The International Journal of Social Sciences and Humanities Invention 4(12): 4227-4230 2017
DOI: 10.18535/ijsshi/v4i12.10 **ICV 2015: 45.28**
ISSN: 2349-2031

Research Article

Study on Relationship of BMI with Eating Pattern and Health Concern

N. Daud[1*], C. W. Heng[2], N. F. Razak[3] and H. W. You[4]

[1,2,3,4] Pusat PERMATApintarTM Negara, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia

Abstract: Behaviors associated with eating are always considered as one of many factors which contribute to the development of childhood obesity. Moreover, balanced diet really plays an important role in human's body as all-inclusive maturation potentiality, and good shape can be promoted. As we know, we are what we eat. This research was carried out to determine the relationship between body mass index (BMI), eating pattern of pre-university students and their health concern. All students from ASASIpintar have responded on a questionnaire created regarding the above matter and this study lasts for 10 months. Students have filled in three sections which are demographic and anthropometric information, health concern and eating pattern. The results showed that BMI did not affect students' health concern. However, these results suggested that BMI level had an effect on eating pattern. Specifically, it was suggested that when humans had a healthy BMI, they had a less healthy eating pattern. When humans were overweight, they had a healthier eating pattern. In conclusion, BMI must be healthy or overweight to to affect eating pattern while BMI did not affect students' health concern. Hence, one implication of the results obtained from the research is that the people start to realise that teenagers who look healthy do not necessarily lead a healthy eating pattern. In the future, people would be more aware of their eating pattern, improving their overall health by indulging in balanced diet. Furthermore, students and the people around the world would also notice that healthy eating plays important role in shaping their own futures.

Keyword: Body mass index (BMI), Eating pattern, Health concern.

INTRODUCTION

In the year 2008, the World Health Organization (WHO) Global Status Report 2010 registered that in the world, 36.1 million people lost their lives. This is actually due to 4 focal non-communicable diseases (NCDs). NCDS are heart diseases, diabetes, cancers and also lung diseases which are chronic. (The Star Online,2013). In 2011, it has been shown by statistics that 72.8 percent of Malaysians reside in cities or urban places (National Urbanization Policy Malaysia, 2011). Urbanization actually causes various health issues such as overweight. Obesity causes other problems of health such as Type II diabetes mellitus, mental sickness and cancer as well. It was revealed by National Health and Morbidity Survey that in 2006, 14 percent of adults in Malaysia were obese and 29 percent of Malaysian grownups were classified to be overweight (Mazlina Mansor & Harun, 2014).

Behaviors associated with eating are always considered as one of many factors which contribute to the development of childhood obesity. Behavior is often thought to be guided by personal beliefs and tacit knowledge, which arise from the interpretation of sensory-motor experiences. Tacit knowledge, however, is different from declarative knowledge or the acquisition of factual information attained during formal education. It was revealed that children, including those of preschool age, knew a great deal about eating. Moreover, it was suggested that beliefs and tacit knowledge are more influential in directing eating behaviors than declarative knowledge or knowing facts about food, nutrition, the body, or health (Celeste M. Schultza & Danfordb, 2016).

Many studies indicate that despite possessing ample knowledge about food, abundant young people do not find it easy to follow healthful eating recommendations and often consume food which is thought to be unhealthy (Leann L. Birch & Fisher, 1998)& (Jillian K. Croll, Dianne Neumark-Sztainer, & Story, 2001). Similar findings have been found among Hong Kong students, which indicated that many students are not able to put the theory they learn in the classroom into practice (Wai-ling Theresa Lai Yeung, 2007).

It is found that the trend of eating disorders among students at the start of their youthfulness is undergoing an increase (Rajna Knez, Radenka Munjas, Mladen Petrovecki, Ela Paucic-Kirincic, & Mladen Peršic, 2006). There are a variety of factors that influence young people's food choices. Some of the factors are accessibility of food, food cost and the distinguished health or density of energy characteristics of the food (Christine Shannon MPH, Mary Story PhD, Jayne A. Fulkerson, & French, 2002) & (Mary Story, Dianne Neumark-Sztainer, & Simone French, 2002).

Recently in Taiwan, detrimental diets and sedentary lifestyle play a main role in causing disablement, premature death and healthcare costs which are high. People have some common

comprehension of the association between selection of food and well-being. However, eating pattern remains damaging and the intake of vegetables and fruits still maintains beneath levels of sufficiency. The supposition that attitude, initiated during adolescence, are probable to resume throughout the whole life (Sun, 2008) . It can be concluded that exploring the eating attitude and health concern among pre-university students is an important endeavor. Before the study, it was predicted that BMI does affect health concern among students and their eating pattern.

In this paper, a study was conducted to investigate the relationship between Body Mass Index (BMI), eating pattern of pre-university students and their health concern. Specifically, the research was carried out to determine whether BMI plays a significant role in deciding the health concern and eating pattern of students or not.

Methodology

All students from ASASIpintar UKM 2016 have been selected as the sample for this study. This study consists of two dependent variables and one independent variable. The independent variable is the Body mass index (BMI) of students while the dependent measures are health concern among the students and their eating patterns.

This research utilized the quantitative research methodology. In order to determine the relationship between the variables, ANOVA tests were used. A set of questionnaire containing 48 questions was divided into 3 sections. Questions were developed based on two questionnaires previously conducted and studied by Engs and David and coworkers (David G. Schlundt, Margaret K. Hargreaves, & Maciej S. Buchowski, 2003) & (Engs, 1987). Question type, such as a scale ranging from 1 to 5 (1 = strongly disagree, 2 = disagree, 3 = neutral or not applicable, 4 = agree, 5 = strongly agree) and (1 = Not concerned , 2 = Mildly concerned, 3 = Moderately concerned, 4 = Very concerned, 5 = Extremely concerned) was utilised in the questionnaire. The dissimilar sections of the questionnaire were (i) demographic information, (ii) health concern (iii) eating pattern. The questionnaire was validated previously by other researchers (David G. Schlundt et al., 2003; Engs, 1987).

Consensus from the respondents were sought to enable the researcher to distribute the questionnaires to them.

Discussion

Statistical Package for the Social Sciences (SPSS) Software was used for data analysis and to investigate the relationship between the dependent and independent variables.

Table 1: Table of Group Statistic of Age against Gender

Gender	N	Mean	Std. Deviation	Std. Error Mean
Male	44	17.8636	0.34714	0.05233
Female	59	17.8136	0.43449	0.05657

As we can see from the Table 1 and Figure 1, the respondents of this study comprised of different races such as Malay, Chinese, Indian and others. Their mean ages were almost the same, ranging from 17 to 18 years old. To be precise, the mean of age of 44 male respondents was 17.86 while the mean of age of 59 female respondents was 17.81.

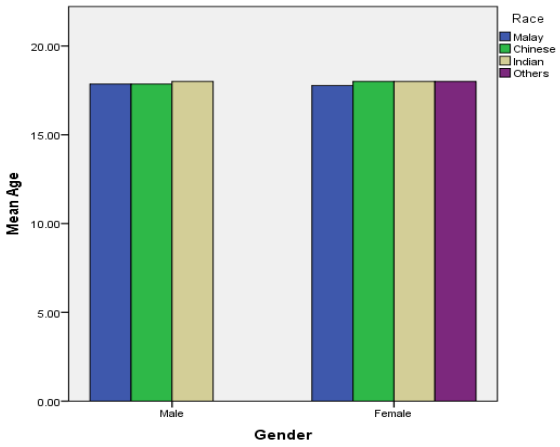

Figure 1: Graph of Races with Mean Age against Gender

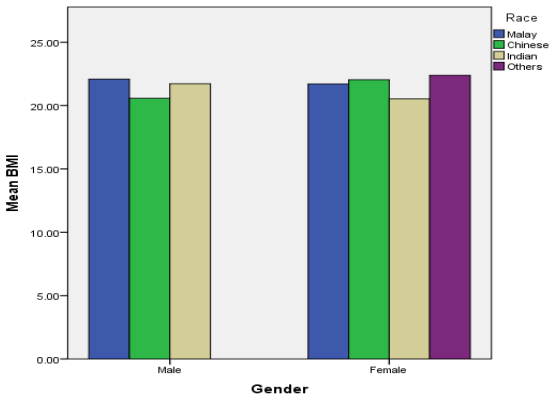

Figure 2: Graph of Mean Races with Mean BMI against Gender

A BMI below 18.5 is considered underweight. A BMI of 18.5 to 24.9 is considered healthy. A BMI of 25 to 29.9 is considered overweight. A BMI of 30 or higher is considered obese. From Figure 2, we can see the mean BMI of the respondents ranged between approximately 20.5 and 22.0.

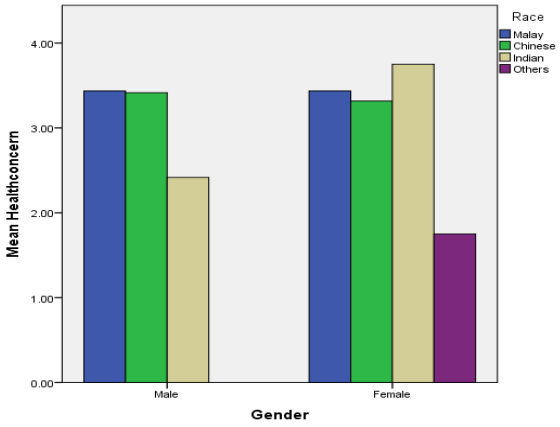

Figure 3: Graph of Mean Races with Mean Health Concern against Gender

From Figure 3, it can be concluded that Indian males had the lowest mean health concern as the level of health concern was

below 3, which was normal level of health concern. As for females, the respondent from the other races had the lowest level of health concern. Other respondents, on the other hand, had health concern which was above 3 and was moderately high. The respondents which had the highest level of health concern were Indian females.

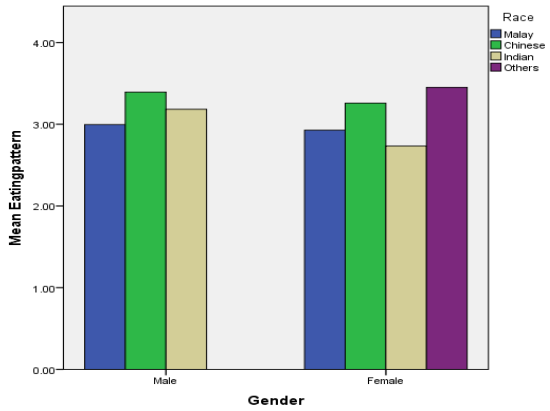

Figure 4: Graph of Races with Mean Eating Pattern against Gender

Among all of the respondents, merely Indian respondents had mean eating pattern with value less than 3, implying that they did not lead a healthy eating lifestyle. Other than that, respondent who had the healthiest eating pattern was the female respondent from other races.

As a whole, respondents of this study did not have extremely low or high levels of health concern but moderately low or high level of health concern. As for eating pattern, respondents generally had a moderately healthy eating pattern.

Table 2: ANOVA Test of Health Concern

Health concern	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Between Groups	1.5880	3	0.529	1.095	0.354
Within Groups	47.716	99	0.482		
Total	49.304	102			

A one-way between subjects' ANOVA was conducted to compare the effect of Body Mass Index (BMI) on the health concern of respondents in underweight, healthy, overweight and obese conditions. There was not a significant effect of Body Mass Index (BMI) on the health concern of respondents at the $p<0.05$ level for the four conditions [$F(3, 99) = 1.10$, $p = 0.354$].

Table 3: ANOVA Test of Relationship between Eating Pattern and BMI

Eating Pattern	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Between Groups	1.732	3	0.577	2.790	0.044
Within Groups	20.487	99	0.207		
Total	22.219	102			

A one-way between subjects ANOVA was conducted to compare the effect of Body Mass Index (BMI) on the eating pattern of respondents in underweight, healthy, overweight and obese conditions.

There was a significant effect of Body Mass Index (BMI) on the eating pattern of respondents at the $p<0.05$ level for the four conditions [$F(3, 99) = 2.79$, $p = 0.044$].

Table 4: Table of Tukey HSD of multiple comparisons between BMI and Eating Pattern

(I) BMI	(J) BMI	Mean Diff. (I-J)	Std. Error	Sig.	90 % Confidence Interval	
					Lower Bound	Upper Bound
Under-weight	Healthy	0.2986	0.1257	0.995	-0.2621	0.3218
	Over-weight	-0.4330	0.2061	0.160	-0.9117	0.456
	Obese	-0.2312	0.1970	0.645	-0.6886	0.2261
Healthy	Under-weight	-0.0299	0.1258	0.995	-0.3218	0.2621
	Over-weight	-0.4629	0.1801	0.056	-0.8811	-0.0447
	Obese	-0.2611	0.1695	0.418	-0.6547	0.1325
Over-weight	Under-weight	0.4330	0.2061	0.160	-0.0456	0.9117
	Healthy	0.4629	0.1801	0.056	-0.0447	0.8811
	Obese	0.2018	0.2354	0.827	-0.3448	0.7484
Obese	Under-weight	0.2313	0.7970	0.645	-0.2261	0.6886
	Healthy	0.2611	0.1695	0.418	-0.1326	0.6547
	Over-weight	-0.2018	0.2354	0.827	-0.7484	0.3448

***Table 5*:** Table of Description of Relationship between Eating Pattern and BMI

Eating Pattern	N	Mean	Std. Dev.	Std. Error	90 % Confidence Interval	
					Lower Bound	Upper Bound
Under-weight	16	2.9812	0.3502	0.0876	2.7948	3.1678
Healthy	72	2.9514	0.4784	0.0564	2.840	3.0638
Over-weight	7	3.4314	0.3544	0.1340	3.087	3.7420
Obese	8	3.2125	0.4846	0.1713	2.8074	3.6176
Total	103	3.0078	0.4667	0.0460	2.9166	3.0990

Post hoc comparisons using the Tukey HSD test indicated that the mean score for the overweight condition (M = 3.41, SD =

0.35) was significantly different than the healthy condition (M = 2.95, SD = 0.48). However, the underweight condition (M = 2.98, SD = 0.35) did not significantly differ from the overweight, healthy and obese condition. This is same for the obese condition (M=3.21, SD= 0.48). Taken together, these results suggested that BMI level which was considered healthy had an effect on eating pattern. Specifically, the results suggest that when humans had a healthy BMI, they had a less healthy eating pattern. When humans were overweight, they had a healthier eating pattern. However, it should be noted that BMI must be healthy or overweight to see an effect. BMI which was considered underweight and obese did not appear to significantly affect eating pattern.

There were several reasons which might contribute to these findings about the relationship between eating pattern, health concern and BMI. First and foremost, people who were overweight were conscious about their appearances and were aware of their health of body, specifically. Hence, they would eat more healthily, hoping that they would look more attractive and be healthier. As for people who had healthy BMI, they might overlook the importance of healthy eating pattern, thinking that they look healthy enough.

Limitations of the current research were identified. First limitation was that not all students of the world responded to the survey. Besides, the result obtained was not tally with hypothesis. The limitation to the generalizability of the findings was that the questionnaires were answered by the students from the same college. Moreover, there was not an equal amount of respondents from each race.

Future research could distribute the questionnaires to pre-university students of a variety of colleges so that the robustness of the results of the present study can be established.

Conclusion

In conclusion, when teenagers had a healthy BMI, they led a less healthy eating lifestyle. On the other hand, when humans were overweight, they had a healthier eating pattern. However, BMI did not affect students' health concern.

The generality of the relationship between body mass index (BMI), eating pattern and health concern among pre-university students was generalized to the population of pre-university students. In fact, adolescence is characterized by rapid growth and maturation. Balanced diet really plays an important role in human's body as it gives a all-inclusive maturation potentiality, promotes good shape and fine fettle. Hence, one implication of the results obtained from the research is that teenagers who look healthy do not necessarily lead a healthy eating pattern. In the future, they would be more aware of their eating pattern and improve their overall health by indulging in balanced diet. Students who are from underweight, overweight and obese category would also realize that healthy eating plays important role in shaping their own futures.

References

Celeste M. Schultza, & Danfordb, C. M. (2016). Children's knowledge of eating: An integrative review of the literature. *Appetite, 107*, 534-548.

David G. Schlundt, P., Margaret K. Hargreaves, P., & Maciej S. Buchowski, P. (2003). The Eating Behavior Patterns Questionnaire predicts dietary fat intake in African American women. *Journal of THE AMERICAN DIETETIC ASSOCIATION, 103*, 338-346.

Engs, R. C. (1987). THE HEALTH CONCERN QUESTIONNAIRE.

Jillian K. Croll, Dianne Neumark-Sztainer, & Story, M. (2001). Healthy Eating: What Does It Mean to Adolescents? *Journal of Nutrition Education and Behavior, 33*, 193-198.

Leann L. Birch, & Fisher, J. O. (1998). Development of Eating Behaviors Among Children and Adolescents. *Pediatrics, 101*, 539-549.

Mary Story, P., RD, , Dianne Neumark-Sztainer, P., MPH, RD, , & Simone French, P. (2002). Individual and Environmental Influences on Adolescent Eating Behaviors. *Journal of the American Dietetic Association, 102*(3), S40-S51.

Mazlina Mansor , & Harun, N. Z. (2014). Health Issues and Awareness, and the Significant of Green Space for Health Promotion in Malaysia. *153*, 209-220.

National Urbanization Policy Malaysia. (2011). Retrieved September 15, 2013, from http://smp.townplan.gov.my/blog/?tag=national-urbanisation-policy

Rajna Knez, M. D., M.Sc., , Radenka Munjas, Mladen Petrovecki, M. D., Ph.D.,, Ela Paucic-Kirincic, M. D., Ph.D., , & Mladen Peršic, M. D., Ph.D. (2006). Disordered eating attitudes among elementary school population. *Journal of Adolescent Health, 38*, 628-630.

Sun, Y.-H. C. (2008). Health concern, food choice motives, and attitudes toward healthy eating: The mediating role of food choice motives. *Appetite, 51*, 42-49.

The Star Online. (2013). Healthy living campaign. Retrieved October 9 ,2016, from http://thestar.com.my/health/story.asp?file=/2012/6/17/health/11473233&sec=health

Wai-ling Theresa Lai Yeung, P. (2007). *The Eating Habits of Hong Kong Adolescents and Their Families.* (PhD thesis), Deakin University.