



**UNIVERSITI PUTRA MALAYSIA**

***AWARENESS, KNOWLEDGE AND PRACTISE OF THE HEALTHIER  
CHOICE LOGO MALAYSIA AMONG UNDERGRADUATE STUDENTS  
IN UNIVERSITI PUTRA MALAYSIA***

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CHOICE LOGO AMONG UNDERGRADUATE STUDENTS IN UNIVERSITI  
PUTRA MALAYSIA**



**BY**

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A project submitted as a partial fulfilment of the requirement for the degree of  
Bachelor of Science (Nutrition and Community Health) from the Faculty of  
Medicine and Health Sciences, Universiti Putra Malaysia

## APPROVAL

This project entitled – “Awareness, Knowledge and Practise of The Healthier Choice Logo Among Undergraduate Students in Universiti Putra Malaysia” was prepared by Nur Raihanah binti Harith Fadzillah and submitted to the Faculty of Medicine and Health Sciences as a partial fulfillment of the requirement for the degree of Bachelor of Science (Nutrition and Community Health) from the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia.



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Date: \_\_\_\_\_

## DECLARATION

I hereby declare that this thesis report is based on my original work except for quotations and citations which have been acknowledged to the corresponding authors.

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## TABLE OF CONTENTS

APPROVAL.....	ii
DECLARATION .....	iii
ACKNOWLEDGEMENT .....	iv
TABLE OF CONTENTS .....	v
LIST OF TABLES .....	viii
LIST OF FIGURES .....	ix
ABSTRACT.....	x
ABSTRAK .....	xi
CHAPTER 1 .....	1
INTRODUCTION .....	1
1.1 Background .....	1
1.2 Problem statement .....	3
1.3 Significance of the study .....	5
1.4 Research questions .....	6
1.5 Research objectives .....	6
1.5.1 General objectives.....	6
1.5.2 Specific objectives .....	6
1.6 Null hypothesis.....	7
1.7 Research framework.....	8
CHAPTER 2 .....	10
LITERATURE REVIEW.....	10
2.1 Introduction of the Healthier Choice Logo .....	10
2.2 Nutrient criteria for the application of HCL.....	16
2.3 Front-of-package healthy logo in other countries .....	17
2.3.1 Developed country .....	18
2.3.2 Developing country.....	19
2.6 Sociodemographic analysis on practise of food labels.....	21
2.6.1 Sex and food label.....	21
2.6.2 Age and food label.....	22
2.6.3 Ethnicity and food label .....	23
2.6.4 Education level and food label.....	24
2.6.5 Income and practise of food labels .....	25

2.6.6 Household size and food label .....	25
2.7 Awareness of front-of-package .....	26
2.8 Knowledge of front-of-package .....	27
2.9 Practise of front-of-package .....	28
CHAPTER 3 .....	29
METHODOLOGY .....	29
3.1 Study design .....	29
3.2 Study location.....	29
3.3 Sample size.....	29
3.4 Respondents.....	31
3.5 Sampling design .....	31
3.6 Research instruments.....	33
SECTION A: Sociodemographic characteristics.....	33
SECTION B: Awareness of Healthier Choice Logo .....	33
SECTION C: Knowledge on Healthier Choice Logo.....	34
SECTION D: Practise of Healthier Choice Logo.....	35
3.7 Study approval.....	35
3.8 Data collection.....	35
3.9 Data analysis.....	36
CHAPTER 4 .....	37
RESULTS AND DISCUSSION .....	37
4.1 Socio-demographic characteristics .....	37
4.2 Grocery shopping behaviour of the respondents .....	39
4.3 Awareness of Healthier Choice Logo.....	40
4.4 Knowledge of Healthier Choice Logo.....	42
4.5 Practise of the Healthier Choice Logo .....	44
4.6 Associations between Sociodemographic Characteristics with Awareness, Knowledge and Practise of Healthier Choice Logo .....	45
4.6.1 Awareness of Healthier Choice Logo .....	45
4.6.2 Sociodemographic characteristics and Knowledge of Healthier Choice Logo .....	47
4.6.3 Sociodemographic characteristics and Practise of Healthier Choice Logo.....	48
4.7 Associations between Awareness, Knowledge and Practise of Healthier Choice Logo.....	54
4.7.1 Awareness of Healthier Choice Logo and Knowledge of Healthier Choice Logo.....	54

4.7.2 Awareness of Healthier Choice Logo and Practise of Healthier Choice Logo .....	54
4.7.3 Knowledge of Healthier Choice Logo and Practise of Healthier Choice Logo .....	55
CHAPTER 5 .....	57
CONCLUSION, LIMITATION AND RECOMMENDATION .....	57
5.1 Conclusion.....	57
5.2 Limitations of study.....	58
5.3 Recommendations .....	59
REFERENCES.....	60
Appendix A: Approval letter from JKEUPM .....	66
Appendix B: Approval letter from each selected faculty.....	70
Appendix C: Questionnaire.....	74
Appendix D: Information sheet and consent form.....	81

## LIST OF TABLES

Table 2.1: The nutrient criteria according to the food groups.....	13
Table 2.2: Healthy Logo in developed countries .....	17
Table 2.3: Healthy Logo in developing countries .....	17
Table 3.1: Summary of the sample size using correlation formula.....	30
Table 3.2: Inclusion and exclusion criteria of the subject.....	31
Table 3.3: Classification of awareness of Healthier Choice Logo.....	34
Table 3.4: Classification of knowledge of Healthier Choice Logo.....	34
Table 4.1: Socio-demographic characteristics of the respondents (n = 184).....	38
Table 4.2: Grocery shopping behaviour among the respondents (n=184).....	40
Table 4.3: Results based on items in awareness of Healthier Choice Logo .....	41
Table 4.4: Category of awareness of Healthier Choice Logo .....	41
Table 4.5: Results based on items in knowledge of Healthier Choice Logo .....	43
Table 4.6: Category of total knowledge score on Healthier Choice Logo.....	44
Table 4.7: Results based on items in practise of Healthier Choice Logo .....	44
Table 4.8: Frequency of respondents using the Healthier Choice Logo (n=65) .....	44
Table 4.9: Reason for practise of the Healthier Choice Logo (n = 65).....	44
Table 4.10: Association of sociodemographic characteristics and awareness of Healthier Choice Logo .....	46
Table 4.11: Association of sociodemographic characteristics and knowledge of Healthier Choice Logo .....	47
Table 4.12: Association of sociodemographic characteristics and practise of Healthier Choice Logo .....	49
Table 4.13: Association of awareness of Healthier Choice Logo and knowledge of Healthier Choice Logo .....	54
Table 4.14: Association of awareness of Healthier Choice Logo and practise of Healthier Choice Logo using chi-square test of independence.....	54
Table 4.15: Association of knowledge of Healthier Choice Logo with the practise of Healthier Choice Logo using chi square test of independence .....	55

## LIST OF FIGURES

Figure 1.1: Research framework of this study .....	8
Figure 2.1: Latest Healthier Choice Logo (May, 2020).....	10
Figure 2.3: Guideline daily amount label.....	21
Figure 3.1: Multistage sampling design.....	32



## ABSTRACT

### AWARENESS, KNOWLEDGE AND PRACTISE OF THE HEALTHIER CHOICE LOGO (HCL) AMONG UNDERGRADUATE STUDENTS IN UNIVERSITI PUTRA MALAYSIA

**Nur Raihanah binti Harith Fadzillah**

Healthier Choice Logo (HCL) was introduced by the Ministry of Health Malaysia to combat obesity issues. This study aims to evaluate the awareness, knowledge and practise of HCL among undergraduate students in Universiti Putra Malaysia (UPM). A cross-sectional study with a total of 184 respondents participating in this study. The respondents were required to answer a self-administered questionnaire that consist 4 sections which are sociodemographic characteristics, awareness, knowledge, and practise of HCL. Chi-square test of independence and Pearson's correlation test were used to identify associations between sociodemographic characteristic, awareness, knowledge and practise of HCL. The mean age of the respondents was  $21.13 \pm 1.42$  years and majority of the respondents were females (58.0%), Malay (85.3%), studied engineering (50.0%), living in college dormitory (65.2%), mother (37.5%) and father (34.2%) completed secondary school, having allowance of less than RM500 (28.3%), from the B40 category household (46.7%) and having a household size of more than 4 person (71.2%). The study found 40.8% respondents were having high awareness and 71.2% had moderate knowledge with mean scores of  $3.07 \pm 0.86$  and  $18.24 \pm 2.90$ , respectively. Besides that, 35.3% of the respondents were using HCL during shopping. Year of study ( $p < 0.05$ ) and knowledge of HCL ( $p < 0.01$ ) were associated with awareness of HCL. Father's ( $p < 0.05$ ) and mother's ( $p < 0.05$ ) education level, and field of study ( $p < 0.05$ ) showed associations with knowledge of HCL. Sex ( $p < 0.05$ ), living arrangement ( $p < 0.05$ ), awareness ( $p < 0.01$ ) and knowledge ( $p < 0.05$ ) of HCL showed associations with practise of HCL. In conclusion, the results showed high awareness but moderate knowledge level and still low practise of HCL among students in UPM. This indicates that HCL is not a determinant in purchasing packaged food. There are associations between awareness, knowledge and practise of HCL which shows awareness and knowledge of HCL plays a role in the practise of HCL. Finally, more exposure on HCL must be done especially by the government to increase the awareness, knowledge and practise of HCL.

## ABSTRAK

### KESEDARAN, PENGETAHUAN DAN PENGGUNAAN LOGO PILIHAN LEBIH SIHAT (HCL) DALAM KALANGAN PELAJAR DI UNIVERSITI PUTRA MALAYSIA

**Nur Raihanah binti Harith Fadzillah**

Logo Pilihan Lebih Sihat (HCL) telah dikeluarkan oleh Kementerian Kesihatan Malaysia (KKM) untuk mengatasi masalah obesiti. Kajian ini bertujuan untuk menilai kesedaran, pengetahuan dan penggunaan HCL dalam kalangan pelajar ijazah di Universiti Putra Malaysia (UPM). Kajian keratan rentas ini disertai oleh 184 responden. Responden dikehendaki menjawab borang soal selidik yang mengandungi 4 bahagian iaitu ciri sosio-demografi, kesedaran, pengetahuan dan penggunaan HCL. Ujian Khi Kuasa Dua dan ujian korelasi Pearson telah digunakan untuk mengetahui perhubungan antara ciri sosio-demografi, kesedaran, pengetahuan dan penggunaan HCL. Purata umur responden adalah  $21.13 \pm 1.42$  tahun dan sebilangan besarnya adalah wanita (58.0%), Melayu (85.3%), mengikuti jurusan kejuruteraan (50.0%), tinggal di kolej (65.2%), ibu (37.5%) dan bapanya (34.2%) menamatkan pengajian sehingga sekolah menengah, mempunyai elaun kurang dari RM500 (28.3%) per semester, daripada kategori B40 (46.7%) dan mempunyai isipadu rumah lebih daripada 4 orang (71.2%). Kajian telah menunjukkan responden mempunyai kesedaran tinggi (40.8%) dan pengetahuan sederhana (71.2%) dengan purata markah  $3.07 \pm 0.86$  dan  $18.24 \pm 2.90$ . Selain itu, hanya 35.3% yang menggunakan HCL semasa pembelian. Pemboleh ubah yang menunjukkan perhubungan dengan kesedaran HCL adalah tahun belajar ( $p < 0.05$ ) dan pengetahuan HCL ( $p < 0.01$ ). Selain itu, tahap pembelajaran ibu ( $p < 0.05$ ) dan bapa ( $p < 0.05$ ), dan jurusan ( $p < 0.05$ ) menunjukkan perhubungan dengan pengetahuan HCL. Jantina ( $p < 0.05$ ), tempat tinggal ( $p < 0.05$ ), kesedaran ( $p < 0.01$ ) and pengetahuan ( $p < 0.05$ ) HCL menunjukkan perhubungan dengan penggunaan HCL. Kesimpulannya, kajian menunjukkan kesedaran tinggi tetapi pengetahuan sederhana dan penggunaan HCL masih rendah dalam kalangan pelajar UPM. Ini menunjukkan HCL bukan penentu penting semasa pembelian makanan. Terdapat juga perhubungan antara kesedaran, pengetahuan dan penggunaan HCL yang bermaksud kesedaran dan pengetahuan memainkan peranan dalam menentukan penggunaan HCL. Akhir sekali, lebih banyak pendedahan tentang HCL

harus dilakukan terutamanya daripada pihak kementerian untuk meningkatkan kesedaran, pengetahuan dan penggunaan HCL.



# CHAPTER 1

## INTRODUCTION

### 1.1 Background

Nowadays, the public are more health conscious especially in the consumption of food. The reason being many non-communicable diseases such as obesity could be caused by the poor dietary behaviour (Peltzer et al., 2014). Food labels are one of the ways to identify the food that were consumed. According to Norazmir et al. (2012), nutrition information or food label is an instance of the vital components that are included in the Malaysian Dietary Guidelines (MDG) to improve the dietary routine of Malaysians. Nutrition information refers to the list of nutrients on the food packaging. This information is meant for consumers to understand the content of the food product (Food Safety and Quality Division from Ministry of Health Malaysia, 2010) and it is supported by FAO/WHO in Food Labelling Fifth Edition (2007).

An article reviewed by Mandle et al. (2015) stated that generally food labels are divided into two sections which are the back-of-package (BOP) and the front-of-package (FOP). The BOP nutrition label enlightens about the nutritional content of the food and it lists out the nutrients and their amount in a section of food label called the nutrition information panel (NIP) (Food Safety and Quality Division (MOH), 2010) while the FOP label is a new incorporation to the mandated nutrition information panel. Front-of-package systems were classified as explanatory system during the Forty-Fourth Session of Codex Committee on Food Labelling (CCFL) in 2017

(Fatimah, Ruhaya & Zainudin, 2019). BOP focuses on nutritional content meanwhile FOP focuses on content explanation or food claims.

Healthier Choice Logo Malaysia (HCL) is the newest food label that is placed at the front of the pack to indicate that the food item is a healthier option among that type of food. It was launched on 20<sup>th</sup> of April 2017 by the Ministry of Health. The purpose of this FOP label as by the Ministry of Health is to encourage consumers in making a healthier food choice and to encourage food manufacturers to readjust their nutritional content to achieve a healthier food product (Guidelines on Healthier Choice Logo Malaysia, 2020). In the same guidelines, it is also stated there are several nutrient criteria for eight product sub-categories (cereals, fruits & vegetables, meat & poultry, fish & fish products, dairy & dairy products, beverages, sauces & oils and legumes & nuts) that need to be completed and followed in order to apply for the HCL certificate. Thus, proving some aspects that the manufacturers must follow in order to obtain HCL certificate on their food product.

Healthier choice logo is not recent as most countries have already developed their own logo before Malaysia. Example of healthier choice logo in other countries are “Healthier Choice Symbol” in Thailand and Singapore, Philippines has “Wise Eat” logo and Brunei also went with “Healthier Choice Logo” in 2017 (Pomeranz et al., 2019). Middle-income countries such as Thailand and Ecuador still show low practise of these front-of-package labels (Pongutta, Tantayapirak & Paopeng, 2019; Teran et al., 2019). Meanwhile, developed country such as Singapore showed high practise of food labels but low level of knowledge on how to use the label (Vijaykumar et al., 2013). As for Malaysia, there is no published study examining on awareness, knowledge and practise of HCL

## 1.2 Problem statement

According to World Health Organization (2020), about 1.9 billion adults aged 18 and above are overweight. In Malaysia, 30.6% of Malaysian adults are overweight and 17.7% are obese (National Health and Morbidity Survey, 2015). Besides that, overweight issue is also common among university (24.7% in men and 19.3% in women) in 22 countries (Peltzer et al., 2014). Odlaug et al. (2015) also reported 27.9% of college students in Midwestern United States University were overweight and obese. A recent study in five universities in Malaysia found that the prevalence of overweight (21.2%) and obesity (16.3%) were high among university students (Wan Mohamed Radzi et al., 2019). Hence, this shows that obesity is a serious issue that needs to be solved.

Besides that, dietary behaviour is found to be one of the associated factors of obesity (Storcksdieck Genannt Bonsmann & Wills, 2012). A study by Petlzer et al. (2014) supports this statement especially in terms of eating fibre and avoiding high fat food to reduce this problem. However, since this is a cross-sectional study, the real cause in specifically on dietary behaviour could not be determined. Study done by Yap, Ng and Kaur (2019) in Klang Valley have shown that overweight and obese university students are more prone to have a lower healthy eating index (HEI) compared to normal weight students. This is supported by other studies by Fokeena et al. (2016) and Yosae et al. (2016) as the studies concluded that young Malaysian adults have poor diet quality.

Apart from that, food label is related to dietary behaviour and they are shown to have heavy influence on calorie choice (EUFIC, 2016). A study conducted by Kim (2018) in Korea showed that the respondents who use food labels are more likely to

have reduced calorie intake. This study also reported that obese respondents were more likely to use food labels compared to normal weight respondents which is similar to other studies (Chen et al., 2012). This indicates that people who are trying to lose weight are the ones that use food labels more frequently. This could be due to them trying to monitor their caloric intake. A study by Cecchini and Warin (2015) have shown food labels help consumers in reducing the calorie intake by 3.59% and selecting healthier food product by 17.95%. Thus, food label is proven to be a very important aspect in determining the calorie intake.

Food label appearance is also one of the factors that could affect the preference and understanding of food labels. A study by Ambak et al. (2018) reported that low prevalence of food label use (never: 55.0%, sometimes: 22.0%, always: 23.0%) is due to low awareness and lack of understanding. Cecchini & Warin (2015) gave out the same result and agree that diet-related knowledge is important in choosing healthier food. However, consumers would still prefer pre-packaged food with nutrition labels compared to with no nutrition label in 20 countries (Mandle et al., 2015). Furthermore, Cabrera et al. (2017) stated that colour, size and position of the food logos are what attract consumers to read food labels, with colour choice being the largest contributor for perceived healthfulness. Therefore, there are a lot of preference or criteria that could influence the practise of food labels.

Lastly, since the launching of HCL in 2017, there is only one study regarding HCL by Fatimah, Ruhaya and Zainudin (2019). This study is about consumer's perception of HCL and was done before the implementation of HCL. The result of this study shows that most of the consumers (80%) supported the implementation of HCL. This is due to consumers believing that HCL could help in making better food choice.

Hawley et al. (2013) also mentioned about the importance of having credible logo in order to convince the practise of this logo. More studies regarding HCL must be done in order to understand the current status of HCL. Therefore, this study aimed to identify the current awareness, knowledge and practise among university students.

### **1.3 Significance of the study**

This study is important since there is no study regarding the awareness, knowledge, and the practise of the HCL in Malaysia since it is a new food label initiative from the government to the public. The findings from this study can serve as a baseline data on the current status. Policy makers could use the data gained to improve or make new policies in improving the public's awareness regarding this matter and overall health.

Besides that, this study could enhance body knowledge for the consumers regarding HCL as it is still a new initiative. Consumers that have participated in the study would also know about their current status or awareness regarding this new logo created by the government. Before answering the questionnaire, the respondents were briefed about this study and about HCL. This can help the consumers to indirectly know and understand about this logo to benefit their future product choice.

Furthermore, the result from this study could be used by health workers to improve initiated interventions. When the current status of awareness is known, interventions or programs could be done based on the needs of the public. This can be very useful especially for healthcare practitioners such as nutritionists that work with

the community. Food label is a very important knowledge that everyone should be taught of in order to improve the public's health status.

#### **1.4 Research questions**

1. What is the awareness level of the Healthier Choice Logo among undergraduate students in Universiti Putra Malaysia?
2. What is the knowledge level of Healthier Choice Logo among undergraduate students in Universiti Putra Malaysia?
3. What is the practise of Healthier Choice Logo among undergraduate students in Universiti Putra Malaysia?
4. What is the association between the awareness level, knowledge level and the practise of the Healthier Choice Logo?

#### **1.5 Research objectives**

##### **1.5.1 General objectives**

To identify the awareness, knowledge and practise of Healthier Choice Logo (HCL) Malaysia among undergraduate students in Universiti Putra Malaysia.

##### **1.5.2 Specific objectives**

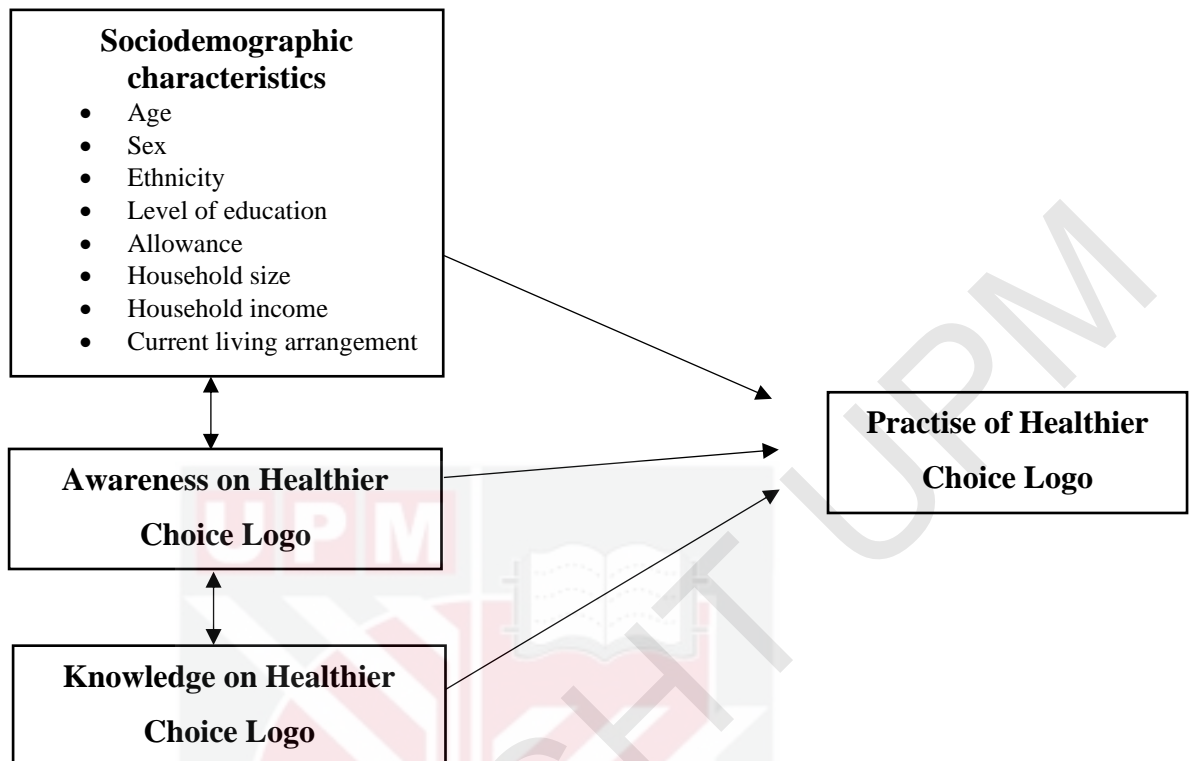
1. To determine the sociodemographic characteristics (age, sex, ethnicity, education level, monthly allowance, current living arrangement, household size) among undergraduate students in Universiti Putra Malaysia

2. To determine the awareness level of the Healthier Choice Logo (HCL) among undergraduate students in Universiti Putra Malaysia
3. To determine the knowledge level of the Healthier Choice Logo (HCL) among undergraduate students in Universiti Putra Malaysia
4. To determine the practise of the Healthier Choice Logo (HCL) among undergraduate students in Universiti Putra Malaysia
5. To determine the association between the sociodemographic characteristics with awareness level, knowledge level and practise of the Healthier Choice Logo (HCL) among undergraduate students in Universiti Putra Malaysia
6. To determine the association between the awareness, knowledge and practise of the Healthier Choice Logo (HCL) among undergraduate students in Universiti Putra Malaysia

#### **1.6 Null hypothesis**

1. There are no significant associations between the sociodemographic characteristics, awareness, knowledge and practise of the Healthier Choice Logo (HCL) among undergraduate students in Universiti Putra Malaysia

## 1.7 Research framework



**Figure 1.1: Research framework of this study**

Figure 1.1 shows the research framework for this study where the dependent variable is the practise of the HCL. There is no particular study that reported the practise of HCL but there are studies focused on food labelling in particular the front-of-package labels. Sociodemographic characteristics have been proven to have association with practise of food label such as age, sex, ethnicity, education, monthly allowance and household size. Talagala and Arampobela (2016) found out that women and people with older age are more prone to use nutrition labelling compared to men and people with younger age. Even though most studies show various result, a study by Gautam and Naresh (2018) have found out that education and gender have association with food label practise. However, a study by Syed, Abbas and Muhammad (2012) shows there is no relation between food label practise and education. Besides that, Singla (2010) have found that household size is negatively influence food label

use. Simmaky et al. (2015) have also found out that level of income, age and level of education were significantly associated with the awareness and practise of food labels.

The awareness of food labels has also shown to have association with the practise of the labels. A study by Mary et al. (2016) shows positive correlation between awareness of food labels and the practise of the labels in making food choices. Cheah and Yip (2016) also supports this statement while emphasizing the importance of having awareness about food labelling. However, a study by Osei Mensah (2012) stated that awareness is not a determinant of the practise of food labels. The knowledge in food labelling is also one of the contributing factors to the practise of food labels. Knowledge is a factor found to be significantly associated with the practise of food labels and nutritional claims (Petrovici et al., 2012; Carrillo, Varela & Fiszman, 2012). Cooke and Papadaki (2014) reported that consumers that are knowledgeable about food labels are more likely to use food labels.

## CHAPTER 2

### LITERATURE REVIEW

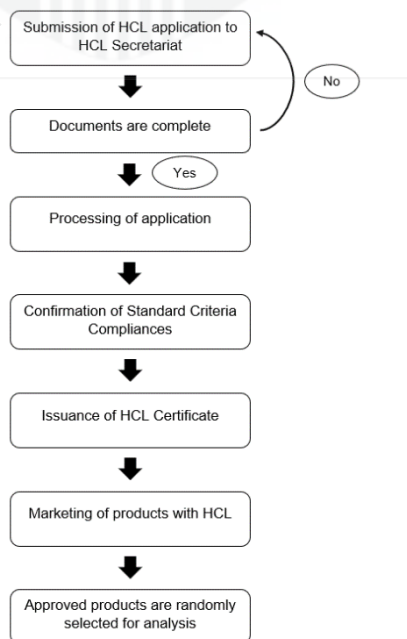
#### 2.1 Introduction of the Healthier Choice Logo

Healthier Choice Logo (HCL) is the latest food label initiative that was introduced by the Ministry of Health on the 20<sup>th</sup> of April 2017. As of May 2020, the Ministry of Health have updated a new logo used for HCL as shown in Figure 2.1. This initiative is in check with the strategy in the National Plan of Action for Nutrition Malaysian (NPAM) III (2016-2025) that focuses on healthy eating and active living. The 23<sup>rd</sup> ASEAN Summit 2013 emphasized on the responsibilities of food industries to produce healthier food in the market. Besides that, the 65<sup>th</sup> World Health Assembly (WHA) 2012 Resolution focused on the importance of food labelling system in order to educate consumers on healthy food choices. Both of these statements are in line with the purpose of having this HCL in Malaysia as stated by the Director of Nutrition Division, Ministry of Health (MOH) besides providing an environment that supports healthy eating practices (Guidelines of the Healthier Choice Logo, 2020).



**Figure 2.1: Latest Healthier Choice Logo (May, 2020)**

In the guidelines, it is also mentioned about the intention of HCL is to provide point-of-sale information as not all food products can carry or have that logo. The request or implementation of HCL is a voluntary basis as it is up to the company or industry to apply for the logo. In order to get the logo practise, the manufacturers must submit applications to the Nutrition Division and the certification will only be given upon approval of the MOH. The summary of application procedure is being illustrated in Figure 2.2. The food products may only use HCL if they comply to the certain criteria (Table 2.1) that is set by the Ministry of Health. However, enforcement and confirmation of the criteria that needs to be achieved is a primary responsibility of the individual company.



**Figure 2.2: The summary of the Healthier Choice Logo application procedure**

Upon certification acceptance, the company must agree to have non-exclusive use of the logo for any one product per one company and the certification is not negotiable, lendable, forged, transferable, altered or misused in any way. Besides that, the company must be responsible for ensuring the right practise of the logo on certified products. Before submitting the label, the product must have all these criteria which are having the front-of-package (FOP) energy icon, the product must display the nutrients specified as shown in Table 2.2 in the nutrition information panel (NIP). The product should also have this statement written in English or Malay language, “HCL helps consumers to identify healthier product within the same category”. Other than that, the company must be responsible to ensure the management of their food product comply with the Malaysia Food Regulation 1985. Finally, the certificate can only be valid for two years upon approval. When the time is up, the products will be re-evaluated to the latest nutrient criteria. The criteria may change in order to follow latest scientific updates (Guidelines of Healthier Choice Logo Malaysia, 2020).

**Table 2.1: The nutrient criteria according to the food groups.**

CEREALS	Nutrient criteria (per 100g)							
	Energy	Fat	SFA	TFA	Sodium	Total Sugars	Dietary Fibre	Whole Grains
Oats	-	-	-	-	No added	≤ 25 g	≥ 6 g	100%
Breakfast cereal (adult)	-	≤ 3g	-	-	≤ 400mg	≤ 25 g	≥ 3 g	≥ 25%
Breakfast cereal (children)	-	≤ 3g	-	-	≤ 400mg	≤ 30 g	≥ 3 g	≥ 25%
Cereal beverages (premix)	-	≤ 11g	-	-	≤ 632mg	≤ 42 g	≥ 3 g	-
Dry wheat noodle	-	≤ 2g	-	-	≤ 180mg	-	≥ 3 g	-
Instant noodle	-	≤ 20g	-	-	≤ 1000mg	-	≥ 3 g	-
Biscuits & crackers	≤ 250 kcal (per serving)	≤ 25g	≤ 10g	≤ 0.5g	≤ 420mg	≤ 24g	≤ 3g	-

FISH & FISH PRODUCTS	Nutrient criteria (per 100g)			
	Fat	Sodium	Added Sugars	Omega 3
Sardines & mackerel	≤ 15g	≤ 400mg	≤ 5g	≥ 300mg
Salmon	≤ 10g	≤ 400mg	≤ 5g	≥ 300mg
Tuna in water	≤ 5g	≤ 400mg	≤ 5g	≥ 300mg
Tuna in oil	Lower than 25%	≤ 400mg	≤ 5g	≥ 300mg
Seafood & other fishes	≤ 5g	≤ 400mg	≤ 5g	≥ 300mg

FRUITS & VEGETABLES/ MEAT & POULTRY	Nutrient criteria (per 100g)		
	Fat	Sodium	Light Syrup
Canned: Fruit & Fruit cocktails	-	-	18° > brix ≥ 14°; or natural juice
Canned: Meat & Poultry	≤ 10g	≤ 450mg	-

SAUCES/ FATS & OILS	Nutrient criteria (per 100g)				
	SFA	TFA	Total Sugars	Sodium	Energy
Salad dressing	≤ 5g	≤ 1g	≤ 20g	≤ 750mg	≥ 380 kcal
Nuts & seeds butter	≤ 10g	≤ 0.5g	≤ 30g	≤ 400mg	-

MILK & DAIRY PRODUCTS	Nutrient criteria (per 100g)			
	Fat	Calcium	Total Sugars	Total sucrose
Plain milk powder (exl FMPC, IF, FUF, maternal)	≤ 19g (2g/100ml)	≥ 120mg	-	-
Flavoured milk powder	≤ 19g (2g/100ml)	≥ 120mg	-	≤ 19g
Liquid milk (plain) per 100ml	≤ 1.5g	≥ 130mg	-	-
Liquid milk (flavoured) per 100ml	≤ 1.5g	≥ 130mg	≤ 6g (exl lactose)	-
Fresh milk (liquid)		(as per Malaysian Food Regulation)		
Cultured milk/ yoghurt drink per 100ml	≤ 1.5g	-	≤ 8g (exl lactose)	-
Yoghurt	≤ 2.0g	-	≤ 10g (exl lactose)	-
Cheese	≤ 15g	≥ 240mg	-	-

BEVERAGES	Nutrient criteria (per 100ml)			
	Total sugars	Fat	Sodium	Calcium
Malted/choc (ready-to-drink)	≤ 8g	≤ 2g	-	-
Malted/choc (powder)	≤ 12g (exl lactose, per serving)	≤ 5g	-	-
Juice drinks/ Fruit drinks	≤ 6g	-	≤ 40	-
Fruit juice	No added sugars	-	-	-
Vegetables juice	No added sugars	-	≤ 120mg	-
Soy bean milk/ drink	≤ 6g	≤ 2g	-	≥ 60mg
Water (drinking/ mineral)				(as per Malaysian Food Regulations)

<b>BEVERAGES</b>		<b>Nutrient criteria (per 100ml)</b>	
		<b>Total sugars</b>	<b>Fat</b>
<b>Sweetened drinks</b>	<b>Botanical</b>	≤ 6g	-
	<b>Isotonic electrolyte</b>	≤ 6g	-
	<b>Flavoured drink (non-carbonated)</b>	≤ 6g	-
	<b>Flavoured drink (carbonated)</b>	≤ 7g	-
<b>Tea mix</b>	<b>Tea drink (with/ without milk)</b>	≤ 6g	≤ 1.5g
	<b>Tea mix powder</b>	≤ 12g (per serving)	≤ 5g (per serving)
<b>Premix coffee</b>	<b>Coffee drink</b>	≤ 6g	≤ 1.5g
	<b>Coffee premix powder</b>	≤ 12g (per serving)	≤ 5g (per serving)

<b>LEGUMES, NUTS &amp; SEED</b>		<b>Nutrient criteria (per 100ml)</b>		
		<b>Sodium</b>	<b>Total sugars</b>	<b>Protein</b>
<b>Peanut butter</b>		≤ 400 mg	≤ 15g	≥ 24g

## 2.2 Nutrient criteria for the application of HCL

Based on the Nutrient Criteria for Healthier Choice Logo Malaysia (2019), the nutrient criteria that needs to be complied by the industries is shown in Table 2.1. The nutrient criteria vary according to the food group. Cereals food group focuses on nutrients such as energy, fat, saturated fatty acid, trans fatty acid, sodium, total sugar, dietary fibre and percentage of whole grain. Meanwhile, fish and fish products focus on fat, sodium, added sugar and omega 3 content. Fruits, vegetables, meat and poultry have similar nutrient criteria that they focused on. The nutrient criteria for these food groups are fat, sodium and light syrup. For sauces, fats and oils, saturated fatty acid, trans fatty acid, total sugars, sodium and energy are the nutrient criteria that food industries must comply. Milk and dairy products focus on nutrients such as fat, calcium, total sugars and total sucrose. Beverages must comply to nutrient contents such as total sugars, fat, sodium and calcium. The last food group is legumes, nuts and seed which the criteria compromise of sodium, total sugar and also protein.

Malaysia's HCL nutrient criteria were made based on World Health Organization's (WHO) Nutrient Profile Model, Singapore's Healthier Choice Symbol (HCS), Food Act 1983 and Choices Program International Product Criteria. If compared to the nutrient criteria for Brunei's HCL, there are additional categories of eggs and egg products, seafood, snacks and miscellaneous (Brunei Nutrient Criteria for Healthier Choice Logo, 2016). Meanwhile, for Singapore, the HCS similar to Brunei aside from another additional category which is convenience meals (Healthier Choice Symbol Nutrient Guidelines, 2017). Brunei's nutrient criteria were also made based on the WHO Nutrient Profile Model and Singapore's HCS nutrient criteria. Hence, the similarity in the nutrient criteria.

### 2.3 Front-of-package healthy logo in other countries

Other countries also have their own healthy logo similar to Malaysia to help consumers in making a better food choice. The healthy logo for other countries is shown in Table 2.2 for some developed countries and Table 2.3 for developing countries below.

**Table 2.2: Healthy Logo in developed countries**

Country	Singapore	Brunei	United States	Sweden
Logo				

Pomeranz et al. (2019)

**Table 2.3: Healthy Logo in developing countries**

Country	Thailand	Philippine
Logo		

Pomeranz et al. (2019)

### **2.3.1 Developed country**

Based on Table 2.2, the first logo is from Malaysia's neighbouring country, Singapore. The logo is called Healthier Choice Symbol and it is also created by the government. It is also up to companies to apply and can be used together with other claims such as "Higher in Whole Grain". The next logo is from Brunei, and the logo is also called Healthier Choice Logo. It is also established by the government and needs to comply to the criteria similar to Singapore's nutrient criteria. Apart from that, Walmart which is a very common supermarket in the United States are using this logo called Great for You. This is developed by the food industry and it is self-used on fresh food and Walmart's common brand. In order to use this logo, the industry need to comply to several criteria. Finally, in Sweden, the government had introduced this logo called Swedish National Food Agency's Keyhole Symbol. This logo is used in Sweden, Denmark, Norway and Iceland. It is also similar where standards have to be followed before using the symbol. All of the mentioned logos are evaluative summary indicator and it reflects positive indicator (Pomeranz et al., 2019).

One of the developed countries and a neighbouring country to Malaysia, Singapore also have their own healthy choice logo called Healthier Choice Symbol (HCS). The purpose of HCS is the same as HCL in Malaysia as it also serves to differentiate a healthier food product in the same category. Based on the study by Vijaykumar et al. (2013), it is shown that Singaporeans have a high practise of food labels but relatively low knowledge of the practise. The most significant low knowledge of food label is on the nutritional content, natural/fresh claims and organic food. This indicates that they are unclear of the use of these particular food labels but

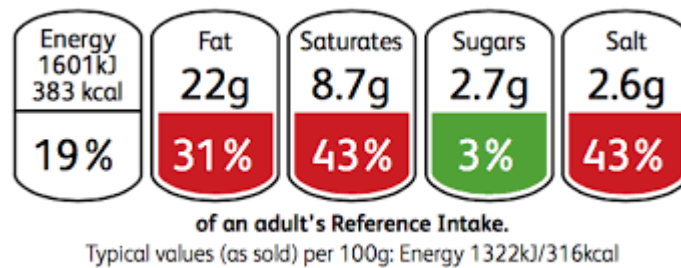
uses other food labels besides nutritional content, natural/fresh claim and organic food. Low nutritional knowledge could be the cause of low practise of food labels and the consumer could misinterpret the numerical information that could affect the dietary choices and health result. A previous study by Williams (2005) indicate that consumers would prefer food claims and do not really care about finding health information beyond the claims. The findings that shows positive practise of food labels may be due to a positive attitude of Singaporeans. Besides that, the respondents are very health conscious as the study also studied the attitude and awareness of the consumers there.

### **2.3.2 Developing country**

Table 2.3 shows several logos that are similar to HCL and are used in some developing countries. The first one is Thailand's Healthy Choice logo. It is supervised by the Thai Food and Drug Administration and the application is voluntary. In order for companies to use this logo on their food product, nutrient criteria based on food type set by the Thai Food and Drug Administration must be followed. Besides that, Philippine also have their own healthy logo called Wise Eat. It is also voluntary and the process is similar to Thailand where the industries need to comply to nutrient criteria. However, for Wise Eat logo, the food must comply to all the nutrient criteria stated and at least one additional criterion based on Codex. These logos in Thailand and Philippine are also portraying positive evaluative summary indicator (Pomeranz et al., 2019). Positive evaluative summary indicator is an indicator that is immediately understood as a whole positive indicator for the food which is similar to HCL.

A study by Pongutta, Tantayapirak and Paopeng (2019) revealed about the use and understanding of consumers on the current guideline daily amount (GDA) label in

Thailand. Guideline daily amount is a food label that indicates how much calories and some other nutrients (total sugars, fat, saturated fat and sodium) that consist in that particular food product as shown in Figure 2.3. This GDA label can help consumers in understanding how much calorie that they are about to consume before buying the food product. Guideline daily amount is also one of the front-of-package (FOP) labels which is meant to be explanatory as described during Forty-Fourth Session of Codex Committee on Food Labelling (CCFL) in 2017 (Fatimah, Ruhaya & Zainudin, 2019). Even though both GDA label and HCL are both self-explanatory and are on the FOP, GDA focuses on the calorie information and did not compare to other similar food product. The study was conducted using Thai structured questionnaire that accessed a few variables such as sociodemographic data, packaged food consumption, practise of food labels and preference of food labels. The study also compares the practise of the normal GDA label which shows informative scheme to the GDA plus scheme which has a more interpretive scheme. The study resulted in low understanding of the GDA label despite having taught in school-based campaigns and mass media since 2011 (Public and Consumer Affairs Advertisement Control Division, 2011). The practise of the labels is also low even among educated people and higher social class. Besides, consumers would prefer GDA plus scheme where they would understand better as they have interpretation like colour-coding and explanatory texts. Thus, proving the importance of interpretive scheme in order to enable the understanding of consumers on their food product.



**Figure 2.3: Guideline daily amount label**

## 2.6 Sociodemographic analysis on practise of food labels

Overall, there are mixed results on the association of sociodemographic characteristics and the use of food labels. A study by Hess et al. (2011) showed that sociodemographic variables did not play a huge role in the practise of food labels. The study focuses on the role of health-related, motivational and sociodemographic aspects in determining food label use using questionnaires. The author also stated that the variables such as age and education may be correlated with a more important underlying factors like behaviours or attitudes and how the variables only become significant if these factors are not measured. Another study by Chen et al. (2012) concluded that sociodemographic characteristics affect food label practise but it is also depending on the psychosocial factors and the respondent's social cognitive construct.

### 2.6.1 Sex and food label

There are a lot of studies related to food labels found out sex to be associated with practise of food label (Gautam & Naresh, 2018). A study by Su et al. (2015) which was done in Nebraska studied on sex-based analysis on food label practise and health. The result of this study is females reported to use food labels more compared to men.

This author explained that this result is due to females being the food handler in most families and thus have higher use of food labels. Besides that, females are more likely to have discontent towards their body therefore would be more prone to watch their diet to have their desired body image. However, the result also indicates that food label practise is more significant among males if they are obese or have illnesses such as hypertension, heart disease, diabetes and high cholesterol. Another study by Yong Kang et al. (2015) based on the Third National Health and Morbidity Survey among Malaysian adults gave similar result where females are more likely to use food labels compared to males. The author also included that females are more attentive about body image, diet and health besides having better knowledge on nutrition than males. However, the real reason as to why males have lesser use of food label still needs more research in order to combat and increase food label use.

### **2.6.2 Age and food label**

Age have been shown to be associated with food label practise (Festila et al., 2014). A study by Soederberg (2014) that studied about the factors affecting the use of nutrition labels in the United States. The result for this study is that there was not much difference between older and younger adults in this study in terms of food label awareness and practise. However, the knowledge for food labels were higher among the older adults compared to the younger adults. This is due to older adults are more interested of food labels usually due to health factors hence more focus on what they consume. The author also mentioned about how the surroundings might play a role in the affecting this result. Similarly, a study by Cooke and Papadaki (2014) gave out similar results where older people have more knowledge in food label compared to

younger people. This study focuses on food label use and its relationship with nutrition knowledge and attitude of healthy eating among university students in the United Kingdom. While the result demonstrates a higher knowledge in the older adults, the author also explained how this knowledge is what affects the practise of food label. Besides that, older consumers are more interested in food label due to wanting to eat healthier and concern about their health (Vemula et al., 2014)

### **2.6.3 Ethnicity and food label**

A study by Chen et al. (2012) in the United States that studied on food label use among adults also had similar results whereby ethnicity was found to be significantly associated with food label practise. The result shows that Hispanics are more likely to practise food labels compared to non-Hispanics. In the study, the author explained that ethnicity was dependent on other sociodemographic characteristic especially income. This is due to Hispanics having a more stable and higher socioeconomic status compared to other races. There is also a study done in Singapore by Vijaykumar et al. (2013) where the author studied about the factors that may influence food label use among supermarket shoppers using the Theory of Planned Behaviour. This study found out that ethnicity is significantly associated with food label practise. The result shows that Malays have a more positive attitude and perceived subjective norms regarding food label practise compared to other races (Chinese, Indian and Caucasians). Malay people also have shown to understand the way to use food label better than Chinese people in this study. The result emphasized on the psychosocial factors playing a bigger role in food label practise but studied on how ethnicity might affect food label use. However, the exact mechanism on how

different cultures might affect the result was not explained by the author. Besides that, a study by Yong Kang et al. (2015) in Malaysia had similar result where Malays are more prone to practise food labels compared to other two major ethnicity. The author also mentioned on how income, culture, health perception and practises vary among the races might gave out this result. This indicates that not only ethnicity affescts the food label practise but also these underlying factors which might be related to ethnicity. Further explanation was not described by the author. However, more qualitative study was suggested to have better understanding on how ethnicity might affect food label practise.

#### **2.6.4 Education level and food label**

Marjan et al. (2015) conducted a study to find out the reason why consumers are not using food labels in Iran. In this study, education is shown to be associated with food label use. consumers who have education level of diploma and higher showed greater use of food label compared to those with lower education level. The author also mentioned about level of education affects the nutritional knowledge of the consumer thus gave out higher practise of food labels among higher education category. Another study by Latiff and Ayob (2015) done in Selangor among Indian consumers found similar result where education level is associated with food label awareness. In this study, the author also reported that majority of the respondents (72%) are not aware of the food labels. Yong Kang et al. (2015) agreed with this by stating that higher education consumers processes information related to health better than lower education consumers. However, another study by Aygen (2012) done in Turkey found out that consumers with high school level of education reads food label

more than university graduate but the author did not further discuss on the mechanism for this part.

#### **2.6.5 Income and practise of food labels**

A study by Gupta and Dharni (2016) in India studied about how food label use may affect healthier food choice. The study found out that there are moderate to low practise of food label among the respondents. However, the result demonstrate income to not significantly affect food label use among the consumers there. However, a study by Yong Kang et al. (2015) where the author studied about factors affecting food label use among Malaysian adults. This study was done using the data from the Third National Health and Morbidity Survey on food label use. The result shows income, employment status and education level are associated with food label use. Those having higher income are shown to use food labels more than lower income category. The author also mentioned about higher income level people are more exposed with nutrition intervention program thus making them more conscious about their health. Another study by Themba and Tanjo (2013) among consumers in Botswana gave similar results where higher income consumers have more practise of food labels. However, there is no difference in the sociodemographic characteristics on the awareness of food labels.

#### **2.6.6 Household size and food label**

A study by Petrovici et al. (2012) studied on nutritional knowledge on food labels among supermarket shopper in England. The author found out that bigger

household size would result in less practise of food label compared to smaller household size. The author also added that the budget and family preference have a big role in affecting these decisions. Besides that, the author also mentioned mothers or the main food buyer's preference have the largest effect on the household's food label practise. Another study by Falola (2014) studied on food label practise among Nigerians living in Kwara State where the mean household size for this study is 9 persons. The result of this study showed that household size negatively affects the use of food labels whereby an increase in the household size would decrease the food label practise among the respondents. This is similar to previous study by Petrovici et al. (2012). The author also added that the number of schooling children also affects the practise of food label among respondents. This is due to lesser income to be distributed to each child and the caretaker would focus on the price of the food compared to the food label. Yong Kang et al. (2015) supported these two studies as family construct majorly affect the food label practise among household members.

## **2.7 Awareness of front-of-package**

Healthier Choice Logo is a form of front-of-package (FOP) label that helps in understanding the nutrition content in a more explanatory way. Simmaky, Madhujith and Vasantharuba (2015) investigated about the awareness level of consumers on food labels and the effect of the level of awareness and their behaviour. The type of study that was conducted is cross-sectional study using a structured questionnaire across Jaffna district in Sri Lanka. From the findings, it can be concluded that 92% which is a very high percentage are aware of the food labels on the food product. This statement is supported by a study by Sejal Jain, Gomathi and Sitanshu (2018) which the authors

studied about the awareness and preferences of food item with food labels. This study is also a cross-sectional study using semi-structured questionnaire that was held in supermarkets in urban area of Puducherry. This study reported high awareness of food labels on food product and high preferences of food product that has food labels on it. However, since there is not yet a study regarding HCL about the awareness of the logo, no conclusions can be made yet to identify the current awareness level.

## **2.8 Knowledge of front-of-package**

There are a lot of study that focuses on the knowledge regarding food labels and focusing on front-of-package (FOP) labels. According to a study by Vijaykumar et al. (2013), the authors studied about the determinants of food label use among supermarket shoppers in Singapore. The findings pointed out at the knowledge of calorie requirement and nutrient content is low and less than a quarter of the total sample could answer the questions correctly. This shows that consumers have low level of nutrition and health knowledge which could result in diseases such as non-communicable diseases.

Goodman et al. (2011) stated that food labels are a source of nutritional information and would affect dietary choices despite having insufficient comprehension of the content of the information. Hence, showing the importance of having knowledge in nutrition especially in term of food labelling since food labels are for the practise of everyone. However, this data can only be used to conclude overall knowledge of FOP labels since there is not yet any current study about the knowledge on the HCL.

## 2.9 Practise of front-of-package

According to a study by Egnell et al. (2018), front-of-package (FOP) labels is associated with an increase in a more healthful consumption as compared to food product that has no label. This helps in improving consumers capability to differentiate and choose a healthier food product (Hawley et al., 2013; Hersey et al., 2013). This study by the authors differentiate between many types of FOP labels which are interpretive FOP labels (Nutri-Score), multiple traffic light label, health star rating and warning signs. The total number of participants that are included are 12 015 participants and varies from 12 countries so this shows that this study has a really large sample size. What can be concluded from this study is that all FOP is very helpful in increasing consumers' understanding of the nutritional content due to several reason but combination of colour-coded information with summary graded graphical design have shown to be most effective. However, the understanding of consumers for each FOP is very different and varies among all 12 countries. The function of each label varies and even the perception of consumers towards the food label varies. The result from this study indicates that FOP labels play a huge role in making food choices as it is what consumers see first on the food package. Thus, consumers should be taught and be well versed on the FOP labels in order to be able to practise it.

## CHAPTER 3

### METHODOLOGY

#### 3.1 Study design

This was a cross-sectional study aimed to determine the awareness, knowledge and practise of Healthier Choice Logo (HCL) among undergraduate students at Universiti Putra Malaysia.

#### 3.2 Study location

This study was conducted in Universiti Putra Malaysia (UPM). There are 16 faculties and 11 institutes in UPM but the study was done only in UPM Serdang. The total number of students in UPM Serdang was 21302 students as of 2019 (Official Portal of Universiti Putra Malaysia, 2019).

#### 3.3 Sample size

The sample size was calculated using the correlation coefficient formula (Cole, 1997) and additional adjustment calculation was done to take account of the sample effect and response rate as shown in Table 3.1.

$$n = \frac{(z_{1-\frac{\alpha}{2}} + z_{1-\beta})^2}{r^{*2}/(1-r^{*2})} + 5$$

Where:

n = Calculated sample size

Z<sub>1-α/2</sub> = z score for significance level at 5% = 1.96

Z<sub>1-β</sub> = z score for power set at 80% = 0.842

r\* = correlation

DEFF = 1.3

Response rate = 83 % (Norazmir et al., 2012)

Eligibility rate = 90 %

**Table 3.1: Summary of the sample size using correlation formula**

Correlation	Calculation	Source
Correlation of knowledge and general practise of food labels r = 0.87	$n = \frac{(1.96+1.28)^2}{(0.87)^2/(1-(0.87^2))} + 5$ n = 8 n = 8 x 1.3 (DEFF) n = 10.4 ÷ 0.83 (response rate) n = 12.5 ÷ 0.90 (eligibility rate) n = 13.9 ≈ 14 respondents	Marietta, Welshimer & Anderson, 1999
Correlation of education and ease of nutritional label practise r = 0.712	$n = \frac{(1.96+1.28)^2}{(0.712)^2/(1-(0.712^2))} + 5$ n = 15 n = 15 x 1.3 (DEFF) n = 19.5 ÷ 0.83 (response rate) n = 23.5 ÷ 0.90 (eligibility rate) n = 26.1 ≈ 26 respondents	Singla, 2010
Correlation of food label awareness and food label practise r = 0.31	$n = \frac{(1.96+1.28)^2}{(0.31)^2/(1-(0.31^2))} + 5$ n = 104 n = 104 x 1.3 (DEFF) n = 135.2 ÷ 0.83 (response rate) n = 162.9 ÷ 0.90 (eligibility rate) n = 180.1 ≈ 180 respondents	Mary et al., 2016
Correlation of level of education and food label use r = 0.647	$n = \frac{(1.96+1.28)^2}{(0.647)^2/(1-(0.647^2))} + 5$ n = 20 n = 20 x 1.3 (DEFF) n = 26 ÷ 0.83 (response rate) n = 31.3 ÷ 0.90 (eligibility rate) n = 34.8 ≈ 35 respondents	Osei Mensah et al., 2012

After consideration of the design effect and the response rate, the largest sample size was selected. The selected sample size consists of 180 respondents.

### 3.4 Respondents

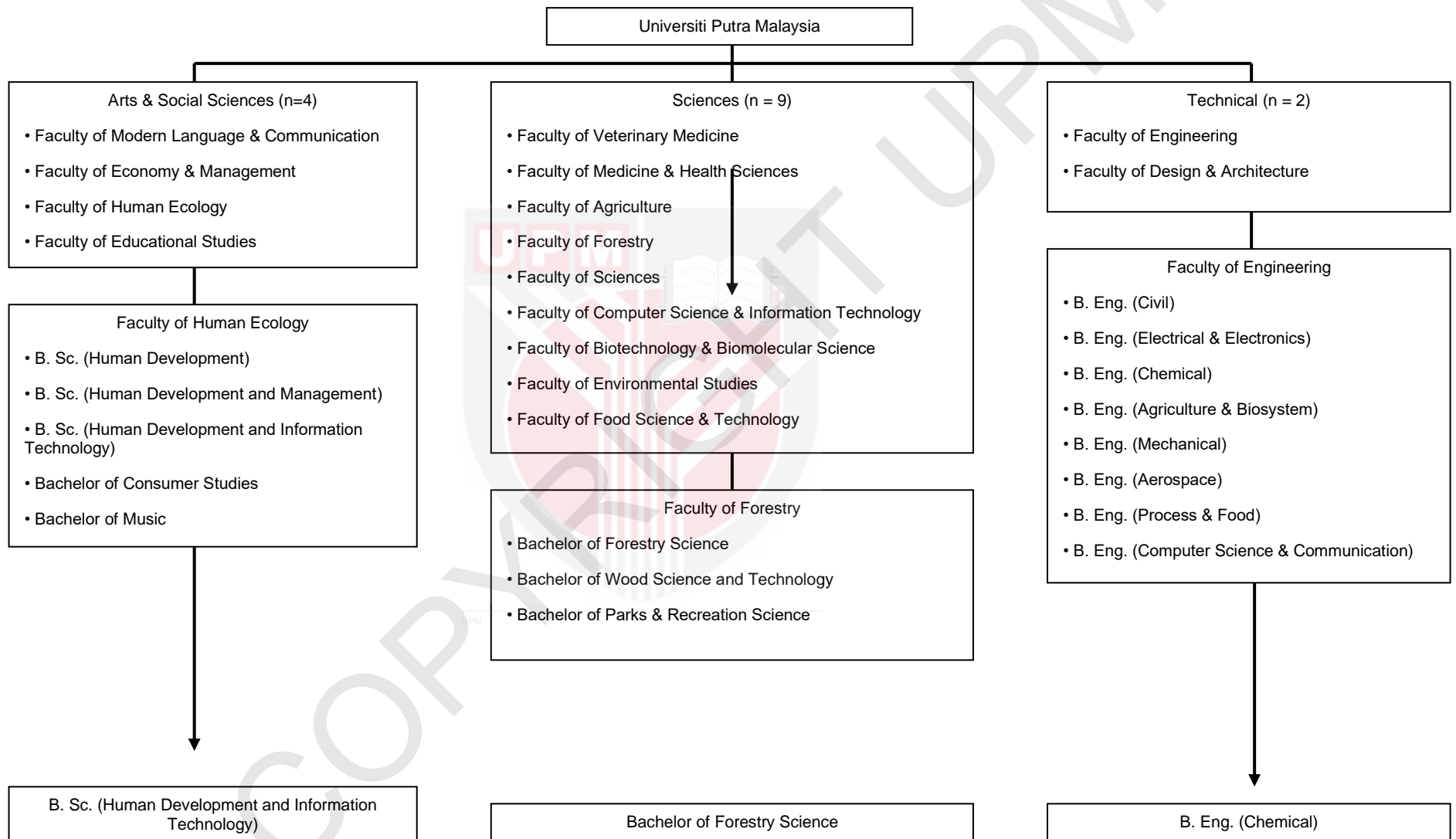
The target population of this study were undergraduate students aged 18 to 25 years old. The respondents were selected based on the inclusion and exclusion criteria as stated in Table 3.2 below:

**Table 3.2: Inclusion and exclusion criteria of the subject**

Inclusion criteria	Exclusion criteria
<ul style="list-style-type: none"><li>• Male and female</li><li>• All ethnic groups</li><li>• Undergraduate students</li><li>• Aged 19-25 years old</li></ul>	<ul style="list-style-type: none"><li>• Foreigner</li></ul>

### 3.5 Sampling design

For this study, a multistage sampling design was used to determine students from which program are going to be selected for data collection as described in Figure 3.1. Since the study was done in UPM Serdang, only 15 faculties were involved in the sampling design. First, all 15 faculties were divided into three category which are Arts and Social Sciences, Technical and Sciences. Then, a faculty from each category was randomly selected. From the selected faculty, a program was randomly selected for the study as illustrated in Figure 3.1. Students of all year from each selected program that follow the inclusion and exclusion criteria were all invited to participate in the study. Overall, a total of 184 respondents were recruited for this study.



**Figure 3.1: Multistage sampling design**

### **3.6 Research instruments**

All respondents were given a set of self-administered questionnaires in English that consist of four sections which are sociodemographic data, awareness of the HCL, knowledge on the HCL and the practise of HCL. Some improvements were made in order to suit this study as the questionnaires were used to study food labels. The changes were done with the supervision of the supervisor. There is a total of 20 items in this questionnaire to investigate the awareness, knowledge and practise of HCL.

#### **SECTION A: Sociodemographic characteristics**

This section consists of the respondent's sociodemographic characteristics which are the age, sex, ethnicity, level of education, allowance, household size, household income and current living arrangement which will be self-reported by the respondents.

#### **SECTION B: Awareness of Healthier Choice Logo**

In this section, the awareness of the respondents on the HCL was investigated. The questions were adapted by a study by Ponnudurai et al. (2019) where the study focuses on the awareness and practise of food labels. The improvements made were on the study focus which was from food labels to HCL. This section contains eight questions on grocery shopping behaviour that the respondents must answer, and the data were analysed descriptively except for two questions accessed the awareness level of the respondents. The answer options for these two questions are 'Yes' and 'No'. One mark was given for every 'Yes' answer and zero mark were given for every 'No' answer.

The total score of the awareness section ranged from 0 to 2, which were classified into three groups which are low, moderate and high similar to the adapted study.

**Table 3.3: Classification of awareness of Healthier Choice Logo**

Categories	Total marks
Low	0
Moderate	1
High	2

### **SECTION C: Knowledge on Healthier Choice Logo**

This section contains the questions regarding the knowledge of the respondents regarding the HCL. The section was adapted by a study by Farah Wahida et al. (2008) where the author studied about the knowledge, attitude and practice of food label. Only the knowledge part from the questionnaire was adapted in this study. Improvements were made to change the study focus from food labels to HCL. Adjustments were made with the reference of Guidelines of Healthier Choice Logo Malaysia (2017) and Nutrient Criteria for Healthier Choice Logo Malaysia (2019). Reliability test for this section gave out a Cronbach's alpha value of 0.91 which indicates excellent reliability. There are 15 questions and the answer options for this section are 'True', 'False' and 'Unsure'. Seven questions focus on general knowledge of HCL, five questions on the certification for HCL and three questions on the nutrient criteria of HCL. Two marks was given for every right answer and zero mark for every wrong and 'Unsure' answer. The total score ranged from 0 to 30 which were further classified into three groups; low, moderate and high similar to adapted study.

**Table 3.4: Classification of knowledge of Healthier Choice Logo**

Categories	Total marks
Low	0-15
Moderate	16-23
High	24-30

## **SECTION D: Practise of Healthier Choice Logo**

The last section consists of information on the respondent's practise of the HCL. This section was adapted from the same study by Ponnudurai et al. (2019). The only improvement done on this part was on the study focus which is from food label to HCL. In this section, there were four questions where for the first two questions, the answer will be categorized into two which are 'Yes' and 'No'. One question will focus on practise of food label, one question will focus on practise of HCL, one question will focus on the frequency of the practise of HCL and finally, the last question is to find out the reason for the practise of HCL. For this section, only one question was used to assess the practise of HCL and will be categorised as "Yes" and "No".

### **3.7 Study approval**

Prior to data collection, ethical approval for the study protocol was obtained from the Ethics Committee for Research Involving Human Subjects Universiti Putra Malaysia (*Jawatankuasa Etika Universiti Penyelidikan Melibatkan Manusia*). The application number is JKEUPM-2019-546. Approval from Dean of each of the selected faculties were also obtained.

### **3.8 Data collection**

Data collection was conducted from March 2020 until May 2020. Data collection was done at selected faculties in Universiti Putra Malaysia. Before the respondents answer the questionnaire, they were given an information sheet explaining the purpose of this

study together with a consent form of agreement to participate in this study. Written informed consent were obtained from the respondents before answering the questions. During the data collection, the questionnaire given consists of four sections that respondents must answer. However, due to COVID-19 pandemic, the data collection was done through online questionnaire method but the processes are still similar. Goodies was given to attract and act as a token of appreciation for participation in the questionnaire survey. However, goodies distribution can only be done before the implementation of the Movement Control Order due to COVID-19.

### **3.9 Data analysis**

The data obtained was analysed using the IBM SPSS Statistics version 25.0. Categorical data were presented in frequency and percentage while numerical data were presented as mean  $\pm$  SD. Hypothesis testing was conducted using chi-square test of independence for categorical data which are the sociodemographic characteristics, awareness of HCL, knowledge of HCL and practise of HCL. Meanwhile, for awareness of HCL and knowledge of HCL, the continuous data was used to test association using Pearson correlation test. The p-value for all test was set at  $<0.05$ .

## CHAPTER 4

### RESULTS AND DISCUSSION

#### 4.1 Socio-demographic characteristics

The sociodemographic characteristics are described in Table 4.1. The total number of respondents recruited and follow the inclusion and exclusion criteria are 184 respondents (58.2% females and 41.8% males). Twenty-six respondents were able to be collected before the execution of Movement Control Order (MCO) by the Malaysian government to overcome COVID-19. During MCO, a total of 158 respondents were recruited using online questionnaire. Overall, this yield out a total of 184 respondents for this study.

The mean age of the respondents was  $21.13 \pm 1.42$  years and are ranging from 19 to 25 years old. Majority of the respondents are Malay (85.3%) studied Bachelor of Bachelor of Electronic and Electrical Engineering (50.0%) and are living in college dormitory (65.2%). Besides that, here is an almost equal distribution from all year of study. The mean personal allowance per semester was  $RM1598.42 \pm 1401.05$  and majority of them have allowance of less than RM500 (28.3%) and more than RM2000 (26.1%) per semester. Personal allowance in this study means any spending money that is gotten from any sources in a semester. Apart from that, majority of them have both the father's (34.2%) and mother's (37.5%) education level of secondary school. The mean monthly household income was  $RM6502.42 \pm 5421.23$  and majority of them are from the B40 category which is less than RM4850 (46.7%). B40 category (< RM4850), M40 category (RM 4850 – RM 10959) and T20 category (> RM 10959) are

according to Department of Statistics Malaysia (2019). Majority of them have a household size of more than 4 people (71.2%) and the mean household size is  $5.43 \pm 1.60$  people.

**Table 4.1: Socio-demographic characteristics of the respondents (n = 184)**

<b>Characteristics</b>	<b>Mean <math>\pm</math> SD</b>	<b>n (%)</b>
<b>Age (years)</b>	$21.13 \pm 1.42$	
19-21		110 (59.8)
22-25		74 (40.2)
<b>Sex</b>		
Male		77 (41.8)
Female		107 (58.2)
<b>Ethnicity</b>		
Malay		157 (85.3)
Chinese		10 (5.4)
Indian		12 (6.5)
Others		5 (2.7)
<b>Course of study</b>		
Bachelor of Electronic and Electrical Engineering		92 (50.0)
Bachelor of Science (Human Development and Information Technology)		33 (17.9)
Bachelor of Forestry Science		59 (32.1)
<b>Year of study</b>		
First year		50 (27.2)
Second year		50 (27.2)
Third year		35 (19.0)
Fourth year		49 (26.6)
<b>Current living arrangement</b>		
College dormitory		120 (65.2)
Off-campus		64 (34.8)
<b>Allowance per semester (RM)</b>	$1598.42 \pm 1428.64$	
$\leq 500$		52 (28.3)
501-1000		40 (21.7)
1001-1500		19 (10.3)
1501-2000		25 (13.6)
$\geq 2001$		48 (26.1)
<b>Father's education level</b>		
No formal education		3 (1.6)
Primary school		9 (4.9)
Secondary school		63 (34.2)
STPM/Matriculation/Foundation		13 (7.1)
Diploma		30 (16.3)
Bachelor's degree		38 (20.7)
Master's degree		18 (9.8)
Doctoral degree		4 (2.2)
Others		6 (3.3)

*Cont.*

<b>Characteristics</b>	<b>Mean ± SD</b>	<b>n (%)</b>
<b>Mother's education level</b>		
No formal education		4 (2.2)
Primary school		9 (4.9)
Secondary school		69 (37.5)
STPM/Matriculation/Foundation		23 (12.5)
Diploma		21 (11.4)
Bachelor's degree		43 (23.4)
Master's degree		10 (5.4)
Doctoral degree		0 (0.0)
Others		5 (2.7)
<b>Monthly household income (RM)</b>	<b>6502.42 ± 5421.23</b>	
<4850		86 (46.7)
4850– 10959		49 (26.6)
>10959		49 (26.6)
<b>Household size</b>		
≤4	<b>5.43 ± 1.60</b>	53 (28.8)
>4		131 (71.2)

#### **4.2 Grocery shopping behaviour of the respondents**

The grocery shopping behaviour of the respondents are shown in Table 4.2. For frequency of grocery shopping, majority of the respondents choose to shop “Once every two weeks” (40.2%), followed by “Once every month” (33.2%) and then only “Every week” (26.6%). Majority of them prefer to shop during the weekend (59.8%) and during daytime (45.1%). Besides that, majority of them also prepare a list beforehand and also decide at the supermarket during shopping (40.8%). The result also shows majority of the respondents buy pre-packaged food every week (60.3%). For the respondents’ perception on food labels, majority of them find food labels to be useful (76.1%) and provide nutrition information (65.1%).

**Table 4.2: Grocery shopping behaviour among the respondents (n=184)**

<b>Items</b>	<b>n (%)</b>
<b>Frequency of grocery shopping</b>	
Every week	49 (26.6)
Once every two weeks	74 (40.2)
Once every month	61 (33.2)
<b>Preferred time of grocery shopping</b>	
Weekday	74 (40.2)
Weekend	110 (59.8)
Day time	83 (45.1)
Night time	26 (14.1)
Anytime	75 (40.8)
<b>Preparation before grocery shopping</b>	
Prepare a list beforehand	60 (32.6)
Decide at supermarket	49 (26.6)
Both	75 (40.8)
<b>Frequency of buying pre-packaged food</b>	
Every day	10 (5.4)
Every week	111 (60.3)
Monthly	39 (21.2)
Rarely	24 (13.0)
<b>Perception of food labels (n=182)</b>	
Useful	140 (76.1)
Good to know expiry date	95 (51.6)
Lack of information	10 (5.4)
Legal requirement	56 (30.4)
Advertising purpose	25 (13.6)
Provide nutrition information	121 (65.8)

### 4.3 Awareness of Healthier Choice Logo

The items for awareness of the HCL are shown in Table 4.3 below. Majority of the respondents have seen the HCL before (64.6%) but majority of them have not heard of HCL before (56.5%). The respondent's category of score are shown in Table 4.4 whereby mean score for this section is  $3.07 \pm 0.86$  which is situated in the moderate category. Besides that, the result shows that majority of the respondents have high awareness of HCL (40.8%).

In present study, only a part of the respondents is aware of the HCL. The others have not either heard or seen the HCL before. This result is lower compared to a study by Fatimah, Ruhaya and Zainudin (2019) where 85% of the respondents are aware of not HCL but another form of front-of-pack logo which is the energy icon. This energy icon was released in 2012 which was earlier than the release of HCL hence could explain the difference in the percentage. Overall, the result shows that there is lack of HCL exposure on the respondents in the present study because up until May 2020, the total number of products that are allowed to use the logo is 289 products already (Ministry of Health, 2020). Even with quite a number of products with HCL, there are still a number of students that are not aware of this logo.

**Table 4.3: Results based on items in awareness of Healthier Choice Logo**

Items	n (%)	
	Yes	No
Seen Healthier Choice Logo	117 (63.6)	67 (36.4)
Heard of Healthier Choice Logo	80 (43.5)	104 (56.5)

**Table 4.4: Category of awareness of Healthier Choice Logo**

Category	Mean $\pm$ SD	n (%)
Low awareness (score 0)	1.07 $\pm$ 0.86	62 (33.7)
Moderate awareness (score 1)		47 (25.5)
High awareness (score 2)		75 (40.8)

**Ponnudurai et al. (2019)**

#### 4.4 Knowledge of Healthier Choice Logo

The distribution of respondents according to the answers are described in Table 4.5 below. Majority of the respondents answered correctly when asked if HCL was introduced by the MOH (56.0%) and requirement to comply to nutrient criteria before obtaining HCL (53.3%). However, majority of the respondents are not sure about the year HCL was introduced in (78.8%), eligibility of food type (54.9%), the charge for application of HCL (70.1%), the period of validity of HCL per application (76.1%), function of HCL (69.6%), placement of HCL on food package (65.2%), the requirement of placement of HCL together with the energy icon (76.1%), the size (77.2%) and colour (62.0%) of the logo and the applicants' registration with the Registrar of Companies (63.0%). Besides that, majority of the respondents are also unsure of the nutrient criteria on oat food product (74.5%), fish and fish products (83.7%), and drinking and mineral water (75.5%). The score category of respondents is shown in Table 4.6 below. The mean score for knowledge of HCL is  $18.24 \pm 2.90$  which is placed at moderate category. Majority of the respondents are in moderate knowledge (71.2%), followed by low knowledge (21.7%) and only 7.1% are having high knowledge on HCL.

Almost majority of the respondents have moderate knowledge and very little showed high knowledge on HCL in current study. This is slightly different from a study in Ghana where the author found slightly above half of the respondents are having moderate knowledge, followed by high knowledge and then low knowledge (Madilo et al., 2020). The author studied on understanding of food labels also among university students. This result indicates many of the respondents are still having low to moderate knowledge on HCL.

**Table 4.5: Results based on items in knowledge of Healthier Choice Logo**

No.	Items	n (%)		
		Correct answer	Incorrect answer	Unsure
1	The Healthier Choice Logo was introduced by the Ministry of Health*	103 (56.0)	1 (0.5)	80 (43.5)
2	The Healthier Choice Logo was introduced in 2017*	35 (19.0)	4 (2.2)	145 (78.8)
3	All types of food are eligible to apply for the Healthier Choice Logo	40 (21.7)	43 (23.4)	101 (54.9)
4	The application for the certification of Healthier Choice Logo is free of charge*	25 (13.6)	30 (16.3)	129 (70.1)
5	There is a list of nutrient content that must be complied by the manufacturers in order to obtain the certification of Healthier Choice Logo on their food product*	98 (53.3)	5 (2.7)	81 (44.0)
6	Once approved, the certification of Healthier Choice Logo on the food product is valid for 1 year (12 months)	11 (6.0)	33 (17.9)	140 (76.1)
7	The Healthier Choice Logo compares food within the same food category*	49 (26.6)	7 (3.8)	128 (69.6)
8	The Healthier Choice Logo can be placed on either front-of-package or back-of-package	19 (10.3)	45 (24.5)	120 (65.2)
9	The label submitted for the Healthier Choice Logo must contain the Front Of Pack energy icon*	36 (19.6)	8 (4.3)	140 (76.1)
10	The size of the logo should not have less than 15mm width when applied on the packaging*	31 (16.8)	11 (6.0)	142 (77.2)
11	There is only one colour for the logo that the Ministry of Health allow on the food packaging	11 (6.0)	59 (32.1)	114 (62.0)
12	Applicants must be registered with the Registrar of Companies to be able to apply for the certificate*	63 (34.2)	5 (2.7)	116 (63.0)
13	Oat food products must be 100% whole grain*	38 (20.7)	9 (4.9)	137 (74.5)
14	All added sugars in fish and fish products must be $\leq 5g$ *	24 (13.0)	6 (3.3)	154 (83.7)
15	Drinking and mineral water cannot apply for the certification even if they comply to the Malaysian Food Regulation	13 (7.1)	32 (17.4)	1395.5)

\* True answers

**Table 4.6: Category of total knowledge score on Healthier Choice Logo**

Category	Mean $\pm$ SD	n (%)
Low knowledge (score 0-15)	18.24 $\pm$ 2.90	40 (21.7)
Moderate knowledge (score 16-23)		131 (71.2)
High knowledge (score 24-30)		13 (7.1)

Farah Wahida et al. (2008)

#### 4.5 Practise of the Healthier Choice Logo

The result in Table 4.7 shows that 78.8% of the respondents are using food labels during shopping but only 35.3% of the respondents are practising HCL. Majority of the respondents who are practising HCL (46.2%) rarely use HCL and only 12.3% used every time during shopping. The reason for the usage is shown in Table 4.8 where majority of the respondents used HCL to eat healthier (29.2%), the logo can be trusted since it is published by MOH (26.2%) and to make better food choice (23.1%).

**Table 4.7: Results based on items in practise of Healthier Choice Logo**

Items	n (%)	
	Yes	No
Practise of food label	145 (78.8)	39 (21.2)
Practise of Healthier Choice Logo	65 (35.3)	119 (64.7)

**Table 4.8: Frequency of respondents using the Healthier Choice Logo (n=65)**

Frequency	n (%)
Everytime	8 (12.3)
Sometimes	27 (41.5)
Rarely	30 (46.2)

**Table 4.9: Reason for practise of the Healthier Choice Logo (n = 65)**

Items	n (%)
To ensure food safety and quality	8 (12.3)
To eat healthier	19 (29.2)
To make better food choice	15 (23.1)
Contains good information	5 (7.7)
The content can be trusted as it is by the Ministry of Health	17 (26.2)
Appearance of the logo	1 (1.5)

The result shows a very huge difference in the percentage between food label practise and HCL practise. This could mean that the respondents would refer to other food labels beside HCL compared to HCL in terms of making food choice. Even among the respondents that practise HCL, only a small percentage are practising at every shopping session. The reason for the practise of HCL are mainly to practise a healthier eating practises which is similar to previous studies (Hawley et al., 2013; Hersey et al., 2013). Besides that, it is also due to the respondents trust the label as it is published by the MOH. This indicates that consumers trust what the ministry does and will comply if they want to and when they have enough awareness and knowledge on the label. The government should realise how the consumers rely on the messages that the government portray before taking actions.

#### **4.6 Associations between Sociodemographic Characteristics with Awareness, Knowledge and Practise of Healthier Choice Logo**

##### **4.6.1 Awareness of Healthier Choice Logo**

Chi-square test of independence was used to test the associations of sociodemographic characteristics with the awareness of HCL. Based on Table 4.10, the result shows that only year of study have significant association with the awareness of HCL ( $p < 0.05$ ).

However, other variables such as age ( $p > 0.05$ ), sex ( $p > 0.05$ ), ethnicity ( $p > 0.05$ ), field of study ( $p > 0.05$ ), living arrangement ( $p > 0.05$ ), allowance ( $p > 0.05$ ), father's education level ( $p > 0.05$ ), mother's education level ( $p > 0.05$ ), household income ( $p > 0.05$ ) and household size ( $p > 0.05$ ) shows no association with the awareness of HCL.

**Table 4.10: Association of sociodemographic characteristics and awareness of Healthier Choice Logo**

Characteristics	Awareness of HCL n (%)			$\chi^2$	p-value
	Low	Moderate	High		
<b>Age (years)</b>				2.458	0.293
19-21	33 (53.2)	32 (68.1)	45 (60.0)		
22-25	29 (46.8)	15 (31.9)	30 (40.0)		
<b>Sex</b>				0.427	0.808
Male	24 (28.7)	21 (44.7)	32 (42.7)		
Female	38 (61.3)	26 (55.3)	43 (57.3)		
<b>Ethnicity</b>				2.049	0.359
Malay	50 (80.6)	40 (85.1)	67 (89.3)		
Non-Malay	12 (19.4)	7 (14.9)	8 (10.7)		
<b>Field of study</b>				2.843	0.241
Science	51 (82.3)	42 (89.4)	58 (77.3)		
Non-science	11 (17.7)	5 (10.6)	17 (22.7)		
<b>Year of study</b>				18.246	0.006*
First year	13 (21.0)	8 (17.0)	29 (38.7)		
Second year	16 (25.8)	16 (34.0)	18 (24.0)		
Third year	20 (32.3)	8 (17.0)	7 (9.3)		
Fourth year	13 (21.0)	15 (31.9)	21 (28.0)		
<b>Current living arrangement</b>				1.022	0.600
College dormitory	38 (61.3)	30 (63.8)	52 (69.3)		
Off-campus	24 (38.7)	17 (36.2)	23 (30.7)		
<b>Allowance per semester (RM)</b>				4.884	0.087
≤1500	41 (66.1)	22 (46.8)	48 (64.0)		
>1500	21 (33.9)	25 (53.2)	27 (36.0)		
<b>Father's education level</b>				9.214	0.056
Primary education/no formal education	5 (8.1)	0 (0.0)	7 (9.3)		
Secondary education	22 (35.5)	20 (42.6)	21 (28.0)		
Tertiary education	35 (56.5)	27 (57.4)	47 (62.7)		
<b>Mother's education level</b>				3.244	0.518
Primary education/no formal education	7 (11.3)	2 (4.3)	4 (5.3)		
Secondary education	23 (37.1)	20 (42.6)	26 (34.7)		
Tertiary education	32 (51.6)	25 (53.2)	45 (60.0)		
<b>Monthly household income (RM)</b>				7.511	0.111
<4850	35 (56.5)	18 (38.3)	33 (44.0)		
4850– 10959	14 (22.6)	18 (38.3)	17 (22.7)		
>10959	13 (21.0)	11 (23.4)	25 (33.3)		
<b>Household size</b>				4.393	0.111
≤4	40 (64.5)	25 (53.2)	35 (46.7)		
>4	22 (35.5)	22 (46.8)	40 (53.3)		

\* $p < 0.05$

HCL = Healthier Choice Logo

#### **4.6.2 Sociodemographic characteristics and Knowledge of Healthier Choice Logo**

Chi-square test of independence was used to test the associations of sociodemographic characteristics with the knowledge of HCL. Based on Table 4.11, the result shows that field of study ( $p<0.05$ ), father's education level ( $p<0.05$ ) and mother's education level ( $p<0.05$ ) were significantly associated with knowledge of HCL.

However, other variables such as age ( $p>0.05$ ), sex ( $p>0.05$ ), ethnicity ( $p>0.05$ ), year of study ( $p>0.05$ ), living arrangement ( $p>0.05$ ), allowance ( $p>0.05$ ), household income ( $p>0.05$ ) and household size ( $p>0.05$ ) shows no association with the knowledge of HCL.

**Table 4.11: Association of sociodemographic characteristics and knowledge of Healthier Choice Logo**

Characteristics	Knowledge of HCL n (%)			$\chi^2$	p-value
	Low (n=40)	Moderate (n=131)	High (n=13)		
<b>Age (years)</b>				0.776	0.679
19-21	25 (62.5)	76 (58.0)	9 (69.2)		
22-25	15 (37.5)	55 (42.0)	4 (30.8)		
<b>Sex</b>				0.690	0.708
Male	19 (47.5)	53 (40.5)	5 (38.5)		
Female	21 (52.5)	78 (59.5)	8 (61.5)		
<b>Ethnicity</b>				0.887	0.642
Malay	35 (87.5)	112 (85.5)	10 (76.9)		
Non-Malay	5 (12.5)	19 (14.5)	3 (23.1)		
<b>Field of study</b>				8.982	0.011*
Science	39 (97.5)	103 (78.6)	9 (69.2)		
Non-science	1 (2.5)	28 (21.4)	4 (30.8)		
<b>Year of study</b>				3.235	0.779
First year	11 (27.5)	33 (25.2)	6 (46.2)		
Second year	12 (30.0)	36 (27.5)	2 (15.4)		
Third year	6 (15.0)	27 (20.6)	2 (15.4)		
Fourth year	11 (27.5)	35 (26.7)	3 (23.1)		

Cont.

Characteristics	Knowledge of HCL n (%)			$\chi^2$	p-value
	Low (n=40)	Moderate (n=131)	High (n=13)		
<b>Current living arrangement</b>				1.918	0.383
College dormitory	23 (57.5)	87 (66.4)	10 (76.9)		
Off-campus	17 (42.5)	44 (33.6)	3 (23.1)		
<b>Allowance per semester (RM)</b>				0.010	0.995
≤1500	24 (60.0)	79 (60.3)	8 (61.5)		
>1500	16 (40.0)	52 (39.7)	5 (38.5)		
<b>Father's education level</b>				14.697	0.005*
Primary education/no formal education	1 (2.5)	11 (8.4)	0 (0.0)		
Secondary education	23 (57.5)	37 (28.2)	3 (23.1)		
Tertiary education	16 (40.0)	83 (63.4)	10 (76.9)		
<b>Mother's education level</b>				14.365	0.009*
Primary education/no formal education	3 (7.5)	10 (7.6)	0 (0.0)		
Secondary education	24 (60.0)	42 (32.1)	3 (23.1)		
Tertiary education	13 (32.5)	79 (60.3)	10 (76.9)		
<b>Monthly household income (RM)</b>				9.021	0.061
<4850	22 (55.0)	61 (46.6)	3 (23.1)		
4850– 10959	11 (27.5)	36 (27.5)	2 (15.4)		
>10959	7 (17.5)	34 (26.0)	8 (61.5)		
<b>Household size</b>				3.733	0.155
≤4	7 (17.5)	43 (32.8)	3 (23.1)		
>4	33 (82.5)	88 (67.2)	10 (76.9)		

\* $p < 0.05$

HCL = Healthier Choice Logo

#### **4.6.3 Sociodemographic characteristics and Practise of Healthier Choice Logo**

Chi-square test of independence was used to test the associations of sociodemographic characteristics with the practise of HCL. Based on Table 4.12, the result shows that sex ( $p < 0.05$ ) and living arrangement ( $p < 0.05$ ) were significantly associated with practise of HCL.

However, other variables such as age ( $p > 0.05$ ), ethnicity ( $p > 0.05$ ), year of study ( $p > 0.05$ ), field of study ( $p > 0.05$ ), allowance ( $p > 0.05$ ), father's education level

( $p>0.05$ ), mother's education level ( $p>0.05$ ), household income ( $p>0.05$ ) and household size ( $p>0.05$ ) shows no association with the practise of HCL.

**Table 4.12: Association of sociodemographic characteristics and practise of Healthier Choice Logo**

Characteristics	Practise of HCL n (%)		$\chi^2$	p-value
	Use HCL	Do not use HCL		
<b>Age (years)</b>			3.149	0.076
19-21	45 (69.2)	65 (54.6)		
22-25	20 (30.8)	54 (45.4)		
<b>Sex</b>			5.208	0.022*
Male	35 (53.8)	42 (35.3)		
Female	30 (46.2)	77 (64.7)		
<b>Ethnicity</b>			0.205	0.651
Malay	57 (87.7)	100 (84)		
Non-Malay	8 (12.3)	19 (16.0)		
<b>Field of study</b>			1.142	0.321
Science	56 (86.2)	95 (79.8)		
Non-science	9 (13.8)	24 (20.2)		
<b>Year of study</b>			4.845	0.183
First year	24 (36.9)	26 (21.8)		
Second year	15 (23.1)	35 (29.4)		
Third year	11 (16.9)	24 (20.2)		
Fourth year	15 (23.1)	34 (28.6)		
<b>Current living arrangement</b>			6.895	0.009*
College dormitory	51 (78.5)	69 (58.0)		
Off-campus	14 (21.5)	50 (42.0)		
<b>Allowance per semester (RM)</b>			0.291	0.589
≤1500	37 (56.9)	74 (62.2)		
>1500	28 (43.1)	45 (37.8)		
<b>Father's education level</b>			2.090	0.352
Primary education/no formal education	4 (6.2)	8 (6.7)		
Secondary education	18 (27.7)	45 (37.8)		
Tertiary education	43 (66.2)	66 (55.5)		
<b>Mother's education level</b>			0.404	0.817
Primary education/no formal education	4 (6.2)	9 (7.6)		
Secondary education	23 (35.4)	46 (38.7)		
Tertiary education	38 (58.5)	64 (53.8)		

Cont.

Characteristics	Practise of HCL n (%)		$\chi^2$	p-value
	Use HCL	Do not use HCL		
<b>Monthly household income (RM)</b>			2.895	0.235
<4850	31 (46.7)	55 (46.2)		
4850– 10959	13 (20.0)	36 (30.3)		
>10959	21 (32.3)	28 (23.5)		
<b>Household size</b>			2.647	0.104
≤4	24 (36.9)	29 (24.4)		
>4	41 (63.1)	90 (75.6)		

\* $p < 0.05$

HCL = Healthier Choice Logo

Year of study is shown to be significantly associated with the awareness of HCL where first year students are more aware of HCL followed by fourth year, second year and lastly third year students. Most study did not study on the year of study in relation to food label. However, a study by Li et al. (2012) had a similar result to present study and the reason could be due to many first year students are living in college dormitory. This also reflects on present study as students in UPM are provided dormitory to stay during their first year. Living in college dormitory results in higher intercommunication among other courses which might result in better awareness in HCL. Association with seniors with better knowledge on HCL could also explain the reason for the increase of awareness on HCL. Besides that, a study by Geng and Midford (2015) found out that first year students have a higher stress level compared to other year of study. One of the common ways to destress among university students is by doing leisure activities such as shopping (Zhang & Zheng, 2017). Apart from that, first year students have shown to be more aware of their surrounding and have better learning experience (Soiferman, 2017). This could explain how first year students are more aware of the HCL compared to other year.

Besides that, field of study have shown to be significantly associated with the knowledge of HCL. The result shows majority of the respondents in the high knowledge category were found to be science stream students. This could be due to science students have higher knowledge on general health compared to non-science students (Talagala & Arambepola, 2016). This could also be due to a high percentage of the respondents are from science background (82%). This huge gap between the field of study could result in inaccurate association between the variables. However, a study by Norazlanshah et al. (2013) found out that even science students have low nutritional knowledge. The author also added that what really influence food label use in that study is the respondent's attitude towards food label.

Parent's education level is also significantly associated with the knowledge of HCL. Parents who are having tertiary education have the highest percentage in high knowledge of HCL. This shows that parents with higher education level results in higher knowledge of HCL. This is consistent with previous study where higher education are associated with having higher nutrition knowledge (Marjan et al., 2015). Higher education people have shown to process information related to health better than lower education (Yong Kang et al., 2015). This is a very interesting finding to know how the parent's education could affect their child's knowledge on the logo. The explanation for this could be parent's level of education actually affects the child's ability to motivate and comprehend things (Cheung & Pomerantz, 2012). However, further research should be done to really understand the mechanism on how this variable might affect the child's knowledge.

The result also shows that sex have a significant association with the practise of HCL. Males have a higher practise of HCL compared to females in present study. This result is inconsistent to other studies where majority of the studies found females

are more prone to use food labels instead of males (Gautam & Naresh, 2018). Previous study found females have higher practise of food labels due to having more attention on body image, diet and health compared to males (Yong Kang et al., 2015). Females are also usually perceived as the food handler in most family thus it is common for females to have higher food label use. However, there are also studies that found males to have higher food label use if they are obese or are having diseases (Su et al., 2015). Besides that, the reason for lesser use of food labels among females could be due females are more focused on their studies hence they would have a limited time to look at food labels (Nurliyana et al., 2011).

Living arrangement also have shown to be associated with the practise of HCL. Students who are living in college dormitory showed more practise of HCL compared to students living outside. This could be due to staying in dormitory might enable behaviour change which may result in a more positive eating habit among the respondents (Li et al., 2012). Respondents living in college dormitory can easily follow other collegemates that are practising healthy eating habit. Furthermore, majority of the students living in the college dormitory might already know students from other courses besides from their own course. Besides that, the dormitory provided consists of several courses staying together in the same dorm. This could mean that the respondents associate themselves with people from other courses especially nutrition related courses. This could easily contribute the practise of HCL as university students can easily increase their nutrition knowledge if they have access to the information (Liao et al., 2019).

The results have also shown age, ethnicity, household income, allowance and household size were not significantly associated with any three variables. For age, this result is inconsistent with previous studies as food label practise have shown to be

significantly associated with age (Festila et al., 2014). This could be due to small age gap in present study as the respondents are university students and are only ranging from 19 to 25 years old. Besides that, other studies found out that the nutrition knowledge is what plays the most role in ensuring food label practise (Cooke & Papadaki, 2014; Soederberg, 2014). Ethnicity have also shown to be not significantly associated in present study. This is also inconsistent as previous study have found ethnicity to be significantly associated to food label practise (Chen et al., 2012). This could be due to a high percentage of the respondents are Malay (85%), hence the associations cannot be seen clearly. Previous studies have also found Malay people to have a more positive attitude toward food labels compared to other races (Vijaykumar et al., 2013; Yong Kang et al., 2015).

In present study, household income and allowance have also shown to not be associated with all other three variables. This is inconsistent with most studies on the association of income and allowance with food label practise. Other studies have found that people with higher income would have a higher food label practise (Themba & Tanjo, 2013; Festila et al., 2014). This is due to people with higher income are more exposed to nutrition intervention program and makes them more health conscious (Yong Kang et al., 2015). However, there is also study that found similar result as present study where there is no association of income and allowance with food label practise (Gupta & Dharni, 2016). The other sociodemographic characteristic that showed no association is the household size. Household size have shown to be negatively affects food label practise as larger household size results in decrement of food label practise (Yong Kang et al., 2015; Petrovici et al., 2012). This could be due to the focus would be on the price of the food product instead of the nutrition labels as the food needs to be divided among the family members (Falola, 2014).

## 4.7 Associations between Awareness, Knowledge and Practise of Healthier Choice Logo

### 4.7.1 Awareness of Healthier Choice Logo and Knowledge of Healthier Choice Logo

Pearson's correlation test was used to analyse the association of awareness and knowledge of HCL. Based on Table 4.13, the result shows significant positive association between the variables ( $p < 0.01$ ).

**Table 4.13: Association of awareness of Healthier Choice Logo and knowledge of Healthier Choice Logo**

Variables	r	*p-value
Awareness of Healthier Choice Logo	0.295	0.000

\*Pearson Correlation Coefficient Test

### 4.7.2 Awareness of Healthier Choice Logo and Practise of Healthier Choice Logo

Chi-square test of independence was used to analyse the association of awareness and practise of HCL. Based on Table 4.14, the result shows significant associations between the variables ( $p < 0.01$ ).

**Table 4.14: Association of awareness of Healthier Choice Logo and practise of Healthier Choice Logo using chi-square test of independence**

Characteristics	Practise of HCL n (%)		$\chi^2$	p-value
	Use HCL	Do not use HCL		
<b>Awareness of Healthier Choice Logo</b>			20.798	0.000*
Low	13 (20.0)	49 (41.2)		
Moderate	36 (30.3)	11 (16.9)		
High	41 (63.1)	34 (28.6)		

\* $p < 0.05$

HCL = Healthier Choice Logo

### **4.7.3 Knowledge of Healthier Choice Logo and Practise of Healthier Choice Logo**

Chi-square test of independence was used to analyse the association of knowledge and practise of HCL. Based on Table 4.15, the result shows significant associations between the variables ( $p < 0.05$ ).

**Table 4.15: Association of knowledge of Healthier Choice Logo with the practise of Healthier Choice Logo using chi square test of independence**

Characteristics	Practise of HCL n (%)		$\chi^2$	p-value
	Use HCL	Do not use HCL		
<b>Knowledge of Healthier Choice Logo</b>			10.279	0.006*
Low	6 (9.2)	34 (28.6)		
Moderate	52 (80.0)	79 (66.4)		
High	7 (10.8)	6 (5.0)		

\* $p < 0.05$

HCL = Healthier Choice Logo

Finally, the awareness, knowledge and practise of HCL have shown to be associated with each other. Awareness of HCL have shown to have positive association with knowledge of HCL which means when awareness is high, the knowledge would also be high. This result is consistent with other previous studies where people who are more aware and knowledgeable about food labels are more prone to practise food labels (Mary et al., 2016; Cheah & Yip, 2016; Cooke & Papadaki, 2014). Besides that, this result also illustrates the Stages of Behaviour Change especially in the three middle part which are contemplation, preparation and action (Schifferstein, 2020). Awareness is needed in order to realise about the issue (contemplation stage) and then only the preparation stage will take place where at this

stage, the person will start to gather information to gain knowledge. After having knowledge, then only the person will start to practise the behaviour (action stage).



## CHAPTER 5

### CONCLUSION, LIMITATION AND RECOMMENDATION

#### 5.1 Conclusion

The majority of the respondents have shown to have high awareness and moderate knowledge of the HCL (HCL) however only 35.3% of the respondents are using HCL during grocery shopping. Even among the respondents that practise HCL, only a small percent use HCL every time during shopping. Next, this study has revealed that there are associations between year of study with the awareness of HCL where first year students are more aware of HCL. Meanwhile, field of study where science stream students have higher knowledge of HCL and the parent's level of education also shows significant association with knowledge of HCL. Besides that, males and students living in college dormitory are more prone to use HCL. Finally, there are associations between awareness, knowledge and practise of HCL. The relation of these variables with the sociodemographic characteristics may vary due to psychosocial factors and the respondent's social cognitive construct (Chen et al., 2012). The results in current study indicates that HCL is still not an important determinant in choosing food product during shopping among university students. The associations between awareness, knowledge and practise of HCL shows that awareness and knowledge affect the practise of HCL among university students. The practise of HCL can only be increased if there are awareness and knowledge of HCL among the respondents.

## 5.2 Limitations of study

Since the data collection was done during COVID-19 situation, there are a few limitations that might affect the result such as the result highly depended on internet connection of the respondents. Besides that, if the respondents did not understand about the questions, it may be hard for them to ask since there is no guidance. This may cause the respondents end up having a hard time answering and might not want to participate in the study anymore. There is a contact number on the questionnaire for the respondents to contact if they are having a hard time understanding the questions.

Apart from that, information of the awareness, knowledge and practise of HCL might be overestimated or underestimated by the respondents as it is self-reported. The respondents might be able to look for the answers while answering the questionnaire especially in the knowledge of HCL part. This could lead to bias in the respondent's answer and largely depend on the respondent's honesty.

Finally, there is a major difference in the respondents on the ethnicity and the field of study where majority of them are Malay and are from engineering faculty respectively. Hence, this could cause a bias in the result and the associations could not be seen clearly. Apart from that, there is lack of variety on the age group as this was done only on university students.

### 5.3 Recommendations

Based on the finding of present study, there is a high awareness on HCL but still lack in knowledge and practise of HCL among study population. Therefore, policy makers should take this opportunity in educating the public especially university students on HCL. The ministry could try to adapt to a more modern and up to date ways to increase HCL exposure such as using Twitter or Instagram to advocate on HCL. These social medias are more common among youngsters which may result in higher exposure on HCL among university students.

Besides that, exposure of HCL could also be done during nutrition intervention among university students. The university could use the students' health record to identify students with obesity problem and do nutrition intervention while also advocating on HCL. Besides that, the university management could also promote HCL using billboards in UPM and even in UPM's Wi-Fi registration website. Students would notice this exposure as it is a common route taken when going to class and also every time when the students are using the Wi-Fi.

Future study should focus on the variables' association with the behavioural (dietary intake, diet quality, physical activity) and psychosocial (social support, perceived stress, depressive symptoms, body image perception) factors to understand better the reason for their awareness, knowledge and practise of HCL. Apart from that, future study should also study on the real-life usage on HCL which could be done during grocery shopping. Real-life usage in this context means to investigate while consumers are purchasing the products, the researchers can investigate the preferred items that has HCL on the food package. This could help in knowing the effect of using HCL as a determinant of buying food products.

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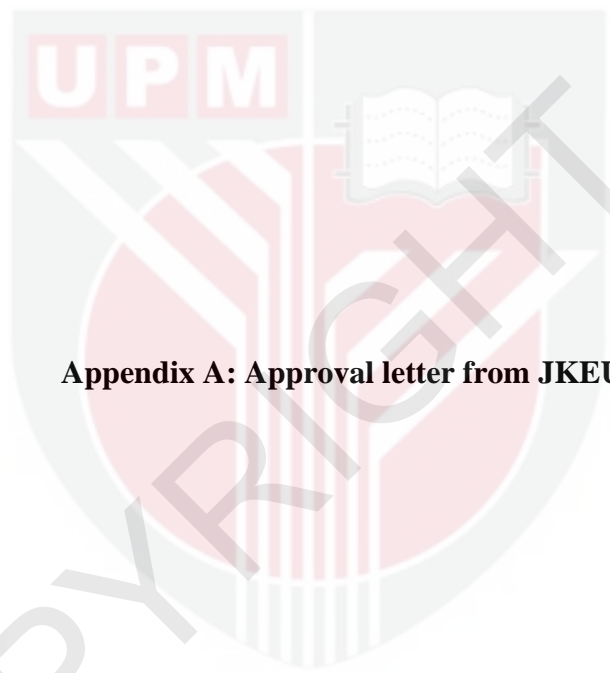
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**Appendix A: Approval letter from JKEUPM**

**ETHICS COMMITTEE FOR RESEARCH INVOLVING HUMAN SUBJECTS  
(JKEUPM)  
UNIVERSITI PUTRA MALAYSIA**

<b>Research title</b>	: Awareness, Knowledge and Usage of Healthier Choice Logo Malaysia (HCL) among Undergraduate Students in Universiti Putra Malaysia.
<b>Study Site</b>	: Universiti Putra Malaysia
<b>JKEUPM Ref No.</b>	: JKEUPM-2019-546
<b>Researcher</b>	: Nur Raihanah Harith Fadzillah
<b>Supervisor</b>	: Assoc. Prof. Dr. Norhasmah Sulaiman

Documents received and reviewed with reference to the above study:

1. Ethics Application Form, Version 1 dated 24/12/2019
2. Respondent Information Sheet & Consent (English), Version 1 dated 24/12/2019
3. Respondent Information Sheet & Consent (Malay), Version 1 dated 24/12/2019
4. Proposal (English), Version 1 dated 24/12/2019
5. Questionnaires/ Interviews (English), Version 1 dated 24/12/2019
6. Curriculum Vitae of:
  - a. Assoc. Prof. Dr. Norhasmah Sulaiman

The University Research Ethics Committee, Universiti Putra Malaysia (JKEUPM) operates in accordance to the ICH-GCP Guidelines.

Decision by JKEUPM:

- Approved
- Permission MUST BE OBTAINED** from the respective hospitals/ institutions before conducting the research
- Disapproved

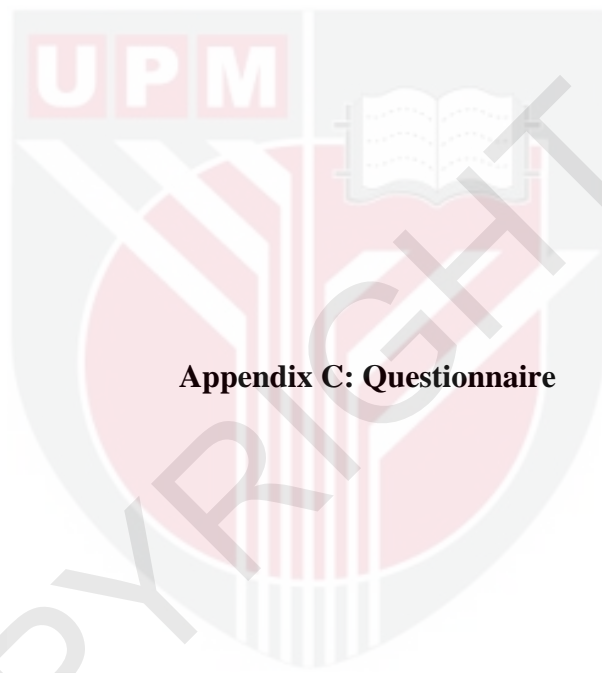
Please note that the approval is **VALID UNTIL 14 JANUARY 2021**

Researchers should comply with the following:

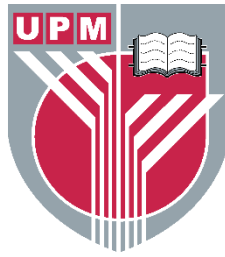
- I. Complete a Study Final Report upon study completion (Form 3.2).
- II. Ethical approval is required in the case of amendments/ changes to the study documents/ study sites/ study team.



**Appendix B: Approval letter from each selected faculty**



**Appendix C: Questionnaire**



**FACULTY OF MEDICINE AND HEALTH SCIENCES  
DEPARTMENT OF NUTRITION AND DIETETICS**

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**QUESTIONNAIRE**

**“CONFIDENTIAL”**

**RESEARCH TITLE:**

**AWARENESS, KNOWLEDGE AND PRACTISE OF THE HEALTHIER  
CHOICE LOGO MALAYSIA (HCL) AMONG UNDERGRADUATE  
STUDENTS IN UNIVERSITI PUTRA MALAYSIA (UPM)**

**Researcher:** Nur Raihanah binti Harith Fadzillah

**Supervisor:** Assoc. Prof. Dr Norhasmah binti Sulaiman

**Date:**

---

**Instruction:** Questions in this questionnaire form are for academic purposes only. All information collected is secured. Your involvement and cooperation are greatly appreciated.


## SECTION A: SOCIODEMOGRAPHIC CHARACTERISTICS

Instruction: Fill in the blanks or tick (/) in the space provided below

1.	Date of birth:	___ / ___ / _____ (dd/mm/yyyy)
2.	Sex:	<input type="checkbox"/> Male <input type="checkbox"/> Female
3.	Ethnicity:	<input type="checkbox"/> Malay <input type="checkbox"/> Chinese <input type="checkbox"/> Indian <input type="checkbox"/> Other Please state _____
4.	Faculty:	
5.	Program:	
6.	Year of study:	<input type="checkbox"/> Year 1 <input type="checkbox"/> Year 2 <input type="checkbox"/> Year 3 <input type="checkbox"/> Year 4 <input type="checkbox"/> Year 5
7.	Father's education level	
8.	Mother's education level	
9.	Monthly household income:	RM
10.	Monthly allowance (per semester):	RM
11.	Number of households:	
12.	Current living arrangement:	<input type="checkbox"/> College in campus <input type="checkbox"/> Outside of campus

## SECTION B: AWARENESS OF HEALTHIER CHOICE LOGO

Instruction for Section B, C and D: Tick (/) the answer that describes you best.

1. How often do you go shopping? <input type="checkbox"/> Every week <input type="checkbox"/> 2 weeks once <input type="checkbox"/> Once a month
2. When do you prefer to go shopping? <input type="checkbox"/> Weekdays <input type="checkbox"/> Weekends <input type="checkbox"/> Once a month
3. At what time do you usually go shopping? <input type="checkbox"/> Daytime <input type="checkbox"/> Night <input type="checkbox"/> Anytime
4. Did you do any preparation before going shopping? <input type="checkbox"/> Prepare list <input type="checkbox"/> Decide at supermarket <input type="checkbox"/> Both
5. How often do you buy pre-packaged food? (biscuits, noodles, 3in1 drinks etc.) <input type="checkbox"/> Every day <input type="checkbox"/> Every week <input type="checkbox"/> Monthly <input type="checkbox"/> Rare
6. Have you seen this logo on the front package of any food product before?  <input type="checkbox"/> Yes <input type="checkbox"/> No
7. Have you heard of Healthier Choice Logo Malaysia or HCL before? <input type="checkbox"/> Yes <input type="checkbox"/> No
8. What do you think about food labels? **(You may answer more than one) <input type="checkbox"/> Useful <input type="checkbox"/> Lack of information <input type="checkbox"/> For advertising purpose <input type="checkbox"/> Good to know expiry date <input type="checkbox"/> Legal requirement <input type="checkbox"/> Provide nutrition information

## SECTION C: KNOWLEDGE ON HEALTHIER CHOICE LOGO

No.		TRUE	FALSE	UNSURE
1.	The Healthier Choice Logo was introduced by the Ministry of Health			
2.	The Healthier Choice Logo was introduced in 2017			
3.	All types of food are eligible to apply for the Healthier Choice Logo			
4.	The application for the certification of Healthier Choice Logo is free of charge			
5.	There is a list of nutrient content that must be complied by the manufacturers in order to obtain the certification of Healthier Choice Logo on their food product			
6.	Once approved, the certification of Healthier Choice Logo on the food product is valid for 1 years (12 months)			
7.	The Healthier Choice Logo compares food within the same food category			
8.	The Healthier Choice Logo can be placed on either front-of-package or back-of-package			
9.	The label submitted for the Healthier Choice Logo must contain the Front Of Pack energy icon			
10.	The size of the logo should not have less than 15mm width when applied on the packaging			
11.	There are only one colours for the logo that the Ministry of Health allow on the food packaging			
12.	Applicants must be registered with the Registrar of Companies to be able to apply for the certificate			
13.	Oat food products must be 100% whole grain			

14.	All added sugars in fish and fish products must be $\leq 5g$			
15.	Drinking and mineral water cannot apply for the certification even if they comply to the Malaysian Food Regulation			



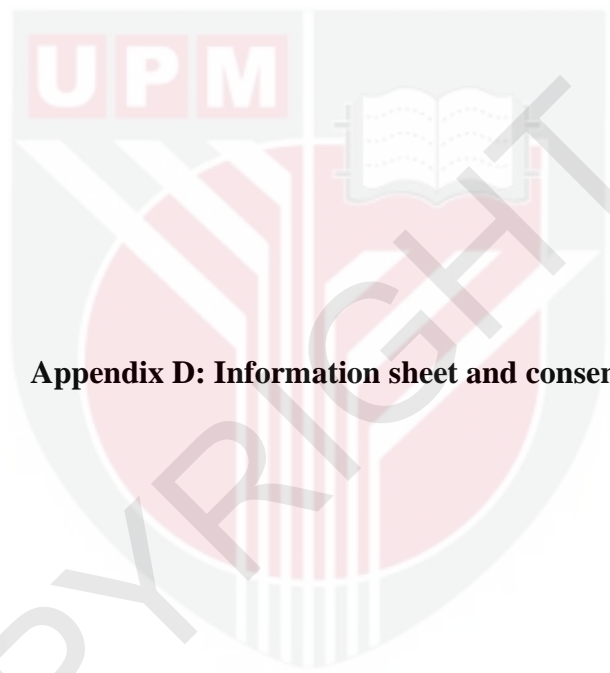
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**SECTION D: USAGE OF HEALTHIER CHOICE LOGO**

No		YES	NO
1.	Do you refer food labels when making purchases?		
2.	Do you refer the Healthier Choice Logo when making purchases?		
3.	Based on Question No. 2, if you do, how frequent do you use HCL when making purchases?  <input type="checkbox"/> Every time  <input type="checkbox"/> Sometimes  <input type="checkbox"/> Rarely		
4.	Why did you use HCL when making purchases?  _____  _____		

**END OF QUESTIONNAIRE**

**THANK YOU FOR YOUR PARTICIPATION AND COOPERATION**



**Appendix D: Information sheet and consent form**

**JAWATANKUASA ETIKA UNIVERSITI UNTUK  
PENYELIDIKAN MELIBATKAN MANUSIA (JKEUPM)  
UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG,  
SELANGOR, MALAYSIA**



**FORM 2.4: RESPONDENT'S INFORMATION SHEET AND  
INFORMED CONSENT FORM**

Please read the following information carefully and do not hesitate to discuss any questions you may have with the researcher.

**1. STUDY TITLE :**

Awareness, Knowledge and Usage of Healthier Choice Logo (HCL) among Undergraduate Students in Universiti Putra Malaysia

**2. INTRODUCTION:**

Healthier Choice Logo (HCL) is one of the initiative of the Ministry of Health (MOH) in overcoming health problems especially obesity issue. Healthier Choice Logo is a type of food label that is meant to help consumers in making better food decision, encourage industries to reformulate their products and to provide an environment that supports healthy nutrition practices. The prevalence of obesity in general is increasing, even among university students. Therefore, this study aims to study the awareness, knowledge and the usage of the Healthier Choice Logo Malaysia among undergraduate students in Universiti Putra Malaysia.

This study is part of the graduation requirement for Bachelor of Science (Nutrition and Community Health) from Faculty of Medicine and Health Sciences, Universiti Putra Malaysia (UPM) and is expected to be completed within one year of study. A total of 181 students from UPM will participate in this study.

**3. WHAT WILL YOU HAVE TO DO?**

You need to read and understand about this study from this Respondent's Information Sheet. If you agree to participate in this study, you are required to sign the respondent's consent form in Page 3. Upon completing the respondent's consent form, please return it to the researcher.

During data collection, you need to answer a set of questionnaire including information on sociodemographic characteristics, awareness, knowledge and usage of the Healthier Choice Logo Malaysia (HCL).

Your participation in this study is voluntary. You have the right to withdraw from this study anytime without giving any reasons and no penalty will be applied upon your withdrawal.

**4. WHO SHOULD NOT PARTICIPATE IN THE STUDY?**

Students who are:

- a) Foreigners

**5. WHAT WILL BE THE BENEFITS OF THE STUDY:**

**(a) TO YOU AS THE SUBJECT?**

You can increase your body knowledge about the Healthier Choice Logo and may implement the usage of this logo the next time you go shopping.

**(b) TO THE INVESTIGATOR?**

Findings of this study will provide information on the awareness, knowledge and usage of the Healthier Choice Logo Malaysia among undergraduate students. Findings of this study also will help health advocates to develop suitable prevention and health promotion programs in improving nutritional and health status of undergraduate students depending on their awareness and knowledge of this logo in the future.

**6. WHAT ARE THE POSSIBLE RISKS?**

There will be no risk as you are only required to answer this questionnaire.

**7. WILL THE INFORMATION THAT YOU PROVIDE AND YOUR IDENTITY REMAIN CONFIDENTIAL?**

All information provided will be remained confidential and used for academic purposes only. Researchers will not disclose your name or any personal information to third parties. No individual description will be made on any parts of the study or publication.

**8. WHO SHOULD YOU CONTACT IF YOU HAVE ADDITIONAL QUESTIONS DURING THE COURSE OF THE RESEARCH?**

If you have any enquiries, you can contact as follows:

Researcher:  
Nur Raihanah binti Harith Fadzillah  
+6019-9805787  
raihanahharith@gmail.com

Supervisor:  
Assoc. Prof. Dr. Norhasmah binti Sulaiman  
+603-97692461  
norhasmah@upm.edu.my

*Please initial here if you have read and understood the contents of this page\_\_\_\_\_*

**9. CONSENT**

I ..... Identity Card No. ....  
address.....  
.....hereby voluntarily agree to take part in  
the research stated above \*(clinical /drug trial/video recording/ focus group/interview-based/  
questionnaire-based).

I have been informed about the nature of the research in terms of methodology, possible  
adverse  
effects and complications (as written in the Respondent's Information Sheet). I understand  
that I have the right to withdraw from this research at any time without giving any reason  
whatsoever. I also understand that this study is confidential and all information provided with  
regard to my identity will remain private and confidential.

I\* wish / do not wish to know the results related to my participation in the research

I agree/do not agree that the images/photos/video recordings/voice recordings related to me  
be used in any form of publication or presentation (if applicable)

\* delete where necessary

Signature ..... Signature .....  
(Respondent) (Witness)

Date :..... Name :.....  
I/C No. :.....

I confirm that I have explained to the respondent the nature and purpose of the above-  
mentioned research.

Date ..... Signature .....  
(Researcher)