ORIGINAL ARTICLE

Knowledge, Attitude and Practice related to the Consumption of Dietary Fibre Among Adults in Kelantan

Zhi Yan Hew, Juliana Shamsudin

Dietetics Programme, School of Health Sciences, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia

ABSTRACT

Introduction: Adults in Malaysia are rarely aware of the benefits of dietary fibre (DF) consumption for overall health. The purpose of this study was to examine adults' knowledge, attitude, and practice (KAP) on dietary fibre consumption and their association in Kelantan, Malaysia. **Materials and methods:** A cross-sectional study of adults in Kelantan included 192 respondents with a mean age of 30.4 (SD 10.4) years. Participants who met the inclusion and exclusion criteria provided a completed socio-demographic questionnaire and a validated KAP on the DF consumption questionnaire. **Results:** This study showed that respondents had moderate knowledge (64.0, IQR 28.0) %, positive attitude (91.7, IQR 16.7) % and good practice (84.6, IQR 23.1) % scores towards DF consumption. The results of this study demonstrated a statistically significant weak correlation between attitude and practice (r=0.193, p=0.007) and knowledge and practice on DF consumption (r= 0.153, p=0.034). However, there was no statistically significant correlation (p=0.815) between knowledge and attitude towards DF consumption. **Conclusion:** These findings suggest multiple avenues for future research that could further clarify and expand upon the results. Longitudinal studies could provide significant insights into how fluctuations in knowledge, attitudes, and practices affect DF consumption over time.
Malaysian Journal of Medicine and Health Sciences (2025) 21(4): 186-194. doi:10.47836/mjmhs.21.4.24

Keywords: Knowledge, Attitude, Practice, Dietary fibre (DF), Adult

Corresponding Author:
Juliana Shamsudin, PhD
Email: juliana@usm.my
Tel : +6097677632

INTRODUCTION

A 2021 systematic review indicates that dietary fibre consumption is advantageous for digestive health, especially concerning inflammatory bowel disease (IBD) and its subtypes. Elevated dietary fibre intake may avert various cancers and reduce the prevalence of coronary heart disease (CHD), as per two health claims approved by the Food and Drug Administration (FDA) (2). Adults are susceptible to the risk of developing coronary heart disease (CHD) due to chronic conditions such as hypertension and unhealthy lifestyles, including fast food consumption and insufficient physical activity (3). It is essential to inform adults that increased dietary fibre intake can facilitate bile excretion, thereby reducing low-density lipoprotein (LDL) cholesterol levels. Dietary fibre can promote the proliferation and function of beneficial bacteria in the gastrointestinal tract by serving as nourishment for the advantageous human gut microflora (4).

In the context of Malaysia, a study by Norimah et al. (2010) (5) indicated that fruit is not included in the top ten daily food items consumed by Malaysian adults. This alarming trend has elicited apprehensions regarding the health of Malaysia's adult demographic. The Malaysian Dietary Guidelines expert group (2010) recommends a daily dietary fibre intake of no less than 25 g, alongside a consistent healthy eating regimen (6). Regrettably, adults often consume insufficient quantities of dietary fibre (7). Research from the Malaysian Adult Nutrition Survey (MANS) in 2003 indicated that merely 40% of Malaysian adults consumed 1 cup of green leafy vegetables daily, approximately 96 g, representing 40% of the WHO's recommendation of 240 g per day (8). This unequivocally demonstrates that, as per the Malaysian food pyramid 2020, adults in Malaysia fail to meet the advised intake of dietary fibre (specifically, two servings of fruits and three servings of vegetables).

In the global context of dietary fibre consumption, recent studies in the USA indicate that the average total dietary fibre intake is approximately 18-20 g per day, which falls short of the recommended levels for optimal health. This underscores a prevalent issue of insufficient fibre consumption, even in developed nations, emphasising the global necessity for enhanced awareness and intake of dietary fibre (9). Additionally, a study conducted among Saudi adults revealed that, despite being aware of the health benefits of fibre, particularly in the context of managing obesity, heart disease, and blood sugar

levels, there was a discrepancy between this knowledge and their actual food choices. Many participants, despite their awareness, favoured less nutritious alternatives, including fried foods and white bread. Perceptions that fiber-rich foods were costly, unappealing, or difficult to acquire were among the primary obstacles to their consumption. It is intriguing that the study also discovered that a higher fibre intake was associated with a lower rate of obesity, high cholesterol, and constipation (10).

This study focusses on adults (people aged 19 to 59), particularly in Kelantan, to determine their knowledge, attitude, and practice regarding dietary fibre consumption. Unfortunately, there is currently insufficient scientific data and research to establish and reveal this relationship. Nonetheless, most studies on dietary fibre consumption are limited to children and adolescents. It is important to note that adults should consume more high-fibre foods than children because they are more likely to be in poor health (11).

Several studies have investigated the impact of the public's Knowledge, Attitude, and Practice (KAP) on the consumption of dietary fibre. As a result, there is a scarcity of research on the KAP of dietary fibre intake among Malaysian adults, particularly in Kelantan. These individuals have been inadequately investigated in terms of their fibre consumption for a variety of reasons. Adults in Kelantan may possess distinct dietary practices shaped by local culinary traditions, socioeconomic factors, and availability of education or healthcare, potentially diverging from national averages. Prior research indicates that, although Malaysians typically acknowledge the health advantages of dietary fibre, their actual intake frequently fails to meet the recommended levels (12). A study by Ng et al. (2016) (13) revealed that insufficient fibre consumption is prevalent among all age demographics in Malaysia, including adolescents, adults, and the elderly. Moreover, despite possessing moderate knowledge, favourable attitudes, and beneficial habits concerning dietary fibre, the actual consumption among adults remains insufficient. Despite the critical role of dietary fibre in mitigating chronic health conditions like hypertension, diabetes, and cardiovascular diseases, there exists a paucity of research concerning the awareness, attitudes, and actual practices related to fibre consumption among the Kelantanese population. This underscores the necessity to investigate the particular KAP factors that affect dietary fibre intake in Kelantan. The results of this KAP study regarding dietary fibre consumption among adults in Kelantan aim to impact public health policy and dietary education. The findings will provide evidence to support the formulation of targeted public health initiatives, including customised dietary guidelines and health campaigns, to promote enhanced fibre intake. Additionally, the results will be of assistance in the development of educational programmes in Kelantan that are designed to increase awareness of the benefits of dietary fibre, improve dietary habits, and reduce the likelihood of diet-related disorders. Lastly, these results could also serve as a model for interventions that are similar in other regions of Malaysia.

MATERIALS AND METHODS

Study Population

From August to November 2022, a cross-sectional study was carried out both online and in person. The study was conducted in Kota Bharu, Kelantan, Malaysia's northeast. The Human Research Ethics Committee (JEPeM) at USM provided ethical approval for this study (Reference number: USM/JEPeM/22060437). Meanwhile, the inclusion criteria were Malaysian, aged 19 to 59, living in Kelantan, and capable of understanding languages such as Malay or English. Adults who were ill or disabled, as well as those who followed an aggressive diet plan, were excluded.

Sampling Method

This study employed convenience non-probability sampling, and the formula proposed by Naing was utilised to determine the sample size (Naing, 2009) (14), $n=[Z/\Delta]^2 p (1-p)$ (n=sample size, z=value representing the desired confidence level, p=anticipated population proportion and Δ=precision (0.05). The confidence level for this study is established at 95%. The Z-score corresponding to a 95% confidence level is 1.96. According to research carried out in Malaysia, 13.4% of participants incorrectly identified vegetables, fruits, and bean products as sources of dietary fibre in meals (16). The p-value indicating the inadequate understanding of dietary fibre consumption is 0.13. The study was founded on a 10% drop-out rate. Consequently, this study requires a total of 192 adults from Kelantan.

Research Tools and Materials

The questionnaire consists of four sections that require responses from the participants. Every section includes a range of questions, and respondents must answer all of them correctly. The questionnaire has been adopted from Norlida et al. (2018) (15) with permission obtained via email. The Cronbach's based on previous study revealed that the reliability for the KAP scores was good, with Cronbach's α for KAP being 0.733, 0.814, and 0.736, respectively. The four sections include: Section A, which covers sociodemographic data; Section B, focussing on knowledge; Section C, addressing attitude; and Section D, which pertains to practice.

Section A (Sociodemographic Data)

The section A concerned with individuals' personal information and socio-demographic characteristics, such as gender, age, ethnicity, current location, education level, total monthly household income and health conditions.

Section B (Knowledge Related to Consumption of Dietary Fibre)
The knowledge questions are intended to assess adults' understanding of dietary fibre consumption. This section consists of seven multiple-choice questions with "Yes" or "No" and "Correct" or "Wrong" answers. Ten sub-questions are included in each of questions 6 and 7, resulting in a total of 25 questions. The correct answer received one point, whereas the incorrect answer received zero points. The scores range from 0 to 25 points. The results were established by computing the percentage of total scores within the knowledge domain. Individuals who achieved scores below 40%, between 40% and 80%, and above 80% were categorised as having low, moderate, and high knowledge levels, respectively (15). Question examples in these sections include: 1. Do you know what fibre is? 2. In your opinion, which of the following foods contains fibre? 3. In your opinion, what is the recommended fibre intake for adults?

Section C (Attitude Related to Consumption of Dietary Fibre)
This part consists of 12 questions about the attitude towards dietary fibre consumption. These questions were evaluated by using a five-point Likert scale, which consists of "strongly disagree", "disagree", "neutral", "agree" and "strongly agree". Positive, neutral, and negative scales were scored as 2, 1 and 0 points respectively. The range of scores is between 0 to 24 points. Then, the total mean scores were calculated and converted into percentage form. Those who scored less than 40%, 40-80% and more than 80% were classified as having negative, neutral, and positive attitudes respectively (16). Examples of questions in these sections include: eating more fruit and vegetables will make me healthier; eating more fast food and sweet snacks will make me lighter; and eating more fruit and vegetables will make me feel fresher.

Section D (Practice Related to Consumption of Dietary Fibre)
This section consists of thirteen multiple-choice questions with "correct" or "wrong" answers. The correct response was worth one point, and the incorrect response was worth zero points. The scores range from zero to thirteen points. The total mean scores were then calculated and converted to percentages. Those with scores of less than 40%, 40-80%, and more than 80% were classified as poor, moderate, and good practices, respectively (15). Examples of questions in these sections include: : I eat vegetables every meal, I eat fruits every day and I choose carbonated drinks rather than fruit juices.

Data Collection Method
This is a cross-sectional study that has involved adults in Kelantan. After receiving the ethical approval, the process of data collection began. The Participant Information Sheet and Consent Form, as well as the questionnaires, were distributed to the respondents by using convenience sampling. Since most young adults are familiar with online questionnaires, the data collection process conducted by using Google Forms. One benefit of using online questionnaires is that they allow a researcher to gain access to people who share specific attitudes, beliefs, interests, and values about a topic (16). Some young adults and middle-aged adults who were unfamiliar with online questionnaires or smartphones were given hard copy questionnaires.

Moreover, the data collection process was conducted according to the respondents' willingness and availability to take part in this study. The researcher also assisted in administering the questionnaire. Additionally, the recruitment link was distributed to the respondents via various social media platforms, including WhatsApp. The survey invitation was shared on social media, accompanied by a poster and QR code to enable respondents to access the questionnaire. Aside from that, the researcher distributed hard copy questionnaires and posters to respondents in person at various shops and malls, including Watsons Kubang Kerian, Guardian Kubang Kerian, and Mydin Kubang Kerian. This is due to the large population size and short data collection time required. In total, 57 hard copy questionnaires and 135 Google Forms (online) were collected. The respondents were given a brief explanation of this study, including objectives, procedures, benefits, and possible risks of this study. Then, the respondents were informed that all their responses would be kept private. They also have the right to continue or terminate their participation in this study. The hypothesis stated that there was an association between knowledge, attitude, and practice towards consumption of dietary fibre among adults in Kota Bharu, Kelantan, Malaysia.

Data Analysis
All the data collected were interpreted by using Statistical Package for Social Sciences (SPSS), version 26.0. Statistical significance was set at a p-value less than 0.05 (two-tailed test) at a 95% confidence level. Descriptive statistics were used to calculate the mean, standard deviation, frequency, and percentage of all variables. Socio-demographic data, such as age, gender, ethnicity, current location, education level, total monthly household income and health conditions were analysed through descriptive statistics. Descriptive statistics were also used to analyse each question regarding knowledge, attitude, and practice related to the consumption of dietary fibre. Besides, categorical data was presented as frequency (percentage), whereas numerical data was displayed as median (IQR) based on their normality distribution. Tests for statistical normality, like the Shapiro-Wilk test, can help ascertain if the data follows a normal distribution. Additionally, the relationship among knowledge and attitude, knowledge and practice, as well as attitude and practice regarding dietary fibre consumption among adults in Kelantan was

examined using Spearman's rank association test. The significance level was established at 0.05.

RESULTS

Demographic Characteristics

Table I presents the socio-demographic characteristics of the respondents participating in this study (n=192). A total of 53 respondents identified as male (27.6%), while 139 respondents identified as female (72.4%). The majority of respondents were Malay (81.3%), aged between 19 to 25 years old (55%), hailing from Kota Bharu (61.5%), and had attained tertiary education levels (e.g., GCE A Levels, foundation, college, and university) at 76.6%. The findings of the present study indicate that the majority of respondents (68.2%) belonged to the household income group classified as B40.

Table I: Socio-demographic characteristics among adults in Kelantan, (n=192)

Characteristics	Total Subjects (n=192)		
	n	%	Mean (SD)
Gender			
Male	53	27.6	
Female	139	72.4	
Age			30.4 (10.4)
19 – 25 years old	96	55.0	
26 – 44 years old	71	37.0	
45 – 59 years old	25	13.0	
Ethnicity			
Malay	156	81.3	
Chinese	33	17.2	
Indian	3	1.6	
Location			
Kota Bharu	118	61.5	
Others	74	38.5	
Educational Level			
Primary	0	0.0	
Secondary	45	23.4	
Tertiary	147	76.6	
Total Monthly Household Income (RM)[a]			4038 (3771)
Not Stated	8	4.2	
Low (B40)	131	68.2	
Middle (M40)	45	23.4	
High (T20)	8	4.2	

[a]*Source*: Department of Statistics Malaysia (2020). B40 (<RM 4850 per month); M40 (RM 4850 – RM 10,959 per month); T20 (RM 10,960 per month).

Knowledge, Attitude and Practice Related to the Consumption of Dietary Fibre among Adults in Kelantan

Based on Table II, the knowledge related to the consumption of dietary fibre among adults in Kelantan was at a moderate level, with a median value of 64.0 (IQR 28.0) % (95% CI: 63.38-68.40). This suggests that the central tendency of knowledge is moderate, with a significant degree of variability in scores. The relatively broad IQR indicates that the knowledge levels of participants are diverse, with some individuals demonstrating significantly higher or lower levels of knowledge regarding dietary fibre. The necessity of targeted educational interventions to rectify the disparities in knowledge within the population is emphasised by this variability. Among 192 respondents, there were nine of them (4.7%) had a low knowledge level towards dietary fibre, 140 of them (72.9%) had a moderate knowledge level towards dietary fibre since it was placed within the range 40-80%, followed by 43 of them (22.4%) had high knowledge level towards dietary fibre (> 80%).

Table II: Knowledge, Attitude and Practice Score (%) related to the consumption of dietary fibre among adults in Kelantan, (n=192)

KAP Domain	Frequency (n=192)	Percentage (%)	Percentage Score Median (IQR)
Dietary Fibre Knowledge			
Low (< 40%)	9	4.7	64.0 (28.0)
Moderate (40-80%)	140	72.9	
High (> 80%)	43	22.4	
Dietary Fibre Attitude			
Negative (< 40%)	1	0.5	91.7 (16.7)
Neutral (40 – 80%)	35	18.2	
Positive (> 80%)	156	81.3	
Dietary Fibre Practice			
Poor (< 40%)	9	4.7	84.6 (23.1)
Moderate (40 – 80%)	84	43.8	
Good (> 80%)	99	51.6	

In terms of attitude, results showed that adults in Kelantan scored 91.7 (IQR 16.7) % (95% CI: 86.45-89.99) for positive attitude towards dietary fibre consumption. This suggests that the majority of participants maintain favourable attitudes towards dietary fibre, with minimal variation in their scores. The relatively uniform distribution of attitudes across the sample is indicated by the small IQR. Among 192 respondents, there was one of them (0.5%) had a negative attitude towards dietary fibre consumption, 35 of them (18.2%) had a neutral attitude, followed by 156 of them (81.3%) had a positive attitude towards dietary fibre consumption. Nonetheless, merely one participant (0.5%) exhibited a negative attitude, indicating that adverse perceptions regarding dietary fibre are exceedingly uncommon in this population.

Meanwhile, the results showed that the practice towards dietary fibre consumption was categorised as good for adults in Kelantan as they scored 84.6 (IQR 23.1) % (95% CI: 75.99-81.19). This suggests that most participants practise good dietary fibre habits, despite moderate variability in behaviour. The IQR indicates that, while many people follow recommended practices, some exhibit less consistent fiber-related behaviours. Nine of the respondents (4.7%) exhibited poor practices regarding dietary fibre consumption, while 84 of them

(43.8%) demonstrated moderate practices, and 99 of them (51.6%) showed good practices towards dietary fibre consumption.

Association between Knowledge, Attitude and Practice Related to the Consumption of Dietary Fibre among Adults in Kelantan

Table III depicts the relationship between knowledge, attitude, and practice regarding dietary fibre consumption among Kelantan adults. Spearman's rank association test was used to evaluate the results. The findings revealed that there was no statistically significant relationship between knowledge and attitude towards dietary fibre consumption among adults in Kelantan (p-value = 0.815). Meanwhile, there was a statistically significant weak correlation between knowledge and practice (r=0.153, p=0.034) and attitude and practice (r=0.193, p= 0.007) on the consumption of dietary fibre among adults in Kelantan.

Table III: Correlation between knowledge, attitude, and practice on the consumption of dietary fibre among adults in Kelantan, *(n=192)*

Domain	Coefficient correlation, *r*-value	*p*-value*
Knowledge and attitude	-0.017	0.815
Knowledge and practice	0.153	0.034
Attitude and practice	0.193	0.007

*Tested using Spearman's rank correlation test

DISCUSSION

According to the 2020 Malaysian Census (17), the Malays are the majority ethnic group in Kelantan, accounting for nearly 96.6% of the population. This is in accordance with the current study, which demonstrates that the majority of the population in Kelantan is composed of Malays. The data was primarily collected in the vicinity of the Universiti Sains Malaysia (USM) Health Campus, which is why the majority of respondents (61.5%) in this study were from Kota Bharu, Kelantan. According to the 2020 Malaysian Census (17), Kota Bharu, the state capital of Kelantan, had a population of approximately 1,792,501 million. This confirms the above.

Knowledge, Attitude, and Practice related to the Consumption of Dietary Fibre among Adults in Kelantan. This present study aimed to investigate the association between knowledge and attitude, knowledge, and practice, as well as attitude and practice on the consumption of dietary fibre among adults in Kelantan.

The findings of this investigation indicate that the median level of knowledge regarding dietary fibre consumption among adults in Kelantan is 64.0% (IQR 28.0%). This discovery is consistent with the findings of Norlida et al. (2018) (15), who reported that rural and urban adolescents in Malaysia possessed moderate levels of knowledge, with a mean score of 54.4 ± 11.3%. In the same vein, a recent study conducted in Indonesia by Djojosaputro and Prihantini (2023) (18) discovered that 46.9% of adolescents possessed a moderate comprehension of dietary fibre, which is consistent with the knowledge levels of neighbouring Southeast Asian countries. These results indicate that, despite the existence of dietary fibre awareness, it is at a moderate level in these regions. There are potential opportunities to enhance public health education and interventions to increase fibre-related knowledge across various age groups.

Regarding attitude, 81.3% of adults in Kelantan exhibited a favourable attitude towards dietary fibre consumption, with a median score of 91.7% (IQR 16.7%). This outcome closely resembles a study performed on rural adults in Terengganu, Malaysia, where 88.1% demonstrated favourable attitudes towards dietary fibre (7). The minimal variability in our sample (IQR 16.7%) indicates that the population exhibits generally uniform attitudes regarding fibre consumption. International studies exhibit divergent trends. A study by Djojosaputro and Prihantini (2023) (18) in Indonesia revealed that merely 25.9% of participants exhibited a favourable attitude towards dietary fibre, reflecting a significantly diminished enthusiasm for fibre consumption relative to Kelantan. This disparity can be ascribed to various factors, such as cultural dietary habits, public health communications, and socio-economic circumstances.

The study revealed that adults in Kelantan exhibit commendable practices concerning dietary fibre intake (84.6%, IQR 23.1%). These findings are inconsistent with those of Norlida et al. (2018) (15), who documented moderate fibre consumption practices (65.9%, IQR 19.9%) among adolescents. The disparity may be ascribed to the age range of the participants in our study, as numerous adults, especially those with tertiary education, tend to possess more entrenched and consistent dietary habits than adolescents. Moreover, adults may possess enhanced access to resources and information pertaining to healthy eating, facilitating more consistent dietary habits. Conversely, a study conducted by Djojosaputro and Prihantini (2023) in Indonesia revealed that merely 34.6% of participants exhibited good practices concerning dietary fibre intake. The markedly reduced percentage of individuals in Indonesia adhering to sufficient fibre intake can be ascribed to various factors, including socio-economic determinants such as educational attainment, access to health information, and the disparities between urban and rural demographics. These factors may result in a lower prevalence of knowledge and adoption of healthy dietary practices in Indonesia relative to Kelantan, where elevated educational attainment and enhanced access to health education may promote superior dietary habits.

Association between Knowledge and Attitude related to the Consumption of Dietary Fibre among Adults in Kelantan

To date, Malaysia has paid little attention to the relationship between knowledge and attitude, which influence dietary fibre intake among adults. According to the findings, despite varying levels of knowledge about dietary fibre, the majority of respondents had a favourable attitude towards its consumption. This could be due to information about the benefits of dietary fibre consumption that can be obtained via the internet, television, or radio programmes, though some of the respondents had limited knowledge about dietary fibre (19).

According to the findings, there was no statistically significant relationship between knowledge and attitude towards dietary fibre consumption among adults in Kelantan. A study in the Illawarra and Greater Sydney regions found no relationship between adults' knowledge and attitudes towards whole grain consumption. This is because adults typically had a high awareness of whole grain foods, but they lacked the ability to put that knowledge into action (20). Overall, it is reasonable to conclude that people with high levels of knowledge are unlikely to have a positive attitude towards dietary fibre consumption.

Although there is no substantial correlation between knowledge and attitude, public health initiatives ought to persist in advocating for fibre consumption through targeted strategies that integrate education with efforts to modify attitudes and behaviours.

Association between Knowledge and Practice related to the Consumption of Dietary Fibre among Adults in Kelantan

According to the findings, there was a statistically significant relationship between knowledge and practice regarding dietary fibre consumption among adults in Kelantan. This is most likely due to nutritional knowledge being one of the most important factors influencing a person's ability to maintain a healthy eating pattern and overall body health. According to Spronk et al. (2014) (21), respondents who were more aware of food and its nutrient composition had a higher dietary fibre intake. Obayashi et al. (2003) (22) clarified that there was a positive association between nutrition knowledge and eating patterns because knowledge was described as interpretive information for taking informed action. This implies that individuals possessing greater knowledge may be more adept at making healthier dietary selections. On the other hand, this finding differs with Cooke and Papadaki (2014) (23) which found that 34.5% of studies revealed no significant association between nutrition knowledge level and dietary practices. This discrepancy may arise from variations in study designs, population characteristics, and the methodologies employed to evaluate both knowledge and practice. Furthermore, Banwat et al. (2012) (24) reported that adult fruit and vegetable consumption remains low (69.2%), despite the fact that the majority of them (92.4%) are well-versed in the nutritional value of fruits and vegetablesThis implies that mere possession of extensive knowledge may not be sufficient to alter one's eating habits. Another study found no correlation between the two variables because nutrition knowledge alone may not be effective in influencing dietary patterns, and a positive attitude towards healthy eating should be instilled in young adults as early as possible (25). It is possible that the promotion of healthy eating may be more effective when knowledge is combined with attitude-based interventions.

Diverse results in research on the correlation between knowledge and practice in the context of dietary fibre consumption may be attributed to a variety of factors, such as population characteristics, study design, questionnaire utilisation, and time frame. For example, the manner in which knowledge is applied to various populations may be influenced by socio-economic factors, including education level, access to health information, and cultural norms.

Association between Attitude and Practice related to the Consumption of Dietary Fibre among Adults in Kelantan

At present, there is limited evidence regarding the influence of attitude on the dietary fibre consumption practices among adults. According to the current findings regarding the relationship between attitude and practice concerning dietary fibre intake, half of the respondents with a positive attitude reported good practices for dietary fibre consumption. This could be due to their greater beliefs and understanding regarding the significance of fibre (26). Additionally, a previous study indicated that respondents showed greater acceptance of brown rice over white rice after being informed about the health benefits associated with brown rice (e.g., reduced risk of type 2 diabetes mellitus), as they were more motivated to adopt healthier diets and lifestyles (27).

In this research, there was a statistically significant association between attitude and practice on the consumption of dietary fibre among adults in Kelantan. Attitude and practice have a statistically significant weak correlation, thus people's behaviour is very little affected by their opinions or feelings about something. Particularly with regard to dietary fibre intake, the weak or minimal correlations between attitude and practice, knowledge and practice, may be influenced by different external elements, such social influences and environmental cues (28). This result coincides with Norlida et al. (2018) (15) which indicated that there was a positive association between attitude and practice on dietary fibre intake. This correlation can be attributed to the fact that individuals who maintain favourable attitudes towards dietary fibre are more inclined to incorporate it

into their diets, as attitudes have a significant impact on behavioural intentions. The current study's findings were also supported by previous research, which demonstrated that an individual's attitude towards good eating behaviours (e.g., consumption of whole grains) has a positive influence on their dietary practice (29, 27). It is undeniable that consumers, particularly adults, will become more conscious of nutritional components and their subsequent effects on their health (15). In another study by Burgess-Champoux et al. (2006) (29), they reported that there was an association between both variables because adults believed whole grains were more satiating, helping to reduce the risk of certain chronic diseases and comprising more nutrients when compared to refined grains, thus attributing to the higher whole grain intake. Above all, a high intake of dietary fibre from whole grains, cereals, fruits, and vegetables is able to manage body weight as well as minimise the risk of obesity and heart disease (30). Consequently, the correlation between attitude and practice is not only logical but also a critical factor in the promotion of long-term health outcomes, as individuals who have positive attitudes towards fibre are more likely to engage in and sustain healthy eating habits.

Strength, Limitations and Recommendations

To our knowledge, there has been no previous research on KAP and the consumption of dietary fibre among adults in Kelantan, so our work may serve as a starting point for determining new findings and novel theories. This was the first study to test and determine the relationship between knowledge and attitude, knowledge and practice, and attitude and practice regarding dietary fibre consumption among adults in Kelantan. As a result, the findings of this study would provide some new information and insights to raise awareness among adults in Kelantan about the importance of dietary fibre intake.

There are several limitations to this study. Initially, reporting bias cannot be disregarded due to the utilisation of self-administered questionnaires for data collection in this study, which precludes direct interviews and may result in inaccurate reporting. Self-reporting methods are predisposed to biases, such as social desirability bias or recall bias, in which participants overestimate healthy behaviours or incorrectly recall their dietary intake. Additionally, certain respondents asserted that the questionnaires were excessively intricate due to the excessive number of questions that required responses. Therefore, it is possible that some of them are hesitant to participate in this survey and may not have answered the questions accurately. Additionally, convenience sampling may result in biassed data, as responses were obtained from respondents who were most easily accessible. This may potentially distort the data's precision. The study's findings cannot be applied to the entire target population as a consequence.

Aside from that, this study should include more respondents of different races, such as Chinese and Indian. In addition, the cross-sectional design of this study restricts the ability to infer causality between the variables. Future research should endeavour to implement a longitudinal design in order to follow the evolution of dietary practices over time and establish causal relationships. Additionally, to mitigate bias, it is recommended that a random sampling method be implemented in future research to guarantee a more representative sample of the population. This would enhance the generalisability of the results. Moreover, subsequent studies ought to employ objective dietary assessment techniques, including food diaries, 24-hour recalls, or biomarkers, to mitigate the effects of self-reporting bias. The outcomes will also more accurately reflect the community in Kelantan.

CONCLUSION

In summary, this investigation offers valuable insights into the attitudes, knowledge, and practices of adults in Kelantan with respect to the consumption of dietary fibre. A substantial correlation was observed between attitude and practice, as well as knowledge and practice, suggesting that adults are aware of the significance of dietary fibre and generally maintain a favourable perspective on its consumption. Public health campaigns should prioritise educating adults on the advantages of fibre and methods for incorporating more fiber-rich foods into their diets to promote healthy dietary habits. Community workshops, educational seminars, and media campaigns serve as effective instruments for enhancing awareness. Future research should investigate the long-term effects of these interventions via longitudinal studies concentrating on specific demographic groups, including younger adults, individuals from lower socio-economic backgrounds, and various ethnic communities within Kelantan. Furthermore, more detailed studies should investigate the effects of health education programs and other educational initiatives on dietary practices, specifically how awareness of dietary fibre leads to enduring behavioural change. Employing random sampling would further improve the generalisability of the results.

ACKNOWLEDGEMENT

The authors acknowledge all participants for their participation in this study.

REFERENCES

1. Alireza M, Nasser ED, Levinus AD, Bagher L, Ahmad E. Association of Dietary Fibre, Fruit, and Vegetable Consumption with Risk of Inflammatory Bowel Disease: A Systematic Review and Meta-Analysis. Advances in Nutrition. 2021; 12(3),

2021, 735-743, https://doi.org/10.1093/advances/nmaa145.
2. Lattimer JM, Haub MD. Effects of dietary fibre and its components on metabolic health. Nutrients. 2010; 2(12), 1266–1289. doi:10.3390/NU2121266
3. Chang CT, Lee PY, Cheah WL. The prevalence of cardiovascular risk factors in the young and middle-aged rural population in sarawak, malaysia. The Malaysian Journal of Medical Sciences. 2012; 19(2): 27.
4. Mudgil D, Barak S. Composition, properties and health benefits of indigestible carbohydrate polymers as dietary fibre: a review. International Journal of Biological Macromolecules. 2013; 61: 1–6. doi:10.1016/J.IJBIOMAC.2013.06.044
5. Norimah AK, Hwong CS, Liew WC, Ruzita AT, Siti Sa'adiah HN, Ismail MN. Messages of the newly proposed malaysian dietary guidelines (MDG): do adults in kuala lumpur understand them ? Malaysian Journal of Nutrition. 2010; 16(1): 113–123.
6. Ministry of Health Malaysia. Malaysian Dietary Guidelines. Putrajaya: Ministry of Health Malaysia. Malaysia, MOH. 2010. [cited 2024 August 25]. Available from https://nutrition.moh.gov.my/wp-content/uploads/penerbitan/buku/Malaysia Dietary Guidelines 2010.pdf.
7. Oo SS, Aung MMT, Shetty CK, Ibrahim MS, Naing NN, Yusop YBM, et al. Association between knowledge, attitude, and practice about dietary fibre intake and type 2 diabetes among rural people in Terengganu, Malaysia. Malaysian Journal of Public Health Medicine. 2021; 21(2): 338–347. doi:10.37268/MJPHM/VOL.21/NO.2/ART.1039
8. Norimah AK, Safiah M, Jamal K, Siti Haslinda S, Zuhaida H, Rohida S, Fatimah S, Siti Norazlin N, Poh BK, Kandiah M, Zalilah MS, Wan Manan WM, Fatimah S, Azmi MY. Food consumption patterns: Findings from the Malaysian adult nutrition survey (MANS). Mal J Nutr. 2008; 14(1): 25-39.
9. Hannon BA, Thompson SV, Edwards CG, Skinner SK, Niemiro GM, Burd NA, Holscher HD, Teran-Garcia M & Khan NA. Dietary fibre is independently related to blood triglycerides among adults with overweight and obesity. Current Developments In Nutrition. 2018; 3, 1-7.
10. Alfawaz H, Khan N, Alhuthayli H, Wani K, Aljumah MA, Khattak MNK, Alghanim SA, & Al-Daghri NM. Awareness and knowledge regarding the consumption of dietary fibre and its relation to self-reported health status in an adult Arab population: A cross-sectional study. Int. J. Environ. Res. Public Health. 2020; 17, 1-18. https:// doi:10.3390/ijerph17124226
11. Lung WF, Yong KC, Nor Azam AR. Sociodemographic factors as determinants of fruit and vegetable consumption in malaysia. Jurnal Sains Kesihatan Malaysia. 2020; 18(2): 19–29. doi:10.17576/JSKM-2020-1802-03.
12. Mamat Ibrahim SFK, Ali A, Kamarudin KS, Ibrahim NH & Hasim AS. Habitual Dietary Fibre Intake and Lifestyle Characteristics in Relation to Functional Constipation Among Adults in Malaysia. Malaysian Applied Biology. 2022; 51(6), 47–55. https://doi.org/10.55230/mabjournal.v51i6.2391
13. Ng TKW, Jia YT, Low YO, Yeoh LZW, & Gan CL. Dietary fibre and total fluid intakes are inversely associated with risk of constipation in Malaysian adolescents, adults and the elderly. IeJSME.2016; 10(1). 17-23.
14. Naing NN. Sample size determination in experimental studies. in: a practical guide on determination of sample size in health science research. Kelantan, Malaysia: Pustaka Aman Press Sdn. Bhd; 2009.
15. Norlida MD, Nor Izati F, Lam KY, Ika Aida AM, Noor Fairuzi SY, Arnida HT, Hafeedza AR. Knowledge, attitude and practice regarding dietary fibre intake among Malaysian rural and urban adolescents. Malaysian Journal of Nutrition. 2018; 24(1): 77–88.
16. Wright KB .Researching internet-based populations: Advantages and disadvantages of online survey research, online questionnaire authoring software packages, and web survey services. Journal of Computer-Mediated Communication. 2005; 10(3): doi:10.1111/J.1083-6101.2005.TB00259.X/4614509.
17. Department of Statistics Malaysia. (2020). MyCensus 2020. Retrieved from [https://www.mycensus.gov.my/]
18. Djojosaputro, M., & Prihantini, N. N. The relationship between knowledge, attitude, and behavior of fibre food consumption with defection pattern. Asian Journal of Medicine and Health.2023; 21(10), 84-97.
19. Anvari Z. Cultural obstacles to changing social food taste of iranians; case study: to change the taste from traditional to bulky bread. Pertanika Journal of Social Sciences and Humanities. 2020; 28(1): 563–573
20. Barrett EM, Foster SI, Beck EJ. Whole grain and high-fibre grain foods: How do knowledge, perceptions and attitudes affect food choice? Appetite. 2020; 149: 104630. doi:10.1016/j.appet.2020.104630
21. Spronk I, Kullen C, Burdon C, O'Connor H. Relationship between nutrition knowledge and dietary intake. British Journal of Nutrition. 2014; 111(10): 1713–1726. doi:10.1017/S0007114514000087
22. Obayashi S, Bianchi LJ, Song WO. Reliability and validity of nutrition knowledge, social-psychological factors, and food label use scales from the 1995 diet and health knowledge survey. Journal of Nutrition Education and Behavior. 2003; 35(2): 83–92. doi:10.1016/S1499-4046(06)60044-4
23. Cooke R, Papadaki A. Nutrition label use mediates

the positive relationship between nutrition knowledge and attitudes towards healthy eating with dietary quality among university students in the UK. Appetite. 2014; 83: 297–303. doi:10.1016/j.appet.2014.08.039

24. Banwat M, Lar L, Daboer J, Audu S, Lassa S. Knowledge and intake of fruit and vegetables consumption among adults in an urban community in north central nigeria. Nigerian Health Journal. 2012; 12(1): 12–15.
25. Sajwani RA, Shoukat S, Raza R, Shiekh MM, Rashid Q, Siddique MS, et al. Knowledge and practice of healthy lifestyle and dietary habits in medical and non-medical students of Karachi, Pakistan. Journal of the Pakistan Medical Association. 2009; 59(9): 650–655.
26. Pelletier JE, Laska MN, Neumark-Sztainer D, Story M. Positive attitudes toward organic, local, and sustainable foods are associated with higher dietary quality among young adults. Journal of the Academy of Nutrition and Dietetics. 2013; 113(1): 127–132. doi:10.1016/j.jand.2012.08.021
27. Zhang G, Malik VS, Pan A, Kumar S, Holmes MD, Spiegelman D, et al. Substituting brown rice for white rice to lower diabetes risk: a focus-group study in chinese adults. Journal of the American Dietetic Association. 2010; 110(8): 1216–1221. doi:10.1016/j.jada.2010.05.004
28. Кьster-Boluda, I & Vidal-Capilla I. Consumer attitudes in the election of functional foods. Spanish Journal Of Marketing. 2017; 21(S1), 65-79. http://dx.doi.org/10.1016/j.sjme.2017.05.002
29. Burgess-Champoux T, Marquart L, Vickers Z, Reicks M. Perceptions of Children, Parents, and Teachers Regarding Whole-Grain Foods, and Implications for a School-Based Intervention. Journal of Nutrition Education and Behavior. 2006; 38(4): 230–237. doi:10.1016/j.jneb.2006.04.147
30. Cho SS, Qi L, Fahey GC, Klurfeld DM. Consumption of cereal fibre, mixtures of whole grains and bran, and whole grains and risk reduction in type 2 diabetes, obesity, and cardiovascular disease. American Journal of Clinical Nutrition. 2013; 98(2): 594–619. doi:10.3945/ajcn.113.067629