DIET QUALITY BASED ON HEALTHY EATING INDEX FOR MALAYSIANS (M-HEI) AMONG IIUM KUANTAN STUDENTS

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ABSTRACT

Introduction: Previous studies showed that there has been an increasing number of university students who experience malnutrition. This situation is worrying as they may develop nutritional problems and be risky to get non-communicable diseases in the future. Thus, this cross-sectional study aimed to assess the diet quality and its association with nutrition knowledge among health sciences and non-health sciences students at the International Islamic University Malaysia (IIUM) Kuantan Campus. **Methods:** A total of 180 students from health sciences and non-health sciences programs was conveniently recruited into this study. They were requested to complete a questionnaire which consisted of sections on the Healthy Eating Index for Malaysians (M-HEI) and nutrition knowledge. The MHEI contains nine food groups, each has a score ranging from 0 to 10. The total score was divided by the maximum score and changed to a percentage value. The score which is less than 51% indicates poor diet quality, 51 % until 80% shows moderate diet quality and more than 80% indicate a good diet quality. The nutrition knowledge section contained questions with True/False/Do Not Know answer options. Statements answered correctly were given a score of one whereas statements answered incorrectly or with the 'Do Not Know' option were scored as zero. **Results:** The diet quality of the health sciences students was higher than the non-health sciences students (mean±SD M-HEI scores 56.9±10.2 vs 51.7±9.2, p=0.025). Their nutrition knowledge mean score was also higher than their non-health sciences counterparts (19.9±3.8 vs 17.3±4.2, p<0.001). In addition, the nutrition knowledge score was found to be positively correlated with the M-HEI score (p=0.035). **Conclusion:** The health sciences students have better nutrition knowledge, and this may contribute to better diet quality than their non-health sciences counterparts.

KEYWORDS: Diet quality, Nutrition knowledge, M-HEI

INTRODUCTION

Studies have shown that university students often experience poor eating habits which reduce their diet quality. According to Angeliki et al. (2007), poor eating habits are developed when students live away from their homes as they tend to neglect their nutritional requirements. This transition causes changes in students' dietary habits and they tend to consume an unhealthy intake of foods (Wengreen & Moncur, 2009). Other than that, due to stress and lack of time during university life, the unhealthy intake of food is more preferred by the students. They also are vulnerable to meal skipping which fails to meet the dietary requirements. Thus, all these factors act as barriers to the healthy behaviour of students in consuming a high-quality diet (Ganasegeran et al., 2012).

Research conducted by Hakim, Muniandy and Ajau (2012) at several universities in Selangor such as Universiti Teknologi MARA (UiTM), Universiti Putra Malaysia (UPM), University of Selangor (UNISEL), and Management and Science University (MSU), aimed to examine the nutritional status and eating practices among students. A total of 200 students participated in this study. Through this research, they found that university students were lacking in their diet quality because of the inadequacy of energy intake. This situation leads to a poor diet with insufficient essential nutrients.

The Malaysian Healthy Eating Index (M-HEI) is a tool to examine the diet quality of an individual which was developed by Lee, Norimah and Safiah (2011). Designed to measure the summary of overall diet quality, it is scored based on an individual's compliance with the recommended serving size and nutrient intake in the Malaysian Dietary Guidelines (National Coordinating Committee of Food and Nutrition, 2010) and Malaysian Food Pyramid. The M-HEI consists of nine components of food groups which include seven food groups (grains and cereals, vegetables, fruits, meat, poultry and eggs, fish and seafood, legumes, and milk and dairy products) and two nutrients (fat and sodium).

Dietary intake among people is associated with their nutrition knowledge. This knowledge is among the vital element in contributing to well-being and better quality of life. Research showed that nutrition knowledge is parallel with the dietary behaviour of students (Kreji, Jovanovic, Zezel, Ivezicj & Cvinajovic, 2002). This suggests that with nutrition knowledge, university students are encouraged to consume healthy food and meet nutritional requirements. It is supported by research conducted by Wardle, Parmenter and Waller (2002) that claimed individuals who were knowledgeable regarding nutrition were 25 times more likely to consume adequate amounts of fruits and vegetables daily compared to those who have lesser nutritional knowledge.

An unhealthy dietary intake might affect diet quality, and this may be influenced by nutrition knowledge. Worsley (2002) stated the more knowledgeable the people, the closer they consume food according to the recommended daily value, compared to those who are less knowledgeable. However, the diet quality based on the MHE-I and nutrition knowledge among the students of IIUM Kuantan Campus were yet to be assessed and hence the current study.

METHODS

Study Design

A cross-sectional study design was used for this study. The design of the study can be carried out at one time at a point or over a short period. The locations for this research were at the faculties (Allied Health Sciences, Medicine, Nursing, Dentistry, Pharmacy and Sciences) as well as at the students' university residences (*Mahallah* of Fatimah Az-Zahra, Ummu Kalthum, and Khalid Al-Walid) in the International Islamic University Malaysia (IIUM) Kuantan Campus.The source of population for this study was the students from health sciences which are from Kulliyyah of Allied Health Sciences, Medicine, Nursing, Dentistry and Pharmacy while non-health sciences students are from Kulliyyah of Sciences regardless of gender, races, or socio-demographics status. In this study, convenience sampling was used to recruit participants. Before conducting this research, ethical approval from the Kulliyyah Postgraduate and Research Committee was obtained. Respondents were requested to complete the consent form filling in the questionnaires. A total of 180 subjects were selected to participate in this study according to their academic programs (health sciences and non-health sciences), regardless of gender. The self-administered hardcopy questionnaires were distributed to the participants from health sciences and non-health sciences' students in IIUM Kuantan. The sections in the questionnaire comprised of:

a) Socio-demographics
   The information consisted of age, gender, courses, department, self-reported weight and height, marital status, educational level, and monthly income.

b) Healthy Eating Index for Malaysians (M-HEI)
   The diet quality of respondents was assessed using the M-HEI which has been validated among university students (Waqia, Rosita & Huzwah, 2016). The score of the M-HEI is based on an individual's compliance with the recommended serving size and nutrient intake in the MDG and Malaysian Food Pyramid. Each of the nine components has a score ranging from 0 to 10. The total score is divided by the maximum score of 90 and converted to percentage. A score of < 51%

indicates poor diet quality, 51 - 80% shows moderate diet quality, and > 80% indicates a good diet quality (Pei et al., 2018).

c) Nutrition Knowledge

Participants responded to the question by answering True / False / Do Not Know. The scores were calculated by summing the number of correct responses. Statements answered correctly were given a score of one, while statements answered incorrectly or 'Do not know' were scored zero.

Statistical Analysis

The socio-demographic data were analyzed using descriptive analysis. The Fisher Exact test was used to compare the M-HEI scores between health and non-health sciences' students in IIUM Kuantan. In addition, the Pearson Correlation was used to assess the association between nutritional knowledge and diet quality of the respondents. The data were analyzed using SPSS software.

RESULTS

Demographic Information

The Table 1 shows the demographic data of the respondents. A total of 180 students from Year 1 until Year 4 participated in this study. Of the total students, 90 respondents were from health sciences programs. This included students from Faculties of Medicine, Pharmacy, Allied Health Sciences, Dentistry, and Nursing. The other 90 respondents were from the non-health sciences program (Faculty of Science). There were 50 males (27.8%) and 130 females (72.2%) involved and they aged between 19 and 25 years. Most of the respondents had a normal body mass index (BMI). This included 62 (34.4%) students from health sciences while 65 (36.1%) students from non-health sciences courses. All respondents were single and most of them were staying on campus (98.3%). Regarding the source of income of the respondents, most of them were getting the financial allowance from their parents or scholarship. The range of money per month commonly received by the students was RM201 to RM400. Of the total students, 83 (46.1%) spent about RM150 to RM250 on food (Table 1).

Table 1. Demographics data of the study participants (n=180)

Demographics	Health Sciences % (n= 90)	Non-health Sciences n= 90	Total % (n= 180)
Age (years)			
19	0.6 % (1)	0.6 % (1)	1.1 % (2)
20	4.4 % (8)	11.7 % (21)	16.1 % (29)
21	6.7 % (12)	13.3 % (24)	20 % (36)
22	22.2 % (40)	14.4 % (26)	36.7 % (66)
23	14.4 % (26)	8.9 % (16)	23.3 % (42)
24	1.1 (2)	0.6 % (1)	1.7 % (3)
25	0.6 % (1)	0.6 % (1)	1.1 % (2)
Gender			
Male	11.7 % (21)	16.1 % (29)	27.8 % (50)
Female	38.3 % (69)	33.9 % (61)	72.2 % (130)
BMI Category			
Underweight	6.7% (12)	6.1% (11)	12.8% (23)
Normal	34.4% (62)	36.1% (65)	70.6% (127)
Overweight	7.8% (14)	5.0% (9)	12.8% (23)
Obese class 1	1.1% (2)	2.2% (4)	3.3% (6)
Obese class 2	0% (0)	0.6% (1)	0.6% (1)
Educational level			
1st year	5.6% (10)	14.4% (26)	20.0% (36)
2nd year	16.7% (30)	15.6% (28)	32.2% (58)
3rd year	26.1% (47)	20.0% (36)	46.1% (83)
4th year	1.7% (3)	0% (0)	1.7% (3)
Marital status			
Single	50 % (90)	50 % (90)	100% (180)
Married	0 % (0)	0% (0)	0% (0)
Living situation			
On-campus	48.9% (88)	49.4% (89)	98.3% (177)
Off-campus	1.1% (2)	0.6% (1)	1.7% (3)
Financial source			
Working	0.6% (1)	0.6% (1)	1.1% (2)
Parents	21.1% (38)	22.2% (40)	43.3% (78)
Scholarship/sponsorship	20.6% (37)	25.6% (46)	46.1% (83)
Others	7.8% (14)	1.7% (3)	9.4% (17)
Amount of financial source per month			
Less or equal to RM200	5.0% (9)	8.9% (16)	13.9% (25)
RM201-400	27.8% (50)	30.0% (54)	57.8% (104)
RM401-800	13.9% (25)	8.3% (15)	22.2% (40)
>RM800	3.3% (6)	2.8% (5)	6.1% (11)
Money spent for food per month			
<RM150	5.0% (9)	10.6% (19)	15.6% (28)
RM150-250	23.9% (43)	22.2% (40)	46.1% (83)
RM251-350	12.8% (23)	15.6% (28)	28.3% (51)
>RM350	8.3% (15)	1.7% (3)	10.0% (18)

Diet Quality using M-HEI

According to Table 2, 21 (23.3%) of the health sciences students were having low diet quality. In addition, the other 65 (72.2%) and 4 (4.4%) students from this program had moderate and good diet quality, respectively. On the other hand, 33 (36.7%) of the non-health sciences students were categorized as having poor diet quality, 57 (63.3%) had moderate diet quality while none had good diet quality. Therefore, about two-thirds (n=122) of the students from both fields were considered as having moderate diet quality.

Table 2. Diet quality of health sciences and non-health sciences' students (n= 180)

Diet quality category	Programs		Total Number (%)
	Health sciences Number (%)	Non-health science Number (%)	
Poor diet quality (<51%) Frequency (% within course)	21 (23.3)	33 (36.7)	54 (30)
Moderate diet quality (51-80 %) Frequency (% within course)	65 (72.2)	57 (63.3)	122 (67.8)
Good diet quality (>81 %) Frequency (% within course)	4 (4.4)	0 (0.0)	4 (2.2)
Total Frequency (% within course)	90 (100)	90 (100)	180 (100

The health sciences students' mean M-HEI score (56.9 ± 10.1) was significantly (P<0.05) higher than the mean M-HEI score of the non-health sciences students (51.7 ± 9.2). Thus, it showed that the diet quality of the students from the health sciences programs was better than their non-health sciences colleagues.

Nutrition knowledge

The results indicate that the mean nutrition knowledge score of the health sciences students (19.9 ± 3.8) was significantly (p<0.001) higher than the non-health sciences students (17.3 ± 4.2).

Association between M-HEI Scores and Nutrition Knowledge Scores

As demonstrated in Figure 1, there was a positive, fair correlation (r= 0.292, n = 180, p = 0.035) between the nutrition knowledge scores and M-HEI scores. Therefore, it could be interpreted that with better nutrition knowledge, diet quality improves.
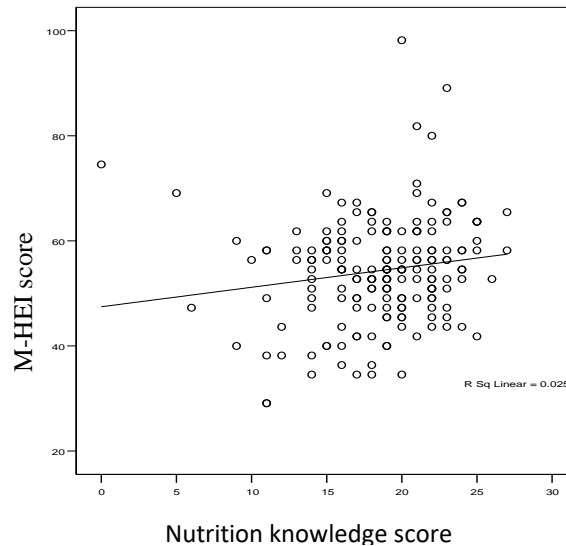

Figure 1. Correlation between the MHE-I and nutrition knowledge scores of health sciences and non-health sciences students (n=180).

DISCUSSION

As stated by the World Health Organization (WHO, 2015), a healthy diet intake is very important for human life as it prevents people from developing malnutrition and other chronic non-communicable diseases such as diabetes, hypertension, and heart diseases. Therefore, the Ministry of Health (MOH) Malaysia has published the MFP to guide people to take a variety of food according to food serving recommendations. Other than that, MOH also introduced the MDG in 2010 that aims to promote healthy eating and active lifestyle among Malaysians. The key messages developed by experts in nutrition and public health promote Malaysians to take healthy and better-quality food, consume fewer calories, and make wiser food choices.

In the current study, the health sciences students significantly scoring better in diet quality and nutrition knowledge than their non-health sciences counterparts. However, on average, most students were categorized as having moderate diet quality. This indicated that even though the health sciences students may have better knowledge of nutrition, this did not translate into a much better diet quality. Students'

poor and moderate diet quality could be attributed to environment factor likes affordability and availability of meals in colleges (Yahia et. al., 2008). Plus, El-Kassas and Ziade (2016) mentioned in their study that individual factors such as self-discipline, time and convenience, prices of food products, and also dietary knowledge were among the concerns that affect the diet quality of the students. This is also in line with research conducted by Al-Qahtani (2016) that found medical students who were living on university residences were practising poor dietary habits and lifestyle. On the other hand, medical students who were living at home with their parents were found to have more positive dietary habits (El-Mouzan, 2010).

Additionally, the adequacy of food intake and healthy food choices ensure that the students meet the dietary requirement for growth and health maintenance. The findings of the current study indicated that the students did not meet the daily requirement for fruits and vegetables as proposed in the MDG. Similarly, a study conducted by Racette et. al. (2005) found that most college students did not adhere to nutritional guidelines. They were reported to be consuming fewer fruits and vegetables while taking a higher amount of high-fat and high-calorie foods daily. Furthermore, the students' intake of legume and its products was the lowest in the current study. This was supported by Ansari, Stock and Mikolajczyk (2012) that the living situation of the students affects their eating habits. They found that students who moved out of the house had a low intake of nuts, seeds, and legumes. Thus, the lower intake of legumes and its products among the respondents in the current study was due to most of them were living on-campus.

In the current study, the nutrition knowledge score was positively correlated with the diet quality score of the students. This is in line with other studies that demonstrated the association between nutrition knowledge and diet quality. Asakura, Todoriki and Sasaki (2017) found that healthy dietary intake which resulted in better diet quality of the children was associated with the nutrition knowledge of the guardians. Students who have completed nutrition courses were also found to have a better understanding of basic nutrition principles and diet quality compared to those who have not (Nani, 2016). Furthermore, individuals with basic nutrition knowledge were found to apply what they have learnt when in come to the selection of food (Read & Schlenker, 1993). In contrast with current research, another study revealed that there was a negative correlation between eating habits and knowledge in consuming processed food (Abraham, Noriega & Shin, 2018). This finding discovered that despite students' knowledge about the negative effect of the processed food on health, they still consumed the food on daily basis. Thus, a high level of knowledge does not necessarily mean a healthy intake of food.

CONCLUSION

This study indicated that the health sciences were reported to have significantly better nutrition knowledge and diet quality than the non-health sciences group. However, most of the students (regardless of program) were categorized as having a moderate diet quality. Thus, among the recommendation that can be done to improve this among the students in IIUM Kuantan is to discover and investigate the factors that affect their dietary intake. Thus, further actions can be taken by educating and giving awareness to the students about healthy eating. These may help guide the students' eating habits and promote overall health.

REFERENCES

Abraham, S., Noriega, B., R. & Shin, J., Y. (2018). College Students Eating Habits and Knowledge of Nutritional Requirements. J Nutr Hum Health, 2(1), 13-17.

Al-Qahtani, M.H. (2016). Dietary Habits of Saudi Medical Students at University of Dammam. International Journal of Health Sciences, 10(3), 353–362.

Ansari, W., Stock, E., Mikolajczyk, R. (2012). Relationships between Food Consumption and Living Arrangements among University Students in Four European Countries: A Cross-Sectional Study. Nutr J., 11(28), 1-7. doi: 10.1186/1475-2891-11-28.

Asakura, K., Todoriki, H., & Sasaki, S. (2017). Relationship between Nutrition Knowledge and Dietary Intake among Primary School Children in Japan: Combined Effect of Children's and Their Guardians' Knowledge. Journal of epidemiology, 27(10), 483–491. doi:10.1016/j.je.2016.09.014

El-Kassas, G., & Ziade, F. (2016). Exploration of the Dietary and Lifestyle Behaviors and Weight Status and Their Self-Perceptions among Health Sciences University Students in North Lebanon. BioMed Research International. doi:10.1155/2016/9762396.

El-Mouzan, M., I., Al-Salloum, A. A., Al-Herbish, A. S., Qurachi, M. M., Al-Omar, A. A. (2010). Effects of Education of the Head of The Household on the Prevalence of Malnutrition in Children. Saudi Med Journal, 31(3), 304–307.

Lee, T. T, Norimah, A. K. & Safiah, M., Y. (2011). Development of Healthy Eating Index for Malaysian Adults. Proceedings of 26th Scientific Conference of the Nutrition Society of Malaysia; 2011 March 24-25; Kuala Lumpur, Malaysia. Selangor: Nutrition Society of Malaysia. p. 101-2.

Nani, M. (2016). Relationship between Nutrition Knowledge and Food Intake of College Students. Retrieved on September 17th, 2018 from from https://etd.ohiolink.edu/

National Coordinating Committee of Food and Nutrition (2010). Malaysian Dietary Guidelines. Ministry of Health Malaysia, Kuala Lumpur.

Pei, C., S., Appannah, G., Sulaiman, N. (2018). Household Food Insecurity, Diet Quality and Weight Status Among Indigenous Women (Mah Meri) In Peninsular Malaysia. Nutr Res Pract. 12(2), 135-142. doi: 10.4162/nrp.2018.12.2.135

Racette, S. B., Deusinger, S. S., Strube, M. J., Highstein, G. R., & Deusinger, R. H. (2005). Weight Changes, Exercise, and Dietary Patterns During Freshman and Sophomore Years of College. Journal of American College Health, 53, 245–251. doi: 10.3200/JACH.53.6.245-251

Read, M., & Schlenker, E. (1993). Food Selection Patterns Among the Aged. Nutrition in Aging. 2nd Ed.Mosby Inc: St.Louis, MO, 10(4), 45-53.

Waqia B. F, Rosita J., Huzwah K. (2016). Development and Assessment of the Reliability and Validity of a Diet Quality Index in a Sample of Malaysian University Students. Journal of Food and Nutrition Research. Vol. 4, No. 4, pp 251-257.

Wardle, J., Parmenter, K. & Waller, J. (2000). Nutrition Knowledge and Food Intake. Appetite, 34(3), 269–275. doi:10.1006/appe.1999.0311

Wengreen, H. J. & Moncur, C. (2009). Change in Diet, Physical Activity, and Body Weight Among Young-Adults During the Transition from High School to College. Nutr J, 8(32). doi:10.1186/1475-2891-8-32

World Health Organization (2015). Healthy Diet. Retrieved on September 17th, 2018 from http://www.who.int/news-room/fact-sheets/detail/healthy-diet

Worsley, A. (2002). Nutrition Knowledge and Food Consumption: Can Nutrition Knowledge Change Food Behaviour? Asia Pacific Journal of Clinical Nutrition, 11(3), 579-585.

Yahia, N., Achkar, A., Abdallah, A., & Rizk, S. (2008). Eating Habits and Obesity among Lebanese University Students. Nutrition Journal, 7(32), 1. doi: 10.1186/1475-2891-7-32.