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Knowledge, Attitude and Practices of University Students Regarding the Use of Nutritional Information and Food Labels

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ABSTRACT

The food nutrition label provides the nutrition information that helps consumers on food choices and used to give us information so that customer can choose between foods. This study was aimed to determine the association between knowledge, attitude and practices on food label use and to determine the factors that influence the use of food labels during making food purchasing decision among university students. A cross-sectional study of undergraduate students at UiTM Puncak Alam in the Kuala Selangor district of Malaysia was conducted in June until July 2011. Three hundred twenty nine students (n = 329) volunteered to complete a Food Label Use Questionnaire (FLUQ) which included question about sociodemographics, level of knowledge about food and nutrition, attitude and practices related to using food labels and factors affecting the use of food labelling. Hypothesis testing was completed using Independent t-test, Pearson chi-square and descriptive analysis in which the statistical significant level was set at $\alpha = 0.05$. The results show that, only 21.6% of the students “often” use the food label during food purchasing decision. These study shows that the practices by read the nutrition information were significantly associated with the use of food label ($p < 0.05$). The important aspect during buying food product was expiry date (98.5%), taste (95.7%), price (92.4%) and nutrient content (90.5%) were significantly associated with the use of food label. The students attitude which is do not know how to use nutritional information label ($p = 0.028$) and label was not attractive ($p = 0.037$) were significantly associated on food label use.

Key words: Food labels, nutrition information labels, nutritional information, purchasing decision, food product, nutrition knowledge, attitude, practice

INTRODUCTION

Nowadays, roles of food labels are use to inform the consumer and help sell the food products (Cheftel, 2005). The important of food label was proven when a immune enhancing power bar at present developed in the Vaal University of technology were screened for it's nutritional information (Roger *et al.*, 2009). Besides, most of adults' consumers are very aware of information on nutrition labels (Fulgoni and Miller, 2006). Other than that, research done by Kretser (2006) found that consumers are attracted in buying healthful foods and beverages from the used of food label to satisfying personal health goals. The food label was necessary to facilitate informed choice

or to prevent false, misleading or unreliable conduct (Rumble *et al.*, 2003). This is supported by Philipson (2005) and Tarasuk (2006) in their research which state that labelling statements on the food product can make consumers better informed and more health conscious. Currently, it is familiar that many disease are diet related and can be control or prevented throughout an appropriate diet and therefore to change eating pattern, sufficient information such as nutritional information must be provided at the point of purchase (Cunningham and Sobolewski, 2011) and thus it can make simpler the whole concept of healthy eating (Prathiraja and Ariyawardana, 2003) and useful for making better food choices (Borra, 2006; Grunert *et al.*, 2010). In addition, balanced nutrition is a key element to ensure a happy and healthy life (Sharadamma *et al.*, 2011).

On the other hand, several problems do occur regarding the uses of food label, for instance, some consumers do not understand food nutrition label well enough to make healthy food choices (Pelletier *et al.*, 2004). Thus, inappropriate food choice may cause diet are high in calories, fat, sodium and refined carbohydrates (Fatimah *et al.*, 2010). Research has found that high education people more likely to use food labels (Blitstein and Evans, 2006). Other than that, according to Hiew *et al.* (2010) respondents with at least a diploma had an extensively better level of knowledge of Nutrition Information Panel than those with a primary level education and better in food choices. In addition, children also recommended expanding their nutrition knowledge to select healthy food choices at schools, homes and in restaurants (Eboh and Boye, 2006). Furthermore, Islam and Ullah (2005) found that educational status have significant influence on knowledge and attitude of pregnant women toward nutrition. But another research done by Ahmadi *et al.* (2009), Al-Numair (2004) and Ozcelik *et al.* (2007) found that physicians do not have enough knowledge about nutrition and thus they need more education in nutrition to facilitate them during using nutritional information.

There are many factors being considered during buying the food products such as packaging, price, taste and nutritional labelling (Harnack *et al.*, 2008). Besides, the type of nutrition information used also influence the students understanding toward nutrition information thus influence them to read or not the labels. For example, different formats are used in different countries leading to confusing to the consumers during food purchasing decision. The present study was designed to determine the association between students' knowledge, attitude and practices on the use of food labels and to determine the factors that influence the use of food labels during making food purchasing decisions.

MATERIALS AND METHODS

Subjects: A cross-sectional study of undergraduate students at UiTM Puncak Alam in the Kuala Selangor district of Malaysia was conducted in June until July 2011 with a target group of diploma and degree students between 18-26 years old. All students studying in the Faculty of Health Sciences, Faculty of Pharmacy and Faculty of Office Management and Technology at UiTM were invited to participate in the study but only full-time and registered students were selected during the study period. By using a precision of 0.05 at a 95% confidence interval, the minimum sample size calculated by a single proportion formula. A non-probability sampling method (convenience sampling) was used to sample all the university students (n = 329). Three hundred twenty nine students (n = 329) volunteered to complete a Food Label Use Questionnaire (FLUQ). Ethical approval was obtained from the university before implementing this research. The questionnaires were distributed to the students during the day of data collection and were collected during that time. The students who not able to answer during that time, the questionnaires were collect on the

next day. Students were assured that their participants were voluntarily and the questionnaires were anonymous.

Questionnaire: A Self-administered questionnaire FLUQ that was modified from Blitstein and Evans (2006), Lewis *et al.* (2009) and a knowledge, attitude and practice study on food and nutrition (KAP) was used to assess the relationship between knowledge, attitude and practices on food label use among students at UiTM Puncak Alam. The FLUQ consisted of 26 questions; it included question about sociodemographics, level of knowledge about food and nutrition, attitude and practices related to using food labels, factors affecting the use of food labelling and student understanding and preferences for different nutrition information formats. To establish content validity, the questionnaire had been pre-tested and improved for intended purpose and usefulness. The questionnaire consisted of four main sections. Section A collected demographic data. The important question was the frequency of using food label by using 4-likert scale with answer ranging from often to never. There were eleven questions about students' demographics data, included sex (male or female), age, faculty, year (1, 2, 3 or 4), height, weight, BMI which categorized participants as normal weight (BMI < 25), overweight (25<BMI<30) or obese (BMI>30) and marital status, family income and level of education. Section B contained 8 multiple questions of food and nutrition. Section C contained the question about attitude on food label uses among UiTM's students were asked by using the 4-part Likert-type response set included most important, important, least important and not important. It also includes 2 questions about the factors influences the use of food labels during making food purchasing decision. The students can choose more that one answer based on the question about why refer the food label and hy do not refer the food label. Section D contained the question about practices on food label use, it were asked by using 4-part Likert-type response set included often, sometimes, rarely and never which was asked about the frequency of reading labelling on nutritional label such as total fat, calories from fat, trans fat, saturated fat (SF), cholesterol (chol), carbohydrate (CHO), protein, fibre, sugar, vitamin and mineral.

Statistical analysis: The data collected was analysed using Statistical Package for Social Sciences (SPSS), version 17.0 (SPSS Inc. Chicago, IL, USA). Hypothesis testing was completed using Independent T-test, Pearson Chi-square and descriptive analysis in which the statistical significant level was set at $p < 0.05$. The categorical variable results are presented as frequency and its percentage and the numerical variable results are presented as the Mean \pm SD.

RESULTS

Subject demographics: A total of 329 students were sampled, with the majority of the participants being female and most of them being Malays. The Mean \pm SD ages of the male (n = 57) and female (n = 272) students were 20.6 \pm 1.5 and 20.9 \pm 1.5, respectively. The number of students from diploma level was 156 students (43.9% male students and 48.2% female students) while from degree level was 173 students (56.1 male students and 51.8 female students). The students are selected from three faculty which is from Health Science (n = 220), Pharmacy (n = 20) and Office Management and technology (n = 89) correspondingly. Most respondent (68.4% male students and 62.5% female students) were reported to have a BMI in the normal BMI category, respectively (Table 1).

Table 1: Characteristic of study populations

Characteristics	Gender			
	Male (n = 57)		Female (n = 272)	
	n	%	n	%
Level of study				
Diploma	25	43.9	131	48.2
Degree	32	56.1	141	51.8
Faculty				
Health science	35	61.4	185	68.0
Pharmacy	5	8.8	15	5.5
Office management and technology	17	29.8	72	26.5
Year of study				
1	34	59.6	81	29.8
2	15	26.3	100	36.8
3	7	12.3	75	27.5
4	1	1.8	16	5.9
BMI				
Underweight (<18.5)	12	21.1	63	23.2
Normal (18.5-24.9)	39	68.4	170	62.5
Overweight (25-29.9)	6	10.5	29	10.7
Obese (>30)	0	0	10	3.7
Family income/month				
≤RM 1500	28	49.1	151	55.5
RM 1500-RM 2500	14	24.6	41	15.1
RM 2500-RM 4000	7	12.3	48	17.6
≥RM 4000	8	14.0	32	11.8

BMI: Body Mass Index, n = No. of respondent

Table 2: Level of nutrition knowledge

Variable	Gender					
	Male (n = 57)		Female (n = 272)		Total	
	n	%	n	%	n	%
Level of nutrition knowledge						
High	24	42.1	157	57.7	181	55.0
Medium	26	45.6	90	33.1	116	35.3
Low	7	12.3	25	9.2	32	9.7

n = No. of respondent

Level of nutrition knowledge: The majority of the students have high knowledge about basic nutrition knowledge (55% students) followed by medium level of nutrition knowledge (35.3% students) and low nutrition knowledge (9.7% students) respectively. Based on the table, can conclude that the female student have slightly high knowledge (57.7%) compare to male students (42.1%), respectively. The range of scores for each level was as follows which based on 7Q: High (6.0-7.0), Medium (4.0-5.0) and Low (1.0-3.0) (Table 2).

Frequencies of nutrition information use on food label during food purchasing decision according to gender: The majority of the students are “sometimes” use of food label during

Table 3: Frequency of food label use during food purchasing decision according to gender

Frequency	Gender					
	Male (n = 57)		Female (n = 272)		Total	
	n	%	n	%	n	%
Often	16	28.1	55	20.2	71	21.6
Sometimes	16	28.1	104	38.2	120	36.5
Rarely	17	29.8	95	34.9	112	34.0
Never	8	14.0	18	6.6	26	7.9

n = No. of respondents

Table 4: Association between knowledge on food label use

Nutrition knowledge	Use of food labels					χ^2 statistic (df)	p-value
	Often (%)	Sometimes (%)	Rarely (%)	Never (%)	Total (n = 329) (%)		
High	45 (24.9)	63 (34.8)	63 (34.8)	10 (5.5)	181 (55.0)	1.976 (1)	0.080 ^b
Medium	23 (19.8)	41 (35.3)	37 (31.9)	15 (12.9)	116 (35.3)		
Low	3 (9.4)	16 (50)	12 (37.5)	1 (3.1)	32 (9.7)		
Total	71 (21.6)	120 (36.5)	112 (34.0)	26 (7.9)	329		

^bp>0.05 indicate that is not significant association between knowledge and food label use

buying food product which is about 120 (36.5%) students from 329 students. It was followed by “rarely” use of food label (34% students), “often” use (21.6% students) and “never” use (7.9% students) respectively (p = 0.097). If compared based on the gender, male are “often” use the food label compared to female with 28.1 and 20.2% for each gender (Table 3). Conversely, majority of the female students are “sometimes” use the food label during food purchasing decision which is about 38.2% while majority of the male students (29.8%) are “rarely” use of food label during their food purchasing decision. However, there were no significant association between gender and the use of food label use during food purchasing decision (p = 0.097).

Association between knowledge on food label use: Majority of the students are “sometimes” use the food label during making food purchasing decision which is about 36.5% of the total students (n = 329). The students that have high knowledge of nutrition knowledge was 55% but only 24.9% of them are “often” use the food label during buying food product and 5.5% of them never use the food labels. There were no significant association between level of nutrition knowledge and the use of food label during making food purchasing decision (p = 0.080) (Table 4).

Association between attitudes on food label use: The item that was important for the students during buying food products are classified as attitude question same with the factors affecting the use of food labelling. Majority of the students stated that the price (50.2%), taste (53.8%), ingredient (52.3%) and expiry date (90.6%) was the “most important” aspect that makes them buying the food. But, most of them are “rarely” used the nutrition information. In addition, less than half of them which stated that price, taste, ingredient and expiry date are the “most important” aspect during buying are “often” use nutrition information on food labels (Table 5a). The factors affecting the use of food labelling are presented in Table 5b and c. Table 5b shows the

Table 5a: Association between attitudes (important aspect during buying food product) on food label use

Attitude item	Use of food labels				Total (n = 329) (%)	χ^2 statistic (df)	p-value
	Often (%)	Sometimes (%)	Rarely (%)	Never (%)			
Price							
Most important	42 (25.5)	46 (27.9)	63 (38.2)	14 (8.5)	165 (50.2)	0.401	0.00 ^a
Important	24 (17.3)	68 (48.9)	39 (28.1)	8 (5.8)	139 (42.2)	(1)	
Least important	5 (22.7)	5 (22.7)	10 (45.5)	2 (9.1)	22 (6.7)		
Not important	0 (0)	1 (33.3)	0 (0)	2 (66.7)	3 (0.9)		
Taste							
Most important	42 (23.7)	58 (32.8)	59 (33.3)	18 (10.2)	177 (53.8)	1.362	0.017 ^a
Important	25 (18.1)	52 (37.7)	53 (38.4)	8 (5.8)	138 (41.9)	(1)	
Least important	4 (28.6)	10 (71.4)	0 (0)	0 (0)	14 (4.3)		
Not important	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)		
Ingredient							
Most important	39 (22.7)	62 (36.0)	64 (37.2)	7 (4.1)	172 (52.3)	4.801	0.00 ^a
Important	30 (22.6)	49 (36.8)	41 (30.8)	13 (9.8)	133 (40.4)	(1)	
Least important	0 (0)	9 (50)	7 (38.9)	2 (11.1)	18 (5.5)		
Not important	2 (33.3)	0 (0)	0 (0)	4 (66.7)	6 (1.8)		
Packaging							
Most important	14 (19.7)	25 (35.2)	29 (41)	3 (42.3)	71 (21.6)	0.001	0.122 ^b
Important	37 (24.7)	56 (37.3)	42 (28)	15 (10)	150 (45.6)	(1)	
Least important	14 (15.6)	31 (34.4)	39 (43.3)	6 (6.7)	90 (27.4)		
Not important	6 (33.3)	8 (44.4)	2 (11.1)	2 (11.1)	18 (5.5)		
Expiry date							
Most important	70 (23.5)	100 (33.6)	105 (35.2)	23 (7.7)	298 (90.6)	0.099	0.007 ^a
Important	1 (3.8)	15 (57.7)	7 (26.9)	3 (11.5)	26 (7.9)	(1)	
Least important	0 (0)	5 (100)	0 (0)	0 (0)	5 (1.5)		
Not important	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)		

^ap-value<0.05 indicate that it have significant association between attitude and the use of food labels, ^bp-value>0.05 indicate that it not significant association between attitude and the use of food labels

factors why the students read the food label. Majority of the students read the food labels because they understand each information on food labels (63.2%) followed by for health or beauty (50.8%), concern about taste and price (42.9%), to control energy intake reported only 29.5%, experience food allergy (15.2%) and another 4% was for others reasons such as to know whether the food have the logo “halal” or not. Table 5b represent the factor why the students do not refer the food label during buying food products. It was because of the time constrain which reported about 55.9% of the students, followed by label was not attractive (38.6%), there is no label on certain food (26.4%), no health problem (24.3%), do not know how to use food label/nutrition information (17.9%) and about 1.8% for others reasons such as not enough info about the food product. However, most of the students attitude were not significant associated on nutritional information use except for do not know how to use nutritional information label (p = 0.028) and label was not attractive (p = 0.037) were significantly associated on food label use.

Association between practices on food label use: Based on the Table 6a-c it shows that majority of the students are ‘sometimes’ read the item or labelling on the food label. About half of the students ‘sometimes’ read the list of ingredient (53.8%), serving size (50.5%), health claim (55.6), calories/energy (50.8%) and fibre which are about 51.1%, respectively. Most of the labels

Table 5b: Association between attitudes (read food label) on food label use

Attitude item: Refer food label	Use of food labels				Total (n = 329) (%)	χ^2 statistic (df)	p-value
	Often (%)	Sometimes (%)	Rarely (%)	Never (%)			
Understand each info on food label							
Yes	54 (25.9)	72 (34.6)	66 (31.7)	16 (7.7)	208 (63.2)	3.601 (1)	0.090 ^b
No	17 (14.0)	48 (39.7)	46 (38.0)	10 (8.3)	121 (36.8)		
Experience food allergy							
Yes	6 (12)	23 (46)	20 (40)	1 (2)	50 (15.2)	0.103 (1)	0.066 ^b
No	65 (23.3)	97 (34.8)	92 (33)	25 (9)	279 (84.8)		
To control energy intake							
Yes	19 (19.6)	39 (40.2)	27 (27.8)	12 (12.4)	97 (29.5)	0.386 (1)	0.12 ^b
No	52 (22.4)	81 (34.9)	85 (36.6)	14 (6.0)	232 (70.5)		
For health or beauty							
Yes	38 (22.8)	2 (37.1)	53 (31.7)	14 (8.4)	167 (50.8)	0.271 (1)	0.82 ^b
No	33 (20.4)	58 (35.8)	59 (36.4)	12 (7.4)	162 (49.2)		
Concern about taste and price							
Yes	35 (24.8)	43 (30.5)	47 (33.3)	16 (11.3)	141 (42.9)	0.268 (1)	0.061 ^b
No	36 (19.1)	77 (41)	65 (34.6)	10 (5.3)	188 (57.1)		
Others							
Yes	0 (0)	9 (69.2)	2 (15.4)	2 (15.4)	13 (4)	0.545 (1)	0.026 ^a
No	71 (22.5)	111 (35.1)	110 (34.8)	24 (7.6)	316 (96)		

^ap-value<0.05 indicate that it have significant association between attitude and the use of food labels, ^bp-value>0.05 indicate that it not significant association between attitude and the use of food labels

Table 5c: Association between attitudes (Do not refer food label) on food label use

Attitude item: Do not refer food label	Use of food labels				Total (n = 329) (%)	X ² statistic (df)	p-value
	Often (%)	Sometimes (%)	Rarely (%)	Never (%)			
Do not know how to use food label/NIP							
Yes	5 (8.5)	21 (35.6)	27 (45.8)	6 (10.2)	59 (17.9)	7.797 (1)	0.028 ^a
No	66 (24.4)	99 (36.7)	85 (31.5)	20 (7.4)	270 (82.1)		
Time constrain/limited time							
Yes	44 (23.9)	64 (34.8)	62 (33.7)	14 (7.6)	184 (55.9)	0.561 (1)	0.696 ^b
No	27 (18.6)	56 (38.6)	50 (34.5)	12 (8.3)	145 (44.1)		
Label was not attractive and confusing							
Yes	17 (13.4)	52 (40.9)	46 (36.2)	12 (9.4)	127 (38.6)	0.472 (1)	0.037 ^a
No	54 (26.7)	68 (33.7)	66 (32.7)	14 (6.9)	202 (61.4)		
There is no label on certain food							
Yes	21 (24.1)	30 (34.5)	31 (35.6)	5 (5.7)	87 (26.4)	0.415 (1)	0.736 ^b
No	50 (20.7)	90 (37.2)	81 (33.5)	21 (8.7)	242 (73.6)		
No health problem							
Yes	16 (20)	28 (35)	26 (32.5)	10 (12.5)	80 (24.3)	1.134 (1)	0.379 ^b
No	55 (22.1)	92 (36.9)	86 (34.5)	16 (6.4)	249 (75.7)		
Others							
Yes	2 (33.3)	4 (66.7)	0 (0)	0 (0)	6 (1.8)	2.918 (1)	0.214 ^b
No	69 (21.4)	116 (35.9)	112 (34.7)	26 (8)	323 (98.2)		

^ap-value<0.05 indicate that it have significant association between attitude and the use of food labels, ^bp-value>0.05 indicate that it not significant association between attitude and the use of food labels

Table 6a: Association between practices on food label use

Practices item	Use of food labels				Total (n = 329)	χ^2 statistic (df)	p-value
	Often (%)	Often (%)	Rarely (%)	Never (%)			
Read: List of ingredient							
Often	30(28)	30(28)	28(26.2)	7(6.5)	107(32.5)	3.951(1)	0.012a
Sometimes	29(16.4)	29(16.4)	68(38.4)	14(7.9)	177(53.8)		
Rarely	12(27.3)	12(27.3)	16(36.4)	4(9.1)	44(13.4)		
Never	0(0)	0(0)	0(0)	1(100)	1(0.3)		
Read: Serving size							
Often	22(32.4)	22(32.4)	18(26.5)	4(5.9)	68(20.7)	0.682(1)	0.039 a
Sometimes	23(13.9)	23(13.9)	61(36.7)	16(9.6)	166(50.5)		
Rarely	23(28.4)	23(28.4)	25(30.9)	5(6.2)	81(24.6)		
Never	3(21.4)	3(21.4)	8(57.1)	1(7.1)	14(4.3)		
Read: Health claim							
Often	24(27.9)	24(27.9)	19(22.1)	6(7)	86(26.1)	2.097(1)	0.000a
Sometimes	29(15.8)	29(15.8)	81(44.3)	11(6)	183(55.6)		
Rarely	15(30.6)	15(30.6)	9(18.4)	5(10.2)	49(14.9)		
Never	3(27.3)	3(27.3)	3(27.3)	4(36.4)	11(3.3)		
Read: Calories/energy							
Often	19(21.3)	19(21.3)	24(27)	7(7.9)	89(27.1)	0.035(1)	0.003a
Sometimes	35(21)	35(21)	73(43.7)	9(5.4)	167(50.8)		
Rarely	13(20)	13(20)	14(21.5)	8(12.3)	65(19.8)		
Never	4(50)	4(50)	1(12.5)	2(25)	8(2.4)		
Read: Calories from fat							
Often	20(21.5)	20(21.5)	30(32.3)	3(3.2)	93(28.3)	0.160(1)	0.000a
Sometimes	30(20)	30(20)	64(42.7)	13(8.7)	150(45.6)		
Rarely	17(22.4)	17(22.4)	17(22.4)	6(7.9)	76(23.1)		
Never	4(40)	4(40)	1(10)	4(40)	10(3.0)		

*p-value <0.05 indicate that it have significant association between practices and the use of food labels. ^bp-value>0.05 indicate that it not significant association between practices and the use of food labels

were significantly associated with the use of nutrition information on food labels (p<0.05) except for reading the label of sodium (p = 0.188), total fat (p = 0.064), carbohydrate (p = 0.301) and vitamin and mineral (p = 0.315) were not significant associated with the use of nutrition information on food labels.

DISCUSSION

A recent study has suggested identifying the use of nutrition information panels and sociodemographic variables among adults who make household food purchasing decisions. Like others studies, conversely, this was based on the association between knowledge, attitude and practices on food label use among students. No studies that being aware of examine this association and the factors affecting the use of nutrition information on food labels among students. This study found that majority of the students either male or female are “sometimes” used the food label during making food purchasing decision. The present study stated those males are less likely to use nutrition information on food label than females (Blitstein and Evans, 2006; Kim *et al.*, 2000). Surprisingly, this study showed that male students are “often” use the food label compared to female where most of the female are “sometimes” used the food labels during their food purchasing decisions. But why do female students are sometimes not often using nutrition information

Table 6b: Association between practices on food label use

Practices item	Use of food labels				Total	χ^2 statistic (df)	p-value
	Often	Sometimes	Rarely	Never			
Read: Total fat							
Often	22 (22.4)	39 (39.8)	31 (31.6)	6 (6.1)	98 (29.8)	0.082 (1)	0.064b
Sometimes	28 (18.8)	49 (32.9)	61 (40.9)	11 (7.4)	149 (45.3)		
Rarely	18 (25)	31 (43.1)	17 (23.6)	6 (8.3)	72 (21.9)		
Never	3 (30)	1 (10)	3 (30)	3 (30)	10 (3.0)		
Read: Trans fat							
Often	22 (27.2)	36 (44.4)	19 (23.5)	4 (4.9)	81 (24.6)	1.980 (1)	0.014a
Sometimes	28 (17.4)	53 (32.9)	67 (41.6)	13 (8.1)	161 (48.9)		
Rarely	15 (21.4)	30 (42.9)	19 (27.1)	6 (8.6)	70 (21.3)		
Never	6 (35.3)	1 (5.9)	7 (41.2)	3 (17.6)	17 (5.2)		
Read: Saturated fat							
Often	23 (29.5)	36 (46.2)	16 (20.5)	3 (3.8)	78 (23.7)	5.024 (1)	0.002a
Sometimes	27 (17.2)	52 (33.1)	67 (42.7)	11 (7)	157 (47.7)		
Rarely	15 (19)	31 (39.2)	24 (30.4)	9 (11.4)	79 (24.0)		
Never	6 (40)	1 (6.7)	5 (33.3)	3 (20)	15 (4.6)		
Read: Cholesterol							
Often	25 (27.2)	31 (33.7)	33 (35.9)	3 (3.3)	92 (28.0)	2.310 (1)	0.041a
Sometimes	25 (16.7)	62 (41.3)	50 (33.3)	13 (8.7)	150 (45.6)		
Rarely	18 (23.4)	27 (35.1)	25 (32.5)	7 (9.1)	77 (23.4)		
Never	3 (30)	0 (0)	4 (40)	3 (30)	10 (3.0)		
Read: Sodium/salt							
Often	21 (27.6)	28 (36.8)	22 (28.9)	5 (6.6)	76 (23.1)	2.228 (1)	0.188b
Sometimes	27 (17.3)	63 (40.4)	55 (35.3)	11 (7.1)	156 (47.4)		
Rarely	20 (23.3)	28 (32.6)	31 (36)	7 (8.1)	86 (26.1)		
Never	3 (27.3)	1 (9.1)	4 (36.4)	3 (27.3)	11 (3.3)		

^ap-value<0.05 indicate that it have significant association between practices and the use of food labels. ^bp-value>0.05 indicate that it not significant association between practices and the use of food labels

consistently that male students? One reason may be in their minds the female students have limited time to read the label and more than worried about the assignment given and their education than to spend time reading the nutrition information on every purchase of food products. However, there were no significant association between gender and the use of food label use during food purchasing decision (p = 0.097).

Previous studies have shown that level of knowledge influence the using of food label. It is supported by Blitstein and Evans (2006) stated that higher levels nutrition knowledge was more likely to use nutrition information on food label when making food purchasing decision than those who are low education. Additionally, those with higher education appear to be more able of interpreting the information provided on nutrition labels and incorporate that information into a healthy diet (Prathiraja and Ariyawardana, 2003; Kim *et al.*, 2000; Barreiro-Hurle *et al.*, 2010). Similar to the study done by Marietta *et al.* (1999) found that knowledge was positively correlated with use of food labels. It shows that educated people was more nutrition conscious to get better food choices and healthy eating. But according to Onay *et al.* (2011) stated that those customers with lower educational levels were found to display more conscious consumer attitudes during food purchasing decision. In this study shows no significant association between level of

Table 6c: Association between practices on food label use

Practices item	Use of food labels					χ^2 statistic (df)	P-value
	Often (%)	Sometimes (%)	Rarely (%)	Never (%)	Total (%)		
Read: Carbohydrate							
Often	19 (21.8)	34 (39.1)	30 (34.5)	4 (4.6)	87 (26.4)	1.154 (1)	0.301 ^b
Sometimes	31 (19.5)	63 (39.6)	52 (32.7)	13 (8.2)	159 (48.3)		
Rarely	18 (25.4)	22 (31)	25 (35.2)	6 (8.5)	71 (21.6)		
Never	3 (25)	1 (8.3)	5 (41.7)	3 (25)	12 (3.6)		
Read: Protein							
Often	20 (21.3)	43 (45.7)	28 (29.8)	39 (3.2)	94 (28.6)	2.314 (1)	0.009 ^a
Sometimes	30 (19.1)	55 (35)	59 (37.6)	13 (8.3)	157 (47.7)		
Rarely	18 (26.9)	21 (31.3)	22 (32.8)	6 (9.0)	67 (20.4)		
Never	3 (27.3)	1 (9.1)	3 (27.3)	4 (36.4)	11 (3.3)		
Read: Fibre							
Often	17 (22.1)	34 (44.2)	23 (29.9)	3 (3.9)	77 (23.4)	0.815 (1)	0.010 ^a
Sometimes	29 (17.3)	61 (36.3)	65 (38.7)	13 (7.7)	168 (51.1)		
Rarely	22 (31.0)	24 (33.8)	19 (26.8)	6 (8.5)	71 (21.6)		
Never	3 (23.1)	1 (7.7)	5 (38.5)	4 (30.8)	13 (4.0)		
Read: Sugar							
Often	26 (28.6)	32 (35.2)	29 (31.9)	4 (4.4)	91 (27.7)	3.108 (1)	0.020 ^a
Sometimes	24 (15.2)	68 (43.0)	53 (33.5)	13 (8.2)	158 (48.0)		
Rarely	18 (25.7)	19 (27.1)	27 (38.6)	6 (8.6)	70 (21.3)		
Never	3 (30)	1 (10)	3 (30)	3 (30)	10 (3.0)		
Read: Vitamin and mineral							
Often	20 (20.4)	36 (36.7)	36 (36.7)	6 (6.1)	98 (29.8)	0.450 (1)	0.315 ^b
Sometimes	29 (19.2)	54 (35.8)	57 (37.7)	11 (7.3)	151 (45.9)		
Rarely	18 (27.3)	24 (36.4)	18 (27.3)	6 (9.1)	66 (20.1)		
Never	4 (28.6)	6 (42.9)	1 (7.1)	3 (21.4)	14 (4.3)		

^ap-value <0.05 indicate that it have significant association between practices and the use of food labels, ^bp-value>0.05 indicate that it not significant association between practices and the use of food labels

nutrition knowledge and the use of food labels. The students that have high knowledge about nutrition was 55% but only 24.9% of them are “often” use the food label during buying food product while 5.5% of them “never” use the food labels. This shows that the student that have high knowledge about nutrition do not use it to guide them during buying food products.

There are many factors being considered during buying food products such as packaging, price, taste, nutritional content and expiry date. According to Harnack *et al.* (2008) found that taste was the most highly factors rated when buying food from groceries. It is supported by Drichoutis *et al.* (2006) and Goodman *et al.* (2011), which stated that the meal planner especially may be more interested in taste than nutrition information. Furthermore, the research done by Aktas *et al.* (2009), revealed that there is significant different between the educational level of the university graduated students and the criteria they concern while purchasing like package, brand, contents, production date, expiry date, nutritional value and healthfulness. However, this study shows that expiry date was the higher factors when buying food product among students followed by taste, ingredient, price, nutrient content and lastly was packaging (21.6%). This may because of the students more aware about the safety of the food compared to taste and price which may not healthy and costly. It can see that nutrient content of the food not the higher factors during buying.

Furthermore, majority of the students' attitude read the food labels because they understand each information on food labels (63.2%) followed by for health or beauty (50.8%), concern about taste and price (42.9%), to control energy intake reported only 29.5%, experience food allergy (15.2%) and another 4% was for others reasons such as to know whether the food have the logo "halal" or not. According to Driskell *et al.* (2008), the most frequently selected reasons for using nutrition label were because have general knowledge (51.7%), concern about overall health (49.2%), calorie counting (46.7%) and concern about certain nutrient (43.3%). This shows that the reasons why the student use nutrition label on food label because they understand the information on the label. Yet, the factors why do the students do not refer food label was time constrain or limited time (55.9% students) and the label was not attractive and confusing (38.6%). This finding had a similar finding as previous study conducted by Conklin *et al.* (2005), stated that the time pressure may influence the use of nutrition information. It supported by Barreiro-Hurle *et al.* (2010) which state that the use of food label is influences by economic conditions and time constraints. All of these findings show that the majority of the consumers have limited time to read the food label and understand it during buying food product. They assume that they know what they want to buy and there is no point to waste the time to read the food label and do calculation on groceries but finally they will buy the food even though it not meet the nutrient requirement. However, the association between attitude on food label or nutrition information use with varying results.

Based on the Table 6a-c it shows that most of the 15 items that appear on Nutrition Facts label are significantly associated with the use of food label ($p < 0.05$). So, there is significantly association between practices and the use of food labels. This value provides insight into the relative importance students placed on each of these items. According to Borra (2006), the consumers were most aware and practice to read the label of calories (89%), followed by total fat (81%), sodium (75%), sugar (73%) carbohydrate (72%), saturated fat (71%) and cholesterol (66%). This shows that the consumer more aware on the fat content in a food product which it may because of the health conscious and to control their weight. But in this study, practices by reading the list of ingredient and health claim was the highest among others labels. It is supported by the research done by Driskell *et al.* (2008), which state that female Canadian university students more prone to read ingredient information than others item label. This may be due to religious factors that prohibit them from consuming any sources that prohibited by religion or any other chemical or substance added to the food that can cause allergic reaction.

The limitation of this study was the participants involved were mostly Malay students which limit the generalisability of the finding. It may not reflect the true features of the Malaysian's students.

CONCLUSIONS

Overall, students have mixed views on food labelling. Some find it useful for making better choices, whereas others believed it is too complicated, taking time and as students it should be easier to use. For undergraduate university students, taste and price may the most highly rated factor when buying food product rather that nutritional labelling. It may due to limited budget, time constrain and just to get energy and full their appetite. However, information concerning the use of food label was limited. This finding also suggest that the program about the important of food labelling and how to use it should be held and give awareness to the students that "reading food

labels” as one of many strategies, along with controlling portions, making better food choice, exercising getting more sleep, drinking more water and others. Further research is needed to understand this association and the factors influence the use of food label in detail.

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