



UNIVERSITI PUTRA MALAYSIA

***INFLUENCE OF MENU LABELING ON THE CALORIES ORDERED
AMONG MALAYSIAN PRIVATE UNIVERSITY STUDENTS IN
KLANG VALLEY AND ITS ASSOCIATED FACTORS***

NG PENG HAN

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MALAYSIAN PRIVATE UNIVERSITY STUDENTS
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**BY
NG PENG HAN**

A project submitted as a partial fulfillment of the requirement for the
Bachelor of Science in Dietetics with Honors from the Faculty of
Medicine and Health Sciences, Universiti Putra Malaysia

This project entitled “Influence of Menu Labeling on the Calories Ordered Among Malaysian Private University Students in Klang Valley and its Associated Factors.” was prepared by Ng Peng Han and submitted to the Faculty of Medicine and Health Sciences as a partial fulfillment of the requirement for the degree of Bachelor of Science in Dietetics with Honors from the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia



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ABBREVIATIONS

Abbreviations	Meaning
BMR	Basal Metabolic Rate
BMI	Body Mass Index
MOH	Ministry of Health Malaysia
MET	Metabolic Equivalent of Task
PAL	Physical Activity Levels
USA	United States of America
WHO	World Health Organization

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ABSTRACT

INFLUENCE OF MENU LABELING ON THE CALORIES ORDERED AMONG MALAYSIAN PRIVATE UNIVERSITY STUDENTS IN KLANG VALLEY AND ITS ASSOCIATED FACTORS.

NG PENG HAN

Malaysia had the highest obesity rates among adults in Southeast Asia. Calorie menu labeling is among the methods that is used to curb the obesity problem. However, the effectiveness of menu labeling is still inconclusive and very limited studies were conducted in Malaysia. Therefore, the objective of this study was to investigate the influence of menu labeling on the total calories ordered among Malaysian private university students and its associated factors. Data was obtained online through a self-reported questionnaire using the Google Form platform from a total of 200 participants. The participants were selected through the snowballing sampling method from a total of 10 private universities in Klang Valley. Among the variables recorded include participants' sociodemographic and respondent variables, BMI, physical activity level, health consciousness, attitude towards menu labeling, and the total calories ordered, which were compared to the participants' individual caloric needs. A total of 200 Malaysian private university students participated. Most of them were of Chinese ethnicity (65%), and had a normal weight BMI (61.5%). Their household income level generally consisted of private university students from the B40 (41.5%) and M40 (40.5%) backgrounds. There was no significant difference in the total calories ordered between those that were exposed to a calorie labeled menu and those that were not. Meanwhile, health consciousness ($r = 0.332$, $p < 0.001$) and ethnicity ($p = 0.001$) were found to be significantly associated with the total calories ordered. Even though there was not a statistically significant difference in the total calories ordered between those that were exposed to a calorie labeled menu and those that were not, the calories ordered by the participants exposed to a calorie labeled menu was found to be less. Therefore, this current study's findings highlighted the importance of the need to have further studies that investigate the influence of menu labeling implementation in Malaysia so that the effectiveness of menu labeling can be fully understood.

ABSTRAK

PENGARUH PELABELAN MENU TERHADAP

KALORI YANG DIPESAN DI KALANGAN

PELAJAR UNIVERSITI SWASTA MALAYSIA

DI LEMBAH KLANG SERTA FAKTOR-FAKTOR YANG BERKAITAN.

NG PENG HAN

Malaysia mempunyai kadar obesiti yang tertinggi dalam kalangan orang dewasa di rantau Asia Tenggara. Pelabelan menu kalori adalah antara kaedah yang digunakan untuk membendung masalah obesiti. Walau bagaimanapun, keberkesanan pelabelan menu masih tidak dapat disimpulkan dan kajian yang dijalankan di Malaysia tidak ramai. Oleh itu, objektif kajian ini adalah untuk mengkaji pengaruh pelabelan menu terhadap jumlah kalori yang dipesan dalam kalangan pelajar universiti swasta Malaysia dan faktor-faktor yang berkaitan. Data kajian ini diperolehi melalui soal selidik yang diisi oleh peserta sendiri secara talian dengan menggunakan platform *Google forms*. Seramai 200 peserta mengambil bahagian dalam kajian ini. Para peserta dipilih melalui kaedah persampelan 'bola salji' dari 10 universiti swasta di Lembah Klang. Antara faktor yang dikaji termasuk faktor sosiodemografi dan responden, BMI, tahap aktiviti fizikal, kesedaran kesihatan, pandangan terhadap pelabelan menu, dan jumlah kalori yang dipesan, yang dibandingkan dengan keperluan kalori individu peserta. Data yang dikumpul menunjukkan bahawa kebanyakan peserta dalam kajian ini terdiri daripada etnik Cina (65%), dan mempunyai berat badan biasa (61.5%). Tahap pendapatan isi rumah mereka secara amnya terdiri daripada pelajar universiti daripada latar belakang B40 (41.5%) dan M40 (40.5%). Tiada perbezaan yang ketara didapati dalam jumlah kalori yang dipesan antara mereka yang terdedah kepada menu berlabel kalori dan yang tidak. Sementara itu, kesedaran kesihatan ($r = 0.332$, $p < 0.001$) dan etnik ($p = 0.001$) didapati mempunyai hubungan yang ketara dengan jumlah kalori yang dipesan. Walaupun tiada perbezaan yang ketara dalam jumlah kalori yang dipesan antara mereka yang terdedah kepada menu berlabel kalori dan yang tidak, kalori yang dipesan oleh peserta yang terdedah kepada menu berlabel kalori didapati lebih kurang. Oleh itu, dapatan kajian ini menekankan kepentingan keperluan untuk mengadakan kajian lanjutan yang menyiasat pengaruh pelaksanaan pelabelan menu di Malaysia supaya keberkesanan pelabelan menu dapat difahami sepenuhnya.

CHAPTER 1

INTRODUCTION

1.1 Background

Obesity refers to individuals who have a body mass index (BMI) more than 25 kg/m². It is a notable public health concern and has been described as a global health challenge (World Health Organization, [WHO], 2021). It is a serious issue and is responsible for around 3.4 million deaths, approximately 3.9% of years of life lost and 3.8% of disability-adjusted life-years (DALYs) worldwide (Ng et al., 2014). In Malaysia, obesity is a common health problem faced by many Malaysians regardless of race, gender, and ethnicity. In fact, Malaysians have the highest rate of obesity among adults throughout the Southeast Asian region, in which 48% of the population is classified as obese (Chong et al., 2019).

Numerous studies have established that eating out was positively associated with being overweight and obesity (Bezerra & Sichieri, 2009; Cao et al., 2014). This may be because the ingredients used to make the food in eateries and restaurants are higher in calories than self-cooked meals at home (Hua et al., 2021). Eating-out is a common phenomenon in Malaysia, and the changing lifestyle among urbanites has encouraged greater numbers of the urban population to eat out for their meals (Ali & Abdullah, 2017). It was observed that eating out for working individuals usually occurs on working days while families usually eat out during the weekends. Also, the current trend and practice among university students is to eat out for most of their meals due to the convenience and nature of their student accommodations' living conditions (Llanaj et al., 2018). As can be seen, eating out or consuming meals

prepared by restaurants and outside eateries is a factor tied to the occurrence and prevalence of obesity and overweight statuses among the general population.

One of the many strategies proposed to help consumers to choose healthier options (e.g. low calorie foods) when eating out is to provide menu labelling. Menu labeling refers to “calories and/or other nutritional information (eg. sodium, fat, and carbohydrate) as well as daily calorie intake recommendations posted on the menus or menu boards.” The purpose of menu labeling is to inform consumers regarding healthier food choices when eating out or eating away from home (Finkelstein et al., 2011). Menu labeling is known as a recognized intervention tool among a wide array of efforts employed by government policymakers and health professionals alike that has the capability to reduce rates of obesity and its comorbidities (Radwan et al., 2017).

Menu labeling policies have been implemented in various countries including the United States of America (USA) under the Patient Protection and Affordable Care Act of 2010, which required certain types of foodservice operations to post calorie information on their menus and drive-through signs (Bollinger et al., 2011). The United Kingdom (UK) also enacted a similar law in 2018 that required large businesses with more than 250 employees to display calorie information on their menus and customers’ point of purchase, which includes physical and online menus alike. Also, a province wide mandatory menu-labeling legislation was enacted in Canada under the Ontario Healthy Menu Choices Act in Canada (Scourboutakos et al., 2019). However, it should be noted that in the countries that implemented mandatory menu labeling policies, not all were successful in reducing the total calories ordered by consumers, and there were mixed findings. For instance, it was found that calorie menu labeling at a Starbucks branch reduced the total food calories ordered by

customers (Bollinger et al., 2011), but there was no significant difference in total calories ordered on restaurant customers when presented with calorie labeled menus (Ellison et al., 2014). Thus, further research needed especially in the country who plans to implement menu labeling policies such as Malaysia.

In Malaysia ,there is currently no menu labeling policies implemented. The only policy related to food labeling that is currently implemented in Malaysia is the mandatory display of calorie and nutrition information on packaged food, under the Food Regulations 1985 Act (Ministry of Health Malaysia, 1985). However, based on the Nutrition Action Plan 2016-2025, “the Malaysian Government plans to enact a nationwide menu labeling law that will require certain foodservice operations to provide menu labeling to their consumers by the year 2025” (Ministry of Health, 2016).

There are numerous forms of menu labelling used in other countries such as the Health Star Rating (HSR) labeled menu (Niven et al., 2019), calorie labels ordered from low to high calories (Rank-Ordered Calories) (Liu et al., 2012a), and the equivalent physical activity duration required to burn off the calories found in that menu item (Platkin et al., 2014). In Malaysia, the most commonly used menu labelling format is the calorie information format. In this format, calorie information is posted on the menus with or without the recommended nutrient intake (RNI) and estimated daily calorie requirement for adults and children. This menu labelling format is voluntarily provided at major fast food restaurant outlets such as Kentucky Fried Chicken (KFC) and McDonald’s. For McDonald’s, the calorie and nutrient information is provided on pamphlets, food wrappers, tray placemats, and on the official restaurant website (Azlina et al., 2011).

In this study, the term menu labeling refers to the ‘provision of the number of calories per menu item, and the recommended calorie intake for an adult in Malaysia. This study aims to examine the influence of menu labeling on the total amount of calories ordered among Malaysian private university students in Klang Valley.

1.2 Problem Statement

According to the 2019 National Health and Morbidity Survey, there is an obesity epidemic in Malaysia in which it was found that “half of the adult population were reported to be either overweight (30.4%) or obese (19.7%).” Obesity is also regarded as a risk factor for non-communicable diseases (NCDs) like type 2 diabetes, cardiovascular diseases, and several cancers such as breast, large intestine, pancreas and kidney cancers in medical literature. Alarming, compared with normal-weight individuals, obesity can drastically increase the risks of type 2 diabetes by sevenfold in men and 12-fold in women (Wilding, 2014).

This can prove to be a main concern as the occurrence of obesity is linked to the high frequency of eating out by consumers (Bezerra & Sichieri, 2009; Cao et al., 2014). This issue may be further amplified as an article by Fournier et al. (2016) showed that the high frequency of foods consumed outside of home by the urban population in Malaysia is believed to be rated as “one of the highest in the world with Malaysians that dine out encompassing 86.8% of the population, compared to 13.2% who only cook and dine at home.” Even though the lockdown has greatly reduced the occurrence of Malaysians dining out, the reopening of the Malaysian economy due to a successful vaccination campaign will definitely lead to an increase in the occurrence of dining in restaurants by Malaysians, with restaurant owners expecting a return to 50 to 60

percent of pre-pandemic sales level by the end of the year 2021 (The Straits Times, 2021).

One of the strategies to help food service consumers to make more health conscious choices (selecting lower calorie foods) when eating out is by implementing menu labeling policies. Menu labeling is defined as “the provision of calorie and/or nutrition information (e.g., sodium, fat, and carbohydrate) or daily calorie intake recommendations on the menu or menu boards with the intention to inform consumers on healthier food choices when eating out.” (Finkelstein et al., 2011) It was found that the implementation of menu labeling policies in other countries has a positive influence on the individual's food choices when eating out. These individuals tend to select lower-calorie options when menu labeling is present (Roberto et al., 2010). Also, it is reported that after mandating menu labeling law in California, USA in 2008, it was found that the obesity rates witnessed a significant drop (Craig et al., 2020).

However, a menu labeling study conducted in Ontario, Canada, provided mixed findings as the average calories in the food products offered on menus increased after menu labeling legislation were in effect (Scourboutakos et al., 2019). There have also been studies in USA that found that calorie menu labelling alone was not an effective way to reduce calories purchased or consumed as there was no significant difference in the calories ordered between the group that ordered from a calorie labelled menu and a non-calorie labelled menu (Berry et al., 2019; Swartz et al., 2011). Thus, it can be said that the findings, in general, are inconclusive as certain studies found that menu labeling influences consumer behaviors such as purchased calories, ordered calories, and calories consumed, whereas some studies do not.

The inconclusive findings of previous findings might be due to the studies not taking into consideration that each individual has different caloric needs according to their BMR. Also, at the time of ordering calories, participants may have different levels of physical activities, thus resulting in them requiring different amounts of calories. For example, the average calorie intake for a sedentary Malaysian female is 1610 kcal / day as per the recommended nutrient intakes for Malaysia (RNI), whereas a physically active female with physical activity levels (PAL) of 1.6 would result in her requiring 2000 kcal/day. Therefore, to ensure greater credibility of the results obtained, the proposed study will examine the influence of menu labeling on calories ordered by considering individual caloric needs.

Furthermore, no known studies have been conducted in Malaysia on the influence of menu labeling; consumers' food choices or calories ordered. Currently, no menu labelling policy has been implemented in Malaysia. There are only a few major fast-food restaurants which voluntarily offer menu labelling to their customers. To the best of the researchers' knowledge, there is no study on the prevalence of the use of menu labelling in Malaysia. The available studies in Malaysia mostly examined customers' intentions to use menu labelling in food service if it is available. For example, a study by Delvarani et al. (2013) done on a sample of the adult population in Klang Valley found that "attitude, subjective norms, and perceived behavioural control was significantly associated with the intention to use menu labelling." Also, another study by Azlina et al. (2011) found that fast food consumers positively perceived icon-based menu labels which were reportedly easier to understand.

Given that the Malaysian Government intends to enact a nationwide menu labelling law by the year 2025 (Ministry of Health, 2016), it is extremely important to examine the influence of menu labeling. Evidently, an insufficient amount of research was done

on the influence of calorie menu labeling and recommended calorie intake of an individual shown on the menu on the total calories ordered by the participants in Malaysia. Therefore, to fill this gap, the proposed study will investigate the influence of calorie menu labelling on Malaysians, specifically young adults (university students).

An extensive literature review suggested that there are a considerable number of studies conducted on the effect of menu labeling on the total calories ordered by university students. However, these studies are mostly conducted in the western and/or developed countries in which menu labeling policies have already been implemented (Liu et al., 2012; Platkin et al. 2014; Roberto et al., 2010; Roseman et al., 2017). There is scant research related to the influence of menu labelling in Malaysia, especially among university students. Therefore, to fill this gap this study will examine the influence of menu labeling on Malaysian university' students food choices (ordered calorie).

1.3 Research Questions

1. Do calorie labelled menus influence Malaysian university students in Klang Valley to order lower calorie meals than their needs as compared to non-calorie labelled menus?
2. Do sociodemographic factors, BMI, physical activity level, health consciousness, and attitude towards menu labeling influence Malaysian university students in Klang Valley to order lower calorie meals than their needs from calorie labelled menus as compared to those who ordered using non-calorie labelled menus?

1.4 Significance of the Study

The aim of this study is to determine the effects of socio-demographic characteristics and perceived health consciousness on the difference in total calories ordered and total calorie needs among Malaysian university students in Klang Valley that were exposed to calorie labelled menus and non-calorie labelled menus. The findings could fill the research gaps highlighted in the problem statement and contribute to the existing body of knowledge regarding the association between menu labeling and calories ordered. In addition, this study can generate new knowledge on the effectiveness of menu labeling among university students. The findings of this study can be used as the baseline data for future research in Malaysia, especially due to the fact that the menu labelling policy is expected to be implemented in Malaysia by the year 2025. In terms of practicality, the study findings could enable health professionals and food operators to gain a deeper understanding and obtain insightful information on the influence of menu labeling among Malaysian university students, and how best to utilize it for their business operations by choosing to put low calorie or high calorie options on their menu after taking into account university students' preferred choice. Lastly, this study can provide insight into whether menu labeling might be useful to be a nutrition intervention program in Malaysia, especially for university students.

1.5 Objectives

1.5.1 General Objective

To investigate the relationship between socio-demographic characteristics, respondent characteristics, BMI, health consciousness, and attitude towards menu labeling with the total calories ordered among Malaysian private university

students in Klang Valley that were exposed to calorie labelled menus and non-calorie labelled menus.

1.5.2 Specific Objectives

1. To determine the socio-demographic characteristics (age, gender, ethnicity, household income level), respondent characteristics (frequency of eating out, frequency of using labeled menu), BMI, health consciousness, and attitude towards menu labeling among Malaysian private university students in Klang Valley.
2. To compare the difference in means between socio-demographic factors (gender, ethnicity, household income level) on the total calories ordered among Malaysian private university students in Klang Valley that were exposed to calorie labelled menus only.
3. To examine the associations between socio-demographic characteristics (age), BMI, health consciousness, and attitude towards menu labeling on the total calories ordered among Malaysian private university students in Klang Valley that were exposed to calorie labelled menus only.
4. To compare the difference in total calories ordered and total calorie needs by Malaysian private university students between those that were exposed to a calorie labelled menu and a non-calorie labelled menu (control).

1.6 Alternative Hypotheses

1. There are significant associations between sociodemographic factors, BMI, health consciousness, and attitude towards menu labeling among Malaysian private university students in Klang Valley that were exposed to calorie labelled menus.

2. There is a significance difference in total calories ordered and total calorie needs by Malaysian private university students between those that were exposed to a calorie labelled menu and a non-calorie labelled menu (control).

1.7 Conceptual Framework

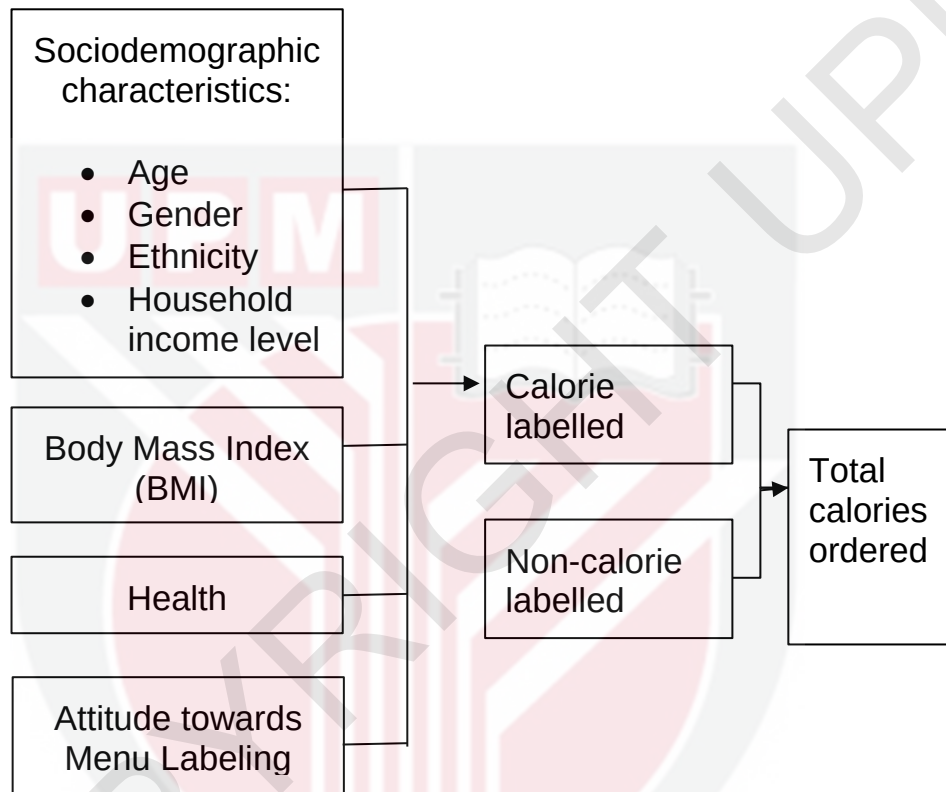


Figure 1.0 Conceptual framework

The conceptual framework shows the relationship of sociodemographic characteristics, body mass index (BMI), health consciousness, and attitude towards menu labeling among private university students, and the difference in total calories ordered between the study participants that were presented with a calorie labeled menu, and those that were not. Sociodemographic characteristics, body mass index (BMI), health consciousness, and attitude towards menu labeling are independent variables of this study, whereas the dependent variable is the difference in total calories ordered between the study participants that were presented with a calorie labeled menu, and those that were not. This study also assessed if there was a significant association between all of the independent variables with study participants that were presented with a calorie labeled menu only.

CHAPTER 2

LITERATURE REVIEW

2.1 Overview of Menu Labelling

For years, people have relied on nutritional information on packaged foods and beverages. Nutritional information in restaurants, on the other hand, was rarely made public, except for a few global food corporations such as McDonald's and Kentucky Fried Chicken. McDonald's, for example, started to label their menu with calories information in September 2012 (Petimar et al., 2019). Menu labelling refers to the act of providing calorie information on a menu whereas menu labelling is defined as a listing of nutritional information such as calories for menu items in restaurants or retail food outlets, according to the United States Food and Drug Administration (FDA).

The FDA amended the Food and Drug Administration Act in 2010, requiring chain restaurants and similar retail food establishments to post calorie information on menus and menu boards for all standard menu items, disclose calorie information on signs adjacent to foods on display and self-service foods that are standard menu items, include a succinct statement concerning suggested daily caloric intake, and make written nutrition information available (U. S. Food and Drug Administration, 2019).

Only a few countries, however, have taken the initiative to make menu labelling a legal requirement in restaurants. In May 2018, the United States became the first country to pass a mandatory national menu labelling rule, requiring restaurant chains with 20 or more locations in the US to include calorie information on their menus, in accordance with the Patient Protection and Affordable Care Act (Food and Drug Administration, HHS, 2016). While in South Korea, calorie and nutrient information are required to be provided for children's meals under the Special Act on Safety

Management of Children's Dietary Life to control the high intake of calories and sodium typically associated in the typical Korean diet(Ahn et al., 2015). Aside from that, other countries such as Australia, Canada, and the United Arab Emirates have also implemented the menu labelling policy, ranging from national, state, provincial or territorial levels (Rincón-Gallardo et al., 2020).

In Malaysia, the government intends to make menu labelling mandatory. Initially, the implementation was only gazetted for fast food restaurants, with other food service chains opting in freely (MOH, 2016). The strategy has now been incorporated in the National Plan of Action for Nutrition 2016-2025, which will develop rules and mandate the display of nutrition information on menus in food outlets by 2025. As can be seen, Malaysia is in the process of implementing a menu labelling regulation. However, more research is essential to determine consumer readiness as well as the impact of menu labelling among Malaysians.

As some nations have established or are in the process of establishing menu labelling policies, customers' willingness and readiness to use menu labelling must be assessed. Consumers have shown a great interest in obtaining nutrition information, particularly calorie information, according to a research evaluation on consumer behaviour from 2008 to 2012 (Krieger & Saelens, 2013). According to a phone study conducted by Bleich & Pollack in 2010, over 68 percent of Americans supported the government mandating that chain restaurants publish calorie information on menus at the point of purchase. In Malaysia, there have been few studies examining consumers' willingness to utilise menu labelling. In a study published in 2020 by Rahamat & Arendt, more than 60% of people said they noticed menu labelling, but just 33.6 percent said they used it while making food purchases.

According to a study conducted at cafeterias at University Malaysia Terengganu (UMT), where 85.8% of the participants were between the ages of 18 and 24, 43.9 percent strongly agree and 45.8% agree that nutrition menu labelling is beneficial to them. Furthermore, 45.8% of participants strongly think that having menu labels in cafeterias is beneficial (Marina et al., 2020). To summarise, Malaysians are enthusiastic about the use of menu labelling. However, more research is needed to see if the discrepancy between total calories ordered and total calories required is influenced by menu labelling.

2.2 Socio-demographic Factors

2.2.1 Age

When it comes to the use of menu labelling, there has been a mixed bag of results when it comes to the age aspect. Older adults and adults with a positive opinion of diet quality were significant predictors of food label use for both men and women, according to a study involving 1,382 participants aged 19 to 70 (Stran & Knol, 2013). Satia et al. (2005), published similar findings, showing that older individuals were more likely to read nutrition labels. However, a study was conducted in a fast-food chain restaurants to see if the use of calorie labelling had an impact on adult, teen, and child purchases. It was discovered that calorie labelling at this chain restaurants was not linked to changes in food purchases in any of the age groups. It was also discovered that while calorie labelling improved the anticipated probability of seeing calorie information, it had no effect on the estimation of calories consumed (Petimar et al., 2019). As a result, there has been a mixed finding in terms of the effect of age on menu labelling usage, and this study will look at the effect of age on the difference in total

calories ordered and total calories needed, as well as whether menu labelling usage had an impact.

2.2.2 Gender

For the gender aspect, the majority of studies in this field of research have revealed that females are more likely and eager to employ menu labelling. Women were more supportive of having nutritional information on a menu and healthier alternatives than males (Heathcote & Baic, 2011). This statement is also supported by a study conducted in Brazil where it was concluded that women make healthier food choices when they eat out (Bezerra & Sichieri, 2009). Similarly, in 2018, Krešić et al. reported that compared to males, females were more interested in nutrition label information and food energy content, and food label information affected their food choices more. Women were also found to read food labels more frequently than men. Men, on the other hand, were more confident in their abilities to grasp nutritional information provided on menus, according to the same survey. In addition, according to another study, women check and use food label components more frequently and extensively than males. (Stran & Knol, 2013) and that women choose lower calorie meals and lower priced meals when calorie information was provided than when it was not, while on the other hand men's selections were unaffected (Gerend, 2009). However, it's worth noting that using menu labelling to reduce calories has been linked to binge eating in women (Larson et al., 2018). In addition, one study found that when menu labels were present, women were more likely to consume fewer calories (Sinclair et al., 2014). As a result, when comparing the difference in total calories ordered and total calories needed, it can be determined that women were more influenced by the existence of menu labelling than men. As a result, the goal of this study is to look into

the impact of sex on menu labelling and how it affects the gap between total calories ordered and total calories needed.

2.2.3 Ethnicity

When it comes to the impact of ethnicity on menu labelling and, as a result, the calories ordered, the results are equivocal. In a study of 3132 Washington residents, Whites were more likely to use calorie information (Chen et al., 2015). In sit-down restaurants, however, Blacks and Hispanics utilise menu labels more than Whites, although Whites see and use menu labels more in other settings, according to another study (Feng & Fox, 2018) in which is similar with the findings of a study among 100,141 adults where the prevalence of menu labelling use is higher in participants who is non-White (Lee-Kwan et al., 2016). Mexican-Americans and other Hispanic communities are more likely than non-Hispanic white men to check and use food labels (Stran & Knol, 2013). To the best of our knowledge, there are only a few studies in Malaysia that assess the ethnicity component in the presence of menu labelling in order to assess the difference between total calories ordered and total calories required. Only one study found that Malays were 2.47 times more likely to read food labels than Chinese, Indians were 1.59 times more likely, and other Bumiputras were 1.45 times more likely (Ambak et al., 2014). As a result, the goal of this research is to learn more about the influence of menu labelling on the disparity between total calories ordered and total calorie needs among Malaysian ethnic groups.

2.3 Health consciousness

Health consciousness is defined as a school of thought that disposes consumers to engage in behaviours that improve or maintain their health (Kraft & Goodell, 1993; Wardle & Steptoe, 2003). There is also plenty of evidence that health consciousness

is a significant driver of healthy eating, since those who are health conscious are more likely to follow dietary recommendations (Thorogood et al., 1990).

This is in keeping with research findings that demonstrate that health consciousness has a significant favourable effect on the intention to consume healthy foods, resulting in a considerable positive effect on healthy food consumption among Malaysian young adults (Al Mamun et al., 2020).

This is advantageous since people who are more worried about their health are more likely to use tools like menu labelling to aid them in their decision-making process when selecting meal selections (Arendt et al., 2018). This is corroborated by an article in which respondents were given the Physical Activity Calorie Equivalent (PACE) label, and it was discovered that the PACE label was ineffective in reducing discretionary snack food consumption among less health-conscious persons. However, this study had a small sample size of 97 individuals, and the majority of the participants were female (35 percent men and 65 percent female), which could have influenced the results. Historically, women have been found to be more health focused than males.

However, other studies have found an adverse association between health consciousness and menu labelling usage. According to a study conducted in Oklahoma, calorie labels at restaurants have a greater impact on consumers with lower degrees of health consciousness than on customers with higher levels of health consciousness. However, they discovered that adding traffic light indicators to the calorie information reduced the quantity of calories ordered even among the health-conscious customers (Ellison et al., 2013). As a result, the goal of this research is to

determine the influence of health consciousness on the difference between total calories ordered and total calories required.

2.4 Attitude towards menu labeling

Attitude is defined as “the degree to which a person has a favourable or unfavourable evaluation or appraisal of the behaviour in question” (Ajzen, 1991). Attitudes are said to arise from a set of behaviour beliefs which in turn produce certain behaviours or outcomes, hence, people would usually follow a behaviour if they tend to have a positive attitude towards it and vice versa. Similarly, a consumer's intention to read the menu label depends on his or her attitude towards it. It is typical that attitude towards menu labeling is generally positive as evidenced by multiple studies conducted on university students in Malaysia (Delvarani et al., 2013), and in other countries (Kim et al., 2018, Roseman et al., 2021). A study also found that college students who were overweight or were recreational athletes had a greater positive attitude toward menu labeling than normal weight students. Henceforth, this study employs attitude as a key construct of interest in identifying an association between attitude toward menu labeling and the total calories ordered.

2.5 Difference in Total Calories Ordered and Calorie Needs

Several studies have found that when people are given calorie information, they order fewer calories (Green et al., 2015; Gustafson & Zeballos, 2020; Roberto et al., 2010). However, the individual calorie requirements of the subjects were not taken into account in these research. As a result, unlike other studies that only look at total calories ordered as the dependent variable, this study will look at the difference between total calories ordered and calorie needs. This is because every human has

different calorie needs, and it would be biased to just look at total calories ordered because those with higher calorie needs will order more calories from the menu than those with lower calorie needs.

In this study, the sociodemographic factors (age, gender & ethnicity) and the health consciousness of the participants will be evaluated to determine the effect of it on the difference between total calories ordered and total calorie needs for each participant, when exposed to calorie labelled menus and non-calorie labelled menus.

To obtain the calorie needs of the participant, the Mifflin St Jeor Formula was used, in which it required the participants' age, sex, weight, and height to get the basal metabolic rate (BMR). Next, the BMR was multiplied with the physical activity level of the participants, to obtain the total calorie needs.

Nonetheless, limited studies have investigated the effect of sociodemographic factors and health consciousness on the difference in total calories ordered and calorie needs when exposed to calorie labelled menus and non-calorie labelled menus. Hence, this study aims to fill in the aforementioned research gap.

CHAPTER 3

METHODOLOGY

3.1 Study Design

This was a quasi-experimental study aimed to determine the influence of sociodemographic factors, perceived health consciousness, and attitude towards menu labeling on the difference in total calories ordered and total calorie needs among Malaysian private university students in Klang Valley that were exposed to calorie labelled menus and non-calorie labelled menus.

3.2 Study Location

This study was conducted among private universities in the Klang Valley area. Klang Valley has a rough population of 8 million (Department of Statistics Malaysia, 2020) and is located centre in the federal territories of Kuala Lumpur and Putrajaya, with a few cities and towns in the state of Selangor as well. A total of ten randomly selected private universities was included in this study. Due to ethical requirements, the identifiers which include the universities names were not revealed in this study.

3.3 Sample Size Determination

The sample size was calculated using G*Power software v3.1. (Faul et al., 2009)

Table 3.3 Calculation of sample size

	No calorie menu labeling	With calorie menu labeling + nutrition information
Mean	734.91	827.87
Standard deviation	243.07	243.11

Effect size, d

$$= 92.96 \div 243$$

$$= 0.38$$

Total SS = 174 (Wisdom et al., 2010)

Assuming 10% non-response rate, $174 \div 0.9 = 194$ total respondents.

Hence, a total of minimum 194 participants are required in this study.

3.4 Subjects

Table 3.4 Inclusion and exclusion criteria for the selection of participants

Inclusion Criteria	Exclusion Criteria
a. At least 18 years old	a. International students
b. Malaysians	b. Diagnosed with diet related NCDs
c. Undergraduate	c. Pregnant or lactating women
d. Literate individuals	d. Under strict dietary restriction due to chronic disease or surgery
	e. Severely handicapped or with a physical disability

Sampling Design

The study employed a simple random sampling method to randomly select the universities of the participants of this survey. All universities that were selected are located in the Klang Valley area in Selangor, Malaysia. In total, there were 10 private universities partaking in this study (refer to Figure 3.5). The reason up to 10 universities were included is so that the researchers are able to obtain as many respondents as possible after taking into consideration the typical low rate of responses when surveys are distributed online. As long as the selection criteria were met, all university students from the participating universities were invited to participate in this study via the snowball sampling method.

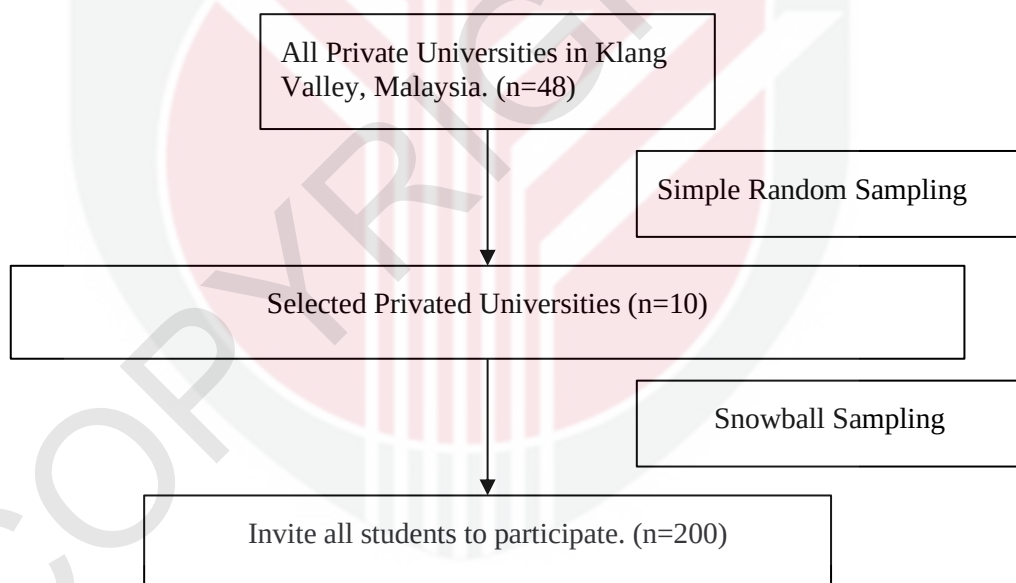


Figure 3.5 Sampling design

3.5 Research Tools/Instruments

Self-administered questionnaire

All instruments that were used in this study were included in the self-administered questionnaire. The self-administered questionnaire consisted of information on sociodemographic factors (age, gender, and ethnicity), respondent factors (frequency of eating out, frequency of using labeled menu, and hunger scale), calorie or non-calorie labeled menu, BMI, lifestyle factors (physical activity status), level of health consciousness, and attitude towards menu labeling. All the items in the questionnaire were adapted from previous studies (Ahmad et al., 2018; Mamun et al., 2020). The languages used in these questionnaires were both English and Bahasa Malaysia for the menus, but only in English for the questionnaire.

3.6.1 Sociodemographic factors

Sociodemographic factors such as age, gender, and ethnicity were self-reported by the respondents. There were three questions and the sociodemographic section was the first part of the questionnaire, after the survey participants' consent is accepted.

3.6.2 Body mass index (BMI)

The height and weight in centimeters and kilograms respectively were self-reported by the respondents in the questionnaire. Then, using the information obtained, the researchers calculated the respective respondent's body mass index (BMI) reading using the formula: $BMI = kg/m^2$.

3.6.3 Physical Activity Level

Physical activity level (PAL) for the last seven days is assessed using The International Physical Activity Questionnaire-Short Form (IPAQ-SF). The Metabolic Equivalent of Task (MET) of walking is 3.3, moderate activity is 4.0, and vigorous activity is 8.0. MET minutes a week (MET-min/week) is calculated using the equation: MET level x minutes of activity x events per week. Finally, the individual can be categorised by MET-minutes/week according to official guideline criteria as follows:

Category	Criteria
1 - Low PAL 1.0-1.39	Those individuals who do not meet the criteria for Categories 2 or 3 are considered to have a 'low' physical activity level
2 - Moderate PAL 1.4-1.89	Any one of the following 3 criteria: a) 3 or more days of vigorous-intensity activity of at least 20 min per day b) 5 or more days of moderate-intensity activity and/or walking of at least 30 min per day c) 5 or more days of any combination of walking, moderate-intensity or vigorous-intensity activities achieving a minimum Total physical activity of at least 600 MET-minutes/week.
3 - High PAL 1.9-2.49	Any one of the following 2 criteria: a) vigorous-intensity activity on at least 3 days achieving a minimum Total physical activity of at least 1500 MET-minutes/week b) 7 or more days of any combination of walking, moderate-intensity or vigorous-intensity activities achieving a minimum Total physical activity of at least 3000 MET-minutes/week.

Table 3.6 : Physical activity level (PAL) status scoring categories.

The reliability of IPAQ was satisfactory, by which Cronbach's alpha coefficient was 0.91 (Badicu et al., 2020). IPAQ-SF is valid and has been used in a recent study in Malaysia (Ahmad et al., 2018). Each IPAQ category of classification is given a Physical Activity Levels (PAL) range (Ohkawara et al., 2011) so that it can be used as a multiplying factor with an individual's basal metabolic rate, which would be calculated by using the Mifflin St Jeor formula, to determine the individual's total energy expenditure.

The formula of calculation is as follows:

Resting Metabolic Rate (RMR): Mifflin St Jeor Formula

Men: $(10 \times \text{weight in kg}) + (6.25 \times \text{height in cm}) - (5 \times \text{age in years}) + 5$

Women: $(10 \times \text{weight in kg}) + (6.25 \times \text{height in cm}) - (5 \times \text{age in years}) - 161$.

Total Energy Expenditure (TEE) = RMR x PAL

3.6.4 Hunger Scale

Only one item with a Likert scale from 1 to 7 (1=not hungry at all; 7 =extremely hungry) was collected as a respondent variable. This method of assessing the study participant's hunger level was utilized in numerous studies as well (Peggy et al., 2012; Reale et al., 2016).

3.6.5 Health consciousness

Health consciousness is defined as the perceived importance of health in an individual's daily life routines. It reflects the individual's willingness to adopt a healthy routine, food, and lifestyle. The health consciousness questionnaire which consists of 6 items, has a Cronbach alpha score of 0.89, and was used in a recent study in a local setting (Mamun et al., 2020). All question items were assessed using a 7-point Likert scale, ranging from 1 for 'strongly disagree' to 7 for 'strongly agree'.

3.6.6 Attitude Towards Menu Labeling

The questionnaire consisted of seven items using the seven-point Likert type scale which assesses the attitude towards the presence of calorie information posted at full-service restaurants with adjectives ranging from 1 to 7 (eg. harmful–beneficial; bad–good; worthless–useful), and the attitude towards the act of using menu labeling with adjective scales of harmful–beneficial; difficult–easy; worthless–useful; and inconvenient–convenient. This questionnaire has a Cronbach's alpha score of 0.79, and was used in a previous study (Roseman et al., 2021) among college students.

3.6.7 The Difference in Total Calories Ordered and Total Calorie Needs

The difference in total calories ordered and total calorie needs can be calculated by first calculating the individual energy needs using the Harris Benedict equation to determine the study participant's basic metabolic requirements (BMR) which is then multiplied with physical activity level (PAL). From there, the total calories ordered by the study participant was compared with 30.5% of their calculated individual energy

needs which is the median amount of calories ordered for lunch by Malaysians (Zalilah et al., 2008).

Equation to determine the difference in total calories ordered and total calorie needs:

Participant's estimated caloric needs for lunch - (minus) the total calories ordered by the participant = Total Calories Ordered

Positive value indicated as less calories were ordered as compared to individual needs. Likewise, negative value indicated more calories were ordered as compared to individual needs.

3.7 Pre-Testing

Prior to the study, pre-testing was conducted at the end of December 2021. This is to test the understanding of respondents towards the questionnaire prepared. In this pre-testing, 10 undergraduate students from UPM were selected based on similar characteristics with the sample of interest (Roseman et al., 2017). These respondents were not included in the actual data collection. The clarity, understanding and time taken to complete the questionnaire were assessed. The questionnaire was then further be improved based on problems and feedback from the pre-testing respondents to improve the study instrument for the actual data collection.

3.8 Data Collection

For this research, an online self-administered questionnaire was used to collect data. Data collection was conducted for 2 months. The questionnaire was put into an online survey tool called Google forms. The methods of distribution used to reach our target group, which consists of Malaysian private university students, included distributing

the questionnaires via online messaging platforms like Telegram and WhatsApp messenger. The method employed is known as the snowballing method whereby study participants were asked to identify other potential study participants. The questionnaire was shared in the form of a Google form link and was limited to one response per email to prevent duplicate responses. The participants were randomly assigned to either: (1) no calorie labeling, (2) calorie labeling menus. The Google form included information that informed our respondents about the purpose of this study, obtained consent from our respondents, and explained the process of ordering food from the provided menu. After that, the respondents' data was collected when they answered the self-administered questionnaire online. As soon as each google form reached the minimum of 100 respondents, the Google form was closed. The tabulation of data was obtained in the results section of the Google form.

3.9 Study Flowchart

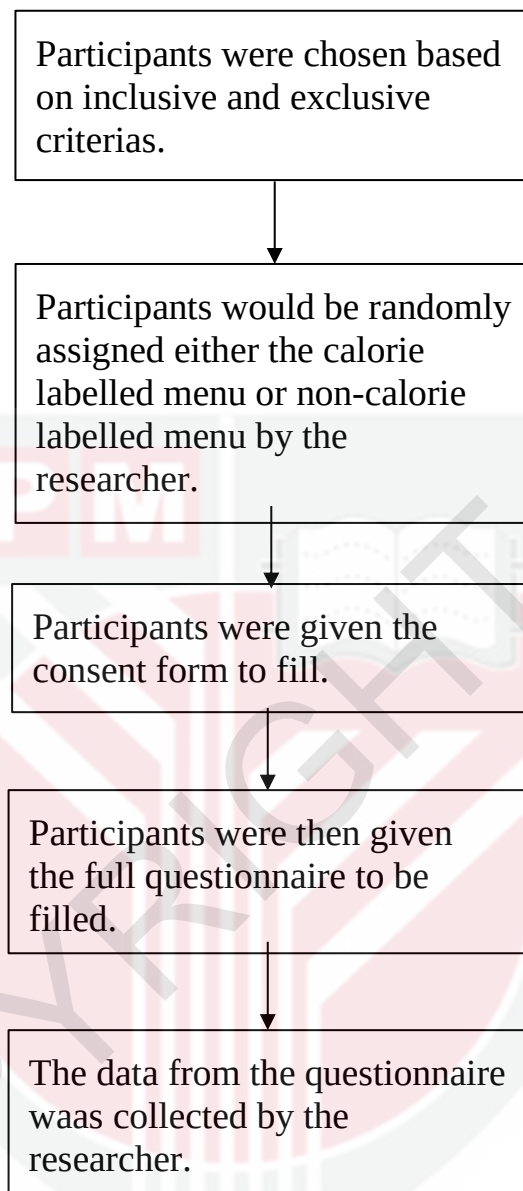


Figure 3.9 : Flow of study procedures

For this study, the study participants were first chosen based on the inclusive and exclusive selection criterias. Then, selected participants were assigned either a calorie labelled menu or non-calorie labelled menu by the researcher. Next, after filling in the consent form, participants will be given the full questionnaire to be filled. Lastly, the data from the questionnaire was collected by the researcher.

3.10 Ethics Approval

The ethical approval from *Jawatankuasa Etika Untuk Penyelidikan Melibatkan Manusia* (JKEUPM), Universiti Putra Malaysia, Serdang was obtained before the study was conducted.

3.11 Operational Definition

1. Menu labeling: Menu with amount of calories per item, and the recommended calorie intake for an adult in Malaysia.
2. Total calories ordered: Participants total calorie ordered based on the menu provided to them (with or without calories information).
3. Total calorie needs: Participants' individual calorie needs based on BMR (weight, height and age) and physical activity level.
4. Difference in total calories ordered and total calorie needs: Amount of calories ordered by the participants based on the menu minus with participants' individual calorie needs.

3.12 Data analysis

Upon obtaining the data from the Google form responses excel sheet, the data was cleaned by removing the outliers and invalid data entries that did not fulfill the inclusion criteria and data that is incomplete to prevent obtaining inaccurate results.

The IBM SPSS Statistics version 26 was used to quantitatively analyze the data. The normality of each independent variable was checked using the Shapiro–Wilk test so that the tests used later in inferential statistics could be determined. Analysis on descriptive data was carried out using univariate analysis. Finding on the categorical variables was presented in frequency and percentage, while the result for continuous

variables presented as means and standard deviations. With the significance level set at $p < 0.05$, the following tests were run. Pearson correlation test was used to measure the correlation between an individual's BMI, health consciousness, attitude towards menu labeling, age, and total calories ordered whereas One Way ANOVA test and t-test were used to determine the correlation between sociodemographic factors, such as gender and ethnicity, and the total calories ordered. The independent t-test was used to compare the difference in means between control and the intervention participants.

CHAPTER 4

RESULTS AND DISCUSSION

4.0 Background

This chapter presented the results and discussion of the study that aims to determine the associations between socio-demographic characteristics, physical activity level, health consciousness, and attitude towards menu labeling on the difference in total calories ordered and total calorie needs among Malaysian private university students in Klang Valley that were exposed to calorie labelled menus. The difference in total calories ordered and total calorie needs by Malaysian private university students between those that were exposed to a calorie labelled menu and a non calorie labelled menu (control) was also assessed.

4.1 Socio-demographic Factors

There were 200 subjects that successfully completed all of the data required in this study. The details of socio-demographic of the respondents were presented in Table 4.1. The age range of the respondents were from 18 to 29 years old with a mean of 21.78 ± 1.60 years. There were slightly more female respondents of 116 people (58%) than males (42%) with only 84 respondents. For the respondents' BMI, most of them had normal weight (61.5%), while the respondents with underweight, overweight, and obese BMI were 20.5%, 13.0%, and 5.0% respectively. Next, the majority of the participants were Chinese which recorded 65%, followed by Malay and Indian with percentages of 19.5% and 9.0%, respectively. This study also involved a few with Bumiputera ethnicities (4%) and other ethnicities (2.5%). In terms of household income level, the number of B40 and M40 study participants were somewhat similar, with percentages of 41.5% and 40.5%, respectively. And the T20 classified participants occupied 18% of the study.

4.2 Physical Activity Level

As shown in Table 4.2, the mean and SD of the physical activity level of respondents were 1.6 ± 0.15 , clearly indicating that the majority of respondents were minimally active with a PAL level of 1.6. Based on the data obtained, 27 respondents were inactive with a PAL level of 1.4 (27.3%), 47 respondents were minimally active with a PAL level of 1.6 (47.5%), and 25 were active with a PAL level of 1.8 (25.3%).

4.3 Health Consciousness and Attitude Towards Menu Labeling

Table 4.1 shows the level of health consciousness and attitude towards menu labeling of the respondents. The mean score for level of health consciousness was above average at 4.84 out of 7. This result indicated that the respondents' level of health consciousness was quite high. The mean score for attitude towards menu labeling was also high at 5.72 out of 7. This result indicated that the respondents' attitudes towards menu labeling was favorable. This finding was similar to other studies that found that Malaysian consumers typically had positive attitude towards menu labeling (Delvarani et al., 2013).

4.4 Frequency of Eating Out Per Week and the Frequency of Using Menu Labeling

Table 4.1 shows the frequency of eating out per week and the frequency of using menu labeling of all respondents (N = 200). The mean score frequency of eating out per week was, on average, about 4 days out of 7. The mean score for the frequency of using menu labeling when eating out was relatively low at 2.18 out of 4. This result indicates that the respondents' rarely used menu labeling when eating out.

Table 4.1: Socio-demographic characteristics, BMI, physical activity level, health consciousness, attitude towards menu labeling, frequency of eating out per week, and frequency of using menu labeling of all respondents (n=200), and respondents given the calorie labeled menu only (subjects) (n=99).

Variables	Subjects (N=99)		All Respondents (N=200)	
	n (%)	Mean $\pm$ SD	n (%)	Mean $\pm$ SD
Age (years)		21.40 $\pm$ 1.55		21.78 $\pm$ 1.6
Gender				
Male	48 (48.5)		84 (42.0)	
Female	51 (51.5)		116 (58.0)	
BMI		21.25 $\pm$ 4.22		21.61 $\pm$ 4.14
Underweight	25 (25.3)		41 (20.5)	
Normal weight	55 (55.6)		123 (61.5)	
Overweight	15 (15.2)		26 (13.0)	
Obese	4 (4.0)		10 (5.0)	

Ethnicity

Malay	18(18.2)	39 (19.5)
Chinese	66 (66.7)	130 (65.0)
Indian	12 (12.1)	18 (9.0)
Bumiputera Sabah/Sarawak	2 (2.0)	8 (4.0)
Others	1 (1.0)	5 (2.5)

Household income (RM)

B40	39 (39.4)	83 (41.5)
M40	41 (41.4)	81 (40.5)
T20	19 (19.2)	36 (18.0)

IPAQ level

1.6 ± 0.15

Inactive (1.4 PAL)

27 (27.3)

(<600 MET minutes per week)

Minimally Active (1.6 PAL)

47 (47.5)

(600-2999 MET minutes per week)

Active (1.8 PAL) 25 (25.3)

(≥ 3000 MET minutes per week)

Health Consciousness 4.84 $\pm$ 1.07

Attitude Towards Menu Labeling 5.72 $\pm$ 1.13

Frequency of eating out per week (days) 4.045 $\pm$ 2.09

Frequency of using menu labeling 2.1800 $\pm$ 1.02

Never (1) 63 (31.5)

Rarely (2) 64 (32.0)

Sometimes (3) 47 (23.5)

Often (4) 26 (13.0)

4.5 Hypothesis testing

a) **There is no significant association between gender and the difference in total calories ordered and total calorie needs.**

As can be seen in Table 4.12, there was no significant association between gender and the difference in total calories ordered and total calorie needs. However, numerous studies in the past have proved that women were more likely to consume fewer calories when menu labels were present (Krieger et al., 2013; Roseman et al., 2017; Sinclair et al., 2014), while the men's menu selections were unaffected when presented with a labeled menu (Gerend, 2009). A potential reason as to why no significant association was found between gender and total calories ordered, was possibly due to our method of study which adjusted for the individual caloric needs when calculating the participant's total calories ordered, as opposed to the majority of other studies that do not (Rahamat et al., 2022).

Table 4.2: Correlation between gender with the difference in total calories ordered and total calorie needs among intervention subjects (calorie menu labeled) (n = 99).

Total calories ordered						
Variables	n	Mean	SD	t	df	p-value
Male	48	35.15	302.01	0.679	97	*0.499
Female	51	72.42	242.55			

*Independent-samples t test

b) There is a significant association between ethnicity and the difference in total calories ordered and total calorie needs.

As can be seen in Table 4.12, a one-way ANOVA test was run with the ethnicity of respondents as the independent variable and total calories ordered as the dependent variable. Results indicated that there was a significant association between ethnicity and the difference in total calories ordered and total calorie needs ($F(2,93) = 7.725$, $p = 0.001$). The Tukey post hoc test revealed that the difference in total calories ordered and total calorie needs of Indians ($M = 316.22$, $SD = 276.88$) were significantly higher than that of Chinese ($M = 33.04$, $SD = 254.72$; $p = 0.002$) and Malays ($M = -39.44$, $SD = 245.71$; $p = 0.001$). This means that the Indian respondents ordered much less calories than their lunch caloric requirement when presented with a calorie labeled menu. So far, no study on the total calories ordered between the ethnic groups in Malaysia was conducted, and the studies that assessed menu labeling use by Malaysians were few and far between. A study from the US however, showed that non-Hispanic and other ethnic groups of adults, which included Asians, Hawaiian, and Native American, overall had the highest prevalence of using menu labeling, but no consistent patterns by race/ethnicity were found across states (Lee-Kwan et al., 2014). Another study conducted in the US also found that there were nonsignificant decreases in the calories purchased for Black Americans who indicated that calorie labels mattered to them, but overall, there were no significant differences between the other ethnic groups in the study. For the most part, a large majority of studies indicated that ethnicity and total calories ordered upon calorie menu labeling intervention is not significant (Elbel et al., 2009).

Our significant findings may be due to the unequal distribution of ethnicity among the recruited respondents with 66% being Chinese. This is the typical unequal distribution of ethnicity commonly found in private universities whereby Chinese and Indian ethnic groups generally outnumber the Malays which was a possible reason to explain our findings.

Table 4.3: Association between ethnicity with the difference in total calories ordered and total calorie needs among intervention subjects (calorie menu labeled) (n = 99).

Variables	Chinese		Indian		Malay		F (2,93)	p
	Mean	SD	Mean	SD	Mean	SD		
Total calories ordered	33.04	254.72	316.22	276.88	-39.44	245.71	7.725	.001

c) There is no significant association between household income level and the difference in total calories ordered and total calorie needs.

As can be seen in Table 4.12, a one-way ANOVA test was run with the household income level of respondents as the independent variable and the difference in total calories ordered and total calorie needs. as the dependent variable. The results indicated that there was no significant association between household income level and the difference in total calories ordered and total calorie needs. A study by Glanz et al., (1998) reported that taste is the most important influence on their food choices, followed by cost. This may be a reason as to why there were no significant differences

between the food ordered by respondents of different income groups. However, a study by Long et al., (2015) discovered that individuals coming from high socioeconomic status (SES) were more likely to benefit from the use of menu labeling by having less calories purchased or consumed, than those from low income backgrounds. Another study also claimed that high income members of society were associated with more reported use of menu labels (Fernandes et al., 2016).

A possible explanation for our findings may be because there was no price listed for each menu item like various other studies (Liu et al., 2012), so the participants were not limited to ordering menu items within their spending power which may explain why household income level was not significant. Furthermore, other factors such as taste or convenience were also found to be able to supersede the importance of price and nutrition (Pratt et al., 2016).

Table 4.4: Household income level and the difference in total calories ordered and total calorie needs among subjects (n = 99).

	B40		M40		T20		F(2,96) p	
	Mean	SD	Mean	SD	Mean	SD		
Total calories ordered	43.90	277.67	62.81	285.41	57.55	243.53	0.049	.952

d) There is no significant association between age and the difference in total calories ordered and total calorie needs.

Based on Table 4.8, there was no significant association between age and the difference in total calories ordered and total calorie needs ($r = 0.031$, $p=0.758$). This finding was in line with numerous studies which found that there was no significant association between age and the total calories ordered or purchased by subjects (Liu et al., 2012; Sinclair et al., 2014). It was reasoned that a possible explanation for our findings was due to our study having all of our participants as young adult university students with a generally similar age range (18 to 29 years old).

e) There is no significant association between BMI and the difference in total calories ordered and total calorie needs.

Based on Table 4.8, there was no significant association between BMI and the difference in total calories ordered and total calorie needs ($r = 0.143$, $p=0.157$). This did not differ from the norm as most studies have shown that there was no significant associations between BMI and the total calories ordered given menu labeling ($p=.11$) (Liu et al., 2012; Platkin et al., 2014). However, in an online workplace lunch ordering website, it was found that only obese consumers ($BMI >30$) ordered significantly fewer calories when exposed to numeric calorie menu labeling ($p<.05$), overweight and normal weight consumers' ordered calories were not significant (VanEpps et al., 2016). However, it should be noted that the study by VanEpps et al. (2016) that showed significant associations (for obese individuals only) involved participants that were affluent, well-educated, and worked in a healthcare company which may explain their findings. Whereas, our study involved university students from diverse income

and academic backgrounds, who may not use or know how to use calorie menu labeling (Krukowski et al. 2006).

Table 4.5: Correlation between age and body mass index (BMI) with the total calories ordered among intervention subjects (calorie menu labeled) (n = 99).

Variables	Total Calories Ordered	
	r	p-value
Age	0.031	0.758
Body Mass Index (BMI)	0.143	0.157

**Pearson Correlation test is significant at $p < 0.01$

*Pearson Correlation test is significant at $p < 0.05$

4.5.2 The correlation between health consciousness and attitude towards menu labeling and the difference in total calories ordered and total calorie needs.

- a) There is a significant correlation between health consciousness and the difference in total calories ordered and total calorie needs.

Based on Table 4.11, there was a medium positive correlation between health consciousness and the difference in total calories ordered and total calorie needs ($r = 0.332$, $p < 0.001$). This indicated that the higher the level of health consciousness, the higher the difference in total calories ordered and total calorie needs. A study by Rahamat et al., (2022) conducted on consumers in a restaurant found that when calorie menu labeling was present, health-conscious consumers were positively influenced to use menu labeling, which led to them purchasing less calories. This finding was also

aligned with the study conducted by Mamun et al. (2020) on Malaysian young adults whereby it was proven that health consciousness had a significant favorable effect on the intention to consume healthy foods, which were lower in calories. However, these findings may also be due to the slightly higher number of female respondents which were generally more health conscious than males (Akhondan et al., 2015; Botchway et. al, 2015). Both the studies that proved this claim also involved university students as the study respondents. Furthermore, it is known that health-conscious consumers typically practiced healthy behaviors, such as selecting healthy food, controlling their calorie intake as well as reading nutrition labels (Ellison et al., 2013). This fact was also similar with Mai and Hoffmann (2012) which found that health-conscious consumers made their food choices based on health-related features (e.g., fat content and nutrition labeling).

b) There is no significant correlation between attitude towards menu labeling and the difference in total calories ordered and total calorie needs.

A Pearson correlation was run and it determined that there was no significant correlation between the difference in total calories ordered and total calorie needs between attitude towards menu labeling and the difference in total calories ordered and total calorie needs ($r = 0.189$, $p = 0.059$). Many studies conducted on university students and consumers alike found that Malaysians typically have a fairly positive attitude towards menu labeling (Delvarani et al. 2013). Other studies done by Kim et al. (2018) and Roseman et al. (2021) in South Korea and the United States respectively also proved that consumers' attitudes towards menu labeling is fairly positive. But, no studies in Malaysia investigated whether there was a positive correlation between the attitude towards menu labeling and the total calories ordered by the study participants.

which are similar to our current findings, and a study done on college students in the United States by Stran et al. (2016) also yielded a fairly similar result of ($M = 5.89$, $SD = 0.97$). Even though this study's finding contradicted that of Abdelaziz et al., (2019) whereby it was discovered that there was a positive impact of attitude and customer buying intention of a nutrition labeled item in a restaurant setting, it may be because some university students, even with a positive attitude towards menu labeling, are less willing to select healthier food options when presented with menu labeling without other tools such as nutritional education, the presence of social norms, and nudges (Castellari et al., 2018).

Table 4.6: Correlation between health consciousness and attitude towards menu labeling with the total calories ordered among intervention subjects (calorie menu labeled) ($n = 99$).

Variables	Total Calories Ordered	
	r	p-value
Health consciousness	0.332	0.001**
Attitude towards menu labeling	0.189	0.059

**Pearson Correlation test is significant at $p < 0.01$

*Pearson Correlation test is significant at $p < 0.05$

4.5.3 The comparison between the difference in total calories ordered and total calorie needs between those that were exposed to a calorie labeled menu (subject) and a non calorie labeled menu (control).

- a) There is no significant difference between the difference in total calories ordered and total calorie needs between those that were exposed to a calorie labeled menu (subject) and a non calorie labeled menu (control).**

An independent t-test was carried out to compare the mean difference in total calories ordered and total calorie needs between those that were exposed to a calorie labeled menu (subject) and a non calorie labeled menu (control) and it determined that there was no significant difference between those that were exposed to a calorie labeled menu (54.35 ± 272.23) and a non calorie labeled menu (15.73 ± 233.12), ($t(1.078) = 198, p = 0.282$).

The term ‘total calories ordered’ was operationally defined as the difference between the individual’s caloric needs and total ordered meal calories. For this study, the estimated individuals’ lunch calorie intake was subtracted by the total calories ordered by an individual during a meal. Therefore, the higher the value of ‘total calories ordered’, the lower the calories ordered by an individual according to his estimated needs which meant that calorie menu labeling may have played an essential role in reducing the total calories ordered by the individual.

This finding was in line with a study done among university students in Italy whereby students were not necessarily more willing to change their food selections to healthier options when presented with menu labeling (Castellari et al., 2018). Studies by Sinclair et al. (2014) and Ellison et al. (2014) also claimed that menu labeling with calories alone did not have the intended effect of decreasing calories selected ($p=0.35$) and that

there was no significant difference in total calories ordered on restaurant customers when presented with calorie labeled menus respectively.

However, there were also some studies that reported results dissimilar to the findings obtained. For example, a study conducted on college students in the United States found that college students ordered significantly less calories with calorie information posted on the menus (Stran et al., 2016). Consumers in the United States that had access to calorie menu labeling were also found to order modestly reduced (statistically significant) calories in menu selections (Crockett et al., 2018; Sturm et al., 2018; Restrepo et al., 2018). Furthermore, a study conducted in a university dining hall indicated that the introduction of food labels resulted in a small but significant reduction of the mean total kcals purchased per week ($p < 0.001$) from the labeled foods (Cioffi et al., 2015).

To explain the above findings and literature, it must be said that even though the findings from this study were not significantly different, the total calories ordered among the subjects that received a calorie labeled menu were lower. Some possible reasons include the fact that this study took into account individual caloric needs, while others only calculated the total calories ordered and assumed that all participants had the same caloric needs (Rahamat et al., 2022). Besides, this may be due to menu labeling not commonly found in Malaysia except for fast food restaurants (KFC Corporation, n.d.; McDonald's Corporation, n.d.). Also, it should be highlighted that the frequency of using menu labeling by participants of this survey was found to be 'rarely' even when it is available (2.18 ± 1.02) at the dining places they go to, and menu labeling if not used, was found to be ineffective at influencing the total calories ordered as the consumers would not make informed healthy choices (Cantu-Jungles et al.,

2017). Even so university students were found to be less willing to select healthier food options when presented with menu labeling without other tools such as nutritional education, social norm provision and nudges (Castellari et al., 2018). Regardless, the intervention of menu labeling still brought up some positives as a study by Kim and Ham (2016) claimed that a restaurant may gain a more positive brand image leading to customers' trust and loyalty, if it takes customer perceived proactive steps in resolving the obesity epidemic.

Table 4.7: The type of menu received by subjects (n=200), and the total calories ordered.

Total calories ordered						
Variables	n	Mean	SD	t	df	p-value
Calorie labeled menu	99	54.35	272.23	1.078	198	*0.282
Non calorie labeled menu	101	15.73	233.12			

CHAPTER 5

CONCLUSION, LIMITATIONS AND RECOMMENDATIONS

5.1 Conclusion

To summarize, this study involved Malaysian private university students of which most of them were Chinese (65%), had normal BMI (61.5%), came from household income levels backgrounds of B40 (41.5%) and M40 (40.5%), and were found to be minimally active (47.5%), had a good attitude towards menu labeling 5.72 ± 1.13 , and had above average levels of health consciousness 4.84 ± 1.07 .

The study showed that there was a significant association between ethnicity and the difference in total calories ordered and total calorie needs ($p=0.001$). However, this may be due to the unbalanced ethnicity of our study participants. No significant association was found between the other sociodemographic factors which were gender and household income level.

Next, it was found that there was a significant association between the level of health consciousness and the difference in total calories ordered and total calorie needs ($p=0.00$). However, the association of attitude towards menu labeling and total calories ordered was found to be non-significant. Lastly, even though the study found that the total calories ordered among the subjects that received a calorie labeled menu were lower, the findings were not significantly different.

In conclusion, further studies need to be done to get a better assessment of the potential influence of calorie menu labeling among Malaysian private university students, and the factors associated with influencing the total calories ordered after calorie menu labeling intervention.

5.2 Limitations

There were some limitations of the study. Firstly, unequal distribution of ethnicity among the recruited respondents was reported which gave an unbalanced representation of each ethnic group. Another limitation of this study was that the data were collected self-reported through a Google form and not in an actual cafeteria setting. Thus, overestimating or underestimating the total calories ordered might happen due to the manner this study was conducted. Also, only total calories ordered were measured but total calories consumed were not. Next, for our survey, the method we used to assess our study participants' spending power was "household income level", when we should have asked for their monthly allowance or pocket money instead. Furthermore, as we also assessed their frequency of eating out, we should have first asked them whether they are currently residing in their university residential college or not, as they may assume that eating at their college's cafe may be considered as eating from home instead of eating out. Lastly, the absence of large scale implementation of menu labeling in Malaysia may have affected the results as study participants were not familiar with menu labeling.

5.3 Strengths

Firstly, this research provided new information to local studies to determine the association between sociodemographic characteristics, BMI, physical activity level, health consciousness, and attitude towards menu labeling with the difference in total calories ordered and total calorie needs in Malaysia. Also, the total calories ordered by participants in this study was compared to their relative individual calorie needs, which is a feature not many studies had as most of the other studies only measured the impact of menu labeling based on the total calories purchased or consumed. Lastly, this study also promoted the body of knowledge for future research and helped healthcare professionals and government health institutions in planning for nutrition intervention strategies as well as nutrition focused health policies as it provided new information regarding the effect of calorie menu labeling on the difference in total calories ordered and total calorie needs.

5.4 Recommendations

In terms of future recommendations, to improve the study, researchers could include other meals of the day such as breakfast, evening snack, and dinner to obtain total daily energy intake to learn more in depth regarding the effect of calorie menu labeling and its association with the independent variables measured in the study. Moreover, future studies can also be conducted in person with the researcher explaining in detail the steps needed to take in this study to improve the accuracy of the results obtained in this study. Also, future study should be conducted at a location with balanced ethnicity or recruit more respondents from other ethnicities to get a more balanced representation from various ethnic groups. Next, researchers could include a price factor with a budget for the participant to spend on, assess the participants' monthly allowance instead, and inform them that having a meal at their residential college is considered eating out to ensure greater accuracy of the total calories ordered by the participants. Finally, more health promotion and nutrition education programs focusing to improve the awareness regarding the use of calorie menu labeling and nutritional labeling so that university students would be able to make better more health focused choices when eating out or ordering from a calorie labeled menu.

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APPENDICES

APPENDIX A: APPROVAL LETTER FROM JKEUPM

Ref. no: UPM/TNCPI/RMC/JKEUPM/1.4.18.2 (JKEUPM)

Date: 11 January 2022

Dear Prof./Dr./Mr./Ms.,

APPLICATION FOR JKEUPM ETHICAL CLEARANCE: APPROVED

With reference to the above, I am pleased to inform you that your application for ethical

clearance for the research project entitled 'Influence of menu labelling on the calories ordered

among Malaysian university students in Klang Valley' has been approved.

Please note that the official letter of approval will be issued as soon as possible. However, the

ethical clearance is considered effective from the date of this email, and you may now proceed with your research.

Kindly remind the ethical approval is required in the case of amendments/ changes to the study documents/ study sites/ study team.

Researchers should also complete a Study Final Report upon study completion.

The form can be obtained from the Ethics Committee for Research Involving Human Subjects (JKEUPM) website (<http://www.tncpi.upm.edu.my/faildokumen>).

If you have any enquiries, please contact 03-97691602/1244

Note: Please use this reference number for any transaction:- JKEUPM-2021-824

Thank you.

Yours faithfully,

Prof. Dr. Zamberi Sekawi

Chair

APPENDIX B: RESPONDENT'S INFORMATION SHEET AND CONSENT FORM (ENGLISH VERSION)

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: Intention to use menu labelling among private-sector workers with overweight or obesity or non-communicable diseases in, Malaysia

2. INTRODUCTION: To promote a healthier food choice among foodservice consumers, Malaysian Government plans to implement a menu planning policy by the year 2025. Menu labelling is calorie and other nutrition information posted on menus and menu boards. This study aims to examine the intentions to use menu labelling. Data collection will be conducted through an online questionnaire using a Google Form. Only respondents who fulfil the criteria of the study can participate. Data from these studies will be used by the investigator for academic purposes such as Bachelor Dissertation, conference proceedings, and journal articles.

3. WHAT WILL YOU HAVE TO DO?

If you agree to participate, you will be asked to complete an electronic questionnaire. The questionnaire consists of three sections: screening questions, socio-demographic, and menu labeling. You will be screened through the screening questions. You will continue the following part if you fulfill all the criteria for this study. In the socio-demographic information section, questions such as gender, age, ethnicity, education level, occupation, and range monthly household income will be asked. There are 26 questions related to menu labeling. Your participation will take approximately 10 – 15 minutes.

4. WHO SHOULD NOT PARTICIPATE IN THE STUDY?

You should NOT participate in this study if you are: (a) under 18 years old, (b) a non-Malaysian, (c) a healthcare worker, (d) a student, (e) a non-private sector workers, (f) normal weight and not having non-communicable diseases.

5. WHAT WILL BE THE BENEFITS OF THE STUDY:

(a) TO YOU AS THE SUBJECT?

If you decide to participate in this study, there will be no direct benefit to you.

(b) **TO THE INVESTIGATOR?**

It is hoped that the information gained in this study will help the policy makers to have a

better understanding of consumer behaviour in promoting health eating.

Researchers plan to use information from this study for scholarly activities, such as research conference proceedings and journal articles.

Information collected, including your response during this study, may be shared with other researchers or used for future research studies. We will not obtain additional informed consent from you before sharing the de-identified data.

6. WHAT ARE THE POSSIBLE RISKS?

There are no foreseeable discomforts or risks to the participants from taking part in this study.

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

Your participation will be anonymous. It is possible that other people and offices responsible for making sure research is done safely will review your response. This includes the auditing department of Universiti Putra Malaysia, and *Jawatankuasa Etika Universiti Putra Malaysia* (JKEUPM) – a committee that reviews and approves human subject research studies may inspect and/or copy study records for quality assurance and data analysis.

8. EXPECTED DURATION FOR PARTICIPATION

Your participation will last approximately 10 – 15 minutes.

9. YOUR RIGHTS AS A PARTICIPANT

Participating in this study is completely voluntary. You may choose not to take part in this study or to stop participating at any time, for any reason, without penalty or negative consequences.

10. ADDITIONAL QUESTIONS DURING THE COURSE OF THE RESEARCH?

If you have any questions during the course of the research, please contact Ng Peng Han (student), Faculty Medicine and Health Science, 010-2108193, 204698@student.upm.edu.my; Dr. Syafiqah Binti Rahamat (senior lecturer/research supervisor), Faculty Medicine and Health Science, 03-97692465, syafiqahrahatat@upm.edu.my.

YOUR CONSENT

By answering "Yes" to the next question, you are agreeing to participate in this study. Make sure you understand what the study involves before you agree. If you have questions about the study you could contact us via email: 19631@student.upm.edu.my OR syafiqahraamat@upm.edu.my.

I certify that I am **18 years old or over and agree** to participate in this research study.

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 (online 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.

Signature
(Respondent)

Signature
(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 C: RESPONDENT'S INFORMATION SHEET AND CONSENT FORM (MALAY VERSION)

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



BORANG 2.4: PENERANGAN DAN PERSETUJUAN RESPONDEN

Sila baca maklumat berikut dengan teliti. Sekiranya anda mempunyai sebarang pertanyaan, sila kemukakan kepada penyelidik.

1.TAJUK KAJIAN: Pengaruh pelabelan menu terhadap kalori yang dipesan dalam kalangan pelajar universiti Malaysia di Lembah Klang.

2. PENGENALAN: Kajian ini merupakan sebuah kajian kuasi-eksperimen untuk menentukan kesan ciri sosiodemografi dan persepsi kesihatan terhadap perbezaan antara jumlah kalori yang dipesan dan jumlah keperluan kalori dalam kalangan pelajar universiti Malaysia di Lembah Klang yang terdedah kepada menu berlabel kalori dan menu tidak berlabel kalori.

3. APAKAH YANG PERLU ANDA LAKUKAN?

Anda dikehendaki menjawab soal selidik yang mengandungi soalan berkaitan dengan jantina, umur, berat badan, ketinggian, etnik, tahap aktiviti fizikal dan kesedaran kesihatan anda. Kemudian, anda akan diminta untuk memilih makanan pilihan anda daripada menu yang disediakan. Durasi untuk menjawab soal selidik adalah dalam 15 minit.

4. SIAPA YANG TIDAK BOLEH MENYERTAI KAJIAN INI?

Anda disarankan untuk tidak menyertai kajian ini jika memenuhi mana-mana kriteria berikut:

1. Pelajar antarabangsa.
2. Didiagnosis dengan penyakit tidak berjangkit (*noncommunicable disease*) berkaitan diet.
3. Wanita hamil atau menyusui.
4. Sedang menjalani sekatan pemakanan yang ketat atas sebab penyakit kronik atau pembedahan.
5. Cacat atau merupakan seorang yang kurang upaya dari aspek fizikal.

5. APAKAH FAEDAH MENYERTAI KAJIAN INI?

(a) KEPADA ANDA SEBAGAI PESERTA?

Jika anda mengambil bahagian dalam kajian ini, tiada faedah langsung akan diberi kepada anda

(b) KEPADA PENYELIDIK?

Dapat mengisi kekosongan penyelidikan dan menyumbang kepada badan ilmu

saintifik.

6. ADAKAH IA BERISIKO?

Anda tidak akan menghadapi sebarang risiko ketika menyertai penyelidikan ini.

7. ADAKAH MAKLUMAT DAN IDENTITI SAYA KEKAL RAHSIA?

Maklumat dan identiti anda akan dirahsiakan dan hanya akan digunakan untuk tujuan pendidikan. Tetapi maklum balas anda bagi kajian ini mungkin akan dilihat oleh beberapa penyelidik serta jabatan yang bertanggungjawab dalam memastikan kajian dijalankan dengan selamat. Contoh jabatan adalah *Jawatankuasa Etika Universiti Putra Malaysia* (JKEUPM), Universiti Putra Malaysia yang akan menilai dan meluluskan kajian berkaitan manusia dengan cara memeriksa dan/atau mengambil salinan rekod kajian untuk tujuan jaminan kualiti dan analisis data.

8. SIAPA YANG SAYA PERLU HUBUNGI SEKIRANYA SAYA MEMPUNYAI SOALAN TAMBAHAN SEMASA MENGIKUTI PENYELIDIKAN INI?

Untuk sebarang pertanyaan mengenai penyelidikan ini, sila hubungi penyelidik bersama, Ng Peng Han (0102108193), Nurin Adlyn binti Ahmad Rosli (0194946814) atau penyelidik utama, Dr. Syafiqah Rahamat (0397692465). Sila ambil maklum bahawa penyelidik hanya menjalankan tugas sebagai penyelidik dan bukan sebagai perunding kesihatan.

Sila tandatangan di sini sekiranya anda telah membaca dan memahami kandungan halaman ini _____

9. PERSETUJUAN

Saya..... No Kad Pengenalan.
beralamat.....
.....dengan ini bersetuju untuk mengambil bahagian secara
sukarela dalam penyelidikan yang tersebut di atas *(soal selidik).

Saya telah diberi penjelasan secara menyeluruh mengenai penyelidikan ini dari segi metodologi, risiko dan komplikasi (seperti tertulis pada Helaian Penerangan Responden). Saya memahami bahawa saya berhak menarik diri dari penyelidikan ini pada bila-bila masa tanpa memberi sebarang alasan. Saya juga memahami bahawa sebarang maklumat yang berkaitan identiti saya akan dirahsiakan.

Saya* berminat / tidak berminat untuk mengetahui keputusan kajian yang melibatkan saya.

Saya setuju/tidak bersetuju untuk imei/gambar/rakaman video/ rakaman suara digunakan dalam apa jua bentuk penerbitan atau pembentangan. (sekiranya berkaitan).

*potong yang tidak berkenaan

Tandatangan Tandatangan
(Responden) (Saksi)

Tarikh :..... Nama :.....

No. K/P:

Saya mengesahkan bahawa saya telah menerangkan kepada responden ini sifat dan tujuan penyelidikan yang tersebut di atas.

Tarikh Tandatangan
(Penyelidik)

APPENDIX D: QUESTIONNAIRE

CONFIDENTIAL*/ *SULIT

Reference

Number

--	--	--



QUESTIONNAIRE BORANG SOAL SELIDIK

**Influence of menu labeling on the calories ordered among
Malaysian private university students in klang valley and its associated
factors.**

***Pengaruh pelabelan menu atas kalori yang ditempah di kalangan pelajar
universiti swasta Malaysia di lembah klang dan faktor-faktor yang
berkaitan.***

Supervisor/Pemantau: DR. SYAFIQAH BINTI RAHAMAT

Researcher/Penyelidik: NG PENG HAN

Part A:

Instructions: Fill in the blanks or tick (✓) in the space provided.

	Information	Answer
1.	Gender	[] Male [] Female
2.	Age	_____ years
3.	Ethnicity	[] Malay [] Chinese [] Indian [] Others: _____
4.	Monthly household income group / Kumpulan pendapatan isi rumah bulanan	[] B40 (Less than RM2500 - RM4849) / B40 (Kurang daripada RM2500 - RM4849) [] M40 (RM4850 - RM10959) / M40 (RM4850 - RM10959) [] T20 (RM10960 - More than RM15039) / T20 (RM10960 - Lebih daripada RM15039)

5.	Current body weight (kg) / Berat badan semasa (kg)	___ kg
6.	Current body height (m) / Ketinggian badan semasa (m)	___ m
7.	How often do you eat outside in a week?	☐ once a week ☐ 2 times a week ☐ 3 times a week ☐ 4 times a week ☐ 5 times a week ☐ 6 times a week ☐ 7 times a week
8.	Whenever you eat outside, how often do you use calorie information shown on the menu (if provided)?	☐ Often / Kerap ☐ Sometimes / Kadang-kadang ☐ Rarely / Jarang ☐ Never / Tidak pernah

9.	Currently, on a scale of 1-7, how hungry are you?	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 (1=NOT HUNGRY AT ALL; 7 =EXTREMELY HUNGRY)
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Part B:

Instructions: Please select a lunch meal for yourself according to the menu given.

MENU (LUNCH) | MENU (MAKANAN TENGAH HARI)

Energy requirements for moderately active adults in a day:
Male: 2240 kcal
Female: 1840 kcal

Keperluan tenaga orang dewasa yang sederhana aktif dalam sehari:
Lelaki: 2240 kcal
Perempuan: 1840 kcal

RICE | NASI

White rice | Nasi putih

	2 level scoops 2 senduk rata 150 kcal
	3 level scoops 3 senduk rata 225 kcal
	4 level scoops 4 senduk rata 300 kcal
	5 level scoops 5 senduk rata 375 kcal

National Coordinating Committee on Food and Nutrition (2017). Recommended nutrient intakes for Malaysia. A report of the technical working group on National guidelines. Ministry of Health Malaysia.

MENU (LUNCH) | MENU (MAKANAN TENGAH HARI)

SIDE DISH | LAUK

	Omelette Telur dadar 1 whole 1 biji 136 kcal
	Egg tofu soup Sup tofu telur 4 pieces 4 keping 136 kcal
	Stir fried mixed vegetables Sayur campur goreng 1/2 cup 1/2 cawan 39 kcal
	Traditional Malaysian salad Ulam 1 cup 1 cawan 4 kcal
	Cabbage cooked in coconut gravy Sayur kobis masak lemak 1/2 cup 1/2 cawan 60 kcal

Shahar, S., Sali, H. S., Maraf, Z. A., Haron, H. (2015). Atlas of food exchanges & portion sizes. (3rd ed.). MDC Publishers Sdn Bhd.

MENU (LUNCH) | MENU (MAKANAN TENGAH HARI)

SIDE DISH | LAUK



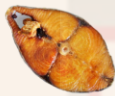
Fried chicken | Ayam goreng
1 large piece (drumstick) | 1 ketul besar ('drumstick')
436 kcal



Chicken curry | Kari ayam
1 piece + 4 tablespoon gravy | 1 ketul + 4 sudu besar kuah
263 kcal



Catfish fried in chili | Ikan keli goreng berlada
1 whole | 1 ekor
227 kcal



Fried Spanish mackerel | Ikan tenggiri goreng
1 piece | 1 keping
177 kcal



Black pepper beef | Daging masak lada hitam
3 pieces (matchbox size) | 3 ketul (saiz kotak mancis)
207 kcal

Shafar, S., Sali, N., & Manaf, Z. A., Haron, H. (2015). Atlas of food exchanges & portion sizes. (3rd ed.). MDC Publishers Sdn Bhd.

Ministry of Health Malaysia. (2016). Senarai kalori bagi makanan dan minuman. http://nutrition.moh.gov.my/wp-content/uploads/2016/02/0405_SenaraiKaloriMakananDanMinuman.pdf

MENU (LUNCH) | MENU (MAKANAN TENGAH HARI)

BEVERAGES | MINUMAN



Water | Air kosong
250 ml | 250 ml
0 kcal



Tea with condensed milk | Teh tarik
200 ml | 200 ml
130 kcal



Iced coffee | Kopi ais
300 ml | 300 ml
160 kcal



Iced tea | Teh O ais
250 ml | 250 ml
80 kcal

NutritionUKM. (2016). Kewil kalori english (brochure). Ministry of Health Malaysia.

Part C:

IPAQ Short Form Questionnaire

The questions will ask you about the time you spent being physically active in the last 7 days. Please answer each question even if you do not consider yourself to be an active person.

Think about all the vigorous activities that you did in the last 7 days. Vigorous physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

1. During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling?

_____ days per week

[] No vigorous physical activities → Skip to question 3

2. How much time did you usually spend doing vigorous physical activities on one of those days?

_____ hours per day

_____ minutes per day

[] Don't know / Not sure

Think about all the moderate activities that you did in the last 7 days. Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

3. During the last 7 days, on how many days did you do moderate physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

_____ days per week

[] No moderate physical activities → Skip to question 5

4. How much time did you usually spend doing moderate physical activities on one of those days?

_____ hours per day

_____ minutes per day

[] Don't know / Not sure

Think about the time you spent walking in the last 7 days. The includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure.

5. During the last 7 days, on how many days did you walk for at least 10 minutes at a time?

_____ days per week

[] No walking → Skip to question 7

6. How much time did you usually spend walking on one of those days?

_____ hours per day

_____ minutes per day

[] Don't know / Not sure

The last question is about the time you spent sitting on weekdays during the last 7 days. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

7. During the last 7 days, how much time did you spend sitting on a week day?

_____ hours per day

_____ minutes per day

[] Don't know / Not sure

Part D:

Health Conscious Questionnaire (HTC)

The following questions are to assess your level of health consciousness. Please select the higher number if you agree with the statement and vice versa. There are no right or wrong answers. All of your responses are confidential.

		Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
1.	I choose food carefully to ensure good health	1	2	3	4	5	6	7
2.	I consider myself a health-conscious consumer	1	2	3	4	5	6	7
3.	I often think about health-related issues.	1	2	3	4	5	6	7
4.	I am prepared to do anything that is	1	2	3	4	5	6	7

	good to health							
5.	I often dwell on my health.	1	2	3	4	5	6	7
6.	I think that I take health into account a lot in my life.	1	2	3	4	5	6	7

Part E:

Attitude Towards Menu Labeling (ATT)

The following questions are to assess your level of attitude towards menu labeling. Please choose the number that best indicates your feeling towards the statement.

1- Using posted calorie information to make a meal decision is...

	1	2	3	4	5	6	7	
Harmful								Beneficial
Difficult								Easy
Worthless								Useful
Inconvenient								Convenient

2- Having calorie information posted at full-service restaurants is...

	1	2	3	4	5	6	7	
Harmful								Beneficial

Bad								Good
Worthless								Useful

END OF QUESTIONNAIRE

THANK YOU FOR YOUR PARTICIPATION AND COOPERATION



APPENDIX E: ORIGINALITY REPORT

ORIGINALITY REPORT			
11%	11%	5%	8%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS
PRIMARY SOURCES			
1	lib.dr.iastate.edu Internet Source	3%	
2	scholarcommons.sc.edu Internet Source	3%	
3	Submitted to Universiti Putra Malaysia Student Paper	1%	
4	assets.researchsquare.com Internet Source	1%	
5	www.science.gov Internet Source	1%	
6	www.ANZCTR.org.au Internet Source	1%	
7	www.mdpi.com Internet Source	1%	
8	Submitted to University of Newcastle Student Paper	1%	
9	Submitted to Monash University Student Paper	1%	