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Nutrition menu labelling in Terengganu: a cross-sectional study of knowledge, attitudes, perception and their relationship with healthy food choices

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Abstract

Nutrition menu labelling has been implemented in a number of restaurants in Malaysia. However, no known empirical research has focused on assessing the knowledge, attitude and perception (KAP) of nutrition menu labelling among consumers. Therefore, this cross-sectional study was conducted with 155 consumers (age 18 and above) from several selected cafeterias that were equipped with menu nutrition labelling to determine their KAP. Questionnaires consisting of socio-demographic, knowledge, attitude and perception of consumers on menu nutrition labelling, and consumers' healthy food choices were given to the respondents through a self-administrated approach. The data collected were analysed using SPSS 21. The results show that respondent knowledge was predominantly moderate (54.8%), with a median score of 12 out of 25. Both the attitudes (87.1%) and perceptions (85.2%) of the respondents were mainly positive towards nutrition menu labelling. Attitude ($r=0.547$, $p=0.001$) and perception ($r=0.539$, $p=0.001$) had positive significant relationships towards healthy food choices among the respondents at $p<0.05$. In conclusion, most consumers have a positive attitude and perception of nutrition menu labelling and may significantly influence towards healthy food choices. Further strategies are needed to increase consumer knowledge of nutrition menu labelling to promote greater usage of this information among Malaysian consumers.

1. Introduction

Recently in Malaysia, there has been increasing interest in the consumption of food away from home. Approximately 28,610 food services were available in Malaysia in 2009 (Ismawati *et al*., 2014). New fast food outlet also showed an upsurge of growth of up to 67% by 2004 to 2009 (Ismawati *et al*., 2014). However, this growth pattern has led to the increased prevalence of obesity and diet-related non-communicable disease. This has been an alarming concern to the Malaysia Ministry of Health (MOH). Many approaches have been strategized by the MOH, such as implementing and advocating the National Plan of Action for Nutrition III (2016 - 2025). One such initiative is the implementation of *Bersih, Sihat, Selamat* (BeSS) certificate for food premises in Malaysia. Its criteria include providing and promoting the correct portion sizes according to individual needs and nutrition labelling (MOH, 2016).

Recent evidence by Din *et al*. (2012) and Salhadi *et al*. (2018) suggests that providing nutrition menu labelling and calorie information helps consumers in making food choices and may ultimately lead to healthier selections. Nutrition menu labelling enforcement has been carried out in several countries. For example, in the United States chains with 20 or more establishments are required to provide nutritional information on menus (Lee-Kwan *et al*., 2016). In Canada, large chains are also required to provide nutritional information on their menus (White *et al*., 2016). In South Korea, nutritional information is required to be provided for children meals items (Ahn *et al*., 2015). As for Malaysia, the implementation has been gazetted on fast food outlets while for the other food services chain are voluntarily (MOH, 2016). Meanwhile, in Thailand (Ng *et al*., 2018) and many other Asian countries, implementation is still voluntary (Kasapila and Shaarani, 2011).

Knowledge and attitude play an important role in managing weight and partaking in healthy behaviour (Lee-Kwan *et al*., 2016); thus, knowledge and attitude related to nutrition menu labelling are prominent in encouraging healthier food choices for people (Roseman *et al*., 2013; Fakih *et al*., 2016; Radwan *et al*., 2017). Studies have also revealed that more menu information

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leads to healthier food consumption (Fakih *et al*., 2016). Nonetheless, few studies have been done gauging knowledge, attitude and perception of nutrition menu labelling among consumers, particularly in Terengganu. Thus, this study aims to assess the interrelationships among knowledge, attitude and perception of nutrition menu labelling and its association towards healthy food choices among consumers.

2. Materials and methods

2.1 Research design

This cross-sectional study was conducted at University Malaysia Terengganu (UMT), located in Kuala Nerus, Terengganu. The chosen cafeterias were Cafeteria *Kolej Syed Abdul Malik* (KKSAM) and Cafeteria *Kolej Abdul Rahman Limbong* (KKARL), which were selected through purposive sampling. The inclusion criterion for the study location was that the café must have provided nutrition menu labelling by displaying the calorie values of at least five menu items. The sample size of this study was calculated using the Cochrane formula (1977) at 95% confident interval and 45% expected proportion with a 6% desired level of precision. To avoid a low response rate, the percentage of sample size was increased to 15%. Therefore, a total of 155 respondents were recruited. Eligibility criteria required individuals to be a consumer at any of the selected café's, aged 18 and above, and willing to participate in this study. Inform consent was obtained prior to data collection. Data collection was conducted between July and September 2019. Ethical approval was obtained from the Human Ethics Board of Committees of Universiti Malaysia Terengganu with reference number JKEPM/2019/35.

2.2 Research instrument

The instrument used for this research was a self-administrated questionnaire consist of five focal sections: socio-demographic, knowledge on nutrition menu labelling (NML), attitude on NML, perception of NML, and healthy food choices. The validity and reliability of the questionnaire were determined using internal validity and Cronbach's Alpha (>0.6 to be reliable), correspondingly.

2.3 Sociodemographic and general food label

This section included eight items: gender, age, education level, occupation and also general food labelling questions (adopted from Malaysian Adults Nutrition Survey, Institute of Public Health, 2014).

2.4 Knowledge on nutrition menu labelling

The knowledge section consisted of 25 items concerning consumer general nutrition knowledge (18-items) and nutrition menu labelling knowledge by comparing the calories of foods (7-items). Twenty-four were positive statements and one was negative statement (item 25). The answers provided were 'Yes', 'No' or 'Not Sure'. This questionnaire was self-constructed by referring to Malaysia Dietary Guideline (National Coordinating Committee on Food and Nutrition Ministry of Health Malaysia, 2013) taken from Key Message 1 'Eat variety of food within your calorie recommended intake' and also *Panduan Penyajian Hidangan Sihat Semasa Mesyuarat* (KKM, 2011). One point was given for the correct answer and zero points were given to the answer that is incorrect and not sure answer. The knowledge score range between 0 and 25 and were categorized as poor (0 – 7 points), moderate (8 – 14 points) and high (15 – 25 points), respectively (Herath *et al*., 2017).

2.5 Attitude on nutrition menu labelling

Consumer attitudes on nutrition menu labelling consisted of 11 items. These items were derived from previous studies and modified to suit this study (Piron *et al*., 2010; Lassen *et al*., 2014; Parikh and Behnke, 2015; Kim and Ham, 2017). The responses for this section were along a five-point Likert Scale. The scores for the positive questionnaire were as follows: 5-strongly agree, 4-agree, 3-neutral, 2-disagree, and 1-strongly disagree, while for the negative questions were scored on the reverse. The score ranges from 11 to 55 and higher score indicated a higher level of attitude or positive attitudes. Score 35 and above considered as positive attitude (Jeruszka-Bielak *et al*., 2018).

2.6 Perception of nutrition menu labelling

Consumer perception of nutrition menu labelling included 9 items adopted from previous study conducted by Din *et al*. (2012). The responses for this section were along a five-point Likert Scale as follows: 5-strongly agree, 4-agree, 3-neutral, 2- disagree, and 1-strongly disagree. Scores ranging from 9 to 45 and higher indicated higher level of perception or positive perception. Scores of 22 and above were considered as positive perception (Norazlanshah *et al*., 2013).

2.7 Healthy food choices among consumer

This last part comprise of 10 items self-developed questionnaire and was adopted from a previous study by Bauer and Reisch (2018). The responses for this section were along a five-point Likert Scale as follows: 5-strongly agree, 4-agree, 3-neutral, 2-disagree, and 1-strongly disagree. Score ranging from 10 to 50 and higher indicated a higher level of healthy food choices or

good healthy food choices. Score 25 and above considered as good healthy food choices.

2.8 Data analysis

Data were analysed using IBM SPSS version 21. Normality tests were performed prior to data analysis. Since the data were not normally distributed, continuous data has been presented in the form of median and inter-quartile range. Spearman tests were performed to determine the correlations between knowledge, attitude, perception and healthy food choices with a significance level of $p < 0.05$.

3. Results and discussion

3.1 Socio-demographic characteristic of respondents

Table 1 indicates that most of the respondents were female students between 18 and 24 years old. As shown in Table 1, three general questions were asked concerning the nutrition labels. For "Do you read the nutrition labelling when you buy or receive food (where applicable)?" the percentage obtained for 'yes, always' was 16.1%; 'yes, sometimes' 76.8%; and 'no' 7.1%. Based on Institute of Public Health (2014), 45% of respondents read the food label. It has been reported that those who usually read food labels are female, had a tertiary academic level and were not single (Ambak *et al*., 2018). For the understanding of food label; approximately 16.8% always understand; 72.9% sometimes understand; and 10.3% do not understand food labels. Ambak *et al*. (2018) stated that many consumers fail to understand food labels due to a low academic level. For the present study, a possible explanation for this might lay in difficulty reading the small-print food labels and also a lack of nutrition education. In terms of what information was read from the menu labels, most respondents read the information on total energy at 70.3%, followed by carbohydrates including sugar at 48.4% and food additives at 45.8%. In Ambak *et al*.'s (2018) study, respondents paid more attention to reading the expiry dates and precautionary statements only, while only 14.4% read total energy, with 21.5% reading sugar information and 19.9% reading fat information.

Table 1. Sociodemographic and consumer food label information (n=155).

Sociodemographic Profile	Frequency (%)
Age	
18-24 years old	133 (85.8)
25-34 years old	11 (7.1)
35-44 years old	2 (1.3)
45-54 years old	4 (2.6)
≥ 55 years old	5 (3.2)
Gender	
Male	64 (41.3)
Female	91 (58.7)
Race	
Malay	136 (87.7)
Chinese	11 (7.1)
Indian	6 (3.9)
Others	2 (1.3)
Level of Education	
SPM and equivalent level	23 (14.8)
Currently doing Diploma/Asasi	39 (25.2)
Currently doing Degree	91 (61.3)
Currently doing Master/PhD	2 (1.3)
Occupation	
Student	120 (77.4)
Staff	35 (22.6)
Do you read the nutrition labelling when you buy or receive food (where applicable)?	
Yes, always	25 (16.1)
Yes, sometimes	119 (76.8)
No	11 (7.1)
[a] What kind of information in the nutrition label do you read?	
Total energy	109 (70.3)
Carbohydrate content including sugar	75 (48.4)
Salt/Sodium content	41 (26.5)
Vitamin Content	37 (23.9)
Mineral Content	17 (11.0)
Food additives	71 (45.8)
Fibre	20 (12.9)
Do you understand the information in the food label when you buy or receive food?	
Yes, always	26 (16.8)
Yes, sometimes	113 (72.9)
No	16 (10.3)

[a] can choose more than one answer

3.2 Knowledge on nutrition menu labelling

Table 2 shows the distribution of knowledge based on the correctly answered items. What stands out in the table is only two items concerning consumer general nutrition knowledge, namely items 1 and 12, received the most correct answers. This result was as expected, as item 1, which is the definition of a calorie, and item 12, which refers to the suggested servings of fruit per day, are common knowledge. This is because this information has been well-advertised on mass media and social network. This is supported by a study conducted by Pon *et al*. (2006) which found that nutritional knowledge among the public is mostly obtained from newspaper and magazines.

It is apparent from Table 2 that most of the respondents could give correct answers for the calorie comparison of a given meal, except for items 24 and 25. This was quite surprising because it indicates that consumers appeared to have the knowledge of the nutrition menu label. However, this result contradicts those of a study conducted by Zainordin *et al*. (2015)

Table 2. Distribution of respondent responses to nutritional menu labelling knowledge (n=155)

Items	Yes	No	Not Sure	Answered Correctly
	n (%)	n (%)	n (%)	n (%)
1. Calorie is a measure of the energy in food.	128 (82.6)	6 (3.9)	21 (13.5)	128 (82.6)
2. The calorie required for sedentary women is 1500 kcal.	43 (27.7)	11 (7.1)	101 (65.2)	43 (27.7)
3. The calorie required for active women is 2000 kcal.	56 (36.1)	13(8.4)	86 (55.5)	56 (36.1)
4. The calorie required for active men is 2500 kcal.	77 (49.7)	8 (5.2)	70 (45.2)	77 (49.7)
5. Fat contributes the highest calorie of 9 kcal per 1 gram.	62 (40.0)	20 (12.9)	73 (47.1)	62 (40.0)
6. Protein provides 4 kcal per gram of food.	62 (40.0)	9 (5.8)	84 (54.2)	62 (40.0)
7. Carbohydrate contributes 4 kcal per gram of food.	57 (36.8)	11 (7.1)	87 (56.1)	57 (36.8)
8. One plate of fried rice contains a higher calorie content than one plate of white rice.	126 (81.3)	14 (9.0)	15 (9.7)	126 (81.3)
9. The recommended daily intake of sugar is 50 grams.	45 (29.0)	30 (19.4)	80 (51.6)	45 (29.0)
10. The higher the fat content in the food, the higher the calorie content.	110 (71.0)	29 (18.7)	16 (10.3)	110 (71.0)
11. The recommended serving size for cereal and grains is 4-8 servings per day	35 (22.6)	42 (27.1)	78 (50.3)	35 (22.6)
12. The recommended serving size for fruits and vegetables is 2-3 servings per day.	110 (71.0)	12 (7.7)	33 (21.3)	110 (71.0)
13. The recommended serving size for protein is 1⁄2 to 1 serving per day.	68 (43.9)	33 (21.3)	54 (34.8)	68 (43.9)
14. The recommended serving size for nuts and dairy products is 1⁄2-2 servings per day.	61 (39.4)	22 (14.2)	72 (46.5)	61 (39.4)
15. ‘Teh peng’ contains higher calories than ‘teh o’.	132 (85.2)	11 (7.1)	12 (7.7)	132 (85.2)
16. The calorie for one plate of white rice is about 240 kcal.	50 (32.3)	14 (9.0)	91 (58.7)	50 (32.3)
17. ‘Roti bakar’ spread with jam contains higher calories than plain ‘roti bakar’.	126 (81.3)	15 (9.7)	14 (9.0)	126 (81.3)
18. The recommended calorie intake for breakfast is approximately 400 kcal.	52 (33.5)	18 (11.6)	85 (54.8)	52 (33.5)
19. The recommended calorie intake for morning tea is approximately 250 kcal.	42 (27.1)	20 (12.9)	93 (60)	42 (27.1)
20. The recommended calorie intake for lunch is approximately 500 kcal.	49 (31.6)	27 (17.4)	79 (51.0)	49 (31.6)
21. The recommended calorie intake for teatime is approximately 250 kcal.	47 (30.3)	18 (11.6)	90 (58.1)	47 (30.3)
22. The recommended calorie intake for dinner is approximately 400 kcal.	38 (24.5)	28 (18.1)	89 (57.4)	38 (24.5)
23. 'Limau ice' contains a lower calorie content than 'sirap limau.'	101 (65.2)	25 (16.1)	29 (18.7)	101 (65.2)
24. Fried chicken contains a higher calorie content than chicken curry.	51 (32.9)	74 (47.7)	30 (19.4)	51 (32.9)
25. 'Fried mee' has a lower calorie content than 'mee sup.'	82 (52.9)	49 (31.6)	24 (15.5)	49 (31.6)

Table 3. Attitude on nutrition menu labelling among respondents (n=155)

Items	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree	Median (IQR)
	n (%)	n (%)	n (%)	n (%)	n (%)	
1. I found nutrition menu label helpful.	2 (1.3)	5 (3.2)	9 (5.8)	71 (45.8)	68 (43.9)	4 (1)
2. I appreciate having nutrition menu label at the café I ate.	3 (1.9)	3 (1.9)	9 (5.8)	69 (44.5)	71 (45.8)	4 (1)
3. It is interesting for me to read the nutrition menu label.	3 (1.9)	5 (3.2)	27 (17.4)	78 (50.3)	42 (27.1)	4 (1)
4. It is worth reading the nutrition menu label before buying any food.	3 (1.9)	8 (5.2)	18 (11.6)	69 (44.5)	57 (36.8)	4 (1)
5. I would use calorie information to order low-calorie foods and drinks.	6 (3.9)	19 (12.3)	40 (25.8)	62 (40.0)	28 (18.1)	4 (1)
6. It is beneficial for me to read the nutrition menu label.	3 (1.9)	3 (1.9)	25 (16.1)	58 (37.4)	66 (42.6)	4 (1)
7. I trust the nutritional information provided on the nutrition menu label.	4 (2.6)	19 (12.3)	34 (21.9)	63 (40.6)	35 (22.6)	4 (1)
8. The nutritional information provided affects my decision to purchase.	5 (3.2)	19 (12.3)	40 (25.8)	70 (45.2)	21 (13.5)	4 (1)
9. I prefer to eat in a restaurant with a menu label.	5 (3.2)	19 (12.3)	34 (21.9)	63 (40.6)	34 (21.9)	4 (1)
10. I am satisfied with the provided menu label.	3 (1.9)	7 (4.5)	36 (23.2)	70 (45.2)	39 (25.2)	4 (1)
11. I always read the menu label.	7 (4.5)	28 (18.1)	46 (29.7)	54 (34.8)	20 (12.9)	3 (1)

which found that calorie knowledge among students in Universiti Malaysia was low. This may be due to a lack of exposure to calorie information in their surroundings, particularly at the students' cafeterias.

3.3 Attitude on restaurant's menu label

Table 3 shows the degree of consumer agreement in terms of their attitudes towards nutrition menu labels. The table indicates that consumers in this study had positive attitudes towards nutrition menu labelling. Surprisingly, item 1 stated that 43.9% of the consumer in UMT cafes strongly agree and 45.8% agree that nutrition menu label is useful for them. Similarly, item 2 had 45.8% of the consumer strongly agree that they appreciate having menu labels at the cafes. Although the implementation of nutrition menu labels in Malaysia is not yet as compulsory and influential as nutrition food label, consumers generally find them to be useful. This finding is consistent with those of Radwan *et al*. (2017), who found that 47% of the participant reported that nutrition menu labels are useful, especially among female consumers.

3.4 Perception of restaurant menu labelling

For Table 4, the most surprising aspect is that consumers predominantly had good expectations for nutrition menu labels. This result is similar to those of previous studies which showed that consumers tend to use nutrition menu labels when provided and that nutrition menu labels are helpful if provided (Fernandes *et al*., 2015). A study by Parikh and Behnke (2015) showed that nutritional information influences the decision-making process. However, some consumers who do not make their food selections based on the nutritional information have still indicated that they found the information valuable and appreciate its availability. The findings on consumer perceptions of nutrition menu labelling may reflect their expectations of the nutrition menu labelling provided at cafeterias. Therefore, health authorities should enhance and promote the nutrition menu information provided in the cafeterias and food premises to aid consumers in making healthy food choices, since their perception of nutrition menu label is already at a good level.

3.5 Healthy food choices among café consumers

Table 5 indicates that most of the respondents made healthy food choices, as almost all of them tended to eat food that offers lower fat and lower salt. They also chose foods that are healthier rather than those offering sensory appeal, convenience, prices, and familiarity. 23.9% strongly agreed and 49% agreed that they chose healthier food to control their weight. This result is supported by a study done by Ambak *et al*. (2014), which showed that those who desire to lose weight will tend to prefer healthier food and refer to nutrition labels.

Unexpectedly, fewer than 50% of consumers strongly agreed and agreed that they refer to the menu label to estimate their calorie consumption. These results are likely to be related to their preference on other dietary suggestion (i.e. sugar intake, fat intake, etc.), or perhaps they take no precautions in terms of their daily energy intake. These results indicate that awareness among consumers of menu labelling is still low.

3.6 Overall knowledge, attitude and perception score distributions

All in all, the respondents have moderate knowledge, positive attitude and perception of nutrition menu labelling as shown in Table 6. This finding showed that respondents managed to have a good attitude and

Table 4. Perception of nutrition menu labelling among respondents (n=155)

Items	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree	Median (IQR)
	n (%)	n (%)	n (%)	n (%)	n (%)	
1. Nutritional information on the menu is important to me.	3 (1.9)	7 (4.5)	22 (14.2)	75 (48.4)	49 (31.0)	4 (1)
2. I believe that nutritional information helps me to determine the nutrition intake when I dine in a restaurant.	4 (2.6)	14 (9.0)	22 (14.2)	80 (51.6)	35 (22.6)	4 (1)
3. I am interested in finding nutritional information of the menu items in a restaurant.	5 (3.2)	14 (9.0)	50 (32.3)	64 (41.3)	22 (14.2)	4 (1)
4. I intent to pay attention to nutritional information while choosing a menu item in a restaurant.	4 (2.6)	21 (13.5)	45 (29.0)	63 (40.6)	22 (14.2)	4 (1)
5. I am confident that I will use nutritional information.	11 (7.1)	26 (16.8)	50 (32.3)	61 (39.4)	7 (4.5)	3 (1)
6. I would like to see additional nutritional information about menu items in a restaurant.	8 (5.2)	17 (11.0)	45 (29.0)	69 (44.5)	16 (10.3)	4 (1)
7. Restaurant should provide nutrition information in the menu.	4 (2.6)	6 (3.9)	22 (14.2)	82 (52.9)	41 (26.5)	4 (1)
8. I believe nutritional information should not be misleading.	3 (1.9)	10 (6.5)	20 (12.9)	63 (40.6)	59 (38.1)	4 (1)
9. Nutritional information (carbohydrate, protein, fat) indicated by percentage is sufficient for me to know how many ingredients the food contains.	6 (3.9)	14 (9.0)	46 (29.7)	65 (41.9)	24 (15.5)	4 (1)

Table 5. Distribution of healthy level food choices among respondents (n=155)

Items	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree	Median (IQR)
	n (%)	n (%)	n (%)	n (%)	n (%)	
1. I would buy food that is low in fat.	0(0)	4 (2.6)	25 (16.1)	75 (48.4)	51 (32.9)	4 (1)
2. I would buy food that is in low salt.	1 (0.6)	3 (1.9)	23 (14.8)	76 (49.0)	52 (33.5)	4 (1)
3. I would buy food that provides nutritional information on the menu.	0(0)	6 (3.9)	19 (12.3)	80 (51.6)	30 (32.3)	4 (1)
4. I will compare the label before choosing the most nutritious food.	1 (0.6)	17 (11.0)	46 (29.7)	60 (38.7)	31 (20.0)	4 (1)
5. I will calculate the consumption of my calorie intake by referring to the menu label.	3 (1.9)	17 (11.0)	60 (38.7)	60 (38.7)	15 (9.7)	3 (1)
6. I'm going to choose food that is healthier than sensory appeal.	1 (0.6)	21 (13.5)	40 (25.8)	62 (40.0)	31 (20.0)	4 (1)
7. I'm going to choose food that is healthier than convenience.	3 (1.9)	25 (16.1)	43 (27.7)	59 (38.1)	25 (16.1)	4 (1)
8. I'm going to choose food that is healthier than the price.	1 (0.6)	23 (14.8)	48 (31.0)	56 (36.1)	27 (17.4)	4 (1)
9. I'm going to choose food that is healthier than the familiarity of food.	1 (0.6)	17 (11.0)	40 (25.8)	78 (50.3)	19 (12.3)	4 (1)
10. I'm going to choose food that is healthier for weight control.	4 (2.6)	15 (9.7)	23 (14.8)	76 (49.0)	37 (23.9)	4 (1)

positive perception even though the implementation of the nutrition menu label is still novice as stated by Din *et al*. (2012). Din *et al*. (2012) stated that the consumer in full-services restaurants does support the use of the nutrition menu label. In agreement with the present results, a previous study by Kim *et al*. (2013) demonstrated that consumers in Hong Kong restaurants had a good attitude towards the implementation of menu labels in restaurants. However, more nutrition education programs need to be developed to ensure that consumers are able to understand those nutrition menu labels with a positive attitude.

Table 6. Overall Knowledge, Attitude and Perception score distributions (n=155)

Components	Distributions	
	n (%)	Score median (IQR)
Knowledge		
Poor (0 – 7)	30 (19.4)	12 (6)
Moderate (8 – 14)	85 (54.8)	
High (15 – 25)	40 (25.8)	
Attitude		
Negative (< 35)	20 (12.9)	43 (8)
Positive (> 35)	135 (87.1)	
Perception		
Negative (< 22)	6 (3.9)	46 (8)
Positive (> 22)	149 (96.1)	
Healthy Food Choices		
Poor (<25)	8 (5.2)	41 (10)
Good (>25)	147 (94.8)	

Knowledge score (min=0, max=25), Attitude score (min=11, max=55), Perception score (min=9, max=45), Healthy food choices score (min=10, max=50)

3.7 Relationship between knowledge, attitude and perception with healthy food choices level among selected cafe's consumer

The most obvious finding to emerge from this correlation coefficient analysis is that there is a significant positive relationship between attitude, perception and healthy food choices at $p<0.05$, with the notable absence of knowledge as shown in Table 7. Interestingly, knowledge showed a non-significant correlation with healthy food choices. These findings broadly support the work of Delvarani *et al*. (2013) which found that proposed nutritional knowledge is not the main predicator of intention to use the nutrition menu label. This outcome is contrary to those of studies which link nutritional knowledge with nutrition label usage. Zainol *et al*. (2018) stated that knowledge significantly and positively influences attitude towards organic food, implying the positive effect of knowledge on attitude. It is perhaps surprising that there was a moderate positive relationship between attitude and healthy food choices. Acheampong and Haldeman (2013) explained that consumers with higher nutrition knowledge are more likely to have positive attitudes about healthy eating. However, a recent study by Mogre *et al*. (2017) found that consumers' nutrition related knowledge does not correlate with their attitudes, and thus will not affect nutritional label usage. Lastly, based on the present study it can be concluded that both the attitudes and perceptions of consumers play an important role in choosing healthier food, even though the implementation of nutritional labels is rather new in Malaysia compared to other countries like the US. Thus, more educational health-related interventions need to be conducted to

Table 7. Relationship between knowledge, attitude and perception with healthy food choices level (n=155)

	Healthy Food Choices	
	r-value	p-value
Knowledge	0.036	0.65
Attitude	0.547	0.001*
Perception	0.539	0.001*

* Significant at $p<0.05$

educate and promote nutritional labels.

4. Conclusion

This cross-sectional study aimed to determine levels of knowledge, attitude and perception towards nutrition menu labelling and its relationship towards healthy food choices among selected café's consumer. Findings showed that most of the café's consumer showed moderate nutrition knowledge but positive attitude and perception of nutrition menu labelling, and a good level of healthy food choices. This study produced results which corroborate the findings of a great deal of the previous work there is a significant correlation between attitude, perception and healthy food choices at $p<0.05$.

Despite its exploratory nature, this study has provided a deeper insight into knowledge, attitude and perception towards nutrition menu labelling and healthy food choices among the consumer in Terengganu. The empirical findings in this study may be of broad use to the health-related authorities to implement more programs to promote consumer on using nutrition menu labelling in their daily life.

Conflict of interest

The authors declare no conflict of interest.

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