

**KNOWLEDGE, ATTITUDE AND PRACTICE (KAP) ON DIETARY
FIBRE AMONG UNDERGRADUATE STUDENTS SCHOOL OF
HEALTH SCIENCES IN UNIVERSITI SAINS MALAYSIA (USM)**

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**SCHOOL OF HEALTH SCIENCE
UNIVERSITI SAINS**

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FIBRE AMONG UNDERGRADUATE STUDENTS SCHOOL OF
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By

NURUL NASHWA BALQIS BINTI ZAILANI

**Dissertation submitted in partial fulfilment
of the requirement for the degree of
Bachelor in Nutrition with Honours**

CERTIFICATE

This is to certify that the dissertation entitled “KNOWLEDGE, ATTITUDE AND PRACTICE (KAP) ON DIETARY FIBRE AMONG UNDERGRADUATE STUDENTS SCHOOL OF HEALTH SCIENCES IN UNIVERSITI SAINS MALAYSIA (USM)” is a bona fide record of research work done by Ms NURUL NASHWA BALQIS BINTI ZAILANI during the period from March 2024 to January 2025 under my supervision. I have read this dissertation and 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 in Nutrition with Honours.

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DECLARATION

I hereby declare that this dissertation is the result of my 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.



.....

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LIST OF ABBREVIATIONS

KAP	Knowledge, Attitude and Practice
BMI	Body Mass Index
WHO	World Health Organization
CVD	Cardiovascular Disease

**PENGETAHUAN, SIKAP DAN AMALAN (KAP) TERHADAP SERAT
MAKANAN DALAM KALANGAN PELAJAR SARJANA MUDA PUSAT
PENGAJIAN SAINS KESIHATAN DI UNIVERSITI SAINS MALAYSIA (USM).**

ABSTRAK

Pengambilan buah-buahan dan sayur-sayuran dalam kalangan pelajar di Malaysia didapati tidak mencukupi. Objektif utama kajian ini adalah untuk menilai tahap pengetahuan, sikap, dan amalan (KAP) yang berkaitan dengan serat dietari dalam kalangan pelajar program sarjana muda di Pusat Pengajian Sains Kesihatan, Universiti Sains Malaysia (USM). Sebanyak 147 responden telah berdasarkan kriteria kemasukan menggunakan kaedah pensampelan mudah. Soal selidik dwibahasa dalam bahasa Melayu dan Inggeris digunakan untuk pengumpulan data. Hasil kajian telah menunjukkan bahawa kebanyakan responden menunjukkan pengetahuan yang rendah (57.8%) dan amalan yang rendah (91.2%) mengenai serat dietari, manakala majoriti menunjukkan tahap sikap positif yang tinggi (83.0%) terhadap pengambilannya. Ciri-ciri sosiodemografi yang berkaitan dengan program akademik ($p = 0.002$) mempunyai hubungan yang signifikan dengan tahap pengetahuan mengenai pengambilan serat dietari. Sebaliknya, jantina ($p = 1.000$), etnik ($p = 0.377$), dan tahun pengajian ($p = 0.243$) tidak menunjukkan hubungan yang signifikan. Selain itu, keputusan mengenai sikap terhadap serat dietari tidak menunjukkan sebarang hubungan dengan mana-mana faktor sosiodemografi, dengan nilai p untuk jantina ($p = 0.170$), etnik ($p = 0.089$), program ($p = 0.716$), dan tahun pengajian ($p = 0.432$). Selain itu, amalan pengambilan serat dietari tidak menunjukkan sebarang hubungan yang signifikan dengan faktor sosiodemografi, dengan nilai p untuk jantina ($p = 1.000$), etnik ($p = 0.455$), program ($p = 0.704$), dan tahun pengajian ($p = 0.429$). Status indeks jisim badan juga tidak menunjukkan sebarang hubungan yang signifikan dengan ciri sosiodemografi, dengan nilai p untuk jantina ($p = 0.929$), etnik ($p = 0.993$), program ($p = 0.203$), dan tahun pengajian ($p = 0.722$). Akhir sekali, indeks jisim

badan menunjukkan tiada hubungan dengan pengetahuan, sikap, dan amalan, dengan nilai p untuk pengetahuan ($p = 0.108$), sikap ($p = 0.217$), dan amalan ($p = 0.283$).

**KNOWLEDGE, ATTITUDE, AND PRACTICE (KAP) TOWARDS DIETARY
FIBER AMONG UNDERGRADUATE STUDENTS AT THE SCHOOL OF
HEALTH SCIENCES, UNIVERSITI SAINS MALAYSIA (USM).**

ABSTRACT

Consumption of fruits and vegetables among students in Malaysia is inadequate. The primary objective was to assess the levels of knowledge, attitudes, and practices (KAP) related to dietary fibre among undergraduate students at the School of Health Sciences, Universiti Sains Malaysia (USM). A total of 147 respondents were recruited from the School of Health Sciences based on inclusion criteria using a convenience sampling method. A validated bilingual (available in both Malay and English) questionnaire was employed for data collection. The findings of the study revealed that most respondents exhibited low knowledge (57.8%) and low practice (91.2%) regarding dietary fibre, while the majority demonstrated a high level of positive attitude (83.0%) towards its intake. Sociodemographic characteristics related to academic programs ($p = 0.002$) were significantly associated with the level of knowledge regarding dietary fibre intake. In contrast, gender ($p = 1.000$), ethnicity ($p = 0.377$), and year of study ($p = 0.243$) did not demonstrate a significant association. Furthermore, the results regarding attitudes toward dietary fibre revealed no associations with any sociodemographic factors, with p-values for gender ($p = 0.170$), ethnicity ($p = 0.089$), programs ($p = 0.716$), and year of study ($p = 0.432$). Additionally, the practice of dietary fibre intake showed no significant associations with sociodemographic factors, with p-values for gender ($p = 1.000$), ethnicity ($p = 0.455$), program ($p = 0.704$), and year of study ($p = 0.429$). Body mass index status also did not exhibit any significant associations with sociodemographic characteristics, with p-values of gender ($p = 0.929$), ethnicity ($p = 0.993$), program ($p =$

0.203), and year of study ($p = 0.722$). Lastly, body mass index showed no associations with knowledge, attitude, and practice, with p-values for knowledge ($p = 0.108$), attitude ($p = 0.217$), and practice ($p = 0.283$).

CHAPTER 1: INTRODUCTION

1.1 Background of Study

Dietary fibre (DF) consists of complex substances, such as lignin, which cannot be broken down in the upper intestines, as well as nondigestible carbohydrates. Whole-grain cereals, fruits, vegetables, and legumes are important sources of dietary fibre (He *et al.*, 2022). There are two types of dietary fibre: soluble fibre, which is primarily found in fruits and vegetables, and insoluble fibre which is present in whole-grain products and cereals. Consuming dietary fibre is associated with a lower risk of mortality and the development of cardiovascular disease. Additional health benefits of dietary fibre have also been reported, including a reduced risk of cancer and improved intestinal health (Barber *et al.*, 2020). According to a study by He *et al.*, 2022, increasing total dietary fibre intake by 10 g/day can reduce the likelihood of developing metabolic syndrome by 11%. Furthermore, an increase of 10 g of dietary fibre in daily food intake can lead to a reduction of 2.2 kg in body weight (Miketinas *et al.*, 2017). Additionally, a high-fibre diet is recommended to lower the prevalence of obesity, as fibre can replace the energy of other nutrients by adding mass and bulk to meals (Dhingra *et al.*, 2011).

In Malaysia, it is recommended that adults consume at least five servings of fruits and vegetables daily, comprising two servings of fruit and three servings of vegetables, with each serving weighing approximately 80 grams (Lo *et al.*, 2022). A study indicated that adults aged 19 to 50 who consumed more than three servings of whole grains daily exhibited a reduced body mass index, waist circumference, and a lower percentage of overweight or obese individuals compared to those who consumed fewer than 0.6 servings of whole grains daily (O'Neil *et al.*, 2010). Despite the numerous benefits of dietary fibre for our health, global consumption of fruits and vegetables remains low.

According to the World Health Organization (WHO), approximately 16 million (1.0%) disability-adjusted life years (DALYs) and 1.7 million (2.8%) deaths worldwide are attributable to insufficient fruit and vegetable intake (WHO, 2022). A study conducted among health science students at Universiti Kebangsaan Malaysia found that 70.5% and 52.3% of the students did not meet the recommended intake of fruits and vegetables, respectively (Teoh *et al.*, 2021). Low dietary fibre intake can adversely affect individual health, as prospective cohort studies have provided substantial evidence linking diets low in dietary fibre to an increased risk of prevalent non-communicable diseases, such as type 2 diabetes, colon cancer, and cardiovascular disease (CVD) (Mathers, 2023). Therefore, to meet the dietary fibre recommendations, individuals should aim to consume at least three servings of vegetables and two servings of fruit in their daily diet.

1.2 Problem Statement

Young adults are more likely to become obese when they enter college, as they take on greater responsibility for their daily food and lifestyle choices. A child or teenager who is overweight has an increased chance of becoming overweight or obese as an adult, as well as a higher risk of developing diseases in adulthood. Weight gain during college is often a result of adjusting to university life, which is a critical period for young adults to change their behaviours, including eating habits, as they gain independence in their food choices (Chen Yun *et al.*, 2018).

According to Pem and Jeewon (2015), consuming fruits and vegetables has been shown to reduce the intake of other foods, particularly those high in energy, which helps maintain body weight and may prevent weight gain. Furthermore, it is now understood that fibre-rich foods can help prevent diabetes, colon cancer, breast cancer, and cardiovascular disease (CVD) (Melina *et al.*, 2016). Low dietary fibre intake is common among university students, which may be caused by bad eating habits, a lack of understanding, or unfavourable attitudes. However, little study has examined the relationship between students' actual consumption patterns and their knowledge, attitudes, and behaviours (KAP) about dietary fibre intake. Thus, the purpose of this study is to determine how different sociodemographic characteristics and students' KAP related dietary fibre consumption relate to one another. It is anticipated that eating more fruits and vegetables will result in consuming more dietary fibre, which may help university students avoid obesity by enhancing digestion, encouraging fullness, and lowering the chance of gaining too much weight.

1.3 Significance of the Study

In developed countries, there is substantial evidence indicating a high prevalence of cardiometabolic diseases, such as metabolic syndrome, obesity, type 2 diabetes, and cardiovascular disease (CVD) (Benjamin *et al.*, 2017). According to Liu *et al.* (2016), the consumption of fruits and vegetables is inversely associated with the risk of developing type 2 diabetes, cardiovascular disease (CVD), and certain types of cancer. Additionally, dietary fibre reduces the risk of obesity-related disorders by positively influencing the digestive system (Dayib *et al.*, 2020). However, a study found that the consumption of fruits and vegetables remains low in daily food intake, and individuals who are overweight or obese tend to visit fast food restaurants more frequently (Chen Yun *et al.*, 2018). According to Navarro-Prado *et al.* (2018), university students' body mass index (BMI) and their consumption of unhealthy foods are significantly correlated. Given that university students generally eat fewer fruits and vegetables and participate in unhealthy activities like smoking, drinking alcohol, and eating poorly, this could be explained by their new surroundings. Many university students still consume far fewer fruits and vegetables than the recommended daily intake, even though they typically have a better awareness of nutrition and superior nutritional knowledge (Alsunni & Badar, 2015).

As a result, the research's conclusions will offer important insights into the knowledge, attitudes, and behaviours (KAP) around dietary fibre consumption. Additionally, the findings of this study can be applied to developing intervention techniques that will assist college students in improving their comprehension, cultivating a happy outlook, and establishing healthy fruit and vegetable consumption habits. This study will, therefore, fill the knowledge gap regarding students' levels of fibre intake in relation to dietary requirements.

1.4 Research Questions

1. What is the knowledge of dietary fibre intake among the undergraduate students School of Health Science, USM?
2. What is the attitude of dietary fibre intake among the undergraduate students School of Health Science, USM?
3. What is the practice dietary fibre intake among the undergraduate students School of Health Science, USM?
4. Is there any association between sociodemographic characteristics with knowledge, attitudes, practice (KAP) dietary fibre intake among the undergraduate students School of Health Science, USM?
5. Is there any association between Body Mass Index (BMI) with sociodemographic characteristics among the undergraduate students School of Health Science, USM?
6. Is there any association between Body Mass Index (BMI) with knowledge, attitude and practice among the undergraduate students School of Health Science, USM?

1.5 Research Objectives

1.5.1 General Objectives

This study aims to determine the knowledge, attitudes, and practice (KAP) of dietary fibre among undergraduate students School of Health Science, USM.

1.5.2 Specific Objectives

1. To identify the knowledge of dietary fibre intake among the undergraduate students School of Health Science, USM.
2. To identify the practice of dietary fibre intake among the undergraduate students School of Health Science, USM.
3. To identify the attitude of dietary fibre intake among the undergraduate students School of Health Science, USM.
4. To determine the association between sociodemographic characteristics with knowledge, attitudes, and practice (KAP) of dietary fibre intake among the undergraduate students School of Health Science, USM.
5. To determine the association between Body Mass Index (BMI) with sociodemographic characteristic among the undergraduate students School of Health Science, USM.
6. To determine the association between Body Mass Index (BMI) knowledge, attitude and practice among the undergraduate students School of Health Science, USM.

1.6 Research Hypothesis

Hypothesis 1

Null Hypothesis, H_0 : There is no significant association between sociodemographic characteristics with knowledge, attitude, and practice (KAP) of dietary fibre intake among the undergraduate student's School of Health Science, USM.

Alternative Hypothesis, H_a : There is a significant association between sociodemographic characteristics with knowledge, attitude, and practice (KAP) of dietary fibre intake among the undergraduate students School of Health Science, USM.

Hypothesis 2

Null Hypothesis, H_0 : There is no significant association between Body Mass Index (BMI) with sociodemographic characteristics among the undergraduate students School of Health Science, USM.

Alternative Hypothesis, H_a : There is a significant association between Body Mass Index (BMI) with sociodemographic characteristics among the undergraduate students School of Health Science, USM.

Hypothesis 3

Null Hypothesis, H_0 : There is no significant association between Body Mass Index (BMI) with knowledge, attitude, and practice among the undergraduate students School of Health Science, USM.

Alternative Hypothesis, H_a : There is a significant association between Body Mass Index (BMI) with knowledge, attitude, and practice among the undergraduate students School of Health Science, USM.

1.7 Conceptual Framework

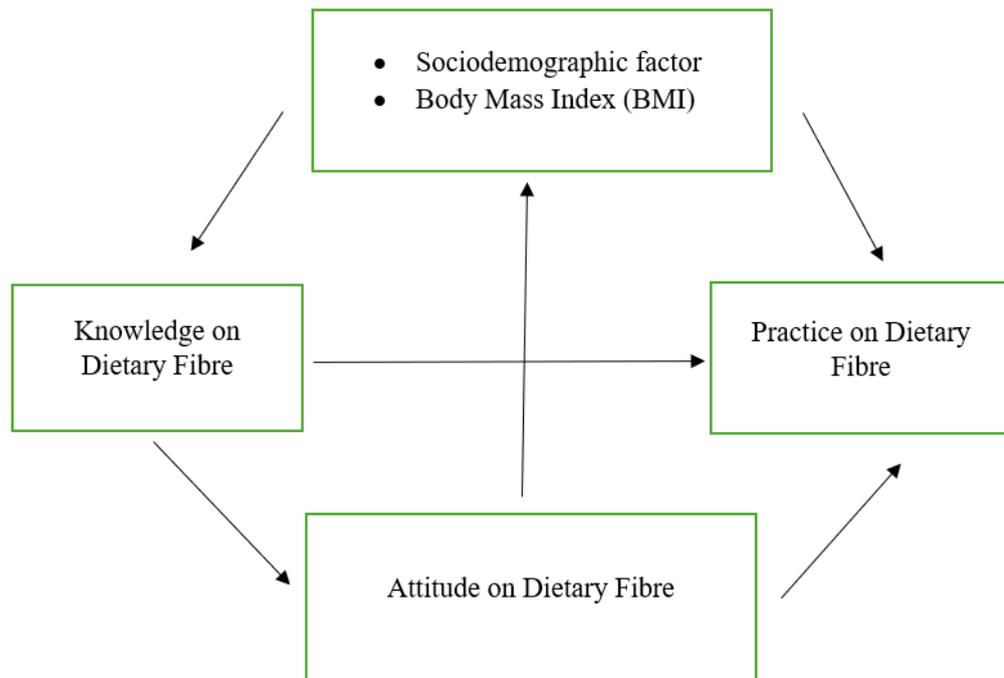


Table 1.7: Independent and Dependent Variable of This Study

	Independent Variables	Dependent Variables
a.	Age	Knowledge
b.	Gender	Attitude
c.	Ethnicity	Practice
d.	Programmes	
e.	Year of Study	
f.	Body Mass Index (BMI)	

CHAPTER 2: LITERATURE REVIEW

2.1 Dietary Fibre Intake Status of University Students

According to recent data from the World Health Organisation (WHO) (2019), insufficient intake of dietary fibre, mostly from fruits and vegetables, was the cause of almost 3.9 million deaths worldwide in 2017. Maintaining good health and lowering the risk of nutrition-related illnesses like heart disease, stroke, and hypertension require eating enough fruits and vegetables (Boeing *et al.*, 2012). Despite these health advantages, only 6% of female university students and 4.2% of male students reach the recommended levels of vegetable intake, which is a concerning low percentage (Teschl *et al.*, 2018). According to the German National Nutrition Survey II (NVS II), university students also have a tendency to consume fewer vegetables than older persons (Heuer *et al.*, 2015). This result supports previous research showing that university students eat much less vegetables than is advised, underscoring the need for better eating practices among this demographic (Oyebode *et al.*, 2014).

According to a study on Malaysian female university students, many of them only ate one serving of fruits and vegetables per day and consumed fewer calories than what the Malaysian Dietary Guidelines advised (Ahmad Sirfan *et al.*, 2020). According to a survey conducted at Umm Al-Qura University, only 14% of students said they usually ate the recommended two to four servings of fruits and vegetables each day, and a noteworthy 32% of participants said they never ate any (Althubaiti, 2022). A diet high in fruits and vegetables is crucial for preventing chronic diseases and preserving a healthy body weight, according to earlier studies (Dhandevi Pem & Rajesh Jeewon, 2015). Global trends, however, show that kids are consuming fewer fruits and vegetables. For example, Vereecken *et al.* (2015) surveyed German college students and discovered that although 80% of them would prefer to eat fruits and vegetables every day, their actual intake was still low. This is part of a larger trend where students' eating habits tend to deteriorate as the transition from high school to college, which frequently leads to several health problems that are typical of college students (Guillaumie *et al.*, 2010).

2.2 Knowledge, Attitude, and Practice Levels Regarding Dietary Fibre Intake.

Developing successful health-promoting treatments requires an understanding of the connection between actual vegetable intake, knowledge of recommended servings, and subjective views of fulfilling these recommendations. Many students are fully aware of the necessary daily intake of fruits and vegetables, according to several studies. For example, according to one study, half of Germans are aware of the precise number of servings of fruits and vegetables that are suggested each day, and the majority of students are aware of the amount of produce that should be consumed each day (Teschl *et al.*, 2018). According to a different study, most participants were aware of how diets high in fibre can help avoid diseases like obesity, cardiovascular disease, and blood sugar management (Alfawaz *et al.*, 2020). Van den Bogerd *et al.* (2018) found that despite this awareness, young people—especially university students—continue to consume less fruits and vegetables than is advised. A similar pattern was noted in a study of Universiti Kebangsaan Malaysia health science students, where 52.3% did not meet the recommended intake of vegetables and 70.5% did not meet the recommended intake of fruits (Teoh *et al.*, 2021).

A study conducted by Alsunni and Badar (2015) on Saudi Arabian university students revealed that while 72.2% of the participants possessed excellent knowledge about nutrition, only a small percentage (32.7%) consumed the recommended five servings of fruits and vegetables daily. This result is consistent with the findings of Davis *et al.* (2015), who contended that dietary behaviour modifications cannot be affected just by information. The idea that information by itself does not result in better eating habits is supported by the lack of notable gender differences in vegetable intake, even when people are aware of the suggested serving sizes. Additionally, Khalili Rohin *et al.* (2021) stressed that although information is crucial, it does not ensure that attitudes and actions

will change. They emphasised that consumption habits are also greatly impacted by other factors, including socioeconomic position, personal preferences, cultural influences, and the cost, availability, and accessibility of fruits and vegetables. This implies that in order to effectively affect dietary behaviours, diverse approaches that go beyond simple knowledge promotion are required.

2.3 Prevalence of Overweight and Obesity among University Students.

Asia is experiencing a significant increase in cases of overweight and obesity, with Malaysia leading this trend. However, there is a lack of recent data specifically focusing on youth, particularly university students in Asia. Over the past five decades, the global prevalence of obesity has reached pandemic levels, with rates continuing to rise. According to Blüher (2019), since 1990, the global obesity rate among adults has more than doubled, while the prevalence among children and adolescents (ages 5 to 19) has quadrupled. In 2022, it was reported that 43% of adults were classified as overweight (WHO, n.d.). A study by Pital and Ghazali (2022) highlighted the high prevalence of overweight and obesity among university students, particularly among male students. Furthermore, students pursuing bachelor's degrees exhibited higher body mass indices (BMIs) compared to those enrolled in associate degree programs. Similarly, research conducted among undergraduate students at Universiti Putra Malaysia found that 38.1% of participants were either overweight or obese, with 22.9% and 15.9% falling into the respective categories.

Furthermore, a study by Rabanales-Sotos *et al.* (2020) revealed that health science students in the Amazon region exhibited a notably high body mass index (BMI), with male students being more likely to be classified as obese and individuals over the age of 20 more likely to be overweight or smokers. The percentage of overweight young adults varies significantly by country, with rates ranging from 16% to 37% in Spain, 2.9% to 14.3% in China, 11% to 37.5% in India, 17% in the United States, and 13.4% to 31.6% in South Africa and Latin America (Štefan *et al.*, 2017). These findings underscore the growing concern regarding obesity among young adults globally, particularly in Asia,

where the prevalence of overweight and obesity is rising rapidly, highlighting the urgent need for targeted health interventions.

2.4 Factors Influencing Knowledge, Attitude, and Practice of Dietary Fibre.

Several factors, including gender, parental education level, and socioeconomic status, can significantly influence students' knowledge, attitudes, and behaviours regarding fruit and vegetable consumption. A study conducted in Poland by Krusinska (2017) found that teenagers living in rural areas, whose parents had lower educational levels and limited financial resources, were less likely to achieve a high dietary fibre intake. These factors were associated with lower socioeconomic status, and for Polish teenagers, consuming a single high-fibre meal was insufficient to meet fibre intake recommendations. Similarly, a multivariate analysis by Marques-Vidal *et al.* (2018) revealed that male gender, poor educational attainment, and a sedentary lifestyle were positively correlated with unhealthy eating patterns, such as "Meat & Fries" and "Fatty & Sugary foods". In contrast, the consumption of "Fruits & Vegetables" was negatively correlated with these factors.

Another study by Fauziyana *et al.* (2021) found that women who were widowed or separated, had lower incomes, and consumed insufficient energy were less likely to consume adequate amounts of dietary fiber. Olatona *et al.* (2018) observed in Lagos State, Nigeria, that knowledge, attitudes, and practices (KAP) related to fruit and vegetable consumption were significantly influenced by household income, professional occupation, and education level. They also noted that cooking methods and sociodemographic factors, such as male gender, independent living, lower body mass index (BMI), and advanced academic years, were associated with the non-consumption of fruits and vegetables. Further research by Štefan *et al.* (2017) showed that a higher percentage of students who did not consume vegetables reported a lower quality of life. A busy lifestyle was identified as a barrier to fruit consumption, with taste preferences emerging as a key factor influencing fruit intake. Olatona *et al.* (2018) suggested that

higher levels of education could lead to a better understanding of the health benefits of fruits and vegetables, thereby promoting healthier dietary choices. In conclusion, socioeconomic factors, including income and education, play a significant role in shaping eating habits. Higher levels of education may enhance awareness of the health benefits of fruits and vegetables, encouraging greater consumption. Additionally, socioeconomic status influences eating preferences and lifestyle choices, ultimately impacting dietary habits (Affret *et al.*, 2017; Chen & Antonelli, 2020).

2.5 Interventions to Improve Dietary Fibre Knowledge, Attitude, and Practice.

Dietary fibre is one of the important components for a healthy diet, as there was a study from a previous paper that stated that it is well-known for its ability to keep against chronic illnesses like heart disease, type 2 diabetes, and several gastrointestinal issues (Stephen *et al.*, 2017). Most of the people nowadays still do not meet the dietary recommendation for fibre, although recommendations for sufficient dietary fibre consumption vary by country and age group. It is generally accepted that people should consume 25–30 g or more per day (McKeown *et al.*, 2022). A popular framework for comprehending and enhancing health-related behaviours is the knowledge, attitude, and practice (KAP) framework. Meeting recommended intake amounts of dietary fibre requires consistent dietary practices, a good attitude towards its advantages, and adequate information about the nutrient. There were several studies that investigated this (KAP) with dietary intake, like among rural and urban adolescents in Selangor, Hulu Terengganu, and among university students as well to see how their knowledge, attitude, and practice towards fruits and vegetables intake.

However, despite the numerous health benefits of dietary fibre, many individuals tend to consume highly processed, refined grains while neglecting adequate intake of

fruits and vegetables. Additionally, some actively avoid carbohydrate-rich foods in an attempt to follow the perceived health advantages of low-carbohydrate diets. As a result, both groups are likely to fall short of meeting the recommended fibre intake levels (McKeown *et al.*, 2022). Healthcare professionals can play a key role in assisting patients to choose nutrient-dense, carbohydrate-based diets that include a variety of dietary fibre types by providing examples of high-fibre foods. Emphasizing the importance of consuming sufficient dietary fibre from a variety of naturally high-fibre plant foods should be central to such advice. Furthermore, a previous dietary intervention study investigated whether encouraging individuals with metabolic syndrome to consume more fibre could improve their diet and promote weight loss. This was achieved by educating participants about fibre-rich foods and motivating them to increase their daily fibre intake to at least 30 grams, compared to the average American's intake of 16 grams. In the future, similar interventions could support healthcare professionals in promoting increased dietary fibre intake across various settings.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Research Design

This study is a cross-sectional research study design was be carried out among the undergraduate students School of Health Science, USM as cross-sectional studies are observational research methods that examine data from a population at a specific point in time. (Wang & Cheng, 2020).

3.2 Study Area

This study was conducted among the undergraduate students School of Health Science, Universiti Sains Malaysia there were 10 courses that were involved in this particular study and the subjects participated based on their availability to answer the questions in the area of campus and their hostel as well.

3.3 Study Population

All undergraduate students from the School of Health Sciences of Universiti Sains Malaysia, Kubang Kerian were chosen for this study population. The student from Nutrition, Dietetics, Biomedicine, Environmental and Occupational Health, Nursing, Exercise and Sports Science, Medical Radiation, Speech Pathology, Audiology, and Science Forensic programs were the respondents for this study. There was no specific range of ages in this study as everyone was allowed to participate in this study as long as they were undergraduate students from the School of Health Sciences.

3.4 Subject Criteria

3.4.1 Inclusion criteria

- a) All undergraduate students from the School of Health Sciences at Universiti Sains Malaysia.

3.4.2 Exclusion criteria

- a) Students who have difficulty understanding English.

3.5 Sample Size Estimation

The sample size was calculated by using the formula to calculate the knowledge, attitude, and practices of dietary fibre.

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

where,

n = sample size

Z = value representing the desired confidence level

Δ = precision

p = anticipated population proportion

Using the 95% of the confidence intervals, the Z-score is 1.96. The precision decided is 5% (0.05). The prevalence of the knowledge regarding the fruits and vegetables intake is 8.2% taken from previous study conducted by (Sabbour *et al.*, 2018). The sample calculation is as below:

$$n = \left(\frac{1.96}{0.05}\right)^2 0.082(1 - 0.082)$$

n= 116

10% drop-out rate is applied on the sample size:

$$= 10/100 \times 116$$

$$= 11.6 = 12$$

$$= 116 + 12 = 128 \text{ subjects.}$$

Using the 95% of the confidence interval, the Z-score is 1.96. The precision decided is 5% (0.05). The prevalence of the attitude regarding the fruits and vegetables intake is 6.7% taken from a previous study conducted by (Marlina *et al.*, 2019). The sample calculation is as below:

$$n = \left(\frac{1.96}{0.05}\right)^2 0.067(1 - 0.067)$$

$$n = 96$$

10% drop-out rate is applied on the sample size:

$$= 10/100 \times 96$$

$$= 9.6 = 10$$

$$= 96 + 10 = 106 \text{ subjects.}$$

Using the 95% of the confidence interval, the Z-score is 1.96. The precision decided is 5% (0.05). The prevalence of the practice regarding good practice on fruits and vegetable intake is 7.3% taken from a previous study conducted by (Teschl *et al.*, 2018). The sample calculation is as below:

$$n = \left(\frac{1.96}{0.05}\right)^2 0.073(1 - 0.073)$$

$$n = 104$$

10% drop-out rate is applied on the sample size:

$$= 10/100 \times 104$$

$$= 10$$

$$= 104 + 10 = 114 \text{ subjects}$$

The association between sociodemographic characteristics with knowledge, attitudes, and practice (KAP) dietary fibre intake and an association between body mass index (BMI) with sociodemographic characteristics among the undergraduate students at the School of Health Science is calculated by using the G Power application with effect size is 0.3.

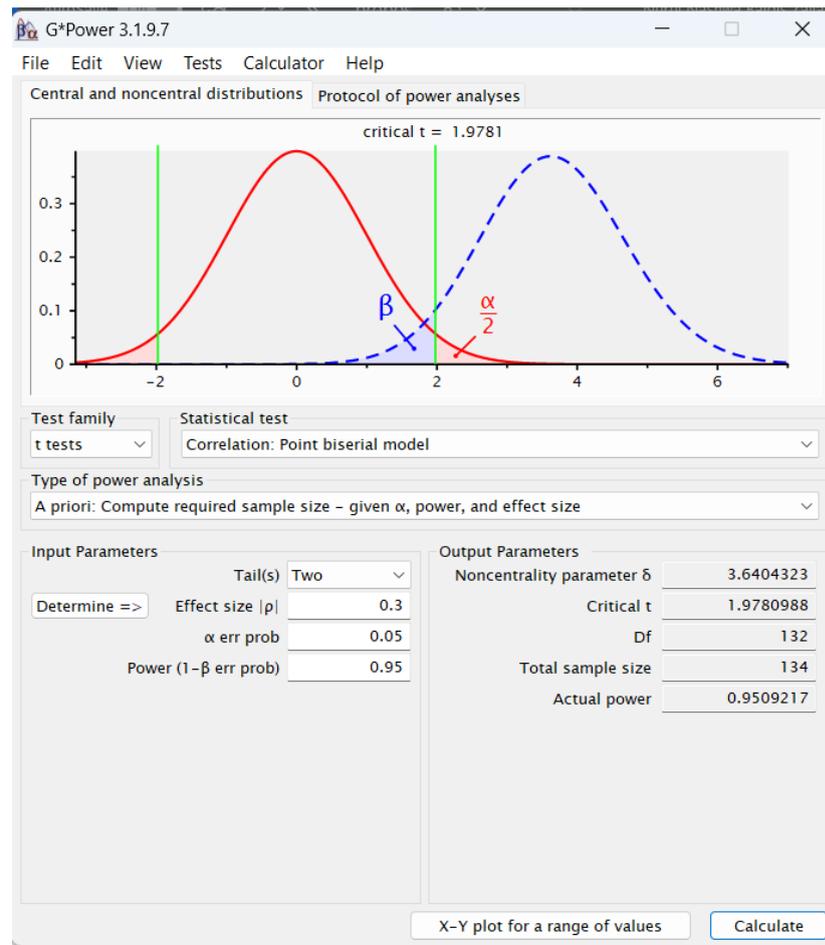


Figure 3.5: Sample size calculation by using G Power software.

The sample size is calculated using G Power software as it is recommended that the number of participants needed in this study is 147 considering 10% of drop-out undergraduate students from the School of Health Science, USM.

3.6 Sampling Method and Subject Recruitment

The respondent was recruited by using the convenience method as it is a non-probability sampling method. All the subjects are voluntarily recruited and the undergraduate students who meet all the inclusion criteria, absence of exclusion criteria, volunteer, and are interested in participating in the study are selected. Participants are willing to take part in the research, read the research information, approve the consent form, and complete the questionnaire. The first 147 undergraduate students School of Health Science who met all the criteria were chosen as research participants. The set of questionnaires will be distributed through WhatsApp's messaging application throughout the four months of data collection in the form of Google Forms.

3.7 Research Tool

In this research, the data was collected by using a validated self-administered questionnaire. The questionnaire is divided into three parts, sociodemographic section, body mass index (BMI), and knowledge, attitude, and practice (KAP) of dietary fibre intake section. The participants are expected to complete the whole questionnaire within 15 minutes.

3.7.1 Part I: Sociodemographic Information

The sociodemographic information that was collected in this study includes the subject's gender, ethnicity, program, and year of study, for gender (male and female), ethnicity was Malay, Chinese, Indian, and others like, Murut, Bajau, Kadazan and Iban. There were 10 programs in the School of Health Sciences, Nutrition, Dietetics, Biomedicine, Environmental and Occupational Health, Nursing, Exercise and Sports Science, Medical Radiation, Speech Pathology, Audiology and Science Forensic and involved all years of study from Year 1 until Year 4.

3.7.2 Part II: Body Mass Index (BMI) Status among School of Health Sciences

Students in Universiti Sains Malaysia, USM.

Participants' body weight and height were collected by the researcher to obtain their BMI status by dividing the body weight in (kg) with squares body height (m^2) as the data was self-reported by the subjects. There are four classes of body mass index which are underweight ($BMI < 18.5 \text{ kg}/m^2$), normal (BMI between 18.5 and 24.9 kg/m^2), overweight ($BMI \geq 25 \text{ kg}/m^2$), and obese ($BMI \geq 30 \text{ kg}/m^2$). (NHS Inform, 2023). The overweight and obese classification will be used to indicate the high body mass index status among the students.

3.7.3 Part III: Knowledge, attitudes, and practice (KAP) of dietary fibre intake assessment.

The questionnaire was adopted from the previous study which is “Knowledge, Attitude, and Practice regarding Dietary Fibre among Malaysian Rural and urban adolescents (Daud et al., 2018). There were 3 domains in this questionnaire, the first domain was about the knowledge related to dietary fibre intake, and it consisted of 24 items where the participants needed to answer whether the statement was “true” or “false”. There will be one mark given for the correct answer and zero for the wrong answered question as the minimum mark is zero and 24 for the maximum. Next, the second domain was about the attitude regarding dietary intake as it consists of 12 items, and the participants needed to answer whether they “strongly agree”, “neutral”, or “strongly disagree”.

For this second part, the ideal answer was given two marks, meanwhile, neutral and inappropriate answers were given one and zero marks and the range score was between 0 to 24. The last part is about the practice of dietary fibre intake as it consists of