

Groceries shopping practices and diet quality among Malaysian

Nur Islami Mohd Fahmi Teng ^{1*}, Maziana binti Mat Zin ¹, Nurhazimah binti Zakaria¹

1 Department of Nutrition and Dietetics, Faculty of Health Sciences, Universiti Teknologi MARA, 42300 Bandar Puncak Alam, Selangor, Malaysia

* **Corresponding Author:** Nur Islami Mohd Fahmi Teng

Department of Nutrition and Dietetics, Faculty of Health Sciences, Universiti Teknologi MARA, 42300 Bandar Puncak Alam, Selangor, Malaysia

Email: nurislami@puncakalam.uitm.edu.my | Phone: +603-3258-4540, Fax: +603-3258-4599

Abstract

Objective: Poor nutritional status had been associated with the diet quality and grocery shopping practices. Besides, the socioeconomic status influenced their behaviors toward grocery shopping practices. The aims of this study are i) to determine the association between diet quality and grocery shopping practices among supermarket adult consumers ii) to determine the risk factors that affect the grocery shopping practices among supermarket adult consumers.

Design: A set of questionnaires regarded on demographic data, and groceries shopping practices were administered.

Setting: This is a cross sectional study, conducted in Klang Valley, Malaysia.

Subjects: A total of 118 volunteered consumers between aged 20 to 64 years old were studied.

Results: This study showed that more than half of consumers categorized as regular shoppers (56.8%), while the remaining as recommended shoppers (43.2%). There was a poor positive ($r = 0.233$) and significant ($p < 0.05$) correlation between diet quality and grocery shopping practices. Consumers that practiced recommended grocery shopping had better fruit (mean = 1.3, SD = 0.96, with $p = 0.004$) and vegetable (mean = 1.4, SD = 0.6, with $p = 0.025$) serving per day. Most of the consumers with poor diet quality come with secondary education (51.4%) (Crude OR [cOR]): 0.43; 95% CI: 0.19, 0.99), and low household income (47.7%) (cOR: 0.34; 95% CI: 0.15, 0.75).

Conclusions: Sociodemographic and diet quality may influence the groceries shopping practice. The findings of this study are useful to determine the potential groups for nutrition intervention programs in order to combat the health inequity among adults.

Key words: Groceries shopping, Diet quality, Healthy eating index

Introduction and Background

Rapid growing of socioeconomic in the country for the past years led to significant changes of lifestyles among the communities. The sustained economic growth in Malaysia had resulted in a definite innovation in the food, which gave impact to the nutrition and health issues. One of the factors that lead to the obesity and overweight nowadays is poor quality in eating pattern due to lack of purchasing and consumption of fruits and vegetables.¹

Groceries' shopping is one of the important factors that may affect the diet quality of an individual. This is due the rapid evolving of supermarkets that offers junk foods and processed foods. This expansion and diffusion of supermarket not only influence the producers but also the consumers due to the price and availability of the processed, packages and dried foods.² Most of these foods that are available in supermarket nowadays are high in sodium, sugar and fat content in which one of the element that contribute to the risk factor of non-communicable chronic disease as well as obesity. Several studies had investigated the expansion of supermarkets and their effect on small farmers and food retailing.³ There was also studies by Balsevich, Berdegue, Flores, Mainville, and Reardon that analysed the relationship between the evolutions of supermarkets and consumer preferences as well as food safety.⁴ However, there was a big research gap on the implication of grocery shopping practices towards eating pattern among adult consumers in the urban population.

Thus, the aim of this study is to determine the association of grocery shopping practices and diet quality among supermarket adult consumer. Besides, it is also important to highlight the risk factors that affect the grocery shopping practices.

Methodology

Subjects: A total of 118 adult consumers, aged between 20 to 64 years old were consented in this cross sectional study. We used purposive sampling technique, where we excluded those with physical and mental disability, terminally ill disease and those who spent money for business purpose related to foods. Participants were recruited from the hypermarket and residential area around Klang Valley. This study was approved by the Research Ethical Committee of Universiti Teknologi MARA.

Sociodemographic indicators: Information on age, gender, level of education, and level of income was obtained. Education was stratified into secondary and tertiary education. Level of income was categorizes in the basis of low (<MYR 2300), moderate (MYR 2300-5600) and high (>MYR 5600) *[MYR 1 = USD 0.233 as on 6th January 2016]. We further categorized into the amount of money usually spent for groceries shopping (<MYR100 or >MYR100) and the frequency of groceries shopping (daily, >4times, weekly or fortnightly).

Assessment of groceries shopping practices: The practices of groceries shopping among participants were assessed using questionnaire adapted from Turrell, Blakely, Patterson, Oldenburg.⁵ The practices were then categorized into 'recommended' and 'regular' shoppers group. "Recommended" was defined as those who mainly purchased healthy foods, in line with

the Malaysia Dietary Guidelines. ⁶ Further, the factors that influenced the purchasing patterns were determined.

Assessment of eating pattern and diet quality: Diet History Questionnaire (DHQ) ⁷ was used to assess dietary patterns on participants. Participants' were interviewed regarding the type of food eaten, portion size, cooking method as well as the frequency of each type of meals taken. Based from the DHQ, the diet quality was further determined using Healthy Eating Index. ⁸ In the present study, we categorized the index into eight components (Table 1). Each component was calculated based on the scoring given and calculations for each score were done proportionately. The possible score range from 0-100 where the lowest score reflect poor compliance with Malaysia Dietary Guidelines and vice versa. The scoring was categorised into three; score <51% as poor, 51-80% as moderate, >80% as good.

Statistical analysis: Data was analyzed using Statistical Package for the Social Sciences (SPSS) version 21.0. The normality of data was tested using Kolmogorov Smirnov test. Pearson correlation, Chi Square test, T test, and simple linear regression test were applied. The significant level was set at p value less than 0.05.

Results

Demographic

A total of 118 participants involved in this study. Demographics characteristics was summarised as in Table 2. Majority of the subjects have tertiary education level, perform their groceries shopping in weekly basis, and spent more than MYR 100 for groceries shopping.

The groceries shopping practice

More than half of the subjects was categorised as regular shoppers (Table 3). Analysis of the risk factors that affect the groceries shopping shows that secondary educational level had decrease odds to practice recommended grocery shopping by 57% than tertiary educational level. Those who spent per shopping more than RM 100 had 1 times the odds to practice recommended grocery shopping than those who spent less than RM 100 whilst those who had income less than RM 2300 had 66% decrease odds to practice recommended grocery shopping than who had income more than RM 2300 (Table 4).

Further, we analysed the factors that may affect groceries shopping practices. As expected, concern about body weight was the significant factors that affected groceries shopping practices ($p < 0.05$). In this case, a total of 60.6% subjects in recommended shoppers category concerns about their body weight as compared to only 39.4% from regular group. In contrast, price was the most important factors that influence the regular shoppers' category (not significant) (Table 5).

Diet quality

Table 6 summarised the diet quality based on shopping practices category. Consumers that practiced recommended grocery shopping had better fruits and vegetables serving per day ($p < 0.05$) and high HEI score ($p < 0.05$) as compared to regular shopping practices. However, total HEI score revealed that none of the subjects have good diet quality. More than half was categorise having moderate diet quality (Figure 3.1 and Table 7). Further, we analysed the association between shopping practices and diet quality. There was a poor positive ($r = 0.233$) and significant ($p < 0.05$) correlation between eating pattern and grocery shopping practices as shown in Figure 3.2.

Discussion

Malaysia, is a county that has developed from agriculture based economy to manufacture industry.⁹ This rapid change in economy subsequently affects the diet quality and eating pattern, especially among urban resident area. The rapid changes in the urbanisation and industrial food products contribute to the changes of food consumption in Malaysia as well as 'westernised' eating pattern.¹⁰ Further, growing numbers of large supermarket with variety of local and imported groceries may affect the consumers' choice and affect their diet quality.

There are many factors that can affect the grocery shopping practices among adult. Given in this study, higher education, better income and extra money spend in groceries shopping were the factors leading to better groceries choice. Higher education level may influence healthy practices as they are considered to have better knowledge about healthy eating.¹¹ They are also more likely to use nutritional labels during purchasing.¹² On the other hand, those with low education are more likely to have low income, rarely use nutritional label¹³ and have higher tendency to purchased unhealthy foods together with low intake of fruit and vegetables. Nutritious foods also appears to be expensive than unhealthy food.¹⁴⁻¹⁶ However, it is still unclear whether the healthy foods are really more expensive than less healthy foods when the price is as count per calorie.¹⁷ Therefore, an education towards healthy foods purchase may be a potential intervention towards the low income population.

It can also be concluded that concern about body weight is the factor that makes people bought healthy groceries. However, the limitation in this study is that we did not measure our subjects' body mass index, hence could not relate whether our subjects were concern about their current BMI (body mass index) or about getting overweight. Higher BMI often associated with unhealthy groceries shopping¹⁸, and it is known that bad eating habit is well correlate with high BMI and chronic diseases. The recommended group was also found to have better intake of vegetables and fruits. Previous studies have concluded that the intake of these food groups was better in high income group.¹⁹⁻²⁰ Those with low income may found that both fruits and vegetables are expensive²¹ and rather spent for their staple food.

Conclusion

To conclude, eating pattern was correlate positively with grocery shopping practice. People who practice better eating habit may perform groceries shopping wisely.²² There is a need to conduct a larger scale of study with longer duration.

Conflict of Interest

There is no conflict of interest.

Acknowledgment

We thank Universiti Teknologi MARA for financial support via Lestari Grant, 600-IRMI/DANA 5/3 LESTARI (0094/2016).

References

1. He K, Hu F, Colditz G, Manson J, Willett W, Liu S. Changes in intake of fruits and vegetables in relation to risk of obesity and weight gain among middle-aged women. *International journal of obesity*. 2004;28(12):1569-1574.
 2. Asfaw A. *Supermarket purchases and the dietary patterns of households in Guatemala*. Citeseer; 2007.
 3. Reardon T, Timmer P, Berdegue J. The rapid rise of supermarkets in developing countries: induced organizational, institutional, and technological change in agrifood systems. *Electronic Journal of Agricultural and Development Economics*. 2004;1(2):168-183.
 4. Balsevich F, Berdegue JA, Flores L, Mainville D, Reardon T. Supermarkets and produce quality and safety standards in Latin America. *American journal of agricultural economics*. 2003;85(5):1147-1154.
 5. Turrell G, Blakely T, Patterson C, Oldenburg B. A multilevel analysis of socioeconomic (small area) differences in household food purchasing behaviour. *Journal of Epidemiology and Community Health*. 2004;58(3):208-215.
 6. NCCFN. National Coordinating Committee on Food and Nutrition. *Malaysian Dietary Guidelines*. Putrajaya: National Coordinating Committee on Food and Nutrition. Ministry of Health Malaysia 2010.
 7. Shahar S, Earland J, Abdulrahman S. Validation of a dietary history questionnaire against a 7-D weighed record for estimating nutrient intake among rural elderly Malays. *Malays J Nutr*. 2000;6(1):33-44.
 8. Teng NIMF, Shahar S, Manaf ZA, Haron H, Ngah WZW. Fasting Calorie Restriction Improved the Quality of Dietary Intake among Aging Men in Klang Valley, Malaysia. *Pakistan Journal of Nutrition*. 2013;12(7):607-614.
-

9. Moy F, Atiya A, Wong M. Framingham risk scores and anthropometric measurements in predicting cardiovascular risks among Malay men. *Malaysian journal of nutrition*. 2008;14:57-63.
10. Tee E. Nutrition of Malaysians: where are we heading. *Mal J Nutr*. 1999;5(1&2):87-109.
11. Turrell G, Hewitt B, Patterson C, Oldenburg B, Gould T. Socioeconomic differences in food purchasing behaviour and suggested implications for diet-related health promotion. *Journal of Human Nutrition and Dietetics*. 2002;15(5):355-364.
12. Satia JA, Galanko JA, Neuhouser ML. Food nutrition label use is associated with demographic, behavioral, and psychosocial factors and dietary intake among African Americans in North Carolina. *Journal of the American Dietetic Association*. 2005;105(3):392-402.
13. Andrade AM, Greene GW, Melanson KJ. Eating slowly led to decreases in energy intake within meals in healthy women. *Journal of the American Dietetic Association*. 2008;108(7):1186-1191.
14. Devine CM, Nelson JA, Chin N, Dozier A, Fernandez ID. "Pizza Is Cheaper Than Salad": Assessing Workers' Views for an Environmental Food Intervention. *Obesity*. 2007;15(S1):57S-68S.
15. Powell LM, Chaloupka FJ. Food prices and obesity: evidence and policy implications for taxes and subsidies. *Milbank Quarterly*. 2009;87(1):229-257.
16. Ahmad SNBB. Organic food: A study on demographic characteristics and factors influencing purchase intentions among consumers in Klang Valley, Malaysia. *International journal of business and management*. 2010;5(2):105.
17. Lee A, Mhurchu CN, Sacks G, et al. Monitoring the price and affordability of foods and diets globally. *obesity reviews*. 2013;14(S1):82-95.
18. Inagami S, Cohen DA, Finch BK, Asch SM. You are where you shop: grocery store locations, weight, and neighborhoods. *American journal of preventive medicine*. 2006;31(1):10-17.
19. Hall JN, Moore S, Harper SB, Lynch JW. Global variability in fruit and vegetable consumption. *American journal of preventive medicine*. 2009;36(5):402-409. e405.
20. Yen ST, Tan AK. Who are eating and not eating fruits and vegetables in Malaysia? *International journal of public health*. 2012;57(6):945-951.
21. Cassady D, Jetter KM, Culp J. Is price a barrier to eating more fruits and vegetables for low-income families? *Journal of the American Dietetic Association*. 2007;107(11):1909-1915.
22. West CD. *Food Shopping Habits and the Association with Diet*. 2014.

Table 1: Component and scoring criteria of Healthy Eating Index

Component	Maximum point	Standard for maximum score	Standard of minimum score of zero
Whole grain	10	4-8 servings/day	No whole grains
Fish	10	≥ 1 serving/day	No seafood or plant proteins
Meat	10	½ - 1 servings/day	No protein foods
Dairy product	10	1-3 servings/day	No dairy
Green and beans	10	½ - 1 serving/day	No dark green vegetables or beans and peas
Fruits	10	≥2 servings/day	No fruits
Vegetables	10	≥3 servings/day	No vegetables
Sodium	10	≤2400 mg/day	≥4800mg/day

Based on Malaysia Dietary Guidelines (2010)

Table 2: Sociodemographic characteristics

Variable	n (%)
Age	
20-39 years	64 (54.2)
40-64 years	54 (45.8)
Gender	
Male	50 (42.4)
Female	68 (57.6)
Educational level	
Secondary	37 (31.4)
Tertiary	81 (68.6)
Frequency of shopping	
Daily	8 (6.8)
>4 times	29 (24.6)
Weekly	44 (37.3)
Fortnightly	37 (31.4)
Money spent for groceries shopping	
<MYR 100	50 (42.4)
>MYR100	68 (57.6)

Table 3: Groceries shopping practices

Groceries shopping practices	n	%
Regular	67	56.8
Recommended	51	43.2

Table 4: Risk factors of groceries shopping practice

Risk Factor	Crude OR	(95%CI)	p value
Age			
20-39	1.05	(0.51, 2.18)	0.899
40-64	1.00		
Gender			
Male	0.82	(0.44, 1.92)	0.819
Female	1.00		
Ethnicity			
Malay	0.65	(0.06, 7.37)	0.728
Others	1.00		
Educational level			
Secondary	0.43	(0.19, 0.99)	0.048
Tertiary	1.00		
Household income			
<RM 2300	0.34	(0.15, 0.75)	0.008
>RM 2300	1.00		
Money spend			
<100	0.44	(0.21, 0.95)	0.036
>100	1.00		

Table 5: Factors affecting groceries shopping

	Grocery shopping practices		p value
	Regular n (%)	Recommended n (%)	
Concerns about health n (%)			0.541
Yes 75 (63.6)	41 (54.7)	34 (45.3)	
No 43 (36.4)	26 (60.5)	17 (39.5)	
The Price n (%)			0.502
Yes 98 (83.1)	57 (58.2)	41 (41.8)	
No 20 (16.9)	10 (50.0)	10 (50.0)	
Your own taste preference n (%)			0.621
Yes 61 (50.8)	36 (58.3)	25 (41.7)	
No 57 (48.3)	31 (54.4)	26 (45.6)	
Partners' taste preference n (%)			0.353
Yes 59 (50.0)	31 (52.5)	28 (47.5)	
No 59 (50.0)	36 (61.0)	23 (39.0)	
Children's taste preference n (%)			0.126
Yes 53 (44.9)	26 (49.1)	27 (50.9)	
No 65 (55.1)	41 (63.1)	24 (36.9)	
Concerns about body weight n (%)			0.018
Yes 33 (28.0)	13 (39.4)	20 (60.6)	
No 85 (72.0)	54 (63.5)	31 (36.5)	
Suitability for young children n (%)			0.995
Yes 44 (37.3)	25 (56.8)	19 (43.2)	
No 74 (62.7)	42 (56.8)	32 (43.2)	
Out of habit n (%)			0.915
Yes 26 (22.0)	15 (57.7)	11 (42.3)	
No 92 (78.0)	52 (56.5)	40 (43.5)	
Availability n (%)			0.860
Yes 20 (16.9)	11 (55.0)	9 (45.0)	
No 98 (83.1)	56 (57.1)	42 (42.9)	
Taste preference of other adult n (%)			0.385
Yes 30 (25.4)	15 (50.0)	15 (50.0)	
No 88 (74.6)	52 (59.1)	36 (40.9)	

Analysis perform using Chi square test

Table 6: Analysis of Diet Quality

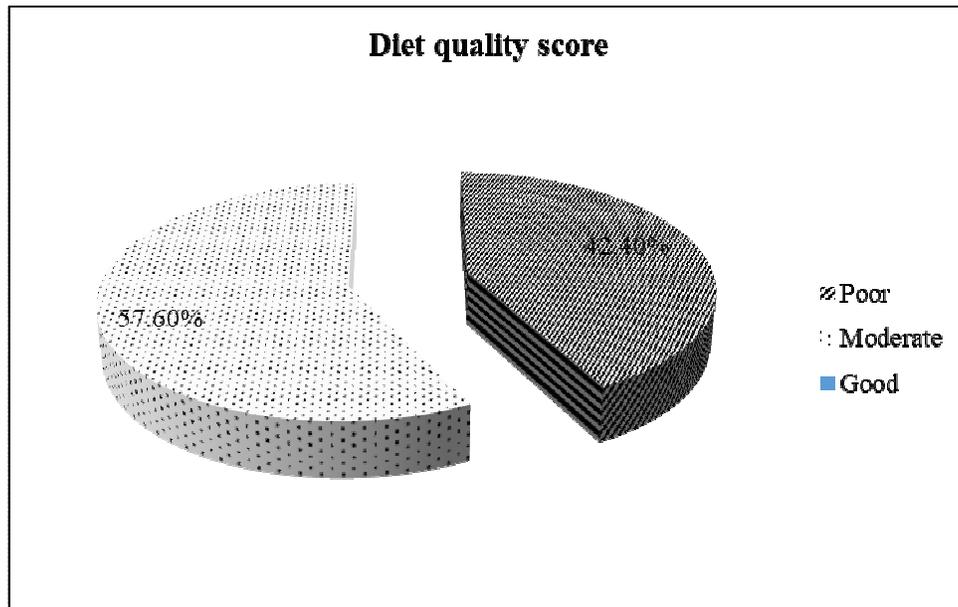
Characteristic (mean ± SD)	Grocery shopping practices		p value
	Regular (mean ± SD)	Recommended (mean ± SD)	
Grain			
Serving/day (5.9 ± 1.9)	6.0 ± 1.9	5.8 ± 1.7	0.571
HEI score (7.1 ± 1.9)	7.2 ± 1.9	7.01 ± 1.9	0.575
Meat			
Serving/day (1.5 ± 0.8)	1.5 ± 0.9	1.4 ± 0.7	0.546
HEI score (8.9 ± 2.2)	8.8 ± 2.4	9.0 ± 2.03	0.628
Fish			
Serving/day (0.9 ± 0.6)	0.8 ± 0.6	1.0 ± 0.6	0.215
HEI score (6.8 ± 3.5)	6.5 ± 3.7	7.2 ± 3.3	0.261
Legume			
Serving/day (0.3 ± 0.5)	0.3 ± 0.5	0.3 ± 0.5	0.994
HEI score (2.2 ± 3.5)	2.3 ± 3.6	2.2 ± 3.4	0.882
Fruits			
Serving/day (1.1 ± 0.9)	0.9 ± 0.8	1.3 ± 0.96	0.004
HEI score (5.0 ± 3.4)	4.1 ± 3.3	6.1 ± 3.3	0.002
Vegetable			
Serving/day (1.3 ± 0.7)	1.1 ± 0.7	1.4 ± 0.6	0.025
HEI score (4.2 ± 2.3)	3.8 ± 2.4	4.8 ± 1.95	0.028
Dairy			
Serving/day (0.3 ± 0.5)	0.3 ± 0.6	0.3 ± 0.5	0.953
HEI score (0.9 ± 1.7)	0.9 ± 1.9	0.9 ± 1.6	0.954
Sodium			
Serving/day (2598 ± 1003)	2549 ± 957	2663 ± 1068	0.545
HEI score (7.6 ± 3.2)	7.7 ± 2.96	7.4 ± 3.5	0.545

Analysis using Independent T test

Table 7: Correlation between diet quality and groceries shopping practices

	Grocery shopping practices		p value
	Regular, n(%)	Recommended, n(%)	
Poor	33 (49.3)	17 (33.3)	0.083
Moderate	34 (50.7)	34 (66.7)	
Good	0	0	

Analysis using Pearson Chi Square test

Figure 1: Total HEI score**Figure 2: Association between diet quality and groceries shopping practices**