

Knowledge, Attitude, and Practice of Dietary Fibre Consumption Among International Islamic University Malaysia (IIUM) Students

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ABSTRACT

Background: Dietary fibre provides many advantages to human health and can be found in fruits, vegetables, grains, and other plant-based foods. It has been proven that intake of dietary fibre is low globally and while interventions should focus on all age groups, those targeting young adults should be given priority. Therefore, this study intends to assess the knowledge, attitude, and practice (KAP) of dietary fibre consumption among International Islamic University Malaysia (IIUM) undergraduate students. **Methods:** A cross-sectional study was employed, and the sample population consisted of students of IIUM Kuantan, Gombak, and Pagoh. A validated KAP survey adopted from a previous study was used. The survey was created using Google Forms and disseminated through online platforms. A total of 381 students (190 health science and 191 non-health science) participated in this study. **Results:** The results found that the students had moderate levels of knowledge ($69.7 \pm 10.3\%$) and practice ($57.3 \pm 18.3\%$), as well as high positive attitude ($86.5 \pm 10.1\%$) towards dietary fibre consumption. There were no significant differences in KAP scores between health science and non-health science students. Nonetheless, there was a significant relationship between knowledge and practice ($p = 0.022$), and between attitude and practice ($p < 0.001$). On the other hand, no significant relationship was found between knowledge and attitude ($p = 0.587$). **Conclusion:** Nutritional interventions that incorporate aspects of knowledge and attitudes should be developed to promote better practices and habits of dietary fibre consumption among university students.

Keywords:

knowledge; attitude; practice; dietary fibre

INTRODUCTION

According to the Codex Alimentarius 2009, “dietary fibre means carbohydrate polymers with ten or more monomeric units, which are not hydrolysed by the endogenous enzymes in the small intestine of humans” (de Menezes et al., 2013, p.1). Dietary fibres have a variety of structures and properties, however they are primarily divided into soluble and insoluble fibres.

Consuming adequate dietary fibre is crucial as it is good for the gut and general health. Its role may be indirect and not immediate, but it plays a significant function in the health maintenance of the body's systems such as the digestive and immune systems. Its contribution to the evacuation of bowels is the most widely recognised and accepted fact worldwide (Barber et al., 2020). Dietary fibre also serves as a prebiotic in the intestine. It is through nutrient enrichment and modification of gut microbiota and the immune system that prebiotics are able to strengthen human health (Yadav et al., 2022).

Despite the well-established health benefits of dietary fibre, it is one of the food components that many people

of all ages around the globe, including Malaysia, have yet to reach its recommended daily intake amount. For example, students at International Islamic University Malaysia (IIUM) Kuantan campus consumed around 5 g of dietary fibre per day as compared to the Malaysian national guideline of 20 g to 30 g per day (Abdul Rahim & Mat Jusoh, 2023; Ministry of Health Malaysia [MOH], 2017). This problem may stem from the apparent disconnect between the prevalence of NCDs and the potential role of dietary fibre in lessening their risks among this population.

There exists a need in understanding the knowledge, attitude, and practice (KAP) regarding dietary fibre consumption among university students. To date, studies on KAP of dietary fibre consumption particularly among Malaysian university students have yet to be conducted or published. Lack of data in this area could possibly hinder the policymakers and healthcare professionals from planning and implementing suitable dietary interventions for this population. Therefore, this study aims to determine the KAP of dietary fibre among students of IIUM. The scores were then compared between health

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science and non-health science students. Furthermore, the correlation between the KAP domains was investigated.

MATERIALS AND METHODS

Study Participants

This cross-sectional study was conducted online on IIUM undergraduate students who were studying in Kuantan, Gombak, and Pagoh campuses. There is a total of 14 kulliyahs or faculties in the mentioned campuses. Six faculties are in Kuantan, namely Kulliyah of Allied Health Sciences (KAHS), Kulliyah of Dentistry (KOD), Kulliyah of Medicine (KOM), Kulliyah of Nursing (KON), Kulliyah of Pharmacy (KOP), and Kulliyah of Science (KOS). Meanwhile, there are seven faculties in Gombak, including Kulliyah of Islamic Revealed Knowledge and Human Sciences (KIRKHS), Kulliyah of Law (KOL), Kulliyah of Architecture and Environmental Design (KAED), Kulliyah of Economics and Management Sciences (KENMS), Kulliyah of Education (KOED), Kulliyah of Engineering (KOE), and Kulliyah of Information and Communication Technology (KICT). Lastly, only one faculty is located at Pagoh, which is Kulliyah of Sustainable Tourism and Contemporary Languages (KSTCL). Those taking health science courses were those in KAHS, KOD, KOP, KOM, and KON.

The sample size was determined using the Krejcie and Morgan table. Hence, a minimum of 379 participants was needed. The students were eligible to participate in the study if they were healthy, aged from 19 to 25 years old, and living on campus. International students, pregnant and lactating students, and students who were undergoing low-fibre diet due to medical reasons were excluded from this study. A total of 381 students were recruited using convenience sampling.

Questionnaire

A set of questionnaires was created through adopt and adapt method from a previous study by Mat Daud et al. (2018) with some modifications. The online survey was created by using Google Forms and distributed to students via social media. There were four sections in the questionnaire: sociodemographic information, knowledge of dietary fibre, attitude towards dietary fibre, and practice of dietary fibre consumption. The KAP scoring method and categorisation of the KAP scores were based on the original study.

The first section contained questions about respondents' gender, age, year of study, kulliyah, marital status, and

monthly allowance. The second section comprised 24 factual items with "yes" and "no" answer options. A correct answer was given one mark while a wrong answer was given zero mark. Therefore, the total score for this section was 24 marks. The third section contained 12 items that aim to assess the students' opinions regarding the health effects and importance of dietary fibre. The five-point Likert scale was used as the answer options (strongly disagree, disagree, neutral, agree, and strongly agree). Two marks were given to the positive scale, one mark for the neutral scale, and zero mark for the negative scale. The total score for this section was 24 marks. The final section consisted of 12 items with "yes" and "no" answer options. This section evaluated the students' daily dietary behaviour relating to dietary fibre, including food preferences and frequency of dietary fibre intake. As for the scoring, a favourable practice received one mark, while any unfavourable practice received zero mark (Mat Daud et al., 2018). In total, the maximum score for this section was 12 marks. For each KAP section, the mean score percentage was categorised into either low (< 40%), medium (40% – 80%), or high (> 80%) category (Mat Daud et al., 2018).

Statistical Analysis

The data in this study was analysed using the Statistical Package for the Social Sciences (SPSS) Version 20. For all tests, the significance level was set to 0.05, with 95% confidence level. Descriptive analysis was used to determine the KAP scores of the students. Meanwhile, independent samples *t*-test and Mann-Whitney U test were used to compare the KAP scores between health science and non-health science students. Lastly, to examine the correlation between the KAP domains, Spearman's correlation test was utilised.

RESULTS

General Characteristics of the Participants

According to Table 1, a total of 190 health science (50 males, 140 females) and 191 non-health science (46 males, 145 females) students participated in this study. The average age of the respondents was 21.7 ± 1.4 years old. Most of the respondents were third year students (31.2%) and the least participated category of students was from fifth year students (1.6%). Most respondents were from KAHS (51.5%) for the health science group and KOS (38.2%) for the non-health science group.

Table 1: Sociodemographic information distribution of IIUM students ($n = 381$)

| Characteristic | Total (N = 381) | | Health Science (N = 190) | | Non-health Science (N = 191) | |
|--------------------------|-----------------|------|--------------------------|------|------------------------------|------|
| | <i>n</i> | % | <i>n</i> | % | <i>n</i> | % |
| Gender | | | | | | |
| Male | 96 | 25.2 | 50 | 26.3 | 46 | 24.1 |
| Female | 285 | 74.8 | 140 | 73.7 | 145 | 75.9 |
| Age ^a (years) | 21.7 | 1.4 | 21.6 | 1.2 | 21.9 | 1.6 |
| Year of Study | | | | | | |
| Year 1 | 87 | 22.8 | 43 | 22.6 | 44 | 23.0 |
| Year 2 | 103 | 27.0 | 57 | 30.0 | 46 | 24.1 |
| Year 3 | 119 | 31.2 | 56 | 29.5 | 63 | 33.0 |
| Year 4 | 66 | 17.3 | 30 | 15.8 | 36 | 18.8 |
| Year 5 | 6 | 1.6 | 4 | 2.1 | 2 | 1.0 |
| Kulliyah | | | | | | |
| KAHS | 97 | 25.5 | 97 | 51.5 | | |
| KAED | 8 | 2.1 | | | 8 | 4.2 |
| KOD | 5 | 1.3 | 5 | 2.6 | | |
| KENMS | 12 | 3.1 | | | 12 | 6.3 |
| KOED | 12 | 3.1 | | | 12 | 6.3 |
| KOE | 12 | 3.1 | | | 12 | 6.3 |
| KICT | 20 | 5.2 | | | 20 | 10.5 |
| KIRKHS | 31 | 8.1 | | | 31 | 16.2 |
| KOL | 5 | 1.3 | | | 5 | 2.6 |
| KOM | 25 | 6.6 | 25 | 13.2 | | |
| KON | 34 | 8.9 | 34 | 17.9 | | |
| KOP | 29 | 7.6 | 29 | 15.3 | | |
| KOS | 73 | 19.2 | | | 73 | 38.2 |
| KSTCL | 18 | 4.7 | | | 18 | 9.4 |
| Marital status | | | | | | |
| Single | 376 | 98.7 | 189 | 99.5 | 187 | 97.9 |
| Married | 5 | 1.3 | 1 | 0.5 | 4 | 2.1 |
| Monthly allowance (RM) | | | | | | |
| < 300 | 113 | 29.7 | 51 | 26.8 | 62 | 32.5 |
| 300 – 500 | 124 | 32.5 | 65 | 34.2 | 59 | 30.9 |
| 501 – 1000 | 125 | 32.8 | 65 | 34.2 | 60 | 31.4 |
| > 1000 | 19 | 5.0 | 9 | 4.7 | 10 | 5.2 |

^aMean (SD)

KAP Scores of Dietary Fibre

Table 2 shows the KAP scores of IIUM students. The knowledge of IIUM students on dietary fibre was at the medium level ($69.7 \pm 10.3\%$). The health science students ($70.0 \pm 10.2\%$) have a comparable knowledge score with the non-health science students ($69.4 \pm 10.5\%$).

Remarkably, the students have a positive attitude towards the importance of dietary fibre since their mean score fell into the high category ($86.5 \pm 10.1\%$). Furthermore, the mean attitude score of health science students ($86.6 \pm 9.8\%$) was similar to that of non-health science students ($86.1 \pm 10.5\%$).

Lastly, the health science students ($58.1 \pm 17.3\%$) have a comparable practice score to non-health science students ($56.5 \pm 19.4\%$). The mean practice score of the overall students fell into the medium category ($57.3 \pm 18.3\%$).

Table 2: KAP score percentage of health science, non-health science, and overall students

| Domain | Percentage Score (Mean \pm SD) | | |
|-----------|----------------------------------|------------------------------|-----------------|
| | Health Science (N = 190) | Non-health Science (N = 191) | Total (N = 381) |
| Knowledge | 70.0 ± 10.2 | 69.4 ± 10.5 | 69.7 ± 10.3 |
| Attitude | 86.8 ± 9.8 | 86.1 ± 10.5 | 86.5 ± 10.1 |
| Practice | 58.1 ± 17.3 | 56.5 ± 19.4 | 57.3 ± 18.3 |

Comparison of KAP Scores Between Health Science and Non-health Science Students

Knowledge and attitude scores

Based on Table 3, Mann-Whitney U test was used to analyse the difference in knowledge and attitude scores between the health science and non-health science students. For the knowledge domain, it was discovered that there was no significant difference between the two groups ($U = 17588$, $n_1 = 190$, $n_2 = 191$, $p = 0.601$), with a small effect size (0.027). On the other hand, there was no significant difference in the attitude scores between the two groups ($U = 17537$, $n_1 = 190$, $n_2 = 191$, $p = 0.568$), with a small effect size (0.029).

Table 3: Comparison of knowledge and attitude scores between health science and non-health science students (Mann-Whitney U test)

| Domain | Mean rank | | Mann-Whitney U | Z-value | p-value | Effect size |
|-----------|--------------------------|------------------------------|----------------|---------|---------|-------------|
| | Health science (n = 190) | Non-health science (n = 191) | | | | |
| Knowledge | 193.93 | 188.08 | 17588.00 | -0.523 | 0.601 | 0.027 |
| Attitude | 194.20 | 187.82 | 17537.00 | -0.571 | 0.568 | 0.029 |

Practice scores

The difference in practice scores between the health

sciences and non-health sciences students was explored using independent samples *t*-test. From the analysis, as seen in Table 4, there was no significant difference between the two groups ($p = 0.404$).

Table 4: Comparison of practice scores between health science and non-health science students (Independent samples *t*-test)

| Variable | Health science (<i>n</i> = 190) | | Non-health science (<i>n</i> = 191) | | Mean differences (95% CI) | <i>t</i> -statistics (df) | <i>p</i> -value |
|--------------|-------------------------------------|-----------|---|-----------|---------------------------|---------------------------|-----------------|
| | Mean | <i>SD</i> | Mean | <i>SD</i> | | | |
| Practice (%) | 58.1 | 17.3 | 56.5 | 19.4 | 1.60 (-2.13, 5.27) | 0.853 (379) | 0.404 |

Association Between KAP Domains

Spearman's rank order correlation was used to determine the associations between knowledge and attitude, knowledge and practice, as well as attitude and practice. The results are presented in Table 5. Among the three associations analysed, only two of them produced significant results, which were knowledge and practice ($r = 0.117$, $n = 381$, $p = 0.022$) and attitude and practice ($r = 0.206$, $n = 381$, $p < 0.001$). Even though significant, the associations showed weak positive relationships. On the other hand, the knowledge and attitude association had the weakest positive relationship and was the only one without a significant outcome ($r = 0.028$, $n = 381$, $p = 0.587$).

Table 5: Spearman's correlation analysis between the KAP domains

| Association | Spearman's Correlation Test (<i>n</i> = 381) | |
|------------------------|---|-----------------|
| | <i>r</i> -value | <i>p</i> -value |
| Knowledge and attitude | 0.028 | 0.587 |
| Knowledge and practice | 0.117 | 0.022 |
| Attitude and practice | 0.206 | < 0.001 |

DISCUSSION

Based on the results, the general knowledge level of the students was at the moderate level. The finding on knowledge classification was consistent with a previous study done on Malaysian adolescents, although its mean was a little lower compared to the current study ($54.4 \pm 11.3\%$) (Mat Daud et al., 2018). The slight difference in the scores may be attributed to the increased health information-seeking behaviour among young adults. That is, apart from themselves, they also tend to search health information for their families and peers to show support for them (Thorsteinsdottir & Kane, 2018). This behaviour allows them to obtain more knowledge regarding healthy living, including proper nutrition and diet. The knowledge scores of health science and non-health science students

can be considered comparable to each other. Health science students are generally taught about the importance of healthy eating towards human health in greater details and have more nutrition-related learning materials, which may include emphasis on eating plenty of dietary fibre, especially fruits and vegetables. Despite that, people nowadays can retrieve any information quickly using the internet, including those pertaining to dietary fibre (Mat Daud et al., 2018; Georgiou & Moshogianni, 2023; Rohin et al., 2021).

Next, the students have a high level of positive attitude and good perception towards the importance of dietary fibre. It can be concluded that the students were aware of the benefits of dietary fibre, regardless of their academic background.. This outcome matters because, through regular practice of this mindset, it can help people of all ages gradually eat more dietary fibre. A previous study by Yen and Lim (2019) on university staff recorded the same score classification as the present study, although its mean attitude score ($88.57 \pm 8.44\%$) was a little higher. The similarity in both studies can be attributed to the participants' educational level, in which study participants in both studies have received and were receiving tertiary education at higher institutions. People with higher education levels, regardless of their field of study, tend to have better nutrition awareness and habits (Azizi Fard et al., 2021; Hearty et al., 2007). According to Hearty et al. (2007), age also contributes to the positive attitude among adults towards healthy eating. This may be due to their roles in family and disease prevention.

Similar to knowledge score, the mean practice score of the total student was at moderate level. Majority of the students did not eat vegetables in each meal ($n = 203$) and did not consume fruits daily ($n = 283$). The moderate practice level may serve as evidence that there are still many Malaysian young adults who have yet to achieve the desirable behaviour to achieve the recommended dietary fibre intake. University students' dietary choices are multifactorial. Findings in previous studies by Wan Zakaria

et al. (2021) and Yun et al. (2018) revealed that many university students consumed inadequate dietary fibre, mainly fruits and vegetables, because they favoured cheap and accessible foods rather than healthy ones. Another study in Norway found that young adults who lived far from their parental home had declining intakes of vegetables and fruits (Winpenny et al., 2018). Moreover, it was observed that participants in the present study had the lowest practice score when compared to two similar KAP studies (Mat Daud et al., 2018; Yen & Lim, 2019). These disparities may be due to environmental factors. For instance, many university students face financial constraints and packed academic schedule that could disrupt the amount and quality of their overall food intake (Gamba et al., 2021).

Even though the knowledge level was concluded to be on the moderate level, the correlation test proved that it did not have any significant link to the attitude level. Based on the results, it is possible that the students' knowledge of dietary fibre was just superficial, and hence insufficient to have a major impact on their attitudes. Aside from that, attitude towards food among university students can be influenced by many factors, and knowledge may contribute only a small percentage to it. Common factors like food preference and aversion play a huge part in forming attitude revolving dietary fibre. For example, cravings and preference for healthy foods such as salads were not common among adults even though they know that the foods are good for them (Van Dyke et al., 2024). In contrary, the students' practice level regarding dietary fibre consumption was significantly associated to their knowledge and attitude levels. An individual who lacks knowledge or have a negative perception of dietary fibre are less likely to prioritise its consumption. In fact, positive attitude was one of the major factors that can influence the intentions to consume at least three servings of vegetables among university students (Nguyen et al., 2020). Furthermore, a study conducted among Italian university students revealed that knowing nutritional characteristics of food was one of the key variables influencing their daily diet choices (Savelli et al., 2019). Therefore, improving students' knowledge and attitudes regarding dietary fibre is critical for fostering improved eating practice and habits.

CONCLUSION

In summary, this study assessed the KAP levels of dietary fibre consumption among undergraduate students of IIUM. The results demonstrated that the students have moderate levels of knowledge and practice, and a high level of positive attitude. However, no significant

differences in the scores were found between health science and non-health science students, indicating that these two student groups have similar KAP levels. Besides that, it was discovered that the practice level was highly influenced by knowledge and attitude. Thus, interventions incorporating these two factors should be conducted to gradually improve dietary fibre intake in this population. .

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