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Understanding and Use of Food Package Nutrition Label among Educated Young Adults

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Abstract: Nutrition information on food labels has become one of the major components included in Malaysian Dietary Guideline in order to promote healthy dietary habits among Malaysians. This study was aimed to assess the understanding on nutrition label information and ability to perform common nutrition label task and to explore the extent of nutrition label usage as well as the reason associated with the intensity of label used among educated young adults. Cross sectional study conducted by distributing 357 self administered questionnaires among students in UiTM Puncak Alam and only 295 returned (response rate = 82.6%). The questionnaires collected information of demographics, nutrition knowledge and understanding, nutrition label task, item used on nutrition label and the reason of nutrition label use. The mean ages are 21±1.745 which most of the respondent currently study at degree (73.9%) and diploma (26.1%) level. The nutrition knowledge means score 12.08±4.287 where about 37.6% have low knowledge and only 30.5% have good knowledge. In nutrition label task section, majority of the subjects (69.5%) unable to perform resulting in mean score 0.94±1.097. The most item used on food labels are ingredient list (78.3%) while percent daily value information are the least use (56.5%) by the subjects. More than half (53.6%) of the subjects do not use the nutrition label mainly because they do not understand the terms on the label (32.4%). In contrast, the label user uses the label to assess specific nutrient content of the food (38.4%). The level of nutrition knowledge is significantly associated with performance on nutrition label task ($p < 0.001$) where high proportion of subject with low nutrition knowledge unable to perform the nutrition label task. In conclusion, this study found that there is low understanding of nutrition knowledge and use of nutrition label among young adults.

Key words: Nutrition label, label use, young adults, label understanding, packaging food

INTRODUCTION

In these few years, south East Asian region has increase interest in nutrition label and claim (Tee, 2002). Nutrition label has become a priority when purchasing food due to the increment of diet related disease (Drichoutis *et al.*, 2006). The continuous trend of obesity raises the questions on how it motivates consumers to choose healthier food (Berning *et al.*, 2010). This is supported by reported from the NHMSII survey found that there is increment in prevalence of overweight from 16.6% to 29.1% (Noor Safiza *et al.*, 2008).

Young adults with age range 18-29 years old (Norimah *et al.*, 2010) studied as the sample because within this age they experience a high stress period because of hectic life to earn a living and very active (Farrell and Nicoteri, 2007). In addition, physical activity level reduce, the maintenance of weight become a major concern (Farrell and Nicoteri, 2007) and energy intake increase (Shah *et al.*, 2010). This may due to increase availability

of food consumption in large portion and low understanding of serving size for certain food item (Shah *et al.*, 2010). In fact, Mirnalini *et al.* (2008) also found that the highest increment in energy intake is among subjects with college/university education level.

As tools to assist consumers to practice healthy dietary intake, nutrition label primary objective is to describe the nutritional quality of a food factually and informatively (Tee, 2002). Besides, it conveys information of nutrient content through the label and help consumers to choose food wisely to plan their daily meal (Tee, 2002). As a potent tool, basic knowledge requires to interpret the information conveyed in order to have an impact on the consumers (Taylor and Wilkening, 2008). Temple *et al.* (2010) states that consumers can alter their food choice and consumption by understand the nutrition label. Thus, the question of nutrition knowledge should assess the understanding of nutrition information on food label (Grunert *et al.*, 2010).

Grunert *et al.* (2010) found that the degrees of understanding are higher than usage of nutrition label. In addition, Barreiro-Hurle *et al.* (2010) stated that consumers who use nutrition label has better nutrition knowledge and understanding. Another study done by Misra (2007) stated those undergraduates students are more knowledgeable in nutrition and have good attitude on food label. The study also suggest that positive attitude toward food label possess by female, older students, who use supplement and have exposure to nutrition education.

Since, study on consumers interpretation of nutrition label are lack (Fatimah *et al.*, 2010) and based from Malaysian Dietary Guideline (2010) who suggest small scale studies has been conducted among various consumer groups in different part of the country, this study was aimed (i) to assess the understanding on nutrition label information and ability to perform common nutrition label task and (ii) to explore the extent of nutrition label usage and the reason associated with the intensity of label used among educated young adults.

MATERIALS AND METHODS

Study design and participants: A cross sectional study was conducted among educated young adults age 18-29 years old in UiTM Puncak Alam. Students involved currently study in three main faculties which are Faculty of Health Science, Faculty of Office Management and Technology and Faculty of Pharmacy. The student from nursing and nutrition and dietetic department were excluded in this study. Convenient sampling was used to sample 357 subjects study at diploma, degree, master and doctor of philosophy level. Subjects was assured their participation were anonymous.

Questionnaires: A total of 357 questionnaires distributed and the participation is voluntary and anonymous due to separation of consent form. The questionnaires prepared based from the National Coordinating Committee for Food and Nutrition (NCCFN) and previous research study conducted by Misra (2007) with some modification based from the Malaysian Dietary Guideline 2010. The content of research instrument was validated by conducting pilot test on 10 randomly selected students and modified to improve the need of the study. The respondent in pilot study has similar criteria of subject involves in this study. The questionnaires prepared in English and it was self administered. It is categorized into five main sections which were demographic data, nutrition knowledge and understanding, nutrition label use task, specific item used on food label and factors of nutrition label used.

Demographic data: The respondent self-reported their age, gender, race, level of education (diploma, degree, master or doctor of philosophy), faculty, weight, height and physical activity frequency.

Nutrition knowledge and understanding: A total of 22 questions developed based from National Coordinating Committee for Food and Nutrition (NCCFN) with some modification in Malaysian Dietary Guideline 2010. The questions include information on food label information, basic nutrition information, carbohydrates, protein, fat, sodium and salt. Most questions used the common terminology and information on nutrition label. The correct answer will be scored 1, wrong answer score as 0 and not sure scored as 9. Based on the maximum score of 22 points, the total score classified into good (>15), average (12-14) as and low (<11) nutrition knowledge and understanding.

Nutrition label use task: Two samples of nutrition information panels adapted directly from a loaf of bread and multiple package of biscuits. In nutrition label for bread, respondent required to identify the total calorie in whole packaging and amount of carbohydrate per serving (in gram). In contrast, in nutrition label of biscuits, question asked on total calories and dietary fiber in a packet of biscuit. Correct interpretation of nutrition label scored as 1 and wrong interpretation scored as 0. Total score in nutrition label application section categorized by considered >2 as able to use and score ≤ 1 considered as unable to use nutrition label.

Specific item use on food label: A list of 12 common items include on the food package nutrition label such as serving size, total energy, saturated fat level, trans fat level, total sodium and etc was measured using Likert scale (1 = Never and 5 = Always) to observe the extent of use among the subjects. Analysis of specific item used using likert scale collapsed "sometimes", "often" and "always" response to obtain the most used item on nutrition label while "never and "rarely" response collapsed in one group.

Factors of nutrition label used: A question asked the respondent use of nutrition label scored as yes (1) and no (0). Subjects who answer yes required to state the reason that induce them using food label and similar to those who answer no. Five common reason claimed by the consumers listed including an option for other reason. The answer was analyzed using multiple responses.

Statistical analysis: Data entry and descriptive statistic was carried out using SPSS, version 17.0 (SPSS Inc. Chicago, IL, USA). Categorical data presented in frequency and percentage while numerical data presented as mean \pm SD. Hypothesis testing conducted using chi-squared where p-value<0.05 considered as significant.

Table 1: Demographic data of educated young adults in UiTM Puncak Alam

	All (n = 295)	
	n	%
Age (y), mean±SD	21±1.745	
Gender		
Male	62	21
Female	233	79
Race		
Malay	286	96.9
Melanau	3	1.0
Kadazan	1	0.3
Iban	1	0.3
Others	4	1.4
Level of education		
Diploma	77	26.1
Degree	218	73.9
Faculty		
Health sciences	145	49.2
Office management and technology	111	37.6
Pharmacy	39	13.2
BMI classification		
Underweight	66	22.4
Normal	162	54.9
Overweight	35	11.9
Obese	16	5.4
Physical activity		
Never	22	7.5
Occasionally	182	61.7
1-3 times/week	66	22.4
At least 5 times/week	23	7.8

RESULTS

Demographic data: Table 1 show demographic data of the participants. This cross sectional study was conducted among students in UiTM Puncak Alam age 18-29 years old. A total of 357 questionnaires distributed and only 295 returned (response rate = 82.6%) which comprises of students from Faculty of Health Science (49.2%), Faculty of Office Management and Technology (37.6%) and Faculty of Pharmacy (13.2%). This study comprises male (21%) and female (79%) student with the mean age 21±1.745. Most of the respondent currently study at degree (73.9%) and diploma (26.1%) level with the majority are bumiputeras Malays (96.9%), Melanau (1.0%), Kadazan (0.3%), Iban (0.3%) and others (1.4%). More than half of the respondents have normal body mass index (54.9%), followed by underweight (22.4%), overweight (11.9%) and obese (5.4%). About 61.7% of subjects do physical activity occasionally, 22.4% do one to three times per week, 7.8% do at least five times per week and 7.1% never do physical activity.

Nutrition knowledge and understanding: The score for each questions in nutrition knowledge and understanding section summarized in Table 2. From the analysis, mean score are 12.08±4.287 with majority of subjects answer correctly except for a few questions.

Table 2: Nutrition knowledge and understanding score for each question

Questions	Correct (%)	Wrong (%)	Not sure (%)
NKU1	82.4	3.1	13.6
NKU2	83.7	7.1	9.2
NKU3	63.4	4.7	31.2
NKU4	59.3	4.4	33.2
NKU5	26.1	10.2	62.4
NKU6	27.5	8.8	61.0
NKU7	30.8	10.5	56.9
NKU8	79.3	8.5	11.2
NKU9	59.3	23.4	15.9
NKU10	73.2	8.8	15.9
NKU11	32.9	13.6	52.9
NKU12	74.6	7.5	16.9
NKU13	51.2	23.7	24.7
NKU14	54.9	18.3	23.7
NKU15	70.5	13.2	15.6
NKU16	80.0	5.4	14.2
NKU17	60.3	12.5	27.1
NKU18	22.4	16.6	60.7
NKU19	33.9	23.1	43.1
NKU20	12.2	52.9	34.6
NKU21	52.2	9.2	38.0
NKU22	77.6	4.4	16.9
Classification of nutrition knowledge			%
Mean±SD			12.08±4.287
Low knowledge			37.60
Average knowledge			31.90
Good knowledge			30.50

Note: NKU: Nutrition Knowledge and Understanding

More than half of the subject does not sure with the questions 5, 6, 7, 11 and 18. The question asked knowledge of percent daily value that show high nutrient level (62.4%), percent daily value that show low nutrient level (61.0%), recommendation of fat from total calories (60.7%), recommended energy requirement daily for active women and sedentary men (56.9%) and recommendation of carbohydrate from total calories (52.9%). Majority of respondents wrongly interpret question 20 (52.9%) that asked the difference of salt and sodium. In addition, 43.1% subject's not sure function of Trans-fat provides health benefits or not. From the total score calculated, 30.5% subjects classified as having good nutrition knowledge, 31.9% have average and 37.6% have low nutrition knowledge and understanding.

Nutrition label use performance: Table 3 shows the frequency of response in this section. The mean score for this section are 0.94±1.097. Most of the respondents unable to interpret the total calories in whole package of bread (93.6%) and unable to identify the carbohydrates provided in one serving of bread (77.3%). This was due to misinterpret one serving of bread is equal to one slice. In the second nutrition label, 76.9% of respondent unable to interpret total calories per packet of biscuits and 58.0% wrongly interpret dietary fiber in a serving of biscuit. Surprisingly, more than half of the subjects does not perform (69.5%) in nutrition label use task.

Table 3: Frequency of nutrition label task score

Question no	Context of questions	Answers			
		Correct		Wrong	
		n	%	n	%
1a	Total calories in whole packaging of bread	19	6.4	276	93.6
1b	Gram of carbohydrate in 1 serving of bread	67	22.7	228	77.3
2a	Total calories in a packet of biscuit	68	23.1	227	76.9
2b	Gram of dietary fiber in 1 serving of biscuit	124	42.0	171	58.0
Classification of ability to interpret label		n		%	
Perform		90		30.5	
Not perform		205		69.5	
Nutrition label use task score Mean±SD		0.94±1.097			

Table 4: The frequency and percentage of reason for nutrition label usage

Nutrition label use	All subjects (n=295)	
	n	%
Use	137	46.4
Not use	158	53.6
Reason of nutrition label use		
To assess specific nutrient content of different product	83	38.4
Have allergy on certain food	19	8.8
For health and beauty	56	25.9
Control energy intake from food	32	14.8
To avoid certain nutrient	20	9.3
Others	6	2.8
Reason of not using nutrition label		
I do not have time	39	18.6
Do not understand the terms on the package	68	32.4
Size of the prints are too small	23	11.0
I do not have health problem	15	7.1
The information is confusing	50	23.8
Others	15	7.1

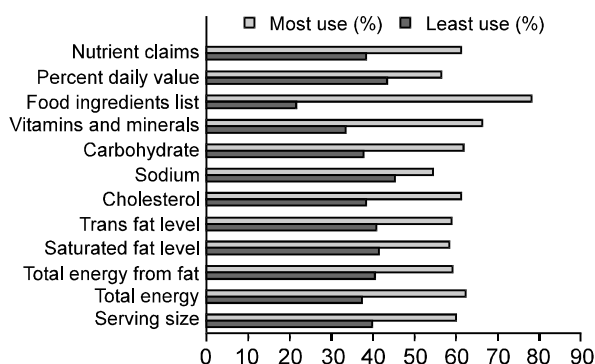


Fig. 1: The common item used by educated young adults on food packages

Specific item used on nutrition label: Figure 1 show the most common item used by consumers when purchasing packaging. The ingredient list are the most common item used (78.3%), followed by vitamin and minerals (66.4%), total energy (62.4%), carbohydrate (61.9%), both cholesterol level and nutrient claims (61.4%), serving size (60.0%), total energy from fat (59.3%), trans fat (59.0%), saturated fat (58.3%) and percent daily value (56.5%).

Nutrition label use and factors of usage: Table 4 list the frequency and percentage of label usage and the factors associated. About half of the respondent claim they do not use the nutrition label (53.6%) and only 46.4% use the label. The most common reason of nutrition label use is to assess specific nutrient content on different product (38.4%), for health and beauty (25.9%), to control energy intake from food (14.8%), to avoid certain nutrient (9.3%), because of having allergy to certain food (8.8%) and other reason (2.8%). In contrast, subjects do not refer to nutrition label because they do not understand the terminology on the package (32.4%), confuse with the information (23.8%), do not have time (18.6%), small printing size (11.0%), no health problems (7.1%) and other reason (7.1%).

From the statistical analysis, level of nutrition knowledge is significantly associated with performance of nutrition label task ($p < 0.01$). There is high proportion of subjects with low nutrition knowledge unable to perform in nutrition label task compared to subject with high and average knowledge (Table 5). In contrast, there was no significant association between level of nutrition knowledge and nutrition label use ($p = 0.404$) There was also no significant association between gender and nutrition label use ($p = 0.820$) (Table 6).

Table 5: Level of nutrition knowledge and performance in nutrition label task

Knowledge level	Perform label task n(%)	Do not perform label task n(%)	X ² statistic (df)	p-value
Low	18(15.8) ^a	96(84.2) ^b	24.692(2)	<0.001
Average	30(31.9)	64(68.1)		
Good	42(48.3)	45(51.7)		

Superscripts with different letters are significantly different at p<0.05 within the same row; n = 295

Table 6: Label usage according to level of knowledge and gender

	Use label n(%)	Do not use label n(%)	X ² statistic (df)	p-value
Good knowledge	44(48.9) ^a	46(51.1) ^a	1.811(2)	0.404
Average knowledge	47(50.0)	47(50.0)		
Low knowledge	46(41.4)	65(58.6)	0.052 (1)	0.820
Male	28(45.2) ^a	34(54.8) ^a		
Female	109(46.8)	124(53.2)		

Superscripts with different letters are significantly different at p<0.05 within the same row; n = 295

DISCUSSION

In promoting healthy eating habit, nutrition education helps increase knowledge about nutrient and impact on health to promote the usage of nutrition label (Lin *et al.*, 2004). The present study shows that educated young adults have low nutrition knowledge and understanding. This is contradicting with Grunert *et al.* (2010) who stated that younger people have higher level of understanding and nutrition knowledge. This might be due to lack of interest in health care issues among young adults in Malaysia (Norimah *et al.*, 2010).

Present study shows the confusion commonly develops on questions related to percent daily value, energy requirement and recommended intake of major nutrient. This could be due to majority of Malaysian adults have moderate understanding on the key messages in dietary guidelines (Norimah *et al.*, 2010). In addition, Rothman *et al.* (2006) study among patients also claim the problems in understanding the information on percent daily value and not understand what percent daily value give present (Hawthorne *et al.*, 2006). Percent daily values give consumers the relative significant of information for their daily diet and enable them to compare the foods (Taylor and Wilkening, 2008).

The common mistake done in present study when questions asked the differences between sodium and salt. Grimes *et al.* (2009) shows similar finding in their study where almost half of their subject interpret that the salt and sodium are similar. Besides, Trans fat also being misinterpreted as providing health benefits. This is similar to study by Lin and Yen (2010) where Trans fat also wrongly interpret as providing health benefits.

Previous study by Pelletier *et al.* (2004) found that more than half of the patients unable to interpret the total calorie in the nutrition label due to confusion between calorie per serving and calorie per package and partial serving size (Hawthorne *et al.*, 2006). This have no difference with present study where subjects usually cannot identify the calorie in the packaging and do not understand the serving size. The misinterpretation of serving size is common and this may due to low

knowledge regarding serving size (Shah *et al.*, 2010) which may lead to over or under estimation of nutrient intake (Rothman *et al.*, 2006). Moreover, the serving size define in nutrition label are not similar with the serving size define by the food pyramid (Norimah *et al.*, 2010). In addition, viewing nutrition label quickly may also cause misunderstanding on the nutrient content declared on the label whether it represent whole package or only a portion (Taylor and Wilkening, 2008). Surprisingly, Fatimah *et al.* (2010) findings were contradicted where more than half of the subject able to extract the nutrition information from the similar nutrition fact panel format use in this study. This may due to some of the subject who receives nutrition education prior to the study helps them to use the information in selecting food (Lin *et al.*, 2004).

Study done by Bowman (2005) stated that less men in young adult age and more women and older adults put their priority on nutrition when purchasing food. Although the study on label usage shows no consistency, most of the study found that label usage affect by gender and education level (Drichoutis *et al.*, 2006). However, Fitzgerald *et al.* (2008) found that there are no relation on the label use and education. This might due to having problems to comprehend nutritional information, technical information and energy allotment experience among parents who preferred simple and more visual aspect nutrition fact panel for better understanding (Norgaard and Brunso (2009). For the same reason, similar problems faced among educated young adults in current study which more than half does not use the nutrition label. This is due to unable to understand the term on the package, confuse, do not have time and small printing nutrition label size. Similar to study by Driskell *et al.* (2008), time constraint becomes a major reason among student who do not use nutrition label.

Most of the reason to use nutrition label are to assess specific nutrient content of different product, for health and beauty purpose and control energy intake from food. This agree with study by Driskell *et al.* (2008) where about half of their respondents use nutrition label for general knowledge, 49.2% concern about health, 46.7%

to count calorie and 43.3% particular about certain nutrient. This could be due to having special diet, have well understanding in nutrition knowledge (Lin *et al.*, 2004), to avoid harmful nutrient and have more available time (Drichoutis *et al.*, 2006). Furthermore, these consumers prefer to choose diet low in fat and cholesterol (Lin *et al.*, 2004).

Surprisingly, more than half numbers of subject with good nutrition knowledge unable to perform in nutrition label task. This is similar to findings by Rothman *et al.* (2006) that higher education level patients also having problems in interpreting the food label. This could be due to unable to interpret and understand the serving size (Norimah *et al.*, 2010).

Finding among educated young adults shows that level of nutrition knowledge does not influence the label use. This is contradict with previous study by Barreiro-Hurle *et al.* (2010) where subject with high nutrition knowledge use nutrition label more when purchasing goods and Fitzgerald *et al.* (2008) where well nutritional knowledge Latinas subject use the food label. The phenomena among our young adults may due to lack of awareness, understanding and practice to select food healthily. Moreover, food selection among college student could also be due to taste and cost constraint instead of choosing healthier product (Misra, 2007). However, this should be further investigated in larger young adult population in Malaysia.

Present study found that subject prefers to use ingredient list most often compared to other items. This is contradict with study done by Temple *et al.* (2010) that reports majority of adults in university at buffalo used calorie and fat information. Moreover, Satia *et al.* (2005) also found that African American adults in North Carolina use serving size energy, energy from fat, gram of fat and cholesterol more. This could be due to low understanding on how the information helps in planning their meals. Information about calorie on fat is among the least used by subjects. This supported findings by Norimah *et al.* (2010) which found one of the key recommendation confused by the consumers is 'limit the intake of saturated fat to less than 10% of total daily calorie intake'. The study show that consumers unable to justify the recommended requirement when they use the item on nutrition label.

Conclusion: Nutrition label helps in managing daily meal planning. The finding gives an alarm on current young adults' perception toward nutrition label. It is important for an individual to interpret and wisely used the information to practice healthy eating. Nutrition education need to be emphasized and promotes among the consumers especially among young generation in order to reduce the risk of diet related disease in future. To improve the understanding on nutrition label usage, more steps need to be explore to improve consumers

understanding on nutrition label since the availability of processed food are increasing in the market.

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