

Impact of Traffic Light Food Labelling on Consumer Awareness of Health and Healthy Choices of the Point-of-Purchase

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IMPACT OF TRAFFIC LIGHT FOOD LABELLING ON CONSUMER AWARENESS OF HEALTH AND HEALTHY CHOICES OF THE POINT-OF- PURCHASE

Sri Lanka introduced colour coding for sugar, salt & fat regulations, which was enforced from the 1st of June 2019. It is the latest food labelling regulation in Sri Lanka. Over the years of consumer studies, even though few studies have studied the impact of food labels on consumer purchase decisions, there is not enough evidence on traffic light food labelling system and its impact on health and healthy choices of the point-of-purchase. Hence, this research study on the impact of colour coding regulation on consumer's buying decisions with special reference to Western Province, Sri Lanka. The purpose of this research was to study the influence of colour code label system on consumer's buying decisions and analyse the consumer's knowledge of the traffic light food labelling system. A purposely developed online questionnaire was administered to 200 randomly selected samples in Western Province in Sri Lanka. The questionnaire had three separate parts. The first part of the questionnaire sought information on the socio-demographic profile of the respondent. The second part had few questions on basic knowledge and behavioural aspect of traffic light food labelling system. The third part of the questionnaire was questioned about further improvements in the traffic light food label from the consumers' perspective. IBM SPSS version 21 software was used for analysing collected data with frequency analysis and Friedman test. Results revealed that most of the consumers refer to the price label instead of other labels. Also, they are not giving special attention to traffic light food labels at the point-of-purchase. Among the consumers who considered traffic light food labelling system at the point-of-purchase, most respondents had a clear idea about different colour codes and would like to consume food products with a low level of sugar, salt, and fat. Further, a fair number of respondents suggested enlarging the size of the existing colour codes of the traffic light food labelling system. Based on the results obtained, it can be observed that still Sri Lankan consumers are not significantly considered traffic light food labels at the point-of-purchase, and they are limited to seek the price tag at the point-of-purchase. Further, the findings of this study will act as a guide for food regulators when assessing the outcome of the new food labelling regulation of Sri Lanka.

Keywords: Consumer purchasing decision, colour coding labels, Sri Lanka, traffic light food labels

Introduction

Health-related problems, including non-communicable diseases (NCD), are a major concern in the present context. According to the World Health Organization, 41 million people globally died each year because of non-communicable diseases. Tobacco accounts for over 7.2 million deaths every year (including indirect smoking), excess salt/sodium intake caused 4.1 million deaths every year, use of alcohol accounts for more than 3.3 million deaths every year, and insufficient physical activity caused 1.6 million deaths annually (WHO, 2018). In the Sri Lankan context, NSDs are caused approximately 75% of the annual total deaths in Sri Lanka. Tobacco consumption, unhealthy diet, harmful use of alcohol, and physical inactivity are the main reasons for NCDs in Sri Lanka. Further, the salt consumption of Sri Lankans is two to three times higher than the recommended level (WHO, n.d.).

In this kind of situation, every government tries to reduce NCDs patients by improving healthy diet habits, advised them to regular exercises, and prevent tobacco & alcohol products. When consider improving healthy diet habits, there were introduced a few rules and regulations to the food and beverage producers. In 2007, the Food Standards Agency (FSA), on behalf of the United Kingdom government, introduced a colour-coded labeling system with three colours indicating sugar, salt, and fat amounts on the particular food product. Sri Lankan government also introduced Traffic Light Food Labels in 2016 for beverage products such as Fruit juice, fruit nectar, carbonated beverages, and ready-to-serve beverages. It is mandatory for solid and semi-solid food products from the 1st of June 2019 onwards.

On the product label, there should be display few key parts such as price, date of manufacture, date of expiry, batch number, nutrient amounts, ingredients, weight, address and contact details of the manufacturer, quality certify labels, and traffic light food label. The traffic light food label indicates sugar, salt, and fat amount containing the relevant food product according to the high, medium, or low levels by red, amber (yellow), and green colour codes. The latest part of a food label is the traffic light label. The main purpose of the traffic light food label is to provide sufficient and simple information about sugar, salt, and fat amounts of the particular food product and habituate healthy eating patterns.

Traffic Light Food Labels are very easy to understand than nutritional labels, even for those without sufficient knowledge about human nutrition. The traffic light food label has three colour codes which are, red, amber (yellow), and green. Each represents the amount of sugar, salt, and fat. Over 22.5g of sugar, over 17.5g of fat, over 5g of saturated fat, and over 1.5g of salt per 100g are considered as high amounts and are represented on the traffic light label by red colour. Between 5g and 22.5g of sugar, between 3g and 17.5g of fat, between 1.5g and 5g of saturated fat, and between 0.3g and 1.5g of salt per 100g are considered as moderate amounts and are represented on the traffic light label by amber (yellow) colour. 5g and below of sugar, 3g and below of fat, 1.5g and below of saturated fat and 0.3 g and below of salt on per 100g are considered as low amounts and are represented on the traffic light label by green colour (Department of Health, the Food Standards Agency, developed administrations in Scotland, Northern Ireland and Wales and British Retail Consortium, 2016).

Since the traffic light food label is the latest part of the food product label in Sri Lanka, there are not enough research studies to determine consumer preferences on this label and the influence created by the traffic light food label on consumers' minds. Also, it has to determine the difference in consumers purchasing patterns before and after implementing the traffic light food label. Further, this research study focuses on identifying the factors influencing purchase decisions at the point-of-purchase, identifying the effectiveness of using traffic light food label on the food product label, and identifying possible improvements of traffic light food labelling systems.

Review of literature

The law of traffic light food labelling system was initially introduced in 2007 by FSA on behalf of the United Kingdom government. After it was introduced to Sri Lanka in 2016 regarding beverages, it

was mandatory for solid and semi-solid food products from the 1st of June 2019. Hence, traffic light food labelling law is the latest food label regulation in Sri Lanka.

Many empirical studies have investigated how food labels can influence consumer purchasing decisions on the point-of-purchase. Many young consumers are believing the importance of food labels while purchasing food products from retail shops. Indian research was revealed several reasons to check food product labels by people rather than past. Those are increasing consumer income, changing the family structure and lifestyle, gradual decrease in cooking, and less faith in the quality of unpacked and non-branded products. Most consumers read the food product labels before purchasing the product and believe the food product label is significantly influenced by their purchasing decision at the point-of-purchase.

There isn't a significant effect of gender on considering different kinds of labels except for the nutritional label. Both male and female consumers don't consider nutritional labels due to a lack of technical knowledge about food and human nutrition. However, there is a difference in reading the food product label before purchasing the products according to gender. Female consumers pay more attention and are more serious about the information provided by food product labels rather than male consumers. Female consumers are more concerned about unhealthy food components such as sugar, salt, and fat than male consumers. The age and education of consumers don't affect reading the food label. Also, there is a difference between vegetarian and non-vegetarian consumers when it comes to reading food product labels. Vegetarian consumers are more concerned about food labels than non-vegetarian consumers. Date of manufacturing, expiry, and best used before date labels are more considered by consumers (Kumar & Kapoor, 2017).

A study about introducing the traffic light food label system to primary and secondary school canteens in Australia revealed most parents would welcome the implementation of traffic light food labels on the school canteens, as well as supermarkets that sold traffic light food labelled products and grocery shops (Pettigrew *et al.*, 2011).

A study about buyer's awareness of the traffic light colour coding system for beverages in Kekirawa area, Sri Lanka, revealed most beverage consumers were not aware of three colour codes on the bottle package. Few consumers have seen these three-colour codes, but they couldn't interpret each colour code's meaning to determine the sugar level. Further, the study suggested the need for a publicity campaign about three colour code systems from mass media such as television, posters, social media, print media, and brochures. Also, it revealed insufficient knowledge of the colour codes of the soft drink consumers in Kekirawa area, Sri Lanka. It stressed a key point of the colour code symbol that it should be larger than the current colour code size. It may help consumers identify and understand the colour code easily on the market premises (Weerasinghe & Selvarajan, 2019).

There is another study about changes in consumer behaviour between before and after implementation of traffic light food labels on the university canteen of the Midwestern region of the United States. In the post-implementation survey, 60.8% of the participants reported that they noticed the traffic light

food labelling system, and 52% of participants had an idea about the meaning of different traffic light food labelling colours, and 48% of participants didn't have (Olds & Sas, 2018). A study revealed that the cause behind unhealthy eating patterns is the lack of knowledge about the nutrition of consumers (Elbel, 2011).

Another study was conducted in the cafeteria of Massachusetts General Hospital, Boston, United States, to examine the difference in consumer buying decisions between pre-and post-implementation of the traffic light food labels. This study revealed the consumer's awareness of the healthiness of foods had increased at the point-of-purchase after introducing the traffic light food labels (Sonnenberg *et al.*, 2013).

Research Method

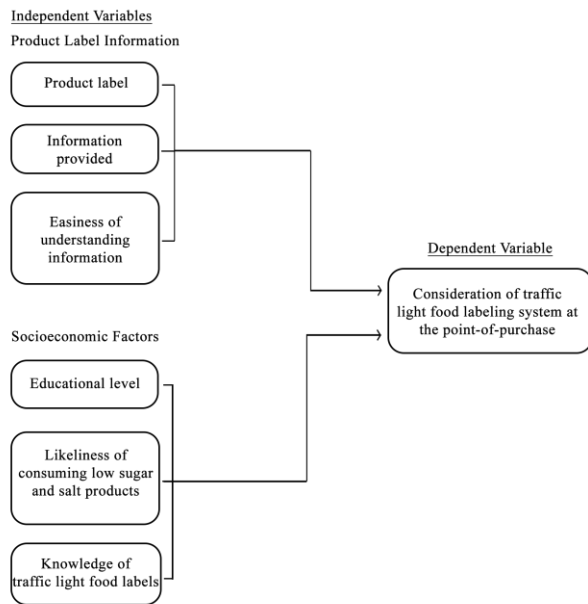
The study design, Sampling & Data collection method

Since the traffic light food label is the latest food product labelling regulation, it was decided to narrow down the research area to get a clear idea of consumer's preferences about this labelling regulation. Then Western province of Sri Lanka was selected as the research area. Western province has three administrative districts and also, in this research area contains people with different socio-economic profiles. A web-based, self-administrated questionnaire was developed to collect samples for the research. Data were collected from 200 individuals who represent the Western Province of Sri Lanka. The questionnaire had three sections; the first section collected demographic factors of the respondents such as the respondent's district, age, gender, education status, and monthly income level. The second section collected data relating to the respondent's basic knowledge and behavioural aspect of the traffic light food labelling system. The third section collected possible improvements in traffic light food labels from the consumer's perspective.

Data Analysis Method

Frequency analysis was used to identify socio-demographic factors. Important attributes of the traffic light food label such as label, information, understandability, easiness, consumer's knowledge about traffic light food labels, consumer's educational level was performed with Friedman test to determine the relationship between independent variables and dependent variable. Independent variables of this research study are the product label, information provided by the label, easiness of understanding information, educational level of the respondent, the likeliness of consuming low sugar & salt products, and respondent's knowledge of traffic light food label. The dependent variable of this research study is the consideration of traffic light food labelling system at the point-of-purchase. Cross-tabulation was performed to determine the relationship between checking the product label and price label consideration.

Conceptual Framework



Results & Discussion

The demographic profile of sample respondents from whom data was collected for this research study is depicted in a few tables. A total of 200 samples represented 3 administrative districts of western province, Sri Lanka. 44% of respondents were from Gampaha district. 31.5% of respondents were from the Colombo district, and 24.5% of respondents were from the Kaluthara district (Table 1).

Table 1: Districts that the data collected

District	Frequency	Percentage
Colombo	63	31.5
Gampaha	88	44.0
Kaluthara	49	24.5
Total	200	100.0

61% of respondents are female and 39% of respondents are males (Table 2).

Table 2: Gender of respondents

Gender	Frequency	Percentage
Male	78	39.0
Female	122	61.0
Total	200	100.0

79% of respondents were from the 20 – 29 years age category, which means more young consumers had responded to the research study (Table 3).

Table 3: Age groups

Age Groups (Years)	Frequency	Percentage
10 – 19 years	3	1.5
20 – 29 years	158	79.0
30 – 39 years	5	2.5
40 – 49 years	4	2.0
50 – 59 years	14	7.0
60 – 69 years	12	6.0
70 – 79 years	4	2.0
Total	200	100.0

As expected, most of the respondents have at least a university education. That is 80.5% of the total (Table 4).

Table 4: Educational status of respondents

Education Status	Frequency	Percentage
Postgraduate	8	4.0
Graduate	11	5.5
Undergraduate	142	71.0
A/Ls	28	14.0
O/Ls	9	4.5
Student (School)	2	1.0
Total	200	100.0

The majority of the respondents don't have independent income sources since they are still students (Table 5).

Table 5: Monthly income level of respondents

Monthly Income	Frequency	Percentage
No independent income	139	69.5
Less than 25,000/=	9	4.5
Between 25,000 – 50,000/=	28	14.0
Between 50,000 – 75,000/=	10	5.0
Between 75,000 – 100,000/=	8	4.0
Above 100,000/=	6	3.0
Total	200	100.0

More than 80% of respondents certainly check the product labels before purchasing food products. 16.5% of respondents check product labels eventually before the purchase decision. The majority of responses which is 91% of respondents, check price labels. Secondly, most consider labels as ingredients labels. That is 38.5% and thirdly, check the nutrition label and traffic light food label. That is 30% of both nutrition and traffic light food labels (Table 6).

Table 6: Product label consideration before the purchase decision

Question	Response	Frequency	Percentage
Do you check the product label before purchasing the product?	Yes	160	80.0
	No	7	3.5
	Maybe	33	16.5
Price label consideration	Yes	182	91.0
	No	18	9.0
Ingredient label consideration	Yes	77	38.5
	No	123	61.5
Nutritional label consideration	Yes	60	30.0
	No	140	70.0
Traffic light food label consideration	Yes	60	30.0
	No	140	70.0
Total		200	100.0

Respondent's product label checking behaviour is different. Some respondents check the product label usually, some respondents don't check product labels at all. Some respondents check product labels eventually. Therefore, price label consideration is higher than the usual label consideration percentage. It was performed cross-tabulation to determine the relationship between check the product label and price label consideration (Table 7). According to the cross-tabulation results, 155 respondents certainly check not only the product label but also the price label. Eventually, 27 respondents check the product label. If 27 respondents check the product label, they will check the price label also. Also, 182 respondents would check the price label, which is 91% of the total sample.

Table 7: Cross-tabulation between product label checking and price label consideration

Variable	Price label consideration	
	Yes	No
Do you check the product label before purchasing the product	Yes	5
	No	7
	Maybe	6
Total	182	18

When considering consumer’s knowledge about traffic light food labels, 78.5% of respondents know about the meaning of the red colour code, and 18% of respondents don’t have a clear idea (Table 8).

Table 8: Knowledge about traffic light food labels – Red colour

Colour label	Meaning of the colour code	Frequency	Percentage
The red colour code represents	High level of sugar/salt/fat of the food product	157	78.5
	Medium level of sugar/salt/fat of the food product	5	2.5
	Low level of sugar/salt/fat of the food product	2	1.0
	I haven’t any idea.	36	18.0
Total		200	100.0

72.5% of respondents know about the meaning of the amber (yellow) colour code of the traffic light food label, and 19.5% of respondents don’t have a clear idea (Table 9).

Table 9: Knowledge about traffic light food labels – Amber colour

Colour label	Meaning of the colour code	Frequency	Percentage
Amber (Yellow) colour code represents	High level of sugar/salt/fat of the food product	6	3.0
	Medium level of sugar/salt/fat of the food product	145	75.5
	Low level of sugar/salt/fat of the food product	8	4.0
	I haven’t any idea.	39	19.5
	Total	198	99.0
	Missing Data	2	1.0

76.5% of respondents have an idea about the meaning of the green colour code of the traffic light food label, and 19% of respondents don’t have a clear idea (Table 10).

Table 10: Knowledge about traffic light food labels – Green colour

Colour label	Meaning of the colour code	Frequency	Percentage
Green colour code represents	High level of sugar/salt/fat of the food product	5	2.5
	Medium level of sugar/salt/fat of the food product	3	1.5
	Low level of sugar/salt/fat of the food product	153	76.5
	I haven’t any idea.	38	19.0

Total	199	99.5
Missing data	1	0.5

Most of the consumers responded as they buy food products eventually even it has a red colour code on the package. 66.5% of respondents buy food products eventually if it has high sugar, salt or fat. 5.5% of respondents buy food products even though it has high sugar, salt, and fat components. The conclusion of these results is, traffic light food labelling system doesn't impact consumer buying behaviour significantly (Table 11).

Consumers have preferred to purchase food products if the food product has low sugar, salt, and fat components. That is 52% of the total sample. 26.5% of respondents don't prefer to buy low sugar, salt, and fat food products. Also, 19.5% of consumers buy low sugar, salt, and fat food products eventually (Table 11).

Table 11: Consumer's purchase decision on different colour codes

Situation	Decision	Frequency	Percentage
Consumer's purchase decision if a product has a red colour label	I purchase the product	11	5.5
	No, I don't purchase the product	54	27.0
	Maybe, I purchase the product	133	66.5
	Total	198	99.0
	Missing data	2	1.0
Consumer's purchase decision if a product has a green colour label	I purchase the product	104	52.0
	No, I don't purchase the product	53	26.5
	Maybe, I purchase the product	39	19.5
	Total	196	98.0
	Missing data	4	2.0

Few variables influence the information provided by traffic light food labels as well as the buying decisions of consumers. For example, check the product labels at the point-of-purchase, price label consideration, knowledge about human's daily sugar and salt requirement, consumer's likeliness of consuming low sugar and salt products, education level of consumers, consumer's knowledge about traffic light food labels, easiness of understanding information that provided by traffic light food label and attractiveness of the traffic light food label are significantly influenced to concern information that provided by traffic light food labels and influence to the purchasing decision.

The Friedman test determined the relationship between independent variables and the dependent variable. Independent variables are the product label, information provided by the label, easiness of understanding information, educational level of the respondent, the likeliness of consuming low sugar & salt products, and respondent's knowledge of traffic light food label. The dependent variable is the consideration of the traffic light food labelling system at the point-of-purchase.

The hypothesis is developed to identify the relationship between independent variables and the dependent variable.

H₀ = There is a relationship between independent variables and the dependent variable.

H₁ = There isn't a relationship between independent variables and the dependent variable.

According to Friedman, the test significance is 0.000 under 0.05 alpha value. Hence the alternative hypothesis is rejected, and the null hypothesis, in which there is a relationship between independent variables and the dependent variable, is accepted (Table 12).

Table 12: Relationship between independent and dependent variables

Significance	0.000
N (Number of respondents)	195
Chi-Square	1358.022
Df	10

Improvements in traffic light food labels

The research questionnaire collected data regarding future improvements of the traffic light food labels from the consumers' perspective. 43% of consumers responded that it is very easy to understand, and 20% of respondents reported that it is easy to understand the information provided by the traffic light food label. It indicates the simplicity of the traffic light food label (Table 13).

Table 13: Easiness of understanding the information provided by traffic light food label

Easiness	Frequency	Percentage
Very difficult to understand	8	4.0
Difficult to understand	18	9.0
Neutral	43	21.5
Easy to understand	40	20.0
Very easy to understand	86	43.0
Total	195	97.5
Missing data	5	2.5

The attractiveness of the traffic light food label was determined. 35.5% of respondents reported that the label is attractive, and 24.5% of respondents reported that the label is more attractive. The majority of the respondents reported that the label is attractive (Table 14).

Table 14: Attractiveness of the traffic light food label

Attractiveness	Frequency	Percentage
Very less attractive	12	6.0

Less attractive	19	9.5
Neutral	45	22.5
Attractive	71	35.5
More attractive	49	24.5
Total	196	98.0
Missing data	4	2.0

Considering the size of the traffic light food label, 51.5% reported that the existing size is good. 44% reported that the label should be large, and 2% reported that the label should be smaller than in the existing label (Table 15).

Table 15: The size of the traffic light food label

Label size	Frequency	Percentage
Current size is okay	103	51.5
It should be larger	88	44.0
It should be smaller	4	2.0
Total	195	97.5
Missing data	5	2.5

52% of respondents reported that traffic light food labels provide sufficient information to make the right purchase decision. 13% reported that it doesn't provide sufficient information to make the right purchase decision (Table 16).

Table 16: Traffic light food label provides sufficient information

Information	Frequency	Percentage
It doesn't provide enough information	26	13.0
Neutral	65	32.5
It provides enough information	104	52.0
Total	195	97.5
Missing	5	2.5

Conclusion & Recommendations

The research was conducted under the topic, "Impact of traffic light food labelling on consumer awareness of health and healthy choices of the point-of-purchase." It considered the education status of consumers, consumer's knowledge about traffic light food labels, and attributes of the label to determine usage of the information provided by traffic light food labels.

Data was collected from the survey method using a questionnaire, and 200 responses were collected from all three districts of western province, Sri Lanka. According to the descriptive analysis, most

respondents were from Gampaha district. The majority of respondents were female. Respondents believe that the traffic light food label provides sufficient information, as well as believe it is enough of the attractiveness and understandability of the label. According to the Friedman test, the independent variables influenced traffic light food labelling system consideration at the point-of-purchase. But none of the variables showed a significant impact on the consumer's purchasing decision at the point-of-purchase, even though the majority of the respondents had a clear idea of the meaning of different colour codes. Research results displayed the lack of attitudes of respondents on Traffic light food labels, human nutrition, and healthy eating patterns.

Therefore, it is recommended to organise some informative awareness programs with consumers. Also, the research questionnaire collects data for possible improvements in the traffic light food label. Food businesses, packaging institutes, and relevant government regulatory institutes may use these research results to further improvements on the label. The label size should be larger than the existing one.

Since this labelling system is the latest food product labelling regulation in Sri Lanka, future research studies should be focused on changes in the consumer preferences with this labelling system, consumer's knowledge on this labelling system, areas that can develop consumer's awareness and knowledge related to this labelling system, and the relationship between traffic light food labelling system and the number of NCDs patients in Sri Lanka. Also, this research study only focuses on the Western province of Sri Lanka. Therefore, future research studies can be expanded to the other provinces as well as the whole island.

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Appendix

Table 1: Districts that the data collected

Table 2: Gender of respondents

Table 3: Age groups

Table 4: Education status of respondents

Table 5: Monthly income level of respondents

Table 6: Product label consideration before the purchase decision

Table 7: Cross-tabulation between product label checking and price label consideration

Table 8: Knowledge about traffic light food labels – Red colour

Table 9: Knowledge about traffic light food labels – Amber colour

Table 10: Knowledge about traffic light food labels – Green colour

Table 11: Consumer's purchase decision on different colour codes

Table 12: Relationship between independent and dependent variables

Table 13: Easiness of understanding the information provided by traffic light food label

Table 14: Attractiveness of the traffic light food label

Table 15: The size of the traffic light food label

Table 16: Traffic light food label provides sufficient information