Conceptual Framework

CHAPTER 3

METHODOLOGY

3.1 Study Design

This research was conducted in a cross-sectional design. The research was carried out through an online platform that used a questionnaire to evaluate the relationship between financial literacy and food security status in USM health campus students. A cross-sectional study is an observational study in which the researcher measures the outcomes and exposures of the study at the same time (Setia, 2016). The participants were selected based on the exclusion and inclusion criteria which been set by the researcher for the study. This research design benefits the researcher as it is quick, cheap, and easy to conduct via a self-reported survey (Cherry & Gans, 2019).

3.2 Study Area

This study was conducted in the health campus of Universiti Sains Malaysia, Kubang Kerian, Kelantan, Malaysia. The study area was chosen due to the limited studies on the association between financial literacy and food security status in university students. The study area of this research allowed the researcher to reach out to the targeted population easily so the data could be obtained effectively. The study also focused on students at the USM health campus, which was a relevant and specialized group of interest. There are no business and finance-related courses available on this health campus, and university students are rarely exposed to educational programs related to financial management. Hence, this study can provide insights into the financial literacy level and food security status of university students who study health sciences, dentistry, and medicine.

3.3 Study Populations

This study was conducted among undergraduate students from the health campus of Universiti Sains Malaysia, Kubang Kerian, Malaysia. The study involved three different schools in the USM health campus which are Health Sciences (PPSK), Dental Sciences (PPSG), and Medical Sciences (PPSP). There were nine courses available in the School of Health Science, including speech pathology, biomedicine, dietetics, nutrition, environmental and occupational health, exercise and sport science, medical radiation, and nursing. While in School of Dental Health and Medical Health offer Doctor of Dental Surgery and Doctor of Medicine, respectively.

3.4 Subject Criteria

Subject selection was based on inclusion and exclusion criteria.

3.4.1 Inclusion criteria

- 1st – 5th-year USM Health Campus Undergraduate students.
- Students aged 18 years and above.
- Malaysian citizenship.

3.4.2 Exclusion criteria

- Foreign citizenship.

3.5 Sample Size Estimation

1 proportion sample size formula was used to determine the required sample size of the population:

$$n = \left[\frac{z}{\Delta} \right]^2 p(1 - p)$$

n = sample size

Z= value representing desired confidence level

Δ = precision

p = anticipated population proportion

For this study, the confidence interval of 95% was set with a Z-score value of 1.96 and the precision rate was set at 5%. This research used 22% as the population proportion to calculate the sample size. Hence, the total sample size estimation required for this study was 317 participants including an additional 20% drop-out.

$$\begin{aligned} \text{Sample size, } n &= \left[\frac{z}{\Delta} \right]^2 p(1 - p) \\ &= \left[\frac{1.96}{0.05} \right]^2 0.22(1 - 0.22) \\ &= 264 \end{aligned}$$

$$20\% \text{ drop-out} = 0.2 \times 264$$

$$= 53$$

$$n = 317 \text{ participants}$$

3.6 Sample Size Method and Subject Recruitment

Stratified sampling was chosen for this study to recruit the participants among undergraduate students in the USM health campus. Subjects were recruited based on the inclusion and exclusion criteria. Stratified sampling is a probability sampling method that involves the division of a population into smaller subgroups known as strata. The strata are formed based on members' shared attributes or characteristics. The overall sample size (n) was 317 participants. The strata (i) would be the 3 different schools in the USM health campus

which are the schools of Health Sciences (PPSK), Dental Sciences (PPSG), and Medical Sciences (PPSP). The total number of students from each school was determined (N^i). The total number of all students from all schools was represented as N . Sampling fraction was calculated ($\frac{n}{N}$). The total number of students from each school (N^i) was multiplied with the sampling fraction ($\frac{n}{N}$) to calculate each sample size from each school (n^i). The sampling within the strata was done by simple random sampling using random number generator.

Table 3.1 Sample Size

Schools (i)	Number of students (N^i)	Sample size (n^i)
Health Sciences	1160	171
Dental Sciences	254	37
Medical Sciences	734	108
Total	(N) 2148	(n) 316

The purpose of using stratified sampling was to ensure that every school in USM health campus was properly represented in the sample. This helped with the generalizability and validity of the study, as well as avoiding research biases like undercoverage bias. Undercoverage bias occurs when a part of the population is excluded from the sample. Subjects were chosen because they are geographically close and have availability at a given time or willingness to participate in the research. A poster and an online questionnaire, Google Forms were distributed to the students through online communication platforms such as WhatsApp through the help of each school batch leader.

3.7 Research Instruments

3.7.1 Questionnaire design

The data was collected through an online questionnaire via Google Form until reaching the target population. The questionnaire consisted of 3 parts: Part A: Demographic & Socioeconomic Characteristics, Part B: Food Security Status, and Part C: Financial Literacy.

Part A: Demographic & Socioeconomic Characteristics

Data assessed include gender, age, ethnicity, year of study, residence, origin, number of siblings, working part-time, parental education level, household income, and financial assistance.

Part B: Food Security Status

The food security status was assessed by using the Six-Item Short Form Food Security Survey Module that was developed by researchers at the National Center for Health Statistics. It has been shown to identify food-insecure households and households with very low food security with reasonably high specificity and sensitivity and minimal bias compared with the 18-item U.S. Household Food Security Survey Module (Blumberg et al., 1999). It was conducted to measure the prevalence of the food security status in students of the USM health campus and to categorize the students into three groups of food security status, which are 'high food security', 'low food insecurity' and 'very low food insecurity'. The method that was used to categorize the students was based on the score the students obtained. There were 6 items in this questionnaire. Responses of "often" or "sometimes" on questions 1 and 2, and "yes" on questions 3, 5, and 6 were coded as affirmative (yes). Responses of "almost every month" and "some months but not every month" on question 4 were coded as affirmative (yes).

Food security status is assigned as follows:

- Raw score 0-1—High or marginal food security
- Raw score 2-4—Low food security
- Raw score 5-6—Very low food security

Part C: Financial Literacy

Financial literacy was measured using eight questions developed by the OECD (2022) in which the intended population was adult individuals aged between 18 and 79. It assessed knowledge about inflation, interest rates, compound interest, returns versus risk, and diversification. The financial literacy score was ranked into high, medium, and low. Participants with 6 or more correct responses was categorized as high scores, while those with 4 to 5 correct responses was categorized as medium scores. The low score is when the respondents scored between 1 to 3 correct responses (Sawandi et al., 2018). The questions themselves were largely drawn from existing surveys and have all been validated and approved by OECD/INFE experts. They represent good practice in financial literacy and financial inclusion measurement.

3.8 Operational Definition

Table 3.2 Operational Definition

Term	Definition
High food security	No reported indications of food-access problems or limitations (USDA, 2023).
Marginal food security	One or two reported indications—typically of anxiety over food sufficiency or shortage of food in the house. Little or no indication of changes in diets or food intake.
Low food security	Reports of reduced quality, variety, or desirability of diet. Little or no indication of reduced food intake (USDA, 2023).

Very low food security	Reports of multiple indications of disrupted eating patterns and reduced food intake (USDA, 2023).
Financial literacy	A combination of financial awareness, knowledge, skills, attitudes, and behaviours necessary to make sound financial decisions and ultimately achieve individual financial well-being (OECD, 2022).

3.9 Data Collection Method

Data collection was started after receiving ethical approval from the Human Research Ethics Committee (HREC) of USM. The estimated time for the data collection process was carried out within two months. Questionnaires were distributed using an online Google Form survey to all targeted participants through social network platforms such as WhatsApp. A poster was used to encourage the students to engage in participation in this study.

The first page of the questionnaire consists of email address and the informed consent form for the respondent to choose either to agree or disagree to participating in the study. There were three sections of the questionnaire including Part A: Demographic & Socioeconomic Characteristics, Part B: Food Security Status, and Part C: Financial Literacy. The estimated time to answer the questionnaire was about 10 to 15 minutes.

The researcher's contact details, including the phone number and email address, were listed on the first page of the questionnaire. Subjects can email the researcher or contact the phone number provided if they have any queries about the study or need help understanding the questions. On the form, only one response per Google account was permitted. The researcher contacted the representatives from each school to ensure that the online Google form would reach all the intended participants.

3.10 Study Flowchart

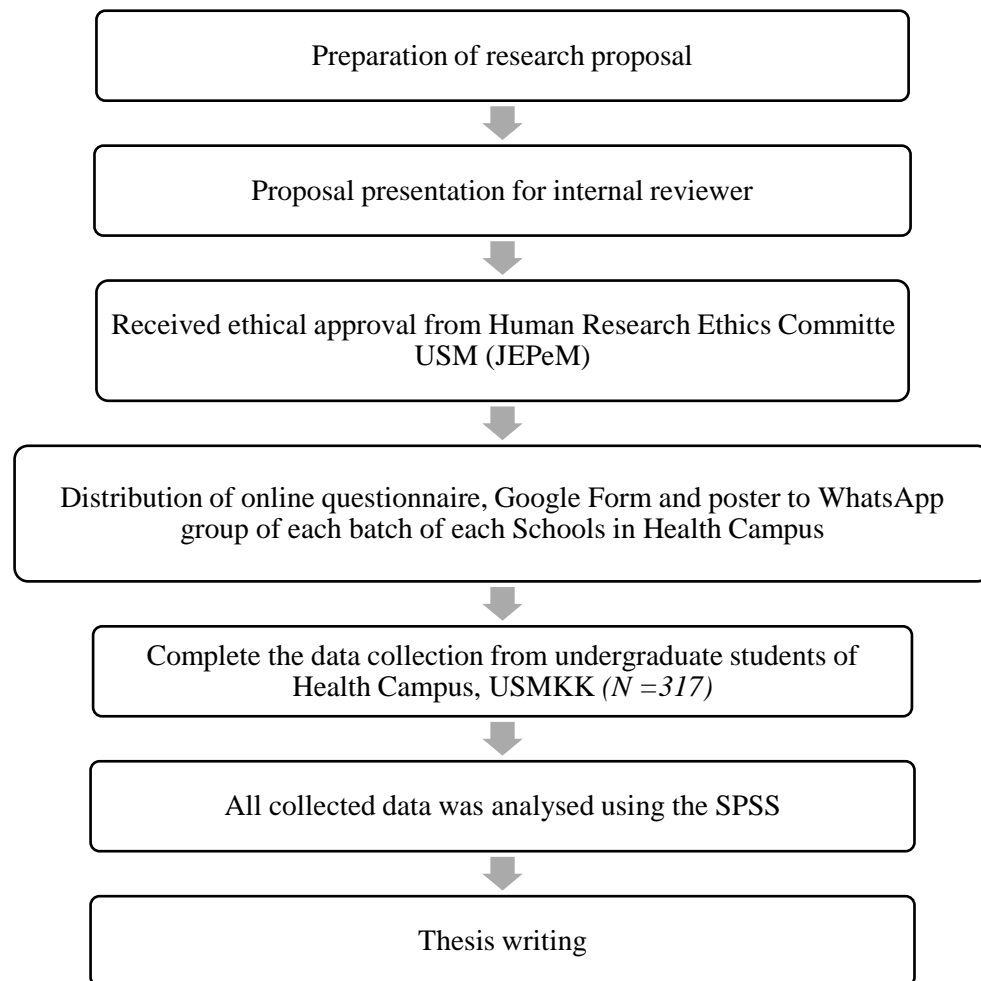


Figure 3.1 Study Flowchart

3.11 Data Analysis

IBM Statistical Package for Social Sciences (SPSS) version 27.0 was used to analyse data statistically. All variables were analysed using descriptive statistics and presented in terms of frequency, percentage, mean, and standard deviation (SD). Pearson's Chi-square test or Fisher Exact test was used to determine the association between all categorical variables (sociodemographic factors and financial literacy) with food security status. Person's Chi-square test was used if the expected count <5 was less than 20% of the cells while Fisher Exact test was used if the expected count <5 was more than 20% of the cells. Hypothesis testing was done to determine whether to reject or accept the null hypothesis (H_0). To reject the null hypothesis,

the p-value of statistical significance must be ≤ 0.05 indicating that the hypothesis is statistically significant as it is set with a p-value of 0.05. If the p-value is >0.05 , the null hypothesis (H_0) cannot be rejected.

3.12 Gantt Chart & Milestone

3.12.1 Gantt chart

Table 3.3 Gantt chart

Research Activity	2023			2024						
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Research proposal preparation										
Research proposal submission										
Research proposal presentation										
Approval for research study (JePEM)										
Data collection										
Data analysis										
Complications of research findings										
Thesis writing										

Thesis submission for assessments											
Presentation of thesis											

3.12.2 Milestone

End of January 2024 : Approval of the research proposal by JEPeM

End of May 2024 : Completion of data collection

End of May 2024 : Completion of data analysis

End of June 2024 : Thesis submission and presentation

3.13 Ethical Considerations

3.13.1 Subject vulnerability

Participants might experience discomfort as the questionnaire consists of 23 questions, which will ask about students’ financial literacy level and food security status. Thus, it requires 10 – 15 minutes to answer. The form was in the Google form and distributed to the participants to obtain their willingness to participate in research, its expected risks and possible benefits, and the activities expected of them as subjects. Participants are not being forced to sign the assent and consent form. Participants will not be penalized if they refuse to participate or fill out the questionnaire form at any time because they have the freedom to withdraw from the study at any time.

This research will benefit those categorized in the vulnerable group which is food insecure students. The initiative food program, which tackles food insecurity as it arises, can use the research's findings. Individuals who meet the criteria for food insecurity can receive assistance with food access and financial difficulties from BHEPA, Pusat Islam, and schools in