Mal J Nutr 25(2): 287-296, 2019

Consumer awareness and understanding of front-of-pack (FOP) energy icon labelling in Negeri Sembilan, Malaysia

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ABSTRACT

Introduction: The implementation of front-of-pack (FOP) energy icon labelling helps consumers in making good food choices. This is the first study in Malaysia focusing on such labelling since it was launched in 2012. It was aimed at determining the awareness and understanding of the FOP energy icon on food labels in Malaysia. **Methods:** A total of 366 consumers aged 18-60 years old in the state of Negeri Sembilan participated in the study. A guided, self-administered survey was conducted using a convenient sampling method. **Results:** The results showed that 85% of consumers surveyed were aware of FOP energy icon. Among those who were aware of the icon, 50% (n=155) were categorised as 'excellent' and 41% (n=128) categorised as 'good', for understanding the FOP. **Conclusion:** This study indicated that the icon could be viewed as a potential tool to be used in conjunction with the nutrition information panel (NIP). Most of the respondents could extract nutrition information from the FOP (energy) icon. The study showed that those who had understood the icon were in the group categories of high education, youth and female. There was also no significant association between those who received nutrition labelling education and level of understanding nutrition information from the icon. Therefore, it is important to further explore the possibility the beneficial impact of FOP labelling system, including consumer education aspects.

Keywords: Label, nutrition labelling, front-of-pack (FOP), energy icon

INTRODUCTION

Simplified nutrition labelling has been identified as an important tool to help consumers make healtheir food choices. Recognising this potential, the nutrition labelling of all prepackaged foods was proposed as a policy measure in the non-communicable diseases (NCDs) action plan for 2013–2020, which was adopted by the 66th World Health Assembly in May 2013 (WHO, 2013).

Consumers are confronted with an increasing variety of foods, especially processed and packaged products. Consequently, it has become increasingly difficult for them to make healthy and informed choices. The Third National Health and Morbidity Survey (NHMS III) of Malaysia in 2006 reported that 78.2% of consumers read the nutrition label when buying or receiving food (IPH, 2008). However, the same study repeated in 2014 indicated that the prevalence

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doi: https://doi.org/10.31246/mjn-2018-0127

of reading nutritional information from food labels was only 45.0% (IPH, 2015).

Consumer testing by the Keystone Group has suggested that the simplicity of summarising the diverse nutritional information in the nutrition information panel (NIP) into a single indicator to classify products is highly desirable for consumers (Lupton *et al.*, 2010). Similarly, research in the European Union (EU) has indicated that consumers generally prefer simpler, "healthy choice tick" front-of-pack (FOP) icons (Feunekes *et al.*, 2008). Work by the Food Standards Agency in the United Kingdom also suggests that more complex FOP icons, such as Multiple Traffic Lights with percentages and levels that are based on the guideline daily amounts, may help with the evaluation of several nutrients for a given food (FSA, 2009).

When FOP systems first appeared in the late 1980s and early 1990s, they were largely developed by non-profit health organisations (IOM, 2010). Since then, food manufacturers have been adding summary nutritional information on the FOP in addition to that currently mandated, on the back or side of the NIP. These different approaches to communicate nutritional information through food labels have become important part of the strategy to assist consumers in adopting healthy dietary practices, as well as encourage food industries to produce healthier food options. The information may be a quick guide to inform consumers about the nutrition content of different products.

Malaysia has made nutrition labelling mandatory for most prepacked foods since 2003. In addition, one of the FOP systems introduced in Malaysia is energy icon that was launched by the Health Minister on 2nd April, 2012. It provides a description of the number of calories per serving contained in certain food and beverage products. It was reported that Federation of Malaysian Manufacturers Malaysian Food Manufacturing Group (FMM MAFMAG) had agreed to put FOP (energy) icon on food and beverage products to help consumers estimate their daily nutrient intake (The Star, 2012). As of September 2017, FMM MAFMAG reported that about 1,345 products had displayed the FOP (energy) icon (KKM, 2018). This has been part of the industry's commitment to tackle the issue of obesity and NCDs in the country.

Since the energy icon was launched more than five years ago, there has been no study published, to the best of our knowledge, in Malaysia, that has focused on the FOP for energy icon. There was a national study to review the proposal of using certain symbols or logos such as "healthier choice" that was carried out by Task Force Committee on Healthier Choice under Ministry of Health in 2008. However, the findings of the study of 1936 respondents from 15 states were not published. In 1992, a study by Schucker *et al.* suggested that consumers purchased more products which displayed FOP labelling than those which did not. Previous studies have found that FOP label formats could help consumers to differentiate between healthy and unhealthy products (Dunbar, 2010; Feunekes *et al.*, 2008). Among various FOP label formats, the consumers took the longest time to evaluate the products with the Guideline Daily Amount (GDA) format (Feunekes *et al.*, 2008).

This preliminary study in Negeri Sembilan was aimed at examining consumer awareness and understanding of the FOP for energy icon in the Malaysian context. It is important to gather this information to help relevant authorities to strengthen the consumer understanding of nutrition information displayed on food labels. Furthermore, the findings from this study may help the policy makers to design nutrition

labelling education programmes, and to undertake future research in this area.

MATERIALS AND METHODS

A total of 366 respondents were recruited using a convenient sampling method. These respondents were recruited from September to December 2016, prior to the department's activities of Healthy Community Kitchen, Healthy Supermarket, Nutrition Information Centre, Community KOSPEN (*Komuniti Sihat Pembina Negara*) and from participants of nutrition talks held in Negeri Sembilan. Respondents who met the inclusion criteria (i.e. age 18-60 years, Malaysian citizen and enrolled at any of those department's activities between September to December 2016) were recruited. The exclusion criteria for this study were the presence of illnesses such as dementia or mental disorders, special dietary needs and communication difficulties. Written consent from each respondent was obtained prior to data collection.

The questionnaire was designed to be self-administered with guidance by the interviewer. To establish the content validity, nine officials who were involved in the areas of food labelling, nutrition labelling and signposting were asked to review the questionnaire. Each reviewer independently rated the relevance of each section in the questionnaire using a four-point likert scale (1=not relevant, 2=quite relevant, 3=relevant, 4=very relevant). The questionnaire was piloted among 24 different subjects from the community and improved upon for intended purpose and usefulness. The average time taken to finish the questionnaire was about 20 minutes.

The questionnaire consisted of a few main sections. These sections included demographic information, awareness and understanding of the FOP (energy) icon. Section A involved eight questions on the general characteristics of the respondents namely, gender, race, age, education level, occupation, marital status and receipt of any nutrition labelling education. Section B contained two questions regarding awareness and availability of FOP (energy) icon. In Section C, the concept that was used in the previous studies (Byrd-Bredbenner, 2000; IGD, 2005) on understanding how to get the nutrition information from the food label, was adapted. Using the FOP (energy) icon on the food label, respondents were asked to answer ten questions about nutrition information from the shown FOP icon. Respondents were required to answer either "true" or "false and the responses were classified as correct or incorrect, based on the factual answers. A score was calculated by summing the number of correct responses which could range from 0-10, with higher the score, indicating a greater ability to understand the nutritional information. The scores were divided into four groups, namely, 'excellent' for score 9-10, 'good' for score 6-8, 'fair' for score 3-5 and 'weak' for score 0-2.

Ethical approval

Ethical approval was obtained from the Ministry of Health Research and Ethics Committee (MREC) (NMRR-16-1252-31661). The project was registered with the National Medical Research Register (NMRR) prior to implementation. All the information from the questionnaire including the personal information of the respondents' was kept confidential.

Data analysis

Data analysis was undertaken using the SPSS version 16.0 (IBM Corp., Armonk, New York). Pearson's chi-square test was used to test whether there was significant association between the awareness of the FOP (energy) icon and receiving nutrition labelling education. The level of significance used for the

data analysis was set at $p<0.05$. The correlation test was used to evaluate the association between category of understanding FOP (energy) icon with other factors including awareness of the icon, receiving nutrition labelling education and sociodemographic characteristics.

RESULTS

The demographic characteristics of the respondents are shown in Table 1. Female respondents constituted 71.0% (n=260) of the respondents and male 29.0% (n=106). The majority was Malays (84.0%), followed by Chinese (7.0%), Indians (6.0%) and the other ethnic groups such as Kadazans, Bajaus and Muruts constituted 3.0%. The age category with the highest percentage of respondents was 35–44 years, who made up 28.7% (n=105). The proportions and numbers for the other age categories were 18–24 (26.8%, n=98), 25–34 (15.0%, n=55), 45–54 (19.1%, n=70) and 55–60 (10.4%, n=38). Almost half (48.0%) had achieved a secondary level of education and the proportions who completed primary school, diploma/certificate, degree holders were 2.0%, 34.0% and 16.0%, respectively. The study also indicated that *Sijil Pelajaran Malaysia* (SPM)/Malaysia Certificate of Education (MCE) holders were the

Table 1. Sociodemographic characteristics of the respondents

Characteristics	*n*	*%*
Gender		
Male	106	29.0
Female	260	71.0
Ethnic group		
Malays	309	84.4
Chinese	25	6.8
Indians	23	6.3
Others	9	2.5
Age group		
18-24 years	98	26.8
25-34 years	55	15.0
35-44 years	105	28.7
45-54 years	70	19.1
55-60 years	38	10.4
Education level		
Primary school	8	2.2
Lower secondary	27	7.4
Upper secondary	147	40.2
Diploma/certificate	125	34.2
Degree	59	16.1
Occupational		
Public sector	116	31.7
Private sector	40	10.9
Self employed	52	14.2
Retiree	13	3.6
Housewife	55	15.0
Student	90	24.6
Marital status		
Married	228	62.3
Single	114	31.1
Divorced/widowed	24	6.6

Table 2. Association between awareness of FOP (energy) icon and receiving nutrition labelling education

Receiving nutrition labelling education	*Awareness of FOP, n (%)*			χ^2	*p-value*
	Yes	*No*	*Total*		
Yes	191 (52.2%)	23 (6.3%)	214 (58.5%)		
No	119 (32.5%)	33 (9.0%)	152 (41.5%)	8.242	0.004
Total	310 (84.7%)	56 (15.3%)	366 (100.0%)		

highest respondents (40.2%, n=147), followed by *Sijil Tinggi Persekolahan Malaysia* (STPM)/diploma/certificate holders (34.2%, n=125), degree holders (16.1%, n=59), *Penilaian Menengah Rendah* (PMR)/ *Sijil Rendah Pelajaran* (SRP)/Malaysia Lower Certificate of Education (LCE) holders (7.4%, n=27) and primary school leavers (2.2%, n=8). Most of the respondents worked in the public sector (31.7%, n=116). Others were students (24.6%, n=90), housewives (15.0%, n=55), self-employed (14.2%, n=52), private sector employees (10.9%, n=40) and retirees (3.6%, n=13). On marital status, married respondents showed the highest percentage (62.3%, n=228), followed by single respondents

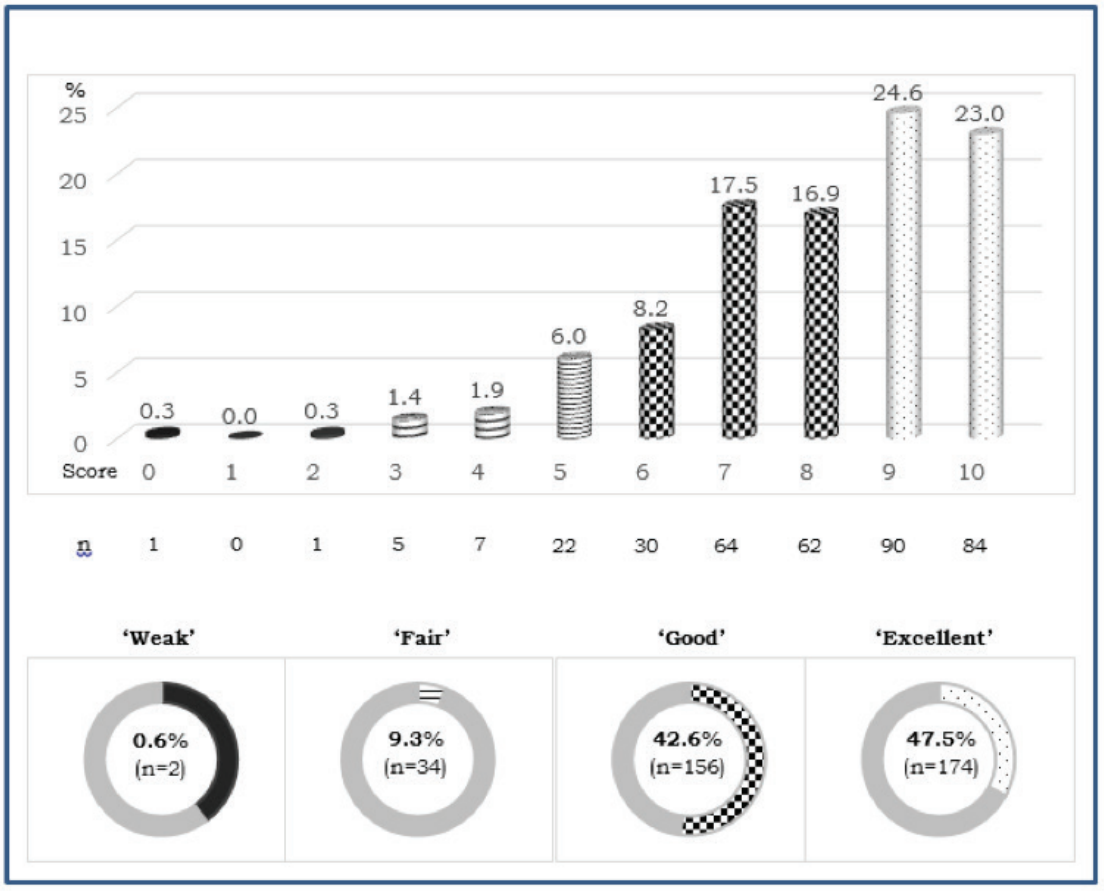

Figure 1. Category of understanding of the FOP (energy) icon

Table 3. Association between category of understanding FOP (energy) icon and those receiving nutrition labelling education and awareness

Status	*Category of understanding, n (%)*				*Total*	*r*	*p-value*
	Weak	*Fair*	*Good*	*Excellent*			
Receiving nutrition labelling education							
Yes	1 (0.5)	20 (9.3)	90 (42.1)	103 (48.1)	214	0.008	0.877
No	1 (0.7)	14 (9.2)	66 (43.4)	71 (46.7)	152		
Awareness of the icon							
Yes	2 (0.6)	25 (8.1)	128 (41.3)	155 (50.0)	310	-0.155	0.003
No	0 (0.0)	9 (16.1)	28 (50.0)	19 (33.9)	56		

(31.1%, n=114) and divorcees or widow/widower (6.6%, n=24).

The findings showed that 84.7% (n=310) aware of the FOP energy icon that had been printed on food label. Among these respondents, 66.1% (n=242) found that the energy icon was easy to recognise on the label, while 18.9% (n=69) claimed it was hard to find the icon and 15.0% (n=55) were not sure about the icon. Among the 366 respondents, 58.5% (n=214) had received nutrition labelling education mostly from health staff (65.4%, n=140). Other sources of nutrition labelling education were from advertisements (21.5%, n=46), industry or product promoters (3.3%, n=7) and others such as part of the education curriculum (9.8%, n=21) (Table 2). Among all the respondents, including those who had received nutrition labelling education, 52.2% (n=191) were aware of the icon. Among all the respondents and including those who had never received any nutrition labelling education, only 32.5% (n=119), were aware of the icon. Based on the chi-square tests, there was a significant association between receiving nutrition labelling education and the awareness of the FOP energy icon ($p<0.05$).

The mean score for understanding the FOP was 8.0±1.8 and 23.0% (n=84) of the respondents obtained full marks when they were asked to extract information from the FOP. A majority of the respondents (24.6%, n=90) scored 9 marks. Those respondents who scored 10 and 9 marks were grouped as 'excellent'. This group was the largest compared to other groups (47.5%, n=174). The second largest group was the respondents who scored 6-8 marks, who were categorized as 'good' (42.6%, n=156); and <10.0% (n=36) of the respondents scored <6 marks. They were categorized as 'fair' (scored 3-5 marks) and 'weak' (scored 0-2 marks), with the percentage of 9.3% (n=34) and 0.6% (n=2) respectively. Figure 1 shows the scores of the respondents for the understanding of the FOP (energy) icon.

The category of understanding by receiving nutrition labelling education and awareness of FOP is presented in Table 3. The findings showed that there was no relationship between those who had received nutrition labeling education and their understanding of FOP (energy) icon ($p>0.05$). However, there was an association between the awareness of FOP (energy) icon and understanding the icon ($p<0.01$).

Table 4 presents the category of understanding the icon by socio-demographic background. The results showed that among the males, 14.2% (n=52) were categorised as 'good',

Table 4. Association between understanding of FOP (energy) icon and socio demographic background

Characteristics	*Category of understanding, n (%)*				*Total*	*r*	*p-value*
	Weak	*Fair*	*Good*	*Excellent*			
Gender							
Male	1 (0.3)	14 (3.8)	52 (14.2)	39 (10.7)	106	0.134	0.010
Female	1 (0.3)	20 (5.5)	104 (28.4)	135 (36.9)	260		
Age							
18-24 years	0 (0.0)	4 (1.1)	38 (10.4)	56 (15.3)	98	-0.246	0.000
25-34 years	0 (0.0)	4 (1.1)	14 (3.8)	37 (10.1)	55		
35-44 years	0 (0.0)	14 (3.8)	44 (12.0)	47 (12.8)	105		
45-54 years	1 (0.3)	7 (1.9)	37 (10.1)	25 (6.8)	70		
55-60 years	1 (0.3)	5 (1.4)	23 (6.3)	9 (2.5)	38		
Education level							
Primary	0 (0.0)	1 (0.3)	7 (1.9)	0 (0.0)	8	0.284	0.000
Lower secondary	0 (0.0)	7 (1.9)	15 (4.1)	5 (1.4)	27		
Upper secondary	2 (0.6)	19 (5.2)	64 (17.5)	62 (16.9)	147		
Diploma/ Certificate	0 (0.0)	6 (1.6)	50 (13.7)	69 (18.8)	125		
Degree	0 (0.0)	1 (0.3)	20 (5.5)	38 (10.4)	59		

followed by 'excellent' (10.7%, n=39) and 'fair' (3.8%, n=14). As for the females, the majority (36.9%, n=135) were categorised as 'excellent', followed by 'good' (28.4%, n=104) and 'fair' (5.5%, n=20), respectively. For the age group of 18-24 years, 25-34 years and 35-44 years showed the same pattern where most of the respondents' understanding of FOP (energy) icon were categorized as 'excellent' (15.3%, n=56; 10.1%, n=37 and 12.8%, n=47 respectively). For the age group of 45-54 years and 55-60 years, both groups showed that the majority of the respondents' understanding of FOP (energy) icon was categorized as 'good' (10.1%, n=37 and 6.3%, n=27 respectively). Correlation tests showed that gender, age and level of education were significantly associated with the understanding of FOP (energy) icon (p<0.01).

DISCUSSION

Since the FOP energy icon was launched in 2012, about 85.0% of the consumers surveyed have become aware it. Grunert & Wills (2007) reported that consumers must be exposed or be aware of the label system in order for the label to have any effect. The results of this study also showed that majority of the respondents were able to understand nutritional information from the icon. This may be due to the fact that the nutritional information on the icon was self-explanatory and was compatible with the message that the industry had intended to communicate.

According to Grunert & Wills (2007), the indication that the FOP icon was helpful in assisting consumers to make informed food choices was when they could understand the nutritional information on the label. A year after the

implementation of FOP GDA labelling in Thailand, about 48% of consumers aware of GDA labels, and 52% were able to identify the information from the GDA labels when choosing products (Rimpeekool *et al.*, 2016). Based on unpublished data from the Singapore Health Promotion Board (HPB) in 2004, 67.4% of people were aware of Healthier Choice Symbol (HCS) labels on food products in the market, and 69.0% of these people had used this symbol to assist them in making healthier food choices (Soon *et al.*, 2008). A study in New Zealand also reported that the awareness of FOP "Tick" had increased from 71% in 1997 to 87% in 2000. The proportion of consumers claiming to use the "Tick" to guide food choices increased from 43% to 55% (Mhurchu, Eyles & Choi, 2017). These findings are an indication of how the awareness of FOP nutrition-related symbol can support healthier eating habits.

The findings also showed that there was no association between those who had ever received nutrition-labeling education and understanding of FOP (energy) icon. Education may support the use of nutrition information on food label by increasing the efficiency of label use. Previous studies on the relationship between nutrition labelling education and the use of the nutrition label revealed mixed findings. Kim, Nayga & Capps (2001) found that knowledge of health had a positive effect on label use, while Nayga (2000) could find no evidence to support this relationship. Findings in other studies suggested that the combination of nutrition labelling and education of consumers, can significantly influence consumer behaviour (Teisl, Bockstael & Levy, 2001; Teisl & Levy, 1997). The majority of a systematic review of 17 studies conducted in the United States, found that educational interventions could lead to a positive impact on the health of the population when they use and/or understand the nutrition information on food labels (Moore *et al.*, 2018).

The findings of understanding the FOP (energy) icon are consistent with previous studies in relation to the demographic characteristics of consumers. Our study indicated that those who understood the icon were in the categories of high education, youth and female. Ducrot *et al.* (2015) found that those who able to understand FOP labelling also tended to be female with higher education level. In a various review studies on nutrition labelling, several demographic differences such as being females and higher education level have been observed to be positively associated with food label use (Drichoutis, Lazaridis & Nayga, 2006; Cowburn & Stockley, 2005). The reason women would pay more attention to nutrition labels was that they were more concerned about the nutritional composition of food and the use of nutrition labelling would enable them to make a healthier choices (Nayga, 1999). However, the findings of some other studies showed contradictory results, in which men used nutrition labels more often than women (Aygen, 2012) or no significant differences were seen between men and women in the use of nutrition labels (Norazlanshah *et al.*, 2013). Consumers with higher education level may have a better chance of assessing nutrition information on labels as compared to those who are lesser educated. This is where the media can support in promoting the education of nutrition labelling to the less educated consumers, to attract their attention to become more interested in nutrition labelling (Hayati *et al.*, 2015). The previous studies in Malaysia found significant differences of age for the nutrition label literacy (Rashidah *et al.*, 2014; Cheong *et al.*, 2013). However, the study by Mohamad Rohieszan *et al.* (2016) was not able to support those

findings and showed that the difference was not significant by age. A review of past studies has also reported that the effects of age on label use were mixed (Drichoutis *et al.*, 2006).

CONCLUSION

The findings suggest that the majority of the respondents gave a correct interpretation of the nutritional information from the FOP (energy) icon. This study indicates that the icon is viewed as a potential tool to be used in conjunction with NIP. The icon also can give consumers useful information to help consumers in making food choices based on their daily requirements. Even though the findings showed no significant association between those who received nutrition labeling education and understanding of the icon, it is important to encourage better understanding to ensure the usage of the nutrition information on the label. Any nutrition labelling system including FOP (energy) icon needs to be accompanied by awareness and education programmes.

As a preliminary step in assessing understanding of Malaysian consumers towards FOP (energy) icon, this study has its limitation. The numbers of respondents according to ethnicity in Malaysia need to be taken into account to reflect the true features of Malaysian population structure. Studies focusing on consumer education aspects are also necessary. These scopes were beyond the objectives of the study. However, it is essential to address the knowledge gaps and future research would be needed to include these parameters in the context of Malaysian population.

Acknowledgement

We would like to extend our gratitude to the Director General of Health, Malaysia for his approval to publish this study. This work was supported by the Negeri Sembilan State Health Department. We thank the nutritionists in Negeri Sembilan, especially Mr Mohamad Ihsan Tahir and Ms Farah Wahida Za'abar, for assistance rendered.

Authors' contributions

FS, principal investigator, conceptualised and designed the study, led the data collection in Negeri Sembilan, prepared the draft of the manuscript and reviewed the manuscript; RS, advised on the data analysis and interpretation and reviewed the manuscript; ZMA, assisted in conceptualised the study and reviewed the manuscript.

Conflict of interest

The authors have no conflict of interest regarding the publication of this article.

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