

**PJN**

ISSN 1680-5194

PAKISTAN JOURNAL OF  
**NUTRITION**

**ANSI***net*

308 Lasani Town, Sargodha Road, Faisalabad - Pakistan  
Mob: +92 300 3008585, Fax: +92 41 8815544  
E-mail: [editorpjn@gmail.com](mailto:editorpjn@gmail.com)

## Knowledge, Attitude and Practice of Healthy Eating and Associated Factors among University Students in Selangor, Malaysia

Mohd Rohaizat Hassan<sup>1</sup>, Hasanain Faisal Ghazi<sup>1</sup>, Nur Syazana Umar<sup>1</sup>, Norzaleha Masri<sup>1</sup>, Sameeha Mohd Jamil<sup>2</sup>, Zaleha Md. Isa<sup>1</sup> and Nazarudin Safian<sup>1</sup>

<sup>1</sup>Department of Community Health, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Cheras, Malaysia

<sup>2</sup>School of Healthcare Sciences, Faculty of Health Sciences, Universiti Kebangsaan Malaysia, Kuala Lumpur Campus, Kuala Lumpur, Malaysia

**Abstract:** Healthy eating is one of the ways of disease prevention around the world. The aim of this study was to determine the level of knowledge, attitude and practice of healthy eating and their associated factors among university students in the state of Selangor, Malaysia. A cross sectional study was carried out from May 2012 until February 2013 in one public university and two selected private universities in Hulu Langat District, Selangor. A total of 300 diploma and degree students aged 18 to 25 years old were selected using simple random sampling. Anthropometric measurement and self-administered questionnaire adopted from the Ministry of Health, Malaysia were used as the study tools. The prevalence of good knowledge was 74.0%, good attitude was 80.3%, but good practice was only 22.0%. The factors associated with good knowledge were female gender (POR = 0.42, CI 0.25; 0.70), degree study level (POR = 2.42, CI 1.30; 4.51) and awareness on the Malaysian Dietary Guideline (MDG) (POR = 2.02, CI 1.17; 3.49). Factors associated with good attitude were respondents' place of living in hostel (POR = 0.37, CI 0.17; 0.81), awareness on MDG (POR = 1.94, CI 1.06; 3.58) and awareness on Malaysian Food Pyramid (POR= 3.45, CI 1.49; 7.98). Meanwhile, the only factor associated with good practice was low family income ( $p < 0.05$ ). In conclusion, there was a good level of knowledge and attitude of healthy eating among university students in Malaysia, but not in the practice of healthy eating. Further strategies are needed to increase the practice of healthy eating especially among the students of high and middle income family.

**Key words:** Knowledge, attitude, practice, healthy eating, university student, Selangor, Malaysia

### INTRODUCTION

Healthy eating is one of the ways of disease prevention especially related to non-communicable diseases (NCDs) such as ischemic heart disease, cerebrovascular disease, type II diabetes and certain types of cancer (WHO, 2006; Baez *et al.*, 2015; Triches and Giugliani, 2005). The global burden of NCDs is not only affecting the developed countries, but also showing an increasing trend in developing countries (WHO, 2003; Boutayeb, 2005). In May 2004, the World Health Organization (WHO) has adopted the "Global Strategy on Diet, Physical Activity and Health" by improving the two major factors which are diet and physical activity. Dietary recommendation from this strategy is to achieve energy balance and a healthy body weight, limit energy intake from total fat, shift fat consumption from saturated fat to unsaturated fat, eliminate trans-fatty acids, increase consumption of fruits and vegetables, legumes, whole grains and nuts, limit the intake of free sugars, limit salt (sodium) consumption from all sources and ensure that salt is iodized (WHO, 2006).

There were many studies focusing on university students as the target group. As university students, they are expected to have a sufficient or good knowledge regarding healthy eating as they are able to gain knowledge from multiple sources such as from university, books, internet and etc. Colleague sportsmen students in India had shown good results of KAP on healthy eating (Nazni and Vimala, 2010). However, there was also a KAP study with unsatisfactory knowledge and practice of healthy eating among students such as in Sarawak (Aung *et al.*, 2012). Studies done in Malaysia on factors affecting healthy eating habits among medical students reported that they did not practice healthy eating habits (Ganasegeran *et al.*, 2012) and took only one serving of fruits per week (Abdal Qader *et al.*, 2015). Studies from different parts of the world like in Iran (Alizadeh and Ghabili, 2008) and Lebanon (Yahia *et al.*, 2014) also reported that the university students were not practicing good healthy eating habits.

Although students may have a good knowledge of healthy meal and good eating habits especially among

medical students, they put stressful events and lack of time as a barrier to practice healthy eating habit (Thawabieh and Qaisy, 2012). Some other common factors of unhealthy eating habits are meal skipping, snacking, fast food consumption, low self-esteem and inadequate information of nutrient (Sakamaki *et al.*, 2005; Deshpande *et al.*, 2009). However, practicing regular eating at university canteen may help some students to improve their dietary habits, specifically their fruits/vegetables and meat/fish consumption at a rather low price (Guagliardo *et al.*, 2011).

The aim of this study was to determine the level of knowledge, attitude and practice (KAP) of healthy eating and to identify associated factors among university students in Hulu Langat District, Selangor, Malaysia.

## MATERIALS AND METHODS

**Study design:** This cross-sectional study was conducted in May 2012 until February 2013 among medical students from the age of 18 to 25 years old at one public university and two private universities in Hulu Langat District, Selangor, Malaysia. The two private universities were selected by convenience sampling, while the selection of six faculties in the public university was done by simple random sampling. There was only one faculty in each private university. Only students from diploma and degree courses were selected. Students were chosen by simple random sampling method. Those who were involved in any dietary or weight reduction programme were excluded from this study. Sample size was calculated using Pocock Formula 1977 and was based on the study by Yahia *et al.* (2008). The total sample size was 282.

**Study instruments:** For this study, we used two tools which were anthropometric measurement and a self-administered questionnaire in Malay language. Pre-tested questionnaire was done before the study and reliability was tested by using Cronbach's Alpha statistic with value of 0.4. Measurements of height, weight and waist circumference were carried out by well-trained co-researchers before respondents answered the questionnaire. Respondents were weighted in light clothing without stockings and shoes using SECA 713 Digital Flat scale and reading was made to the nearest 0.1 kg. Height was measured to the nearest 0.1 cm using a 2.00 meter measuring tape. Student was asked to stand in the centre of the platform without stocking and shoes, look straight ahead and feet flat with heels almost together touching the measurement board. Body mass index (BMI) was calculated for each student using formula of weight in kg unit divides the power by two of height in meter unit ( $\text{kg}/\text{m}^2$ ). BMI for adult using Asian cut-off point from WHO (2000) was used for BMI classification. Classifications of BMI for Asian are underweight ( $\text{BMI} < 18.5 \text{ kg}/\text{m}^2$ ), normal ( $\text{BMI} = 18.5\text{-}22.9 \text{ kg}/\text{m}^2$ ), over weight ( $\text{BMI} = 23.0\text{-}24.9 \text{ kg}/\text{m}^2$ ) and obese

( $\text{BMI} = 25.0 \text{ kg}/\text{m}^2$ ) (WHO, 2000). Waist circumference was measured by using a 2.00-meter measuring tape. The point of measurement is midway between the lowest rib margin and the iliac crest region. Tape stayed at the position around the abdomen about the level of umbilicus and measurement was taken during exhale of breathing. Based on WHO (2004), measurement more than 90 cm for men (35.5 inch) and 80 cm (31.5 inch) for women is at risk of metabolic diseases.

Self-administered questionnaire on healthy eating was adopted from the Ministry of Health, Malaysia's Healthy Lifestyle Campaign 1997 and some questions were developed based on the Malaysia Dietary Guidelines 2010 also by the Ministry of Health, Malaysia. The questionnaire consists of four parts. The first part consists of questions on demographic data. The second part comprised of factors that influence healthy eating and knowledge related to healthy eating. The third part contained attitude questions, while the last part consists of questions regarding practice of healthy eating. Knowledge related to healthy eating based on Malaysia Dietary Guidelines (2010) questionnaire comprised of 13 statements such as 'rice and bread contains more carbohydrate compared to fruits and vegetables'. The students had to response whether the statement is "true", "false" or they "do not know". The right answer was given 1 mark and wrong answer was given 0 mark. The minimum mark was 0 and the maximum mark was 13. Attitude section consists of 8 questions and the students' responses were "agree", "disagree" or "not sure". The minimum mark was 0 and maximum 8. Questionnaire for practices score consist of 16 questions. The minimum mark was 0 and maximum mark was 16. The correct answer was given 1 mark and incorrect answer was given 0 mark. For each knowledge, attitude and practice, the total mark of 50% and above was considered as good knowledge, attitude and practice, while total mark of less than 50% was considered as poor knowledge, attitude and practice.

**Data analysis:** The Statistical Package for Social Sciences (SPSS) version 22.0 was used in this study to analyze the data. Means and standard deviations were used to report continuous variables while frequencies and percentages were used for categorical variables. Chi-squared test was used to determine the association between two categorical variables. Statistical results were considered significant at  $p = 0.05$ .

**Ethical consideration:** Approval of the study was obtained from the Research and Ethics Committee of Universiti Kebangsaan Malaysia Medical Centre with approval number of FF-206-2012.

## RESULTS

**Socio-demographic characteristics:** Three hundred students participated in this study. More than half were

Table 1: Socio-demographic characteristics of the respondents

Characteristics	No.	Percentage
<b>Age (year)</b>		
18-20	160	53.3
21-25	140	46.7
<b>Gender</b>		
Male	111	37.0
Female	189	63.0
<b>Type of University</b>		
Private	145	48.3
Public	155	51.7
<b>Current study level</b>		
Degree	247	82.3
Diploma	53	17.7
<b>Place of living</b>		
Hostel	267	89.0
Others	33	11.0
<b>Family income</b>		
High (>RM 10,000)	11	3.7
Middle (RM 3,000-10,000)	153	51.0
Low (<RM 3,000.00)	136	45.3
<b>BMI (Asian)</b>		
Underweight	58	19.3
Normal	137	45.7
Overweight	67	22.3
Obese	38	12.7
<b>Waist circumference</b>		
Normal	241	80.3
High risk	59	19.7

females (189, 63.0%). Mean age was 20.3±1.80 years. More than half of the students were from public university (51.7%). Anthropometric measurements of the students showed that mean BMI was 22.47±5.08 kg/m<sup>2</sup> and mean waist circumference was 30.1±3.98 inches (Table 1).

**Knowledge related to healthy eating:** Mean total score of knowledge related to healthy eating based on Malaysia Dietary Guidelines was 59.1 (SD±17.4). A total of 74.0% respondents can be categorized into good knowledge of healthy eating habits. There was a significant association between knowledge and gender ( $p = 0.001$ ) in which more female showed good knowledge on healthy eating compared to male students. Awareness of MDG was found to have significant association with knowledge in which those who were aware of it has 2 times more chance to have a good knowledge compared to others as shown in Table 2. Significant association was also noted between knowledge and student's current study level in which more degree students showed good knowledge on healthy eating compared to diploma students ( $p = 0.005$ ).

**Attitude related to healthy eating habit:** The mean mark for attitude related to healthy eating habit among students was 62.4 (SD±21.0). Majority of the students can be categorized into having good attitude towards healthy eating habit (80.3%). Factors significantly associated with attitude related to healthy eating habits

were place of living (more students in hostels showed good attitude as compared to other places), awareness on MDG and Malaysian Food Pyramid (Table 3).

**Practice related to healthy eating habit:** Mean mark for practicing healthy eating habit was 33.4 (SD±15.9) and 234 students or 78.0% was practicing unhealthy eating habit as compared to only 22.0% (66 students) with good practicing score. Family income ( $p = 0.033$ ) was the only factor that has significant association with practicing score in which more students of low family income showed good practices on healthy eating as compared to those of middle and high family income (Table 4).

## DISCUSSION

The main finding of this study revealed that university students had good level of knowledge (74.0%), good attitude (80.3%) but poor practice (78.0%). This study found significant associations between student factors, family income, awareness of MDG and food pyramid information with the knowledge, attitude and practice of healthy eating habit among university students in Hulu Langat, Selangor.

The finding of KAP level was similar with a previous study in Kelantan (Arfah *et al.*, 2010). However, a study in Sarawak (Aung *et al.*, 2012) showed poor knowledge of healthy eating. No associations were found between age and knowledge, attitude and practice. However, study among university students in Germany found that age 21 years old and below had significantly higher attitude towards healthy eating as compared to students whose age was more than 21 years old (Harker *et al.*, 2010). Gender was also associated with knowledge on healthy eating habit (Deshpande *et al.*, 2009). Significant influence of gender in this study was similar to a study in Pakistan that compares medical and non-medical students in which knowledge of female students was better than male students as females were more concerned about what they are eating compared to males (Sajwani *et al.*, 2009). However, good practice of healthy eating habits was not associated with gender in our study. This is similar to a study finding among private medical students in Malaysia (Ganasegeran *et al.*, 2012). Good knowledge of healthy eating also had significant association with higher study level. Our result is supported by previous studies such as a study done among medical students in Pakistan (Sajwani *et al.*, 2009) and among nutrition students in Saudi Arabia (Bano *et al.*, 2013). This could be due to extra knowledge gained during their study period.

Place of living had a significant association with good attitude of healthy eating habit in which students who were staying in hostels showed higher good attitude as compared to students who were staying outside. A study in Greece reported that staying away from home caused significant changes in attitude and practice (Papadaki

Table 2: Factors associated with knowledge on healthy eating

		----- Knowledge -----				X <sup>2</sup>	p-value	POR	----- 95% CI -----	
Variables		----- Good -----		----- Poor -----						
		f (%)		f (%)						
Gender	Male	70	63.1	41	36.9	10.95	0.001*	0.42	0.25	0.70
	Female	152	80.4	37	19.6					
Type of University	Private	107	73.8	38	26.2	0.01	0.937	0.98	0.58	1.64
	Public	115	74.2	40	25.8					
Current study level	Degree	191	77.3	56	22.7	8.05	0.005*	2.42	1.30	4.51
	Diploma	31	58.5	22	41.5					
Place of living	Hostel	198	74.2	69	25.8	0.03	0.860	0.93	0.41	2.10
	Others	24	72.7	9	27.3					
Family income	High	39	28.7	97	71.3	1.92	0.383			
	Middle	26	17.0	127	83.0					
	Low	1	9.1	10	90.9					
BMI (Asian)	Underweight	17	29.3	41	70.7	2.49	0.478			
	Normal	31	22.6	106	77.4					
	Overweight	17	25.4	50	74.6					
	Obese	13	34.2	25	65.8					
Waist circumference	Normal	179	74.3	62	25.7	0.05	0.827	0.93	0.49	1.77
	High Risk	43	72.9	16	27.1					
<b>Emotional factor</b>										
Emotional/Stress	Stressful	203	74.1	71	25.9	0.01	0.911	1.05	0.42	2.61
	Not stressful	19	73.1	7	26.9					
<b>Awareness factor</b>										
Malaysian dietary guidelines	Yes	105	81.4	24	18.6	6.43	0.011*	2.02	1.17	3.49
Malaysian food pyramid	Yes	205	74.8	69	25.2	1.10	0.295	1.57	0.67	3.69
<b>Environment factor</b>										
Availability of healthy food	Yes	130	73.0	48	27.0	0.21	0.645	1.07	0.61	1.87
Availability of unhealthy food	Yes	48	20.0	192	80.0	3.40	0.065	0.51	0.24	1.05

\*Chi square test with p-value significant at p<0.05

Table 3: Factors associated with attitude on healthy eating

		----- Attitude -----				X <sup>2</sup>	p-value	POR	----- 95% CI -----	
Variables		----- Good -----		----- Poor -----						
		f (%)		f (%)						
Age (year)	18-20	129	80.6	31	19.4	0.02	0.892	1.04	0.59	1.84
	21-25	112	80.0	28	20.0					
Gender	Male	86	77.5	25	22.5	0.91	0.340	0.75	0.42	1.35
	Female	155	82.0	34	18.0					
Type of University	Private	120	82.8	25	17.2	1.05	0.307	1.35	0.76	2.40
	Public	121	78.1	34	21.9					
Current study level	Degree	195	78.9	52	21.1	1.70	0.192	0.57	0.24	1.34
	Diploma	46	86.8	7	13.2					
Place of living	Hostel	220	82.4	47	17.6	6.54	0.011*	0.37	0.17	0.81
	Others	21	63.6	12	36.4					
Family income	High	10	90.9	1	9.1	1.06	0.587			
	Middle	124	81.0	29	19.0					
	Low	107	78.7	29	21.3					
BMI (Asian)	Underweight	16	27.6	42	72.4	3.48	0.324			
	Normal	25	18.2	112	81.8					
	Overweight	10	14.9	57	85.1					
	Obese	8	21.1	30	78.9					
Waist circumference	Normal	195	80.9	46	19.1	0.26	0.610	0.83	0.42	1.67
	High Risk	46	78.0	13	22.0					
<b>Emotional factor</b>										
Emotional/stress	Stressful	222	81.0	52	19.0	0.95	0.330	1.57	0.63	3.94
	Not Stressful	19	73.1	7	26.9					
<b>Awareness factor</b>										
Malaysian dietary guidelines	Yes	111	86.0	18	14.0	4.68	0.031*	1.94	1.06	3.58
Malaysian food pyramid	Yes	226	82.5	48	17.5	9.24	0.002*	3.45	1.49	7.98
<b>Environment factor</b>										
Availability of healthy food	Yes	144	80.9	34	19.1	0.09	0.766	1.09	0.61	1.94
Availability of unhealthy food	Yes	191	79.6	49	20.4	0.43	0.513	0.78	0.37	1.65

\*Chi square test with p-value significant at p<0.05

et al., 2007). A previous study reported that the more stressful the respondents, the more they will practice unhealthy diet (Thawabieh and Qaisy 2012).

Psychological factor affecting eating habits was not only due to upset or nervous but also due to unable to control eating habit as foods are in front of them, feeling bored,

Table 4: Factors associated with practice on healthy eating

Variables		Practice				X <sup>2</sup>	p-value	POR	95% CI	
		Good		Poor						
		f (%)	f (%)	f (%)	f (%)					
Age (year)	18-20	31	19.4	129	80.6	1.38	0.241	0.72	0.42	1.25
	21-25	35	25.0	105	75.0					
Gender	Male	21	18.9	90	81.1	0.98	0.324	0.75	0.42	1.34
	Female	45	23.8	144	76.2					
Type of University	Private	33	22.8	112	77.2	0.09	0.759	1.09	0.63	1.88
	Public	33	21.3	122	78.7					
Current study level	Degree	57	23.1	190	76.9	0.95	0.331	1.47	0.68	3.19
	Diploma	9	17.0	44	83.0					
Place of living	Hostel	60	22.5	207	77.5	0.32	0.575	0.77	0.30	1.94
	Other	6	18.2	27	81.8					
Family income	High	1	9.1	10	90.9	6.84	0.033*			
	Middle	26	17.0	127	83.0					
	Low	39	28.7	97	71.3					
BMI (Asian)	Underweight	49	84.5	9	15.5	2.28	0.517			
	Normal	107	78.1	30	21.9					
	Overweight	50	74.6	17	25.4					
	Obese	28	73.7	10	26.3					
Waist circumference	Normal	18	30.5	41	69.5	3.10	0.078	1.77	0.93	3.34
	High Risk	48	19.9	193	80.1					
<b>Emotional factor</b>										
Emotional/stress	Stressful	62	22.6	212	77.4	0.73	0.394	1.61	0.53	4.84
	Not Stressful	4	5.7	22	84.6					
<b>Awareness factor</b>										
Malaysian dietary guidelines	Yes	32	24.8	97	75.2	1.04	0.308	1.33	0.77	2.30
Malaysian food pyramid	Yes	58	21.2	216	78.8	1.28	0.259	0.60	0.25	1.46
<b>Environment factor</b>										
Availability of healthy food	Yes	40	22.5	138	77.5	0.06	0.812	1.07	0.61	1.87
Availability of unhealthy food	Yes	48	20.0	192	80.0	2.80	0.094	0.58	0.31	1.10

\*Chi square test with p-value significant at p<0.05

lonely and also happiness (Ganasegeran *et al.*, 2012). Even though majority of students in this study were stressful, but it was not significantly associated with their knowledge, attitude and practice.

In this study, family income had an influence on healthy eating practices of the university students. As the students have more money, they spent the money to buy luxurious foods from available restaurants and food stalls and this influenced their daily eating habit.

BMI classification based on Asian population was used in this study. The prevalence of obesity among university students was 12.7%, lower than that reported by the National Health and Morbidity Survey (2011) which was 27.2% (Ministry of Health Malaysia, 2011). The reason for this could be the age of the respondents. However, this prevalence is higher compared to the study among postgraduate private university students (8.9%) (Ismail *et al.*, 2014) and other undergraduate university students; 3.4% (Gan *et al.*, 2011); 5.2% (Gopalakrishnan *et al.*, 2012). BMI has no significant association with KAP in this study. This study is similar to a previous study among medical students in Malaysia (Ganasegeran *et al.*, 2012). There was also no significant association between waist circumference and KAP.

Awareness factor on Malaysian Dietary Guidelines and Malaysian Food Pyramid were significantly associated with knowledge and attitude of the students. This shows

that dissemination of knowledge regarding healthy eating among university students were done well by the authority. However, the finding contradicted the study among the general adult population in Kuala Lumpur in which majority of the respondents did not understand the MDG, thus had poor knowledge on good healthy eating (Norimah *et al.*, 2010).

This study also had limitations. This could be due to biased information as the students have to remember the past events to answer the questionnaire. The study was confined to only one district out of nine districts in Selangor. Perhaps for future study, expansion of sampling population should include other districts that have more educational institutions.

**Conclusion:** Level of knowledge and attitude of healthy eating among university students in Malaysia were good, but not on the practice of healthy eating. Further strategies are needed to increase the practice of good healthy eating among university students, especially focusing on students of high and middle family income.

**ACKNOWLEDGEMENT**

Our sincere appreciation and thanks are extended to all participants and staff from the public university and two private universities who were directly and indirectly involved in this study.

## REFERENCES

- Aung, P.P., C.S. Fong, K.B. Azman, N. Ain and B. Zulkifeli, 2012. Knowledge, attitude and practice of healthy eating among the 1st and 2nd year students of Universiti Malaysia Sarawak (UNIMAS). *Int. Conf. Nutr. Food Sci. IPCBEE*, 39: 188-194.
- Alizadeh, M. and K. Ghabili, 2008. Health related life style among the Iranian medical students. *Res. J. Biol. Sci.*, 3: 4-9.
- Arfah, W., N. Wan, M. Ezane and F. Leng, 2010. Knowledge, attitude and dietary and lifestyle practices on bone health status among undergraduate university students in health campus, universiti Sains Malaysia, Kelantan. *Healthy Environ. J.*, 1: 34-40.
- Baez, R., A. Sofia, T. Tayaba, L. Maria P. Durango and G.H. Dario *et al.*, 2005. Prevalence and factors associated with overweight and obesity among university students of the health field in San Luis Potosi Mexico. *Health (Irvine Calif)*, 328-335.
- Boutayeb, A.B.S., 2005. The burden of non-communicable diseases in developing countries. *Int. J. Equity Health.*, 4: 1-16.
- Bano, R., S.B.F. Eyad AlShammari and N.A. Al-Shammari, 2013. A comparative study of knowledge, attitude, practice of nutrition and non-nutrition student towards a balanced diet in hail university. *IOSR J. Nursing and Health Sci.*, 2: 29-36.
- Consultation WHO Expert, 2004. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. *Lancet.*, 363: 157-163.
- Deshpande, S., M.D. Basil and D.Z. Basil, 2009. Factors influencing healthy eating habits among college students: An application of the health belief model. *Health Marketing Quarterly*, 26: 145-164.
- Ganasegeran, K., S.A.R. Al-Dubai, A.M. Qureshi, A.A.A. Al-abed, R.A. Manaf and S.M. Aljunid, 2012. Social and psychological factors affecting eating habits among university students in a Malaysian medical school: A cross-sectional study. *Nutr. J. Bio. Med. Central Ltd.*, 11: 48.
- Guagliardo, V., C. Lions, N. Darmon and P. Verger, 2011. Eating at the university canteen. Associations with socioeconomic status and healthier self-reported eating habits in France. *Appetite*, 56: 90-105.
- Gan, W.Y., M.T. Mohd Nasir, M.S. Zalilah and A.S. Hazizi, 2011. Differences in eating behaviours, dietary intake and body weight status between male and female Malaysian university students. *Malaysian J. Nutr.*, 17: 213-228.
- Gopalakrishnan, S., P. Ganeshkumar, M.V.S. Prakash, Christopher and V. Amalraj, 2012. Prevalence of overweight/obesity among the medical students, Malaysia. *Med. J. Malaysia*, 67: 442-444.
- Harker, D., B. Sharma, M. Harker and K. Reinhard, 2010. Leaving home: Food choice behavior of young German adults. *J. Bus. Res.*, Elsevier B.V., 63: 111-115.
- Ismail, S., H. Sciences and U. Putra, 2014. Prevalence and factors associated with overweight and obesity among Malaysian Post graduate students in a public university. *Int. J. Public Health and Clin. Sci.*, 1: 131-140.
- Mohammed, A. Abdal Qader, Hasanain Faisal Ghazi, Zaleha Md. Isa, Tiba Nezar Hasan and Mustafa Fadil Mohammed, 2015. Nutritional habits among internet users in a private Malaysian medical school. *Pak. J. Nutr.*, 14: 409-411.
- Ministry of Health Malaysia, 2010. Malaysian Dietary Guidelines. p: 27. Available from: <http://www.moh.gov.my/images/gallery/GarisPanduan/diet/intrroduction.pdf>.
- Ministry of Health Malaysia, 2011. National Health and Morbidity Survey 2011 NHMS 2011. National Health and Morbidity Survey.
- Nazni, P. and S. Vimala, 2010. Nutrition knowledge, attitude and practice of college sportsmen. *Asian J. Sports Med.*, 1: 93-100.
- Norimah, A.K., C.S. Hwang, W.C. Liew, A.T. Ruzita, H.S. Sàadiah and M.N. Ismail, 2010. Messages of the newly proposed Malaysian dietary guidelines (MDG): Do adults in Kuala Lumpur understand them? *Malaysian J. Nutr.*, 16: 113-123.
- Papadaki, A., G.A. Hondros, J. Scott and M. Kapsokefalou, 2007. Eating habits of University students living at, or away from home in Greece. *Appetite*, 49: 169-176.
- Sakamaki, R., K. Toyama, R. Amamoto, C.J. Liu and N. Shinfuku, 2005. Nutritional knowledge, food habits and health attitude of Chinese university students-A cross sectional study. *Nutr. J.*, 4: 4.
- Sajwani, R., S. Shoukat, R. Raza, M.M. Shiekh, Q. Rashid and M.S. Siddique *et al.*, 2009. Knowledge and practice of healthy lifestyle and dietary habits in medical and non-medical students of Karachi, Pakistan. *J. Pak. Med. Assoc.*, 59: 650-655.
- Triches, R.M. and E.R.J. Giugliani, 2005. Obesity, eating habits and nutritional knowledge among school children. *Revista de Saude Publica*, 394: 541-547.
- Thawabieh, A.M. and L.M. Qaisy, 2012. Assessing stress among university students. *Am. Int. J. Contemporary Res.*, 2: 110-116.
- World Health Organisation (WHO), 2006. Global strategy.
- World Health Organisation (WHO), 2003. The world health report 2002-reducing risks, promoting healthy life. Education for health (Abingdon, England).
- World Health Organisation (WHO), 2000. The Asia-Pacific perspective: Redefining Obesity and its Treatment, 1-56.
- Yahia, N., C. Brown, M. Rapley and M. Chung, 2014. Assessment of college students' awareness and knowledge about conditions relevant to metabolic syndrome. *Diabetol. Metabolic Syndrome J.*, 6: 111.
- Yahia, N., A. Achkar, A. Abdallah and S. Rizk, 2008. Eating habits and obesity among Lebanese university students. *Nutr. J.*, 7: 32.