

**THE ASSOCIATION BETWEEN STRESS AND EATING BEHAVIOR AMONG
USM SCHOOL OF HEALTH SCIENCES UNDERGRADUATE STUDENTS**

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**THE ASSOCIATION BETWEEN STRESS AND EATING BEHAVIOR AMONG
USM SCHOOL OF HEALTH SCIENCES UNDERGRADUATE STUDENTS**

By

NUR ASHIKEN BINTI LIDON

**Dissertation submitted in partial fulfilment
of the requirements for the degree of
Bachelor of Health Science (Honours) (Dietetics)**

July 2024

CERTIFICATE

This is to certify that the dissertation entitled “THE ASSOCIATION BETWEEN STRESS AND EATING BEHAVIOR AMONG USM HEALTH SCIENCES UNDERGRADUATE STUDENTS” is the bona fide record of research work done by Ms “NUR ASHIKEN BINTI LIDON” during the period from October 2023 to July 2024 under my supervision. I have read this dissertation and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation to be submitted in partial fulfilment for the degree of Bachelor of Health Science (Honours) (Dietetics).

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DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated and duly acknowledged. I also declare that it has not been previously or concurrently 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.



.....
Nur Ashiken binti Lidon

Date: 4 July 2024

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LIST FOR SYMBOLS AND ABBREVIATION

USM	: Universiti Sains Malaysia
JEPeM	: <i>Jawatankuasa Etika Penyelidikan Manusia</i>
BMI	: Body mass index
PSS-10	: Perceived Stress Scale
AEBQ	: Adult Eating Behavior Questionnaire
EOE	: Emotional Overeating
SR	: Satiety Responsiveness
EUE	: Emotional Undereating
WHO	: World Health Organization
SPSS	: Statistical Package of Social Sciences

**HUBUNGKAIT ANTARA TEKANAN DAN TINGKAH LAKU MAKAN
DALAM KALANGAN PELAJAR SARJANA MUDA SAINS KESIHATAN USM.**

ABSTRAK

Tahap tekanan tinggi pelajar universiti disebabkan oleh beban kursus boleh mempengaruhi tingkah laku makan mereka, yang membawa kepada makan berlebihan atau kurang sebagai tindak balas kepada keadaan emosi negatif. Ini memberi kesan kepada kesihatan dan kehidupan seharian mereka. Kajian keratan rentas ini bertujuan untuk mengetahui perkaitan antara tekanan dan tingkah laku makan dalam kalangan pelajar sarjana muda sains kesihatan USM. Sejumlah 127 pelajar telah diambil menggunakan kaedah persampelan mudah dan telah diberikan soal selidik sendiri yang terdiri daripada item sosiodemografi, *Perceived Stress Scale (PSS-10)*, dan *Adult Eating Behavior Questionnaire (AEBQ)*. Terdapat 8 subdomain tingkah laku makan iaitu kelaparan, tindak balas makanan, makan berlebihan secara emosi, keseronokan makanan, tindak balas kenyang, kurang makan emosi, cerewet makanan dan lambat makan. Daripada 127 pelajar, 84.3% adalah perempuan dengan majoriti daripada program Dietetik. 82.7% pelajar berumur 19-23 tahun dan 54.3% adalah pelajar tahun 3 dengan majoriti 70.9% adalah pelajar Melayu. Kira-kira 60.6% menunjukkan bahawa mereka adalah daripada keluarga berpendapatan rendah setiap bulan, (RM4850). Bagi tahap tekanan pula, 85% pelajar berada pada tahap sederhana dengan min 19.51. Terdapat hubungan yang signifikan, lemah dan positif antara tekanan dan kelaparan ($p= 0.026$, $r= 0.197$). Sebaliknya, terdapat hubungan yang signifikan, lemah dan positif antara tekanan dan makan berlebihan secara emosi ($p= 0.026$, $r= 0.197$). Sub domain lain di bawah AEBQ tidak menunjukkan hubungan yang signifikan. Kedua-duanya diuji menggunakan ujian Korelasi Pearson. Keputusan menunjukkan bahawa tahap tekanan pelajar adalah

sederhana dan tabiat pemakanan mereka berorientasikan kepada kelaparan dan makan berlebihan secara emosi. Kajian lanjut diperlukan untuk mengesahkan kajian terkini dan memahami perkaitan antara tekanan dan tingkah laku makan dalam kalangan pelajar sarjana muda.

THE ASSOCIATION BETWEEN STRESS AND EATING BEHAVIOR AMONG USM SCHOOL OF HEALTH SCIENCES UNDERGRADUATE STUDENTS

ABSTRACT

University students' high stress levels due to course load may influence their eating behaviour, leading to overeating or undereating as a response to negative emotional states, impacting their health and daily life. Thus, this cross-sectional study aims to determine the association between stress and eating behaviour among USM health sciences undergraduate students. A total of 127 students were recruited using the convenience sampling method and were given a self-administered questionnaire consisting of sociodemographic items, Perceived Stress Scale (PSS-10), and Adult Eating Behaviour Questionnaire (AEBQ). There are 8 subdomain of eating behaviours which are hunger, food responsiveness, emotional overeating, enjoyment of food, satiety responsiveness, emotional undereating, food fussiness and slowness in eating. Of 127 students, 84.3% were female with majority from Dietetics program. 82.7% of the students aged 19-23 years old and 54.3% were year 3 students with the majority of 70.9% were Malay students. For household income, 60.6% of the students were from low-income families (<RM4850). Regarding stress level, 85% students had a moderate level of stress with a mean of 19.51. There is a significant, weak and positive relationship between stress and hunger ($p= 0.026$, $r= 0.197$). On the other hand, there is a significant, weak and positive relationship between stress and emotional overeating ($p= 0.026$, $r= 0.197$). Others sub domains under AEBQ showed no significant relationship. Both are tested using Pearson's Correlation test. The results imply that the students' stress levels were moderate and that their eating habits were oriented towards hunger and emotional overeating. Further

research is needed to confirm recent studies and understand the association between stress and eating behaviour among undergraduate students.

CHAPTER 1: INTRODUCTION

Following mortality and taxes, stress is the third most common human affliction. Stress is a process which entails understanding, evaluation, and response to tension from stressors that are either internal or external which may trigger anxiety, apprehension fear, and trouble adapting to one's surroundings (Fink 2016). Despite of all socioeconomic backgrounds, stress is a common occurrence for persons (Muhammad et al., 2019). University students are particularly vulnerable to stress. One of the most challenging stages of students' lives is studying in higher education institutions, This can be proved as students are exposed to a variety of stressful situations, such as being away from their homes, family members, and studying (Muhammad et al., 2019). Students which enrol in educational institutions, such as students at universities, must cope with the fast physical, psychological, and mental alterations that result from independent lifestyles, establishing new connections and peer networks, conflicting interactions between educators and students, and elevated learning requirements which can ultimately result in greater levels of stress (Yikealo et al. 2018).

Universities across the globe usually required their undergraduate students to adapt quickly, becoming intellectuals as well as elites following graduation. As a result, multiple programs and educational activities are provided to students to nurture them into potential employees which can satisfy the standards and demands stipulated by their administrators, causing students' spare time to be frequently occupied and their diligent work to be consistently reached to the highest possible standard (Bakar et al., 2017). Prior study has found that undergraduate health sciences and accounting students are stressed to varying degrees (Bakar et al., 2017; Muhammad et al., 2019; Nasir & Abdul Mulud,

2020). Education concerns, such as support factor, overloaded subjects, along with time management, are key causes of undergraduate students' elevated levels of stress (AlRawashdeh et al., 2020; Bakar et al., 2017). A study by Chen et. al., (2017), found that academic workload was the most significant cause of stress among university students. Additionally, competition for grades and fear of failure can also contribute to stress (Flett e. al., 2017).

Academic challenges and elevated stress degrees among college students could influence behaviours associated with health which include eating (Caso et al. 2020). Evidence suggests that stress can alter eating behaviour, redirecting food selections to food with greater palatability and energy value, especially food that high in fat and sugar. It also suggested a different effect of stress on food consumption according to individual characteristics such as gender (Joseph et al., 2018). In addition, there is evidence to suggest that stress may impact eating behaviour by increasing or decreasing frequency of eating or increasing selection of foods, with estimation 35–40% of people increase their food intake when suffering stress, while the remaining proportion either decrease or do not alter their food intake in response to stress (Hill et al., 2021). Usually, most people do not know how to distinguish between hunger and negative emotions, so they would respond to stress as if it were hunger and consequently, by eating (Caso, 2020).

As a result, this research analysed eating behaviours and perceived stress levels to make recommendations for better nutrition for students in higher education, whose diets were particularly low in nutritional intake and were prone to experiencing stress. First, according to the socioeconomic status of the students, this study examined and contrasted stress levels and eating behaviours. Second, every participant's stress level and its

relationship to eating behaviours were evaluated. The findings will be useful in establishing effective measures to counteract improper eating behaviours as well as avoid the detrimental repercussions of unhealthy eating patterns in university students.

1.2 Problem Statement

Several causes, including stress, might cause changes in eating behaviour among university students. As they leave home for college, young adults are said to have bad food habits. This gives them liberty in choosing the foods they eat, particularly can be affected by food accessibility and their socioeconomic background (Gan et al. 2011). Psychological discomfort relates to alterations in eating behaviour, according to research that evaluates the clear impacts of stress on eating practices (Gan et al. 2011). It increases or reduces overall consumption of foods, or it boosts the intake of kinds of food while lowering the intake of others. A review of the previous research on university students revealed that a considerable proportion of the population did not consume food adequately (Kabir, Miah, and Islam, 2018; Sogari et al., 2018; Sprake et al., 2018). Daily, students participate in several types of harmful eating behaviours, such as skipping breakfast, snacking at night, consuming less fluids, eating excessive quantities of food, and eating whilst involved with activities (Sogari et al., 2018). Improper dietary habits lead to an unhealthy body. Obesity is a major issue among university students because of their bad eating habits and lack of participation in extracurricular involvement (Yousif et al., 2019)

As reported by Wan Mohamed Radzi et al. (2019), the rate of overweight and obesity among Malaysian university students is 21.2% and 16.3%, accordingly, significantly higher than the national average (Ministry of Health Malaysia, 2019). Obesity cases, particularly those induced by inadequate nutrition and bad dietary habits, are both avoidable and curable (de Lorenzo et al., 2020). Multiple initiatives and programs have been implemented to promote a healthy diet and a physically active way

of life among people of all ages (Ministry of Health Malaysia, 2003). The objective was to provide Malaysians with a helpful instrument for improving their overall wellness through solid food practices. The dietary recommendations have been proven to function as a useful aid for students in making nutritious food choice options in the setting of university students (Kolodinsky et al., 2007; Kandiah and Jones, 2002). Several research including Malaysian university students have revealed a trend of low diet quality and impaired dietary behaviour (Thu et al., 2019; Sundaram, Ghazi, and Elnajeh, 2018; Omar et al., 2015), demonstrating failure to comply to the MDG standards.

This study aims to explore the association between stress and eating behaviour particularly in the areas of food approach and food avoidance as students confront an intense demand and significant pressure due to the academic demands and in the clinical setting. Their eating habits may be impacted by these pressures, which may result in emotional eating or restrictive eating. Hence, to develop adequate and specific intervention strategies, it is important to broaden our understanding of stress interference on college students eating behaviour. This better understanding can support preventive educational activities and promote health. Therefore, the purpose of this study is to identify the stress level and eating behaviour status including the association between both among health sciences undergraduate student at School of Health Sciences in Universiti Sains Malaysia, Kelantan.

1.3 Rationale of Study

Stress is found to affect 16.4% of students in Southeast Asia (Dessauvague et al., 2022). According to a study done at Muhammadiyah University of Magelang, students' stress levels range, with 35.6% suffering mild stress, 57.4% reporting mild to moderate stress, and 6.9% suffering high stress (Ambarwati et al., 2019). Stress can have a substantial impact on one's eating behaviour through either promoting overeating or discouraging undereating. Emotional overeating, defined as excessive dietary intake as a reaction to unfavourable feelings, could serve as a defence mechanism (Buja, 2022). Excessive overeating can have a negative impact on mental as well as physical wellness, ultimately resulting in disordered eating (Reichenberger et al., 2020). It is notable that, traditionally, psychological concepts have paid little focus on emotional undereating, given the innate propensity for certain people to consume less in reaction to emotions, which is regulated by biological processes that inhibit appetite (Bjrkklund et al., 2019).

This research has the potential to improve the students understanding and raise awareness on stress as it can significantly impact eating behaviour, leading to unhealthy dietary choices, overeating, or under eating. This can provide valuable insights into potential health risks and enable the development of targeted interventions to promote healthier eating habits. This study can help identify stressors most strongly associated with unhealthy eating behaviours among the students. This knowledge can guide the development of targeted interventions and support programs that promote healthy coping mechanisms and stress management strategies. By addressing the association between stress and eating behaviour among students, this study can contribute to the well-being and overall health outcomes of the student.

1.4 Research Questions

- I. What is the stress level among USM Health Sciences undergraduate students?
- II. What is the eating behaviour among USM Health Sciences undergraduate students?
- III. Is there any association between stress and eating behaviour among USM Health Sciences undergraduate students?
- IV. Is there any significant difference between sociodemographic factor and stress level among USM Health Sciences undergraduates students?
- V. Is there any significant difference between sociodemographic factor and eating behaviour among USM Health Sciences undergraduates students?

1.5 Study Objective

Research Objective

General Objective

The objective of this study is to determine the association between stress and eating behaviour among USM Health Sciences undergraduate students.

Specific Objective

1. To identify the stress level among USM Health Sciences undergraduate students.
2. To identify the eating behaviour status among USM Health Sciences undergraduate students.
3. To determine the association between stress level and eating behaviour among USM Health Sciences undergraduate students.

4. To identify any significant difference between sociodemographic factor and stress level among USM Health Sciences undergraduate students.
5. To identify any significant difference between sociodemographic factors and eating behaviour among USM Health Sciences undergraduate students.

1.6 Study Hypothesis

1.6.1 Hypothesis I

Null Hypothesis, H_0 : There is no association between stress and eating behaviours among USM Health Sciences undergraduate students.

Alternative hypothesis, H_1 : There is a significant association between stress and eating behaviours among USM Health Sciences undergraduate students.

1.6.2 Hypothesis II

Null Hypothesis, H_0 : There is no significant difference between stress and sociodemographic factors among USM Health Sciences undergraduate students.

Alternative hypothesis, H_1 : There is a significant difference between stress and sociodemographic factor among USM Health Sciences undergraduate students.

1.6.3 Hypothesis III

Null Hypothesis, H_0 : There is no significant difference between eating behaviours and sociodemographic factor among USM Health Sciences undergraduate students.

Alternative hypothesis, H_1 : There is a significant difference between eating behaviours and sociodemographic factors among USM Health Sciences undergraduate students.

1.7 Conceptual Framework

To illustrate the variable that is intended to be investigated in this study, a conceptual framework was created (Figure 1). Regarding the goal of ascertaining whether stress and eating habits are related, eating behaviours is a dependent variable and stress is an independent variable. Stress can have an impact on eating habits as it will increase the consumption of food, specifically unhealthy foods. The purpose of this study is to examine the association between stress and eating behaviours in health science undergraduate students. Stress is the primary predictor examined in this study, and eating behaviours is the primary result of interest.

Various prior research has found that elevated levels of stress in students in higher education relate to a greater intake of undesirable foods, particularly snacks and fast food (Errisuriz et al. 2016). As a person's stress level rises, they are more likely to engage in unhealthy eating behaviours, indicating their tendency to utilize food as a dysfunctional coping method to alleviate stress. Because of this, whenever they're feeling stressed, they are inclined to consume more (Caso et al. 2020). Eating behaviour is a complex construct which can be influenced by a range of factors, including sex, age, body weight status, and psychological, social, economic, and lifestyle factors (Aoun et. al., 2019, Pigeyre et. al., 2016, Löffler et. al., 2017).

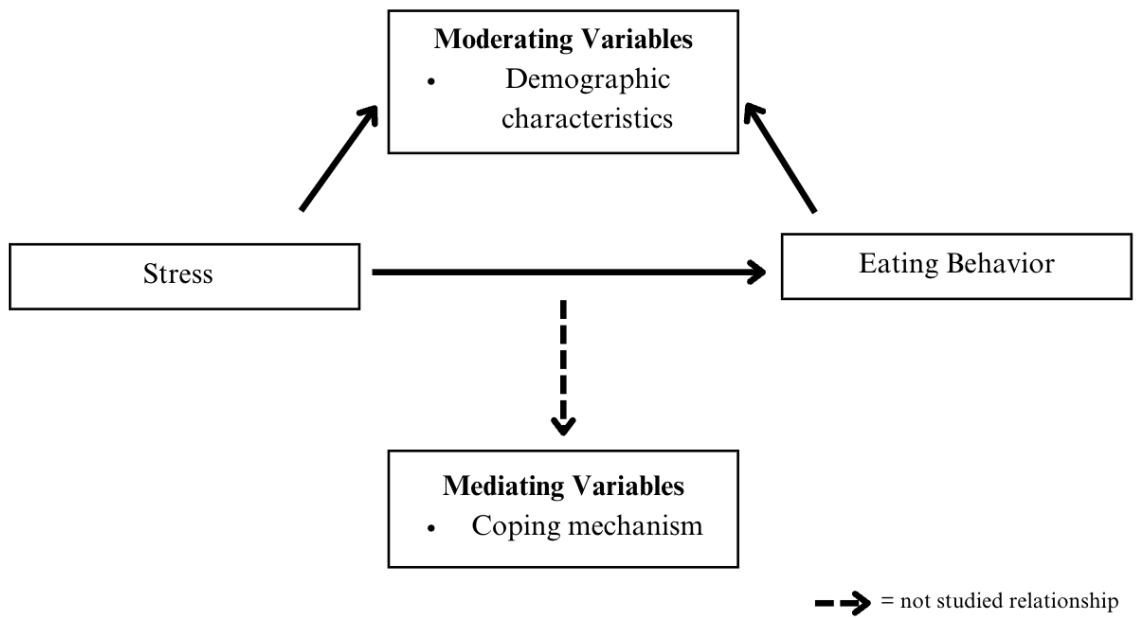


Figure 1: Conceptual framework of association between stress and eating behaviours

1.8 Operational Definition

1. Stress

The body's physiological response to demand for change and its adaptation to them or a threat that threatens our well-being. When a body's adaptive capacity fails to meet the demands of its environment, it results in biological and psychological disturbances (Jia and Loo, 2018).

The Perceived Stress Scale (PSS), an established self-report questionnaire, is used in this study to assess stress. On a Likert scale, participants assess their level of stress during the previous month; higher scores correspond to higher levels of encountered stress.

2. Eating behavior

Eating behavior is defined as a complex interaction of psychological, social, physiological, and genetic factors that can affect mealtime, food preference and quantity of ingestion (Aneesh & Roy, 2022).

CHAPTER 2: LITERATURE REVIEW

2.1 Definition and Prevalence of Stress

Stress can be referred to as the body's physiological response to demand for change and its adaptation to them or a threat that threatens our well-being. When a body's adaptive capacity fails to meet the demands of its environment, it results in biological and psychological disturbances (Jia and Loo, 2018). Insignificant amounts of stress are normal and can help people be more active and productive. Besides, due to declines in physical activity and increases in unhealthy living behaviours, stress can lead to the emergence of health problems, including chronic non-communicable diseases (Pascose et al., 2020). Several studies found that the prevalence of stress among university students is higher than other populations (Fang et al., 2022; Simegn et al., 2022).

Most of the prior research concluded that stress levels were significant among science, medicine, and pharmacy students. According to Hakami (2018), mental discomfort was highest in students of sciences (36%), subsequently followed by students of Business Administration (31.2%), Computer Sciences (30.7%), Pharmacy (29.2%), and Applied Medical Sciences (24.7%). Different research findings revealed a greater percentage of stress amongst students in the College of Medicine and College of Pharmacy than in the College of Applied Sciences (Alqomaizi et al., 2018). Furthermore, a prior investigation found that most of the final-year Health Sciences (nursing) students in Malaysia experience slightly elevated stress (Nasir and Abdul Mulud, 2020).

Several prior research revealed that the levels of stress among health sciences students were substantially higher than those of non-health sciences students (Al-Rawashdeh et al., 2020; Tavolacci et al., 2013; Waghachavare et al., 2013). According to Aafreen et al. (2018), academically scientific stream students endure stress and strain mostly as a result to increased workload during classes and tests, resulting in inadequate time to study and give enough effort into academics. Students in the Business stream, on the contrary, would face stress due to examinations and the lack of certain classes.

2.2 Factor Contributing to High Level of Stress

Academic, social, environmental, and health concerns each have a substantial impact on stress progression (Alqomaizi et al., 2018). In addition to the outstanding standard of the learning environment, the prevalence of study-related adversity, an overburdened syllabus, as well as frequent tests, academic pressure appeared to have emerged as the primary stressor (Alqomaizi et al., 2018; Muhammad et al., 2019). According to Essel and Owusu (2017), there are in fact some aspects in the educational syllabus which can generate such an abundance of stress on understudies via increasing class workload. In terms of academic concerns, most students identified choice selection, number of subjects, number of activities by faculty, and irrelevant subjects as factors contributing towards their elevated stress level.

In a similar way completing the deadlines for completing tasks and undertakings stressed students out (Bakar et al., 2017). Another aspect of an academic curriculum that generates stress among students is the additional hours of study to which they must devote by compromising their personal leisure time for the sake of learning (Essel & Owusu,

2017). Therefore, the students find it difficult to find spare time for themselves. They might get bored and lose interest in their studies over time, and over the long term, this scenario could stress them out, causing them to lose their concentration on their studies (Essel & Owusu, 2017). On the other hand, students who feel disconnected from their peers and campus community may experience higher levels of stress (McEwen et al., 2018).

2.3 Method in Assessing Stress Level

Cohen et al. established the Perceived Stress Scale (PSS) in 1983 to evaluate psychological stress (Vallejo, M. A., et al., 2018). Rather than emphasizing occurrences, this self-reported information scale generates a worldwide degree of stress according to generic questions. The questionnaire queries about how a person feels and one's thoughts from the month prior to this one. Questions on how often each emotion or thought is experienced will be asked. Even though a few of the questions are identical, there are some distinctions among them, so each question needs to be tackled individually. So, the best way to obtain a precise estimation is to answer the questions in as little time as possible.

PSS-10 is relatively easy to be administered as well as helped both researchers and professionals to get better understanding on how stress-inducing life events affect individuals. It can be applied for children aged above 12 years old (Kechter et al., 2019). A prior study looked at confirmatory factor analysis (CFA) of the PSS-10 and discovered that the 2-factor model is best for assessing perceived stress among Ethiopian university students.(Manzar et al., 2018).

Similarly, another study evaluated the principal components factor analysis of PSS-10 and they reported an adequate reliability and validity of PSS-10 to measure perceived stress among Turkish university students. (Manzar et al., 2019) . The PSS demonstrated good internal consistency with Cronbach’s alpha from 0.84 to 0.86 and had been found to be a reliable psychometric measure of perceived stress (Lee EH., 2012). Table 2.1 shows the exploratory factor analysis and reliability coefficients of PSS-1

Table 2.1: Exploratory factor analysis and reliability coefficients of PSS-1

1. In the last month, how often have you been upset because of something that happened unexpectedly?
2. In the last month, how often have you felt that you were unable to control the important things in your life?
3. In the last month, how often have you felt nervous and stressed?
4. In the last month, how often have you felt confident about your ability to handle your personal problems?
5. In the last month, how often have you felt that things were going your way?
6. In the last month, how often have you found that you could not cope with all the things that you had to do?
7. In the last month, how often have you been able to control irritations in your life?
8. In the last month, how often have you felt that you were on top of things?
9. In the last month, how often have you been angered because of things that happened that were outside of your control?
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

2.4 Eating Behaviour and Factor Influencing Food Intake

Eating behaviours is defined as a complex interaction of psychological, social, physiological, and genetic factors that can affect mealtime, food preference and quantity of ingestion (Aneesh & Roy, 2022). It also can be defined as normal behaviours related to eating habits or pattern, selecting foods to eat, quantities of food consumption and food preparations (Kabir et al., 2018). Oti (2018) discovered three major elements affecting student meal selection: demographic information, food character, and recurrence of food menus provided. According to the researcher, the overall profit within the population demographic aspect is judged non-influential for meal choice making, however food characteristics such as food size, food presentation, cooking preparation, as well as value for money influence the process (Oti, 2018). According to Blaková and Dvoulet (2018), the nutritional value of food, provided food appearances, selections on the menu, the cleanliness of the food, service given, and distance and accessibility to food are all elements that impact individuals eating choices.

On the other hand, Yang et al. (2020) asserted that a person's comprehension of nutrition is directly tied to one's perceptions of it, implying that a person that adopts healthy eating habits would be healthy. Proper dietary choices should be stressed in the setting of students because they may influence their overall quality of life in years to come. Poor eating habits, on the other hand, can make kids weaker and less energetic while in college (Al-Shehri et al., 2017). Multiple factors impact choice of food behaviours, including the amount of media exposure, family role, and breakfast practice (Manggabarani et al., 2020). Adolescent dietary preferences are impacted by parental and educational trends that include cultural, religious, economic, tradition, and status in

society, as reported by Sogari et al. (2018). Those with a high social rank, for example, chose modern meals at costly rates and fast-food selections.

2.5 Method in Assessing Eating Behaviour

The Adult Eating Behaviour Questionnaire (AEBQ) is a newly developed questionnaire adapted from the widely used Child Eating Behaviour Questionnaire. (Hunot et al., 2016a). This Likert scale questionnaire has 35 items and 8 components that assesses four food approach scales, namely hunger, food responsiveness, emotional overeating (EOE) and enjoyment of food, and four food avoidance scales, namely satiety responsiveness (SR), emotional undereating (EUE), food fussiness and slowness in eating.

According to the results of a study, confirmatory factor analysis (CFA) found that a seven-factor AEBQ model without the Hunger subscale had higher statistics for fit than the prior eight-factor structure. Cronbach's alpha was utilised to test the internal reliability of each subscale, yielding > 0.70 for all but Hunger ($= 0.68$) (Cohen et al., 2021). Table 2.2 showed the 35 items on Adult Eating Behaviour Questionnaire.

Table 2.2: 35 items on Adult Eating Behaviour Questionnaire

	Strongly disagree. (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly disagree. (5)
I love food					
I often decide that I don't like a food before tasting it					
I enjoy eating					
I look forward to mealtimes					
I eat more when im annoyed					
I often notice my stomach rumbling					

Continued, Table 2.2

	Strongly disagree. (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly disagree. (5)
I refuse new foods at first					
I eat more when im worried					
If I miss a meal, I get irritable					
I eat more when im upset					
I often leave food on my plate at the end of meal					
I enjoy tasting new food					
I often feel hungry when I am with someone who is eating					
I often finish my meals quickly					
I eat less when im worried					
I eat more when im anxious					
Given the choice, I would eat most of the time					
I eat less when im angry					
I am interested in tasting new food I haven't tasted before					
I eat less when im upset					
I eat more when im angry					
I am always thinking about food					
I often get full before my meal is finished					
I enjoy a wide variety of foods					
I am often last at finishing a meal					
I eat more and more slowly during a course of meal					
I eat less when im annoyed					
I often feel so hungry that I have to eat something right away					
I eat slowly					
I cannot eat a meal if I have had a snack just before					
I get full up easily					
I often feel hungry					
When I see or smell food that I like, it makes me want to eat					
If my meals are delayed, I get lightheaded					
I eat less when im anxious					

2.6 Association Between Stress and Eating Behaviour

Increases in cortisol have been shown to be linked to desire for food, food dependence scores, eating excessively, inadequate dietary control, and impulsivity (Philips et al., 2016). Stress is being shown to cause hedonic hunger or eating for enjoyment in the lack of physiological hunger. (Joseph et al., 2018). Studies show that excessive stress promotes eating frequency, intake of fast foods, ready-made meals, snacks, sweets, hot and spicy foods, and drinking alcohol. (Choi et al., 2020; Seo et al., 2018). Foods heavy in sugar and cholesterol are frequently eaten in times when stressed because they are particularly gratifying.

In different scenarios, greater levels of stress amongst college students relate to poorer dietary intake of healthful foods (Hill et al. 2021). As reported by Nakamura et al. (2020), persistent stress has been linked to alterations regarding health behaviours, notably one's appetite and eating choices. When Riyadh undergraduate students are anxious concerning their schoolwork, Mohamed, Mahfouz, and Badr (2020) indicate a surge in poor eating habits such as sweets, snacks, and fast food. As a result, high stress levels among students might alter their eating patterns and eventually contribute to further issues including obesity (Rachim et al., 2018). The general incidence of overweight and obesity amongst Malaysian university students is (21.2%, 16.3%), along with incidence rates of (23%, 17.6%) among Bachelor, (21.9%, 14.3%) Master, and (17.8%, 18.4%) PhD students. Malaysian university students have a greater probability compared to those in different nations to be classified as overweight or obese (Wan Mohamed Radzi et al., 2019). Thus, stress is associated with eating behaviours as indicated in the previous study, that as stress level rises, so does eating behaviours (Wijayanti et al., 2019).

2.7 Association between stress and sociodemographic factor

Globally, a great deal of research has been done on students' stress levels. According to a study by Jia and Loo (2018), one in three undergraduate students in Malaysia reported having high levels of stress, with the average percentage of stress among students recorded as 37.7%. Strategies to lessen stress and enhance educational results can be informed by knowledge of the association between sociodemographic variables and stress. According to research by Cheema et al., (2021), female students experienced much higher levels of stress than male students. This difference in stress tolerance may be caused by the fact that women are more prone to stress than men are.

Furthermore, Shamsuddin et. al., (2013) study revealed that stress levels were greater among the older age group because of growing anxiety about the future and a fear of failing. A prior study found a substantial correlation between stress and a student's academic year (Fauzi et al., 2021). According to research (Garett et al., 2018), first-year students experienced more stress and had worse psychological well-being than second, third, and fourth-year students because of the adjustment to their university experiences.

According to a study by Teh et al. (2015), stress scores among undergraduate students at Melaka Manipal Medical College had a significant association with ethnicity and monthly household (family) income. This finding may have to do with the costly living costs, academic supplies, and transportation costs, as well as the high cost of education (Haq et al., 2024). Among undergraduates, a statistically significant relationship was discovered between stress level and ethnicity, with Malay students scoring higher than students of other ethnicities.

2.8 Association between eating behaviours and sociodemographic factor

Eating behaviour is a dynamic concept that can be affected by a variety of elements, include sex, age, body weight status, psychological, social, and financial factors. (Aoun et. al., 2019, Pigeyre et. al., 2016, Löffler et. al., 2017). It is often known that eating behaviours vary between genders. Studies indicate that female students are more inclined than male students to follow healthy eating habits. According to Tan et al. (2019), men are more prone than women to eating behaviour issues, which raises concerns regarding overnutrition and undernutrition. This is further corroborated by the fact that men consume more calories and have greater energy levels overall, both of which might result in obesity or overweight (Palaniveloo et al., 2021). Nonetheless, the fast-food consumption survey revealed that women consume more of it on average (Cheong et al., 2021). Furthermore, binge eating disorders and other eating disorders are more common in women (Gan et al., 2018).

According to the research by Lim et al. (2021), young people in the lower age group were more likely to follow healthy eating habits because of a greater understanding, which may assist in avoid cardiovascular diseases. In addition, young people living far from their homes while attending university could not have close family ties, which could have a detrimental effect on their eating behaviours. (Gan et. al., 2018). Adverse alterations to eating behaviours were brought about by students' adjustment to a new setting, absence of familial direction, and ignorance of food preparation (Reuter, Bridget, Forster & Brister, 2020). Eating behaviours were linked to the type of academic programme, suggesting that students' understanding of nutrition, which also corresponded

to the type of academic programme, could help them consume a more nutritious diet (Medina et al., 2020).

Malay adults are associated with poor dietary behaviours, such as having a significant tendency for salt (Marina et al., 2019) as well as fast food (Cheong et al., 2021) among the multiracial communities studied in these studies. As a result, certain disorders like hypertension are more common among the Malay population (Liew et al., 2019). Thus, it was discovered that dietary intake and ethnicity were highly correlated (Ramlee et al., 2019; Cheong et al., 2021; Lim et al., 2021), with every ethnic group being distinguished by its own eating habits and cultural norms (Raji et al., 2017). The income of households is the characteristic that is most usually linked to eating behaviour, after ethnicity. The results of research consistently suggest a relationship between food insecurity (Ramlee et al., 2019; Tan et al., 2019; Gan et al., 2020) and generally bad dietary habits (Cheong et al., 2020). Lower household income also has an impact on consumption desires particularly when it comes to foods like "healthy food" or "organic food" (Jalil et al., 2018; Al Mamun et al., 2020).

CHAPTER 3: METHODOLOGY

3.1 Research Design

The research employed a cross-sectional design and utilized a questionnaire to assess the stress levels and eating behaviours among USM Health Sciences undergraduate students. The choice of a cross-sectional study design allowed for the simultaneous collection of information of exposure and outcomes of interest from the participants at a one-time measurement. It also enabled the researchers to efficiently gather data within a short time frame and at a one-time measurement without requiring a substantial budget. However, this study design cannot establish a cause-and-effect relationship and analysed the behavioural changes as no follow up is done after that.

3.2 Study Area

This research was carried out at the Universiti Sains Malaysia Health Campus in Kubang Kerian, Kelantan, specifically targeting Health Sciences undergraduates students. The Health Sciences students in the health campus are chosen as the study population as they are easily accessible for study purposes making it convenient for them to engage in study. The abundance of fast-food restaurants that are easily accessible by the students near the USM Health Campus will help the researcher to understand more on the student's eating behaviour. The reason for selecting USM as the study location was due to its diverse undergraduate population, encompassing individuals from various ethnic backgrounds and programs. This made it an ideal setting for investigating the chosen topic, as it

provided convenience and efficiency in collecting data. Furthermore, the selection of USM was relevant to the participants' circumstances and context.

3.3 Study Population

The target population of this study was Malaysian undergraduate students at School of Health Sciences at Universiti Sains Malaysia, USM Health Campus, Kubang Kerian, Kelantan. The target population encompassed students from different academic programs, including Audiology, Biomedicine, Dietetics, Environmental and Occupational Health, Exercise and Sports Science, Forensic Science, Medical Radiation, Nursing, Nutrition, and Speech Pathology, that are in their first to fourth year of study. Some of the challenges encountered include the difficulty in including samples of students from various programs, year of study and other sociodemographic characteristics that is crucial for the generalizability of results. Students busy schedule may hinder them from participating in this study.

3.2 Selection Criteria

3.2.1 Inclusion Criteria

The inclusion criterion of subjects in the study is based on:

- Participants must be USM Health Sciences undergraduate students.
- Participants must be aged between 19 until 29 years old.
- Hold nationality as a Malaysian.
- Able to read and understand English.