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## Consumers' Knowledge, Understanding and Awareness of Nutrition Information on Food Labels: A Needs Analysis for Nutrition Pictograph Design Development

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### Abstract

Food labels are crucial in providing fundamental nutrition information to help consumers in making healthier choices and specific dietary decisions. Initial information acquired from food labels is most valuable at the point of purchase. Nonetheless, confusing information of nutrition contents on food labels has resulted in difficulties for consumers to make more wholesome decisions. The objective of this study is intended to identify the consumers' level of understanding and awareness in reading nutrition information on food labels. A quantitative Method was adapted. A survey was conducted among 201 respondents at a hypermarket in the city of Shah Alam, Selangor in Malaysia. The findings revealed that although the respondents are aware of food labels, they lack the understanding of nutrition information. The results further indicated that consumers have insufficient understanding of the numerical data on the nutrition information labels. The research concludes that the respondents prefer easy to read and comprehensible nutrition information on food labels by utilizing quick and simple tools of presentation.

**Keywords:** Health Awareness, Nutrition Information, Pictograph Design, Food Label

### Introduction

With the dawning of the Covid-19 pandemic in 2020, a healthy lifestyle is imperative globally and principally in Malaysia. Good eating habits aligned with healthy food consumption are encouraged by the Health Ministry alongside related departments in the public and private sectors. This has increased consumers' demands for healthy food purchases. Additionally, the pandemic has prompted changes in consumer behaviour, where the world witnesses an acceleration in the shift to online shopping. However, nutrition information on food labels can be daunting to many. Most nutritional information are fully presented in the form of text, which appears wordy and do not appeal to the consumers. In fact, according to Gupta and Chitrao (2022), consumers would be inclined to purchase more healthy food products through online shopping if marketers offer various advantages such as convenience and comparisons to traditional methods of purchasing healthy food products. A

study by Jing, et al (2021) has presented a thorough analysis of the evidence regarding the effectiveness of using color-coded labels and warnings to influence consumers' purchasing behaviour towards healthier products. Therefore, nutrition information on food labels must be presented effectively to improve and ensure consumers' understanding and awareness of the different nutritional contents in the packaged food before purchasing. While food sales and purchases becoming globalized, the World Health Organization (WHO) in its 2020 the World Health Organization's campaign for stronger food safety systems and regulations can be found in their 2020 publication "Food Safety and Coronavirus: Guidance for Food Businesses," which emphasizes the importance of maintaining food safety measures during the COVID-19 pandemic. (WHO, 2020). With airborne diseases such as the Covid-19 virus, public health safety has become critical as people are encouraged to boost their immune systems through a change of healthy lifestyle and food consumption. The demand for healthy food and supplements to boost immunity is rising but these require consumers to have the right knowledge, understanding, and awareness of the necessary nutrition information on their food labels before making that wholesome decision (Samson, 2012).

### **Background of Study**

With the changing lifestyle of the 21<sup>st</sup> century, the dietary style of the world population has also altered. Such changes have influenced the development of and inventions in the food industries which subsequently have increased consumers' demand for packaged food that is fast to prepare or ready to eat but with the necessary nutritional ingredients. The Malaysian Ministry of Health has asserted that consumers must have the necessary knowledge and awareness of food labels with effective presentation of nutrition information before purchase and in making healthier food choices. Meanwhile, the National Institute of Health (NIH, 2010) performed a prior study on the practices of looking for information on nutrition labelling among the public. The findings revealed that despite 54.52% of the respondents stating that they always read the nutrition label, an observable percentage of 23.73% of the public would sometimes read the labels, while a worrying 19.3% never do. Hence, the Department of Nutrition made its first revision to the "Guidelines on Healthier Choice Logo Malaysia" in May 2020 (Department of Nutrition, MOH, 2020).

Nutrition labelling allows consumers to be informed and selective before making decisions and purchasing packed food. The nutrition logo guideline not only promotes a better presentation of information but also ensures that the nutrition measurable categories, serving size, number of calories and fat, and essentially, the ingredients are safe and recommended by health experts. Such information is essential to tactfully educate consumers on the nutritional contents of each packed food but would be imperative for those on specific dietary requirements. Nevertheless, some consumers are not overly concerned about the nutrition contents in their packaged food or perhaps, are nonchalant about healthy food intake. However, public health awareness has become more critical as the unwavering spread of the Covid-19 virus became a global concern by the first quarter of 2020. The public must optimize their knowledge and awareness of their dietary habits to include healthy and varied choices (Di Renzo et al., 2020). The World Health Organization has also campaigned for 2021 as the year that the global community needs to be in solidarity towards attaining better health awareness (WHO, 2021). Healthy food intake is imperative; thus, consumers need to not only be aware of their consumption, but also be educated on nutrition information on their food labels. Nevertheless, this will need cooperation from the food sector including producers and retailers.

In a much earlier effort towards healthy food consumption, Tesco became the leading hypermarket to introduce the 'traffic light' label (Figure 1) of nutrition information on its food packaging that has immediate clarity in presentation (Gyekye, 2012). The nutrition label, which is more straightforward, is placed at the front of the food package to ease consumers in making more informed and healthier decisions. Presenting the nutritional information at the front of the food package is in line with the Guideline Daily Amount system (GDA) which suggests the total amount of calories, protein, carbohydrate, sugar, fat, saturates, and sodium.

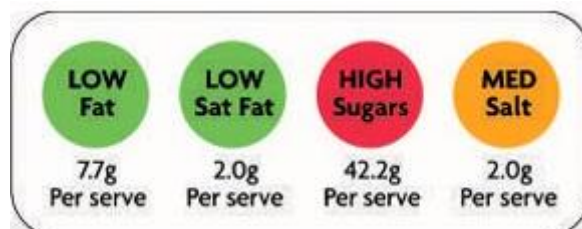


Figure 1: Tesco 'traffic light' nutrition label.



Figure 2: Tesco Front-of-Pack Labels Using GDA System (Source: [www.tesco.com.my](http://www.tesco.com.my), 2014)

Accordingly, Tesco's packaging of its 3-in-1 chocolate malt drink indicates the GDA information at the bottom front of the label (Figure 2). Despite the clear indication of the GDA on the food labels, it was identified that only a low percentage of consumers make use of the nutrition information on these labels in their purchasing decisions (Grunert, Wills & Celemin, 2010). Results from the same study also revealed that the likelihood of nutrition information being sought when purchasing differed between product categories. Importantly, it was also contended that there are substantial differences in consumers' understanding and use of nutritional information on food labels across countries as these could be attributed to national historical background and canvass of public health and nutrition policies. Nevertheless, this method of nutrition labelling on food packaging has yet to be broadly used by food manufacturers in Malaysia. However, the awareness campaign of this system is often executed on a small scale which limits the extent of coverage to consumers. A prior 2011 effort by Malaysia's Ministry of Health in its Front-of-Pack (FOP) Labelling for Energy campaign that garnered voluntary collaboration with those in the food industry was the steppingstone for subsequent efforts in improving the presentation of nutrition labelling on food packaging.

The FOP presentation is a simple depiction of the calories content in the product (Figure 3) with no other detailed descriptions provided.



Figure 3. Front -of -Pack (FOP) labelling for Energy campaign.

(Source: [www.moh.gov.my](http://www.moh.gov.my), 2015)

### Methodology

The research employed the quantitative approach using a survey questionnaire as the data gathering instrument. The questionnaire is made up of three parts and consisted of twenty close-ended questions; Part A aimed to collect the demographic information, Part B aimed to investigate the level of consumers' understanding, knowledge, and awareness towards the nutrition information on food labels meanwhile Part C aimed to assess consumers' knowledge of the existing nutrition pictograph. All the items in the questionnaire were in Bahasa Melayu and English, to enable the researchers to reach people from diverse backgrounds. Part B1 comprised only four five-point likert scale statements (1 = never, 5 = always), which highlighted consumer buying behaviour. Four-point Likert scales in Part B2 allowed researchers to evaluate consumers' informedness about nutrition and label information (1 = strongly disagree, 4 = strongly agree).

Random sampling was applied because the data collected are related to the general consumers' understanding and level of awareness about nutrition pictographs on food labels in promoting healthier food selection. The researchers conducted the survey by distributing questionnaires among 201 random respondents who shopped for packaged food products in a hypermarket in Shah Alam, a city in the state of Selangor in Malaysia.

The product category selected for the product sampling was a random selection of either dry or frozen packaged processed food. All respondents comprised the total of consumers who walked in and shopped at Tesco Shah Alam within one day on a particular weekday. Based on the researcher's observation, there were around 500 estimated customers who came to Tesco daily during 8.00 am – 1.00 pm. However, only 201 customers were willing to answer the survey. The selection of the 201 shoppers meets the criteria of random sampling which involves selecting a sample that is representative of the population.

### Results and Discussions

Data were collected and analysed using the Statistical Package for the Social Sciences (SPSS). Results were presented using descriptive and inferential statistics. The findings were transcribed in two parts; the descriptive analysis provides a summary regarding the total responses for the first objective and the second objective was analysed using Paired Sample

T-Test to determine the mean difference of these pairs: Academic Qualification and Consumers' Buying Behaviour and Academic Qualification and Consumers' Awareness towards Nutrition Information on food labels. The following sections demonstrate the detailed analysis.

### **Part B: Level of Consumers' Buying Behavior and Awareness Level**

This descriptive statistic involves the variables of Consumers' Buying Behaviour related to and Consumers Awareness of nutrition information. The researchers compared the means and standard deviation among the variables to identify the related criteria towards Consumers' Buying Behaviour and Consumers' Awareness. Overall, there are four variables under Consumer's Buying Behaviour and eight for Consumers' Awareness. The results of the descriptive statistic are described in Table 1 and Table 2.

Table 1 presents the descriptive statistic of variables for Consumers' Buying Behaviour. However, the distribution of the mean (M) was evidently low for all criteria, indicating a very low interest in nutritional facts. In a study done by Shaza et al (2021) on consumer buying behaviours in Selangor, the product attribute that largely influenced their purchasing decision is the Halal logo, closely followed by the price. Only a few respondents were concerned about the nutritional facts when asked about the criteria they looked for when buying food products for household consumption.

The highest mean score recorded (M=1.86, SD=.696) is Criterion B2 *The nutritional label influences my choice of food product*, which suggests that some of these respondents did make nutritionally appropriate choices when it comes to food product. Criterion B4 *I consider my health when purchasing food products* reported the lowest mean distribution (M=1.68, SD=.697). This could be due to consumers being complacent with their health, especially those without conditions, which in turn influenced their purchasing behaviour. Despite saying they are health and label-conscious and are prone to making dietary choices, majority of the consumers claimed that they still eat whatever they want regardless of what is good for them (Merwe et al., 2012).

Table 1

*Descriptive Statistics - Consumers' Buying Behaviour criteria.*

Criteria	N	Mean	Std. Deviation
B1 Read the nutritional label before purchase	201	1.80	.671
B2 Nutritional labels influence the choice of food purchase	201	1.86	.696
B3 Choose food product with a better nutritional content	201	1.81	.753
B4 Consider my health level when purchasing food products.	201	1.687	.6973
Valid N (listwise)	201		

Table 2 illustrates the descriptive statistic distribution for Consumers' Awareness. All criteria recorded below average to average mean (M) and Standard Deviation (SD) scores. The highest distribution is B6 (M = 2.24, SD = .758), followed by B7 (M = 2.19, SD = .758), A1

( $M = 2.12$ ,  $SD = .600$ ). This shows that the consumers know about food label reading from campaigns and they also have adequate knowledge with understanding about nutrition information on food packages. However, they lack awareness in choosing nutritionally appropriate food products and would require assistance in making purchases. Interestingly, item B12, which highlights packaging attributes, recorded the lowest mean ( $M = 1.73$ ,  $SD = .608$ ). In another study, more than half of the respondents admitted to choosing a product based on its packaging (Shaza et al., 2021). It can be concluded that packaging is one of the many things customers interact with before shopping for the product but the role of packaging is no more than beckoning the consumers and encouraging impulse buying. Despite having awareness and knowing the importance of reading food labels, there are some factors that might have led consumers to ignoring the nutritional facts on food labels. Most of the respondents had tertiary academic qualifications, yet they claimed they would only read the food labels occasionally while shopping even though they have the urge and intention to read and are aware that the information can assist them in making healthy food choices. In addition, the findings revealed that respondents who are above forty years old are found to be more diligent in monitoring their health level which includes making healthier choices when purchasing packaged food. This corroborates with the findings from Coulson (2000), where it was observed that older respondents reported more frequent label use than their younger counterparts. This could be attributed to medical reasons, which results in a higher likelihood of reading nutritional labels. However, survey findings from Cannoosamy, Gunsam and Jeewon (2014) showed that nutritional label usage was not proportional to an increase in age. This lower use of labels among the elders could be due to the lower processing capacity of older people.

Table 2

*Descriptive Statistics- Consumers' Awareness criteria*

Criteria	N	Mean	Std. Deviation
B5 Enough knowledge about nutrition information.	201	2.12	.600
B6 Know about food labels from an existing campaign	201	2.24	.758
B7 Exposure to the importance of reading the food label.	201	2.19	.740
B8 Understand the nutrient information content label.	201	2.05	.618
B9 Buy food products that provide healthy food icon on the food packaging.	201	1.81	.643
B10 Nutrition contents in the food product meet the healthy food guideline.	201	1.97	.599
B11 Food manufacturer provides enough information.	201	2.10	.625
B12 Read the nutrition information if the label design is attractive.	201	1.73	.608
Valid N (listwise)	201		

**Paired Sample T-Test**

This test is performed to determine the mean of differences between two paired samples. The researchers chose to run a paired sample t-test to ensure the truth of the assumption. The test was performed to compare academic qualification with consumers' buying behaviour and consumers' awareness towards intention to read nutritional facts on food labels. There are five levels of academic qualifications in higher education starting from certificate up to doctoral qualification among the respondents.

**Pair 1: Academic Qualification and Consumers' Buying Behaviour**

Table 3 displays the Paired Samples Statistics analysis for Pair 1 (Academic Qualification and Consumers' Buying Behaviour) and Pair 2 (Academic Level and Consumers' Awareness Level). In this analysis, the mean for the Academic is 3.11. The mean for Consumers' Buying Behaviour is 2.08. The standard deviation for the Academic is .844 and for Consumers' Buying Behaviour is .619.

**Pair 2: Academic Level and Consumers' Awareness Level**

Data in Paired Samples Statistics analysis shows the mean for the Academic is 3.11. The mean for Consumers' Awareness is 2.40. The standard deviation for the Academic is .844 and for Consumers' Awareness is .566.

Table 3

*Paired Samples Statistics*

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ACADEMIC	3.11	201	.844	.060
	Consumers' Buying Behaviour	2.08	201	.619	.044
Pair 2	ACADEMIC	3.11	201	.844	.060
	Consumers' Awareness Level	2.40	201	.566	.040

**Pair 1: Academic level and Consumers' Buying Behaviour**

Table 4 displays the Paired Samples Statistics analysis for Pair 1 (Academic Qualification and Consumers' Buying Behaviour) and Pair 2 (Academic Qualification and Consumers' Awareness Level). The significant value for this pair is .000. Since the p-value <0.05, the researchers can conclude that there is a statistically significant difference between the mean of Academic Level and Consumers' Buying Behaviour. The mean level in academics is higher than Consumers' Buying Behaviour; thus, it can be assumed that the more highly educated participants display a greater intention and awareness to read the nutrition information on food labels.

**Pair 2: Academic Level and Consumers' Awareness Level**

Table 4 also presents that the significant value of this pair is .000 indicating that there is a statistically significant difference between the mean of Academic and Consumers' Buying Behaviour. The mean level in Academic is higher than Consumers' Awareness, and for that reason, it can be concluded that participants with higher academic qualifications display a greater intention to read the nutrition information on food labels.



Table 4

*Paired Sample T-test*

		Paired Differences			95% Confidence Interval of the Difference	t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean					
Pair 1	ACADEMIC Consumers' Buying Behaviour	- 1.035	.992	.070	.897	1.173	14.792	200	.000
Pair 2	ACADEMIC Consumers' Awareness Level	- .716	1.007	.071	.576	.856	10.086	200	.000

Therefore, after going through the paired sample t-test, it can be determined that the academic level among participants does influence their intention to read the nutrition information on food labels. This is in accordance with the findings of Cannoosamy et al (2014), who reported that there was a significant higher mean score for nutritional label use among people with higher levels of education, indicating a clear link between the two variables. Highly educated individuals have a higher tendency to be exposed to health or nutrition-related sources and are more aware that reading a food label is important in making good dietary decisions. Moreover, higher education level offers huge advantage of being informed about nutrition, thus making these people more able to interpret the information provided on the product (Hayati, Fadilah, Aliff, Nur Fatin, & Syazwani, 2015). In contrast, consumers with lower level of education pays little to zero attention towards nutritional labelling as they might have problems in assessing all the information in nutrition labelling.

***Part C: Consumers' knowledge about the existing Nutrition Icon on Front of Pack Food Label on the food packaging.***

This descriptive statistic identifies the frequency distribution of respondents' opinions on the development of the nutrition pictographs. This result will help the researchers to design and develop a nutrition pictograph as a quick tool to educate and assist the consumers when choosing healthier food selections.

Table 5 displays the distribution of respondents on their knowledge of the nutrition icon at the front pack of food packaging. Based on the questionnaire responses, 79.6% of the respondents (C1) *had seen or heard about this nutrition icon at the front of the packaging*, while only 20.4% responded that they had never seen or heard about this. The high percentage shows that the respondents are familiar with this nutrition icon. The percentage for C2 *Are you aware of this icon/symbol used in reading Food Label Campaign in Malaysia?* recorded a high percentage of 58.7% claiming they are aware of the uses of icons/symbols for the 'Read Food Label Campaign' in Malaysia while 41.3% are not aware of it. The data shows that majority of the respondents claimed to be aware of the uses of icons/symbols on food labels.

The researchers also wanted to measure the consumers' understanding of the message delivered through the icon/symbol of the nutrition chart. Slightly more than half of the sample at 52.7% of the respondents claimed to not understand while 47.3% of them *understood the message from the MTL system* (C3). The numerical data used to indicate the content of nutrition in the food may have contributed to the half the sample's lack of understanding about data presented in the nutrition icon system. Most consumers seemed to be more invested in the list of ingredients and nutrient content than on portion sizes (Merwe, Bosman, Ellis, & Beer, 2012). The MTL system is shown in Figure 4.

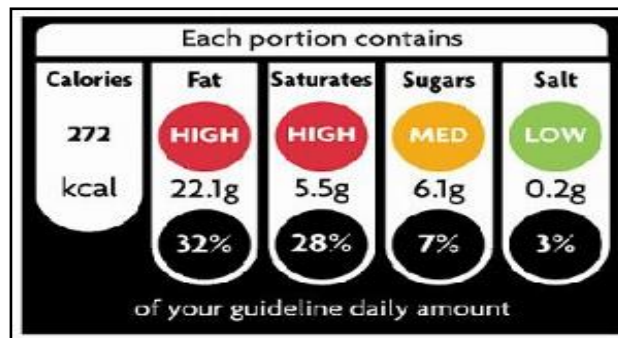


Figure 4: MTL system presented in the questionnaire.

Nevertheless, more than two thirds at 69.2 % of the respondents agreed that the *Multiple Traffic Light system at the front of the pack would influence them to read food labels* (C4). Importantly, the researchers also found that the *pictograph usage is effective in educating the consumers about reading a food label* (C5). The results show that the majority at 80% found it to be effective (16.4% - very effective and 63.2% - effective) while 20.4% consider it to be ineffective. This is supported by a British study that stated that MTL system is a better approach to educate consumers as colour and text are needed for a more comprehensive understanding towards nutritional facts (Foodwatch, as cited in Hayati, Fadilah, Aliff, Nur Fatin, & Syazwani, 2015). In addition, their educational levels may explain why a high percentage of consumers agree that using this pictograph is one of the ways to educate consumers towards reading food label.

Table 5  
*Respondents' knowledge of the nutrition icon at the front pack of food packaging*

Items	TOTAL (N)	Frequency					
		YES	%	NO	%		
C1. Seen or heard about nutrition icons on the front pack of packaging	201	160	79.6	41	20.4		
C2. Are you aware of this icon/symbol used in reading Food Label Campaign in Malaysia?	201	118	58.7	83	41.3		
C3. Do you understand the message delivered?	201	95	47.3	106	52.7		
C4. Do you agree that the Multiple Traffic Light system on the front of the pack will influence you to read a food label?	201	139	69.2	62	30.8		
		<b>Very Effective</b>	<b>Effective</b>	<b>Not Effective</b>			
C5. Do you think this pictograph is effective in educating the consumer about reading food labels?	201	33	16.4	127	63.2	41	20.4

### Conclusion

From the needs analysis data, it can be summarized that more people are aware that reading food label is a means of staying healthy. Consumers' awareness as a factor is relevant to predict consumers' decisions to read the nutrition information on food labels. This key factor is also influenced, not surprisingly, by level of education. The higher the education level, the higher the consumers' level of awareness about health concerns. Apart from that, with elders showing more interest in nutritional facts, age is seen to be another factor associated with the use and understanding of nutritional labels. The elders are highly likely to be interested in maintaining healthy lifestyle and verifying nutrition labels than younger respondents. A study done by Miller et al (2002) showed that nutrition education has benefited older adults with diabetes. The education programs done have helped them in choosing food that suits their health condition and in turn improved their metabolic control. In addition, the elders possess positive attitude towards nutritional labelling and this group understand the importance of the nutritional value of food that may help them to be more mindful about their health and physical condition (Cheong et al., 2013).

The result for consumers' knowledge about the existing nutrition pictograph/ icon on the food label also revealed that respondents do not have the necessary understanding of the message delivered through the existing icon. Although consumers may be aware of the Multiple Traffic Light system (MTL) on food labels for some certain food products, they find it difficult to understand the message delivered by the icons as the nutritional information has been interpreted using numerical data using an unattractive design. Additionally, when consumers are in a rush to shop, they will not read the food labels. However, respondents did agree that the usage of nutrition pictographs on food labels were effective in educating them to satisfactorily understand the importance of nutritional facts, especially for Malaysian food products. It can be concluded that consumers are aware of their health needs by reading the food labels, but some still find the labels difficult to interpret resulting in them ignoring the details. In conclusion, using a more consumer friendly pictograph design to interpret nutrition information on food labels would be an effective medium in educating consumers to get a clearer understanding of the details of nutrition in their purchases.

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