



UNIVERSITI PUTRA MALAYSIA

***KNOWLEDGE, ATTITUDE AND PERCEPTION ON NUTRITION LABEL
USE, BODY WEIGHT STATUS AND SELF-EFFICACY BETWEEN
NUTRITION LABEL USERS AND NON-USERS IN
UNIVERSITI PUTRA MALAYSIA***

NURSYAZWANI BINTI ROSLAN

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UNIVERSITI PUTRA MALAYSIA
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BY

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**A project submitted 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
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ABSTRACT

KNOWLEDGE, ATTITUDE AND PERCEPTION ON NUTRITION LABEL USE, BODY WEIGHT STATUS AND SELF-EFFICACY BETWEEN NUTRITION LABEL USERS AND NON-USERS IN UNIVERSITI PUTRA MALAYSIA

Nursyazwani binti Roslan

Nutrition labeling has become one of the important strategies to be implemented due to alarming increase in the prevalence of overweight and obesity in adults. The use of nutrition label can help consumers to choose and purchase healthier options of food, which eventually lead to healthier nutrient intakes. Previous studies found that university students used nutrition label the least compared to other age groups. Therefore, this cross-sectional study was conducted to compare socio-demographic factors, body weight status, self-efficacy, knowledge, attitude and perception on nutrition label between nutrition label users and non-users in Universiti Putra Malaysia (UPM). A total of 291 university students (41.6% males and 58.4% females) aged 19 to 24 years old from three randomly selected faculties in UPM participated in this study. A self-administered questionnaire was completed by the university students to obtain information on socio-demographic background, nutrition label use, self-efficacy, nutrition label knowledge, attitude and perception on the benefits of nutrition label. Weight, height, waist circumference and body fat percentage of the university students were measured. Results showed that the prevalence of nutrition label use among university students was 20.6%, with no significant difference between male and female students ($\chi^2=0.01$, $p=1.000$). One in five of the males (20.7%) and females (20.6%) were nutrition label users. The most read information on nutrition label were fat content (58.4%), followed by carbohydrate including sugar content (57.4%) and total energy content (51.2%). Majority of the students (51.9%) had moderate level of nutrition label knowledge, while 36.1% of them had low nutrition label knowledge level. Nearly three in four of the students (72.5%) showed moderate level of attitude towards nutrition label and 58.4% showed moderate level of perception on benefits of nutrition label. In term of body weight status, a quarter (25.4%) of the students were overweight and obese, whereas 15.5% of them were underweight. 14.1% of the students had abdominal obesity while about two in five of the students (39.9%) were in the unhealthy (too high) body fat percentage group. Label users showed significantly higher self-efficacy in using nutrition label, more positive attitude and better perception on benefits of nutrition label as compared to non-users. However, there were no significant difference in socio-demographic factors, body weight status and nutrition label knowledge between label users and non-users. In conclusion, low prevalence of nutrition label use was found among university students in this study. Intervention and health education programs related to nutrition label use should be conducted among university students in order to improve their nutrition label use.

ABSTRAK

PENGETAHUAN, SIKAP DAN PERSEPSI TERHADAP PENGGUNAAN LABEL PEMAKANAN, STATUS BERAT BADAN DAN KEYAKINAN DIRI ANTARA PENGGUNA LABEL DAN BUKAN PENGGUNA LABEL DI UNIVERSITI PUTRA MALAYSIA

Nursyazwani binti Roslan

Pelabelan pemakanan telah menjadi salah satu strategi penting untuk dilaksanakan disebabkan peningkatan masalah berat badan berlebihan dan obesiti yang membimbangkan dalam kalangan orang dewasa. Penggunaan label pemakanan boleh membantu pengguna memilih dan membeli makanan yang lebih sihat, yang akan membawa kepada pengambilan nutrien yang lebih sihat. Kajian terdahulu mendapati bahawa pelajar universiti paling kurang menggunakan label pemakanan berbanding dengan kumpulan umur yang lain. Justeru itu, kajian keratan rentas ini dijalankan untuk membandingkan faktor sosio-demografi, status berat badan, keyakinan diri, pengetahuan, sikap dan persepsi terhadap label pemakanan antara pengguna label dan bukan pengguna label di Universiti Putra Malaysia (UPM). Sejumlah 291 pelajar universiti (41.5% lelaki dan 58.4% perempuan) berumur 19 hingga 24 tahun dari tiga fakulti yang dipilih secara rawak di UPM mengambil bahagian dalam kajian ini. Soal selidik telah dilengkapi oleh pelajar universiti bagi mendapatkan maklumat mengenai latar belakang sosio-demografi, penggunaan label pemakanan, keyakinan diri, pengetahuan tentang label pemakanan, sikap dan persepsi terhadap manfaat label pemakanan. Berat, tinggi, ukur lilit pinggang dan peratus lemak dalam badan bagi pelajar universiti telah diukur. Keputusan menunjukkan peratus penggunaan label pemakanan dalam kalangan pelajar universiti adalah 20.6% dan tiada perbezaan yang signifikan antara pelajar lelaki dan perempuan ($\chi^2=0.01$, $p=1.000$). Satu daripada lima lelaki (20.7%) dan perempuan (20.6%) adalah pengguna label pemakanan. Maklumat yang paling banyak dibaca di dalam label pemakanan adalah kandungan lemak (58.4%), karbohidrat termasuk gula (57.4%) dan jumlah tenaga (51.2%). Kebanyakan pelajar (51.9%) mempunyai tahap pengetahuan label pemakanan yang sederhana, manakala 36.1% daripada mereka mempunyai tahap pengetahuan label pemakanan yang rendah. Hampir tiga daripada empat pelajar (72.5%) menunjukkan tahap sikap terhadap label pemakanan yang sederhana dan 58.4% menunjukkan tahap persepsi terhadap manfaat label pemakanan yang sederhana. Bagi status berat badan, suku (25.4%) daripada pelajar mempunyai berat badan berlebihan dan obes manakala 15.5% daripada mereka kurang berat badan. 14.1% daripada pelajar mempunyai obesiti di bahagian perut manakala kira-kira dua daripada lima pelajar (39.9%) dalam kumpulan peratus lemak dalam badan yang tidak sihat (terlalu tinggi). Pengguna label mempunyai keyakinan diri yang lebih tinggi, sikap lebih positif dan persepsi lebih baik terhadap manfaat label pemakanan berbanding bukan pengguna. Walau bagaimanapun, tiada perbezaan didapati dalam faktor sosio-demografi, status berat badan dan pengetahuan label pemakanan antara pengguna label dan bukan pengguna. Kesimpulannya, penggunaan label pemakanan yang rendah telah ditemui dalam kalangan pelajar universiti di dalam kajian ini. Program pendidikan kesihatan tentang penggunaan label pemakanan perlu dilaksanakan dalam kalangan pelajar universiti untuk meningkatkan penggunaan label pemakanan.

CHAPTER 1

INTRODUCTION

1.1 Background

Nutrition label (known as nutrition facts panel in some countries) is a list of nutrient level of food product in the food label. It is a section of information that specifically state the nutrient contents of a food product (Koen, Blaauw & Wentzel-Viljoen, 2016). Grunert and Wills (2007) describes nutrition label as a list of nutritional information of specific food product in tabular format that allows the consumers to choose more nutritious food. The terms used as headings in the presentation of nutrition information of food products include “nutrition information”, “nutrition fact”, or “nutrition label” (Norhidayah & Siti, 2014). The term “nutrition labeling” was commonly used when relating to legislation, rules or regulations (Przyrembel, 2004). Some of the nutritional information on the nutrition label are the serving size, number of servings, total energy, energy from fat, total fat, saturated fat, cholesterol, sodium, carbohydrates, dietary fiber, sugar, protein, vitamin A, vitamin C, calcium, iron, trans fat and other nutrients (Food Labeling Guide, 2008).

Most of the countries voluntarily used Codex Alimentarius as a reference in the development of laws regarding nutrition labeling (Hawkes, 2004). Hawkes (2004) explained that Codex Alimentarius is a set of international standards and guidelines related to food products established by the Food and Agriculture Organization (FAO) and the World Health Organization (WHO). According to the latest Global Update on

Nutrition Labeling 2018 (EUFIC, 2018), some countries such as Venezuela, Morocco, Lebanon, Vietnam, Mauritius, Singapore, Myanmar, Kenya, Turkey, Switzerland, Jordan, Brunei, and South Africa follow the recommendation of nutrition labeling being voluntary unless a health or nutrition claim is made or unless the food is for special dietary uses. On the other hand, there are countries that enforced law on mandatory nutrition labeling for all food products, which include the United States, Canada, Mexico, Argentina, Chile, Colombia, Ecuador, Paraguay, Uruguay, European Union (EU) Member States, Israel, Gulf Cooperation Council members, Nigeria, India, Hong Kong, China, Taiwan, Philippines, New Zealand, Brazil, Malaysia, Thailand, Indonesia, Vietnam, Australia, Russia, Japan and South Korea (EUFIC, 2018).

In the United States, the Nutrition Labeling and Education Act 1990 required mandatory nutrition labeling on all prepackaged food products (Hawkes, 2004). Based on the U. S. Food and Drug Administration (FDA), the mandatory nutrients of the new and improved Nutrition Facts Label are servings, calories, fats including saturated fat and trans fat, cholesterol, sodium, total carbohydrate, dietary fiber, total sugar, added sugar, protein, vitamin D, calcium, iron and potassium (Changes to the Nutrition Facts Label, 2018). The new mandatory nutrient in the nutrition label is the added sugar, which is important in determining the actual source of sugar that contributes to the total daily calories. Other new mandatory nutrients are vitamin D and potassium, which are required due to high prevalence of deficiencies in these vitamins among Americans, compared to vitamin A and C that are no longer required because the deficiencies in these vitamins are quite rare nowadays (Changes to the Nutrition Facts Label, 2018).

In Malaysia, the Ministry of Health has enforced the Food Regulations 1985 where nutrition labeling was made compulsory to be displayed in all food products in 2003 (Zainol et al., 2018). The four basic mandatory nutrients to be displayed in nutrition label of food products in Malaysia are energy, protein, carbohydrate and fat, with other mandatory nutrients that depend on the nutrition claim being made. For example, labeling of monounsaturated, polyunsaturated, saturated and trans fat are mandatory for food with fat-related nutrition claim (Hawkes, 2004). In addition, total sugar must be declared for ready-to-drink beverages and other optional nutrients of vitamins and minerals may be declared if they are present in significant amounts (NCCFN, 2010). The nutrition labeling becomes one of the important strategies to be implemented due to alarming increase in the prevalence of overweight and obesity, which has become a major health problem among Malaysians (Zainol et al., 2018).

University students are young adults who are often linked to obesity and other health problems due to poor eating habits and lack of skills in choosing healthier option of food (Gan, Mohd Nasir, Zalilah & Hazizi, 2012). A review conducted by Christoph, An, and Ellison (2016) reported that 36.5% of the university students in the US, UK, Canada and South Korea used nutrition label. In Malaysia, the prevalence of nutrition label use was the lowest among university students if being compared to adolescents and older adults (Ambak et al., 2018; IPH, 2017; Norazlanshah et al., 2013; Nurliyana, Norazmir & Khairil Anuar, 2011). Findings from the latest Adolescent Health Survey 2017 reported that 84.0% of the adolescents read the nutrition label (IPH, 2017). The Malaysian Adult Nutrition Survey (MANS) 2014 found that 49.2% of adults aged 30 to

39 years read the nutrition label during food purchasing (Ambak et al., 2018). Meanwhile, Nurliyana et al. (2011) and Norazlanshah et al. (2013) revealed lower prevalence of nutrition label use among university students, with 21.6% and 17.0%, respectively. The low proportion of nutrition label users among university students trigger unhealthy dietary intake, in which it will lead to poor health status. A latest study done by Christoph, Larson, Laska and Neumark-Sztainer (2018) showed that low nutrition label use was significantly associated with high total calorie consumption from saturated fat and sweetened beverages, and low consumption of fruits, vegetable, whole grains and fiber among young adults aged 25 to 36 years. Zhang et al. (2017) also found that infrequent label users were associated with higher sodium intake per day, compared to frequent label users in the US.

The availability of nutrition label is one of the strategies to help university students to select healthier and more nutritious food based on the nutrient contents stated in the nutrition label. Effective use of nutrition label helps consumers to choose and purchase healthier options of food wisely (Lim, Kim & Kim, 2015) and the habit of using the nutrition label may lead to healthier and balanced nutrient intakes (Li et al., 2012). This is due to the fact that nutrition label in food products provides clear nutrition information, assists consumers in making healthier option of food products, and avoids consumers from getting confused about nutrition contents of food products (Lim et al., 2015). Hence, the use of nutrition label among university students may definitely contribute to a positive health behavior which will reduce the risk of developing various diseases such as obesity, hypertension and diabetes (Kang et al., 2013). Existence of

nutrition label brings a lot of health benefits if consumers able to understand the use of nutrition label and able to read, fully use and apply the nutrition information on nutrition label into their daily life.

1.2 Problem Statement

The use of nutrition label plays a very important role in reducing the prevalence of various diseases among consumers because poor nutrition label use may lead to unhealthy eating behaviors, which eventually cause poor health status among consumers. For example, Jasti and Kovacs (2010) found that poor nutrition label use was associated with high consumption of fried foods among students. The risk of metabolic syndrome, high blood pressure and diabetes are also higher in individuals who did not use nutrition label, if being compared to nutrition label users (Kang et al., 2013). These studies showed that low nutrition label use may contribute to poor health status which further increases the risk of diseases. Therefore, it is important to improve the awareness on the importance of nutrition label use among university students in order to improve their nutrition and health status.

Despite many studies showed negative effects of not using nutrition label, the prevalence of nutrition label use is still low, especially among university students (Jasti & Kovacs, 2010; Kang et al., 2013). It was found that 35.0% of the university students in the United States (Graham & Laska, 2012), 31.3% in the United Kingdom (McLean-Meynsse, Gager, & Cole, 2011), and 37.8% in Korea (Lim et al., 2015) were nutrition label users. In Malaysia, a cross-sectional study conducted by Nurliyana et al. (2011)

among university students in the Universiti Teknologi MARA (UiTM), Puncak Alam, Kuala Selangor found that only 21.6% of the students often used the nutrition label when purchasing food products. Norazlan Shah et al. (2013) also showed a lower prevalence of only 17.0% of the students in the International Islamic University Malaysia (IIUM), Kuantan used nutrition label. These findings indicated that university students are still lack of awareness on the importance of using nutrition label in practicing a healthier lifestyle.

Nelson, Story, Larson, Neumark-Sztainer and Lytle (2008) defined a unique developmental stage of emerging adulthood, which is the period between postsecondary education and delays in marriage and childbearing of 18 to 25 years old. Emerging adults are mostly enrolled university students, which make them at an important life stage as they left home to stay in college and received full responsibility to make decision in food choice that will give impact to their long-term health behavior patterns and chronic disease risks (Nelson et al., 2008). Hence, it is very important for university students to have high awareness level and knowledge about the importance of utilizing nutrition label in campus life as well as to practice it in daily life in order to reduce the risk of various diseases and develop a healthier youth lifestyle. However, there is limited study comparing knowledge, attitude and perception on nutrition label between label users and non-users among university students in Malaysia.

Previous studies reported that older individuals (Besler et al., 2012; Cha et al., 2014; Cheah et al., 2015), Malays (Cheah et al., 2015) and who live independently (Cha et al.,

2014; Prieto-Castillo et al., 2015) used nutrition label more frequently. There were mixed findings for sex, with few studies (Norazlan Shah et al., 2013; Nurliyana et al., 2011) reported male used nutrition label more frequently than female, while other studies (Ambak et al., 2018; Besler et al., 2012; Bonanno et al., 2018; Li et al., 2012; Prieto-Castillo et al., 2015; Stran & Knol, 2013) found that female used nutrition label more frequently than male. Meanwhile, no significant difference was found in year of study between label users and non-users among university students (Lim et al., 2015; Misra, 2007).

Additionally, few studies compared body weight status, in terms of body mass index (BMI), between label users and non-users (Bonanno et al., 2018; Cha et al., 2014; Rimpeekool et al., 2017). Rimpeekool et al. (2017) reported that there was a significant difference in BMI between label users and non-users among adults. In contrast, Bonanno et al. (2018) and Cha et al. (2014) found no significant difference in BMI between label users and non-users among adults. Moreover, self-efficacy is another important factor that needs attention as it can greatly affect one's action and behavior towards nutrition label use (Aboulnasr, 2013). However, very limited study investigated this factor between label users and non-users. The mixed findings from previous studies encourage this study to further investigate the difference in sociodemographic factors, self-efficacy, and body weight status between label users and non-users.

In general, there is lack of study comparing the factors between label users and non-users among university students in Malaysia. This limits the effort to understand the

problem of low nutrition label use among university students in order to take appropriate action to improve the prevalence of nutrition label users among university students. Therefore, this study aimed to compare socio-demographic factors, body weight status, self-efficacy, nutrition label knowledge, attitude towards nutrition label, and perception on benefits of nutrition label between label users and non-users in Universiti Putra Malaysia (UPM). There are a few important research questions needed to be answered in the study as mentioned below:

1. What is the prevalence of nutrition label use among university students in UPM?
2. Are there any differences in socio-demographic factors, body weight status, self-efficacy, nutrition label knowledge, attitude towards nutrition label, and perception on benefits of nutrition label between label users and non-users in UPM?

1.3 Significance of the Study

To date, studies on nutrition label users and non-users among university students are still very limited in Malaysia. Effective measures can be developed to increase the awareness about the importance of using nutrition label, which will contribute to the increase in the use of nutrition label among university students. This study can contribute to the current knowledge and information about the prevalence of nutrition label use among university students in Malaysia. The latest and updated prevalence of nutrition label use among university students allows the identification of current trend and statistics of nutrition label use.

This study can also be used as a reference for future studies about nutrition label use among university students in Malaysia. Also, the findings of this study can be used to plan and conduct effective intervention programs on nutrition label use. With the implementation of the intervention programs, it is hoped that more university students will use nutrition label when purchasing any food products in order to improve their nutrition and health status.

1.4 Research Objectives

1.4.1 General objective:

To compare socio-demographic factors, body weight status, self-efficacy, knowledge, attitude and perception on nutrition label use between label users and non-users in UPM.

1.4.2 Specific objectives:

- 1) To examine the socio-demographic factors (age, sex, ethnicity, living status and year of study), body weight status (body mass index, waist circumference and body fat percentage), self-efficacy, knowledge, attitude, and perception on nutrition label use among university students in UPM.
- 2) To determine the prevalence of nutrition label use among university students in UPM.
- 3) To compare nutrition label use between male and female students in UPM.
- 4) To compare socio-demographic factors, body weight status, self-efficacy, knowledge, attitude, and perception on nutrition label use between label users and non-users in UPM.

1.5 Research Hypotheses

- a) There is a significant difference in nutrition label use between male and female students in UPM.
- b) There are significant differences in socio-demographic factors, body weight status, self-efficacy, knowledge, attitude, and perception on nutrition label use between label users and non-users in UPM.

1.6 Conceptual Framework

As shown in Figure 1.1, the variables are divided into dependent variable, which is the nutrition label users and non-users among university students, and also independent variables, which are socio-demographic factors, body weight status, self-efficacy, knowledge, attitude, and perception on nutrition label use.

The proportion of nutrition label users were lower among young adults especially university students, compared to older adults of more than 30 years old and adolescents of 13 to 17 years old (Ambak et al., 2018; Cha et al., 2014; Norazlanshah et al., 2013; Nurliyana et al., 2011). Most studies showed that nutrition label was more frequently used by females than males (Ambak et al., 2018; Besler et al., 2012; Bonanno et al., 2018; Li et al., 2012; Prieto-Castillo et al., 2015; Stran & Knol, 2013). However, there were also few studies reported higher nutrition label use in males as compared to females (Norazlanshah et al., 2013; Nurliyana et al., 2011). Moreover, students who were Malay and lived independently were found to use nutrition label more frequently (Cha et al., 2014; Cheah et al., 2015; Prieto-Castillo et al., 2015). Meanwhile, no

significant difference was found in year of study between label users and non-users among university students (Lim et al., 2015; Misra, 2007).

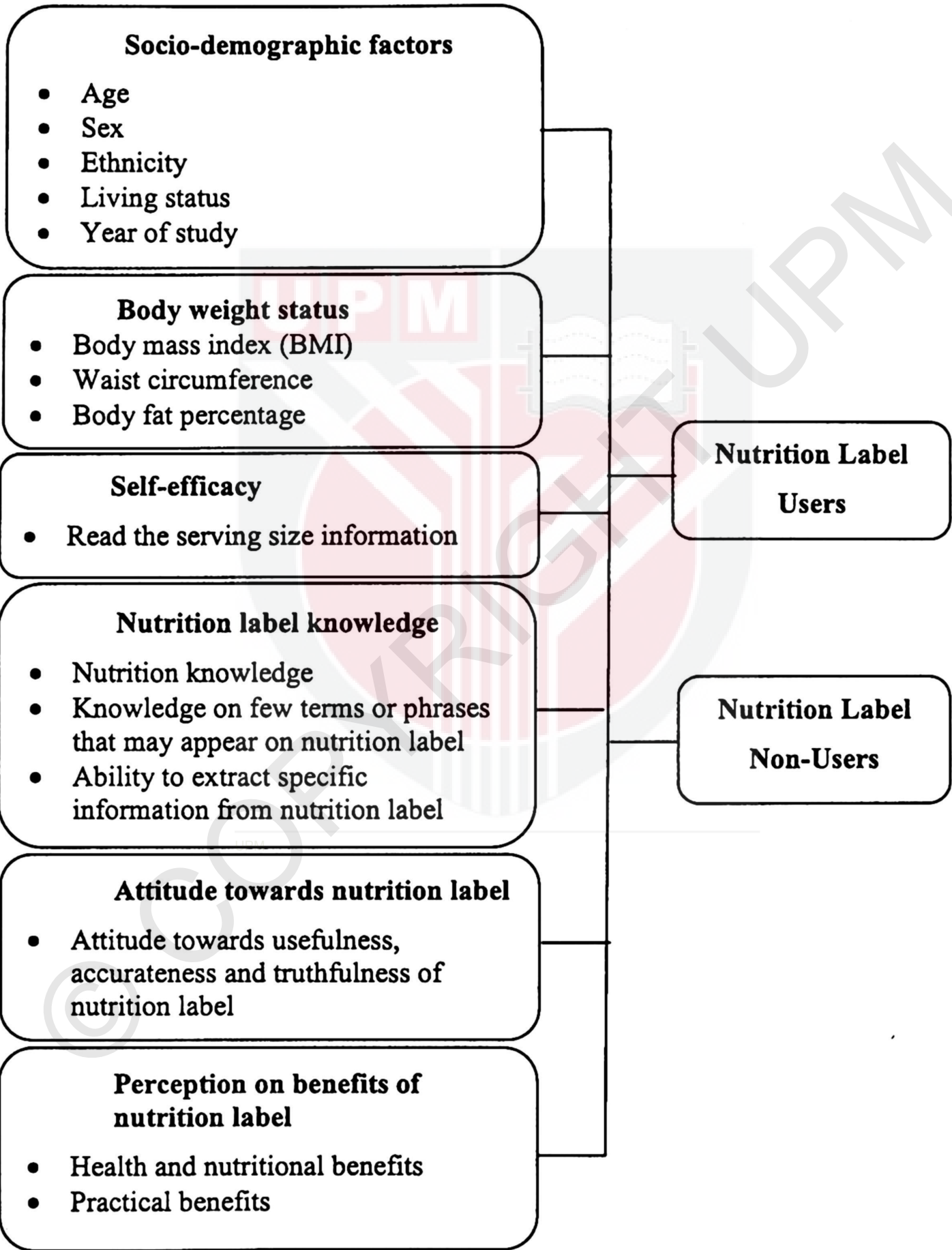


Figure 1.1: Conceptual framework of nutrition label users and non-users among university students

In term of body weight status, a previous study showed that label users had higher BMI than label non-users (Rimpeekool et al., 2017). However, Bonanno et al., (2018) and Cha et al. (2014) reported that there was no significant difference in BMI between label users and non-users. No studies compared waist circumference and body fat percentage between label users and non-users.

Aboulnasr (2013) explained that self-efficacy is very important as it can greatly affect one's behavior towards nutrition label. However, very limited study has been conducted to investigate the difference in self-efficacy between label users and non-users. Cha et al. (2014) and Hess et al. (2011) found that no significant difference in self-efficacy between label users and non-users.

In terms of knowledge on nutrition label, studies showed that label users had significantly higher nutrition label knowledge compared to non-users (Cooke & Papadaki, 2014; Graham & Laska, 2013; Norazlanshah et al., 2013; Rasberry et al., 2007). Furthermore, label users showed more positive attitude towards nutrition label use than non-users (Cooke & Papadaki, 2014; Norazlanshah et al., 2013; Rasberry et al., 2007). Similarly, label users were reported to have more favorable perception on benefits of nutrition label compared to non-users (Lim et al., 2015; Misra 2007).

CHAPTER 2

LITERATURE REVIEW

2.1 Nutrition Label

Food label is defined as *“any written, printed or graphic matter that is present on the label, accompanies the food, or is displayed near the food, including that for the purpose of promoting its sale or disposal”* by World Health Organization (2004). Meanwhile, the South African regulations defined food label as any information, branding or other graphical printing or writing on the food packaging, which include the label for promotional purposes (Koen et al., 2016). Koen et al. (2016) stated that the main role of food label was to tell the consumers about the details of the food product, for example, the branding, price, promotion, information on safe storage, and nutrition and food ingredients details, which was called as the nutrition label.

Nutrition label is a nutritional information list that informed the consumers about nutrient contents of specific food products in order for them to make own comparison and choose healthier food products (Grunert& Wills, 2007). Nutritional information in the nutrition label include serving size, number of servings, total energy, energy from fat, total fat, saturated fat, cholesterol, sodium, carbohydrates, dietary fiber, sugar, protein, vitamin A, vitamin C, calcium, iron, trans fat and other nutrients (Food Labeling Guide, 2008). Zainol et al. (2018) defined nutrition label use as one’s ability to read, understand and use the information provided in the nutrition label. According to Codex Alimentarius, information from the nutrition label allows consumers to make healthier food choices. Example of new format of nutrition label is shown in Figure 2.1

(Changes to the Nutrition Facts Label, 2018) and example of format for the labelling of mandatory nutrients in Malaysia is shown in Figure 2.2 (Tee et al., 2010).

Nutrition Facts	
8 servings per container	
Serving size	2/3 cup (55g)
Amount per serving	
Calories	230
% Daily Value*	
Total Fat 8g	10%
Saturated Fat 1g	5%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 160mg	7%
Total Carbohydrate 37g	13%
Dietary Fiber 4g	14%
Total Sugars 12g	
Includes 10g Added Sugars	20%
Protein 3g	
Vitamin D 2mcg	10%
Calcium 260mg	20%
Iron 8mg	45%
Potassium 240mg	6%
* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.	

Figure 2.1: Example of new format of nutrition label
Source: Changes to the Nutrition Facts Label (2018)

NUTRITION INFORMATION		
Serving size: 50 g		
Servings per package: 4		
	Per 100 g	Per serving (50g)
Energy	230 kcal (966 kJ)	115 kcal (483 kJ)
Carbohydrate	32.0 g	16.0 g
Protein	8.0 g	4.0 g
Fat	8.0 g	4.0 g

Figure 2.2: Format for the labelling of mandatory nutrients in Malaysia
Source: Tee et al. (2010)

Another component of food label is the health and nutrition claim. Hawkes (2004) defined health claim as a claim that the nutrient content in food brings benefit to body health, increase body function and reduce disease risk. The health claims related to

curing, treating or reducing disease risk, such as coronary heart disease, was prohibited in Malaysia (The Ministry of Health, 2013). Meanwhile, nutrition claim includes nutrient content claim, which described the nutrient level in food product, and nutrient comparative claim compared the nutrient level of two or more food products (Hawkes, 2004). In Malaysia, nutrition content claim (“free”, “very low”, “low”, “source” or “high”) may be used if the nutrient content in food satisfies the definition of the claim (Food Act 1982 & Regulations, 2013). The nutrient comparative claims (“reduced”, “less than”, “fewer”, “increased”, “more than”, “light” or “extra”) can only be used to compare two similar food of different versions and the difference in nutrient content of food must satisfies the condition of the claim (Food Act 1982 & Regulations, 2013).

2.2 Codex Alimentarius

Codex Alimentarius is a recognized international guideline for the regulations related to nutrition labeling in food products, which is established by the FAO and WHO (Hawkes, 2004). The standards and guidelines of the Codex include nutrient declaration, supplementary nutrition information and nutrition labelling (Codex Alimentarius Commission, 2012). Some of the Codex guidelines on nutrition declaration are nutrition labeling should be mandatory for all prepackaged foods except foods with small packaging and foods from countries that do not support nutrient declaration, and the mandatory declaration include energy value, protein, carbohydrate, fat, saturated fat, sodium, and total sugar, with the other nutrient related to the nutrition claim (Codex Alimentarius Commission, 2012). Those countries that made a mandatory nutrition labeling regulation are the United States, Canada, Mexico, Argentina, Chile, Colombia, Ecuador, Paraguay, Uruguay, European Union (EU) Member States, Israel, Gulf

Cooperation Council members, Nigeria, India, Hong Kong, China, Taiwan, Philippines, New Zealand, Brazil, Malaysia, Thailand, Indonesia, Vietnam, Australia, Russia, Japan and South Korea, while those countries that made voluntary nutrition labeling regulation are Venezuela, Morocco, Lebanon, Vietnam, Mauritius, Singapore, Myanmar, Kenya, Turkey, Switzerland, Jordan, Brunei, and South Africa (EUFIC, 2018). More countries were shifting to the mandatory regulation of nutrition labeling even when there was no health and nutrition claim being made, which was also recommended by the Codex guideline amended in 2012 (EUFIC, 2018).

2.3 Global Nutrition Label Use

The prevalence of nutrition label use was found to be high in previous studies. Sharif et al. (2014) found that 60.0% of 269 adults aged above 18 years old in Los Angeles utilized the nutrition label when buying food products. A study conducted in South Africa showed that 70.0% of 229 adults aged 18 to 55 years read the nutrition label during first-time purchasing (Van der Merwe et al., 2013). In Pakistan, Zaidi and Muhammad (2012) reported that 72.5% of 207 adult shoppers read the nutrition label when shopping. A cross-sectional study conducted in Istanbul, Turkey reported that 75.0% of 500 adults over 18 years of age “always”, “usually” and “sometimes” read nutrition label (Aygen, 2012). Saha, Vemula, Mendhu and Gavaravarapu (2013) found a high prevalence of 88.0% of 297 adolescents from 6 schools in Kolkata, India read the nutrition label when purchasing packaged food.

However, there were also studies revealed low prevalence of nutrition label use, especially among university students. A study conducted in Louisiana reported a

prevalence of 31.3% of university students who always read the nutrition label when purchasing food products (McLean-Meyinsse et al., 2011). Graham and Laska (2012) used the method of online survey data in a study among students in Minneapolis and showed that 35.0% of the students were categorized as frequent nutrition label users. A cross-sectional study involving university students in Oregon State University found that 36.3% of the students read nutrition label (Li et al., 2012). Lim et al. (2015) also stated that less than half (37.8%) of the female students in Seoul, Korea were classified as nutrition label users. These findings suggested that university students showed low prevalence of nutrition label use.

2.4 Nutrition Label Use in Malaysia

According to the Malaysian Dietary Guidelines (NCCFN, 2010), one of the key messages was to make effective use of nutrition information on nutrition labels. Some of its key recommendations include using the Nutrition Information Panel (NIP) as a reference in choosing foods, making use of nutrition claims wisely, and educate young generation on the use of NIP. It was an informative table in the food label that described the amount of nutrients contained in food (NCCFN, 2010). The inclusion of utilizing the nutrition label as one of the key messages in the Malaysian Dietary Guideline showed the importance of this strategy in adopting a healthy dietary practice among Malaysians in order to prevent non-communicable diseases.

Studies conducted in Malaysia showed that the prevalence of nutrition label use among university students was lower compared to the prevalence of nutrition label use among adolescents and older adults (Ambak et al., 2014; Ambak et al., 2015; Ambak et al.,

2018; IPH, 2017; Norazlanshah et al., 2013; Nurliyana et al., 2011). The Adolescent Health and Nutrition Survey demonstrated a high prevalence of 84.0% of Malaysian adolescents read nutrition label when purchasing food or drinks (IPH, 2017). The Malaysian Adult Nutrition Survey (MANS) 2014 found that 45.0% of adults aged above 18 years always and sometimes read the nutrition label (Ambak et al., 2015). A higher prevalence of 80.5% was reported for obese adults aged above 18 years who read the nutrition label (Ambak et al., 2014).

Meanwhile, a study done by Norazlanshah et al. (2013) which involved undergraduate students of 18 to 24 years old, showed low prevalence of students in Kuantan campus of IIUM who were categorized as excellent nutrition label user (17.0%), followed by poor (25.5%) and moderate (57.6%). Nurliyana et al. (2011) revealed that only 21.6% of undergraduate students aged 18 to 26 years in UiTM Puncak Alam, Kuala Selangor, who read the nutrition label when purchasing food products, which was lower compared to adolescents (84.0%) and older adults (49.2%). The findings of low prevalence of nutrition label use among university students in many countries including Malaysia encourage this study to be conducted.

2.5 Differences in Socio-demographic Factors between Label Users and Non-users

2.5.1 Age

A study done by Besler, Buyuktuncer and Uyar (2012) involved a total of 1,536 participants from 26 regions of Turkey reported that there was a significant difference in age between label users and non-users, with older age respondents used nutrition label

more frequently than younger age respondents. The finding of lower nutrition label use among younger adults may be due to their lower health awareness level compared to older adults (Besler et al., 2012). Cha et al. (2014) conducted a study among young adults aged 18 to 29 years old living in metropolitan Atlanta area and reported similar finding, in which older age respondents used nutrition label more frequently than younger age respondents. It was found that younger adults were less likely to use nutrition label due to their low health literacy compared to older adults (Cha et al., 2014). In contrast, no significant difference was found in age between label users and non-users among 275 students in Korea (Lim et al. 2015).

2.5.2 Sex

Previous studies showed that females used nutrition label more frequently compared to males (Ambak et al., 2018; Besler et al., 2012; Bonanno et al., 2018; Li et al., 2012; Prieto-Castillo et al., 2015; Stran & Knol, 2013). For instance, a study conducted by Stran and Knol (2013) among adults in US showed that women had higher mean use score than men, which indicated that women used nutrition label more often than men. Another study conducted in US also found similar findings of which women (3.0 ± 1.3) had higher mean nutrition label use score than men (2.7 ± 1.4) (Li et al., 2012). Prieto-Castillo et al. (2015) reported high prevalence of nutrition label use among women (45.0%) than men (30.0%) in Spain. Similarly, a recent study conducted in Malaysia by Ambak et al. (2018) revealed higher nutrition label use among women (50.1%) than men (40.4%). Nutrition label use is higher among women than men because women have higher interest and concern related to health and body image, causing them to always check and read the contents of nutrition label (Cheah et al., 2015).

However, there were studies conducted in Malaysia reported that male students used nutrition label more often than female students. Norazlanshah et al. (2013) found that 23.3% of male students were excellent nutrition label users, compared to 14.8% of female students. Nurliyana et al. (2011) also reported that the prevalence of male students (28.1%) who often use nutrition label was higher than female students (20.2%). One possible explanation of the findings is that female students have limited time to read nutrition label as they spend more time on studying and for education purposes, compared to male students (Norazlanshah et al., 2013; Nurliyana et al., 2011).

2.5.3 Ethnicity

The mean score of nutrition label use was found to be the highest among Malays compared to Chinese and Indian in Singapore (Vijaykumar et al., 2013). Similarly, a study conducted in Malaysia involving 39,506 adults found that Malays read nutrition label more frequently compared to other ethnic groups (Cheah et al., 2015). Cheah et al. (2015) commented that the ethnic differences in nutrition label use might be due to differences in education, income, cultural and religious beliefs, health perception and practices among different ethnic groups. However, Ambak et al. (2018) reported that there was no significant difference in the prevalence of nutrition label use between ethnic groups in Malaysia.

2.5.4 Living status

Living status among university students can be divided into living with parents, living with other family or relatives, and living in dormitory, boarding house or rented room or

house (Andrias, 2016). Andrias (2016) reported that most of the university students (61.3%) live in dormitory, boarding house or rented room or house.

A study conducted in US reported that young adults who lived alone used nutrition label more frequently than those who lived with their parents or family (Cha et al., 2014). Prieto-Castillo et al. (2015) also reported that nutrition label use was higher in students who lived alone than students who lived with family. Cha et al. (2014) explained that this finding may be related to higher responsibilities regarding grocery shopping and meal planning among adults who live alone compared to those living with parents or family, which increase the chance for them to read nutrition label when purchasing food products.

2.5.5 Year of study

Misra (2007) found that there was a significant difference in year of study between label users and non-users among university students. Lim et al. (2015) found that the prevalence of nutrition label user was the highest among sophomores (32.7%), followed by freshman (26.0%), seniors (20.0%) and juniors (16.4%). However, there was no significant difference in year of study between label users and non-users (Lim et al., 2015). Misra (2007) found that students in lower year of study had significantly associated with higher nutrition label knowledge and it had an indirect effect (through attitude) on nutrition label use, which may contribute to the insignificant result due to the indirect relationship between year of study and nutrition label use.

In contrast, McLean-Meyinsse et al. (2011) showed that nutrition label use for specific information including serving size, calories, sodium, trans fat, saturated fat, cholesterol, potassium, total carbohydrates, sugars, dietary fiber and protein, depends on academic year. This study found that juniors and seniors were more likely to read most of the nutritional information in the nutrition label than freshmen and sophomore (McLean-Meyinsse et al., 2011). The factor of age, with juniors and seniors who were older than freshman and sophomores, might explain the findings of higher nutrition label use among older students, compared to younger students (Cha et al., 2014).

2.6 Difference in Body Weight Status between Label Users and Non-users

Bonanno et al. (2018) showed that there was no significant difference in BMI between label users and non-users among adults in Italy. A study conducted among university students in Texas by Cha et al. (2014) reported similar findings of no significant difference in BMI between label users and non-users. In contrast, Rimpeekool et al. (2017) found that there was a significant difference in BMI between label users and non-users, with label users showed higher BMI compared to non-users. The finding might be due to the increase in likelihood for overweight and obese individuals who have higher health concern to use nutrition label on food products as one of the ways to lose weight (Rimpeekool et al., 2017). There were no past studies comparing abdominal obesity and body fat percentage between label users and non-users.

2.7 Difference in Self-efficacy between Label Users and Non-users

According to Aboulnasr (2013), self-efficacy is defined as one's beliefs in their abilities and skills that will determine the further action or behavior. Self-efficacy in the use of

nutrition label refers to one's belief regarding the ability to understand and use the nutrition label with the knowledge that she or he had, with higher self-efficacy is related to more positive attitude towards nutrition label (Aboulnasr, 2013). Aboulnasr (2013) explained that individuals with higher self-efficacy have higher confidence in their knowledge and ability to choose healthier food products, which may positively affect their nutrition label use behavior. However, a study done by Cha et al. (2014) revealed that there was no significant difference in self-efficacy between label users and non-users. Hess et al. (2011) also showed similar finding. These findings may be related to the self-efficacy scale used in the previous studies that were not related to nutrition label use, which may contribute to less accurate findings in determining the difference in self-efficacy between label users and non-users (Cha et al., 2014).

2.8 Difference in Nutrition Label Knowledge between Label Users and Non-users

A study conducted by Cooke and Papadaki (2014) found that there was a significant difference in nutrition label knowledge between label users and non-users. The study showed that label users (71.4) had significantly higher nutrition label knowledge score compared to non-users (65.2). Similarly, Rasberry et al. (2007) found higher knowledge score in label users (4.60) compared to non-users (3.81). Another study conducted among students in Malaysia reported that more label users (13.0%) had high nutrition label knowledge than non-users (7.1%) (Norazlanshah et al., 2013). These findings indicated that students who use nutrition label had higher knowledge in nutrition label than those who did not use the nutrition label. This might be due to the level of

awareness to choose and purchase healthier food products increased with the increase in nutrition label knowledge level (Toomey, 2013).

2.9 Difference in Attitude towards Nutrition Label between Label Users and Non-users

A study conducted by Cooke and Papadaki (2014) among 524 students of mean age 25 years in United Kingdom found that there was a significant difference in attitude towards nutrition label between label users and non-users, with label users (9.8) having higher attitude score than non-users (8.8). Rasberry et al. (2007) also found more positive attitude towards nutrition label in label users (21.4), than non-users (19.5) in Texas. Moreover, a study by Norazlanshah et al. (2013) among 165 undergraduate students in IIUM Kuantan Campus showed that more label users (32.2%) had good attitude towards nutrition label score compared to non-users (13.6%). These findings showed that students who use nutrition label during food purchasing have more positive attitude towards nutrition label. This is because those with positive attitude towards nutrition label have higher knowledge regarding nutrition label, which allow them to fully utilize the nutrition label in choosing a healthier food (Toomey, 2013).

2.10 Difference in Perception on Benefits of Nutrition Label between Label Users and Non-users

Lim et al. (2015) found that there was a significant difference in perception on benefits of nutrition label between label users and non-users in Korea. Label users (50.3) showed higher total score for perception on benefits of nutrition label than non-users (48.5). This finding indicated that label users had more favorable perception on benefits of nutrition

label compared to non-users (Lim et al., 2015). Andrias (2007) conducted a study among college students in Indonesia and reported that more label users (44.9%) had good perception on benefits of nutrition label compared to non-users (10.3%). Individuals who had better perception on benefits of nutrition label used nutrition label more frequently because they are more health conscious (Lim et al., 2015).



CHAPTER 3

METHODOLOGY

3.1 Study Design

This study was a cross-sectional study aimed to compare socio-demographic factors, body weight status, self-efficacy, knowledge, attitude and perception on nutrition label use between label users and non-users in UPM.

3.2 Study Location

This study was conducted among undergraduate students in UPM, Serdang, Selangor. UPM is one of the research universities in Malaysia and it has two campuses, which is located in Serdang, Selangor, and Bintulu, Sarawak. UPM main campus in Serdang is located approximately 25 kilometers south from Malaysia's capital city, Kuala Lumpur. There are 15 faculties in main campus of Serdang and the other one faculty in Bintulu campus. A total of 24,874 students were enrolled in its 74 bachelor programs in 2017 and 14,063 of them were undergraduate students (Malaysia's Top Most Innovative University, 2017).

3.3 Sample Size Determination

The proportion formula (Lemeshow, Hosmer, Klar, & Lwanga, 1990) was used in this study to determine the needed sample size. The sample size was calculated as shown below:

$$n = \frac{\{z_{1-\alpha/2}\sqrt{2P(1-P)} + z_{1-\beta}\sqrt{P_1(1-P_1) + P_2(1-P_2)}\}^2}{(P_1 - P_2)^2}$$

where,

$z_{1-\alpha/2}$ = confidence level at 95% (1.96)

$z_{1-\beta}$ = power of test (0.842)

P_1 = proportion of juniors who often used nutrition label

(0.43, McLean-Meyinsse et al., 2011)

P_2 = proportion of freshmen who often used nutrition label

(0.23, McLean-Meyinsse et al., 2011)

P = average proportion of juniors and freshmen who often used nutrition label nutrition label

$$P = (P_1 + P_2) / 2$$

$$= (0.43 + 0.23) / 2 = 0.33$$

$$n = \frac{\{z_{1-\alpha/2}\sqrt{2P(1-P)} + z_{1-\beta}\sqrt{P_1(1-P_1) + P_2(1-P_2)}\}^2}{(P_1 - P_2)^2}$$

$$= \frac{\{1.96\sqrt{0.66(0.67)} + 0.842\sqrt{0.43(0.57) + 0.23(0.77)}\}^2}{(0.2)^2}$$

$$= \frac{\{1.96(0.665) + 0.842(0.65)\}^2}{0.04}$$

$$= \frac{3.423}{0.04} = 86 \times 2 = 172$$

The calculated sample size was further adjusted as shown in Table 3.1 below:

Table 3.1: Additional adjustment in computing the sample size

No.	Criteria	Sample size calculation
1.	Adjust for the estimated sample effect	$n \times DEFF$ $= 172 \times 1.3$ $= 223.6$
2.	Adjust for the expected response rate	$\frac{n}{\text{response rate}}$ Response rate = 90%, therefore $n = \frac{223.6}{0.9} = 248.4$
3.	Adjust for the expected proportion eligible	$\frac{n}{\text{proportion eligible}}$ % eligible = 90%, therefore $n = \frac{248.4}{0.9} = 276$

Hence, the sample size required in this study was 276 respondents.

3.4 Subjects

The target population of this study was university students in UPM. The inclusion and exclusion criteria to be used when selecting the subjects were listed in Table 3.2.

Table 3.2: Inclusion and exclusion criteria for subject selection

Inclusion criteria	Exclusion criteria
Malaysian	International students
Females and males	Pre-university or postgraduate students
Undergraduate students	Pregnant/lactating women
Age 19 to 24 years old	University students with physical disability
	University students with any acute or chronic illness, for example, diabetes mellitus, hypertension and cancer

3.5 Sampling Design

Multistage random sampling method was used in this study. Firstly, the selection of faculties was based on different fields of study, which included art and social science stream, science stream and technical stream. The lists of faculties in each field were

shown in Figure 3.1. Then, one faculty was chosen from each field of study by simple random sampling method and the faculties that were included in this study were Faculty of Modern Language and Communication, Faculty of Medicine and Health Sciences, and Faculty of Engineering. Furthermore, one program was randomly selected from each faculty and all the students in the selected program were recruited in this study. The randomly selected programs were Bachelor of English Language (n=122), Bachelor of Science (Biomedical sciences) (n=198), and Bachelor of Engineering (Mechanical) (n=194). The total number of respondents who agreed to participate in this study was 291 out of 514 eligible respondents, which gave the response rate of 56.6%. The flow chart of sampling design and selection of study subjects is shown in Figure 3.1.

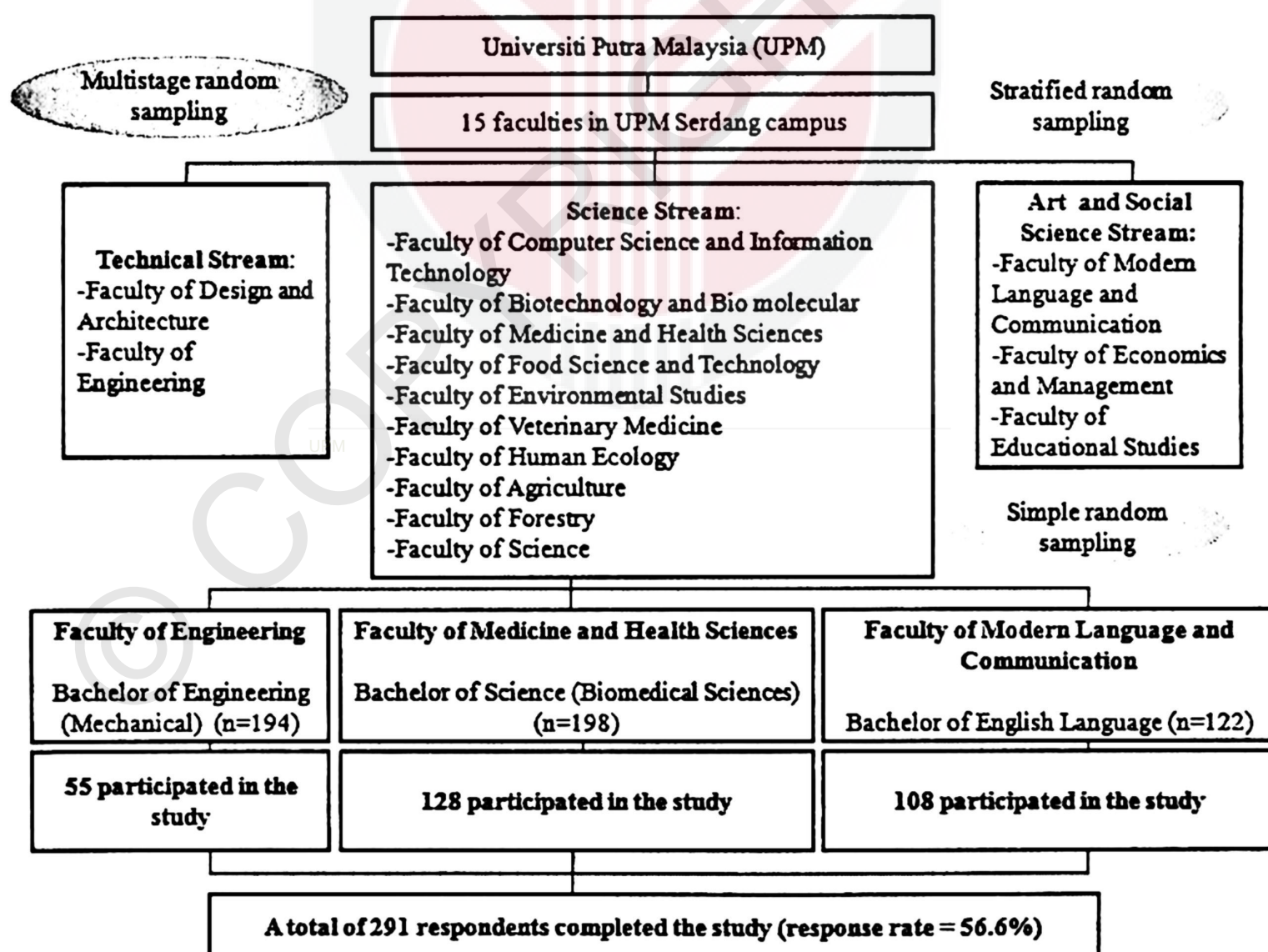


Figure 3.1: Flow chart of sampling design and selection of study subjects

3.6 Study Instruments

A self-administrated questionnaire (English language) was used in this study. Respondents completed information on socio-demographic factors, nutrition label use, self-efficacy, nutrition label knowledge, attitude towards nutrition label, and perception on benefits of nutrition label. Body weight, height, waist circumference and body fat percentage of the respondents were measured by the researcher.

3.6.1 Self-administered questionnaire

3.6.1.1 Socio-demographic factors

The information on sex, age, ethnicity, living status, and year of study of the respondents were self-reported by the respondents.

3.6.1.2 Nutrition label use

Nutrition label use was measured by using an item from The Label Reading Survey (Marietta, Welshimer & Long Anderson, 1999). The question was “How often do you read the nutrition label on food labels before purchasing foods or beverages”, which was measured on a 5-point Likert scale ranging from 1 to 5 with response options of “never”, “rarely”, “sometimes”, “often” and “always”. The classification of nutrition label users was based on the response of “often” and “always”. The responses of “never”, “rarely” and “sometimes” were classified as label non-users. This self-reported item obtained face validity from university students and showed good reliability with Cronbach’s α coefficient of 0.80 (Marietta et al., 1999). In the present study, the Cronbach’s α coefficient was 0.60, indicating moderate level of internal consistency reliability.

Furthermore, another five questions were adapted from the Malaysian Adult Nutrition Survey (MANS) 2014 (IPH, 2014) on the practices and understanding of the respondents on food label were also included in this study. There were four questions in assessing practices among respondents in reading food label, understanding of information in the nutrition label, expiry date, and precautionary food label when buying or receiving food. These four questions had four responses: 'yes, always', 'yes, sometimes', 'no', and 'refuse to answer'. Furthermore, another question was to obtain the information on the specific nutrient information read by the respondents when using the nutrition label. The respondents were allowed to choose more than one answer from the list of 10 options, including total energy content, carbohydrate including sugar content, fat content, salt or sodium content, vitamin content, mineral content, food additives content, fiber content, others to be specified and also option of 'refuse to answer'.

3.6.1.3 Self-efficacy

An item from behavioral skills component in the Self-efficacy for Eating Behaviors Scale (Sallis, Pinski, Grossman, Patterson & Nader, 1988) was used to assess self-efficacy level of the respondents in using nutrition label. The other 7 items under behavioral skills component of the questionnaire were not included as they were not related to behavior towards nutrition label. The item used a 5-point Likert scale ranging from 1 (I know I cannot) to 5 (I know I can) and a higher score indicated a higher self-efficacy in reading nutrition label. This subscale showed good construct validity and internal consistency reliability with a Cronbach's α coefficient of 0.86 (Sallis et al.,

1988). In the present study, the Cronbach's α coefficient was 0.60, indicating moderate level of internal consistency reliability.

3.6.1.4 Nutrition label knowledge

The nutrition label knowledge was evaluated through the use of 9 multiple-choice questions from The Label Reading Survey (Marietta et al., 1999). The components that were tested in the questions included basic nutrition knowledge, knowledge on few terms or phrases that may appear on the label and the ability to extract specific information from nutrition label. Three to six choices of answers were provided for each question and 1 mark was given for each correct answer. Total knowledge scores were calculated by adding all marks obtained from correct answers and a higher mark indicated a higher knowledge on nutrition label, with a maximum score of 9 marks. This questionnaire was validated for content by 5-member expert panels and the internal consistency reliability was good with Cronbach's α coefficient of 0.80 (Marietta et al., 1999). In the present study, the Cronbach's α coefficient for this knowledge questionnaire was 0.70, indicating good internal consistency reliability.

3.6.1.5 Attitude towards nutrition label

Attitude towards nutrition label was measured through 5-item questions from The Label Reading Survey (Marietta et al., 1999). The questions were answered on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). The questions covered the usefulness, accurateness, and truthfulness of the nutrition label and the total attitude score ranged from five to 25. A higher score reflected a more positive attitude towards nutrition label. This questionnaire showed good validity and reliability with a Cronbach's α coefficient

of 0.80 (Marietta et al., 1999). In this study, the Cronbach's α coefficient was reported to be 0.70, indicating good internal consistency reliability.

3.6.1.6 Perception on benefits of nutrition label

An 8-item questionnaire on perception on benefits of nutrition label (Lim et al., 2015) which included health, nutritional, and practical benefits of nutrition label was used in this study. These items were measured on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). A higher score indicated a more favorable perception on benefits of nutrition label, which ranged from 8 to 40. This questionnaire showed good validity and internal consistency reliability with a Cronbach's α coefficient of 0.82 (Lim et al., 2015). In the present study, the Cronbach's α coefficient for this questionnaire on perception was 0.86, indicating good internal consistency reliability.

3.6.2 Anthropometric measurements

Body weight status was determined through the calculation of body mass index (BMI) from the measurement of body weight and height of respondents. Body weight was measured by using a TANITA Digital Weight Scale HD-319 (TANITA Corporation, Japan) while the height was measured without shoes using a SECA Body Tape Measure SE206 (SECA, Germany). Body weight was measured to the nearest 0.1 kg and height was measured the nearest 0.1 cm. The measurements of weight and height were used to calculate BMI by dividing weight (kg) by square of height (m^2). According to WHO (2000), the standard classifications of BMI for adults were underweight ($<18.5 \text{ kg}/m^2$),

normal weight (18.5–24.9 kg/m²), overweight (25.0–29.9 kg/m²), and obesity (>30 kg/m²).

Moreover, waist circumference was measured using Lufkin Executive Thinline tape (SECA, Hamburg, Germany) to the nearest 0.1 cm in order to assess the abdominal obesity of the respondents. The classification of waist circumference was based on Asian cut-offs with ≥ 90 cm for men and ≥ 80 cm for women, to be considered as high risk of abdominal obesity (WHO/IASO/IOTF, 2000).

Additionally, measurement of body fat percentage of the respondents was conducted by using an OMRON body fat monitor HBF-302 (Omron Matsusaka Co. Ltd, Matsusaka, Japan) with accuracy of 0.1%. According to Lee and Nieman (2003), the body fat percentage category was classified into four categories: unhealthy range (too low) ($\leq 5\%$ for males and $\leq 8\%$ for females), acceptable range (lower end) (6–15% for males and 9–23% for females), acceptable range (upper end) (16–24% for males and 24–31% for females) and unhealthy range (too high) ($\geq 25\%$ for males and $\geq 32\%$ for females). All of the anthropometric measurements were measured twice and the mean value was used for further analysis.

3.7 Study Approval

Prior to data collection, ethical clearance was sought from *Jawatankuasa Etika Universiti untuk Penyelidikan Melibatkan Manusia* (JKEUPM) (Reference Number: JKEUPM-2018-337; see Appendix A). Permission to conduct the study in the selected faculties was obtained from the Dean of the selected faculties (see Appendix B).

3.8 Pre-testing

A pre-test of the questionnaire was conducted among 10 respondents who met the criteria for this study. Pre-testing was conducted to check whether the questions asked in the questionnaire were easy for the respondents to understand so that they can answer all of the questions accordingly. The average time needed for the respondents to complete the full set of questionnaire was 15 to 20 minutes. However, the respondents from pre-test were excluded from the study sample and their data were not being used in data analysis.

3.9 Procedures

Data collection was conducted from February to April 2019. Before data collection, the respondents were given an information sheet explaining the purpose of study and a written consent form was obtained from the respondents (see Appendix C). The respondents were required to complete a set of self-administered questionnaire (see Appendix D) and their anthropometric measurements (body weight and height, waist circumference and body fat percentage) were measured by the researcher in the lecture hall. Tokens (i.e. notebooks) were given to those who completed both the questionnaire and anthropometric measurements.

3.10 Statistical analysis

The data collected were analyzed using IBM SPSS Statistics 23 (IBM Corp., Armonk, New York, USA). Continuous variables were presented as means and standard deviation, while categorical variables were presented in the form of frequency and

percentage. Chi-square test and independent-samples *t*-test were used to analyze the differences in socio-demographic factors, body weight status, self-efficacy, knowledge, attitude and perception on nutrition label use between nutrition label users and non-users. The level of statistical significance for the analysis was set at $p < 0.05$.



CHAPTER 4

RESULTS AND DISCUSSION

4.1 Socio-demographic Factors

Table 4.1 shows the socio-demographic background of the respondents in this study. A total of 291 respondents participated in this study, with 58.4% were females and 41.6% were males. Mean age of the respondents was 21.5 years ($SD=1.2$), ranging from 19 to 24 years old. Majority of the respondents were Malay (82.1%), stayed in dormitory (73.9%), sophomore (36.1%), and from Faculty of Medicine and Health Sciences (44.0%).

Table 4.1: Socio-demographic factors of respondents ($n=291$)

Characteristics	n (%)
Sex	
Male	121 (41.6)
Female	170 (58.4)
Age (years)	
19 - 20	69 (23.7)
21 - 22	155 (53.3)
23 - 24	67 (23.0)
Mean $\pm$ SD	21.47 $\pm$ 1.22
Ethnicity	
Malay	239 (82.1)
Chinese	27 (9.3)
Indian	20 (6.9)
Bumiputera Sabah	3 (1.0)
Bumiputera Sarawak	2 (0.7)
Religion	
Islam	246 (84.5)
Buddha	19 (6.5)
Hindu	18 (6.2)
Christian	6 (2.1)
Other	2 (0.7)
Living status	
Living with parents	61 (21.0)
Living in dormitory	215 (73.9)
Living with other family/relatives	4 (1.4)
Others	11 (3.8)
Year of study	
Freshman	79 (27.1)
Sophomore	105 (36.1)
Junior	62 (21.3)
Senior	45 (15.5)
Faculty	
Faculty of Medicine and Health Sciences	128 (44.0)
Faculty of Engineering	108 (37.1)
Faculty of Modern Language and Communication	55 (18.9)

4.2 Nutrition Label Use

As shown in Table 4.2, 6.9% of the respondents never use nutrition label during food purchasing, while 7.6% always use nutrition label. The results showed that 20.6% of the respondents were nutrition label users. Low prevalence of nutrition label use was reported in this study, which was consistent with previous local studies (Ambak et al., 2018; Norazlanshah et al., 2013; Nurliyana et al., 2011). Low prevalence of label users was also reported in the studies in Indonesia (39.6%; Andrias et al., 2016), United States (35.0%; Graham & Laska, 2013), United Kingdom (16.8%; Grunert et al., 2010), and Korea (37.8%; Lim et al., 2015).

Some individuals found that nutrition label is confusing, in which makes it harder to understand and thus contribute to low nutrition label use (Ambak et al., 2018; Annunziata & Vecchio, 2012; Nurliyana et al., 2011). Some found that the use of terms on the label was not easily comprehensible (Annunziata & Vecchio, 2012; Norazmir et al., 2012). Moreover, time constraint might also contribute to the low nutrition label use (Barreiro-Hurle et al., 2010; Conklin et al., 2005; Norazmir et al., 2012; Nurliyana et al., 2011). Majority of the students claimed that they had limited time to read and understand the nutrition label during food purchasing and they assumed that reading nutrition label is a waste of time as they already had in mind of food products they want to purchase (Nurliyana et al., 2011). There were other factors that influenced food purchasing, such as price and taste, might be considered more important compared to nutritional information (Goodman et al., 2011). Misra (2007) reported that factors of taste and cost constraint affected food selection among students instead of choosing healthier food based on nutrient content.

Table 4.2: Frequency and percentage of nutrition label use item in The Label Reading Survey (n=291)

Item	n (%)				
	Never	Rarely	Sometimes	Often	Always
How often do you read the nutrition labels on food labels before purchasing foods or beverages?	20 (6.9)	87 (29.9)	124 (42.6)	38 (13.1)	22 (7.6)
Nutrition label use					
Label users	60 (20.6)				
Label non-users	231(79.4)				

Figure 4.1 shows the types of information read by the respondents when using the nutrition label. More than half of the respondents read the fat content (58.4%), carbohydrate including sugar content (57.4%), and total energy content (51.2%). These findings were similar with previous studies, which reported that fat content, carbohydrate or sugar content and total energy content were the information on nutrition label most frequently read (Borra, 2006; Grunert et al., 2010; Norazmir et al., 2012; Temple et al., 2010).

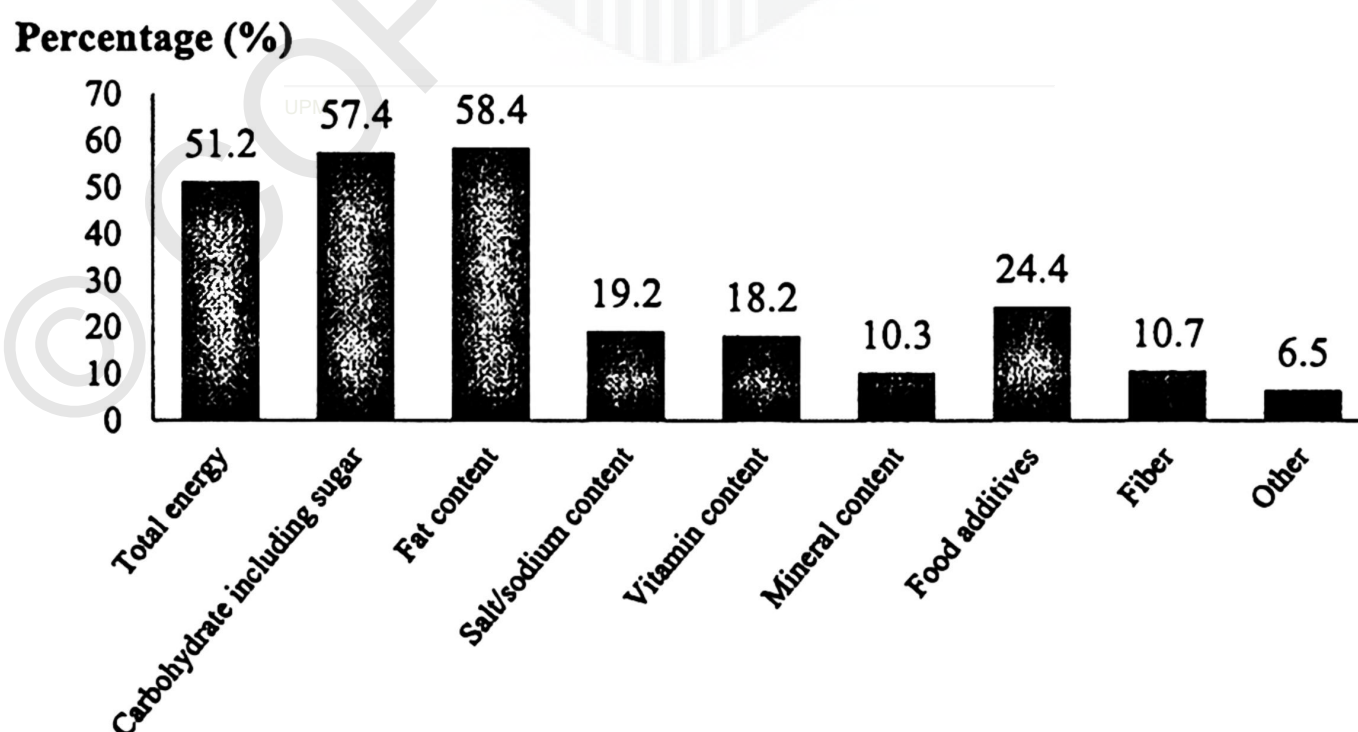


Figure 4.1: Types of information on nutrition label read by respondents

As shown in Figure 4.2, 86.6% of the respondents claimed that they understand nutrition label. Majority of the respondents read expiry date (97.6%) and precautionary food label (92.4%). The high percentage of respondents reading the expiry date and precautionary food label might be due to higher awareness among respondents on food safety compared to nutrient content of food products (Nurliyana et al., 2011).

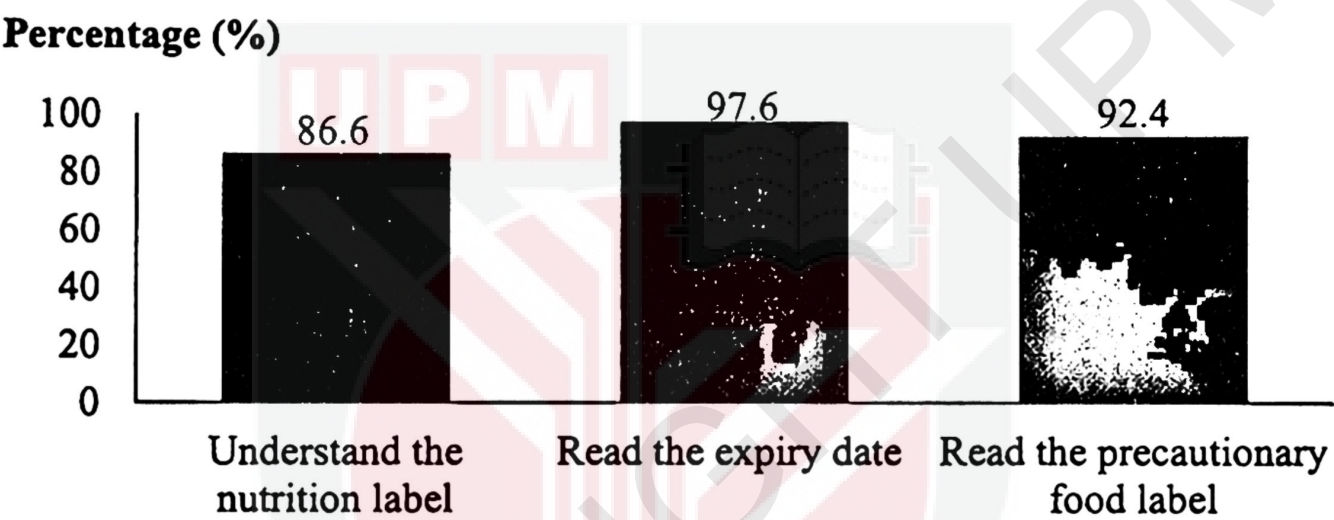


Figure 4.2: Distribution of respondents who understand the nutrition label, read the expiry date and precautionary food label

4.3 Self-efficacy

As shown in Table 4.3, 21.3% of the respondents reported that they felt that they might be able to regularly read the serving size information listed on the Nutrition Facts label of packaged foods. About one in ten of the respondents (12.0%) reported that they know they can regularly read the nutrition label. Overall, the mean score of self-efficacy was 3.25 (*SD*=0.96).

Table 4.3: Distribution of respondents by item in the Self-efficacy for Eating Behaviors Scale (n=291)

Item	n (%)				
	I know I cannot	Maybe I cannot	Neutral	Maybe I can	I know I can
How sure are you that you can regularly read the serving size information listed on the Nutrition Facts label of packaged foods that you eat?	12 (4.1)	34 (11.7)	148 (50.9)	62 (21.3)	35 (12.0)
Mean ± SD	3.25 ± 0.96				
Min – Max	1 - 5				

4.4 Nutrition Label Knowledge

As shown in Table 4.4, only a small proportion of the respondents answered correctly for questions 1 (14.8%), 3 (6.9%), 4 (2.7%) and 6 (9.3%). These findings showed that most of the respondents had poor nutrition label knowledge regarding percentage of Daily Value, nutrition claim, and serving size. However, majority of the respondents answered questions 7 (44.3%), 8 (72.5%) and 9 (67.7%) correctly and these findings showed that most of the respondents had good ability to extract answers from the given nutrition label figures. The mean score of nutrition label knowledge in this study was 2.87 (SD=1.50), ranging from 0 to 7.

Table 4.4: Distribution of respondents by nutrition label knowledge items in The Label Reading Survey (n=291)

Items	n (%)		
	Correct answer	Wrong answer	I don't know
1. The % Daily Value is based on which of the following caloric requirements?	43 (14.8)	82 (28.2)	166 (57.0)
2. Which one of the following items listed on the "Nutrition Facts" panel is recommended to eat less of?	188 (64.6)	40 (13.7)	63 (21.6)
3. When % Daily Value of a nutrient is 5% or less...	20 (6.9)	68 (23.4)	203 (69.8)
4. A food is described on the label as being "reduced calorie". The reduced calorie food contains what percentage of calories less than the original food?	8 (2.7)	64 (22.0)	219 (75.3)
5. A food is considered a good source of a nutrient when it contains at least what percentage of the nutrient of the daily value?	13 (4.5)	70 (24.1)	208 (71.5)
6. A nutrition label states that the serving size is a certain amount - such as ½ cup or 15 crackers. Which of the following statements best describes this amount?	27 (9.3)	142(48.8)	122 (41.9)
7. Using the Label above, how many grams of total fat should be eaten in a 2000 calorie diet?	129 (44.3)	42 (14.4)	120 (41.2)
8. When comparing the two food labels above, which food product has the most grams of fat per serving?	211 (72.5)	29 (10.0)	51 (17.5)
9. When comparing the two food labels above, which food product has the most grams of fiber per serving?	197 (67.7)	26 (8.9)	68 (23.4)
Mean ± SD		2.87 ±1.50	
Min – Max		0 - 7	

Table 4.5 shows the distribution of respondents by levels of nutrition label knowledge. About half of the respondents (51.9%) had moderate level of nutrition label knowledge and one third of the respondents (36.1%) had low level of nutrition label knowledge. Previous studies reported similar findings of more than quarter of the students had low

nutrition knowledge (Andrias et al., 2016; Norazlanshah et al., 2013; Norazmir et al., 2012). Furthermore, this study found that more females (15.3%) reported to have high level of nutrition label knowledge than males (7.4%). This finding was supported by Misra (2007) and Nurliyana et al. (2011).

Table 4.5: Distribution of respondents by levels of nutrition label knowledge in The Label Reading Survey (n=291)

Level of nutrition label knowledge	n (%)		
	Male (n=121)	Female (n=170)	Total (n=291)
Low (0 – 2.33)	48 (39.7)	57 (33.5)	105 (36.1)
Moderate (2.34 – 4.66)	64 (52.9)	87 (51.2)	151 (51.9)
High (4.67 – 7.00)	9 (7.4)	26 (15.3)	35 (12.0)

4.5 Attitude towards Nutrition Label

According to Table 4.6, one third of the respondents (31.6%) strongly agreed that food label is useful. Nearly half of the respondents (44.0%) agreed that food label is accurate. However, one in ten of the respondents disagreed (10.0%) or strongly disagreed (1.4%) that food label is easy to understand. One in five of the respondents disagreed (19.2%) or strongly disagreed (3.8%) that nutrition claims are truthful. The mean score of attitude towards nutrition label was 17.57 (*SD*=2.62), ranging from 8 to 25.

Table 4.6: Distribution of respondents by items in The Label Reading Survey (n=291)

Items	n (%)				
	Strongly disagree	Disagree	Not sure	Agree	Strongly agree
1. Food label is useful	1 (0.3)	0 (0.0)	38 (13.1)	160 (55.0)	92 (31.6)
2. Food label is accurate	2 (0.7)	19 (6.5)	119 (40.9)	128 (44.0)	23 (7.9)
3. Nutrition claims are truthful	11 (3.8)	56 (19.2)	154 (52.9)	61 (21.0)	9 (3.1)
4. Health claims are truthful	4 (1.4)	34 (11.7)	137 (47.1)	101 (34.7)	15 (5.2)
5. Food label is easy to understand	4 (1.4)	29 (10.0)	80 (27.5)	153 (52.6)	25 (8.6)
Mean $\pm$ SD			17.57 $\pm$ 2.62		
Min – Max			8 - 25		

The distribution of respondents by levels of attitude towards nutrition label by sex is shown in Table 4.7. Majority of the respondents (72.5%) were found to have moderate level of attitude towards nutrition label. This prevalence was higher compared to Norazlanshah et al. (2013) who reported 58.2% of the university students had moderate level of attitude towards nutrition label. About one in five of the respondents (21.6%) in the current study had high level of attitude towards nutrition label.

Table 4.7: Distribution of respondents by levels of attitude towards nutrition label by sex (n=291)

Level of attitude towards nutrition label	n (%)		
	Male (n=121)	Female (n=170)	Total (n=291)
Low (8.00 - 13.66)	8 (6.6)	9 (5.3)	27 (5.8)
Moderate (13.67 - 19.33)	88 (72.7)	123 (72.4)	211 (72.5)
High (19.34 - 25.00)	25 (20.7)	38 (22.4)	63 (21.6)

4.6 Perception on Benefits of Nutrition Label

As shown in Table 4.8, about half of the respondents agreed that nutrition label make them select healthy food (52.2%) and help others (58.8%). However, about one in ten of the respondents disagreed that nutrition label helps them not to have food high in fat or sodium (4.8%), to eat adequate amount of food (6.2%), and to prevent diseases (4.8%). Overall, the mean score of perception on benefits of nutrition label was 32.13 (*SD*=4.33), ranging from 17 to 40.

Table 4.8: Distribution of respondents by perception on benefits of nutrition label items (*n*=291)

Items		n (%)				
		Strongly disagree	Disagree	Not sure	Agree	Strongly agree
1.	Make me select healthy food	1 (0.3)	9 (3.1)	54 (18.6)	152 (52.2)	75 (25.8)
2.	Help others	0 (0.0)	5 (1.7)	40 (13.7)	171 (58.8)	75 (25.8)
3.	Make me compare and select healthier food	0 (0.0)	6 (2.1)	36 (12.4)	161 (55.3)	88 (30.2)
4.	Help me not to have food high in fat/sodium	0 (0.0)	14 (4.8)	60 (20.6)	156 (53.6)	61 (21.0)
5.	Make me eat adequate amount of food	3 (1.0)	18 (6.2)	71 (24.4)	150 (51.5)	49 (16.8)
6.	Make me select foods high in vitamins/calcium	1 (0.3)	5 (1.7)	56 (19.2)	156 (53.6)	73 (25.1)
7.	Help me to prevent diseases	0 (0.0)	14 (4.8)	48 (16.5)	132 (45.4)	97 (33.3)
8.	Be good for calories control and obesity prevention	1 (0.3)	5 (1.7)	44 (15.1)	142 (48.8)	99 (34.0)
Mean ± SD		32.13 ± 4.33				
Min – Max		17 - 40				

The distribution of respondents by levels of perception on benefits of nutrition label is shown in Table 4.9. More than half of the respondents (58.4%) had moderate level of perception on benefits of nutrition label, with 58.7% in males and 58.3% in females. A

study done by Andrias et al. (2016) found higher prevalence of 73.6% who had good perception on benefits of nutrition label.

Table 4.9: Distribution of respondents by levels of perception on benefits of nutrition label (n=291)

Level of perception on benefits of nutrition label	n (%)		
	Male (n=121)	Female (n=170)	Total (n=291)
Low (17.00 - 24.66)	4 (3.3)	6 (3.5)	10 (3.4)
Moderate (24.67 – 32.33)	71 (58.7)	99 (58.2)	170 (58.4)
High (32.34 – 40.00)	46 (38.0)	65 (38.2)	111 (38.1)

4.7 Body Weight Status

As shown in Table 4.10, about one in four of the respondents in this study were overweight (18.2%) and obese (7.2%), whereas 15.5% of the respondents were underweight. More females were underweight, while more males were overweight and obese. These findings were similar with a previous study in Kuwait (AlMajed et al., 2011) which reported that more obese males (31.2%) than females (13.8%) was found. Another study among students in Hungary also showed that more males (35.6%) than females (16.9%) were overweight, whereas more females (10.7%) than males (3.8%) were underweight (Breitenbach et al., 2016). Papier et al. (2015) also reported the similar finding, in which there were more obese male students (6.2%) than female students (4.6%) and more underweight female (7.7%) than male students (2.8%) in Australia. Likewise, in Thailand, Pengpid and Peltzer (2015) reported higher prevalence of obesity among males (16.9%) than females (11.5%) and higher prevalence of underweight among females (24.6%) than males (13.7%).

In contrast, according to IPH (2015), more female adults (22.9%) were obese compared to 14.5% of male adults in Malaysia. Another study also reported similar findings, in which more females were obese (33.6%) than males (27.8%) (IPH, 2015). Chan et al. (2017) also found higher prevalence of overweight and obesity in females (52.9%) than males (49.7%).

The mean and standard deviation for waist circumference in this study was 72.31 cm and 12.97 cm, which was lower than previous studies conducted by Ayed et al. (2019) (79.30 ± 12.40 cm) in Tunisia, Hazizi et al. (2012) (76.70 ± 10.10 cm) in Malaysia, and Zamsad et al. (2019) (80.31 ± 5.07 cm) in Bangladesh among university students. About one in ten of the respondents in this study (14.1%) were at risk of abdominal obesity. This prevalence was lower compared to IPH (2015) and Lim (2016) which reported 48.6% and 17.4% of adult population in Malaysia were at risk of abdominal obesity, respectively.

For body fat percentage, the mean and standard deviation in this study was 27.56% and 7.64%, which was almost similar to previous studies by Cheah et al. (2018) ($27.50\% \pm 6.9\%$) and Hung et al. (2017) ($28.40\% \pm 5.30\%$). Nearly 40% of the respondents in this study were in the unhealthy (too high) category, with males (41.3%) had higher prevalence than females (30.6%). This finding was consistent with a recent local study by Cheah et al. (2018) which reported that 43.0% of university students in Malaysia had very high body fat percentage. Another local study conducted by Muralidhara and Chin (2015) reported similar findings, in which males (50.0%) having higher body fat percentage than females (41.4%). Breitenbach et al. (2016) also found that more males

(5.7%) than females (2.5%) were in the unhealthy (too high) category for body fat percentage. In contrast, Goonasegaran et al. (2012) found that more female students (22.8%) than male students (8.9%) in Malaysia had very high body fat percentage.

Table 4.10: Body weight status of respondents by sex (n=291)

Characteristics	n (%)		
	Male (n=121)	Female (n=170)	Total (n=291)
Weight, kg (Mean ± SD)	68.79 ± 15.91	55.64 ± 11.43	61.11 ± 14.93
Height, m (Mean ± SD)	1.70 ± 0.06	1.58 ± 0.06	1.63 ± 0.09
BMI (kg/m ²)			
Underweight (<18.5)	17 (14.0)	28 (16.5)	45 (15.5)
Normal weight (18.5-24.9)	66 (54.5)	106 (62.4)	172 (59.1)
Overweight (25.0-29.9)	26 (21.5)	27 (15.9)	53 (18.2)
Obesity (≥30.0)	12 (9.9)	9 (5.3)	21 (7.2)
Mean ± SD	23.74 ± 5.31	22.35 ± 4.29	22.93 ± 4.78
Waist circumference (cm)			
Normal (male<90; female<80)	105 (86.8)	145 (85.3)	250 (85.9)
Abdominal obesity (male≥90; female ≥80)	16 (13.2)	25 (14.7)	41 (14.1)
Mean ± SD	77.31 ± 14.69	68.75 ± 10.24	72.31 ± 12.97
Body fat percentage (%)			
Unhealthy range (too low) (male≤5; female ≤8)	0 (0.0)	0 (0.0)	0 (0.0)
Acceptable range (lower end) (male 6-15; female 9-23)	16 (13.2)	33 (19.4)	49 (16.8)
Acceptable range (upper end) (male 16-24; female 24-31)	55 (45.5)	85 (50.0)	126 (43.3)
Unhealthy range (too high) (male≥25; female ≥32)	50 (41.3)	52 (30.6)	116 (39.9)
Mean ± SD	25.14 ± 8.77	29.25 ± 6.20	27.56 ± 7.64

4.8 Hypothesis Testing

H₁: There is a significant difference in nutrition label use between male and female students in Universiti Putra Malaysia.

Chi square test was used to determine the difference in nutrition label use between sexes. As shown in Table 4.11, there was no significant difference in nutrition label use between male and female students ($\chi^2=0.01$, $p=1.000$). One in five of the males (20.7%) and females (20.6%) were nutrition label users. This finding was supported by previous local studies (Norazlanshah et al., 2013; Nurliiyana et al., 2011) which reported that there was no significant difference in the use of nutrition label between male and female university students in Malaysia ($p>0.05$).

In contrast, some other studies have shown that female students used nutrition label more frequently than male students (Ambak et al., 2018; Besler et al., 2012; Bonanno et al., 2018; Li et al., 2012; Prieto-Castillo et al., 2015; Stran & Knol, 2013). This might be due to higher nutrition label knowledge in females compared to males, and high concerns of females about their body image, diet and health (Grunert et al., 2012). However, Norazlanshah et al. (2013) and Nurliiyana et al. (2011) found that the prevalence of nutrition label use was higher in male students compared to female students in Malaysia. They explained that behavior of females that prioritized their education, such as assignments, which cause them to have limited time to read nutrition label during food purchasing (Nurliiyana et al., 2011).

Table 4.11: Results of chi-square test in determining the difference in nutrition label use between sexes

Characteristics	n (%)		χ^2	p
	Label users (n=60)	Non-users (n=231)		
Sex			0.01	1.000
Male	25 (20.7)	96 (79.3)		
Female	35 (20.6)	135 (79.4)		

H₂: There are significant differences in socio-demographic factors between label users and non-users in Universiti Putra Malaysia.

Chi square test was used to determine the differences in socio-demographic factors, including age, ethnicity, living status and year of study between label users and non-users. According to Table 4.12, there was no significant difference in age between label users and non-users ($\chi^2=1.02$, $p=0.601$). Similar finding was reported by Lim et al. (2015) among college students in Korea. In contrast, some previous studies showed that there was a significant difference in age between label users and non-users, with older age group used nutrition label more frequently than younger age group (Besler et al., 2012; Cha et al., 2014). One of the possible reasons might be due to higher health awareness level among older adults compared to younger adults (Besler et al., 2012).

In term of ethnicity, no significant difference in ethnicity was found between label users and non-users ($\chi^2=0.64$, $p=0.727$) in this study. Similar finding was reported by Ambak et al. (2018), which reported no significant difference in ethnicity, although majority label users were Malays (52.6%), followed by Chinese (15.7%) and others (31.7%). However, there were previous studies that found significant difference in ethnicity between label users and non-users (Cheah et al., 2015; Vijaykumar et al., 2013). For

instance, Cheah et al. (2015) reported that Malay read nutrition label more frequently than other ethnic groups. This finding may be due to different cultural and religious beliefs between different ethnic groups that may affect nutrition label use (Cheah et al, 2015).

There was no significant difference in living status between label users and non-users ($\chi^2=0.26$, $p=0.880$) in this study. This finding was inconsistent with previous studies (Cha et al., 2014; Prieto-Castillo et al., 2015) which reported a significant difference in living status between label users and non-users. Students who live alone used nutrition label more frequently than those who live with their parents or family (Cha et al., 2014; Prieto-Castillo et al., 2015). The responsibilities related to grocery shopping and meal planning among students who live alone were higher compared to those who live with their parents or family, which increases the possibilities for them to use nutrition label during food purchasing (Cha et al., 2014).

There was also no significant difference found in year of study between label users and non-users ($\chi^2=7.25$, $p=0.064$). Similar findings were reported in previous studies (Lim et al., 2015; Misra, 2007). Misra (2007) conducted a study among college students in Texas found that students in lower year of study had significantly associated with higher nutrition label knowledge and it had an indirect effect (through attitude) on nutrition label use. This may contribute to the insignificant result of difference in year of study between label users and non-users due to the indirect relationship between year of study and nutrition label use.

Table 4.12: Results of chi-square test in determining differences in socio-demographic factors between nutrition label users and non-users

Characteristics	n (%)		χ^2	p
	Label users (n=60)	Non-users (n=231)		
Age (years)				
19 - 20	17 (28.3)	52 (22.5)	1.02	0.601
21 - 22	31 (51.7)	124 (53.7)		
23 - 24	12 (20.0)	55 (23.8)		
Ethnicity				
Malay	51 (85.0)	188 (81.4)	0.64	0.727
Chinese	4 (6.7)	23 (10.0)		
Indian	5 (8.3)	20 (8.7)		
Living status				
Living with parents	14 (23.3)	47 (20.3)	0.26	0.880
Living in dormitory	43 (71.7)	172 (74.5)		
Living with other family/relatives	3 (5.0)	12 (5.2)		
Year of study				
Freshman	23 (38.3)	56 (24.2)	7.25	0.064
Sophomore	15 (25.0)	90 (39.0)		
Junior	15 (25.0)	47 (20.3)		
Senior	7 (11.7)	38 (16.5)		

H₃: There is significant difference in self-efficacy between label users and non-users in Universiti Putra Malaysia.

Independent-samples *t*-test was used to determine the difference in self-efficacy between label users and non-users. As shown in Table 4.14, there was a significant difference in the mean score of self-efficacy between label users and non-users ($t=-6.334$, $p=0.001$). Label users ($M=3.37$, $SD=1.01$) showed significantly higher self-efficacy score compared to non-label users ($M=3.07$, $SD=0.85$). In contrast, Cha et al. (2014) and Hess et al. (2011) found that there was no significant difference in self-efficacy between label users and non-users. The findings may be related to the self-efficacy scale used in the

previous studies that were not related to nutrition label use and this may contribute to less accurate findings in determining the difference in self-efficacy between label users and non-users (Cha et al., 2014). The self-efficacy scale used in this study is related to nutrition label use (Sallis et al., 1988).

Table 4.13: Results of independent-sample *t*-test on self-efficacy score between label users and non-users

Variables	Mean	SD	<i>t</i> -value	<i>p</i> -value
Label users	3.97	1.01	-6.334	0.001*
Non-users	3.07	0.85		

* $p < 0.05$

H4: There is significant difference in nutrition label knowledge between label users and non-users in Universiti Putra Malaysia

The difference in nutrition label knowledge between label users and non-users was determined by using independent-samples *t*-test. Table 4.16 shows that there was no significant difference in nutrition label knowledge score between label users ($M=3.12$, $SD=1.44$) and non-users ($M=2.81$, $SD=1.51$), $t=-1.418$, $p=0.157$. In contrast, previous studies showed that label users had significantly higher nutrition label knowledge score compared to non-users (Cooke & Papadaki, 2014; Norazlanshah et al., 2013; Rasberry et al., 2007). Barreiro-Hurle et al. (2010) explained that respondents with higher nutrition label knowledge had higher ability to comprehend the information provided on nutrition label, which increase their likelihood to use the nutrition label compared to those with lower nutrition label knowledge.

Table 4.14: Results of independent-samples *t*-test on nutrition label knowledge score between label users and non-users

Variables	Mean	SD	<i>t</i> -value	<i>p</i> -value
Label users	3.12	1.44	-1.418	0.157
Non-users	2.81	1.51		

H₅: There is significant difference in attitude towards nutrition label between label users and non-users in Universiti Putra Malaysia.

The difference in attitude towards nutrition label between label users and non-users was determined by using independent-samples *t*-test. As shown in Table 4.15, there was a significant difference in attitude towards nutrition label between label users and non-users ($t=-3.290$, $p=0.001$). Label users ($M=18.55$, $SD=2.54$) showed significantly higher attitude towards nutrition label score than label non-users ($M=17.32$, $SD=2.59$). This finding was supported by previous studies (Cooke & Papadaki, 2014; Norazlanshah et al., 2013; Rasberry et al., 2007), which revealed that label users had more positive attitude towards nutrition label compared to non-users. This is because individuals with higher attitude score were more positive and interested in nutritional content of food products, which cause them to be more aware in using the nutrition label during food purchasing (Richardson, 1993).

Table 4.15: Results of independent-samples *t*-test on attitude towards nutrition label score between label users and non-users

Variables	Mean	SD	<i>t</i> -value	<i>p</i> -value
Label users	18.55	2.54	-3.290	0.001*
Non-users	17.32	2.59		

* $p<0.05$

H6: There is significant difference in perception on benefits of nutrition label between label users and non-users in Universiti Putra Malaysia.

Independent-samples *t*-test was performed to determine the difference in perception on benefits of nutrition label between label users and non-users. As shown in Table 4.17, there was a significant difference in perception on benefits of nutrition label between label users and non-users ($t=-3.335$, $p=0.001$). Label users ($M=33.93$, $SD=4.07$) showed significantly higher perception on benefits of nutrition label score compared to non-users ($M=31.66$, $SD=4.85$) in this study. Previous studies carried out by Lim et al. (2015) and Andrias (2016) showed the similar finding. This is because non-users might perceive healthy eating negatively and they believe that reading nutrition label might reduce their pleasure on eating (Hess et al., 2011).

Table 4.16: Results of independent-samples *t*-test on perception on benefits of nutrition label score between label users and non-users

Variables	Mean	SD	<i>t</i> -value	<i>p</i> -value
Label users	33.93	4.07	-3.335	0.001*
Non-users	31.66	4.85		

* $p<0.05$

H7: There is significant difference in body weight status between label users and non-users in Universiti Putra Malaysia.

Independent-samples *t*-test was used to determine the differences in body weight status, including BMI, waist circumference and body fat percentage between label users and non-users. As presented in Table 4.13, there was no significant difference in BMI between label users ($M=23.32\text{kg/m}^2$, $SD=4.88\text{kg/m}^2$) and non-users ($M=22.83\text{kg/m}^2$, $SD=4.76\text{kg/m}^2$), $t=-0.713$, $p= 0.467$. The finding of this study was consistent with

Table 4.17: Results on the difference in body weight status between label users and non-users

Characteristics	n (%)		$\chi^2 /$ <i>t</i> -value	<i>p</i>
	Label users (n=60)	Non-users (n=231)		
BMI (kg/m ²)			2.10	0.553
Underweight (<18.5)	6 (13.3)	39 (86.7)		
Normal weight (18.5-24.9)	36 (20.9)	136 (79.1)		
Overweight (25.0-29.9)	13 (24.5)	40 (75.5)		
Obese (≥30.0)	5 (23.8)	16 (76.2)		
Mean ± SD	23.32 ± 4.88	22.83 ± 4.76	-0.713	0.476
Waist circumference (cm)			0.01	0.820
Normal (male<90; female<80)	51 (20.4)	199 (79.6)		
Abdominal obesity (male≥90; female, ≥80)	9 (22.0)	32 (78.0)		
Mean ± SD	73.39 ± 11.78	72.03 ± 13.28	-0.723	0.470
Body fat percentage (%)			1.64	0.440
Acceptable range (lower end) (male 6-15; female 9-23)	7 (14.3)	42 (85.7)		
Acceptable range (upper end) (male 16-24; female 24-31)	29 (23.0)	97 (77.0)		
Unhealthy range (too high) (male≥25; female ≥32)	24 (20.7)	92 (79.3)		
Mean ± SD	27.92 ± 6.94	27.47 ± 7.82	-0.408	0.683

previous studies (Bonanno et al., 2018; Cha et al., 2014). However, Rimpeekool et al. (2017) reported that label users had higher BMI than non-label users. This might be due to higher concerns among those with overweight or obesity problems, which increase their likelihood to read nutrition label of food products as one of the techniques to lose weight (Rimpeekool et al., 2017).

In this study, no significant difference was also found in waist circumference between label users ($M=73.39$ cm, $SD=11.78$ cm) and non-users ($M=72.03$ cm, $SD=13.28$ cm), $t=-0.723$, $p=0.470$. However, there is no study investigating abdominal obesity and nutrition label use. Similarly, no significant difference was found in body fat percentage between label users ($M=27.92\%$, $SD=6.94\%$) and non-users ($M=27.47\%$, $SD=7.82\%$), $t=-0.408$, $p=0.683$. There is also no study investigating body fat percentage and nutrition label use.



CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The prevalence of nutrition label use among undergraduate students in UPM was low, with only 20.6% were nutrition label users. The most read information on nutrition label were fat content, carbohydrate including sugar content, and total energy content. Even though the prevalence of nutrition label use was low, over 90% of the students who used label read expiry date and precautionary food label. Label users had significantly higher self-efficacy in using nutrition label, more positive attitude towards nutrition label and more favorable perception on benefits of nutrition label compared to non-label users. However, there were no significant difference in socio-demographic factors, body weight status and nutrition label knowledge between label users and non-users. Therefore, intervention programs in improving the prevalence of nutrition label use among undergraduate students should focus on improving their self-efficacy in using nutrition label, attitude towards nutrition label, and perception on benefits of nutrition label. Nutrition education in helping undergraduate students to select healthier food choices should be designed and implemented.

5.2 Limitations of the Study

This study was a cross-sectional study and the outcome of this study did not allow conclusion regarding causal relationship. The findings of this study could not be generalized to all university students in Malaysia as the current study included undergraduate students from UPM only. Furthermore, the use of self-administered

questionnaire might contribute to under or over-reporting by the respondents and this might affect the accuracy of the findings in this study. In addition, this study involved a combination of science and art students, which may contribute to bias in nutrition knowledge level. The comparison of uneven number of nutrition label users and non-users might lead to inaccurate findings. Lastly, there is no standardized and reliable instrument used to measure nutrition label use and therefore, it is difficult to compare the prevalence of nutrition label use between studies.

5.3 Recommendations

This study demonstrated low prevalence of nutrition label use among undergraduate students in UPM. Thus, nutrition education programs should be conducted to raise awareness of the benefits of using nutrition label and to provide guidance on how to use nutrition label in order to improve nutrition label use among undergraduate students. Knowledge on nutrition label also need to be emphasized among university students as this study found that only one in ten of the students had high level on nutrition label knowledge. Thus, education programs to increase undergraduate students' knowledge on nutrition label must be implemented. Effort in educating university students about nutrition label is important in order to improve their understanding when reading nutrition label and allow them to apply nutrition label in choosing healthy food products in their daily life.

Cohort studies or case-control studies should be conducted in the future in order to determine the factors influencing nutrition label use among undergraduate students. Furthermore, future studies should involve undergraduate students from public and

private universities to have a clearer picture on nutrition label use among undergraduate students.

A valid and standardize instrument used to measure nutrition label use should be developed in order to obtain a more accurate and reliable data regarding nutrition label use and comparison between countries could be done. Most importantly, health care professionals particularly nutritionists should emphasize the use of nutrition label in selecting foods among undergraduate students. Nutrition education on nutrition labeling should be conducted among undergraduate students to teach them about the use of nutrition label and the application of nutrition information on nutrition label into their daily life.

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Appendix A: Ethical approval from JKEUPM

UPM

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

Research title	: Factors Associated with Nutrition Label Use Among University Students in Universiti Putra Malaysia
Study Site	: UPM
JKEUPM Ref No.	: JKEUPM-2018-337
Researcher	: Nursyazwani binti Roslan
Supervisor	: Dr. Gan Wan Ying

Documents received and reviewed with reference to the above study:

1. Ethics Application Form, Version 1 dated 25/10/2018
2. Respondent Information Sheet & Consent (Malay), Version 2 dated 29/11/2018
3. Proposal (English), Version 2 dated 12/12/2018
4. Questionnaires/ Interviews (English), Version 1 dated 25/10/2018
5. Curriculum Vitae of:
 - a. Dr. Gan Wan Ying

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

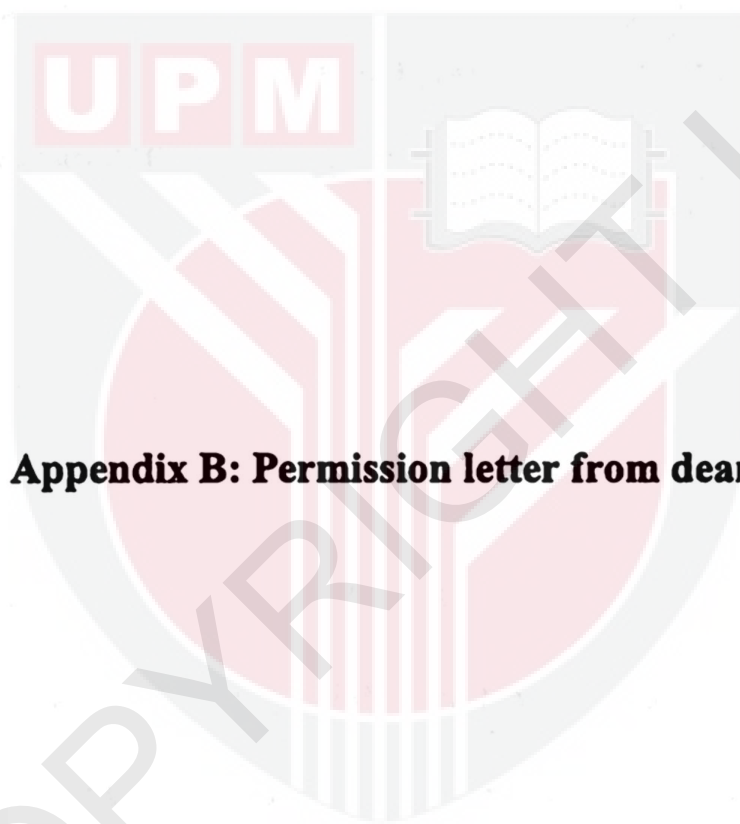
Decision by JKEUPM:

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

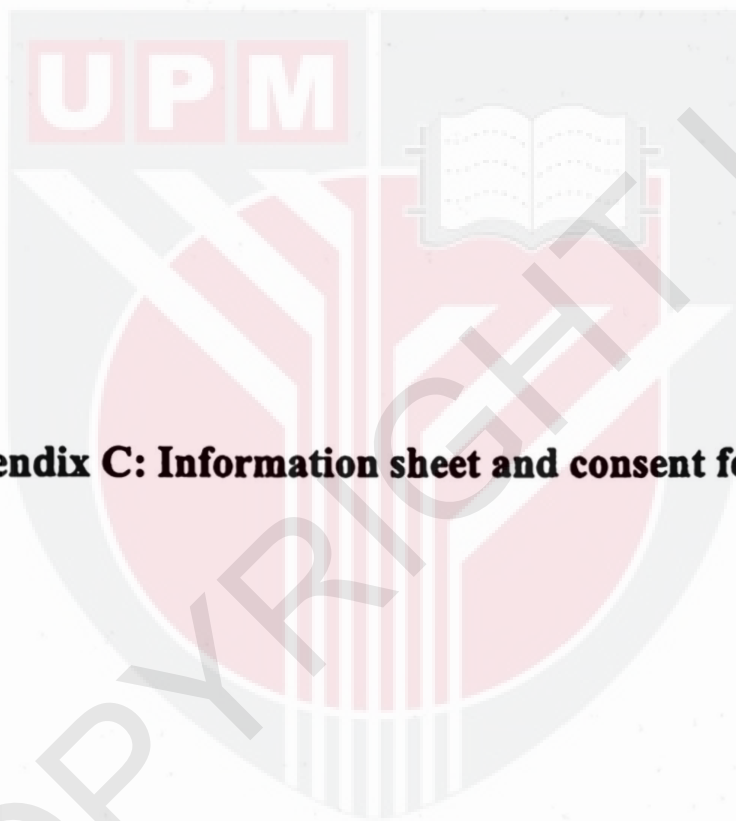
Please note that the approval is **VALID UNTIL 30 DECEMBER 2019**

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.
- III. Applicable for Clinical Trial Studies and Clinical interventional Studies only: Progress Report has to be submitted to JKEUPM at every 6 months from the date of approval (Form 3.1). Report occurrences of all Serious Adverse Events (SAEs), Suspected Unexpected Serious Adverse Reaction (SUSARs) and Protocol Deviation/ Violation at all JKEUPM approved sites to JKEUPM.



Appendix B: Permission letter from deans



Appendix C: Information sheet and consent form

UPM



UPM
UNIVERSITI PUTRA MALAYSIA

**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 :

KNOWLEDGE, ATTITUDE AND PERCEPTION ON NUTRITION LABEL USE, BODY WEIGHT STATUS AND SELF-EFFICACY BETWEEN LABEL USERS AND NON-USERS IN UNIVERSITI PUTRA MALAYSIA

2. INTRODUCTION:

Nutrition label is a list of nutritional information of specific food product that allows the consumers to choose more nutritious food. Nutrition labeling has become one of the most important strategies to be implemented all over the world, especially those countries having high health problem issue. University students were found to be the age group with lowest use of nutrition label than other age groups. Poor use of nutrition label may lead to unhealthy eating behaviors, which eventually cause poor health status. Thus, this study aims to determine factors associated with nutrition label use among university students.

This study is part of the graduation requirements for Bachelor of Science (Nutrition and Community Health) from the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia which is expected to be completed within one year of study.

The objective of this study is to compare the factors between label users and non-users among university students and a total of 276 university students from Universiti Putra Malaysia will participate in this study.

3. WHAT WILL YOU HAVE TO DO?

You need to read and understand the information about this study in this "Respondent Information Sheet". If you voluntarily agree to participate in this study, please sign the respondent's consent letter on page 3. Please return the signed form to the researcher.

Things that you need to do are as follows:-

1. Complete a questionnaire consisting of socio-demographic background, self-efficacy, attitude towards nutrition label, nutrition label knowledge and perception on benefits of nutrition label. After completing the questionnaire, you are required to return it to the researcher.
2. Your height, weight, waist circumference and percentage of body fat will be measured by a researcher in a closed room.

Your participation in this study only takes about 30 minutes. Your participation in this study is voluntary. You can withdraw from this study at any time without giving any reasons and no penalty will be applied on you.

This study has been approved by the Ethics Review Panel, Ethics Committee for Research Involving Human Subjects (JKEUPM) from Universiti Putra Malaysia.

4. WHO SHOULD NOT PARTICIPATE IN THE STUDY?

- a) International students
- b) Pre-university or postgraduate students
- c) Pregnant/lactating women
- d) University students with physical disability
- e) University students with any acute or chronic illness, for example, diabetes mellitus, hypertension and cancer

5. WHAT WILL BE THE BENEFITS OF THE STUDY:

(a) TO YOU AS THE SUBJECT?

You will get information on your weight, height, waist circumference and percentage of body fat. You will also gain some information on nutrition label. Once you have successfully completed this study, a stationery will be given to you as a token of appreciation for your participation in this study.

(b) TO THE INVESTIGATOR?

Investigators are able to know the situation of nutrition label use and its differences in factors among university students. Findings of this study could contribute to the current knowledge and information about nutrition label use among university students in Malaysia and can be used as a reference for researchers for future studies. The findings of this study can also be used by health professionals to plan and conduct effective health promotion programs on nutrition label use among university students.

6. WHAT ARE THE POSSIBLE RISKS?

This study has no direct risk to the subject.

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:
Nursyazwani binti Roslan
017-5183392
wany5487@gmail.com

Supervisor:
Dr. Gan Wan Ying
012-3564362
wanying@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)

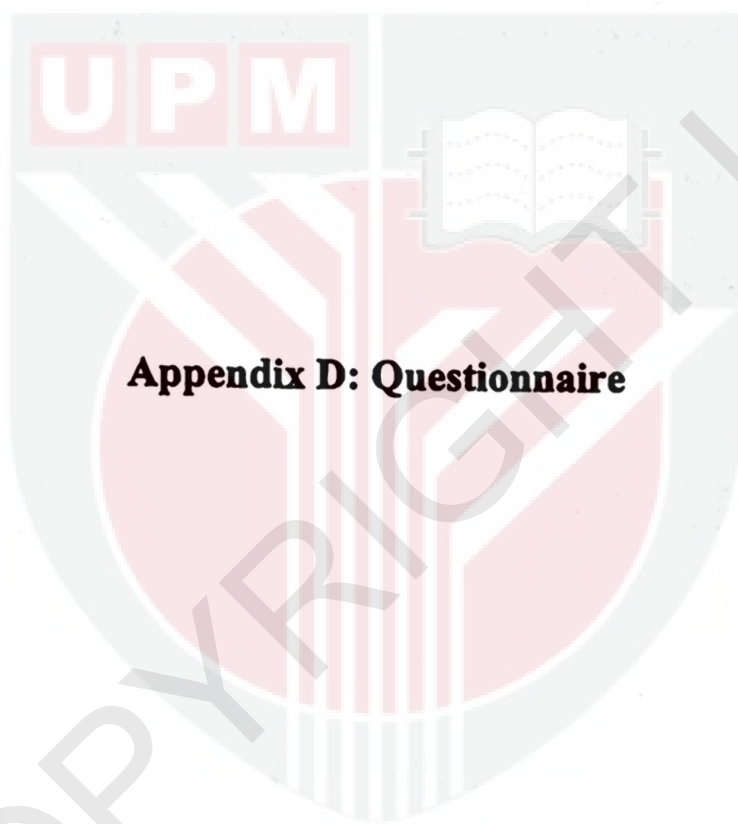
* delete where necessary

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)

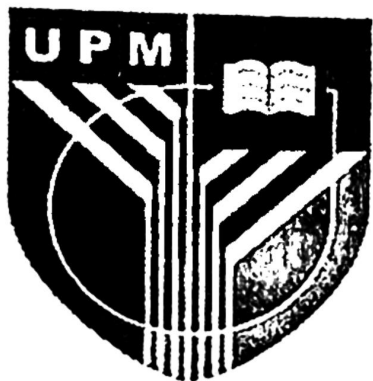


Appendix D: Questionnaire

UPM

Reference No.

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

**KNOWLEDGE, ATTITUDE AND PERCEPTION ON NUTRITION LABEL
USE, BODY WEIGHT STATUS AND SELF-EFFICACY BETWEEN LABEL
USERS AND NON-USERS IN UNIVERSITI PUTRA MALAYSIA**

QUESTIONNAIRE

Researcher:

UPM Nursyazwani binti Roslan (181720)

Supervisor:

Dr Gan Wan Ying

Date of data collection:

Disclaimer: Any data collected in this survey will be treated as confidential information

PART A

Instruction: Please fill in the following personal information.

1. Age : _____ years
2. Date of birth : _____ / _____ / _____ (dd/mm/yy)
3. Sex :

☐ Male☐ Female
4. Ethnicity :

☐ Malay☐ Bumiputera Sabah

☐ Chinese☐ Bumiputera Sarawak

☐ Indian☐ Others: _____
5. Religion :

☐ Islam☐ Buddha☐ Hindu☐ Christian☐ Others: _____
6. Faculty :

7. Programme :

8. Year of study : _____
9. Living status :

☐ Living with parents☐ Living with other family or relatives

☐ Living in dormitory☐ Others, please

specify: _____

PART B
Instruction

Use the following scale to answer the following question.
Circle the number representing how you feel about the statement.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

1. How often do you read the nutrition labels on food labels before purchasing foods or beverages?

1 2 3 4 5

Circle the number representing how you feel about the statement.

1. Do you read the nutrition labeling when you buy or receive food (where applicable)?

- 1 Yes, always
- 2 Yes, sometimes
- 3 No
- 4 Refuse to answer

2. What kind of information in the nutrition label do you read?
(More than one answer is accepted)

- 1 Total energy
- 2 Carbohydrate content including sugar
- 3 Fat content
- 4 Salt/sodium content
- 5 Vitamin content
- 6 Mineral content
- 7 Food additives
- 8 Fibre
- 9 Other, specify.....
- 9 Refuse to answer

3. Do you understand the information in the nutrition label when you buy or receive food?

- 1 Yes, always
- 2 Yes, sometimes
- 3 No
- 4 Refuse to answer

4. Do you read the expiry date on the label when you buy or receive food (where applicable)?

- 1 Yes, always
- 2 Yes, sometimes
- 3 No
- 4 Refuse to answer

5. Do you read the precautionary food label when you buy or receive food (where applicable)? [Example: Once opened, keep in refrigerator and consume within 3 days]

- 1 Yes, always
- 2 Yes, sometimes
- 3 No
- 4 Refuse to answer

PART C
Instruction

Use the following scale to answer the following question.
Circle the number representing how you feel about the statement.

1	2	3	4	5
I know I cannot				I know I can

1. How sure are you that you can regularly read the serving size information listed on the Nutrition Facts label of packaged foods that you eat?

- 1
- 2
- 3
- 4
- 5

PART D
Instruction

Use the following scale to answer the following five questions.
Circle the number representing how you feel about each statement.

1	2	3	4	5
Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree

1) I find the food label useful.

1	2	3	4	5
---	---	---	---	---

2) I believe that the food label is accurate.

1	2	3	4	5
---	---	---	---	---

3) I believe that nutritional claims, such as “no trans fat” or “no fat,” on the food label are truthful.

1	2	3	4	5
---	---	---	---	---

4) I believe that health claims, such as “diets high in soluble fiber may lower cholesterol,” on the food label are truthful.

1	2	3	4	5
---	---	---	---	---

5) The food label is easy to understand.

1	2	3	4	5
---	---	---	---	---

PART E
Instruction

Please select the correct answer.

1. The % Daily Value is based on which of the following caloric requirements?

- | | |
|------------------|------------------|
| A. 1000 Calories | D. 2500 Calories |
| B. 1500 Calories | E. 3000 Calories |
| C. 2000 Calories | F. I don't know |

2. Which one of the following items listed on the "Nutrition Facts" panel is recommended to eat less of?

- | | |
|------------------|-----------------|
| A. Carbohydrates | D. I don't know |
| B. Trans Fat | |
| C. Protein | |

3. When % Daily Value of a nutrient is 5% or less...

- A. The food contains 5% by volume of that nutrient.
- B. The food contains 5% by weight of that nutrient
- C. 5% of the calories for that day are contributed by that nutrient.
- D. The food is a low source of that nutrient.
- E. I don't know

4. A food is described on the label as being "reduced calorie". The reduced calorie food contains what percentage of calories less than the original food?

- | | |
|--------|-----------------|
| A. 5% | D. 35% |
| B. 15% | E. 50% |
| C. 25% | F. I don't know |

5. A food is considered a good source of a nutrient when it contains at least what percentage of the nutrient of the daily value?

- | | |
|--------|-----------------|
| A. 5% | D. 20% |
| B. 10% | E. 25% |
| C. 15% | F. I don't know |

6. A nutrition label states that the serving size is a certain amount - such as ½ cup or 15 crackers. Which of the following statements best describes this amount?
- A. The amount that most nutrition experts recommend that most people should eat.
 - B. The amount most people usually eat.
 - C. The amount of food that the manufacturer decides to put on the label.
 - D. The amount that will make the number of servings in the container come out to be a whole number.
 - E. I don't know

Directions: Using the food labels provided, answer the following questions to the best of your ability

Nutrition Facts			
Serving Size 1 cup (85g) (3 oz.)			
Servings per container 2.5			
Amount per serving			
Calories 45 Calories from Fat 0			
			% Daily Value*
Total Fat	0g		0%
Saturated Fat	0g		0%
Cholesterol	0mg		0%
Sodium	55 mg		2%
Total Carbohydrate	10g		3%
Dietary Fiber	3g		12%
Sugars	5g		
Protein	1g		
Vitamin A 360% • Vitamin C 8% • Calcium 2% • Iron 0%			
*Percent Daily Values are based on a 2,000 calorie diet. Your daily value may be higher or lower depending on your dietary needs.			
		Calories:	2,000 2,500
Total Fat	Less than	65g	80g
Sat. Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate	Less than	300mg	375mg
Dietary Fiber	Less than	25g	30g
Calories per gram: Fat 9 • Carbohydrate 4 • Protein 4			

7. Using the Label above, how many grams of total fat should be eaten in a 2000 calorie diet?
- A. Less than 20

B. Less than 65

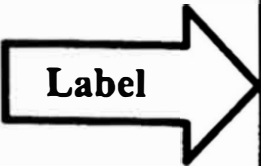
C. Less than 80

D. Less than 300

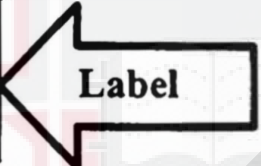
E. Less than 2400

F. I don't know

Nutrition Facts	
Serving Size 172 g	
Amount Per Serving	
Calories 200	Calories from Fat 8
% Daily Value ^a	
Total Fat 1g	1%
Saturated Fat 0g	1%
Trans Fat	
Cholesterol 0mg	0%
Sodium 7mg	0%
Total Carbohydrate 36g	12%
Dietary Fiber 11g	45%
Sugars 6g	
Protein 13g	
Vitamin A 1%	Vitamin C 1%
Calcium 4%	Iron 24%
^a Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.	



Nutrition Facts	
Serving Size 1 ounce Servings in bag 4	
Amount Per Serving	
Calories 165	Calories from Fat 93
% Daily Value ^a	
Total Fat 11g	16%
Saturated Fat 3g	15%
Trans Fat	
Cholesterol 0mg	0%
Sodium 148mg	6%
Total Carbohydrate 14g	5%
Dietary Fiber 1g	5%
Sugars 1g	
Protein 2g	
Vitamin A 0%	Vitamin C 9%
Calcium 1%	Iron 3%
^a Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.	



8. When comparing the two food labels above, which food product has the most grams of fat per serving?
- A. Label 1
B. Label 2
C. I don't know
9. When comparing the two food labels above, which food product has the most grams of fiber per serving?
- A. Label 1
B. Label 2
C. I don't know

PART F
Instruction

Use the following scale to answer the following eight questions based on statement below. Circle the number representing how you feel about each statement.

1	2	3	4	5
Strongly Disagree	Disagree	Not sure	Agree	Strongly Agree

If I were to use nutrition label in selecting/purchasing processed foods/snacks, it would...

1. Make me select healthy foods.

1	2	3	4	5
---	---	---	---	---

2. Help others (e.g., family members, friends) to select good foods.

1	2	3	4	5
---	---	---	---	---

3. Make me compare foods and select better foods.

1	2	3	4	5
---	---	---	---	---

4. Help me not to have foods high in fat or sodium.

1	2	3	4	5
---	---	---	---	---

5. Make me eat adequate amount of foods (serving size).

1	2	3	4	5
---	---	---	---	---

6. Make me select foods high in vitamins or calcium.

1	2	3	4	5
---	---	---	---	---

7. Help me to prevent diseases (e.g., hypertension, diabetes mellitus)

1 2 3 4 5

8. Be good for calories control and obesity prevention.

1 2 3 4 5

PART G

Anthropometry Measurement (Fill in by the researcher)

	Anthropometry measurement		
	Reading 1	Reading 2	Average
Height (cm)			
Weight (kg)			
Waist circumference (cm)			
Percentage of body fat (%)			