UNIVERSITI PUTRA MALAYSIA

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By:

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

This project entitled “Digital food ordering and other factors that influence dietary intake among undergraduates in selected colleges in Universiti Putra Malaysia” was prepared by Husna Hanifah Syukri and submitted to the Faculty of Medicine and Health Sciences as a partial fulfilment of the requirement for the degree of Bachelor of Science (Dietetics) from the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia

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ABSTRACT

Digital food ordering and other factors that influence dietary intake among undergraduates in selected colleges in Universiti Putra Malaysia

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Introduction: The process of eating starts with the choices that were made before the act of eating itself. Nowadays, there several factors that may influence the choice thus the amount of food eaten in daily life and one of them is digital food ordering (DFO). Digital food ordering (DFO) is defined as a platform that allows restaurant businesses to accept and manage orders placed over the internet. Thus, this study is aimed to find if there are associations between DFO and other factors and dietary intake of individuals. The factors that were studied in this study socio-demography

Methods: A cross-sectional study was conducted among 123 undergraduates in selected colleges in the university The respondents need to complete an online survey comprised of 4 which includes socio-demographic, the size of food container used, digital food ordering and food frequency questionnaire which is all self-administered. The instruments include socio-demography, that includes sex, age, ethnicity, religion, current year of study and monthly pocket money and the size of food container used and portions of eaten food, and dietary intake using food frequency questionnaire (FFQ) and the intention on continue using DFO in the future. Pearson product-moment correlation test will be used to determine the relationship between two continuous variables while the Chi-square test will be used to determine the association between two categorical variables.

Results: There are no significant associations between all the factors studied in this study which is socio-demographic factors, the size of food containers and digital food ordering and dietary intake among the respondents in this study. p value for every variable in socio-demographic with dietary intake is .967, .897, .91, .962 and .502 respectively. P value for size of food container and dietary intake is .421, .086, .571, .171, .575 and .501. p value for digital food ordering with dietary intake is .827.

Conclusion: There is no significant association between digital food ordering, socio-demographic factors and size of food container with dietary intake. This is may be due to a couple of limitations in this study. This study did not take note the respondent's weight as when the FFQ is completed, the mean energy intake cannot be determined as under reported or not. In upcoming studies, FFQ is suggested to do a face-to-face interview as self-administered questionnaire will lead to the possibilities of under reporting. For future studies, instead of only finding the size of food containers, the portion sizes need to be determined to see if the container size really affects the dietary intake.

ABSTRAK

Pesan makanan digital dan factor lain yang mempengaruhi pengambilan diet dalam kalangan pelajar prasiswazah di kolej terpilih di Universiti Putra Malaysia

HUSNA BINTI HANIFAH SYUKRI

Introduction: Di bawah payung perkataan 'makan' ialah proses untuk memilih apa yang perlu dimakan. Pada zaman sekarang, terdapat banyak factor yang mempengaruhi proses memilih makanan ini dan salah satunya ialah pesan makanan digital. Pesan makanan digital bermaksud satu platform dimana kedai makan dan restoran boleh menerima pesanan makanan melalui Internet. Selain daripada pesan makanan digital, sosio – demografik pelajar dan saiz bekas makanan yang digunakan juga adalah beberapa faktor yang telah di kaji pada kajian-kajian sebelum ini yang dibuktikan terdapat perkaitan dengan pengambilan makanan. Justeru itu, kajian ini ingin mencari jika ada perkaitan diantara pesan makanan digital, sosio – demografik dan saiz bekas makanan dengan pengambilan diet pelajar prasiswazah di kolej terpilih di Universiti Putra Malaysia. Bagi, sosio – demografik, faktor – faktor nya ialah umur, jantina, etnik, agama, tahun pengajian dan duit poket bulanan. Pengambilan diet bagi kajian ini telah menggunakan instrumen Food Frequency Questionnaire (FFQ). Kajian ini adalah sebahagian daripada syarat bergraduasi bagi Bacelor Sains Dietetik daripada Jabatan Dietetik Fakulti Sains Kesihatan dan Perubatan, UPM dan perlu di sempurnakan dalam tempoh satu tahun pengajian.
Methods: Kajian keratan rentas telah dijalankan dan 123 pelajar telah mengambil Bahagian dalam kajian ini. Pengumpulan data telah dijalankan pada 5 buah kolej yang terpilih dan berjalan daripada bulan Mac higga Mei 2021. Pelajar diminta untuk melengkapkan kaji selidik dalam talian yang terdiri daripada 4 instrumen. Instrumen ini ialah sosio – demografik (umur, Jantina, Etnik, agama, Tahun pengajian dan duit poket bulanan), saiz bekas makanan dan niat untuk menggunakan kaedah pesan makanan digital dan FFQ. Kesemua instrumen ini adalah diisi sendiri oleh para pelajar. Uji kaji korelasi Pearson akan digunakan untuk mencari hubungan di antara dua pemboleh ubah berterusan manakala uji kaji Chi-square akan digunakan untuk menentukan hubungan diantara dua pemboleh ubah jenis kategori.
Results: Tiada perkaitan yang signifikan di antara semua factor yang dikaji dengan pengambilan diet bagi pelajar prasiswazah bagi kajian ini. Ini mungkin terjadi kerana beberapa kekurangan kajian ini. p value bagi setiap pemboleh ubah dalam sosio-demografi dengan pengambilan diet adalah .967, .897, .91, .962 and .502 respectively. P value bagi saiz bekas makanan dan oengambilan diet adalah .421, .086, .571, .171, .575 and .501. p value bagi pengunnan pesan makanan digital dan pengambilan diet adalah .827.
Conclusion: Tiada perkaitan yang signifikan di antara kaedah pesan makanan digital, sosio – demografik, saiz bekas makanan dan pengambilan diet dalam kajian ini. Kajian ini, tidak mengambil berat badan pelajar di mana ini menjadi masalah di mana kajian ini tidak dapat mengenal pasti jika purata tenaga yang dilaporkan adalah mencukupi bagi mereka atau tidak. Selain itu, kajian ini juga tidak mengambil berat porsi makanan yang diambil. Tanpa makluman ini, kajian ini tidak dapat mengetahui jika saiz bekas makanan mempengaruhi pengambilan makanan atau tidak. Akhir sekali, kaedah pesan makanan digital adalah satu cara baharu yang

baru saja mendapat sambutan hangat beberapa tahun lepas. Justeru itu, tiada lagi satu instrumen yang sah bagi mencari hubungan diantara kaedah pesan makanan digital dan jumlah pengambilan makanan. Kajian pada masa akan datang disarankan untuk tidak mengulangi kekurangan kajian ini kerana isu ini iaitu kaedah pesan makanan digital adalah satu isu yang sangat penting untuk dikaji perhubungannya dengan pengambilan makanan.

CHAPTER 1: INTRODUCTION

1.1 Background

The process of eating starts with the choices that were made before the act of eating itself. From where to get the food to the amount of food to consume, it is those choices that will determine the amount of food consumed. Number of food-related choices was miscalculated at the entire eating process, namely from the beginning until the end of eating (Wansink & SObal, 2007). Food related decisions is not similar to food consumption decisions. While the prior determine what to eat , the latter determine the amount to eat (Wansink, 2004). The Social Ecological Model affirm that causes occur in different degree that somehow will partly influence each other, with the outer layers typically consisting of social, cultural, policy, and physical environmental factors, and the inner layers consisting of personal and social network factors. (Calloway et al., 2019)

In this era of globalisation, the process of choosing can be done in the comfort of own houses as it can be done just by a single tap of the mobile phones. This is called as Digital Food Ordering (DFO). Digital Food Ordering (DFO) is a branch on online ordering, nowadays food is not only the things that we could ordered online, the ingredients used to cook the food, hence the cutlery and cookware can also purchase and if you ask for one day delivery, it can be delivered on the very same day you pay for your goods. Definition of digital food ordering is a platform that allows restaurant businesses to accept and manage orders placed over the internet. Grab Food, Food Panda and Lalamove are examples of the phone application used in Malaysia to order food online. DFO is only able to be used if smartphones are available and the Internet can be reached as the definition also specifically said that DFO is a means on ordering food over the internet.

A study conducted shows that 90% of its respondents, who are using smartphones frequently are at the age of 17-36 years old which is in the category of adults and young adults (Azam et al., 2011). Undergraduates are those in the age range who are studying for their first degree either in college or university according to Cambridge dictionary. This age range of subjects would be the best target as they can assess involvement of smartphones in determining food choices taken by these students. Other than food choices, another thing that should be aware of is exactly how much food that is consume in a daily basis. There are many factors that can influence food choice but this study is going to focus on the socio-demographic factors including age, gender, ethnicity, religion, year of study and monthly pocket money. Other factors that will be looked upon are the size of food containers and portions and digital food ordering.

Socio-demographic plays an important role in every choice as it is important to note the differences of every category. In a research conducted, a comprehensive discovery shows that commonly male users have a greater acknowledgment towards numerous mobile contents such as games, application software, e-mail, and Internet browsing. However, female users have an increase trend in buying ringtones and wallpapers to adorn and individualise their smartphone. Therefore, male users have a higher interest in mobile contents that are functional and can accomplish their needs (Azam et al., 2011). Other than gender, other socio-demographic factors such as age, ethnicity, religion, year of study and monthly pocket might give a significant outcome. The next factor that might have a significant association with food intake choices are the size of container used during eating. An increase of size of container will increase the portion of food eaten. This is generally described as the ‘pack size effect’ and is defined by the notion that consumers will take in more product when the product is packaged in a large packaging (Marchiori, 2014). Food portions have drastically increased in the past years as a hamburger at McDonald's in 1955 weighs only 45 g while today it weighs 5 times more which

at 227 g (Young & Nestle, 2007). According to Marchiori, when determining the amount to eat, a consumer would possibly take into account the size of the burger as a starting point and start to consider on eating more or less than the initial portion. Then, they would eat a certain amount of the food and the outcome is that people eat much more today than in years 1955. This event can be understood as an anchoring and adjustment process, where the portion size plays an important guideline on determining the amount of food consume (Marchiori et al., 2014).

1.2 Problem statement

National Health and Morbidity Survey, (NHMS) 2019 have showed that 3.4 million Malaysians are currently living with two major risks of non-Communicable diseases and half of Malaysians which is 1.7 million are currently living with all three major risks which is Diabetes, Hypertension and High Cholesterol. On top of that, we also have the ever-lasting crisis with the increasing cases of obesity and overweight. Half of Malaysians are currently either obese or overweight (IPH,2019). A study done by Swinburn et al. (2004) shows that the causes of obesity is multifactorial and it is divided into evidence that are either solid or plausible. Solid evidence that causes obesity are over-consumption of calorie dense foods that are low in micronutrient and the evidence is plausible is that of excessive advertising of calorie dense and fast-food outlets.

Benton (2015) stated that the urge to curb energy intake and prospect of obesity, until now has been widely focused on the physiological and biological actions that take place while approaching the end of the meal which is to stop food consumption. However, further studies have shown that the decision while starting the meal is as crucial as knowing when to stop to consume food. Especially when satiation is insignificant compared to the size of the meal (in kcal) that are determined from the portion size which is the activity occurred before food

consumption (Brunstrom, 2011). This shows that the decision making before meal begin is as crucial and important as to end the meal. The decision-making process are not the results of physiological and biological actions, it is more to the environment factors. The link between food portion sizes and index of dietary quality have only been discussed in children and adolescents however, no such studies have been reported with adults (Lyons et al., 2018)

While there is solid evidence that over-consumption of energy contributes to obesity and NCDs, often enough the energy intake that are reported in some studies by the respondents does not show overconsumption. According to the past nationwide review, it is reported that Malaysian had an average of calorie intake of 1466 kcal per day, which is equivalent to only 64% from Malaysian Recommended Nutrient Intakes (RNI) (Chan et al., 2017). As this survey was done before 2015, it is safe to assume that the amount consumed by Malaysians nowadays have increased tremendously over the course of 5 years. Moreover, in research done by Lee and Wan Muda (2019) indicates that the calorie intake did not pass the suggested amount however, the protein intake was over the suggested amounts. The research done is only using one instrument which is 3 day 24-hour dietary recall. However, in this research, it is incorporating Food Frequency Questionnaire (FFQ). The strength of FFQ is that it is an instrument that is better at estimating the routine intake (Framework, 2019).

Therefore, this study wants to explore and fill in the gap on digital food ordering and its associations with dietary intake among undergraduate students as in this era, almost everything can be obtained digitally.

1.3 Research question

1. Are there any associations between socio-demographic characteristics and dietary intake among undergraduates in Universiti Putra Malaysia in Selangor?
2. Are there any associations between size of containers and portion size and dietary intake among undergraduates in Universiti Putra Malaysia in Selangor?
3. Are there any association between digital food ordering and dietary intake among undergraduates in Universiti Putra Malaysia in Selangor?

1.4 Objectives

General objective:

To determine if there were any associations with usage of digital food ordering, socio-demographic factors (age, sex, ethnicity, religion, monthly pocket money, current living arrangement), the size of container and portions of eaten food with dietary intake among undergraduates in Universiti Putra Malaysia in Selangor.

Specific Objectives:

1. To assess dietary intake through FFQ of respondents.

2. To examine the socio-demographic factors (age, sex, ethnicity, religion, monthly pocket money, current living arrangement), the size of container and portions of eaten food, and usage of digital food ordering among respondents.

3. To determine the associations between socio-demographic factors, the size of container and portions of eaten food, digital food ordering and dietary intake of respondents.

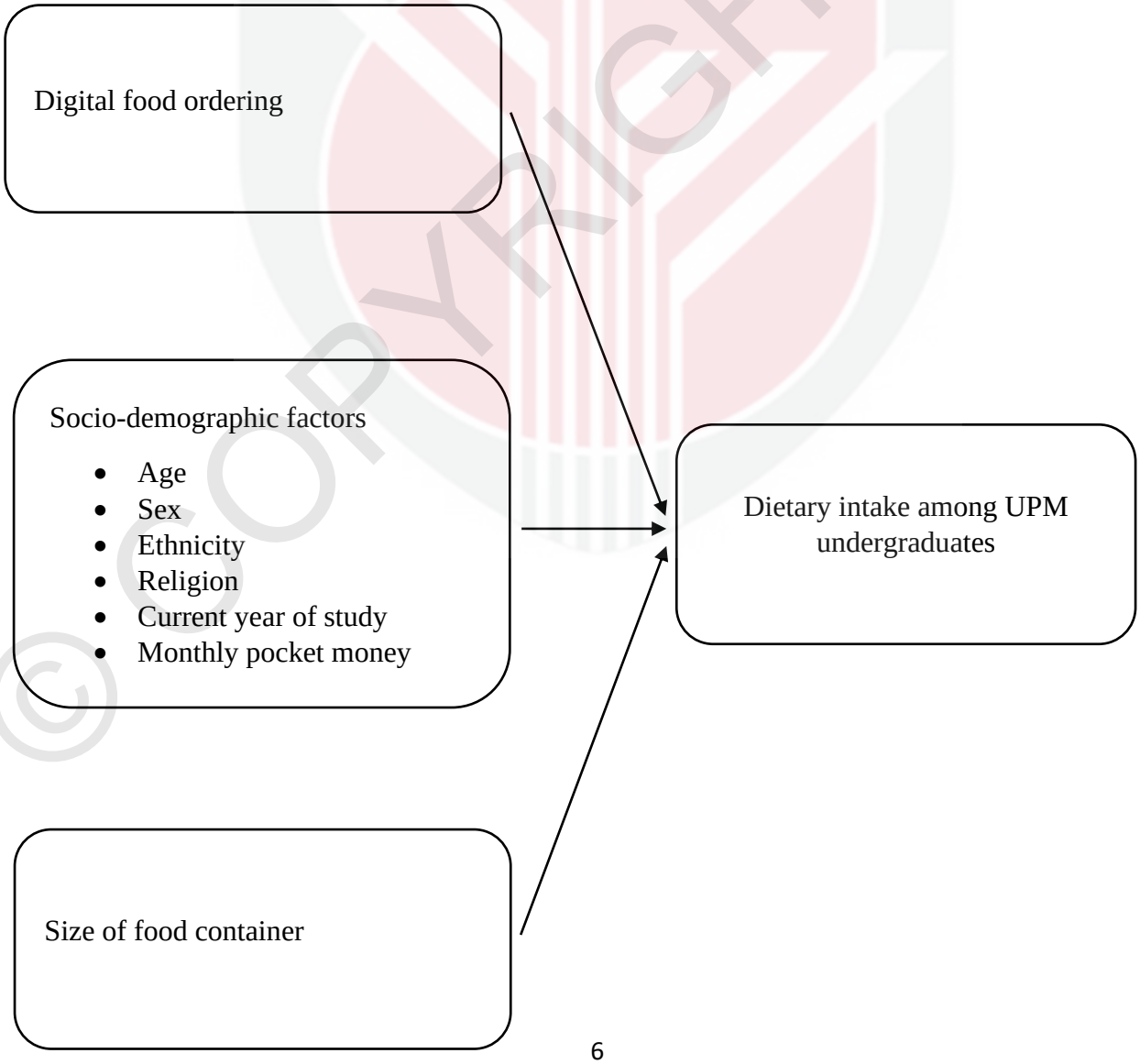
1.5 Hypothesis

1. There are significant associations between socio-demographic factors and dietary intake among respondents.

2. There are significant associations between the size of container and portions and the dietary intake among respondents.

3. There is a significant association between digital food ordering with dietary intake among respondents.

1.6 Conceptual framework



1.7 Significance of study

To find the exact causation on excessive dietary intake is not an easy task as dietary intake is multi-factorial. Past studies have found associations on many factors that can directly or indirectly related to dietary intake. Therefore, this study is important as it will not only test one factor that is associated with dietary intake but it will also study 3 factors which are the subject's socio-demographic, size of food container and food portion and last but not least digital food ordering. Moreover, this study can give a broader insight on what exactly are associated with dietary intake. This study can strengthen past studies that the cause of excessive dietary intake is indeed a multi-factorial issue. This can help to further understand the mechanism behind dietary intake and find a way to deal with the issue. This study can help dietitian to not just focus on the client or patient's dietary intake only but to also take time to explore the patient's foodscape and platescape such as the socio-demographic of the patient, the size of food container used and the use of food delivery application to obtain food. Hence, this study is important to the field of dietetics because it can show that dietary intake is not just influenced by the physiological factors but the environmental factors also play a hand in it. This study can give further clarifications to the health professionals and nutritionist on the factors that influence dietary intake as nowadays, the access to food delivery application has increased.

CHAPTER 2: LITERIATURE REVIEW

Obesity has fast become a global pandemic. Obesity is defined as abnormal or excessive fat accumulation that may impair health. According to WHO, in 2016, more than 1.9 billion individuals, 18 years old and above were overweight and from that, 650 million were obese. This trend is not only seen in a global perspective, as in Malaysia, a finding done by National of Health and Morbidity Survey (NHMS) 2019 found that 50.1% of adults are either overweight or obese with the numbers are 19.7% are obese while the remaining of 30.4% are overweight. The findings further reveal a worrisome increasing trend in overweight, obesity and abdominal obesity from the year 2011 and 2015 which are (29.4%, 15.1%, 45.4%) and (30.0%, 17.7%, 48.6%) respectively (Institut Kesihatan Umum, 2019).

Evidence have shown that obesity and overweight may lead to numerous health problems such as non-communicable diseases. This group of diseases consisted of diabetes, hypertension and hypercholesteremia. Mathers and Loncar (2006) stated that there are available proof that a major risk factor for these NCDs are overweight and obesity and it is fast becoming a pandemic as the increasing trends are not only seen in the developed countries but now can be seen in developing countries as well (Mathers & Loncar, 2006). The overall prevalence of diabetes, hypertension and hypercholesteremia in Malaysia in the year 2019 according to NHMS 2019 are 18.3%, 30.0% and 38.1% respectively. Diabetes have shown an increase in the prevalence compared to only 11.2% in 2011 and 13.4% in 2015. Due to the increasing prevalence of diabetes and the high prevalence of hypertension and hypercholesteremia, intervention should be done to reduce the prevalence of obesity and overweight.

Causes of obesity is not something that can be easily pin point as it is a complex mechanism but increase in dietary intake remains to be one of the major risk factors that can causes obesity and overweight. Obesity is an intricate health condition that arises from a mixture of root problems added with individual factors such as behaviour and genetics (CDC, 2020). There are so many factors that are associated with the increase in dietary intake but in this study, only three factors will be studied which are the socio-demographic factors, the size of food container and food portion and last but not least, the digital food ordering.

Over the years, increasing in weight has not only been linked to excessive energy intake but there are a lot of other contributing factors that may contribute to the increase in energy intake thus increasing the risk of developing overweight and obesity

Digital food ordering (DFO) is the practice of obtaining food from a website or designated application. The food obtained can be either hot meals that are for direct consumption or food products that require further cooking like frozen foods. Nevertheless, DFO makes it easy to obtain food as the effort to obtain them is literally at the tip of our fingertips. As the pandemic forced stalls to close down and dine-ins were not allowed anymore, most of the stalls in Malaysia opted to get into applications like GrabFood and FoodPanda to ensure that the business can still run smoothly despite the pandemic. This opens up to many more choices of foods in the DFO platform itself. If before this the websites were filled with fast foods and snacks, nowadays, hot meals can also be obtained from the platform. As days go by, research studies need to be up to date to match with the development of the new era. Apart from income and socio-demographic factors, it is always a wonder if the accessibility and availability to obtain food plays a role in the act of food purchasing and consumption. According to Roos, Ruthven, Lombard & McLachlan (2013), food cost is not the sole factor that inhibits food accessibility in Avian Park, it is joined with the lack of variety and poor quality of food available in the store. In this study, there are three main factors that control the accessibility

and availability of nutritious food in that area. The factors are restricted access to convenience stores in town, restricted food variation, poor quality of available food and lack of proper food distribution. This shows that in certain areas, the restriction in obtaining quality and nutritious food is a challenge for certain individuals. However, nowadays, food delivery applications can help in obtaining both ready to eat food and ingredients to cook desired food. The effect of technology nowadays has made it easier for everyone with a smartphone and internet connection to obtain food and stuff in general. Food Panda and Grab, two of the giant and leading DFO companies in Malaysia just launched Panda Mart and Grab Mart respectively. The aim of these apps is to make it easier for consumers to not just obtain their food but to obtain other daily essentials such as first aid kit, groceries and even clothing as well. There are a few contributing factors on why people are using food delivery applications other than its convenience and this study found that there are four significant factors that influence the usage of food delivery application especially during this pandemic which is the performance expectancy, social influence, trust and last but not least, perceived task technology fit. Satisfaction has the substantial influence for the users to continue using the application in the future (Zhao & Bacao, 2020)

On top of customers' trust and the convenience of DFO platform itself, discounts while using the application also makes it a popular choice. In a study conducted by Rubby & Briawan (2020) in high school students in Yogyakarta, Indonesia found that the students the average frequency of DFO was 1.6±2.0 times per week and the most common reason for the students to order food through the platform was discounts and promotions offered (74.7%). Another study that supports the findings by Zhao & Bacao was a study by Harahap et al. (2020) where they found that the main reason why undergraduates from Medan Area University opted to use DFO is the convenience of using it. Having food delivered to doorstep without having to sustain hot weather and traffic jams is the reason why they frequently use DFO where the mean

frequency of using DFO is <3 times in a week. In this study, it was also found that for those ordering >3 times per weeks is overweight and obese.

A paper stated that stage two obesity is higher among adults, slight increase among children and narrowing of gender gap and socioeconomic. In this stage, prevalence among women would be at the range of 25% to 40% while men would be at 20% and followed by children at 10% (Lim et al., 2019). The reason why obesity is chosen as an indicator is because excessive energy intake will eventually lead to obesity. In a paper done by Rubby and Briawan (2020), they found that gender and age had a significant correlation with their DFO frequency. Girls were more likely to buy food through online applications ($p=0.002$). They suggest that this may happen due to girls tended to be more interested in discounts and promotions offered by the restaurants. Other than that, the older the subjects, the less their frequency of using DFO ($p=0.003$). This shows that the younger the age, the more frequent the use of DFO over the week. From this paper it can also be seen that girls or females use DFO more frequently than men. It can also be noted that there is a notable distinction in terms of gender in the prevalence of obesity. It was seen that females are more obese in low-income and middle-income countries with the distinction in gender are wider in middle-income country and it widens over time. Despite that, the gap in gender in high-income countries fades as growth of female obesity is slower than male obesity (Ameye & Swinnen, 2019).

Other than age and gender, income or in this study, monthly pocket money, should also be considered as multiple studies have found that the increase in income can lead to a much more comfortable lifestyle hence probably will be having more food. According to a study that was conducted in the rural area of Tanzania, the study has concluded that a family's household earnings are crucial to improve the family's overall nutrition as to food quantity and quality. Other than that, they also found that a higher share of income in a household resulting from

independent agricultural work and jointly earned income strongly related to calorie and micronutrient intake (Van den Broeck et al., 2020). Other than that, another study finding the effects of Fe and Zn intake in low-income subjects was conducted in Serbia, Europe among 754 subjects. This study has found that normally there would be no significant differences in the intake of Fe and Zn across SES groups, just that a slight difference in Fe intake were seen between low-income and high-income groups (Knez et al., 2017). This shows that even though there was no significant difference between intake and income, there was still a little difference. However, a paper was published by finding the trend of obesity across the globe. Interestingly, the prevalence of obesity was the lowest in the poorest country and highest for countries with high GDP per capita. Not just that, insignificant correlation between prevalence in obesity and income levels were seen in middle-income countries. On top of that, in higher income countries, correlation between obesity and income were negative and only significant among females. However, the negative significance does not mean that prevalence of obesity is declining in these countries, it is in fact never changing for the past year. Thus, the negative correlation seen in high-income countries is due to the rate of obesity growth with income being slower in high-income countries compared to middle-income countries. It is interesting to find that the prevalence of obesity is rising even in a low-income country so income might affect dietary intake of individuals. In a study done by Younis & Eljamay (2019) it was found that females consume junk food more than males (67.0%) which then were supported by a study by Sapkota which said (53.5%) consumed junk food were girls that may because girls more likely to be influenced by marketing campaigns that involved giveaways, competitions than males. However, above study findings contradict Rubby & Bi=riawan study where they found that older teenagers tend to eat fast food more frequently than younger teenagers. This finding was noted to be supported by Fanning in (2002) which said the probability of purchasing fast food increases to about 30 years of age where it was seen in Rubby & Briawan study that the

older the individuals, the less frequent it is for them to use DFO. And this study also supported that higher family income resulted in increase in both food quality and quantity.

Over the years, causes of increases in energy intake have been a topic that always peaked interests. One of the associations that are linked to the increasing in energy intake is the size of container and size of portion of the food intake. There are increased in energy intake among adults in the Unites States when they are served foods in a larger portion or container (Lyons et al., 2018).

Wansick (1996) conducted a study to find out if package size can increase the usage of various other products including food. There are several other studies compiled in this one paper but study 4 directly studies the effect of package size on the food intake. This study is conducted among 184 adult women in New Hampshire. Wansick hypothesized that the relationship of package size and the product intake is curvilinear which means that up to one point, the package size would no longer affect the product intake. It is then proved in this study which found that no difference was seen in the usage of medium size and large size package but a significant difference can be seen in the usage of small size and medium size packages. A follow up question then was given to the subjects where the subjects believed that more is better but it is possible to use too much and this thought is applicable to all products including food and household cleaners (Wansink, 1996).

Another study conducted by Marchiori, Corneille & Klein (2012) on container size which influenced snack food intake independent of portion size supported Wansick's findings. This study was conducted in Brussels, Belgium, among 88 Belgians who were undergraduate male students. This study concluded that container size did influence food intake even when the portion size remained unchanged. In this study, subjects were randomly divided into three groups which was according to the portion sizes (PS). The groups are PS small, PS medium

and PS large. Marchiori et. al found that the respondents who received a larger container tend to serve themselves a larger portion of food and finished those large portions. Moreover, energy intake rises up to 100% when the container size increased by 300%. However, energy intake did not increase dramatically if portion size is increased at the same rate (Marchiori et al., 2012).

Marchiori and his colleagues found in their studies, a study conducted by Lin and Fang (2019) further strengthened the outcome of the previous study. Lin and Fang conducted a study on the effect of the size of food containers on the selection behaviour of college students in Tainan City, Taiwan. This study was conducted among 50 undergraduate students with mixed gender. They found that although there were significant effects of food container used on food portion sizes, it is found that the effects are only found in male subjects and not seen in female subjects (Lin & Fang, 2019).

A different study that supported size of food container and size of food portion does influence energy intake was done by DiSantis and his colleagues. DiSantis et al. (2013) conducted a similar study but used different age group. Their study was conducted among 42 children specifically first-grade predominantly African-American, in a privately-funded urban elementary school in Philadelphia, Pennsylvania. This study was conducted by letting the children served themselves, from a buffet style, during lunch using adult size food container. It was found that, approximately 80% of the children who used adult size food container actually served themselves on average, 90.1 kcal more than usual. Other than the size of food container, the type of entrée served also influenced the increase in energy intake. Children tend to serve more entrée when it was something that they liked or when the entrée was served in a unit form instead of in one big bulk (DiSantis et al., 2013)

The findings in all of the study above supported by a paper published by Young and Nestle (2002). This research involved sampling foods that was meant to be eaten immediately upon purchased in popular and established restaurants. It was then found that all of the commonly available food that were measured exceeded the standard portion size that has been set by USDA and FDA. It can be concluded that food portions in the marketplace have increased in size and have exceeded the nations' standard. The increasing portion sizes started to rise in the 1970 until now and moreover, it is parallel to the increase in the nations' body weight. Young and Nestle then concluded that as the size of food portion continue to rise, energy content will rise hand in hand with the portion sizes. Therefore, efforts should be done to increase awareness in consuming smaller portions (Young & Nestle, 2002).

Another study that supports the claim of bigger plate size contribute to greater intake is a study conducted by Lim, Jamaluddin and Er (2018) where they conducted a study in Muar, Johor among 133 subjects. This study found that among subjects who were given a larger plate, they tend to increase in total calorie and tend to choose foods in bigger portion. Moreover, in this study, it is also found that increasing in food consumption due to larger plate size was the same for both genders, male and female.

The study by Lim et al.; (2018) supported the study conducted by Marchiori, Papies and Klein (2014) in Free University of Brussels among 133 subjects. Their study was conducted by asking the participants to imagine that they were in their usual lunch time and to imagine if their lunch were served in a small or large plate size. It was found that, those who imagined being served in a larger plate will consume more food compared to those who imagined eating food in no specific amount and vice versa. On the other hand, individuals who imagined that they will be served in a smaller plate tend to consume less that those who imagined no specific amount.

CHAPTER 3: METHODOLOGY

3.1 STUDY DESIGN

This was a cross-sectional study that aimed to determine the associations between digital food ordering and other factors with dietary intake among undergraduate students in Selangor.

3.2 STUDY LOCATION

The study was conducted in Universiti Putra Malaysia (UPM) located in Serdang, Selangor. UPM is located in the heart of Serdang and it is surrounded by malls and food venue. Based on UPM official website, until 31st December 2018, there are 11, 981 undergraduate students enrolled in the university.

3.3 SAMPLE SIZE DETERMINATION

The sample size for this study was determined by using the formula developed by Hulley, Cummings, Browner, Grady, & Newman (2013)

$$N = \left[\frac{(Z_\alpha + Z_\beta)}{c}\right]^2 + 3$$

whereby $c = 0.5\, x \ln[\frac{1+r}{1-r}]$

Z_α = the standard normal deviate for α = 1.96

Z_β = the standard normal deviate for β = 0.84

r = the expected correlation coefficient

Figure 3. 1 Shows the formula used for sample size calculation

Table 3. 1 Sample size calculation of each independent variables based on the previous studies in identifying factors influencing dietary intake

Factors	**Correlation, r**	**Sample size, n**
Size of container	r=0.50 (Wansink & Cheney, 2005)	$c = 0.5\, x \ln\left[\frac{(1+0.50)}{(1-0.50)}\right]$ = 0.55 $N = \left[\frac{(1.96 + 0.84)}{0.55}\right]^2 + 3$ = 28.917 ≈ 29
Satisfaction of using food delivery application makes users continue using them	r = 0.34 (Zhao & Bacao, 2020)	$c = 0.5\, x \ln\left[\frac{(1+0.35)}{(1-0.35)}\right]$ = 0.35 $N = \left[\frac{(1.96 + 0.84)}{0.35}\right]^2 + 3$ = 67

There are minimal studies regarding the accessibility and availability of food through food delivery applications hence the correlation coefficient for accessibility and availability is

not provided. The highest number of sample size is selected, which is 67 respondents. The sample size has taken into account the estimated sample size design, expected response rate and the expected eligible rate which is 1.3, 80% and 90% approximately.

Table 3. 2 Adjustment to sample size

Criteria	Adjustment	Sample size
Estimated sample size design	1.3	87.1
Expected response rate	0.8	108.9
Expected eligible rate	0.9	121

After calculating the adjustment rates, the sample size for this study is 121 respondents.

3.4 RESPONDENTS

Respondents for this study are Malaysian undergraduate students from Universiti Putra Malaysia, Selangor. The inclusion criteria for this study would be all Malaysian undergraduate students currently enrolled in the university regardless of age. While the exclusion criteria would be a non-Malaysian, students from other universities, a foundation or post-graduate student, married, have chronic disease such as cardiovascular disease, hypertension and diabetes.

3.5 SAMPLING DESIGN

The participants were selected using quota sampling which is one of non-probability sampling. There is a total of 10 colleges in UPM after the unification of colleges. The colleges are Kolej Canselor, Kolej Tun Dr Ismail, Kolej Sultan Alaeddin Suleiman Shah, Kolej Kelima, Kolej Pendeta Za'ba, Kolej Ketiga Belas, Kolej Kesepuluh, Kolej Ketujuh Belas Kolej Kedua Belas dan Kolej Keenam Belas. After randomly selecting 5 out of these 10 colleges, all of the students are welcomed to join the study but a quota of 28 respondents will be chosen from each college. Every student from the selected were invited to join this study. As this study requires 121

respondents, 28 respondents were randomly selected from each college. An invitation were sent to the college WhatsApp group. Every batch (1st year, 2nd year, 3rd year, 4th year and 5th year) will have their own college whatsapp group. The students in the whatsapp group are across courses and is not only limited to only one course of studies. As WhatsApp group have a limit of only 250 participants so the initial of the participants would be 1000 participants from every college. List of names that are in the WhatsApp group were then asked from the admins of the group. For every batch, only 7 students were recruited for this study. The 35th name from the name list were contacted to participate in the study.

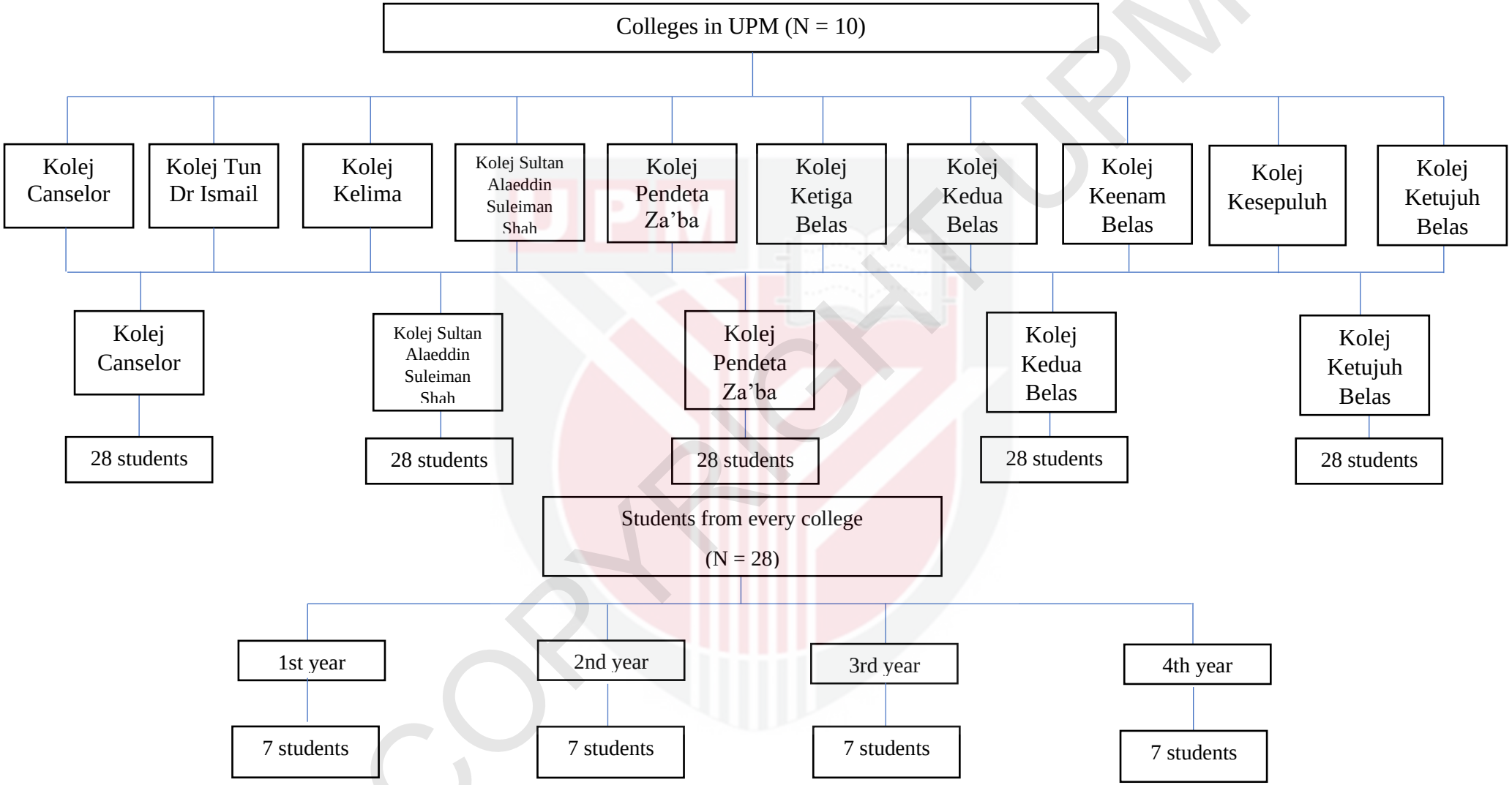


Figure 3. 2 Flow of the sampling design for this study

3.6 STUDY INSTRUMENTS

A self-administered questionnaire in bilingual which is in English and Bahasa will be used in this study. The questionnaire consists of sociodemographic background, the size of food container and food portions, Food Frequency Questionnaire and availability and accessibility of food through the usage of food delivery application.

3.6.1 SELF-ADMINISTERED QUESTIONNAIRE

3.6.1.1 SOCIO-DEMOGRAPHIC BACKGROUND

The sociodemographic factors will be determined via a self-administered questionnaire that consisted of 7 questions in total. The questions include the age, sex, ethnicity, religion, current year of study and monthly pocket money. Refer part A of appendix below. The association test done for age and dietary intake is Pearson's correlation test as age is a continuous variable. The correlation test for sex, ethnicity, religion, year of study and monthly pocket money with dietary intake is done with Chi – square test.

3.6.1.2 SIZE OF FOOD CONTAINER

The size of food container will be determined by asking the respondents what size of food container respondents used for eating. Whether it is small 17 cm (7 inch), medium 22 cm (7 inch), large 27 cm (11 inch) and others (if they use a different size of kitchenware. The questionnaire has two questions which is what is the sizes of plates and bowls do they use when they are serving their foods. The respondents need to tick on the sizes of plates and bowls that they used. The association test for size of food container and dietary intake is Pearson's correlation test.

Figure 3. 3 Size of food container to assist respondents

3.6.1.3 FOOD FREQUENCY QUESTIONNAIRE

Instruments used in this study is the Food Frequency Questionnaire (FFQ). This FFQ is used to determine energy intake of the respondents. The food frequency questionnaire used in this study is adopted from Malaysian Adults Nutrition Survey MANS 2014 (Institute for Public Health, 2014). In this questionnaire, there are a total of 14 category of food and a total of 165 varieties of foods asked. Cereals and cereals products have 18 varieties, fast food have 8 varieties, meat and meat products for non-Muslim have 11 varieties, fish and seafood have 15 varieties, eggs have 4 varieties, legumes and legumes and products have 5 products and milk and milk products have 6 varieties. next, vegetables have 14 varieties, fruits have 26 varieties, drinks have 16 varieties, alcoholic drinks (for non-Muslim only) have 6 varieties, confectionaries have 12 varieties, bread spread have 8 varieties and last but not least flavours have 16 varieties. In this study, FFQ is self-administered by the respondents. An attachment was attached with the FFQ to assist respondents on answering the FFQ. Dietary intake is measured by calculating the mean calorie intake of the respondents. Refer part C of appendix below. Figure 3.4 shows the attachment attached to assist respondents in answering the FFQ.

		(Fill in one of the columns only)			of meal size	servings (each time eaten)
	A. Cereals and cereals product	Daily	Weekly	Monthly		
1	White rice	2			cup	2 1/2
2	Brown rice				cup	
3	Flavoured rice			1	cup	1
4	Rice porridge		1		cup	1 1/2
5	Glutinous rice				cup	
6	Noodles		2		cup	1 1/2
7	Mihun/ Kueh teow/ laksa/ laksam/ loh shi fun		2		cup	1 1/2
8	Pasta		2		cup	1 1/2
9	Sago/ambuyat/linut				cup	
10	Bread	1			slices	2
11	Wholemeal bread				slices	
12	Bread bun				pieces	
13	Roti Canai (includes roti telur, roti sardine, roti bawang, roti pisang, murtabak)		1		slices	1 1/2

Figure 3. 4 Attachment attached with FFQ to help respondents administered FFQ

3.6.1.4 DIGITAL FOOD ORDERING

There will be two part of questionnaire the first one will be asking the frequencies and the type of food respondents usually order when using food delivery application. The frequency will be calculated. The second questionnaire for digital food ordering will be adopted from a research done by (Cho et al., 2019) where he and his colleague find the usage of food delivery app among adults. The questions in the questionnaire consisted of 24 questions that is divided into 8 sections. The sections are convenience, design, trustworthiness, price, variety (food choices), perceived value, attitudes towards food delivery apps and last but not least, the intent to continuously use food delivery applications. For this questionnaire it will be measured with a five-point Likert scale (1= “strongly disagree” and 5 = “strongly agree”). Mean score will be calculated and Pearson correlation will be analysed to find association. Refer part D of appendix below.

3.7 STUDY APPROVAL

Ethics approval was obtained from the Ethics Committee for Research Involving Human Subjects in Universiti Putra Malaysia (JKEUPM) prior to data collection. Permission

from college administrator will not be needed as this study is only going to be using self-reported questionnaire and no face-to-face interview or human sample taken from the participants.

3.8 DATA COLLECTION

All of the questionnaires used in this paper is self-reported. This questionnaire will be distributed in Google Form. There will be 2 sessions of Google Form. The first session of Google Form will be only including part A, B and D which is socio-demographic characteristics, size of food container and food portion and digital food ordering. The second session of Google Form will be only part C which is the FFQ. Total of time to collect data will be in one month with two weeks to be allocated for the first session and another two weeks is for the FFQ.

3.9 PRE-TEST

A pre-test will be conducted prior to data collection. The purpose of the pre-test is to assess the suitability of the questionnaire and also to estimate the time required to complete the questionnaire.

3.10 STATISTICAL ANALYSIS

Statistical analysis will be performed using the IBM SPSS Statistics 26 (IBM Corp., Armonk, NY). The data will be screened for completeness once finished collecting and the normality of the data will be checked. Categorical variables will be presented in the form of frequencies and percentages while continuous variables will be presented in the form of means and standard deviations. In this study, the significance level will be set at $p < .05$ to test the hypothesis. Pearson product-moment correlation test will be used to determine the relationship between two continuous variables while the Chi-square test will be used to determine the association between two categorical variables.

CHAPTER 4: RESULTS

4.1 Socio-Demographic Background

Table 4.1 shows the socio-demographic background of the respondents. A total of 123 undergraduate students participated in this study (26.8% male and 73.2% female). The age group ranging from 19-25 years old with the mean age of the respondents are 21.46 ± 1.25 years old. Among the respondents, the majority are Malays (65.9%), followed by Indian (17.1%), Chinese (15.4%) and others (1.6%). On top of that, majority of the respondents are Muslim with Islam (69.9%), followed by Hindu (14.6%), Buddha (8.9%) and Christian (6.5%). As shown on Table 4.1 , most of the respondents are from first year with (30.1%) followed by second year (26.0%), third year (26.8%) and fourth year (17.0%). Lastly, majority of the respondents the monthly pocket money is RM 100.01 – RM 300.00 (40.7%) followed by RM 300.01 – RM 500.00 (19.5%), RM 500.01 – RM 700.00 (16.3%), RM 100.00 (13.0%) and > RM 700.00 (10.6%).

Table 4. 1 Socio-demographic background of the respondents (n= 123)

Variables	n (%)	Mean ± SD
Age Years		21.5 ± 1.25
Sex		
Male	33 (26.8)	
Female	90 (73.2)	
Ethnicity		
Malay	81 (65.9)	
Chinese	19 (15.4)	
Indian	21 (17.1)	
Others	2 (1.6)	
Religion		

Islam	86 (69.9)
Buddha	11 (8.9)
Hindu	18 (14.6)
Christian	8 (6.5)
Current year of study	
First Year	37 (30.1)
Second Year	32 (26.0)
Third Year	33 (26.8)
Fourth Year	21 (17.1)
Monthly pocket money	
<RM 100	16 (13.0)
RM 100.01 – RM 300.00	50 (40.7)
RM 300.01 – RM 500.00	24 (19.5)
RM 500.01 – RM 700.00	20 (16.3)
≥ RM 700.01	13 (10.6)

4.2 Dietary intake of respondents

In this study, the mean dietary intake of respondents based on FFQ is 1436 ± 353with a percentage distribution of carbohydrate, protein and fat within a recommended intake with 55.71 ± 1.54, 18.11 ± 4.54 and 26.57 ± 6.34 respectively. In this study as well, it can be seen that there are no significant difference in dietary intake, where in male, the mean dietary intake is 1434.8 ± 359.17 while female is 1436.2 ± 353.75. Across ethnicity, Chinese respondents has the highest mean dietary intake while Malays had the lowest mean dietary intake with 1505.3 ± 287.87 and 1410.6 ± 349.81 respectively. Christian got the highest mean dietary intake and Islam got the lowest mean dietary intake with 1526.9 ± 355.01 and 1418.0 ± 353.20

respectively. For current year of study, first year recorded the highest mean dietary intake with 1508.0 ± 335.17 while second year recorded the least mean dietary intake with 1376.3 ± 407.11. Last but not least, for monthly pocket money, the highest mean dietary intake comes from the range group of RM 300.01 – RM 500.00 with mean dietary intake of 1517.4 ± 358.82 and the group with monthly pocket money of ≥ RM 700.01 recorded the least mean dietary intake with 1254.0 ± 369.86.

Table 4. 2 Dietary intake of respondents based on FFQ

Food intake	**Mean ± SD (n = 123)**
Macronutrient intake (g)	
Carbohydrate	240.47 ± 31.59
Protein	77.01 ± 10.88
Fat	52.31 ± 18.73
Macronutrients distribution (%)	
Carbohydrate	55.71 ± 1.54
Protein	18.11 ± 4.54
Fat	26.57 ± 6.34
Daily energy intake	1436 ± 353.73

Table 4. 3 Dietary intake of respondents (FFQ) based on sociodemographic characteristics (n=123)

			Dietary intake (Kcal)
Variables	**n (%)**	**Mean ± SD**	**Mean ± SD**
Age		21.5 ± 1.25	
Sex			
Male	33 (26.8)		1434.8 ± 359.17
Female	90 (73.2)		1436.2 ± 353.75
Ethnicity			
Malay	81 (65.9)		1410.6 ± 349.81
Chinese	19 (15.4)		1505.3 ± 287.87

Indian	21 (17.1)	1469.1 ± 419.02
Other	2 (1.6)	1447.5 ± 553.66
Religion		
Islam	86 (69.9)	1418.0 ± 353.20
Buddha	11 (8.9)	1489.5 ± 245.56
Hindu	18 (14.6)	1445.5 ± 423.62
Christian	8 (6.5)	1526.9 ± 355.01
Current year of study		
First Year	37 (30.1)	1508.0 ± 335.17
Second Year	32 (26.0)	1376.3 ± 407.11
Third Year	33 (26.8)	1441.1 ± 359.11
Fourth Year	21 (17.1)	1391.0 ± 283.52
Monthly pocket money		
≤ RM 100.00	16 (13.0)	1478.4 ± 336.69
RM 100.00 – RM 300.00	50 (40.7)	1426.1 ± 352.73
RM 300.00 – RM 500.00	24 (19.5)	1517.4 ± 358.82
RM 500.00 – RM 700.00	20 (16.3)	1446.3 ± 343.51
≥ RM 700.00	13 (10.6)	1254.0 ± 369.86

4.3 Size of Food Container and Food Portion

Table 4.4 shows the respondents size of food container which further divides into plates and bowls. For the size of plates, it can be seen that the majority of the respondents use large size plates (47.2%) followed by medium size (43.1%) and small size plates (9.8%). For the bowl size, we can see different result when the majority of the respondents use medium size plates more with (78.9%), followed by small size plates (13.8%) and large size bowls (7.3%).

Table 4. 4 Size of food container (Plate and bowls) and the corresponding energy intake (n=123)

Variables		n (%)	Dietary intake (Kcal)
			Mean ± SD
Plate	Small (17 cm)	12 (9.8)	1409.5 ± 432.63
	Medium (22 cm)	53 (43.1)	1454.6 ± 320.29
	Large (27 cm)	58 (47.2)	1424.0 ± 370.8
Bowl	Small (17 cm)	19 (13.8)	1450.4 ± 401.88
	Medium (22 cm)	97 (78.9)	1440.7 ± 355.55
	Large (27 cm)	9 (7.3)	1355.3 ± 245.21

4.4 Digital Food Ordering

Table 4.5 shows the respondents frequency of digital food ordering and the respondents usual order of the type of food while using digital food ordering. Frequency of ordering food through digital food ordering for the past week among the respondents is 1-2 times with 53.7%, followed by never 41 (33.3%) and 3-4 times and 5-6 times record the same percentage of 6.5 % respondents. The mean time ordering for this study is 1.8 ± 0.80. On the other hand, the type of food the respondents often ordered via digital food ordering only results in two which are fast foods (55.3%) and hot meals (44.7%).

Table 4.7 shows the respondents usage of food delivery applications. There are 8 sections of these variables. The mean and standard deviation of the respective sections is convenience 12.8 ± 2.088, design 13.1 ± 2.085, trustworthiness 12.1 ± 2.256, price 9.8 ± 2.311, variety (food choices) 12.3 ± 2.169, perceived value 10.9 ± 2.058, attitudes towards food delivery apps 10.6 ± 2.191 and intent to continuously use food delivery apps 10.6 ± 2.649. The mean total score of this instrument is 92.4 ± 14.107.

Table 4. 5 Frequency of digital food ordering and type of food usually ordered via digital food ordering

Question	Answer	n (%)
What is the frequency of using food delivery applications for the past week?	Never	41 (33.3)
	1 – 2 times	66 (53.7)
	3 – 4 times	8 (6.5)
	5 – 6 times	8 (6.5)
	≥ 7 times	
Mean ± SD		1.8 ± 0.80
What type of food is usually ordered if using a food delivery application?	Fast food	68 (55.3)
	Hot meals	55 (44.7)
	Snacks	
	Drinks	

Table 4. 6 Respondent's usage of delivery application

Variables	n (%)				
	1	2	3	4	5
Convenience					
Using the food delivery app would be convenient for me			25 (20.3)	32 (26.0)	66 (53.7)
The food delivery app would allow me to order food any time			30 (24.2)	32 (26.0)	61 (49.6)
The food delivery app would allow me to order food any place			25 (20.3)	44 (35.8)	54 (43.9)
Mean ± SD			12.8 ± 2.088		
Design					
The food delivery app's structure is logical and easy to follow			17 (13.8)	36 (29.3)	70 (56.9)

The food delivery app's design is concise and easy to understand		16 (13.0)	29 (23.6)	78 (63.4)
All the terms and conditions (e.g., payment, warranty) of the food delivery app are easy to read/ understand	5 (4.1)	20 (16.3)	48 (39.0)	50 (40.7)
Mean ± SD		13.1 ± 2.085		
Trustworthiness				
I trust the food delivery app	5 (4.1)	32 (26.0)	50 (40.7)	36 (29.3)
I felt secure in ordering food through the food delivery app		33 (26.8)	54 (43.9)	36 (29.3)
The information provided by the food delivery app is reliable	4 (3.3)	21 (17.1)	56 (45.5)	42 (34.1)
Mean ± SD		12.1 ± 2.256		
Price				
When I order food through the delivery app, the food is a good product for the price	20 (16.3)	38 (30.9)	49 (39.8)	16 (13.0)
When I order food through the delivery app, the food is economical.	4 (3.3)	40 (32.5)	38 (30.9)	33 (26.9)	8 (6.5)
When I order food through the delivery app, the food is reasonably priced	21 (17.1)	52 (42.3)	42 (34.1)	8 (6.5)
Mean ± SD		9.8 ± 2.311		
Variety (food choices)				
The food delivery app offers a variety of restaurant choices	4 (3.3)	21 (17.1)	61 (49.6)	37 (30.1)

The food delivery app offers a variety of food choices		4 (3.3)	21 (17.1)	44 (35.8)	54 (43.9)
I can order food with a wide range of prices through the food delivery app		4 (3.3)	29 (23.6)	48 (39.0)	42 (34.1)
Mean ± SD			12.3 ± 2.169		
Perceived value					
I feel I am getting good food products with a reasonable price when I use the food delivery app		17 (13.8)	45 (36.6)	44 (35.8)	17 (13.8)
Using the food delivery app is worthy for me to devote my time and efforts		5 (4.1)	17 (13.8)	73 (59.3)	28 (22.8)
Compared with conventional food purchasing ways, it is wise to use the food delivery app		9 (7.3)	65 (52.8)	33 (26.8)	16 (13.0)
Mean ± SD			10.9 ± 2.058		
Attitudes towards food delivery apps					
Using the food delivery app is useful			33 (26.8)	49 (39.8)	41 (33.3)
I am strongly in favour of ordering food through the delivery app		17 (13.8)	49 (39.8)	49 (39.8)	8 (6.5)
I desire to use the delivery app when I purchase food	5 (4.1)	25 (20.3)	36 (29.3)	49 (39.8)	8 (6.5)
Mean ± SD			10.6 ± 2.191		
Intent to continuously use food delivery apps					
I intend to use the food delivery app		17 (13.8)	44 (35.8)	29 (23.6)	33 (26.8)
If I have an opportunity, I will order food through the delivery app		18 (14.6)	52 (42.3)	25 (20.3)	28 (22.8)

I intend to keep ordering food through the delivery app	17 (13.8)	57 (46.3)	21 (17.1)	28 (22.8)

Mean ± SD	10.6 ± 2.649
Mean total score	92.4 ± 14.107

1 Strongly disagree 2 Disagree 3 Neutral 4 Agree 5 Strongly agree

4.5 Associations between SES and dietary intake

From this study it can be seen that all of the socio demographic factors (age, sex, ethnicity, religion, current year of study and monthly pocket money) with dietary intake are not.

Table 4. 7 Associations between socio-demographic background and dietary intake (n= 123)

Variables	**r value**	**p value**
Age	-.123	.176

Variables		**n (%)**		**x^2**	**p value**
		≤1200	**>1200**		
Sex	Male	12 (10)	21 (17)	10.46	.967
	Female	27 (22)	63 (49)		
Ethnicity	Malay	26 (21)	55 (45)	13.32	.897
	Others	13 (11)	29 (23)		
Religion	Islam	27 (22)	59 (48)	11.73	.91
	Others	12 (10)	25 (20)		
Year of study	1st & 2nd year	22 (18)	47 (38)	17.12	.962
	3rd & 4th year	17 (14)	37 (30)		

Monthly pocket money	≤ RM 500	27 (22)	63 (51)	10.46	.502
	> RM 500	12 (10)	21 (17)		

significantly related. For age, as it is continuous variables, association correlation were tested with Pearson Correlation Test. No significant association between mean age and mean energy intake in this study. This was contradicted with a study by Younis & Eljamay (2020) where they found that in their study, older teenagers tend to consume more fast foods compared to older teenagers. This was also contradicted in a study that shows that Stage 2 obesity transition is broadly characterised by a large increase in the prevalence among adults followed by a smaller increase among children. The prevalence of overweight and obesity in the age range of 20-24 according to NHMS 2019 is 19.7 and 11.5 respectively. The trend is increasing as the age range increases shows that prevalence of overweight and obesity increases with age.

Sex, ethnicity, religion, year of study and monthly pocket money were categorised into categorical variable and the association is done by running Chi-square correlation test. There is no significant association between sex, ethnicity, religion, year of study and monthly pocket money with dietary intake. The mean energy intake is categorised into ≤1200 and >1200 where it is a general definition of low-calorie diet. The limitation of this study is that weight of the respondents is not taken into consideration hence cannot categorise the energy intake to a category using Malaysia RNI energy calculation where it requires weight. There was no significant association between sex, ethnicity, religion, year of study and monthly pocket money with dietary intake.

In this study, sex has no significant association with dietary intake where it contradicts with a study where they found that there are significant gender disparities in obesity prevalence worldwide. It was found that females are more obese in low-income and middle-income countries, with the gender gap being highest in middle-income countries. For middle-income

countries, this gap also widens over time. In high-income economies, the gender obesity gap disappears as the growth of female obesity is slower than that of male obesity (Ameye & Swinnen, 2019). This was supported by LM et al., (2019) where they found that before this, obesity is more prevalent among men however, across the years, the gender gap of obesity has been narrowed where the prevalence of obesity among women to be in the range of 25-40%; and that among men near to 20%. It can also be seen in the prevalence of overweight male and female in Malaysia between male and female has not much of a difference which is 30.8 and 30.0 respectively while obesity prevalence between male and female 15.3 and 24.7. Obesity and overweight main contribution is from energy intake thus this study contradicts with previous studies that found that sex has significant association with dietary intake.

Year of study has no significant association with dietary intake. It was hypothesized that university students will lead a lifestyle that is sedentary and high in calories and Bernardo et al., (2017) tested out a hypothesis of those students who live at campus and away from the family and having to assume responsibilities, such as food acquisition and preparation, may significantly affect the eating habits of university students. They found that university students' intake of fruits and vegetables is low. As discussed above, this study limitation is that weight was not taken and by that, we cannot know whether the students are under-reporting their dietary intake or not. However, in this study, the dietary intake is not reaching Malaysia RNI. However, this was supported by a study conducted among undergraduates in UKM, Bangi where in their study it was found that calorie and fat did not achieve the healthy amount to sustain daily life however it was noted that it is maybe the lower energy that they consume can sustain their daily life as most of the respondents is living a sedentary lifestyle hence not much of energy is required (Omar et al., 2015). This low mean energy intake and not reaching Malaysia RNI was also supported by a study conducted by a study also conducted among undergraduate in IIUM where they found that mean calories intake for both male (1504.3 ±

739.4 kcal) and female (1329 ± 510.5 kcal) students were inadequate as compared to Malaysia RNI. This study also found that although the proportion of energy derived from macronutrients was still within recommendation, it was observed that their diets had inadequate vegetables and lack of variety in protein sources. Total fat intake was high in the vast majority of the diets while excessive consumption of empty calories was observed distinctively.

Monthly pocket money also has no significant association with dietary intake. This contradicts with a few studies that found that income or in this context, monthly pocket money has significant associations with dietary intake and dietary quality. Van den Broeck et al., (2020) found that increase in family financial status is crucial in the improvement in the family nutritional status, both in terms of quantity and quality of the nutrition. In their study, it can be seen that in rural Tanzania, a family who is self-employed in the agricultural sector and a household that has joint income has a strong correlation with caloric and micronutrient intake among the family members. This was supported by a study that wanted to find the associations between various SES groups with Zn and Fe intake. It was seen that although there was no significant association between income and ZN and Fe intake, it is to be noted that Fe intake between low income and affluent are quite notable. This study was supported by a study that concluded that an annual family income of more than 500 LYD was related to an increased fast-food consumption of participates compared to an annual family income of (200-300 LYD) that was similar what reported in study by Fanning in (2002) which said probability of increase consuming fast-food increase with family income (Younis & Eljamay, 2019). However, all of these studies found that higher income equals better quality and quantity of dietary intake although there is a study that found that obesity is rising quite rapidly in low-income and middle-income countries compared to high-income countries. The author notes that it does not mean that high-income countries have lower obesity and overweight prevalence, it is that the prevalence in low and middle income is so rapidly rising compared to high-income countries

(Ameye & Swinnen, 2019). Further studies need to take into account these factors which are family income and monthly pocket money with dietary intake and dietary quality.

4.6 Correlations between size of food container and dietary intake

The sizes of plates and bowls chosen by the respondents are categorised in frequency and percentage as it is a continuous variable hence the association test used is Pearson Correlation Test. There is no significant association between each size of plates and bowls used by respondents with dietary intake in this study with the p value for size of plates for small (, medium and large is p=.421, p=.086 and p=.571 respectively. While p value for size of bowls used for small, medium and large is p= .171, p=.575 and p=.501 respectively. This actually contradicts with a study conducted by Marchiori, et al., (2012) where they give 88 Belgian undergraduates different container sizes for the course of 3 days while the portion of the food served in the containers are kept constant. At the end of each day, respondents were asked if they wanted to add on the food portions that were given to them and the researchers concluded that people tend to serve themselves larger food portions in larger plates, bowls or containers, they also eat more when they are served food portions of similar sizes in larger containers. As a matter of fact, calories intake increased by more than 100% when increasing container size (CS) by 300%. Lin & Fang (2019) also supported these findings where they found a significant increase in the consumption of fried rice with the size of plates used. However, it is only significant in the male population and not in females. They concluded that a larger container size may induce more energy intake and overconsumption. However, a study conducted by Lim et al., (2019) in Muar, Johor did a similar study where subjects who were provided with bigger plate size consistently tended to have greater meal energy values, choosing foods with larger portion sizes. Furthermore, in their study, both men and women tended to consume more foods with bigger plate size, indicating that platescapes do have an impact on energy intake. This study contradicts with the study by Lin and Fang that females have no significant

association to the size of CS and PS but the final findings is quite the same which is that container sizes do influence portion intake thus increasing energy intake. Nonetheless, further study need to be done in this field as there is also a study conducted by Libotte et al., (2014) where in their study among undergraduates in Zurich University contradicts with the findings that CS increases PS thus increasing energy intake. They found that even though PS increases with CS, in their studies, respondents who were given bigger size containers tend to serve themselves a larger vegetables and fruits portion. Therefore, they note that the use of large plates should also be considered as a strategy to promote healthy eating by increasing vegetable consumption. It is evident that further investigations in this field are required in order to produce a better evaluation of the effect of container sizes with consumption.

It can also be seen in this study the dietary intake of those choose small, medium and large sizes of plates is 1409.5 ± 432.63, 1454.6 ± 320.29, 1424.0 ± 370.8 respectively while mean energy intake for those who choses small, medium and large sizes bowl is 1450.4 ± 401.88, 1440.7 ± 355.55 and 1355.3 ± 245.21 respectively. We can see that in both medium and large size for both plates and bowls, the mean dietary intake is more in the medium size compared to larger size, this is actually supported by a study by Lyons, et al., (2018) where they hypothesize that the relationship between container size and food intake is curvilinear where at one point, the package size would stop affecting the usage volume, both in food and non-food items. Their findings supported their hypothesis where they found that there was no difference in the usage volume of medium and large size packages. The respondents were then being followed up and the answers are that even though they believe that 'more is better' they also believe that too much is also possible.

Table 4. 8 Perason correlation analysis of size of food container (Plates and bowls) (n=123)

Variables	**n (%)**	**Dietary intake**

			Mean ± SD	r value	p value
Plate	Small (17 cm)	12 (9.8)	1436 ± 353.73	.038	.421
	Medium (22 cm)	53 (43.1)		.156	.086
	Large (27 cm)	58 (47.2)		.09	.571
Bowl	Small (17 cm)	19 (13.8)		-.11	.171
	Medium (22 cm)	97 (78.9)		.098	.575
	Large (27 cm)	9 (7.3)		-0.16	.501

4.7 Associations between DFO and dietary intake

There is no significant association between digital food ordering and dietary intake. This was actually supported by a study Rubby and Briawan (2020), where they also found that there is no association between Online Food Ordering (OFD) frequency and food consumption quality of the subjects. Furthermore, in this study, the subjects' average frequency of DFO was 1.6±2.0 times per week and most of them (≤3 times a week) ordered food through online applications (83.9%). The most common reason for the subjects to order food through the online application was discounts and promotions offered (74.7%).

In this study, the subjects' gender and age had a significant correlation with their DFO frequency. Females tend to buy the DFO platform more than males (C=-0.334, p=0.002). This study notes that this may happen due to the fact that females tend to be more interested in discounts and promotions offered by the platform. Other than that, the older the subjects, the lesser their frequency of using DFO (r=- 0.316, p=0.003). This study concluded that there were significant correlations between age and gender with DFO frequency. However, there was no significant correlation between DFO frequency and food consumption quality. This might be due to the infrequent use of DFO for most of the subjects.

Furthermore, in this study, the type of food ordered through DFO platform only comes in two categories which is fast food and hot meals and it can be seen that more of the respondents usually ordered fast foods while using DFO platform. The results of research conducted by Dewi and Trias (2013) shows that the frequency of ordering food online is relatively rare, which is <3 times a week. However, students who often order food online are >3 times a week, the majority are obese. The results showed that there was a correlation between the frequencies of ordering online food with obesity in Medan Area University students. Application users are made easy to not do activities outside the house but the food they want can be delivered to the house. This greatly facilitates Medan Area University students, where not all students have vehicles to buy the food they want, can avoid hot weather, can avoid vehicle smoke, and can avoid the traffic jams in Medan City. This is exacerbated by the type of food consumed which is mostly incomplete types of food, such as fast food. After not doing physical activity to buy food out of the house, students consume fast food, then they will remain at home without doing other physical activities. So, there is accumulation of fat which causes obesity. So, it can be concluded that, the more often students order food online, the greater the risk of being obese. Excessive energy intake and not balanced with balanced energy expenditure (with less physical activity) will cause weight gain. Changes in lifestyle lead to changes in people's diet which refers to a diet high in calories, fat and cholesterol, and not balanced with physical activity can cause more nutritional problems (Hidayanti, 2010).

Table 4. 9 Frequency of digital food ordering and type of food usually ordered via digital food ordering

Variable	**Mean ± SD**	**r value**	**p value**
Frequency of using DFO	1.86 ± 0.802	.123	.877

Variables	**n (%)**		**x^2**	**p value**
	≤1200	**>1200**		

Type of food ordered using DFO	Fast Food	21	47	17.44	.827
	Hot meals	18	37		

Table 4.7 (1) Pearson correlation analysis of digital food ordering with dietary intake

			Dietary intake	
Section	**Mean ± SD**	**Mean ± SD**	**r value**	**p value**
Convenience	12.8 ± 2.088	1436 ± 353.73	.022	.810
Design	13.1 ± 2.085		-.019	.839
Trustworthiness	12.1 ± 2.256		.101	.264
Price	9.8 ± 2.311		.026	.773
Variety (food choices)	12.3 ± 2.169		.091	.319
Perceived value	10.9 ± 2.058		.040	.659
Attitudes towards food delivery apps	10.6 ± 2.191		.123	.175
Intent to continuously use food delivery apps	10.6 ± 2.649		.109	.228
Mean total score	92.4 ± 14.107		.081	.376

***p<.05**

CONCLUSION

The limitations of this study are not taking the weight of the respondents. Weight is crucial to know whether mean energy taken from the Frequency Questionnaire (FFQ) is under-reported or not. Other than that, FFQ used is self – administered, as it is a long instrument, it is a bit

time consuming, hence we do not know whether the respondents really took their time to answer and fully completed their FFQ earnestly. On top of not having the weight taken, we do not know whether the mean energy obtained from FFQ is meeting their daily requirement or not. Furthermore, there is an absence of a validated tool to assess the relationship between DFO and dietary intake. Digital Food Ordering (DFO) is a tool that is predicted to grow more and become more stable in daily lives, thus a tool designated to find the correlation of DFO and dietary intake can really be a game changer.

In conclusion, there is no significant association between digital food ordering, socio-demographic factors and size of food container with dietary intake. In upcoming studies, FFQ is suggested to do a face-to-face interview as the long duration of time to self-administered will lead to possibilities of under reporting. For future studies, instead of only finding the size of food containers, can also find the portion sizes to see if container size really affects the dietary intake.

REFERENCES

Abdull Hakim, N.H., Muniandy, N.D. & Danish, A. (2012). Nutritional Status and Eating Practices among Universities Students in Selected Universities in Selangor, Malaysia. Asian Journal of Clinical Nutrition 4(3). 77-87. doi 10.3923/ajcn.2012.77.87

Ameye, H., & Swinnen, J. (2019). Obesity, income and gender: The changing global

relationship. *Global Food Security*, Ameye, H., & Swinnen, J. (2019). Obesity, income and gender: The changing global relationship. *Global Food Security*, *23*(September), 267–281. https://doi.org/10.1016/j.gfs.2019.09.003

Azam, M. O., Sabudin, M., Osman, A., & Shiang-Yen, T. (2011). Consumer Behaviors toward Usage of Smartphone in Malaysia. *2011 International Conference on Software and Computer Applications*, *9*, 158–164. https://s3.amazonaws.com/academia.edu.documents/31394649/ICCBM2011_30-B033.pdf?AWSAccessKeyId=AKIAIWOWYYGZ2Y53UL3A&Expires=1554104033&Signature=l7l0jerFRFx%2BiR9WvN%2FMBBDxC70%3D&response-content-disposition=inline%3B filename%3DConsumer_Behaviors_towar

Bernardo, G. L., Jomori, M. M., Fernendes, A. C. & da Costa Proenca, R. P. (2017). Food intake of university students. *(n.d.), 30*(6). 847-865. Doi https://doi.org/10.1590/1678-98652017000600016

Bivoltsis, A., Cervigni, E., Trapp, G., Knuiman, M., Hooper, P., & Ambrosini, G. L. (2018). Food environments and dietary intakes among adults: Does the type of spatial exposure measurement matter? A systematic review. *International Journal of Health Geographics*, *17*(1), 1–20. https://doi.org/10.1186/s12942-018-0139-7

Bouchoucha, M., Akrout, M., Bellali, H., Bouchoucha, R., Tarhouni, F., Ben Mansour, A., & Zouari, B. (2016). Development and validation of a food photography manual, as a tool for estimation of food portion size in epidemiological dietary surveys in Tunisia. *Libyan Journal of Medicine*, *11*(December). https://doi.org/10.3402/ljm.v11.32676

Brunstrom, J. M. (2011). The control of meal size in human subjects: A role for expected satiety, expected satiation and premeal planning. *Proceedings of the Nutrition Society*, *70*(2), 155–161. https://doi.org/10.1017/S002966511000491X

Calloway, E. E., Parks, C. A., Bowen, D. J., & Yaroch, A. L. (2019). Environmental, social, and economic factors related to the intersection of food security, dietary quality, and obesity: An introduction to a special issue of the Translational Behavioral Medicine journal. *Translational Behavioral Medicine*, *9*(5), 823–826. https://doi.org/10.1093/tbm/ibz097

Centers for Disease Controls and Prevention. (2020). Adult Obesity Causes and Consequences. Retrieved from https://www.cdc.gov/obesity/adult/causes.html

Chan, Y. Y., Lim, K. K., Lim, K. H., Teh, C. H., Kee, C. C., Cheong, S. M., Khoo, Y. Y., Baharudin, A., Ling, M. Y., Omar, M. A., & Ahmad, N. A. (2017). Physical activity and overweight/obesity among Malaysian adults: Findings from the 2015 National Health and morbidity survey (NHMS). *BMC Public Health*, *17*(1), 1–12. https://doi.org/10.1186/s12889-017-4772-z

Cho, M., Bonn, M. A., & Li, J. (Justin). (2019). Differences in perceptions about food delivery apps between single-person and multi-person households. *International Journal of Hospitality Management*, *77*(June 2018), 108–116. https://doi.org/10.1016/j.ijhm.2018.06.019

DiSantis, K. I., Birch, L. L., Davey, A., Serrano, E. L., Zhang, J., Bruton, Y., & Fisher, J. O. (2013). Plate size and children's appetite: Effects of larger dishware on self-served portions and intake. *Pediatrics*, *131*(5). https://doi.org/10.1542/peds.2012-2330

Framework, G. (2019). Food Frequency Questionnaires (FFQ) Food Frequency Questionnaires (FFQ). *Nutrición Hospitalaria*, *31*(3), 49–56.

Harahap, L. A. H., Aritonang, E., & Lubis, Z. (2020). The relationship between type and frequency of online food ordering with obesity in students of Medan Area University. Britain International of Exact Sciences (BIoEx) Journal, 2(1), 29-34.

Hill, J. O., Wyatt, H. R., & Peters, J. C. (2012). Energy balance and obesity. Circulation, 126(1), 126–132. https://doi.org/10.1161/CIRCULATIONAHA.111.087213

Hulley, S., Cummings, S., Browner, W., Grady, D., & Newman, T. (2013). Designing clinical research : an epidemiologic approach (4th ed.). Lippincott Williams & Wilkins.

Institut Kesihatan Umum, (IKU). (2019). *National Health and Morbidity Survey 2019 - Technical Report (MOH/S/IKU/144.20(TR)-e)* (Vol. 1).

Institute for Public Health. (2014). National Health and Morbidity Survey 2014: Malaysian Adult Nutrition Survey (MANS) Volume II: Survey Findings. In *Ministry of Health Malaysia: Vol. II* (Issue April). https://doi.org/10.13140/RG.2.1.4039.9769

Jamieson, S. (2004). Likert scales: How to (ab)use them. *Medical Education*, *38*(12), 1217–1218. https://doi.org/10.1111/j.1365-2929.2004.02012.x

Knez, M., Nikolic, M., Zekovic, M., Stangoulis, J. C., Gurinovic, M., & Glibetic, M. (2017). The influence of food consumption and socio-economic factors on the relationship between zinc and iron intake and status in a healthy population. *Public Health Nutrition*, *20*(14), 2486–2498. https://doi.org/10.1017/S1368980017001240

Lee, Y. Y., & Wan Muda, W. (2019). Dietary intakes and obesity of Malaysian adults. Nutrition research and practice, 13(2), 159–168. https://doi.org/10.4162/nrp.2019.13.2.159

Lucas, F., Niravong, M., Villeminot, S., Kaaks, R., Inserm, U., Roussy, I. G., Desmoulins, C., Thomas, A., & Cedex, L. (n.d.). Estimation of food portion size using photographs : validity , strengths , weaknesses and recommendations. *2995*, 65–74.

Lyons, J., Walton, J., & Flynn, A. (2018). Larger food portion sizes are associated with both positive and negative markers of dietary quality in irish adults. *Nutrients*, *10*(12).

https://doi.org/10.3390/nu10121929

Marchiori, D., Corneille, O., & Klein, O. (2012). Container size influences snack food intake independently of portion size. *Appetite*, *58*(3), 814–817. https://doi.org/10.1016/j.appet.2012.01.015

Marchiori, D., Papies, E. K., & Klein, O. (2014). The portion size effect on food intake. An anchoring and adjustment process? *Appetite*, *81*, 108–115. https://doi.org/10.1016/j.appet.2014.06.018

Mathers, C. D., & Loncar, D. (2006). Projections of global mortality and burden of disease from 2002 to 2030. *PLoS Medicine*, *3*(11), 2011–2030. https://doi.org/10.1371/journal.pmed.0030442

NPD Group. Food Service Delivery Among Fastest Growing U.S. Restaurant Industry Trends. (2018). Available online at: https://www.npd.com/wps/portal/npd/us/news/press-releases/2018/foodservice-delivery-in-us-posts-double-digit-gains-over-last-five-years-with-room-to-grow/ (accessed December 17, 2019)

Omar, N. H., Ling, T. P., Joe, L. S. & Ramaya, K. (2015). Dietary Intake and Physical Lifestyle of Residential College Students in Universiti Kebangsaan Malaysia. Jurnal Personalia Pelajar, 18(2). 75-85.

Rubby, A. S. H., & Briawan, D. (2020, November). Online Food Delivery and Food Consumption Quality among Students of SMA Negeri 2 Yogyakarta Indonesia. In Conference on Nutrition and Food 2020 (1st IPB ICNF 2020) (Vol. 18, p. 33).

Swinburn, B. A., Caterson, I., Seidell, J. C., & James, W. P. (2004). Diet, nutrition and the prevention of excess weight gain and obesity. Public health nutrition, 7(1A), 123–146.

https://doi.org/10.1079/phn2003585

Van den Broeck, G., Mardulier, M., & Maertens, M. (2020). All that is gold does not glitter: Income and nutrition in Tanzania. *Food Policy*, *September*, 101975. https://doi.org/10.1016/j.foodpol.2020.101975

Wansink, B. (2004). Environmental factors that increase the food intake and consumption volume of unknowing consumers. *Annual Review of Nutrition*, *24*(217), 455–479. https://doi.org/10.1146/annurev.nutr.24.012003.132140

Wansink, B., & Cheney, M. M. (2005). Super bowls: Serving bowl size and food consumption. *Journal of the American Medical Association*, *293*(14), 1727–1728. https://doi.org/10.1001/jama.293.14.1727

Wansink, B & Sobal, J. (2007). Mindless Eating: The 200 Daily Food Decisions We Overlook. *ENVIRONMENT AND BEHAVIOR*. *39*. 106-123. 10.1177/0013916506295573.

World Health Organization. (2020). *Obesity and Overweight.* Retrieved from https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight

Younis, F. H., & Eljamay, S. M. (2019). Fast Food Consumption among Teenagers aged between (13 to 25) years old and Their Effect on Health in Derna-Libya. J Regen Biol Med., 1(1), 1-8.

Young, L. R., & Nestle, M. (2007). Portion sizes and obesity: responses of fast-food companies. Journal of public health policy, 28(2), 238–248. https://doi.org/10.1057/palgrave.jphp.3200127

Zhao, Y., & Bacao, F. (2020). What factors determining customer continuingly using food delivery apps during 2019 novel coronavirus pandemic period? *International Journal of*

Hospitality Management, *91*(September), 102683. https://doi.org/10.1016/j.ijhm.2020.102683

Zion, A. & Hollmann, T. (n.d.). Food Delivery Apps: Usage and Demographics — Winners, Losers and Laggards. Retrieved from https://www.zionandzion.com/research/food-delivery-apps-usage-and-demographics-winners-losers-and-laggards/

APPENDIX

Appendices A: Questionnaire

FACULTY OF MEDICINE AND HEALTH SCIENCES

FAKULTI PERUBATAN DAN SAINS KESIHATAN

DEPARTMENT OF DIETETICS

JABATAN DIETETIK

QUESTIONNAIRE

BORANG SOAL SELIDIK

RESEARCH TITLE:

TAJUK KAJIAN:

DIGITAL FOOD ORDERING AND OTHER FACTORS THAT INFLUENCE DIETARY INTAKE AMONG UNDERGRADUATES IN SELECTED COLLEGES IN UNIVERSITI PUTRA MALAYSIA

PESANAN MAKANAN SECARA DIGITAL SERTA FAKTOR LAIN YANG MEMPENGARUHI PENGAMBILAN TENEGA DI KALANGAN PELAJAR SARJANA MUDA DI KOLEJ KEDIAMAN TERPILIH DI UNIVERSITI PUTRA MALAYSIA

RESEARCHER

PENYELIDIK : HUSNA BT HANIFAH SYUKRI (198486)

SUPERVISOR

PENYEDIA PENYELIDIK: ASSOC. PROF. DR. ROSITA JAMALUDDIN

Instruction: The questions within this questionnaire are only for academic purposes. All the information will not be revealed to any parties. Your involvement and cooperation are much appreciated.

Arahan: Soalan di dalam borang soal selidik ini hanya untuk tujuan akademik sahaja. Sebarang maklumat tidak akan didedahkan ke mana-mana pihak. Penglibatan dan kerjasama anda amatlah dihargai.

PART A: SOCIO-DEMOGRAPHIC CHARACTERISTICS
Bahagian A: Sosio-Demografik

Fill in the blank or tick the boxes for the questions below.

Isikan tempat kosong atau tandakan bagi soalan di bawah.

No.	Information	Options

1.	Age *Umur*	
2.	Sex *Jantina*	( ) Male / *Lelaki* ( ) Female / *Perempuan*
3.	Ethnicity *Etnik*	( ) Malay / *Melayu* ( ) Chinese / *Cina* ( ) Indian / *India* ( ) Others / *Lain-lain* Please specify *Sila nyatakan*: …….
4.	Religion *Agama*	( ) Islam ( ) Buddha ( ) Hindu ( ) Christian ( ) Others Please specify *Sila nyatakan*: …….
5.	Current year of study *Tahun pengajian*	( ) First Year / *Tahun pertama* ( ) Second Year / *Tahun kedua* ( ) Third Year / *Tahun ketiga* ( ) Fourth Year / *Tahun keempat* ( ) Fifth Year / *Tahun kelima*
6.	Monthly pocket money *Duit belanja bulanan*	( ) ≤ RM 100.00 ( ) RM 100.01 – RM 300.00 ( ) RM 300.01 – RM 500.00 ( ) RM 500.01 – RM 700.00 ( ) > RM 700.00

PART B: SIZE OF FOOD CONTAINER

Bahagian B: Saiz bekas makanan dan bahagian makanan

Food container / *bekas makanan*	**Small / *Kecil*** 17 cm (***6 inch***)	**Medium** 22 cm (***8 inch***)	**Large / *Besar*** 27 cm (11 inch)	**Others** (please indicate the size)
Plate / *Pinggan*				
Bowl / *Mangkuk*				

PART C: FOOD FREQUENCY QUESTIONNAIRE

In this section, you will be asked questions on whether you have eaten or not the type of foods listed. Write down numbers in the column how many times were consumed whether **Daily**, **Weekly**, or **Monthly**. How many times each serving were taken refers to how many of those foods were eaten by the respondents for each time. For example, if you eat papaya, you will be

asked how many slices of papaya were taken each time. If you answered 2 slices, fill in "2" in the answer space. This is because each serving equals to one slice of papaya.

Dalam bahagian ini, anda akan ditanya jika anda ada mengambil makanan yang disenaraikan atau tidak. Catatkan berapa kali anda mengambil makanan tersebut dalam ruangan yang disediakan mengikut kadar pengambilan anda sama ada harian, mingguan atau bulanan. Berapa kali makanan diambil itu bermaksud berapa banyak anda makan bagi satu satu hidangan. Contohnya, jika anda memakan betik, anda akan ditanya berapa potong betik anda makan pada satu masa. Jika anda memakan 2 potong betik, isikan 2 di ruangan yang disediakan.

No.	Type of food	How frequent each food was taken (Fill in one of the columns only)			Reference of meal size	Total servings (each time eaten)
	A. Cereals and cereals product	Daily	Weekly	Monthly		
1	White rice	/			cup	1
2	Brown rice	-	-	-	cup	-
3	Flavoured rice	-	-	/	cup	1
4	Rice porridge	-	/	-	cup	1
5	Glutinous rice	-	-	/	cup	1/2
6	Noodles	/	-	-	cup	1
7	Mihun/ Kueh teow/ laksa/ laksam/ loh shi fun	/	-	-	cup	1

No.	**Type of food**	**How frequent each food was taken** ***(Fill in one of the columns only)***			**Reference of meal size**	**Total servings (each time eaten)**
	A. Cereals and cereals product	**Daily**	**Weekly**	**Monthly**		
1	White rice				cup	
2	Brown rice				cup	
3	Flavoured rice				cup	
4	Rice porridge				cup	
5	Glutinous rice				cup	
6	Noodles				cup	
7	Mihun/ Kueh teow/ laksa/ laksam/ loh shi fun				cup	
8	Pasta				cup	
9	Sago/ambuyat/linut				cup	
10	Bread				slices	
11	Wholemeal bread				slices	

12	Bread bun				pieces	
13	Roti Canai (includes roti telur, roti sardine, roti bawang, roti pisang, murtabak)				slices	
14	Capati				slices	
15	Tosai				slices	
16	Breakfast cereals				cup	
17	Cereal grains prepared with water				cup	
18	Corn				tongkol	
No.	**Type of food**	**How frequent each food was taken *(Fill in one of the columns only)***			**Reference of meal size**	**Total servings (each time eaten)**
	B. Fast food	**Daily**	**Weekly**	**Monthly**		
19	Burger				pieces	
20	Fried Chicken				pieces	
21	Pizza				slices	
22	French Fries				medium size	

No.	**Type of food**	**How frequent each food was taken *(Fill in one of the columns only)***			**Reference of meal size**	**Total servings (each time eaten)**
	B. Fast food	**Daily**	**Weekly**	**Monthly**		
23	Mashed Potatoes				small container	
24	Coleslaw				small container	
25	Sausage/Hotdog/Frankfurter				slices	
26	Nugget				pieces	
No.	**Type of food**	**How frequent each food was taken *(Fill in one of the columns only)***			**Reference of meal size**	**Total servings (each time eaten)**
	C. Meat and meat product (*For non-Muslim only)	**Daily**	**Weekly**	**Monthly**		
27	Chicken				pieces	
28	Quail				whole	
29	Duck				pieces	
30	Meat				matchbox size	
31	Mutton				matchbox size	
32	Internal organs (liver, spleen, lungs)				matchbox size	
33	Chicken/ meat ball				pieces	
34	*Ham				slices	
35	*Bacon				slices	
36	*Luncheon meat				slices	
37	*Pork				matchbox size	
No.	**Type of food**	**How frequent each food was taken *(Fill in one of the columns only)***			**Reference**	**Total servings**

	D. Fish and seafoods	Daily	Weekly	Monthly	of meal size	(each time eaten)
38	Marine fish				whole	
39	Freshwater fish				whole	
40	Prawn				whole	
41	Squid				whole	
42	Canned fish				whole	
43	Crab				whole	
44	Anchovy				tablespoon	
45	Shellfish				tablespoon	
46	Snail				tablespoon	
47	Pickled fish				pieces	
48	Dried squid				pieces	
49	Fish/prawn/squid/crab crackers				slices	
50	Keropok lekor				slices	
51	Fish/prawn/squid/crab ball or cake				pieces	
52	Dried fish				whole	

No.	Type of food	How frequent each food was taken *(Fill in one of the columns only)*			Reference of meal size	Total servings (each time eaten)
	E. Eggs	**Daily**	**Weekly**	**Monthly**		
53	Hen eggs (bulls' eye, omelette, boiled, with chilies or herbs)				pieces	
54	Duck eggs (cooked with coconut milk gravy, omelette)				pieces	
55	Quail eggs (boiled, with chilies)				pieces	
56	Salted egg				pieces	

No.	Type of food	How frequent each food was taken *(Fill in one of the columns only)*			Reference of meal size	Total servings (each time eaten)
	F. Legumes and legumes product	**Daily**	**Weekly**	**Monthly**		
57	Legumes				tablespoon	
58	Groundnuts				tablespoon	
59	Taufufa				tablespoon	
60	Tauhu				slices	
61	Fermented soy beans (tempe)				slices	

No.	Type of food	How frequent each food was taken *(Fill in one of the columns only)*			Reference of meal size	Total servings (each time eaten)
	G. Milk and milk products					
62	Fresh milk				cup	
63	Commercial milk				cup	
64	Yogurt/lassi/curd				cup	

65	Powdered milk				tablespoon	
66	Evaporated milk				tablespoon	
67	Cheese				slices	
No.	**Type of food**	**How frequent each food was taken *(Fill in one of the columns only)***			**Reference of meal size**	**Total servings (each time eaten)**
	H. Vegetables	**Daily**	**Weekly**	**Monthly**		
68	Leaf green vegetables				tablespoon	
69	Ladies finger				tablespoon	
70	Other type of legumes				tablespoon	
71	Bean sprout				tablespoon	
72	Tubers (potatoes, sweet potatoes, yam)				tablespoon	
73	Cabbages				tablespoon	
74	Chilies				tablespoon	

No.	**Type of food**	**How frequent each food was taken *(Fill in one of the columns only)***			**Reference of meal size**	**Total servings (each time eaten)**
	H. Vegetables	**Daily**	**Weekly**	**Monthly**		
75	Tomatoes				tablespoon	
76	Brinjal				tablespoon	
77	Fruit vegetables (Luffa/pumpkin/cucumber/baby corn)				tablespoon	
78	Salted or dried vegetables				tablespoon	
79	Local fresh salads				tablespoon	
80	Mushrooms				tablespoon	
81	Dried mushrooms				tablespoon	
No.	**Type of food**	**How frequent each food was taken *(Fill in one of the columns only)***			**Reference of meal size**	**Total servings (each time eaten)**
	I. Fruits	**Daily**	**Weekly**	**Monthly**		
82	Papaya				slices	
83	Mango				slices	
84	Pineapple				slices	
85	Watermelon				slices	
86	Dragon fruit				slices	
87	Honey dew				slices	
88	Rock Melon				slices	
89	Guava				slices	
90	Water apple				piece	
91	Lime				piece	
92	Banana				piece	
93	Starfruit				piece	
94	Apple				piece	

95	Orange				piece	
96	Pear				piece	
97	Grape				piece	
98	Rambutan				piece	
99	Longan				piece	
100	Lychee				piece	
101	Mangosteen				piece	
102	Durian				piece	
103	Jackfruit				piece	
104	Canned fruits				tablespoon	
105	Dried fruits				tablespoon	
106	Pickled fruits				tablespoon	
107	Young coconut				tablespoon	

No.	**Type of food**	**How frequent each food was taken** ***(Fill in one of the columns only)***			**Reference of meal size**	**Total servings (each time eaten)**
	J. Drinks	**Daily**	**Weekly**	**Monthly**		
108	Plain water				cup	
109	Tea				cup	
110	Coffee				cup	
111	Chocolate drink				cup	
112	Malted drink				cup	
113	Pre-mixed drinks				cup	
114	Ready-to-drink drinks				cup	
115	Cordial syrup				cup	
116	Fruit juice				cup	
117	Carbonated drinks (includes isotonic)				cup	
118	Soy milk				cup	
119	Herbal/botanical drinks (pre-mixed)				cup	
120	Herbal/botanical drinks (ready-to-drink)				cup	
121	Herbal/botanical brewed drinks				cup	
122	Energy drinks				cup	
123	Yoghurt drinks				cup	
No.	**Type of food**	**How frequent each food was taken** ***(Fill in one of the columns only)***			**Reference of meal size**	**Total servings (each time eaten)**
	K. Alcoholic drinks ***(For non-Muslim only)***	**Daily**	**Weekly**	**Monthly**		
124	Shandy				glass	
125	Beer/lager/ale/stout				glass	
126	Todi (Palm wine)				glass	
127	Wine/cider/champagne/				glass	

	peri					
128	Rice wine/lihing				glass	
129	Brandi/rum/whiskey/ vodka/samsu/sam cheng/montoku/langkau				glass	
No.	**Type of food**	**How frequent each food was taken *(Fill in one of the columns only)***			**Reference of meal size**	**Total servings (each time eaten)**
	L. Confectionaries	**Daily**	**Weekly**	**Monthly**		
130	Local kuih				pieces	
131	Sweets				pieces	
132	Chocolate bar				small size 40g	
133	Cake				pieces	
No.	**Type of food**	**How frequent each food was taken *(Fill in one of the columns only)***			**Reference of meal size**	**Total servings (each time eaten)**
	L. Confectionaries	**Daily**	**Weekly**	**Monthly**		
134	Jelly/ custard				pieces	
135	Lolly ice				pieces	
136	Ice cream				pieces	
137	ABC/Ice blended				cup	
138	Cream crackers				pieces	
139	Flavoured/cream/ filled cookies				pieces	
140	Pastry (Pie, croissant)				pieces	
141	Snacks/crackers				pieces	
No.	**Type of food**	**How frequent each food was taken *(Fill in one of the columns only)***			**Reference of meal size**	**Total servings (each time eaten)**
	M. Bread spread	**Daily**	**Weekly**	**Monthly**		
142	Jam				teaspoon	
143	Kaya (coconut jam)				teaspoon	
144	Butter				teaspoon	
145	Margerine				teaspoon	
146	Peanut butter				teaspoon	
147	Cream cheese				teaspoon	
148	Chocolate spread				teaspoon	
149	Garlic spread				teaspoon	
No.	**Type of food**	**How frequent each food was taken *(Fill in one of the columns only)***			**Reference of meal size**	**Total servings (each time eaten)**
	N. Flavours	**Daily**	**Weekly**	**Monthly**		
150	Sugar (white, brown, Melaka)				teaspoon	
151	Honey				teaspoon	
152	Condensed milk (creamer)				tablespoon	
153	Condiment				teaspoon	
154	Pickles				teaspoon	
155	Shrimp paste				teaspoon	
156	Budu				teaspoon	

157	Cencalok				teaspoon	
158	Soy sauce				teaspoon	
159	Chili sauce				teaspoon	
160	Tomato ketchup				teaspoon	
161	Oyster sauce				teaspoon	
162	Fish sauce				teaspoon	
163	Petis/heko/otak udang				teaspoon	
164	Chili flakes				teaspoon	
165	Salad dressing				teaspoon	

PART D: DIGITAL FOOD ORDERING

Bahagian D: Pesanan makanan melalui digital

Instruction: Please tick the following question

Arahan: Sila tandakan jawab soalan dibawah.

Question	Answer
What is the frequency of using food delivery application for the past week? *Apakah kekerapan menggunakan aplikasi penghantaran makanan dalam seminggu yang lepas?*	( ) Never / *Tidak pernah* ( ) 1 – 2 kali ( ) 3 – 4 kali ( ) 5 – 6 kali ( ) 7 kali dan lebih
What type of food usually order if using food delivery application? *Apa jenis makanan yang selalu dibeli jika menggunakan aplikasi penghantaran makanan?*	( ) Fast food / *Makanan segera* ( ) Hot meals / *Makanan panas* ( ) Snacks / *Makanan ringan* ( ) Minuman / *Drinks*

Instruction: Please tick (√) at the option that describe your usage of food delivery application the best.

Arahan: Sila tandakan (√) pilihan yang menggambarkan penggunaan aplikasi penghantaran makanan dengan baik.

1 Strongly disagree 2 Disagree 3 Neutral 4 Agree 5 Strongly agree

1 Sangat tidak setuju 2 Tidak setuju 3 Neutral 4 Setuju 5 Sangat setuju

Convenience ***Kemudahan***	1	2	3	4	5
1. Using the food delivery app would be convenient for me *Penggunaan aplikasi penghantaran makanan memudahkan saya*					
2. The food delivery app would allow me to order food any time *Aplikasi penghantaran makanan membenarkan saya memesan makanan tidak kira masa*					
3. The food delivery app would allow me to order food any place					

Aplikasi penghantaran makanan membenarkan saya memesan makanan tidak kira tempat					
Design ***Reka bentuk*** 1. The food delivery app's structure is logical and easy to follow *Reka bentuk aplikasi logic dan senang untuk digunakan* 2. The food delivery app's design is concise and easy to understand *Reka bentuk aplikasi tepat dan senang difahami* 3. All the terms and conditions (e.g., payment, warranty) of the food delivery app are easy to read/ understand *Semua terma dan syarat aplikasi (kaedah pembayaran) senang untuk dibaca dan difahami.*	1	2	3	4	5
Trustworthiness ***Kepercayaan*** 1. I trust the food delivery app *Saya percaya aplikasi penghantaran makanan* 2. I felt secure in ordering food through the food delivery app *Saya berasa selamat memesan makanan melalui aplikasi penghantaran makanan* 3. The information provided by the food delivery app is reliable *Informasi yang disampaikan boleh dipercayai*	1	2	3	4	5
Price	1	2	3	4	5

Harga 1. When I order food through the delivery app, the food is a good product for the price *Apabila saya memesan makanan, saya mendapat makanan yang berpatutan dengan harga* 2. When I order food through the delivery app, the food is economical. *Apabila saya memesan makanan melalui aplikasi, ia lebih menjimatkan* 3. When I order food through the delivery app, the food is reasonably priced *Apabila saya memesan makanan menggunakan aplikasi, makanan adalah berpatutan*					
Variety (food choices) ***Variasi pilihan makanan*** 1. The food delivery app offers a variety of restaurant choices *Aplikasi penghantaran makanan menawarkan variasi restoran dan kedai makan untuk dipilih* 2. The food delivery app offers a variety of food choices *Aplikasi menawarkan variasi jenis makanan untuk dipilih* 3. I can order food with a wide range of prices through the food delivery app *Saya boleh memesan makanan mengikut julat harga yang saya mahukan*	1	2	3	4	5
Perceived value ***Nilai tampak*** 1. I feel I am getting good food products with a reasonable price when I use the food delivery app	1	2	3	4	5

Saya merasakan yang saya mendapat makanan yang bagus dengan harga yang berpatutan apabila saya memesan makanan menggunakan aplikasi 2. Using the food delivery app is worthy for me to devote my time and efforts *Menggunakan aplikasi penghantaran makanan adalah berbaloi dari segi masa dan tenaga saya* 3. Compared with conventional food purchasing ways, it is wise to use the food delivery app *Apabila dibandingkan penggunaan aplikasi penghantaran makanan dengan membeli makanan sendiri di restoran, lagi bagus menggunakan aplikasi*					
Attitudes towards food delivery apps ***Sikap terhadap aplikasi penghantaran makanan*** 1. Using the food delivery app is useful *Menggunakan aplikasi penghantaran makanan adalah berguna* 2. I am strongly in favour of ordering food through the delivery app *Saya lagi suka menggunakan aplikasi penghantaran makanan* 3. I desire to use the delivery app when I purchase food *Saya lebih suka membeli makanan melalui aplikasi penghantaran makanan*	1	2	3	4	5
Intent to continuously use food delivery apps ***Niat untuk terus menggunakan aplikasi penghantaran makanan*** 1. I intend to use the food delivery app	1	2	3	4	5

Saya berniat untuk menggunakan aplikasi penghantaran makanan					
2. If I have an opportunity, I will order food through the delivery app *Jika diberi peluang, saya akan memesan makanan melalui aplikasi*					
3. I intend to keep ordering food through the delivery app *Saya berniat untuk terus menggunakan aplikasi penghantaran makanan*					

END OF THE QUESTIONNAIRE!

THANK YOU FOR YOUR PATIENCE AND COOPERATION!

Appendix B: JKEUPM Approval

Ref. No: UPM/TNCPI/RMC/JKEUPM/1.4.18.2 (JKEUPM)
Date: 25 January 2021

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 **'Digital Food Ordering and Other Factors that Influence Dietary Intake Among Undergraduates in Selected Colleges in Universiti Putra Malaysia'** 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 Ms. Nurulhasanah Ishak (03-97691605) or Ms. Nor Ellia Abd Ajis (03-97691244).

Note: Please use this reference number for any transaction.

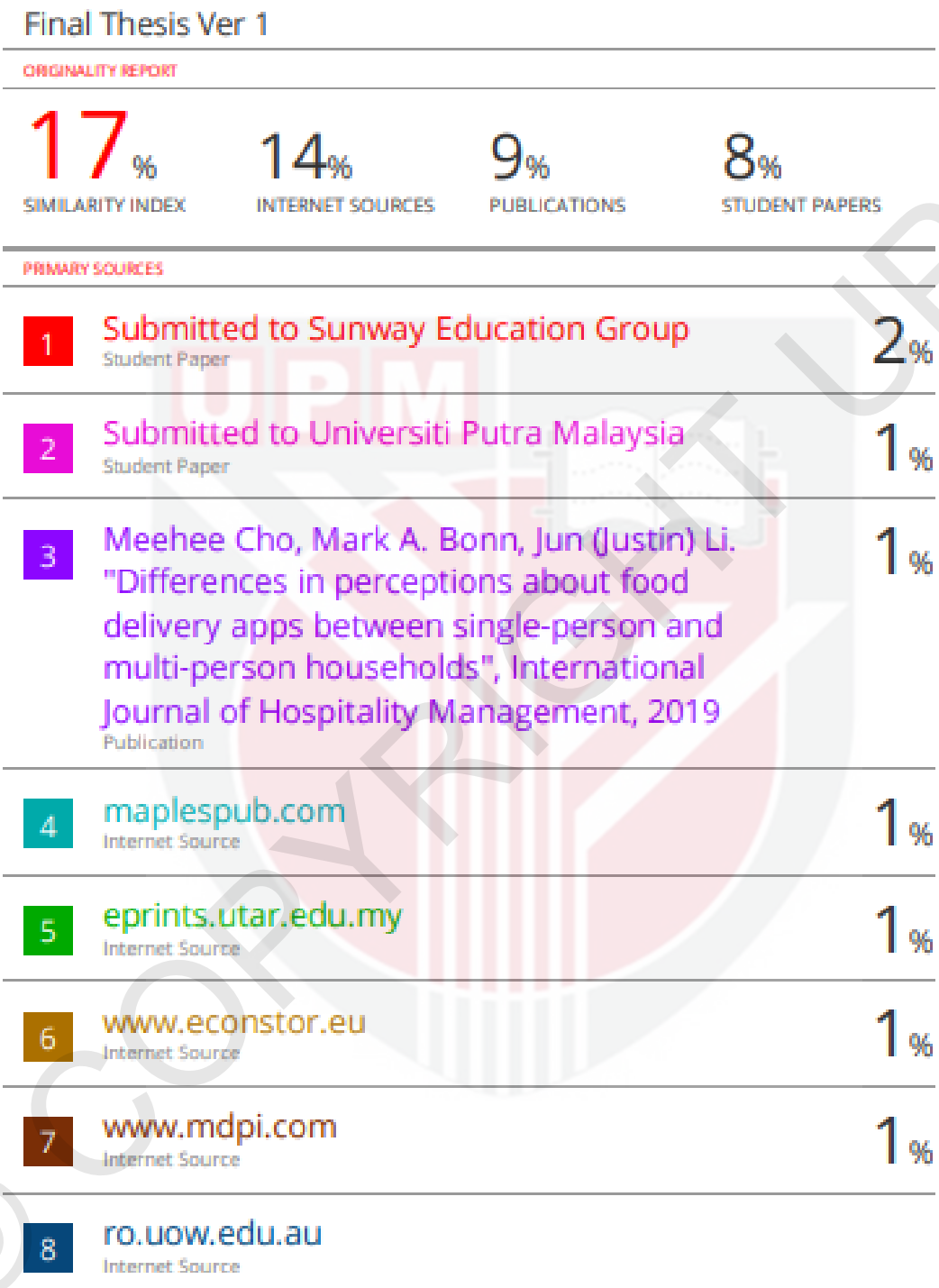
- JKEUPM-2020-437

Thank you.

Yours faithfully,

Prof. Dr. Zamberi Sekawi
Chair
Ethics Committee for Research Involving Human Subjects
Universiti Putra Malaysia

Appendices C: Turn it in percentage



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SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to Sunway Education Group Student Paper	2%
2	Submitted to Universiti Putra Malaysia Student Paper	1%
3	Meehee Cho, Mark A. Bonn, Jun (Justin) Li. "Differences in perceptions about food delivery apps between single-person and multi-person households", International Journal of Hospitality Management, 2019 Publication	1%
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