

## RESEARCH ARTICLE

# Chinese adults' nutrition label literacy in Hong Kong: Implications for nurses

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## Abstract

The study aimed to investigate Chinese adults' nutrition label literacy in Hong Kong. It employed a web-based survey with structured questions. A total of 368 Chinese adults aged 18-59 participated in the survey and their nutrition label literacy was measured by the Newest Vital Sign (NVS). About two-thirds (68%) of the participants had limited nutrition literacy skills. Although they were able to identify correctly the calorie and sugar content of food products, 44% and 48% of them had difficulty in determining the consumption of calories and serving food sizes respectively. Another finding from the survey was that those with lower education level and of older age had significantly lower mean nutrition label literacy scores, which indicated that they were at higher risk for food insecurity. The findings showed that the nutrition label literacy level of Hong Kong's general public is quite low. This study can provide insights for nurses and healthcare professionals on how to educate people with lower education level and/or of advanced age to use nutrition labels more effectively and to further nutrition label literacy study and research, particularly in Hong Kong.

## KEYWORDS

demographic factors, food label, Hong Kong, nutrition education, nutrition label literacy

## 1 | INTRODUCTION

The public has become more health and nutrition conscious with an increase in the prevalence of non-communicable chronic diseases worldwide. The desire to reduce the risk of developing these diseases and/or maintain good health has led to growing consumer interest in healthy and nutritious food products. To be able to make the right choices, consumers need to understand the nutritional information shown on food labels and nutrition and health claims on the packages in order to maximize the benefits from food consumption. Nurses and other health-care professionals play a vital role in promoting health and facilitating the public to select healthy food choices.

### 1.1 | Literature review

Nutrition labelling is increasingly seen as an important tool for encouraging healthier food choices and improving health outcomes. It is a prominent government policy (Campos, Doxey, & Hammond, 2011; Miller & Cassady, 2015) to help customers make better and healthier food decisions and adopt healthy eating habits. It is also a cost-effective

way to convey nutritional information to the public, as labels can aptly allow consumers to quickly evaluate the nutritional value of a food product (Ollberding, Wolf, & Contento, 2011). Several studies have shown that use of nutrition labels is correlated with improved dietary patterns, such as diets that are lower in fat and cholesterol (Cooke & Papadaki, 2014; Onyene & Bakare, 2011; Zoellner et al., 2011), and increased consumption of fruits, vegetables, and fiber (Rothman et al., 2006; Van der Merwe, Bosman, Ellis, De Beer, & Mielmann, 2013).

Despite the increased use of nutrition labels, concerns still exist because many consumers have difficulties in understanding and interpreting the information on the labels (Hess, Visschers, & Siegrist, 2012; Hieke & Newman, 2015). One of their difficulties relates to indecipherable labels because the labels are usually presented in small fonts with information overload (Misra, 2007). This overload is caused by too much nutrient and numerical information, which people find confusing (Drichoutis, Lazaridis, & Nayga Jr, 2006; Ollberding et al., 2011; Vanderlee, Goodman, Yang, & Hammond, 2012), and it very often requires nutritional literacy and numeracy skills for interpretation (Rothman et al., 2006; Sinclair, Hammond, & Goodman, 2013).

Nutritional literacy is broadly understood as part of health literacy, which specifically focuses on nutrition (Silk et al., 2008). Nutritional literacy can be defined as the degree to which individuals have the capacity to obtain, process, and understand basic nutritional information and act upon such information to make appropriate food choices that lead to overall healthy diets (Carbone & Zoellner, 2012; Velardo, 2015). It is perhaps not surprising that there is a significant link between nutritional literacy and nutrition label comprehension (Sinclair et al., 2013). Consumers with high nutritional literacy performed significantly better than those with low literacy in reading and using the information on nutrition labels to judge the healthiness of food products (Tao, Li, Lo, Tang, & Wang, 2011; Viswanathan, Hastak, & Gau, 2009). Sociodemographic characteristics are also influential in affecting consumers' use and understanding of nutrition labels (Sinclair et al., 2013; Staser et al., 2011; Zoellner, Connell, Bounds, Crook, & Yadrick, 2009). For instance, highly literate and educated respondents seemed to be more knowledgeable about label information, as they tend to have better information-processing skills and understanding of nutritional principles (Ducrot et al., 2015). Another study found that women, in general, processed nutrition label information better than men, probably because women are more likely to be calorie conscious and are responsible for meal planning and management of the family (Van der Merwe et al., 2013).

Although there is a growing literature on nutrition label understanding and use, the majority of these empirical studies were limited to places, such as Europe and North America (Malloy Weir & Cooper, 2017; Sinclair et al., 2013; Staser et al., 2011; Zoellner et al., 2009). For example, Zoellner et al. (2009) examined adults' nutritional literacy status, but their context was rural with high poverty rates and low educational attainment. These demographic patterns might not be shared by other places, such as Hong Kong, which is a developed city. In those studies, the authors were assessing the dietary guidelines for Americans, while other countries and cities have developed their own sets of labelling systems. Therefore, their findings might not necessarily be applicable in other contexts, where the labelling regulations, label formats, and socioeconomic characteristics can be significantly different. Lifestyle-related chronic diseases through the promotion of healthy dietary eating habits is global challenge, and there is a scarcity of studies examining the empirical relationship between nutritional literacy and nutrition label use in Asian contexts and Chinese population. In this study, we aimed to fill this gap by assessing Chinese adults' nutrition label literacy in Hong Kong.

In 2008, the Hong Kong Government enacted the Food and Drugs (Composition and Labelling) (Amendment: Requirements for Nutrition Labelling and Nutrition Claim) Regulations with the aim of promoting balanced diets (Centre for Food Safety, 2016). Subsequently, nutrition labelling became mandatory for most prepackaged foods from 1 July 2010 (Centre for Food Safety, 2016). In the enactment, nutrition labels are required to include information on serving size, energy content, the seven core nutrients (protein, carbohydrates, total fat, saturated fatty acids, trans-fatty acids, sodium, and sugars), and must list the amounts of any claimed nutrients (Centre for Food Safety, 2016). In 2012, a survey was undertaken by the Food and Environmental Hygiene Department (FEHD) to evaluate the effectiveness of the labelling scheme. Nonetheless, it was still not clear as to

how and to what extent Chinese consumers read and understood information from nutrition labels. To supplement this survey, results from the current study are valuable to the government and health-care professionals to gain insight to improve the communication of nutritional information via nutrition labels and to influence nutrition label use in Hong Kong.

## 1.2 | Study aim

This study focuses on assessing the relationship of consumer nutrition label literacy across demographic characteristics. The two main questions addressed are: (i) What is Chinese adults' nutrition label literacy in Hong Kong?; and (ii) What is the association between individuals' nutrition label literacy levels and their respective demographic characteristics?

## 2 | METHODS

### 2.1 | Design and sampling

In this study, we employed a Web-based survey with structured questions. Convenience sampling was used. The respondents included had to meet the following two inclusion criteria: (i) Chinese, aged 18–59 years; and (ii) being able to interact with the research personnel or use the Internet. They were recruited via Web links on social media platforms. The Web link survey was also sent to different sites, including universities, schools, workplaces, and community centers for a representative sample. Each participant was given a US\$ 6.25 super-market gift coupon after completing the online questionnaire. The study was approved by the Human Research Ethics Committee of the Education University of Hong Kong.

### 2.2 | Instrument

Data were collected in August–September 2016 through a self-administered four part online questionnaire that had been validated using the content validity test by expert panels prior to its use. The content validity index was .98. It was estimated that each respondent would take approximately 15 min to complete the questionnaire. The questionnaire began by explaining the research aim, stating the inclusion criteria, and thanking the participants for their support. It was then followed by the four part questionnaire. The first part consisted of questions on using nutrition labels when shopping for prepackaged food and reading nutrition labels for dietary choices.

The second part included questions testing the respondents' nutrition label literacy, which was assessed using the Newest Vital Sign (NVS), a self-reporting instrument with six questions measuring respondents' comprehension and use of the information related to nutrition labels. The number of correct answers to the questions could be: zero or one for a high likelihood of limited literacy, two or three for a possibility of limited literacy, and four to six for an adequacy of literacy skills. The internal reliability of the NVS is robust, with Cronbach's alphas  $\geq .76$ . The NVS has been validated against the Test of Functional Health Literacy in Adults for 500 English-speaking primary care patients in Arizona with an area under the receiver–operator characteristic curve of .88. These data indicated that the NVS shows reasonable validity

(Weiss et al., 2005). The NVS and companion materials are available to medical and public health-care professionals at no cost. Permission to use and copy those materials was obtained from the NVS developers. As the participants were Chinese, a Chinese-translated version of the NVS was used. To ensure consistency of the translation, forward and backward translations were done by two independent translators prior to its use. In addition to the NVS questions, three more questions comparing two local nutrition labels were asked.

The third part included questions on the respondents' use of media channels and their levels of trust in those information sources. Because these findings are beyond the focus of the present paper, they will be reported in another paper.

The last part included demographic questions, which covered sex, age, primary language used, level of education, and occupation of the participants.

### 2.3 | Statistical analysis

Data were analyzed using IBM SPSS Statistics for Windows, version 21.0. Descriptive statistics, including means, standard deviations (SD), and frequencies, were used to summarize all participants' responses. The associations of sociodemographic data with participants' nutrition label literacy were evaluated by one-way analysis of variance (ANOVA) tests. In the tests, ANOVA was used to analyze the differences between nutrition label literacy groups' means and their associations with their sociodemographic characteristics. The significance level was set at .05 for all tests.

## 3 | RESULTS

### 3.1 | Demographic and general characteristics

The demographic profile of the sample is shown in Table 1. Four specific characteristics were analyzed: sex, age, occupation, and education background.

Among the 368 participants, nearly 70% were female. With respect to the age distribution, the largest group of participants was aged 18–29 years and made up 43% of the sample. For the highest level of education attained, most (69%) had attained tertiary education. Regarding occupation, 28% of the sample, representing the largest occupation group, were students.

### 3.2 | Frequency of buying prepackaged food

The majority (92.7%) of the respondents claimed that they were frequent purchasers of prepackaged food. This group was made up of three subgroups, including 25.3% who bought prepackaged food “every time/always”, 37.5% who bought this type of food “most times”, and 29.9% who bought them “sometimes”. The minority group comprised non-frequent purchasers, who made up only 7.3% of the sample.

### 3.3 | Frequency of reading nutrition labels

The amount of respondents who frequently referred to the labels when they purchased prepackaged food for the first time (Table 2)

**TABLE 1** Demographic characteristics of the Chinese adults ( $n = 368$ )

Demographic characteristics		N (%)
Sex	Male	111 (30.2)
	Female	257 (69.8)
Age (years)	18–29	158 (42.9)
	30–39	83 (22.6)
	40–49	71 (19.3)
	50–59	56 (15.2)
Occupation	Medical/nursing/allied health professionals	56 (15.2)
	Executive/lawyer/teacher/other professional	62 (16.9)
	Clerk/technician/service industry	90 (24.5)
	Homemaker	29 (7.9)
	Student	104 (28.3)
	Domestic helper	1 (.3)
	Other	26 (7.1)
	Education background	Primary or below
	Did not complete secondary	13 (3.5)
	Completed secondary	74 (20.1)
	Matriculation	25 (6.8)
	Tertiary	253 (68.8)

**TABLE 2** Frequency of reading nutrition labels on packages when buying food products for the first time by demographic data ( $n = 368$ )

Demographic characteristics	N (%)	
	Frequent	Non-frequent
Total	261 (70.9)	107 (29.1)
Sex		
Male	65 (58.6)	46 (41.4)
Female	196 (76.3)	61 (23.7)
Age (years)		
18–29	109 (69.0)	49 (31.0)
30–39	59 (71.1)	24 (28.9)
40–49	57 (80.3)	14 (19.7)
50–59	36 (64.3)	20 (35.7)
Occupation		
Medical/nursing/allied health professionals	44 (78.6)	12 (21.4)
Executive/lawyer/teacher/other professional	47 (75.8)	15 (24.2)
Clerk/technician/service industry	63 (70.0)	27 (30.0)
Homemaker	23 (79.3)	6 (20.7)
Student	68 (65.4)	36 (34.6)
Domestic helper	1 (100.0)	0 (.0)
Other	15 (57.7)	11 (42.3)
Education background		
Primary or below	1 (33.3)	2 (66.7)
Did not complete secondary	7 (53.9)	6 (46.2)
Completed secondary	48 (64.9)	26 (35.1)
Matriculation	18 (72.0)	7 (28.0)
Tertiary	187 (73.9)	66 (26.1)

**TABLE 3** Results of Chinese adults' nutrition label literacy (newest vital sign) (*n* = 368)

Question	N (%) Correct	N (%) Incorrect
4. If you eat the entire container, how many calories will you consume?	205 (55.7)	163 (44.3)
5. If you are allowed to eat 60 g of carbohydrates as a snack, how much ice cream could you have?	193 (52.4)	175 (47.6)
6. Your doctor advised you to reduce the amount of saturated fat in your diet. You usually have 42 g of saturated fat each day, which includes one serving of ice cream. If you stop eating ice cream, how many grams of saturated fat could you consume each day?	222 (60.3)	146 (39.7)
7. If you usually eat 2500 cal in a day, what percentage of your daily value of calories will you be eating if you have one serving?	177 (48.1)	191 (51.9)
8. Is it safe for you to eat this ice cream?	289 (78.5)	79 (21.5)
9. (Ask only if the respondent says "no" to question 8): Why not?	279 (96.4)	10 (3.6)

was 70.9%. Among the frequent readers, the majority were females (75.1%), which represented three quarters of the sample.

### 3.4 | Practices in the use of nutrition labels

Participants who read the nutrition labels on packages when buying food products for the first time were asked about their frequency of reading the different items in the "1 + 7" item list. Over 70% read the items of "sugar" (77.4%) and "calories/energy" (76.6%); this was followed closely by "total fat" (68.8%). Two items which were less read by frequent readers were "protein" (47.6%) and "carbohydrates" (50.8%). Only 59.2% frequent readers read the item "sodium". In contrast, the focus of the infrequent readers was on "protein" (52.4%), "carbohydrates" (49.2%), and "sodium" (40.8%).

### 3.5 | Nutrition label literacy

The nutrition label literacy of the participants was evaluated by the number of correct answers scored (ranging from 0 to 6) on the six item NVS. The mean score of the NVS was 3.65 (SD 1.8). When categorizing nutrition label literacy according to the NVS scoring procedures (Table 3), the results indicated that 58 (15.8%) respondents had a high likelihood of limited literacy skills (0–1 correct answers), 94 (25.5%) had a possibility of limited literacy skills (2–3 correct answers), and 216 (58.7%) had adequate literacy skills (4–6 correct answers).

For the six questions set in the NVS to test nutrition literacy, it was found that the respondents were more able to determine the ingredients on nutrition labels for potential allergies to peanuts. When asked the question, "If you usually eat 2500 calories in a day, what percentage of your daily value of calories will you be eating if you have one serving?", only just less than half of the respondents (48.1%) could calculate the percentage. Nearly half of the answers were wrong in response to the questions: "If you eat the entire container, how many calories will you consume?" (44.3%) and "If you are allowed to eat 60 grams of carbohydrates as a snack, how much ice cream could you have?" (47.6%). Most of the respondents (96.4%) could identify peanuts as the allergen causing safety concern in response to the question: "Is it safe for you to eat this ice cream and why not?"

### 3.6 | Knowledge on Hong Kong nutrition labels

Three questions from the FEHD survey in 2012 (Centre for Food Safety, 2012) were adopted to assess participants' understanding of

the information on Hong Kong nutrition labels. They were set on the nutrition labels of two biscuit brands. A higher proportion (69.6%) of respondents were able to identify the correct pieces of biscuits in the package of brand A (Table 4). A high proportion (77.4%) of respondents answered correctly when asked how much energy one would get if five pieces of brand A biscuits were consumed. Most of the respondents (79.3%) were able to identify the brand that would provide more sugar when eating biscuits of the same weight. Those respondents who could provide nearly two out of three correct answers had the following characteristics: aged 18–29 years, tertiary education, professionals, and frequent readers of nutrition labels for products purchased for the first time.

### 3.7 | Demographic differences with nutrition label literacy

To better interpret the data, the researchers broke down all demographic characteristics. Age and education were divided into four and five groups, respectively. Ethnic origin was not used in the analysis, as all respondents were Chinese.

Nutrition label literacy scores varied significantly by age, education level, and occupation, but not by sex (Table 5). Compared with males, females scored a non-significantly higher mean of NVS 3.8 (SD 1.8). There was a linear relationship between nutrition label literacy and education level, with scores being lowest for respondents with a primary or below education, but highest for those with a tertiary education. A similar pattern was found in occupation, with total scores being lowest for those who were domestic workers and homemakers, but highest for professionals. It is worth mentioning that the youngest age group scored the highest, and the oldest age group of 50–59 years attained the lowest scores.

**TABLE 4** Results on Chinese adults' nutrition label literacy in Hong Kong (*n* = 368)

Question	N (%) Correct	N (%) Incorrect
10. How many pieces of biscuits are there in the package of brand A biscuit?	256 (69.6)	112 (30.4)
11. If you eat 5 pieces of brand A biscuit, how much energy (kcal) do you consume?	285 (77.4)	83 (22.6)
12. When eating biscuits of the same weight, which brand (brand A or B) will provide more sugar?	292 (79.3)	76 (20.7)

**TABLE 5** Demographic characteristics and Chinese adults' nutrition label literacy (*n* = 368)

Demographic characteristics	N (%)	Nutrition label literacy score, mean (SD)	95% CI
Sex			
Male	111 (30.2)	3.40 (1.879)	.147
Female	257 (69.8)	3.76 (1.760)	
Age (years)			
18–29	158 (42.9)	3.91 (1.617)	.003
30–39	83 (22.6)	3.83 (1.745)	
40–49	71 (19.3)	3.41 (1.954)	
50–59	56 (15.2)	2.95 (1.995)	
Occupation			
Medical/nursing/allied health professionals	56 (15.2)	4.32 (1.281)	.000
Executive/lawyer/teacher/other professional	62 (16.9)	4.35 (1.516)	
Clerk/technician/service industry	90 (24.5)	3.03 (1.899)	
Homemaker	29 (7.9)	2.45 (2.028)	
Student	104 (28.3)	3.87 (1.649)	
Domestic helper	1 (.3)	1.00	
Other	26 (7.1)	3.23 (1.966)	
Education background			
Primary or below	3 (.8)	1.33 (2.309)	.000
Did not complete secondary	13 (3.5)	1.77 (1.363)	
Completed secondary	74 (20.1)	2.78 (1.838)	
Matriculation	25 (6.8)	3.76 (1.899)	
Tertiary	253 (68.8)	4.02 (1.635)	

CI = confidence interval; SD = standard deviation.

In order to find out whether level of education, sex, occupation, and age had separate effects on nutrition label literacy, they were entered as variables into a multiple regression model. The results showed that only education background attributed to the significant independent effects at a significance level of .05 (Table 6). There were, however, different patterns of relationships for education levels and age groups; NVS scores tended to be higher with higher education and younger age.

## 4 | DISCUSSION

Despite the comparable demographic and general characteristics shared by the participants recruited in both the FEHD survey (Centre for Food Safety, 2012) and this survey, the present study yielded different results compared to those of the FEHD survey. The proportion of people who purchased prepackaged food frequently rose significantly from 79.7% in 2012 to 92.7% in 2016. We also found that people read labels more frequently than in the 2012 survey (Centre for Food Safety, 2012). This indicates the higher level of involvement and orientation to health and wellness of individuals. Previous studies have noted that

**TABLE 6** Multiple regression of nutrition label literacy on sex, age, education background, and occupation among Chinese adults (*n* = 368)

Variable	$\beta$	P-value	Regression Statistics
Sex	.088	.073	Multiple R = .377
Age	-.079	.153	Adjusted R <sup>2</sup> = .133
Education background	.301	.000	F(4, 363) = 15.019, <i>P</i> < .001
Occupation	-.096	.065	

frequent food label users have a better diet quality (Joshipura et al., 2001; Neuhouser et al., 1999; Ollberding et al., 2011). Our survey further assessed participants' understanding of the information on nutrition labels on local food packages, with participants obtaining better results than those in the 2012 survey (Centre for Food Safety, 2012) for the three questions on the two nutrition labels of brand A and brand B biscuits. They demonstrated greater knowledge in identifying the pieces of biscuits in one serving (69.6 vs 25.3%) and calculating the energy intake for eating five pieces of biscuits (77.4 vs 43.3%). This might imply that the participants were more concerned about "calories/energy" (76.6%) when they read the label items.

Among all the label items, "sugar" was the most frequent item people read on the nutrition labels, and this finding was in line with the findings of other studies (Centre for Food Safety, 2012; Godwin, Speller-Henderson, & Thompson, 2006; Grunert, Wills, & Fernández-Celemín, 2010). The high percentage of respondents able to identify the brand that would provide more sugar when eating biscuits of the same weight indicated that they were very vigilant with the sugar content of foods, which could be attributed to the government's initiatives to reduce sugar in food. During the time this study was conducted, the government was also striving to reduce dietary sugar in keeping with World Health Organization targets. Through establishing the International Advisory Panel and launching Hong Kong's Action on Salt and Sugars Reduction, the government aimed to enhance public awareness of the health impacts of excessive sugar intake (Centre for Food Safety, 2018). Those public health campaigns might be effective in developing links between sugar intake and adverse health effects (e.g. overweight and obesity) among the public.

In the survey conducted by Centre for Food Safety (2012), a high proportion of correct answers came from young people (aged 18–29 years), with matriculation or tertiary education, who were frequent purchasers of prepackaged foods and frequent readers of nutrition labels for products bought for the first time. In this study, a comparatively higher proportion of correct answers came from a similar age group. Therefore, it was not surprising that this study yielded different results.

Although the survey (Centre for Food Safety, 2012) stated that nearly half of the participants ( $n = 1009$ ) had some understanding of nutrients and nutrition labelling, it did not reflect their label literacy skills. This study showed that only 25.5% of the participants had “a possibility of limited literacy” skills, with a mean NVS score of  $\leq 4$ , although they showed good abstract reasoning skills in postulating that if people were allergic to peanuts, then peanut oil would probably be harmful to their health. The scenarios proposed in the NVS in this study tested not only the numeracy skills of the participants but also their “locate-the-information” skills. The result indicated that most neither did well in their numeracy skills nor could derive further information from the labels. They were not familiar with interpreting and deciphering the nutritional information on nutrition labels. These were reflected by the errors that most made in calculating the consumption of calories and converting serving sizes. Nearly half of the participants answered incorrectly the question related to the percentage calorie intake per serving in a day. In this study, we found that the participants were able to locate items on nutrition labels directly, but they were less capable of deriving further information from those items, such as correctly calculating the energy obtained from the weight of the food consumed, and the energy per 100 g, serving of stated size, or serving per package. This deficiency indicated that the public's knowledge level on nutrients and nutrition labels was indeed quite low and inadequate. Although they were concerned about sugar and calories on nutrition labels, they had difficulties in calculating the nutrient content per serving correctly. This could hinder their ability to apply nutritional information to make healthier food choices. The result is consistent with other studies and reviews (Misra, 2007; Staser et al., 2011), which stated that people have problems in understanding nutrition label information and find it difficult to convert serving food sizes. Although the percentage of daily calorie intake is commonly found in foreign countries' nutrition labels, which is not legally mandatory for nutrition labels in Hong Kong, an understanding of this information is still crucial, as Hong Kong imports many prepackaged food products from overseas.

The findings of this study echoed those of previous research studies (Joshipura et al., 2001; Miller & Cassady, 2015; Misra, 2007; Staser et al., 2011), in which consumers had poor reading and comprehension of information about food, nutrition facts, and food sources. Those studies suggested that consumers gained nutrition knowledge from illegitimate information sources, which could mislead them to make wrong choices in food shopping, preparation, and consumption. This could be another reason why consumers have poor nutrition label literacy.

With respect to the correlation between sociodemographic characteristics and nutrition label literacy, the general belief is that lower education, older age, and non-professional occupation are

closely associated with lower mean scores of nutrition label literacy. The results of this study was consistent with findings from other studies (Joshipura et al., 2001; Misra, 2007; Staser et al., 2011) in that there are significant relationships between educational attainment and nutrition scores, and between income level and nutrition label literacy scores. In one previous study it was suggested that demographic factors affected the use and understanding of nutritional information both directly and indirectly (Grunert et al., 2010). However, this relationship is mediated by nutrition knowledge and interest in healthy eating. For example, people in higher social grades might have more interest in healthy eating and better nutrition knowledge, which in turn could affect their use and understanding of nutritional information. Also, in accessing better stores, they might come across more nutritional information from a broad selection of foods.

Despite these findings, there were two limitations in the current study. First, the sample was not randomly selected due to the use of convenience sampling. In the sample, there were more participants in the younger age group with a higher education level. This might affect the generalizability of the findings from the study. Second, there was potential recall bias in the study, as some questions depended on the memory recall of the participants of their purchasing habits.

With these caveats, the findings of this study have implication for nurses in the community. Nurses play a vital role in health care. They are not only the main point of contact with patients when they enter care but are also involved in a wide range of care activities, including health promotion, disease prevention, and the care of individuals of all ages in all health-care and community settings. Due to the limited number of dietitians and nutritionists available to meet the needs of the community, the nutritional care of individuals also forms part of the role of nurses. They are expected to understand the importance of basic nutrition facts, be able to deliver healthy diet education, and explain the rationale behind healthy food choices to individuals to aid recovery, prevent chronic diseases, and patients' quality of life (Xu, Parker, Ferguson, & Hickman, 2017). To improve community health, nurses could develop patients' nutrition label literacy skills via health campaigns in the community, especially targeting those with a lower education, older age, and from non-professional occupations. Nurses might also use the established tool adopted in this study to educate individuals, families, and communities to guide them to make healthy food choices. Being an integral part of community health care, it is crucial for nurses to have adequate knowledge of public nutrition literacy status and develop partnership skills to collaborate with all other stakeholders to improve nutritional care for individuals.

Even though the food labelling scheme was launched by the government over 8 years ago, public education is still lagging. The scheme can only be effective if individuals are better educated in food labelling so that they can read and understand food labels accurately to utilize the nutritional information in selecting healthier foods. It could also be useful if further research is extended to different patient groups or age groups who have to rely on nutritional knowledge to maintain their healthy lifestyles.

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## AUTHOR CONTRIBUTIONS

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