

The Association between Dietary Patterns and the Prevalence of Mental Health among University Students

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Received Date: 18 April 2023

Accepted Date: 12 May 2023

Revised Date: 18 July 2023

Published Date: 31 July 2023

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ABSTRACT

Certain dietary habits may have an impact on mental health. Many studies have shown that diet affects how the body regulates mood by influencing the release of neurotransmitters, but there are conflicting results when it comes to young adults. The aim of the present study is to determine dietary patterns and its relationship with mental health status in among university students. This study was conducted in the form of a cross-sectional analytical observation at UiTM Perlis. A total of 362 students provided the data using two types of questionnaires. The Food Frequency Questionnaire (FFQ) was used to assess dietary patterns, and the General Health Questionnaire (GHQ-12) was used to assess mental health status. Results showed a high prevalence of irregular dietary patterns and mental health status in the sample. The Spearman correlation test revealed that there was no association between dietary habits and mental health status. Results also indicated that 71.3% of the students had a score below four, implying good mental health. However, 28.7% of the students were classified as having poor mental health. Our study highlights the irregularities in food intake among university students, most of whom had inadequate intakes of the recommended amounts. Therefore, the higher institution should perform studies on interventions to cope with changing dietary habits among students. However, their mental health portrayed status of good condition. This could be due to other factors that contribute to the occurrence of mental illness, including physiological, psychological, and social factors. These findings can be used by institutions to promote proper nutrition for this study population.

Keywords: dietary intake, eating habits, eating patterns, mental illness

INTRODUCTION

As the identification of optimal dietary recommendations for the prevention of chronic diseases is currently a public health priority, studies on dietary habits are becoming increasingly important. Dietary patterns are defined as the fixed amount, proportion and variety of foods consumed and the resulting amount and proportion of nutrients in the habitual diet, including their multidimensional and dynamic characteristics (Reedy et al., 2018).

Food and nutrition are linked to oxidative stress, inflammation and brain plasticity, and development, all of which can have an impact on mental health. Previous studies on the link between diet and mental health have mostly focused on specific nutrients such as fatty acids, folate, vitamin B6, and vitamin B12 (Appleton et al., 2007; Murakami et al., 2010 & Sánchez et al., 2011). Because foods and nutrients are taken in combination, research on specific foods or nutrients to date can only provide a limited picture of the relationship between diet and mental health. According to Le Port et al. (2012), global research on dietary patterns has been promoted in recent years as a more thorough strategy than research on specific foods or minerals. It seems that there is a complicated relationship between dietary patterns and mental health in general, and this relationship may vary depending on the community studied. Our target group is therefore university students, most of whom do not live with their parents.

University students are more likely to self-select their diet depending on the cost of food and the availability of fast food. Their ignorance of nutritious food options could lead to resentment and affect eating patterns and nutritional status. A previous study by Halim et al. (2023) found that university students in the northern region of Malaysia consume unhealthy fast food more than once a day, which has a high prevalence. Another study by Moy et al. (2009) has shown that university students are not able to meet the daily requirement of vegetables and fruit. This current trend could increase the likelihood of irregular eating patterns.

Among conditions associated with mental health, depressive symptoms, and depression have been analysed in a few studies, but to our knowledge no study has yet been conducted to examine the influence of dietary patterns on a mental health, particularly among university students. With this in mind, and, given the lack of studies on the general mental health of young adults, we conducted a cross-sectional study to analyse the relationship between dietary patterns and mental health at UiTM Perlis. Thus, this study examines whether dietary patterns affect students' mental health' and to determine the prevalence of mental health status among university students.

LITERATURE REVIEW

Food and Mental Health Relationship

The link between dietary intake and mental health has attracted a lot of attention in recent years. Although it has not been conclusively proven that poor diet leads to mental illness, it has been suggested that a healthy diet may protect against it (Sarris et al., 2015). As being proven by Sánchez et al. (2013), the Mediterranean diet is associated with lower chance of depression. Eating fewer vegetables, fruits, meats, and grains increases the risk of developing a severe mental illness or dysthymia, as well as other anxiety disorders, compared to people who eat an abundant diet of convenience foods. Whatever the cause of a mood problem, what we eat affects how we feel. Due to stress or emotions, some people eat a lot at once, preferring high-fat meals to low-fat ones (Zellner et al., 2006). The function of nutrition in depression therapy has shown that the process of neurotransmitter production requires the nutrients found in whole grain products, eggs, yoghurt, beans, green leafy vegetables, and wheat (Popa et al., 2012).

Eating Patterns among University Students

Poor eating habits are the leading cause of health problems in the population and a problem for young adults entering university life who feel strained and time-consuming. Students are constantly pushed to make healthy eating choices as they transition from secondary school to university and with increasing freedom (Deliens et al., 2014). Some university students are exposed to unhealthy eating habits that contribute to weight gain and make independent dietary choices, sometimes based on the availability of fast food and ease of procurement. Brown et al. (2014)-conducted an experiment linking vending machine transactions on a university campus. They found that many students were more

concerned with convenience, taste, cost, and ease than nutrition when choosing food. Many students preferred to choose quick and tasty options, which were often offered by vending machines. There is evidence that there is a high proportion of physical inactivity, physical inactivity, and poor dietary habits, such as skipping meals, not eating enough snacks between meals, eating fast food, and not eating enough fruit and vegetables among university students (Thorpe et al., 2014). In addition, the growth of fast-food restaurants, convenience stores, vending machines, and shopping malls has created an alarming environment that tempts young adults into harmful eating habits.

MATERIALS AND METHOD

Respondents and Research Design

A total of 362 UiTM Perlis students (aged 20-22 years) from six faculties participated in this survey. The sample size was calculated from based on the population of students at UiTM, Perlis, using the table of (developed by Krejcie & Morgan, Morgan (1970). The study participants were selected using the simple random sampling method. A consent form, simple instructions and a questionnaire were distributed. They had filled in three sets of questionnaires. The current cross-sectional study was conducted from May to July 2021 which occurred during pandemic season. The survey was conducted through an online platform that could be accessed from any device with an internet connection. The Google form was used to collect the information for this survey. The link to the form was distributed through an institutional group and private social media such as WhatsApp and Telegram.

Ethical Approval

The UiTM Research Ethics Committee had approved this study, and all participants were provided with written informed consent. (REC/03/2021 (UG/MR/173).

Instrumentation

The online questionnaire consisted of three sections: the respondents' demographic profile, the food frequency questionnaire (FFQ) and a 12-item version of the General Health Questionnaire (GHQ-12) (Goldberg et al., 1997). The FFQ used in this study is known as the semi-quantitative short-form FFQ. A 79-item short form FFQ was adapted from a previously validated 203-item long form FFQ from the 2014 National Health and Morbidity Survey: Malaysian Adult Nutrition Survey (IPH, 2014). All the questions provided were collected by the researcher to calculate the result. The result was calculated using Nutritionist Pro. Version 5.4. The GHQ-12 included 12 questions to identify and assess indicators of psychological distress and general functioning. Each item on the scale had four responses, from "better than usual" to "much less than usual" The GHQ scoring strategy (0-0-1-1) was chosen for this observation. The scores were summed up by placing everything on a scale from 0 to 12. Due to the variation in GHQ-12 rank scores, the GHQ score for the test was suggested as a rough guide to the best cut-off point. Therefore, based on the mean GHQ score for this test, the cut-off points of 4 was used to determine the respondents' level of psychological well-being. A score below four indicated good mental health, while a score above four indicated good mental health.

Data Analysis

Data were analysed using SPSS v.25 (IBM Corp., Chicago, IL, USA). The frequency and percentage (%) were used to present the descriptive statistics of the subjects' characteristics. Based on the Table 1, here, S (the Kolmogorov-Smirnov test statistic) is 0.95 (total score FFQ) and .167 (total score GHQ), Sig is .0001 for both scores, suggesting that the distribution for FFQ and GHQ score has been violated. Therefore, the hypothesis was tested with the Spearman correlation test.

Table 1. Test of Normality

	Kolmogorov-Smirnov		
	Statistic	df	Sig.
Total score FFQ	.095	362	.0001
Total score GHQ	.167	362	.0001

RESULT

Dietary Intake Patterns and mental health conditions

Table 2, Table 3, and Table 5 show that the highest frequency (percentage) of consumption of grains-based food, meat, fish and seafood patterns, and vegetables is 1 to 2 times per week. Meanwhile, Table 4 and Table 6 show that the highest frequency of consumption (percentage) on egg products and spices is equal or more than 3 times per week. As displayed in Table 7, the highest intake (percentage) of fruit is less than 1 time per week.

In addition, the lowest percentage of frequency of consumption for grains-based food (Table 2), meat, fish, and seafood patterns (Table 3), vegetables and cooking method (Table 5), and fruits (Table 7) is recorded equal or more than 3 times per week. For spices and egg products, the lowest percentage is 1 to 2 times per week.

Findings in Table 2 to Table 5, and Table 7 show that there is no significant correlation between consumption of grains-based food, meat, fish, and seafood patterns, egg products, vegetables, and fruits towards mental health status. However, Table 6 shows a significant correlation between dietary patterns related to spices and mental health ($p=.001$). This suggests that the more frequent spices are consumed, a student is more likely to portray a good mental health status.

Table 2. The distribution of grains-based food patterns and mental health conditions among university students in UiTM Perlis.¹

Dietary pattern	N ²	%	Mental health				P ³
			Good	%	Poor	%	
Less than 1 time per week	136	37.6	98	37.9	38	36.9	0.623
1-2 times per week	165	45.6	121	46.7	44	42.7	
≥3 times per week	61	16.9	40	15.5	21	20.4	

¹In percentage

²Normal (without mental health conditions)

³Result of the Spearman correlation test

Table 3. The distribution of meat, fish and seafood patterns and mental health conditions among university students in UiTM Perlis.¹

Dietary pattern	N ²	%	Mental health				P ³
			Good	%	Poor	%	
Less than 1 time per week	136	37.6	99	38.3	37	36	0.861
1-2 times per week	181	50.0	128	49.4	53	51.5	
≥3 times per week	45	12.4	32	12.4	13	12.6	

¹In percentage

²Normal (without mental health conditions)

³Result of the Spearman correlation test

Table 4. The distribution of eggs products and mental health conditions among university students in UiTM Perlis.¹

Dietary pattern	N ²	%	Mental health				P ³
			Good	%	Poor	%	
Less than 1 time per week	86	23.7	63	24.4	23	22.4	0.158
1-2 times per week	84	23.2	65	25.1	19	18.4	
≥3 times per week	192	53	131	50.5	61	59.2	

¹In percentage

²Normal (without mental health conditions)

³Result of the Spearman correlation test

Table 5. The distribution of vegetables and cooking methods and mental health conditions among university students in UiTM Perlis.¹

Dietary pattern	N ²	%	Mental health				P ³
			Good	%	Poor	%	
Less than 1 time per week	132	36.5	98	37.8	34	32.9	0.417
1-2 times per week	160	44.2	114	44.0	46	44.7	
≥3 times per week	70	19.3	47	18.1	23	22.3	

¹In percentage

²Normal (without mental health conditions)

³Result of the Spearman correlation test

Table 6. The distribution of spices and mental health conditions among university students in UiTM Perlis.¹

Dietary pattern	N ²	%	Mental health				P ³
			Good	%	Poor	%	
Less than 1 time per week	89	24.6	71	27.5	18	17.4	0.001*
1-2 times per week	69	19.1	56	21.6	13	12.6	
≥3 times per week	204	56.3	132	50.9	72	69.9	

* Correlation is significant at the 0.01 level (2-tailed).

¹In percentage

²Normal (without mental health conditions)

³Result of the Spearman correlation test

Table 7. The distribution of fruits and mental health conditions among university students in UiTM Perlis.¹

Dietary pattern	N ²	%	Mental health				P ³
			Good	%	Poor	%	
Less than 1 time per week	283	78.2	196	75.7	87	84.5	0.903
1-2 times per week	50	13.8	39	15.1	11	10.7	
≥3 times per week	29	8.0	24	9.3	5	4.9	

¹In percentage

²Normal (without mental health conditions)

³Result of the Spearman correlation test

Prevalence of mental health

Figure 1 shows the prevalence of mental health status among university students at UiTM Perlis. Good mental health was indicated by a GHQ score below four (4) reported by 261 (71.3%). Meanwhile, 105 (28.7%) of the students indicated that they had poor mental health.

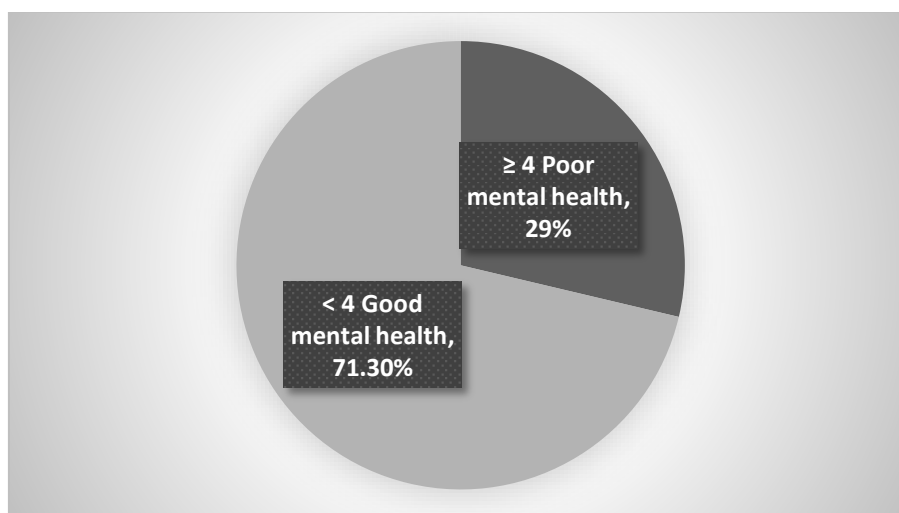


Figure 1: Prevalence of mental health condition among university students in UiTM Perlis

Discussion

This study was conducted during the Open Distance Learning (ODL) period from May to July 2021. The present study shows that the prevalence of mental health among UiTM Perlis students was good (71.3%). A similar result by Bolatov et al (2020) showed that the mental health status of medical students in Kazakhstan improved during online learning. Most students showed good mental health because they lived with their parents.

The prevalence of irregular eating habits among university students may be caused by psychosocial factors such as peer pressure, poor diet, advertising, and body image. These factors could lead to reduced consumption of grain-based foods, seafood, egg products, vegetables, and fruits to about 1 or 2 times a week. This eating pattern indicates irregular eating habits as students do not adhere to this diet more than 3 times a week.

From this study, it was identified that dietary patterns are not associated with mental health. This finding is consistent with findings of Winpenny et al. (2018) conducted among adolescents in the UK. However, previous studies by Kim et al. (2015) and Khayyatzadeh et al. (2019) showed that a healthy diet was associated with a lower likelihood of mental illness. The existence of contradictory results may be caused by the application of the biopsychosocial (BPS) concept in the development of mental illness.

The concept of BPS in relation to mental health states that mental health is the result of an interaction between biological, psychological, and social factors (Babalola et al., 2017). Among the biological factors associated with the occurrence of depression is a person's dietary behaviour. Eating behaviour plays an important role in the formation of neurotransmitters in the brain. A lack of neurotransmitters in the brain can lead to mood disorders (Owen & Corfe, 2017). Neurotransmitters that play an important role in the occurrence of depression are serotonin, dopamine, noradrenaline, and GABA (Rao et al., 2008). However, the biological factor does not have a significant effect on the occurrence of depression unless it is combined with social and psychological factors. Psychosocial factors that play an important role in the occurrence of depression in adolescents include peer pressure, adjustment pressure, social media, family, and socioeconomic conditions.

The current study found no association between consumption of grain-based foods and mental health. Theoretically, the consumption of staple foods rich in carbohydrates plays a role in the release

of insulin into the bloodstream. Insulin promotes the uptake and distribution of tryptophan in the brain, which is then converted into serotonin (Rao et al., 2008). It is known that a tryptophan deficiency can cause mood disorders, but only in people who already suffer from depression (Cowen & Browning, 2015).

Also revealed was no correlation existed between egg products, meat, fish and seafood consumption and mental health. This finding is consistent with the earlier study by Winpenny et al. (2018), which found that consumption of protein groups had no significant association with the incidence of mental illness. Proteins are made up of amino acids, precursors to neurotransmitters in the brain. Theoretically, protein deficiency increases the risk of depression, but only in people with a history of depression or a family history of depression (Ruhe et al., 2007).

Another result of this study shows that there was no correlation between the consumption of fruit and vegetables with mental health status. An adequate intake of fruit and vegetables is important to meet the body's needs for antioxidants and micronutrients. It has been shown that a deficiency in micronutrients, such as iron, increases the likelihood of mental illness (Bourre, 2006). However, this also depends on the type of fruit and vegetables consumed.

Apparently, there was one food group that showed a significant correlation with mental health, namely the consumption of spices. Research over the last decade has shown that the bioactive constituents of spices have a wide range of health benefits. There is ample evidence that spices contain components that are antioxidant, anti-inflammatory, antitumorogenic, anticarcinogenic, and glucose and cholesterol lowering, as well as properties that affect cognition and mood (Jiang, 2019). An example of a spice is black pepper, which can have an antidepressant effect and has a cognition-enhancing effect via the regulation of neurotransmitter metabolism (Li et al., 2007).

Limitations should be considered when evaluating the results. It should be noted that all data used in the current study were collected through self-administered questionnaires, which could lead to misdiagnosis of participants. The Food Frequency Questionnaire (FFQ) used in our study is based on the frequency of food and food groups consumed rather than values; therefore, this questionnaire does not provide information and statistics on nutrient and energy intake values. Finally, a positive student effect may be responsible for some of the associations found in this study.

CONCLUSION

This study highlighted that there is no association between dietary patterns and the prevalence of mental health conditions in university students. One possible reason for the occurrence of mental illness may be the application of the bio-psycho-social concept. 261 students were found to have poor mental health. For many students, mental health and substance use problems may persist, be inadequate, or occur for the first time despite receiving inadequate or no treatment. The results of this study will be useful to dietitians or nutritionists for several reasons. Although no correlation was found, the irregular eating patterns of students are something that should be addressed. These findings can be used for institutions to promote proper nutrition for this study population. For further research, it is recommended to increase the homogeneity of the sample to obtain a more representative result. For example, by selecting samples based on a certain age group, body weight or the same regular activities. University programme development should focus on how to provide students with the knowledge and resources they need to cope with good mental health and thus reduce the potential negative impact on mental well-being. It is advised that future research examines the effects of food pattern changes on college students' mental health.

ACKNOWLEDGEMENTS

The authors would like to thank the university students of UiTM Perlis who have participated in this study.

FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

AUTHORS' CONTRIBUTION

Afiqah, S. designed, planned, and conducted the data collection. Jamaludin, M. carried out the data processing and took the lead in writing the manuscript. Ismail, Z. contributed to the interpretation of the results. Dzulkarnain, A. provided critical feedback. Rosli, N. M. and Mansor, S. H. helped shape the research, analysis, and manuscript.

CONFLICT OF INTEREST DECLARATION

We certify that the article is the Authors' and Co-Authors' original work. The article has not received prior publication and is not under consideration for publication elsewhere. This research/manuscript has not been submitted for publication nor has it been published in whole or in part elsewhere. We testify to the fact that all Authors have contributed significantly to the work, validity and legitimacy of the data and its interpretation for submission to Jurnal Intelek.

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