UNIVERSITI PUTRA MALAYSIA

FACTORS ASSOCIATED WITH FAD DIETS AMONG UNDERGRADUATE STUDENTS IN UNIVERSITI PUTRA MALAYSIA

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FACTORS ASSOCIATED WITH FAD DIETS AMONG UNDERGRADUATE STUDENTS IN UNIVERSITI PUTRA MALAYSIA

BY

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

APPROVAL

This project entitled "Factors Associated with Fad Diets Among Undergraduate Students in Universiti Putra Malaysia" was prepared by Nurul Natasha Binti Zaheid and submitted to the Faculty of Medicine and Health Sciences as a partial fulfillment of the requirement for the degree of Bachelor of Science (Nutrition and Community Health) from the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia.

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DECLARATION

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

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Abstract

FACTORS ASSOCIATED WITH FAD DIETS AMONG UNDERGRADUATE STUDENTS IN UNIVERSITI PUTRA MALAYSIA

Nurul Natasha Zaheid

Fad diets are any diet plan in defiance of logic, basic biochemistry and appetite which impact the nutritional and health status on those who are practicing fad diets. This cross-sectional study was designed to determine factors associated with fad diets among 188 undergraduate students in Universiti Putra Malaysia (UPM). Respondents in this study were selected using simple random sampling method. Respondents completed a self-administered questionnaire on socio-demographic background, body image perception, self-esteem, sources of information on nutrition and health, nutrition knowledge and fad diet practices. Anthropometric measurements including weight, height, and waist circumference were conducted. Results showed that most of the respondents dissatisfied with their body image (76.1%), had low self-esteem (62.8%), used online resources (78.2%) and friends/peers (76.6%) as their major sources to get nutrition and health information. The prevalence of practicing fad diet was 45.2%. Living arrangement, friends/peers (verbally), healthcare professional and body mass index were associated with fad diets practices (p<0.05). In conclusion, this study indicated that the majority of undergraduate students in UPM were dissatisfied with their body image and had low self-esteem, used online resources to get health and nutrition information, had good nutrition knowledge but unaware that fad diets are not sustainable for long-term as adopting a healthy and balanced diet that they can follow for a lifetime. These findings suggest a pressing need for dietitians and nutritionists to work together in order to demystify regarding health and nutrition information on social media.

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Abstrak

FAKTOR-FAKTOR YANG BERKAITAN DENGAN FAD DIET DALAM KALANGAN PELAJAR SARJANA MUDA DI UNIVERSITI PUTRA MALAYSIA

Nurul Natasha Zaheid

Fad diet adalah sebarang rancangan diet yang bertentangan dengan logik, biokimia asas dan selera makan yang mempengaruhi status pemakanan dan kesihatan bagi mereka yang mengamalkan diet. Kajian keratan rentas ini dirancang untuk menentukan faktor-faktor yang berkaitan dengan fad diet di kalangan 188 pelajar sarjana muda di Universiti Putra Malaysia (UPM). Responden dalam kajian ini dipilih menggunakan kaedah persampelan rawak mudah. Responden melengkapkan soal selidik yang dikendalikan sendiri mengenai latar belakang sosio-demografi, persepsi imej badan, harga diri, sumber maklumat mengenai pemakanan dan kesihatan, pengetahuan mengenai pemakanan dan amalan fad diet. Pengukuran antropometrik termasuk berat, tinggi, dan lilitan pinggang dilakukan. Hasil kajian menunjukkan bahawa sebahagian besar responden tidak berpuas hati dengan imej badan mereka (76.1%), mempunyai harga diri yang rendah (62.8%), menggunakan sumber dalam talian (78.2%) dan rakan / rakan sebaya (76.6%) sebagai sumber utama mereka untuk mendapatkan nutrisi dan maklumat kesihatan. Kelaziman mengamalkan diet fad adalah 45.2%. Tempat tinggal, rakan sebaya (secara lisan), pengamal kesihatan dan indeks jisim badan dikaitkan dengan amalan fad diet ($p<0.05$). Kesimpulannya, kajian ini menunjukkan bahawa majoriti pelajar sarjana di UPM tidak berpuas hati dengan imej badan mereka dan mempunyai harga diri yang rendah, menggunakan sumber dalam talian untuk mendapatkan maklumat kesihatan dan pemakanan, mempunyai pengetahuan mengenai nutrisi yang baik tetapi tidak menyedari bahawa fad diet tidak berjaya mengekalkan berat badan untuk jangka panjang melainkan mengamalkan diet yang sihat dan seimbang yang dapat mereka ikuti sepanjang hayat. Penemuan ini menunjukkan keperluan mendesak untuk pakar dietetik dan pakar pemakanan untuk bekerjasama dalam usaha untuk memberi maklumat kesihatan dan pemakanan yang sahih di media sosial.

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CHAPTER 1

INTRODUCTION

1.1 Background

Food faddism is a dietary practice based upon an exaggerated belief within the impacts of food or nutrition on wellbeing and maladies (McBean & Speckmann, 1974). McBean and Speckmann (1974) also mentioned that food faddism arises based on the belief where a particular food can cure a disease, have special health benefits and excludes from the diet due to presence of harmful constituents The definition of food faddism by McBean and Speckmann (1974) is published in The American Journal of Clinical Nutrition has been used in recent research studies in Pakistan and Ghana (Memon et al., 2015; Vuvor et al., 2017) and acknowledging the foundation it has been built on is important even though its publication by more than a decade.

Fad diets fall under the umbrella of food faddism. The definition of fad diets is very subjective. The Oxford Library of Words and Phrase (Volume III) suggests that 'fad' is an 18th century word; a shortened version of 'fiddle-faddle' which means 'trifling'. Van Ginneken (2003) suggests the word of fad as disproportionally fascination of a behaviour. According to Thomson-Gale (2013), fad diets are any diet plan that defies logic, basic biochemistry and appetite appeal. One of the characteristics of fad diets is quick weight loss and excellent physical health promise (Jáuregui-lobera, 2017). In addition, fad diets are characterised by any allegations made that are unrealistic and not supported by scientifically valid evidence (Freedman et al., 2001). Besides, fad diets often do not recommend regular physical activity (Alabama Public Health, 2017). Fad diets promote elimination and restriction of

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certain food groups such as cutting out almost all carbohydrates, animal products, fruits, vegetables, fats and dairy (Jáuregui-lobera, 2017). Besides, these diets advise eating mainly one type of food (Jáuregui-lobera, 2017). In addition, some fad diets require rigid menus where the selection of foods are not varies (Bastin, 2004). Other common features of fad diets include celebrity endorsements (Woolfe, 2016).

There are several popular fad diets around the world, which can be categorized into several groups: high-protein diets, moderate-fat and high-carbohydrate diets, low-fat and very high-carbohydrate diets and very low-calorie diets (Bastin, 2004). A British man, William Banting firstly introduced low-carbohydrate diet in 1863 and up to this day, the fad diets practices keep rising and come with different names (Kraig, 2013). Table 1.1 shows several popular fat diets.

Table 1.1: Several popular fad diets around the world

Diet type	Examples
High-protein diets	Atkins, Dukan, South Beach, Zone
Moderate-fat, high carbohydrate diets	Jenny Craig, Nutri-System, Weight Watchers
Low-fat, very high-carbohydrate diets	Ornish, The New Pritkin Program
Very low calories diets	Bernstein, Leighter Life, Slim Fast
High-fat diet	Ketogenic

Adapted from Bastin (2004)

In developed countries, several researchers did a survey on practicing a specific diet/fad diet. For instance, in the United States, 36% of young consumers aged 18 to 34 years followed a specific diet such as Paleo diet, low-carbohydrate, high-protein diet and high-fat diet (International Food Information Council, 2018). Another survey in the United States by Insider, reported that 31.1% people aged 18 to 29 years expressed interest in low-carbohydrate diet while 23.5% interested to go for reduced-

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calorie diet, 19.3% wanted to try ketogenic diet and 9.2% interested in trying the Atkins diet (Kotecki, 2019). A survey by The Hartman Group (2017) found that 44% of the American consumers have experimented with some type of diet where 12% of them practicing low-carbohydrate diet, 9% of them practicing Weight Watchers and 5% of them practicing Paleo diet. A study by Pedtke (2001) found that 32.2% of young adults aged 18-23 years in Ball State University have tried fad diets. In Canada, 33% of consumers aged ≥18 years followed restricted diets, 11 % followed Ketogenic diet and 4% followed Paleo diet (Insights West, 2019).

In developing countries, studies revealed that the prevalence of fad diets was high. In Pakistan, the prevalence of food faddism among women of childbearing age was 71.5% whereas 47.2% among children at age five and below five years old due to strict elimination diets for food allergies and clear liquid diet (Memon et al., 2015). The prevalence of food faddism in Ghana among university students aged 18 to 25 years was 65.3% (Vuvor et al., 2017). In Indonesia, 100.0% of Surabaya female adolescents practised fad diets (NurJannah et al., 2019) whereas 92.2% of Yogyakarta female adolescents practised fad diets (Sulistyan et al., 2016). In Jordan, 95.5% of university students and employees aged 18-55 years practicing fad diets (Al-Bakheit et al., 2019). From the developed and developing countries' studies, the prevalence of fad diets was high.

There are several factors contributing to the consumption of fad diets. One of the factors is socio-demographic factors. Socio-demographic factors is a combination of social and demographic characteristics of a population expressed statistically (MacMillan Dictionary, 2010). The stage of emerging adulthood, which defines as age 18 to 25 years, is a unique developmental period when young people's independence and autonomy are increasing (Nelson et al., 2008). Being a male or female, both

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genders have their own fights and struggles, as the world is elvolving with modernisation and civilisation (Anderson-Fye, 2011; Swami & Voracek, 2012). Socio-demographic factors influence dietary behaviour (Amoateng et al., 2016). According to Kiefer et al. (2005), there are some considerable gender-specific differences between women and men because they respond differently to foods. Men have a straightforward and pleasure-oriented approach to foods, while women have an ambivalent attitude (Kiefer, Rathmanner & Kunze, 2005). Thus, fad diets are much more common in women (Cormier, 2018). Household income is another subtopic under socio-demographic factors and based on a survey, those with higher household incomes are practising low-carbohydrate diets compared to those with lower household incomes (Finney Rutten et al., 2008).

On the other hand, personal factors such as source of information about nutrition and health and level of knowledge in nutrition contribute to dietary restriction behaviour (Lin et al., 2005). Low level of knowledge in nutrition can contribute to fad diets practices because those who are practicing fad diets do not follow recommended nutrient intakes for Malaysia (RNI) (Institute of Public Health, 2014; Mahmud et al., 2015). A study by Yahia et al. (2016) revealed that students who consumed more than 35 % calories from fat or >300 mg of cholesterol daily had lower nutritional knowledge than those students with lower fat or cholesterol intake. Another study by Guillaumie, Godin, and Vezina-Im (2010) suggested that nutrition knowledge is one of the factors that are most consistently related to healthy diet. Furthermore, those who are practicing fad diets do not seek the registered health professionals such as nutritionists to get information about nutrition and health. A recent Populus survey conducted on behalf of the British Dietetic Association (BDA) found that 41% of 18-24 aged group would trust the advice of a “healthy eating blogger” and 35% of people would trust diet and

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nutrition advice provided to them by a television chef. In addition, women were particularly vulnerable to trusting underqualified or unqualified professionals (British Dietetic Association, 2017).

Psychological factors define as how circumstances influence mental states and drive an action to seek satisfaction (Gellman & Turner, 2013). Psychological factors such as body image perception and self-esteem level have placed these young adults as nutritionally vulnerable groups (Daniali et al., 2013; Korn et al., 2013; Mase et al., 2015). Psychological factors play a big role in fad diets. A focus on beauty norms, weight loss, and celebrity association is particularly evident in the way fad diets are thriving over the years (Sikka, 2017). Young adults tend to have body dissatisfaction because they are constantly being brainwashed by society, as they perceive that the only way women can be accepted and fit in is if they are thin while for men, they need to be chiselled and lean in order to fit in the society (Baker & Blanchard, 2018; Sikka, 2017).

1.2 Problem Statement

The increase in health food movement over the years, which involve fad diets can lead to misleading information regarding nutrition and health (Jáuregui-Lobera, 2017). In this world where anyone can claim himself or herself as a “nutrition expert”, it is very difficult to differentiate whom to trust. Misleading information regarding nutrition and health has huge implications in term of nutritional and health status on those who are practicing fad diets. In term of nutritional status, deficiency in micronutrients occur when the diet is restricted (Poli et al., 2017). In term of health status, long-term high-protein diets can cause kidney damage whereas low-

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carbohydrate diets can cause ketosis resulting cardiac arrhythmias (Bilsborough & Crowe, 2003). These studies show how fad diets can cause more harm than the benefits of temporary weight loss.

Temporary weight loss has psychological implications on young adults because fad diets is not sustainable over a long-term (Joshi & Mohan, 2018). Yo-yo dieting cause emotional distress especially those who expected to have more personal success when they were at their ideal body image (Tylka et al., 2014). Those who are practising fad diets have a tendency to fall into low self-esteem, eating disorders and depression (Ackard et al., 2002). Not just the young adults are at war with their bodies, they are even at war with their minds (Grossbard, 2009; Latha et al., 2006). Thus, fad diets cause more bad consequences in term of mental health rather than positive impacts.

There are only a few studies regarding food faddism and fad diets, which were from Pakistan, Indonesia, Ghana, Jordan and the United States. In Pakistan, the study is focused on socio-demographic factors, reasons for food faddism, source of inspiration for practicing food faddism and health outcome such as being malnourished and low birth weight (Memon et al., 2015). In Indonesia, two studies are focused on body image distortion, eating behaviour, fad diets and body image (NurJannah et al., 2019) and macronutrient intake and fad diets (Sulistyan et al., 2016). In Ghana, the study is focused on socio-demographic factors, reasons and sources of information and perception of food on health (Vuvor et al., 2017) whereas in Jordan, the study is focused on socio-demographic factors, type of diet, sources of dietary plans (Al-Bakheit et al., 2019). In the United States, Thus, there is a need to study on other factors such as psychological factors and personal factors that could contribute to fad diets.

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According to Ministry of Health Malaysia (2016), dietary practices is included in nutrition research priority area to determine nutrition-related behaviour of various age groups. The suggested research topics help to identify gaps and barrier on practising healthy eating. Most of the studies conducted in Malaysia among undergraduate students are focused on eating disorder (Chin et al., 2020; Edman & Yates, 2004; Gan et al., 2011; Kristanto et al., 2016; Talwar, 2012), consumption of fast food (Syafiqah et al., 2018; Vijayakumaran & Amalina, 2018), meal skipping (Moy et al., 2009; Ramli & Appukuty, 2011) and snacking (Isa & Masuri, 2011). There is no study on fad diets in Malaysia. Thus, this study focused on to which extent undergraduate students in Universiti Putra Malaysia are exposed to fad diets, an inappropriate dietary practice in term of prevalence and its determinants such as socio-demographic factors, psychological factors and personal factors.

There will be 17.1 % of Malaysian population aged 15-25 years by 2020 (Worldometer, 2019). This study is focused on young adults aged 18 to 25 years because 30% of internet users in Malaysia is at their 20's (Malaysian Communications and Multimedia Commission, 2018). Young adults in Malaysia have a generally high level of access to the internet resulting them easily to seek information regarding nutrition and health. Most of the young adults aged 18 to 25 years are students and based on Department of Statistics Malaysia, literacy rate age 15 and above is 95.90% in 2017 (Ministry of Education Malaysia, 2018). Thus, young people are easily exposed to fad diets. It is very crucial to empower them on healthy dietary practice following Malaysian Dietary Guidelines because young adults have the power to shape a new future. Thus, there is a need to do a research on fad diets among undergraduate students. Therefore, the aim of this study was to determine factors associated with fad diets among undergraduate students in Universiti Putra Malaysia.

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1.3 Research Questions

1. What are the socio-demographic factors, psychological factors and personal factors and prevalence of fad diets among the undergraduate students in UPM?
2. Is there an association between the socio-demographic factors and fad diets practices among the undergraduate students in UPM?
3. Is there an association between the psychological factors and fad diets practices among the undergraduate students in UPM?
4. Is there an association between the personal factors and fad diets practices among the undergraduate students in UPM?

1.4 Research Objectives

1.4.1 General Objective

1. To determine factors associated with fad diets among undergraduate students in UPM.

1.4.2 Specific Objectives

1. To examine socio-demographic factors (age, sex, ethnicity, field of study, living arrangement, parents' occupation, parents' education level and household income) of undergraduate students in UPM.

2. To examine the psychological factors (body image perception and self-esteem level) of undergraduate students in UPM.

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3. To examine the personal factors (sources of information on nutrition and health, nutrition knowledge level, body mass index and waist circumference) of undergraduate students in UPM.

4. To assess the prevalence of fad diets among undergraduate students in UPM.

5. To determine the associations between socio-demographic factors, psychological factors and personal factors with fad diets among the undergraduate students in UPM.

1.5 Research Hypothesis

1. There is significant association in socio-demographic factors with fad diets among the undergraduate students in UPM.
2. There is significant association between psychological factors with fad diets among the undergraduate students in UPM.
3. There is significant association between personal factors with fad diets among the undergraduate students in UPM.

1.6 Research Framework

Figure 1.1 demonstrates the research framework relating all the variables in this study whereby fad diets was the dependent variable and socio-demographic factors, psychological factors and personal factors were the independent variables.

According to Bärebring, Winkvist and Augustin (2018), female gender and higher education were associated with fad diets. A study by Poobalan et al. (2014) highlighted that young adults (18 to 25 year olds) are vulnerable to unhealthy dietary behaviour. According to Vuvor et al. (2017), ethnicity and household head's

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occupation were significantly influenced the inclusion and exclusion of some food in their diet.

Psychological factors such as body image perception might influence fad diets (Khan et al., 2011; Korn et al., 2013). Negative body image resulting in increased feelings of body shame and decreased awareness of internally bodily states (Tiggemann, 2004). According to Verplanken and Tangelder (2011), an individual's eating behaviour may be adjusted to compensate for their self-esteem. A study by Ferrante et al. (2010) highlighted the link between self-esteem and dieting because self-esteem had an influence on the choice of following a diet.

Personal factors such sources of information on nutrition and health and level of knowledge in nutrition might influence fad diets practices (Charlton, Brewitt, & Bourne, 2004; Lin et al., 2005). The high frequency of access to the media for nutrition information population resulting in huge exposure to trust nutrition information that is unscientific, misleading or designed in such a way as to promote the unscrupulous fad diets (Charlton, Brewitt, & Bourne, 2004). Lin et al. (2005) stated that respondents' nutrition knowledge was positively related to dietary restriction attitudes and behaviours. To those who are practicing fad diets, they do not able to achieve the recommended minimum servings of food groups in their diet (Peck et al., 2011). A study by Boo (2013) found that body mass index (BMI) was significant correlates of weight loss efforts among Korean women aged 20 years old or older. Greater in waist circumference was associated with more reported attempts to lose weight among Latinos and Whites youths (Epperson et al., 2014).

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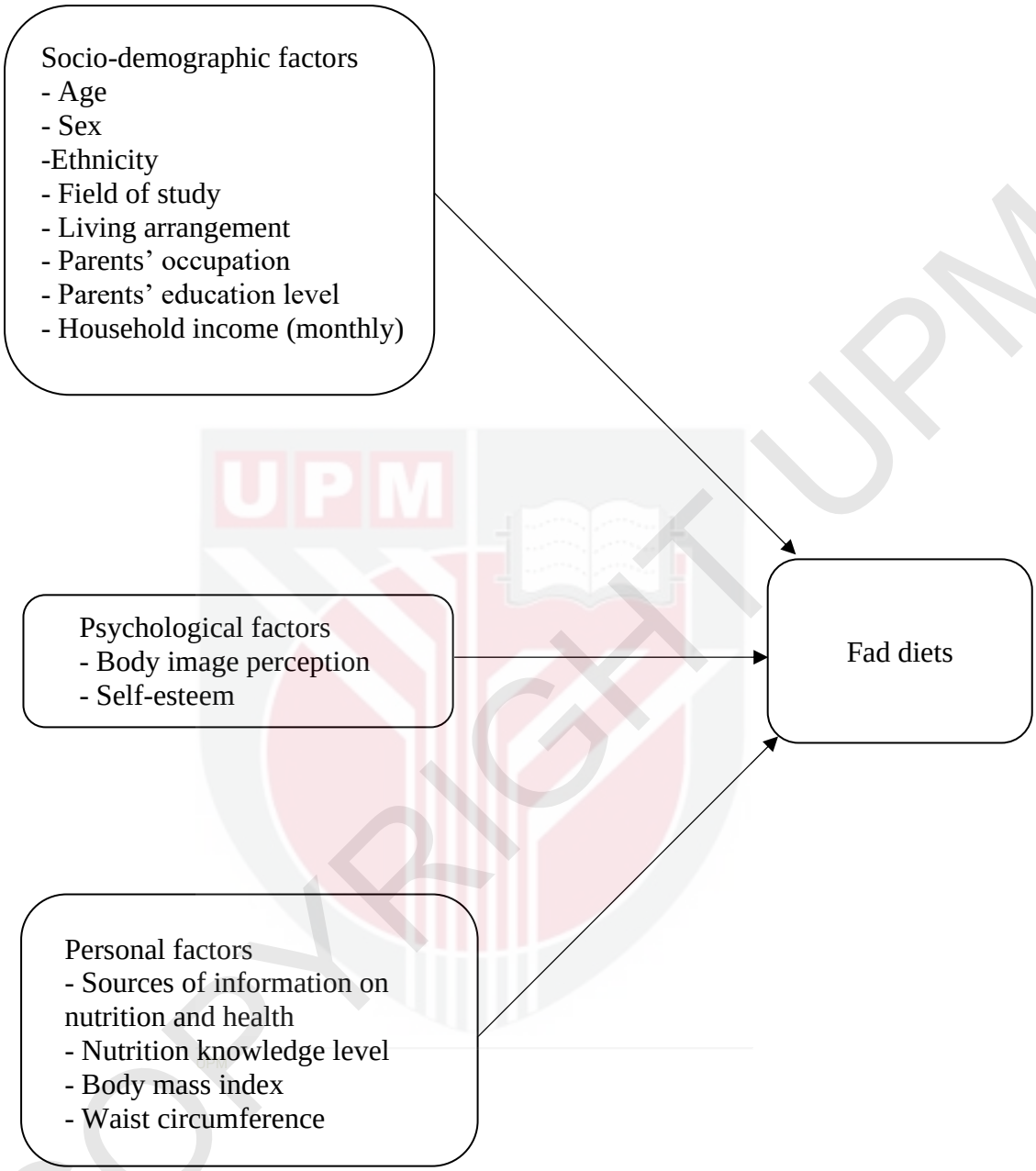

Figure 1.1: Research framework

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1.7 Significance of the Study

To the best of my knowledge, this is the first study regarding fad diets in Malaysia. There is no study yet, which focusing on a specific unhealthy dieting practice. This study will provide the prevalence of fad diets among Universiti Putra Malaysia students.

Even though this study is a cross-sectional, this study will be helpful for other researchers who interested in fad diets as this study will become the baseline data of socio-demographic factors, psychological factors and personal factors. This study would be an eye opening for other researchers to start digging more in-depth regarding the implications of fad diets to various age groups in Malaysia. Researchers with high budgets could do interventions to those people who are practising fad diets, changing their dietary practices and increasing their knowledge on what a healthy diet is.

This study could bring the Ministry of Health of Malaysia's attention on how sources of information about nutrition and health could affect the dietary practice of an individual. Thus, Ministry of Health of Malaysia could do a policy to overcome those self-claimed nutritionist and health experts from having the audacity to manipulate Malaysians' interest on nutrition and health. Besides, this study provides the idea of how body image perceptions and self-esteem can influence fad diets practices. Thus, this study will bring the authorities' attention to filter social media contents which influencing individual's self-esteem negatively.

With this study, the registered dietitians and nutritionists can be aware how their roles have been widening to the extent where they need to clarify and demystify consumer-targeted nutrition messages. In addition, this study will spark ideas for the

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registered dietitians and nutritionists to collaborate with the non-government organisations (NGOs) to do health promotion programmes regarding fad diets.

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CHAPTER 2

LITERATURE REVIEW

According to Arnett (2015), the emerging adulthood is defined as the transition from late adolescence to twenties, focusing on ages 18 to 25 as young people started to leave home and an increase of autonomy in decision-making. Most undergraduate students are at this age range. This period of emerging adulthood is often overlooked, even though exploration of new ideologies and behaviours started to develop to express their individuality. In addition, a degree of experimentation and exploration in emerging adulthood which is unlikely to be feasible in the thirties and beyond. Once enters emerging adulthood period, parental supervision has decreased. At this period, emerging adults have opportunity to try out different ways of living and different possible choices by their own. In this literature review, the factors associated with fad diets among undergraduate students are discussed.

2.1 Overview of fad diets

Fad diets have been around for centuries. In 1820, a poet named Lord Byron introduced Apple Cider Vinegar Diet. This diet consisted of drinking huge amount of vinegar, eating potatoes dipped in vinegar and hard biscuits in order to curb desire for food and cut fat (Foxcroft, 2011). In 1862, a British man named William Banting introduced a low-carbohydrate diet which eliminating starches and sugars (Brueck, 2019).

Dr. Russell Wilder designed a diet called as Ketogenic Diet in 1923, which is quite similar to Atkins Diet (Masood & Uppaluri, 2019). There are three types of

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Ketogenic Diet, which are Classic Ketogenic, consisted of 90% fat, 6% protein, 4% carbohydrate, Modified Ketogenic consisted of 82% fat, 12% protein, and 6% carbohydrate and Medium Chain Triglyceride (MCT) consisted 73% fat, 10% protein and 17% carbohydrate (The Charlie Foundation, 2019).

In 1930, a diet called The Grapefruit Diet or also known as, Hollywood Diet has appeared out of nowhere in the United States (Yabsley & Cross, 2009). The Grapefruit Diet has two versions involving duration needed to follow very low-calorie diets in 7 days and 21 days. This diet consisted of eating grapefruit or drinking grapefruit juice at each meal due to a belief that grapefruit can burn fat.

In 1950, Cabbage Soup Diet requires eating a large amount of cabbage soup for seven days consecutively (Alvarez, 2008). The menu for each day emphasised certain food groups. The first day of the diet, consumption of fruits is very high alongside with the soup whereas the fifth day, consumption of beef up to 0.34 kg and six fresh tomatoes (Carter, 2015). In 1963, Jean Nidetch has founded Weight Watchers which created a SmartPoints system for their followers focusing on diet low calories, saturated fat and sugar, and high in protein (DiValentino, 2018).

In 1970s, a diet called as Dukan Diet was introduced by Pierre Dukan which has gained massive popularity since its creation (Matus, 2018). The Dukan Diet is a protein-based diet which contains four phases and each phase has its own dietary pattern (Spritzler, 2018).

In 1977, Ornish Diet is created by Dr. Dean Ornish and it is a low-fat and very-high-carbohydrate diet (Ornish, 2001). The Ornish Diet eliminates all animal products except egg whites and non-fat dairy products and the main dietary intake consists of legumes and high-fiber carbohydrates (Ornish, 2001).

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In 1977, another fad diet called as SlimFast has appeared which requires replacement of any two meals with SlimFast shakes, three 100-calorie bars or cookies and one 500-calories meal of personal choice (Frey, 2019). This diet can eat six times per day. However, SlimFast does not meet the United States Department of Agriculture's definition of a healthy meal plan because this diet does not consist of all the food groups (Department of Health and Human Services and United States Department of Agriculture, 2015).

In 1979, The Pritikin Plan is created by Nathan Pritikin which consists of diet high in whole grains and dietary fiber, low in cholesterol, and very low in fats (Iliades, 2009). Those who are practising this diet are encouraged to eat six or seven meals each day and the portion sizes are not restricted (Pritikin, 2000).

In 1992, Dr. Atkins released an updated version of the original diet plan for Atkins, which has become popular until now. Atkins diet consists of 60% fat, 30% protein, and 10% carbohydrates by weight (Chapman & Rho, 2009). Atkins diet is based on Atkins' belief that our dietary carbohydrates are responsible for our increased weight and we can turn on the "satiated" trigger by consuming more protein, which helps us regulate our appetite (Torrens, 2018).

In 1995, Zone Diet is developed by Dr. Barry Sears (Cheuvront, 2003). According to Cheuvront (2003), Zone Diet is a modern low carbohydrate diet consists of 40% carbohydrate, 30% protein and 30% fat.

In 2000, LEARN Program is created by Kelly David Brownell, a psychology professor (Brownell, 2000). LEARN Program is a low-fat and high carbohydrate diet which involves specific energy restriction goal (Gardner et al., 2007).

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In 2003, South Beach Diet is introduced by Dr. Arthur Agatston. South Beach Diet consisted of three phases (Mayo Clinic, 2017). During Phase 1, almost all carbohydrate is being cut from the diet and focusing on lean protein for two weeks. During Phase 2, some of the carbohydrates are adding back into the diet (Mayo Clinic, 2017). During Phase 3, the diet is consisted of foods from Phase 1 and Phase 2 (Mayo Clinic, 2017).

Fad diets can be analogized as fashion trends in the world of food. Most fad diets have a shelf life of popularity, some fad diets come and go with different names but with similar dietary approach; evolving from a small seed of truthful health knowledge that has been taken out of context and polluted with a plethora of false information and unrealistic dietary expectations.

2.2 Nutritional Outcomes of Fad Diets

A study from the United States by Calton (2010) stated that South Beach diet is lacking of 21 out of 27 essential micronutrients whereas Atkins diet was lacking of 15 out of 27 essential micronutrients. A study from the United States by other researcher, Cordain (2019) revealed that very-low-carbohydrate-ketogenic-diet (VLCKD) only consume an average daily carbohydrate intake of 33.3 grams. The amount of 33.3 grams of carbohydrates is too little when compared to what is stated in Recommended Nutrient Intakes for Malaysia (RNI, 2017) and the United States Dietary Reference Intakes (National Academy of Sciences, 2016), 130 grams a day for adults. In addition, the study also found that the fat content (74.8% energy) has exceeded the U.S Dietary Reference Intakes (20-35% energy) and 25 - 30% total daily energy intake based on RNI (2017). Very-low-carbohydrate ketogenic diet was found

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lacking in potassium intake. From the same study, the average daily potassium intake was 2087 mg which was 2.3 times lower than the U.S recommended value and RNI Malaysia, 4700 mg (Cordain, 2019). The study has found a shocking finding of sodium intake of the diet where the average daily sodium intakes was 4517 mg which has exceeded the U.S recommended and tolerable upper intake levels (RNI, 2017) value of 2300 mg. The study stated that the high consumption of sodium is due to encouragement of eating highly salted processed meats, salted butter and cheese (Cordain, 2019).

A study from Poland revealed that Dukan Diet was lacking of iron, magnesium and copper (Regula, 2018). Not just deficiency in some of the minerals, Dukan Diet was deficient in vitamins C and B1 (Thiamine). Besides, the dietary fiber a day intake was 12.52 grams, which was below the recommended intake, 25 g/day for women and 38 g/day for men (RNI, 2017). A study from the United States by Freedman and King (2001) revealed that very-low-fat diets like Ornish were low in vitamin E, B12 and zinc. A study from the United States by Gardner et al. (2010) revealed that the percentage of energy from carbohydrate was lowest in Atkins (17%), followed by Zone (42%), LEARN (49%) and Ornish (63%). From this finding, Atkins, Zone and LEARN does not meet the recommended intake of 50-65% of carbohydrates. (RNI, 2017). The study also found that the percentage of energy from protein and fat showed the opposite trends where Atkins (28%), Zone (24%), LEARN (20%) and Ornish (17%) for protein whereas 55%, 35%, 30% and 21 % for fat respectively. From this finding, Atkins and Zone have exceeded the recommended protein intake of 10-20% (RNI, 2017) and Atkins and Zone have exceeded the recommended fat intake of 25-30% (RNI, 2017) whereas Ornish was below the fat recommended intake. At 8 weeks of study, a significantly higher proportion of individuals shifted to intakes at risk of

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inadequacy in the Atkins group for thiamine, folic acid, vitamin C, vitamin K, iron, and magnesium; in the LEARN group for vitamin E, thiamine, calcium, and magnesium; and in the Ornish group for vitamins E and B12 and zinc. In contrast, for the Zone group, the risk of inadequacies significantly decreased for vitamins A, E, K, and C with no significant increases in risk of inadequacy for other micronutrients (Gardner et al., 2010).

From the previous studies above, it can be concluded that none of the diets are perfect as is claimed. Micronutrients play a central part in metabolism and in the maintenance of tissue function while macronutrients provide the energy needed to maintain body functions and carry out the activities of daily life. Both macronutrients and micronutrients are important and dependent on each other.

2.3 Health Outcomes of Fad Diets

A study by Cordain (2019) stated that potassium deficiency and high protein content in a very-low-carbohydrate ketogenic diet can induce a net metabolic acidosis, resulting in producing excessive amounts of acid in the body. In response to the metabolic acidosis, kidney implements adaptive processes aimed to restore the acid-base balance where the kidney increased elimination of calcium, sulphate, phosphate, urate, chloride, ammonium ions and kidney vasodilation occurred and increased glomerular filtration rate (Adeva & Souto, 2011). All of these bring clinical consequences of diet-induced metabolic acidosis which are kidney stone disease, nitrogen wasting and insulin resistance (Adeva & Souto, 2011).

The Dukan Diet is characterized by excessive consumption of products of animal origin (Regula et al., 2018). A study by Choi et al (2004) revealed that high

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meat or seafood consumption increases the risk of gout due to high concentration of uric acid in the blood. According to Perlstein et al. (2004) and Zoccali et al. (2006), high-protein diet might contribute to increased instances of high blood pressure and coronary heart disease. Brinkworth et al. (2010) found that high protein diets reduce the efficiency of kidney functioning. A study by Reddy et al (2002) found that consumption of a low carbohydrate-high protein diet for 6 weeks has decreased estimated calcium balance, and may increase the risk for bone loss.

From the previous studies above, it can be concluded that fad diets do not lead to long-term health benefits. Those who are practicing fad diets could strain their organs and muscles due to not getting all the right nutrients in a long period.

2.4 Effectiveness of Fad Diets on Weight Loss for Long Term

Atallah et al. (2014) conducted a systematic review to examine the efficacy of the Atkins, South Beach, Weight Watchers (WW), and Zone diets, with a particular focus on sustained weight loss at ≥12 months. All 4 diets mentioned above were modestly efficacious at decreasing weight for short-term weight loss, but not sustained for long-term among overweight or obese individuals, whose mean age ranged from 35 to 56 years in the United States (Atallah et al., 2014). A qualitative research design study done by Thomas et al. (2008) revealed that 20 out of 76 Australian participants aged between 16 and 72 years old participants commented that they were unable to maintain dieting because the diets themselves were "unrealistic", "unsustainable", were "too expensive", "did not address individual's lifestyle" and "focused on food rather than changing individual's behaviour". In addition, 23 out of 53 participants who practiced Weight Watchers gradually gaining weight after stopping the diet and they went back to Weight Watchers repeatedly over time (Thomas et al., 2008). This

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finding indicates that the 'diet' itself was unsustainable for most participants and did not promote long term change.

A randomized trial study by Gardner et al. (2007) compare four weight-loss diets which were Atkins, Zone, LEARN and Ornish diets on mean changes in secondary outcomes such as body mass index, body fat (%), waist-hip ratio, LDL-C, HDL-C, triglyceride and non-HDL-C relative to baseline to 12 months. According to Gardner et al. (2007), weight change among the Zone, LEARN, and Ornish groups did not differ significantly at any time point. The pattern of changes in body mass index, percentage of body fat, and waist-hip ratio among groups paralleled the changes in weight, although the between-group differences at 12 months did not achieve statistical significance for percentage of body fat ($p = 0.07$) or waist-hip ratio ($p = 0.10$) among women aged 25 to 50 years. Changes in LDL-C concentrations at 2 months favoured the LEARN and Ornish diets over the Atkins diet; however, these differences lessened and were no longer significant at 6 and 12 months. HDL-C and triglycerides concentrations favored the Atkins group at all time points while non-HDL-C differences among groups were not significant at any time point (Gardner et al., 2007). From this study, fad diets have been proven that weight loss is not sustainable for long term and there was positive outcome on HDL-C and triglycerides when followed Atkins diet.

Another randomized trial study done by Dansinger et al. (2005) found that only for the minority of individuals adults aged 22 to 72 years who can sustain a high dietary adherence level at ≥12 months. Higher discontinuation rates for Atkins and Ornish diet groups indicate that many individuals find these diets to be too extreme (Dansinger et al., 2005). Thus, it can be concluded that the biological, psychosocial, educational,

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and environmental determinants of individual are varies and play role on weight loss and regain.

2.5 Association between socio-demographic and fad diets.

Since there were limited research articles mentioning about fad diets, any articles which mentioning 'attempts at weight loss', 'specific dietary regimens', 'dietary restriction behaviour' and 'dietary patterns' were used to associate with the factors that might influence fad diets practices.

Socio-demographic factors is very important variable to assess in scientific research in order to see its impact on a dependent variable. A study from Ghana found significant associations between ethnicity and household head's occupation with the practice of fad diets among university students (Vuvor et al., 2017). According to Vuvor et al. (2017), 48.0% of the Akans and 52.0% of the Mole-Dagbons were practicing fad diets. The study from Ghana observed among the food faddists that 30.3% had self-employed household heads whereas 69.7% were salaried workers (Vuvor et al., 2017). According to Insel, Turner and Ross (2004), culture is one of the major factors that affect food choices. Ethnicity is bound by culture and this statement is supported by studies of Brown et al. (2019) and Satia (2009); every ethnicity has their own unique food habits and dietary patterns due to beliefs, values and symbols that they accept and passed along from one generation to the next generation. However, Vuvor et al's study was unable to find the significant associations between sex and age with the practice of fad diets. In Ghana, the staples diets are starchy food such as yams, casava, millet, maize, and rice (Falola & Jean-Jacques, 2015) and this might explain on eating mainly one type of food. Vuvor et al. (2017) stated that the reasons for the practice of fad diets are to prevent illness in later life, boost

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performance of body parts and detoxification. A study by Yakub et al. (2010) revealed that Pakistani adult men in urban area with low socio-economic status found that education and income were positively associated with 'high meat diet' scores due to high intake of red meat and chicken. Two studies from Ambrosini et al. (2010) and Cribb et al. (2011) have similar finding which is maternal education is positively associated with adherence to a healthy diet pattern in Australia and the United Kingdom.

A study by Brown, Dhingra and Kola Palmer (2015) found that females were more likely to report extreme dieting behaviours than males; with the odds ratio (OR) of 2.08. A study by Fayet, Petocz and Samman (2012) revealed that 43.0% of female college students were dieting to lose weight. From these studies, the increased pressure women are under to be thin and men to be lean and muscular ideal make them to choose an easy way to get a quick outcome by practicing fad diets.

To conclude, the complexity of fad diets needs a better understanding because there are many socio-demographic factors that influences individuals to practice fad diets.

2.6 Associations between psychological factors and fad diets.

According to Mase et al. (2015), those who perceived themselves as obese had a desire to become slim, were more concerned with body shape in early stage, were more concerned with dieting, had more dieting experience when compared with those who did not perceive themselves as obese. Another study done by Mase et al. (2013) found that 51.7 % of the underweight and 88.8 % of the normal-weight students had a desire for thinness. Thus, this study highlighted a misperception of body shape among Japan young female leading them to go for restricted dieting.

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A study by Canpola et al. (2005) found that a thinner body ideal, low self-worth, and low physical self-concept have more significant effects on body dissatisfaction and dieting behaviour among Turkish adolescents aged 15-17 years. Another study by Cho et al. (2015) found that those who overestimated their body weight had greater interest in weight control and dissatisfaction with their body weights, presented unhealthy reasons to lose weight, and had higher scores for "feeling sad when comparing own body with others". These findings suggested that body image distortion can lead to unhealthy dieting practices.

Emerging adults struggle with self-esteem (Schwartz et al., 2010) and this statement is supported by a study by Putterman and Linden (2003); lower self-esteem scores were associated with higher levels of unhealthy dieting among university students with the mean student age, 19.3 (ranging from 16 to 34). According to Almenara et al. (2017), low self-esteem effects on restraint and weight concern which increases the risk of controlled eating and other extreme weight control behaviours.

To conclude, body image perceptions and self-esteem level play an important role in motivating to practice weight loss activities. Inaccurate body weight perceptions and low self-esteem can do harm on individuals which triggers them to go for inappropriate dieting behaviour; fad diets.

2.7 Association between personal factors and fad diets.

A study by Quaidoo et al. (2018) found that online resources were the most popular source used to seek information on nutrition among young adults age 18 to 25 years (92.7%), followed by traditional media (58.3%) such as television programmes, radio programmes and newspaper articles, 29.7% of the respondents chose

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friends/peers, 29.7% of the respondents chose family members and the least one was healthcare professionals such as nutritionists and dietitians (4.7%). Majority of the participants in the study considered healthcare professionals as very reliable and followed by online resources (Quaidoo et al., 2018).

A study by Choi et al. (2008) found that dietary behaviour of female subjects was positively correlated with nutrition knowledge. A study by Laz et al. (2015) found that the higher score of nutrition knowledge was significantly associated with higher odds of engaging in healthy weight loss behaviors. University students' knowledge of nutrition does not always correlate with their eating habits (Abraham, Noriega & Shin, 2018). In the context of practicing fad diets, adequate nutrition knowledge of an individual might make her/him to perceived healthy dieting differently. A study by Bottcher et al. (2017) found that there was a significant association between Mediterranean Diet Nutrition Knowledge (MDNK) and Mediterranean Diet Adherence Score (MEDAS) scores within university students. The Mediterranean diet was included by some authors as a fad diet promoted for losing weight (Brown et al., 2011).

A study by Santamaría et al (2009) found that those who have overweight body mass index (BMI) exhibited in restrictive diets. Another study by Heerman et al (2017) highlighted that respondents' BMI and those for the proportion of individuals with obesity or morbid obesity was highest when the respondents had an unhealthy diet pattern and simultaneously engaged in weight-related problems. A study by Blake et al. (2013) revealed that men and women with greater weight dissatisfaction reported more into dieting and greater weight dissatisfaction is an important "driver" of unhealthy dieting behaviours; fad diets.

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To conclude, online resources easily disseminate information whether the information are good or bad, resulting in increased interest in nutrition, consciousness of personal nutrition problem and quest for simple and fast solution among the young adults. Elimination of some foods from routine and exaggeration of some food in the routine exhibit fad diets characteristics. Many overweight and obese individuals experience weight-related discrimination resulting in them wanting to lose weight. Besides, individuals with normal body weight who wrongly perceived their body weight have the tendency to go for dieting. Quick way to lose weight is by practicing fad diets even though the results are usually temporary.

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CHAPTER 3

METHODOLOGY

3.1 Study Design

This was a cross-sectional study aimed to determine the factors associated with fad diets. It did not require a follow-up as the data collection was collected at a single point in time and was inexpensive.

3.2 Study Location

This study was conducted in Universiti Putra Malaysia, Serdang, Selangor. Universiti Putra Malaysia is located in the district of Petaling close to new federal territory of Putrajaya and surrounded by vibrant townships of Kajang (16 km), Seri Petaling (14 km), and the city of Kuala Lumpur (Official Portal of Faculty of Veterinary Medicine, 2019). Universiti Putra Malaysia, Serdang is 235.056 hectares consisting fifteen faculties with approximately 11,981 undergraduate students (Official Portal of Universiti Putra Malaysia, 2019).

3.3 Respondents

The respondents of this study were the undergraduate students in Universiti Putra Malaysia. They have been chosen as the respondents because their ages ranged from 19 to 25 years. They are in emerging adulthood. The eligibility of respondents was based on the inclusion and exclusion criteria as stated in Table 3.1.

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Table 3.1: Inclusion and exclusion criteria for the selection of respondents

Inclusion criteria	Exclusion criteria
• Malaysian • Undergraduate students • Female and male • Age 19-25 years old	• Physically disabled • Athlete • Individuals with diagnosed gastrointestinal disorders such as irritable bowel syndrome (IBS), celiac disease and Crohn's disease

3.4 Sample Size Determination

The sample size was determined using the correlation coefficient formula by Cole et al. (1997) and additional adjustment calculation was done to take into account of design effect and response rate.

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

Where,

n = Calculated sample size

Z1-α/2 = z score for significance level at 5% = 1.96

Z1-β = z score for power set at 80% = 0.842

r* = correlation

DEFF = 1.3 (Aday & Cornelius, 2006)

Response rate = 80 %

Eligibility rate = 90 %

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Table 3.2: Summary of the calculated sample size using correlation formula

Correlation	Calculation	Source
Correlation of body image perception and fad diets r = 0.484	$n = \frac{(1.96+1.28)^2}{(0.484)^2/(1-(0.484^2))} + 5$ n = 39 n = 39 x 1.3 (DEFF) n = 50.7 ÷ 0.80 (response rate) n = 63.375 ÷ 0.90 (eligibility rate) n = 70.4 ≈ 71 respondents	Nurjannah & Muniroh, 2019
Correlation of nutrition knowledge and food behaviour r = 0.333	$n = \frac{(1.96+1.28)^2}{(0.333)^2/(1-(0.333^2))} + 5$ n = 89 n = 89 x 1.3 (DEFF) n = 115.7 ÷ 0.80 (response rate) n = 144.625 ÷ 0.90 (eligibility rate) n = 160.7 ≈ 161 respondents	Bogue, Coleman & Sorenson, 2005
Correlation of parents' years of education and diet practice r = 0.66	$n = \frac{(1.96+1.28)^2}{(0.66)^2/(1-(0.66^2))} + 5$ n = 18 n = 8 x 1.3 (DEFF) n = 23.4 ÷ 0.80 (response rate) n = 29.25 ÷ 0.90 (eligibility rate) n = 32.5 ≈ 33 respondents	Laitinen et al., 1995
Correlation of body mass index and eating behaviour r = 0.310	$n = \frac{(1.96+1.28)^2}{(0.310)^2/(1-(0.310^2))} + 5$ n = 104 n = 104 x 1.3 (DEFF) n = 135.2 ÷ 0.80 (response rate) n = 169 ÷ 0.90 (eligibility rate) n = 187.7 ≈ 188 respondents	Shinde, 2019

After comparing sample size calculation for variables and consideration of design effect, response rate and expected proportion of eligibility, the final sample size required for this study was 188 respondents.

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3.5 Sampling Design

Multistage sampling method was used in this study as shown in Figure 3.1. Universiti Putra Malaysia has 15 faculties and was categorized based on three fields of study, including Arts and Social Sciences, Sciences and Technical. One faculty was randomly selected from each field of study, which were from Faculty of Ecology, Faculty of Forestry and Faculty of Engineering. After one program was randomly selected from each faculty, another simple random sampling was made resulting in respondents from B. Sc (Human Development and Information Technology), B. Sc. (Forestry Science) and B. Eng. (Chemical). All students from first year, second year, third year and fourth year are welcomed to participate in this study (n= 188). A total 188 respondents were willing to participate in this study, with a response rate of 100.0%. The high response rate was due to good cooperation between the class representatives, students and the researcher during Movement Order Control (MCO) that was implemented in Malaysia since 18th March 2020

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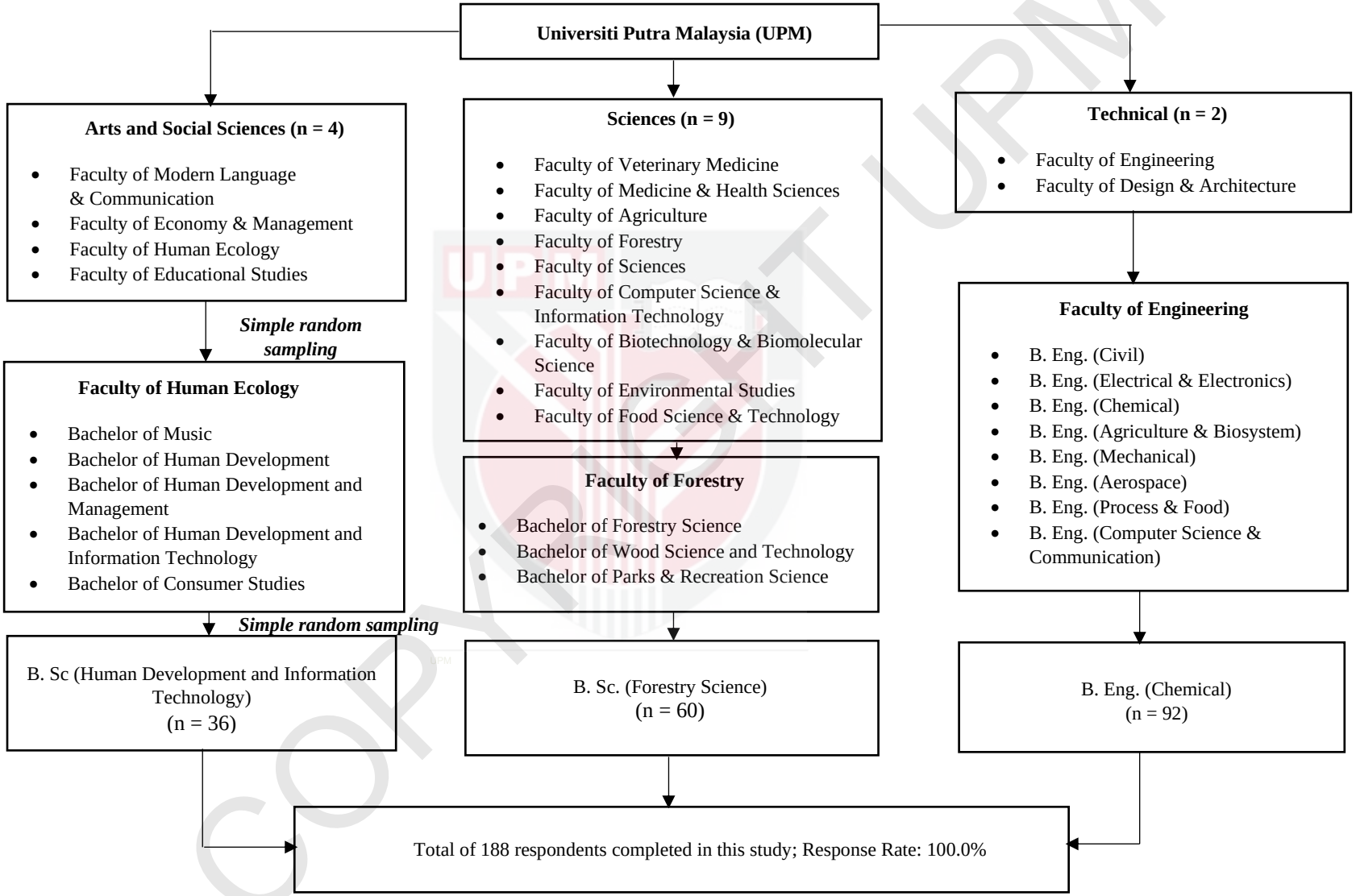

Figure 3.1: Sampling design of this study

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3.6 Research measurements

3.6.1 Self-administered questionnaire

In this study, data was collected using an English version of self-administered questionnaire. The questionnaire comprised of four sections as follows:

Table 3.3 Variables According to Each Section

Section	Variable
A	Socio-demographic factors
B	Psychological factors (a) Body Image Perception (b) Self-esteem
C	Personal factors (a) Sources of information on nutrition and health (b) Nutrition knowledge level
D	Fad diets

(i) Section A Socio-demographic factors

This section consisted of 10 questions to assess socio-demographic background of the respondents, which consisted of age (birth date was recorded, age was calculated by subtracting birth date from the survey date), sex, ethnicity, year of study, field of study, program, current living arrangement, parents' occupation, parents' education level and monthly household income.

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(ii) Section B Psychological factors

This section was intended to determine body image perceptions and self-esteem of the respondents. The body image perception was assessed by using Contour Drawing Rating Scale (Thompson & Gray, 1995). This scale consisted of nine female and male figure images. The respondents were requested to circle any number of 1 to 9 which represent their current body image and ideal body image. The difference "ideal-current" is calculated by subtracting the Ideal Body Size (IBS) from the Current Body Size (CBS). The degree of dissatisfaction with body image was interpreted where the magnitude may be positive when the individual wishes to increase their body size and negative if they wish to reduce their size. To characterize body dissatisfaction, an individual who scored negative (< 0) is labelled as "wishes to be thinner" and the individual who scored positive (>0) is labelled as "wishes to be heavier" while the individual who scored "= 0" is labelled as "satisfied". The internal consistency reliability was good with a Cronbach's alpha value of 0.78 (Thompson & Gray, 1995) and another study by Kakeshita and de Sousa Almeida (2006) used Contour Drawing Rating Scale with a Cronbach's alpha value of 0.93. In the current study, this scale showed an acceptable internal consistency reliability with Cronbach's alpha value of 0.652.

The self-esteem was measured using Rosenberg Self-Esteem Scale (RSE) (Rosenberg, (1965). The scale is a ten item Likert scale with items answered on a four-point scale ranging from strongly agree to strongly disagree. The scoring for Question 1, 2, 4, 6 and 7 are "strongly agree = 3", "agree = 2", "disagree = 1" and "strongly disagree = 0" which are the positive attitude towards the self-esteem. For Question 3, 5, 8 9, and 10, the scoring is reversed which are the negative attitude towards the self-esteem. The

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scale ranges from 0 to 30. Scores between 15 and 25 are within normal range, scores below 15 indicates low self-esteem and a score greater than 25 suggests high self-esteem (Rosenberg, 1989). The internal consistency reliability was good with a Cronbach's alpha value of 0.84 (Martín-Albo et al., 2007) and another study by Mimura and Griffiths (2007) used Rosenberg Self-Esteem Scale (RSE) with a Cronbach's alpha value of 0.87. In this study, this scale showed a good internal consistency reliability with Cronbach's alpha value of 0.82.

(iii) Section C Personal factors

Sources of information about nutrition and health was assessed using 2-item questionnaire from a study by Quaidoo et al. (2018). The first question was used a Likert scale with options such as 'always = 3', 'sometimes = 2', 'rarely = 1' and 'never = 0' as the question stated *'how often you turn to these sources when you seek information regarding nutrition and health?'*. The second question stated *'how reliable do you think the information from these sources is?'* using a Likert scale with options 'unreliable = 0', 'fairly reliable = 1' and 'very reliable = 2 and 'accurate =3'. In the current study, this questionnaire showed a good internal consistency reliability with Cronbach's alpha value of 0.745.

Nutrition knowledge level was assessed using a validated questionnaire developed by the Malaysian Technical Working Group on Research (TWG-R) (Norimah et al., 2008). The instrument consisted of 20 questions, which consisted of five components. The five components are nutrient function, energy of food, nutrient insufficiency, food selection and supplies of nutrients. Each question has five options. Each correct answer was given one mark whereas no mark for incorrect answer. The score ranges from 0

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to 20. This instrument has been tested its reliability using the Cronbach's alpha which was 0.88, indicating high reliability (Chong et al., 2019). In the current study, this questionnaire showed a good internal consistency reliability with Cronbach's alpha value of 0.732. Table 3.4 shown the classification of nutrition knowledge level.

Table 3.4 Classification of nutrition knowledge level

Nutrition knowledge level	Scores	Percentage
Poor	0-10	≤50%
Moderate	11-14	51-74%
Good	15-20	≥75%

Source: Norimah et al., (2008)

(iv) Section D Fad diets

Fad diets practices were assessed using an adapted questionnaire from Rafiqa et al., (2014) which consisted nine items and four items developed based on British Dietetic Association (2017). Total items were 13 items, where "yes" = one mark, "no" = zero mark. The Cronbach's alpha increased after adding four items from researcher from 0.636 to 0.780 for the reliability test. Table 3.5 shows the classification of fad diets practices. Food faddist is defined as those individuals who are practising fad diets whereas non-food faddist is defined as those individuals who are not practising fad diets.

Table 3.5 Classification of fad diets practices

Fad diet practices	Score range
Food faddist (upper median)	3-13
Non-food faddist (lower median)	0-2

Source: DeCoster et al., (2009)

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3.6.2 Anthropometric Measurements

A. Weight and Height Measurements

Weight and height scales were used to measure the weight and the height of the respondents by the researcher. Weighing the subjects was done by using a TANITA HD-314 Digital Weight Scale (Japan) on an uncarpeted floor. Weight measurement of each respondent was done twice. The height of the respondents was measured by SECA 213 Portable Stadiometer (Germany) to the nearest 0.1 cm and were recorded twice in order to get accurate results.

B. Body Mass Index

Body mass index is defined as body weight in kilograms divided by height in meters squared (Center for Disease Control and Prevention, 2017). According to CDC (2017), body mass index is a screening tool to assess body fatness. World Health Organization (2000) has stated the classification of weight by body mass index for Asian population as shown in Table 3.6.

Table 3.6 Classification of eight by body mass index for Asian population.

Classification	BMI (kg/m^2)
Underweight	<18.5
Normal range	18.5-22.9
Overweight	≥23
Pre-obese	23.0-27.5
Obese I	27.5-34.9
Obese II	35.0-39.9
Obese III	≥40.0

Source: World Health Organization (2000)

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C. Waist Circumference

Waist circumference was measured using a Lufkin Executive Thinline Tape W606PM (Cooper Hand Tools, USA) and the readings were recorded to the nearest 0.1cm. Respondents were asked to stand upright with both hands cross in front of the chest. Waist circumference was measured at the top of the iliac crest (World Health Organization, 2008). According to International Diabetes Federation (2006), value of waist circumference ≥90 cm in men and ≥80 cm in women is defined as at risk of co-morbidities.

3.7 Pre-testing

Pre-testing for the questionnaire was conducted among 20 local undergraduate students who were not included in the sample of this study. The purpose of conducting this pre-testing was to ensure the appropriateness, ambiguity and understanding of the instrument. Participants spent about 40 minutes to complete the questionnaire.

3.8 Study Approval

Prior to the commencement of the study, ethical clearance was sought from the Ethics Committee for Research Involving Human Subject of UPM (JKEUPM; Reference Number: JKEUPM-2019-550; See Appendix A). Approval was obtained from Deans of selected faculties (See Appendix B).

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3.9 Data Collection

Data collection was conducted from March to May 2020. The respondents were given an information sheet explaining the purpose of this study together with a consent form of agreement to participate in this study before answering the questionnaire. The respondents were screened based on the study criteria and written informed consent was obtained before answering the questionnaire. The respondents answered the self-administered questionnaire and anthropometry measurements such as height, weight and waist circumference of the respondents were measured. Due to Covid-19 pandemic, only 26 respondents were able to do face-to-face questionnaire and anthropometry measurements by the researcher in the Faculty of Engineering. The rest of the respondents (n = 162) answered the questionnaire through Google online form and anthropometry measurements were based on self-report.

3.10 Data Analysis

All data was analysed using IBM SPSS Statistics 25.0 (SPSS Inc, Chicago USA). Descriptive data which are mean, standard deviation and frequency were presented for all variables. Chi-square test was used determines whether there is an association between two categorical variables. The level of statistical significance was set at $p<0.05$.

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CHAPTER 4

RESULTS AND DISCUSSION

4.1 Socio-demographic factors

Table 4.1 shows the socio-demographic factors of the respondents. There were 188 respondents involved in this study and most of them were 21 years of age (29.2%), followed by 22 years (24.4%), 23 years (17.6%), 20 years (16.0%), 19 years (10.6%), 24 (1.1%) and 25 years (1.1%). There were more female respondents (58.0%) than male respondents (42.0%). Malay respondents are the highest (85.8%), followed by Chinese (5.3%), others Bumiputra (4.8%), and Indian (4.3%). Bachelor of Chemical Engineering respondents (48.9%) are the highest compared other field of study, Bachelors of Forestry Science (31.9%) and Bachelors Science (Human Development and Information Technology (19.1%). College dormitory respondents are higher (66.0%) than off-campus (34.0%) respondents. Respondents whose father are working were the highest (71.9%) and followed by respondents whose father are not working/pensioner (28.1%). Respondents whose mother are not working and housewife were the highest (55.4%) and followed by respondents whose mother are working (44.6%). Respondents whose father had secondary school as their education level were the highest (34.0%) and followed by Bachelor's Degree (21.8%). Respondents whose mother had secondary school as their education level were the highest (36.7%) and followed by Bachelor's Degree (22.3%). Most of the respondents come from B40 low income family, below RM3855 (38.3%).

There were more respondents aged 19 to 21 years old compared to respondents aged 22 to 25 years old. The possible explanation for this finding could be that the

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third year and fourth year students were quite busy with their studies and only some of them were willing to participate in this study. More female respondents than male respondents participated in this study and supported by Saleh and Bista (2017) where they found more women than male student participated in their online survey in Western Michigan University, The United States. This finding also supported by a study by Mulder & de Bruijne (2019) in the Netherlands found that more men were willing to participate face-to-face data collection. Majority of the respondents of this current study were Malays and there was a significant difference in ethnicity groups and fad diets *(p*<0.05*)* using Kruskal-Wallis H Test. This is supported by Jang & Vorderstrasse (2019), a study from the United States where they found that majority of their respondents were non-Hispanic white compared to other races, resulting in significant differences in the progress of Web-based survey participation among different groups in terms of race.

Majority of the respondents of this current study were from Science as their field of study while the non-Science has a small number of students in each year of study. More than half of the respondents were living in college dormitory than in off-campus due to larger total amounts of first year and second year (54.8%) where the priority for accommodation in the college is reserved for first-year students while third year and fourth year students need to compete with second year students based on a merit system.

In this current study, majority of the respondents' father and mother who are working are in professional sector. There is no study in Malaysia focused on specific types of parents' occupations. A study on eating behaviour by Magulod and Capili (2019) in Cagayan State University in Philippines revealed that only 3.0% of respondents' father are in professional sector while 7.0% of respondents' mother are

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in professional sector; different finding might due to majority of the respondents were from urban poor communities of Cagayan, Philippines and majority of the respondents' parents were working as farmers, labourers, service workers and technical workers.

A study by Haque & Hoque (2018) on the relationships between parents' academic backgrounds and incomes and building students' healthy eating habits found that most of the parents' respondents had secondary education and followed by tertiary education; almost similar to this present finding. Another study by Antonogeorgos et al. (2013) on the mediating effect of parents' educational status on the association between adherence to the Mediterranean diet revealed that majority of both respondents' parents had secondary and primary education.

In term of household income, most of the respondents came from B40 low income family (RM<3855) and this present finding is supported by a study by Haque & Hoque (2018) where they found most of their respondents were from B40 low income family.

Table 4.1 Socio-demographic factors of respondents (n=188)

Variables	n (%)	Mean ± SD
Age (years)		21.30 ± 1.31
19	20 (10.6)	
20	30 (16.0)	
21	55 (29.2)	
22	46 (24.4)	
23	33 (17.6)	
24	2 (1.1)	
25	2 (1.1)	
Sex		
Male	79 (42.0)	
Female	109 (58.0)	

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Variables	n (%)	Mean ± SD
Ethnicity		
Malay	161 (85.8)	
Chinese	10 (5.3)	
Indian	8 (4.3)	
Others	9 (4.8)	
Field of study		
B. of Electronic and Electrical Engineering	92 (48.9)	
BSc (Human Development and Information Technology	36 (19.1)	
B. of Forestry Science	60 (31.9)	
Living arrangement		
College dormitory	124 (66.0)	
Off-campus	64 (34.0)	
Parents' occupation		
Father's occupation[1]		
Manager	6 (3.2)	
Professional	52 (27.7)	
Technician/Associate Professional	19 (10.1)	
Clerical Support Worker	3 (1.6)	
Service/Sales Worker	8 (4.3)	
Skilled Agricultural/Forestry Worker	4 (2.1)	
Craft/Related Trades Worker	9 (4.8)	
Plant/Machine Operators/Assemblers	9 (4.8)	
Elementary Occupation	25 (13.3)	
Not working/pensioner	53 (28.2)	
Mother's occupation[1]		
Manager	3 (1.6)	
Professional	61 (32.4)	
Technician/Associate Professional	11 (5.9)	
Clerical Support Worker	1 (0.5)	
Service/Sales Worker	5 (2.7)	
Skilled Agricultural/Forestry Worker	0 (0.0)	
Craft/Related Trades Worker	1 (0.5)	
Plant/Machine Operators/Assemblers	1 (0.5)	
Elementary Occupation	1 (0.5)	
Not working/pensioner	34 (18.1)	
Housewife	70 (37.2)	

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Variables	n (%)	Mean ± SD
Parents' education level		
Father's education level		
No formal education	3 (1.6)	
Primary school	9 (4.8)	
Secondary school	64 (34.0)	
STPM/Matriculation/Foundation	13 (6.9)	
Diploma	30 (16.0)	
Bachelor's degree	41 (21.8)	
Master's degree	17 (9.0)	
Others (Medical degree/SPA)	11 (5.9)	
Mother's education level		
No formal education	4 (2.1)	
Primary school	9 (4.8)	
Secondary school	69 (36.7)	
STPM/Matriculation/Foundation	24 (12.8)	
Diploma	21 (11.2)	
Bachelor's degree	42 (22.3)	
Master's degree	10 (5.3)	
Others (Medical degree/SPA)	9 (4.8)	
Monthly household income[2] (RM)		6467.79 ± 5388.08
<3855	72 (38.3)	
3856-8318	65 (34.6)	
>8319	51 (27.1)	

SD = standard deviation

[1]Malaysia Standard Classification of Occupations by Department of Labour Peninsular Malaysia (2013)

[2]Household Income and Basic Amenity Survey 2014 by Department of Statistics Malaysia (2014)

4.2 Psychological factors

Table 4.2 presents the results of responses of current body image and body image perception of the respondents. For current body image, most of the respondents chosen "scale of 5" (22.9%) indicated as "healthy weight" and the second highest was "scale of 6" (19.1%) indicated as "overweight". For ideal body image, most of the respondents chosen "scale of 5" (34.0%) and the second highest was "scale of 3" (21.8%) indicated as "underweight".

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Table 4.2 Responses of current body image and ideal body image of respondents (n=188)

Scale	n (%)	Mean ± SD
Current body image		4.65 ± 1.77
1	6 (3.2)	
2	21 (11.2)	
3	22 (11.7)	
4	34 (18.1)	
5	43 (22.9)	
6	36 (19.1)	
7	16 (8.5)	
8	8 (4.3)	
9	2 (1.1)	
Ideal body image		3.90 ± 1.38
1	7 (3.7)	
2	27 (14.4)	
3	41 (21.8)	
4	34 (18.1)	
5	64 (34.0)	
6	11 (5.9)	
7	4 (2.1)	
8	0 (0.0)	
9	0 (0.0)	

Table 4.3 shows the scores of body image perception of respondents. Most of them are dissatisfied with their body (76.1%); 75.5% of them wish to be heavier whereas 24.5% of them wish to be thinner. Only 23.9% of the respondents are satisfied with their body size.

More than half of the respondents were dissatisfied with their body and this finding is consistent with a study by Mchiza et al. (2015) where they found that 45.3% of the participants dissatisfied with their body and 84.5% had a largely distorted body image. Mchiza et al. (2015) found that 23.4% of the participants wanted to be thinner as they perceived themselves as heavier whereas 21.9% of the participants wanted to be heavier as they perceived themselves as thinner. In this present study, respondents

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who wish to be heavier; thrice greater percentage than the finding of Mchiza et al. (2015) while similar finding of respondents who wish to be thinner. Another study done by Ferrari, Petroski and Silva (2013) also reported that 70% of the university students in Brazil were dissatisfied with their body shape.

Table 4.3 Body image perception of respondents (n=188)

Variables	Score range	n (%)	Mean ± SD
Body Image			1.23 ± 0.43
Dissatisfied	< 0 and > 0	143 (76.1)	
Wish to be heavier	< 0	108 (75.5%)	
Wish to be thinner	> 0	35 (24.5%)	
Satisfied	= 0	45 (23.9)	

Table 4.4 presents the responses of self-esteem of respondents. Most of the respondents chosen “agree” for positive attitude towards the self-esteem questions. However, majority of the respondents chose “agree’ for negative attitude towards the self-esteem questions where they feel like themselves a failure, they feel do not have much to be proud themselves, they wish they could have more respect for themselves, they feel useless and they think they are no good at all.

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Table 4.4 Responses of self-esteem of respondents (n=188)

Statements	n (%)			
	Strongly agree	Agree	Strongly disagree	Disagree
Worthiness, at least on equal plane with others	47 (25.0)	114 (60.6)	0 (0.0)	27 (14.4)
Have good qualities	49 (26.1)	118 (62.8)	20 (10.6)	1 (0.5)
Feel like a failure	24 (12.8)	71 (37.8)	71 (37.8)	80 (42.6)
Ability to do things	46 (24.5)	109 (58.0)	3 (1.6)	30 (16.0)
Does not feel proud of yourself	16 (8.5)	86 (45.7)	24 (12.8)	62 (33.0)
Positive attitude	59 (31.4)	111 (59.0)	0 (0.0)	18 (9.6)
Self-satisfaction	40 (21.3)	92 (48.9)	4 (2.1)	52 (27.7)
Self-respect	59 (31.4)	106 (56.4)	4 (2.1)	19 (10.1)
Feel like useless	14 (7.4)	110 (58.5)	18 (9.6)	46 (24.5)
Feel no good at all	14 (7.4)	98 (52.1)	30 (16.0)	46 (24.5)

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Table 4.5 shows the scores of self-esteem level of respondents. None of the respondents were high in self-esteem (0.0%), respondents with normal self-esteem were 37.2% and most of respondents were low in self-esteem (62.8%).

More than half of the respondents were low in self-esteem and this finding is consistent with a study by Naseri et al. (2015) found that 72.8% of Al-Zahra University students were low in self-esteem. However, a study by Keshk et al. (2019) shown an opposite finding, 91.5% of university students in Cairo were high in self-esteem. Low self-esteem in this study is due to more students were at age of 19-21 years and according to Chung et al. (2014), self-esteem is greatly impacted within the first year and an increased sense of self- through the college years.

Table 4. 5 Self-esteem level of respondents (n=188)

Variables	Score range	n (%)	Mean ± SD
Self-esteem			12.79 ± 4.5
High	26-30	0 (0.0)	
Normal	15-25	70 (37.2)	
Low	<15	118 (62.8)	

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4.4 Personal factors

Table 4.6 shows the sources of nutrition and health information of the respondents and its frequency. The highest frequency of sources to get nutrition and health information (combinations of 'sometimes' and 'always' responses) was online resources (78.2%), followed by friends/peers (76.6%), family members (65.9%), traditional media (43.1%) and the least one was healthcare professional (41%).

A study by Quaidoo et al. (2018) found two similar findings with this present study on online resources as the highest frequency used and healthcare professional as the lowest frequency used by the respondents to get nutrition and health information. From the descending order right after online resources was traditional media, followed by friend/peers (verbally), family members and the least one; healthcare professional (Quaidoo et al., 2018).

Table 4.6 Sources of nutrition and health information of the respondents and its frequency (n=188)

Types	Never n (%)	Rarely n (%)	Sometimes n (%)	Always n (%)
Family members	14 (7.4)	50 (26.6)	92 (48.9)	32 (17.0)
Friends/Peers (verbally)	9 (4.8)	35 (18.6)	105 (55.9)	39 (20.7)
Healthcare professional (e.g. nutritionists, dietitians, doctors)	37 (19.7)	74 (39.4)	65 (34.6)	12 (6.4)
Online resources	5 (2.7)	36 (19.1)	102 (54.3)	45 (23.9)
Traditional media	10 (5.3)	97 (51.6)	70 (37.2)	11 (5.9)

Table 4.7 shows the reliability perceived by the respondents on the sources to get nutrition and health information. The highest reliability of sources to get nutrition and health information (combinations of 'very reliable' and 'accurate' responses) was healthcare professional (87.3%), followed by online resources (47.9%), traditional

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media (43.6%), family members (31.9%) and the least one was friends/peers (28.2%).This present study had similar finding when compared to Quaidoo et al. (2018) where healthcare professional is the highest reliability, followed by online resources, family members and the lowest reliability was from friends/peers (verbally).

Table 4.7 Reliability of sources of nutrition and health information based on respondents' opinions (n=188)

Types	Unreliable n (%)	Fairly reliable n (%)	Very reliable n (%)	Accurate n (%)
Family members	10 (5.3)	118 (62.8)	57 (30.3)	3 (1.6)
Friends/Peers (verbally)	4 (2.1)	131 (69.7)	49 (26.1)	4 (2.1)
Healthcare professional (e.g. nutritionists, dietitians, doctors)	2 (1.1)	22 (11.7)	84 (44.7)	80 (42.6)
Online resources	0 (0.0)	98 (52.1)	75 (39.9)	15 (8.0)
Traditional media	8 (4.3)	98 (52.1)	72 (38.3)	10 (5.3)

Table 4.8 represents the types of online resources which the respondents have used. Most of the respondents chosen Facebook/Instagram/Twitter of their friends/favorite celebrities (46.8%), followed by YouTube channels (28.7%), Official Portal Ministry of Health/Nutrition Department (12.8%), blogs (6.4%), Google (4.3%), advertisement, Reddit and research papers (0.5%).

Table 4.8 Types of online resources which the respondents have used

Types	n (%)
Blogs	12 (6.4)
YouTube channels	54 (28.7)
Facebook/Instagram/Twitter (Friends/Celebrities)	88 (46.8)
Official Portal MOH/MDA/BDA	24 (12.8)
Others	
Advertisement	1 (0.5)
Google	8 (4.3)
Reddit and research papers	1 (0.5)

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Table 4.9 shows the nutrition knowledge responses of the respondents. Most of the respondents answered correctly for 19 items except the one item which asked on food high in cholesterol. Respondents who answered incorrectly for food high in cholesterol were 49.5% and answered 'do not know' were 13.3%. The second highest incorrect answers but not outnumbered those who are answered correctly was food group eat the most (38.3%) and followed by information on food labelling (35.6%).

Table 4.9 Nutrition knowledge responses of the respondents (n=188)

Statements	Correct n (%)	Incorrect n (%)	Don't know n (%)
Nutrients in a balanced diet	168 (89.4)	20 (10.6)	0 (0.0)
Good food practices	144 (76.6)	43 (22.9)	1 (0.5)
Food group eat the most	115 (61.2)	72 (38.3)	1 (0.5)
Food group eat the least	171 (91.0)	16 (8.5)	1 (0.5)
Food high in salt	159 (84.6)	29 (15.4)	0 (0.0)
Nutrient that gives the most calories	140 (74.5)	41 (21.8)	7 (3.7)
Body building nutrient	142 (75.5)	45(23.9)	1 (0.5)
Food rich in carbohydrate	180 (95.7)	7 (3.7)	1 (0.5)
Food rich in protein	183 (97.3)	4 (2.1)	1 (0.5)
Food rich in vitamin, mineral and fiber	164 (87.2)	17 (9.0)	7 (3.7)
Food rich in dietary fiber	131 (69.7)	42 (22.3)	15 (8.0)
Food high in cholesterol	70 (37.2)	93 (49.5)	25 (13.3)
Information on food labelling	111 (59.0)	67 (35.6)	10 (5.3)
Importance of aerobic exercise	165 (87.8)	19 (10.1)	4 (2.1)
Body Mass Index is an indicator of	178 (94.7)	7 (3.7)	3 (1.6)
Cooking method with high fat content	178 (94.7)	8 (4.3)	2 (1.1)
Health risk of excessive energy intake	181 (96.3)	5 (2.7)	5 (2.7)
Health risk of obesity	188 (100.0)	0 (0.0)	0 (0.0)
Ways to maintain ideal body weight	165 (87.8)	21 (11.2)	2 (1.1)
Health risk of consuming food with excessive sugar	176 (93.6)	10 (5.3)	2 (1.1)

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Table 4.10 shows the scores of nutrition knowledge of respondents. The mean nutrition knowledge score was 16.54 ± 2.04 and the mean percentage score was 82.69 ± 10.18. Most of them were good in nutrition knowledge (83.5%), followed by moderate (15.4%) and poor (1.1%).

In this study, majority of the respondents were good in nutrition knowledge and this is consistent with a study by Dalrymple (2016) where they found that more than half of their respondents were exceptional good in nutrition knowledge. Good in nutrition knowledge among the respondents are due to they are mostly from Science field of study.

Table 4.10 Nutrition knowledge score of respondents (n=188)

Variables	Score range	n (%)	Mean ± SD
Nutrition knowledge	0-20		16.54 ± 2.04
Percent score (%)	0-100		82.69 ± 10.18
Category (%)			
Poor	0-50	2 (1.1)	
Moderate	51-74	29 (15.4)	
Good	75-100	157 (83.5)	

Table 4.11 shows the body mass index of the respondents. The mean body mass index of the respondents was 22.85 ± 4.73 kg/m^2. Respondents who were in normal weight were 46.3%, followed by overweight (23.4%), underweight (16.0%), Obese I (12.2%), Obese II and Obese III respondents both were (1.1%) respectively.

In this present study, the combinations of underweight and overweight/obese respondents were higher than those who were in normal body mass index. A local study done by Gopalakrishnan et al. (2012) revealed that more underweight, overweight and obese body weight (50.7%) than normal body weight (49.3%) among medical students in a private university, AIMST University. However, another local

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study done by Wan Mohamed Radzi et al. (2019) reported that more undergraduate students were in normal body mass index (53.4%) than the combinations of underweight and overweight/obese (46.7%) among undergraduate students in public universities. A recent local study done by Chin et al. (2020) reported a similar finding as Wan Mohamed Radzi et al. (2019), where 70% were in normal weight and 30% in underweight, overweight and obese body weight. Calderon et al. (2004) found that more female who were underweight (16.5%) than male respondents (13.5%) which is similar with this present study (female, 18.3% and male, 12.7%). Calderon et al. (2004) also found that more male (36.5%) were overweight/obese than female respondents (20.9%) which is similar with this present study (male, 41.8% and female, 34.9%). A study by Kamarudin et al. (2017) among Universiti Pendidikan Sultan Idris students revealed a similar finding that more male respondents were overweight/obese (47.5%) than female (43.0%).

Table 4.11 Body mass index of respondents (n=188)

Variables	n (%)	Mean ± SD
Body mass index (kg/m^2)		22.85 ± 4.73
Underweight	30 (16.0)	
Normal	87 (46.3)	
Overweight	44 (23.4)	
Obese I	23 (12.2)	
Obese II	2 (1.1)	
Obese III	2 (1.1)	

Table 4.12 shows the waist circumference of the respondents. The mean waist circumference of the respondents was 73.67 ± 12.08 cm. Most of the respondents had normal waist circumference (86.7%) and 13.3% were at risk of abdominal obesity were 13.3%.

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In this present study, majority of the respondents had a normal waist circumference. However, the prevalence of undergraduate students who were at risk of abdominal obesity in this present study is quite concerning. A study by Peltzer and Pengpid (2017) revealed that prevalence of undergraduate students who were at risk of abdominal obesity in Vietnam (7.5%), Laos (13.7%), Myanmar (14.6%), Singapore (15.0%), Philippines (18.2%), Thailand (20.8%), Indonesia (32.1%) and Malaysia (32.2%) are high. A study by Lazarevich et al. (2013) reported that 26.8% were at risk of abdominal obesity among undergraduate students in Autonomous Metropolitan University-Xochimilco of Mexico City. Another study done by Mogre et al. (2015) also found that 15.2% of the undergraduate students in Tamale, Ghana were at risk of abdominal obesity. A similar finding with Pengpid and Peltzer (2014); 16.4% were at risk of abdominal obesity among undergraduate students of Gandhi Institute of Technology and Management) University in India.

Table 4.12 Waist circumference of respondents (n=188)

Variables	n (%)	Mean ± SD
Waist circumference (cm)		73.67 ± 12.08
Normal	163 (86.7)	
At risk of abdominal obesity	25 (13.3)	

4.5 Fad diet practices

Table 4.13 represents the responses of fad diet characteristics of respondents. Most of the respondents answered “no” for 11 out of 13 items, indicating more than half did not follow fad diets characteristics. The highest answering “yes” was the statement of “do you combine certain foods at specific times of day” and “do you reduce your frequency of eating food” (50%), followed by “do you perform moderate-intensity of physical activity (>150 minutes a week)” (45.7%), “do you follow a diet

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that claims high performance in certain body parts if you are eating certain foods" (24.5%), "do you follow a diet that warns you one food or food group will make you seriously ill or worse" (23.9%) and "do you avoid certain food and replace them with vitamin and mineral supplements" (16.5%).

Two previous study from Indonesia by Hana (2014) and Sulistyan et al. (2016) reported a similar finding with this present study that the statement of "do you reduce your frequency of eating food" was the highest answered "yes". Hana (2014) revealed that "do you avoid certain food and replace them with vitamin and mineral supplements" was the second highest, followed by "do you combine certain foods at specific times of day", "do you perform moderate-intensity of physical activity (>150 minutes a week)" and "do you followed a diet which claims a drastic change". Sulistyan et al. (2016) also found almost similar finding with the present study but with slightly different in order.

Table 4.13 also show that 34 of the respondents (18.1%) claimed that they were currently practicing fad diets. Atkins diet was the highest (23.5%), followed by Zone diet (20.6%), Ketogenic and Paleo diet both were (14.7%) and the least one was Ornish, South Beach and Dukan diet (3.0%), respectively. 27 out of 34 respondents (79.4%) were aware that they are practicing fad diets while 58 out of 154 respondents (37.7%) were unaware that they are practicing fad diets.

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Table 4.13 Responses of fad diet characteristics of respondents (n=188)

Statements	No n (%)	Yes n (%)
Perform moderate-intensity of physical activity (>150 minutes a week)	102 (54.3)	86 (45.7)
Follow a diet which claims a drastic change	158 (84.0)	30 (16.0)
Consume food/drink which claims to burn your fat	164 (87.2)	24 (12.8)
Consume slimming/fat burner pills	180 (95.7)	8 (4.3)
Avoid certain food and replace with vitamin and mineral supplement	157 (83.5)	31 (16.5)
Consume/eat one type of food group	171(91.0)	17 (9.0)
Combine certain food groups at specific times of day	94 (50.0)	94 (50.0)
Reduce your frequency of eating food	94 (50.0)	94 (50.0)
Follow a diet that warns you one food or food group will make you seriously ill or worse	143 (76.1)	45 (23.9)
Follow a diet that claims high performance in certain body parts if you are eating certain foods	142 (75.5)	46 (24.5)
Follow a diet that offers testimonials from celebrities promising a quick fix	173 (92.0)	15 (8.0)
Follow a diet that has rigid rules for a short period of time	159 (84.6)	29 (15.4)
Currently practising any fad diet	154 (81.9)	34 (18.1)
If yes, what type of fad diet are you practising now? (n = 34)		
Atkins	8 (23.5)	
Ornish	1 (3.0)	
Pritikin	3 (8.8)	
Paleo	5 (14.7)	
South Beach	1 (3.0)	
Dukan	1 (3.0)	
Zone	7 (20.6)	
Ketogenic	5 (14.7)	
Others (Intermittent fasting)	3 (8.8)	

Table 4.14 presents the prevalence of fad diets practices of the respondents which was 45.2% and those who were not practicing fad diets (54.8%). From the previous study Vuvor et al. (2017), the prevalence of fad diets among undergraduate students in Universiti Putra Malaysia was slightly lower than (65.3%) Vuvor et al.

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(2017). The prevalence of fad diets in two studies in Indonesia (Hana, 2014; Sulistyan et al. (2016) was twice higher than this present study.

Table 4.14 Fad diet practices of respondents (n=188)

Variables	Score range	n (%)	Mean ± SD
Fad diet practices			2.94 ± 2.66
Category			
Food faddist (upper median)	3-13	85 (45.2)	
Non-food faddist (below median)	0-2	103 (54.8)	

4.6 Association between socio-demographic factors and fad diets practices

Chi-square test was used to examine the associations between socio-demographic factors and fad diets practices. Table 4.15 indicates that there were no associations found between age, sex, ethnicity, field of study, parent's occupation, parent's education level and household income with fad diets *(p*>0.05) except living arrangement and diet practices ($p<0.05$).

4.15 Association between the socio-demographic factors and fad diet practices

Characteristics	n (%)		$\chi 2$	p-value
	Food faddist	Non-food faddist		
Age (years)			1.375	0.241
19-21	43 (50.6)	62 (60.2)		
22-25	42 (49.4)	41 (39.8)		
Sex			0.280	0.597
Male	38 (44.7)	41 (39.8)		
Female	47 (55.3)	62 (60.2)		
Ethnicity			0.087	0.768
Malay	74 (87.1)	87 (84.5)		
Non-Malay	11 (12.9)	16 (15.5)		
Course of study			0.007	0.934
Science	68 (80.0)	84 (81.6)		
Non-science	17 (20.0)	19 (18.4)		
Living arrangement			3.962	0.047*
College dormitory	63 (74.1)	61 (59.2)		
Off-campus	22 (25.9)	42 (40.8)		

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Characteristics	n (%) Food faddist	Non-food faddist	$\chi 2$	p-value
Parents' occupation			3.165	0.075
Father's occupation				
Working	67 (78.8)	68 (66.0)		
Not working	18 (21.2)	35 (34.0)		
Mother's occupation			0.534	0.465
Working	35 (41.2)	49 (47.6)		
Not working	50 (58.8)	54 (52.4)		
Parents' education level				
Father's education level			0.760	0.684
No formal education/ Primary education	4 (4.7)	8 (7.8)		
Secondary education	36 (42.4)	41 (39.8)		
Tertiary education	45 (52.9)	54 (52.4)		
Mother's education's level			0.461	0.794
No formal education/Primary education	5 (5.9)	8 (7.8)		
Secondary education	44 (51.8)	49 (47.6)		
Tertiary education	36 (42.4)	46 (44.7)		
Household income (RM)			0.648	0.723
<3855	31 (36.5)	41 (39.8)		
3856-8318	32 (32.9)	33 (32.0)		
>8319	22 (25.9)	29 (28.2)		

*** Significant at p <0.05**

This study found no association between age and fad diets and this finding is supported by Vuvor et al. (2017) where they found that age (18-25 years) has no association with fad diets, $p>0.05$. Another study done by Bärebring et al. (2018) found no association with age groups of 20-24, 25-30, 31-36, 37-45,46-55 and 56-65 with specific dietary regimen (low carbs, IF, paleolithic diet, Weight Watchers). According to Seward (2014), age (20-74 years) are not significantly associated with

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weight loss program (Weight Watchers, Jenny Craig, Tops, or Overeaters Anonymous). Only Vuvor et al. (2017) study focused on emerging adults age from 18 to 25 years while the two other studies focused on such a wide range of age groups. From this present study, more respondents were practicing fad diets from the age group of 19-21 years than those age group of 22-25 years. According to Ganasegeran et al. (2012), eating habits score was significantly low among younger students (18-21 years) and they are exploring and experimenting more their diets as the transition between adolescence and adulthood as a period of increased risk for excess weight gain; resulting in engaging in weight-related behaviours (Nelson et al., 2008). A study by Malinauskas et al. (2006) revealed the majority of participants age of 18 to 24 years used dieting for weight loss.

In this study, there was no association found between sex and fad diets and this finding is supported by Vuvor et al. (2017) where $p>0.05$. However, a study by Kim et al. (2015) found an association between sex and fad diets among undergraduate students in Korea ($p<0.001$); in contrast with this present study and Vuvor et al. (2017). This present study had a similar finding with Kim et al. (2015) and Vuvor et al. (2017) where they found that more female practicing fad diets than the male respondents. Another study done by Davy et al. (2006) have found that higher percentages of women than men had tried a low-fat diet, low-carbohydrate diet and Weight Watchers. Yahia et al. (2011) suggested that female college students are more conscious of body image and place higher importance on appearance when compared to college males. Thus, female may engage in more dieting practices.

In this study, there was no association found between ethnicity and fad diets and this finding is supported by Seward (2014) where she categorized non-Hispanic White, non-Hispanic Black, Hispanic and others which $p>0.05$, not significant with

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weight loss program (Weight Watchers, Jenny Craig, Tops, or Overeaters Anonymous). Halbert et al. (2018) found that there are no significant differences between racial background with weight loss attempts. A possible explanation of this insignificant result is due to non-normally distributed data as there was a huge majority Malay respondent than other ethnicities participated in this study. A study by Kong et al. (2002) focused on weight loss practices among Malaysian adults found that the most common weight-loss method used was dieting, followed by exercise and the use of slimming teas. Even though Kong et al. (2002) study did not specify what types of diet the respondents used, it appeared that Malays are more likely to try lose weight (44.3%).

In this study, there was no association found between field of study and fad diets. However, Crowley et al. (2014) found that there was a significant difference between medical students described their eating habits to be more healthy than non-medical students in Auckland, New Zealand. A possible explanation of this insignificant result is non-normally distributed data between science and non-science students. There were more respondents from Science as their field of study compared to those from non-Science field of study. A study by Sajwani et al. (2009) found that there was no significant difference in the diet between medical and non-medical students in Karachi, Pakistan and it may be concluded that those who had superior level of knowledge about health and diet are not putting knowledge into practice due to certain barriers such as lack of time and high level of perceived stress. Another study by Banjari et al. (2011) revealed that 35.6% of undergraduate students from Faculty of Food Technology had tried fad diets. A qualitative study by Kabir, Miah and Islam (2018) found that undergraduate students from Science courses in a public university in Bangladesh eaten rice, lentil and egg as their dietary pattern despite of knowing

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carbohydrate and protein intake alone may not be enough to reenergize the body. From the previous studies, it can be concluded that university students regardless science and non-science courses are vulnerable to fad diets. Adopting a diet that calls for the elimination of foods or food groups that contain necessary nutrients and severe dietary restrictions in the interest of losing weight sounds easier and resulting in undergraduate students to practice fad diets as they are lacking of time and high level of perceived stress to practice a moderate, variety of food groups and balanced diet.

In this study, there was an association found between living arrangement and fad diets. In contrast with present study, Minnick (2014) found that there was no association between living arrangement and eating habits of college students, $p>0.05$. A study by Papadaki et al. (2007) where they focused on Greek students living away from home, compared to students still living at home found that more unhealthier dietary choices were made, as well as the decreased consumption of home-cooked meals and increased consumption of take-away and convenience meals among those living away from home. Dhillon et al. (2019) revealed that there are four elements of perceived food environment on campus which are affordability which includes price and meal plan, acceptability which includes familiarity and preferences, accessibility which includes convenience and accommodation and adequacy which includes variety and quality. A study by Hiza and Gerrior (2002) reported that college students did not meet the maximum recommended serving of any of the five major food groups. From this present study, 9.0% of the respondents consumed/eaten one type of food group, 50% of the respondents combined certain food groups at specific times of day and 50% of the respondents reduce their frequency of eating food. Thus, four elements of perceived food environment on campus influence fad diets practices among those living in college dormitory.

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Vuvor et al. (2017) did not found association between parents' occupation and fad diets; similar finding with this present study. However, a study by Al-Haj et al. (2015) found that there was a significant association between eating habits score and father occupation among medical students in a Sudanese medical faculty. Parental characteristics have a profound impact on children's food habits (Campbell et al., 2013) and dietary habits established during childhood and adolescence moderately continue into adulthood (Movassagh et al., 2017). A possible explanation of this present finding could be that young adults start making independent decisions and parents therefore have less influence on dietary patterns even though parents providing financial assistance may play an important role in a person's striving for independence (Beasley et al., 2004).

In this study, there was no association found between parents' education level and fad diets. This finding is supported by Hoque et al. (2018) where they found no significant difference between practices of building healthy eating habit in terms of parents' academic backgrounds. However, a study by El-Nmer et al. (2014) found an association between parents' education level and their children nutritional practice.

In this study, there was no association found between household income and fad diets. This finding is supported by Hoque et al. (2018) where they found no significant difference between practices of building healthy eating habit in terms of parents' income. However, this present finding is in contrast with Machado et al. (2012) and Kakinami et al. (2015) where they found an association between household income and weight-loss attempts. Another study by Brown, Overcash and Reicks (2019) reported that those from households with lower annual income have higher frequency of trying to lose weight compared to those from households with higher

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income which similar to this present study, more food faddists are coming from low household income (B40).

4.7 Association between psychological factors and fad diets practices

Table 4.16 shows that there were no associations between body image perception, self-esteem and fad diets practices (p>0.05).

Table 4.16 Association between the psychological factors and fad diet practices

Variables	n (%)		$\chi 2$	p-value
	Food faddist	Non-food faddist		
Body image perception			1.744	0.187
Dissatisfied	69 (81.2)	74 (71.8)		
Satisfied	16 (18.8)	29 (28.8)		
Self-esteem level			0.747	0.387
High	0 (0.0)	0 (0.0)		
Normal	61 (37.9)	9 (33.3)		
Low	100 (62.1)	18 (66.7)		

In this study, there was no association found between body image perception and fad diets and this finding is supported by Markey and Markey (2005) where they found no significant relation between the male respondents reported wanting to look like and their unhealthy dieting. A study by Raffoul and Hammond (2018) in Canada revealed that those who perceived themselves as having overweight (AOR =1.75) or obesity (AOR = 2.16) versus normal weight engaged in a greater number of unhealthy weight-loss methods (fad diets such as Weight Watchers, Atkins, Beachbody, 21 Day Fix, Ketogenic and Paleo). In contrast with this present study, a local study by Sidek and Hanapiah (2018) revealed that body image perceptions and concern with dieting and weigh were associated with weight loss behaviours among undergraduate students

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in IIUM Kuantan. Another local study by Badrin, Daud and Ismail (2018) also found that body weight perception is associated with weight loss practice among private college students in Kelantan, Malaysia. It could be concluded that regardless whether the individuals are practicing fad diets or the opposite, body dissatisfaction among undergraduate students in Universiti Putra Malaysia was high and half of the students chosen to reduce frequency of eating food and a ratio of 5:25 students followed a diet that has rigid rules for a short period of time; exhibited restrained eating due to fad diets practices.

In this study, there was no association between self-esteem and fad diets practices and this finding is supported by Sulistyan et al. (2016) where they found no association between self-esteem and fad diets. In this present study, those who are high/normal self-esteem have a higher percentage of practicing fad diets than non-food faddist. According to Baumeiste et al. (2003), high self-esteem falls into two categories of benefits which are enhanced initiative and pleasant feelings. These two categories produce opposite responses which might explain why both food faddist and non-food faddist were having a higher percentage of low self-esteem than high/normal self-esteem. According to Poobalan et al. (2014), they found that young adults expressed a need to change their diet, frequently stating that always eating the same thing was 'boring' regardless of whether the food consumed was healthy or unhealthy and preferred variety in their food. Poobalan et al. (2014) also found that the older of the young adults (20+ age group), irrespective of being at university or college, were reasonably confident that their diet was generally healthy.

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4.8 Association between the personal factors and fad diet practices

Table 4.17 indicates no associations between family members, online resources and traditional media with fad diets practices ($p > 0.05$).

In this present study, only friends/peers (verbally) and healthcare professional (nutritionists, dietitians, doctors) were associated with fad diets. According to Jacobs et al. (2017), the use of healthcare professionals as a source of health information were significant across in 2011-2014 in the United States. The reasons why healthcare professional was the least frequency sources to get nutrition and health information in this study could be explained by Jacobs et al. (2017) where they revealed that older participants and participants with less internet skill were more likely to use healthcare professionals as a source of health information. In contrast with this present study, a study by Price (2018) in Canada revealed that online resources and traditional media was associated with greater use of restrictive eating behaviors for weight loss among young adults. A study by Eisenberg et al. (2005) revealed friends influence was associated with unhealthy weight-control behaviors. A study by Cunningham et al. (2012) explained that friends share with each other ideas, expectations about what is appropriate, normal, beautiful, desired and advice about dieting had pressured them to diet.

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Table 4.17 Association between source of nutrition and health information and fad diets practices (n=188)

Variables	n (%)				$\chi 2$	p-value
	Food faddist		Non-food faddist			
	Never/Rarely	Sometimes/Always	Never/Rarely	Sometimes/Always		
Source of nutrition and health information						
Family members	24 (28.2)	61 (71.8)	40 (38.8)	63 (61.2)	1.882	0.170
Friends/Peers (verbally)	12 (14.1)	73 (85.9)	32 (31.1)	71 (68.9)	6.548	0.010*
Healthcare professional (e.g. nutritionists, dietitians, doctors)	41 (48.2)	44 (51.8)	70 (68.0)	33 (32.0)	6.700	0.010*
Online resources	15 (17.6)	70 (82.4)	26 (25.2)	77 (74.8)	1.162	0.281
Traditional media	48 (56.5)	37 (43.5)	59 (57.3)	44 (42.7)	0.000	1.000

*** Significant at p <0.05**

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Table 4.18 indicates no association between types of online resources such as Blogs, YouTube channels, Facebook/Instagram/Twitter (friends/celebrities), Official Portal MOH/MDA/BDA with fad diets practices (p >0.05).

Table 4.18 Association between types of online resources and fad diet practices

Variables	n (%)		$\chi 2$	p-value
	Food faddist	Non-food faddist		
Types of online resources			3.235	0.519
Blogs	5 (5.9)	7 (6.8)		
Youtube channels	26 (30.6)	28 (27.2)		
Facebook/Instagram/Twitter (Friends/Celebrities)	37 (43.5)	51 (49.5)		
Official Portal MOH/MDA/BDA	14 (16.5)	10 (9.7)		
Others	7 (6.8)	3 (3.5)		

Table 4.19 shows that there was association between body mass index and fad diets practices ($p<0.05$). However, there was no association found between nutrition knowledge, waist circumference and fad diets practices ($p>0.05$).

Table 4.19 Association between nutrition knowledge, body mass index and waist circumference with fad diet practices

Variables	n (%)		$\chi 2$	p-value
	Food faddist	Non-food faddist		
Nutrition knowledge level			0.962	0.327
Good	68 (80.0)	89 (86.4)		
Moderate/Poor	17 (20.0)	14 (13.6)		
Body mass index			12.241	0.002*
Underweight	8 (9.4)	22 (21.4)		
Normal	34 (40.0)	53 (51.5)		
Overweight/Obese	43 (50.6)	28 (27.2)		
Waist circumference			3.280	0.070
Normal	69 (81.2)	94 (91.3)		
Abnormal	16 (18.8)	3 (8.7)		

*** Significant at p <0.05**

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In this study, there was no association between nutrition knowledge and fad diets and this finding is supported by Laz et al. (2015) where there were no significant associations were observed between nutrition knowledge and unhealthy weight loss behaviors (took diet pills, medicines, herbs, or supplements without a prescription, fasted for ≥24 hours). Even though undergraduate students in Universiti Putra Malaysia had a good nutrition knowledge level, they did not practice healthy eating and this finding is supported by Hassan et al. (2015) found that 74.0% of their respondents have a good knowledge of healthy eating but poor healthy eating practice. Another study done by Shakkour (2007) found that there was no significant relationship between nutritional knowledge and application among undergraduate students in Liberty University in the United States; the subjects who scored the highest on the nutritional assessment did not have a significantly healthier diet than the subjects who scored lower.

In this study, there was an association between body mass index and fad diets and this finding is supported by Gaylis et al. (2020) where they found an association between body mass index and weight control behavior. According to Calderon et al. (2004), they found that those students with a higher BMI were more likely had tried dieting, 54.7% of them often diet to control their weight. Another study by Méndez-Hernández et al. (2010) also reported that overweight and obese university students in Mexico were more likely to try to lose weight. A study by Neumark-Sztainer et al. (2012) revealed that persistent dieting and use of unhealthy weight control predicted greater increases in BMI in respondents who were overweight and those who were not overweight. Complexities of obesity stigmatization made obese people repeatedly turned to commercial diets in their weight loss attempts (Puhl et al., 2008; Thomas et

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al., 2008). Many obese individuals still rely on 'easy fix' solutions in their continuing and sometimes life-long struggles with their weight.

In this study, there was no association between waist circumference and fad diets. The non-food-faddist respondents have more normal waist circumference than food-faddist respondents while food-faddist respondents who are at risk of co-morbidities is higher than non-food faddist respondents. There is no study focused on the association between waist circumference and fad diets. However, Sares-Jäske et al. (2019) found that dieters had higher waist circumference than non-dieters; suggesting dieting attempts to be non-functional in the long term in the general population. According to Stevens et al. (2010), younger adults tend to experience greater gains in waist than older adults, probably due to greater weight gains during young adulthood.

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CHAPTER 5

CONCLUSION, LIMITATIONS AND RECOMMENDATIONS

5.1 Conclusion

In general, most of the respondents were Malay (85.6%), female (58.0%), aged 19 to 21 years old (55.9%), studying Science field (80.8%), living in college-dormitory (66.0%), respondents' fathers were working (71.9%), respondents' mothers were not working and a housewife (55.3%), respondents whose father had tertiary education level (52.7%), respondents whose mother had secondary education level (49.5%) and came from B40 low income family (RM<3855) (38.3%). Most of the respondents dissatisfied with their body image (76.1%) and had low self-esteem (62.8%), used online resources (78.2%) and friends/peers (76.6%) as their highest frequency sources to get nutrition and health information. The prevalence of practicing fad diet was 45.2%. Living arrangement, friends/peers (verbally), healthcare professional and body mass index were associated with fad diets practices (p<0.05).

In term of socio-demographic factors, age, sex, ethnicity, field of study, parents' occupation, parent's education level and household income were not significantly associated with fad diets practices except living arrangement was significantly associated with fad diet practices. In term of psychological factors, body image perception and self-esteem were not associated with fad diets practices. In term of personal factors, sources of nutrition and health information (friends/peers and healthcare professional) and body mass index were significantly associated with fad diets practices while sources of nutrition and health information (family members,

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friends/peers, online resources and traditional media) and waist circumference were not significantly associated with fad diet practices.

There is no easy-quick-fix fad diet that can guarantee a substantial weight loss and a balanced and complete intake of nutrients. Nutritional and health status will be deteriorating if an individual keep practicing fad diet for long-term.

5.2 Limitations

The findings of this study could not be generalized to the undergraduate students in Malaysia because this study sample is based on one local university only. Second, quality of responses is highly dependent on internet connection speed and length of the questionnaire (Deutskens et al., 2004). This might explain the potential respondents' willingness to answer the questionnaire.

Anthropometry measurements in this study are mostly based on self-reports, n = 162 while only 26 respondents were able to do anthropometry measurements with the right equipment by the researcher. According to Ortiz-Panozo et al. (2017), Pearson correlation coefficients between direct and self-reported measures were above 0.80 for all anthropometric measures, except waist circumference (r=0.78). Thus, this might explain why waist circumference could not found relationship with fad diets practices.

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5.3 Recommendations

There are several recommendations for the future study such as longitudinal studies make comparisons over time on all anthropometric measures (body mass index, waist circumference and percentage body fat) for those who are practicing fad diets. Second, further research on macronutrient and micronutrient intake of food faddists are needed to have a better understand the effects of practicing fad diets on nutritional status and health status in Malaysia.

Third, future research with larger sample size and more study locations is recommended so that the findings can be generalized to the Malaysian population. Fourth, future research on specific fad diets such as Atkins, Paleo, Dukan, Ornish and Ketogenic diet to get the prevalence for practicing each fad diets.

Fifth, dietitians and nutritionists need to work together in order to demystify regarding health and nutrition information on social media such as Facebook, Instagram and Twitter. Official Portal of Ministry of Health/Nutrition Department need more followers/audiences to spread the correct information and make an interactive and engaging social media environment (Abdul Rahim et al., 2019; Neiger et al., 2012). Online resources serve as a very important source of nutrition information for this age group (19-25 years old). Thus, if dietitians and nutritionists are not proficient in digital technologies to communicate food and nutrition information, it is a missed opportunity that opens the doors for others to seize as healthcare professional has the highest reliability sources perceived by the respondents in this study and Quaidoo et al. (2018). Sixth, future research on social pressure from friends/peers and society is recommended in order to better understand the complex reasons which leading an individual practicing fad diet.

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

Research title	:	**Factors Associated with Fad Diets Among Undergraduate Students in Universiti Putra Malaysia.**
Study Site	:	**Universiti Putra Malaysia**
JKEUPM Ref No.	:	**JKEUPM-2019-550**
Researcher	:	**Nurul Natasha Zaheid**
Supervisor	:	**Assoc. Prof. Dr. Norhasmah Sulaiman**

Documents received and reviewed with reference to the above study:

1. Ethics Application Form, Version 1 dated 27/12/2019
2. Respondent Information Sheet & Consent (English), Version 2 dated 2/3/2020
3. Respondent Information Sheet & Consent (Malay), Version 2 dated 2/3/2020
4. Proposal (English), Version 2 dated 19/2/2020
5. Questionnaires/ Interviews (English), Version 2 dated 19/2/2020
6. Curriculum Vitae of:
    a. Assoc. Prof. Dr. Norhasmah Sulaiman

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

Decision by JKEUPM:

[X] Approved

[X] **Permission MUST BE OBTAINED from the respective hospitals/ institutions before conducting the research**

[ ] Disapproved

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

Researchers should comply with the following:

I. Complete a Study Final Report upon study completion (Form 3.2).

II. Ethical approval is required in the case of amendments/ changes to the study documents/ study sites/ study team.

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Appendix C: Information sheet and consent form

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

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

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

1. STUDY TITLE :

Factors Associated with Fad Diets among Undergraduate Students in Universiti Putra Malaysia.

2. INTRODUCTION:

Food faddism is defined as a dietary practice based upon an exaggerated belief within the impacts of food or nutrition on wellbeing and maladies. Fad diets are defined as any diet plan that defies logic, basic biochemistry and appetite appeal. Fad diets fall under the umbrella of food faddism. One of the characteristics of fad diets is quick weight loss and excellent physical health promise. In addition, fad diets are characterised by any allegations made that are unrealistic and not supported by scientifically valid evidence. The increase in health food movement over the years, which involve fad diets can lead to misleading information regarding nutrition and health. Fad diets have many bad consequences in term of nutritional status and health status.

This study is part of the graduation requirement for Bachelor of Science (Nutrition and Community Health) from Faculty of Medicine and Health Sciences, UPM is expected to be completed within one year of study. A total of 188 students from UPM will participate in this study.

3. WHAT WILL YOU HAVE TO DO?

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

During data collection, you need to answer a set of questionnaire including information on sociodemographic factors, psychological factors, personal factors and fad diets. Your body weight, height and waist circumference will be measured by the researcher in a closed room.

You will take approximately 45 minutes to complete this study. Your participation in this study is voluntary.You have the right to withdraw from this study anytime without giving any reasons and no penalty will be applied upon your withdrawal.

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4. WHO SHOULD NOT PARTICIPATE IN THE STUDY?

Students who are:
(a) Physically disabled
(b) Postgraduate students
(c) Non-Malaysian
(d) Athletes
(e) Individuals with any diagnosed disease

5. WHAT WILL BE THE BENEFITS OF THE STUDY:

(a) TO YOU AS THE SUBJECT?

You will know your body weight, height, body mass index (BMI) and waist circumference. In addition, you can know whether you are food faddist or non-food faddist.

(b) TO THE INVESTIGATOR?

Findings of this study will provide information on factors associated with fad diets as well as prevalence of fad diets practices among undergraduate students in Universiti Putra Malaysia. Findings of this study also will help nutritionists and health promotion planners to develop appropriate intervention and health promotion programs in order to tackle fad diets issue among young adults especially university students.

6. WHAT ARE THE POSSIBLE RISKS?

This study has minimal risk where it only involves anthropometry measurements (body weight, height and waist circumference) and as well as filling up a questionnaire.

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

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

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

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

Researcher:
Nurul Natasha Binti Zaheid
018-9556085
natashazaheid@gmail.com

Supervisor:
Assoc. Prof. Dr. Norhasmah Sulaiman
012-3684141 or 03-97692461
norhasmah@upm.edu.my

Please initial here if you have read and understood the contents of this page _____

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9. CONSENT

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

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

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

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

* delete where necessary

Signature ……..…… (Respondent)

Date :……..

Signature ……..…… (Witness)

Name :……..

I/C No. :……..

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

Date ……..……

Signature ……..…… (Researcher)

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Appendix D: Questionnaire

FACULTY OF MEDICINE AND HEALTH SCIENCES

DEPARTMENT OF NUTRITION AND DIETETICS

QUESTIONNAIRE

"CONFIDENTIAL"

RESEARCH TITLE: FACTORS ASSOCIATED WITH FAD DIETS AMONG UNDERGRADUATE STUDENTS IN UNIVERSITI PUTRA MALAYSIA

Researcher: Nurul Natasha Binti Zaheid

Supervisor: Assoc. Prof. Dr. Norhasmah Sulaiman

Instructions: Your participation in this questionnaire is completely voluntary and all of your responses will be kept confidential. I greatly appreciate your valuable time and efforts that you will spend in filling out this questionnaire.

Anthropometric Measurement

	First Reading	Second Reading	Average
Height			
Weight			
Body Mass Index:			
Waist circumference			

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SECTION A: DEMOGRAPHIC FACTORS

Instruction: Please answer all questions by marking (✓) in the appropriate boxes or writing your answers in the spaces provided.

No	Information	Choices
1.	Date of birth	___ / ___ / _____ (dd/mm/yyyy)
2.	Sex	Male ☐ Female ☐
3.	Ethnicity	Malay ☐ Chinese ☐ Indian ☐ Others: _____
4.	Year of study	1st year ☐ 2nd year ☐ 3rd year ☐ 4th year ☐
5.	Name of faculty	
6.	Program	
7.	Current living arrangement	College dormitory ☐ Off-campus ☐
8.	Parents' occupation	Father: _____ Mother: _____
9.	Parents' education level	Father: _____ Mother _____
10.	Household income (Monthly)	

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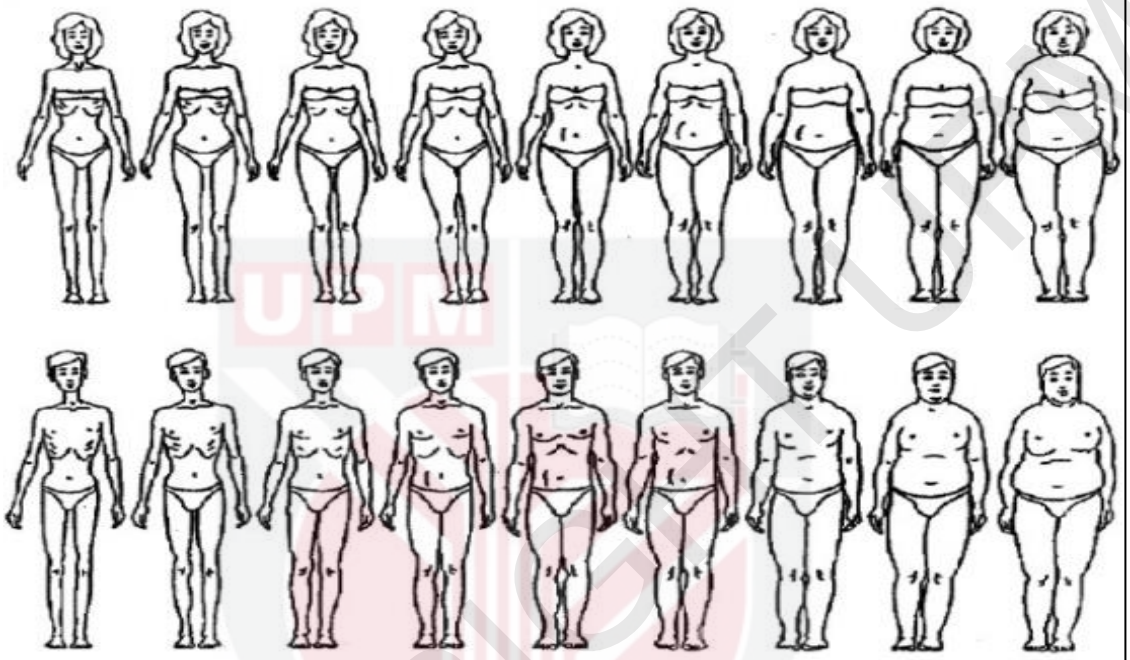
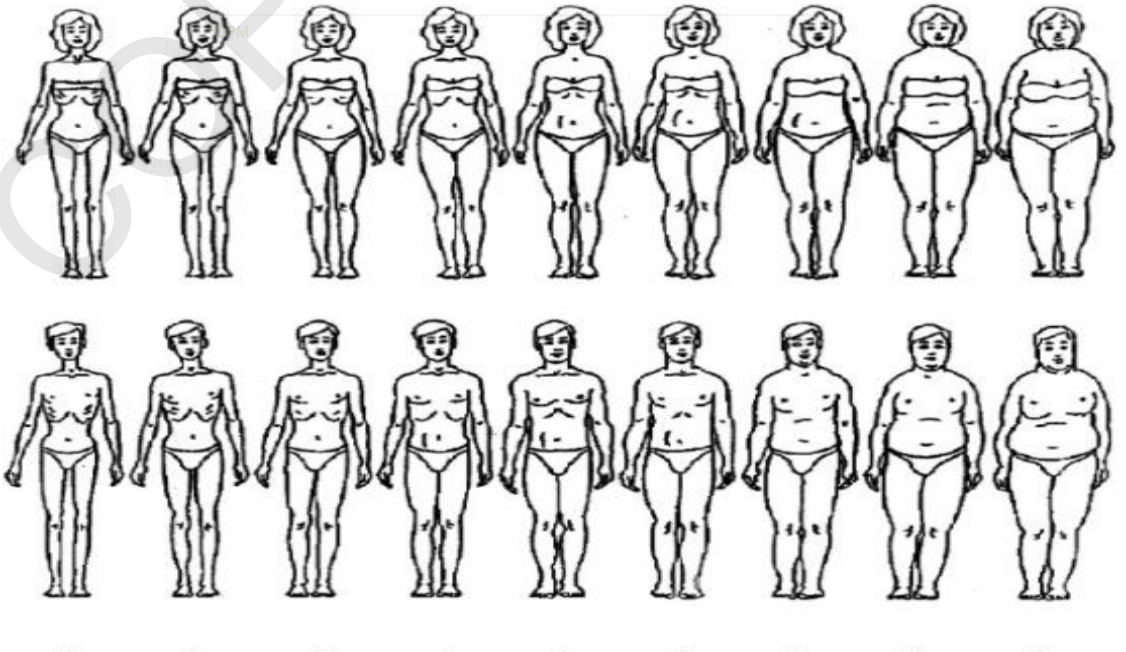
SECTION B

Instruction: Please circle any number that represent your current body weight and ideal body weight.

Current body weight



Ideal Body Weight



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Instruction: Below is a list of statements dealing with your general feelings about yourself. Please indicate how strongly you agree or disagree with each statement by marking (✓).

	Strongly Agree	**Agree**	**Disagree**	**Strongly Disagree**
1. I feel that I am a person of worth, at least on an equal plane with others.				
2. I feel that I have a number of good qualities.				
3. All in all, I am inclined to feel that I am a failure.				
4. I am able to do things as well as most other people.				
5. I feel I do not have much to be proud of.				
6. I take a positive attitude toward myself.				
7. On the whole, I am satisfied with myself.				
8. I wish I could have more respect for myself.				
9. I certainly feel useless at times.				
10. At times I think I am no good at all.				

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SECTION C

1. Where do you get information on nutrition from? For example, if you want information on the benefits of eating yogurt? **Please tick.**

	0 =Never	1= Rarely	2= Sometimes	3=Always
Family members				
Friends & peers				
Healthcare professionals (e.g. nutritionists, dietitians, doctors etc.)				
Online resources **Please tick one.** Blogs ( ) Youtube channels ( ) Facebook/Instagram/Twitter ( ) Official Portal Ministry of Health Malaysia/Malaysian Dietitians' Association/British Dietetic Association ( ) Others, please specify: _____				
Traditional media (e.g. Radio, television, newspapers etc.)				

2. How reliable do you think the information from these sources is? **Please tick.**

	0= Unreliable	1= Fairly reliable	2= Very reliable	3= Accurate
Family members				
Friends & peers				
Healthcare professionals (e.g. nutritionists, dietitians, doctors etc.)				
Online resources **based on what you have chosen in the previous question.**				
Traditional media (e.g. Radio, television, newspapers etc.)				

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Instruction: Please tick (✓) one right answer on the provided space.

1. A balanced diet consists of:

( ) Carbohydrate and protein
( ) Vitamin and mineral
( ) Carbohydrate, fat, protein, vitamin and mineral
( ) Carbohydrate, fat, protein and mineral
( ) Don't know

2. You can get all the nutrients by:

( ) Eating a lot of vegetables
( ) Eating a lot of foods
( ) Eating expensive foods
( ) Eating variety of foods
( ) Don't know

Do you know what food pyramid is?
( ) Yes ( ) No
If "Yes", please answer Question No. 3 and 4, if "No", go to Question No. 5

3. According to the food pyramid, which food group that you can eat **the most?**
( ) Vegetable and fruit
( ) Fat, oil, sugar and salt
( ) Rice, noodle, bread, cereal,
( ) Fish, meat, poultry, legumes
( ) Don't know

4. According to the food pyramid, which food group that you can **eat less?**
( ) Fat, oil, sugar and salt
( ) Fish, meat, poultry, legumes
( ) Milk and dairy products
( ) Rice, noodles, bread, cereal
( ) Don't know

5. Food that high in salt is:
( ) Goat meat
( ) Soy sauce
( ) Spinach
( ) Don't know

6. Which nutrient will give the most calories?
( ) Fat
( ) Vitamin and mineral
( ) Carbohydrate
( ) Protein
( ) Don't know

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7. Which nutrient is required for growth of the body?
( ) Fat
( ) Vitamin and mineral
( ) Carbohydrate
( ) Protein
( ) Don’t know

8. Which among the following food has the highest amount of carbohydrate?
( ) Fish
( ) Vegetables
( ) Bread and biscuit
( ) Fruits
( ) Don’t know

9. Which among the following food has the highest amount of protein?
( ) Vegetables
( ) Chicken
( ) Bread and biscuit
( ) Fruits
( ) Don’t know

10. Which among the following foods rich in vitamin, mineral, dietary fibre?
( ) Fish, meat, poultry, legumes
( ) Oil, fat, sugar and salt
( ) Vegetable and fruits
( ) Rice, noodles, bread, cereal
( ) Don’t know

11. Which among the following food have the highest amount of dietary fibre?
( ) Meat and poultry
( ) Milk and dairy products
( ) Vegetables and fruits
( ) Fish and seafood
( ) Don’t know

12. Which among the following food has the highest amount of cholesterol?
( ) Goat meat
( ) Milk and coconut milk
( ) Yellow egg yolk
( ) Beef *(Daging lembu)*
( ) Don’t know

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13. Which of the following information important in food labelling **except**?
( ) Cooking preparation
( ) Name of manufacturer/production
( ) Weight of product
( ) Ingredients
( ) Expiry date

14. Aerobic exercise (such as jogging, cycling, aerobic dance, brisk walking and swimming) is important for:
( ) Strengthen the bone
( ) Body beauty
( ) Digestion of food
( ) Heart health
( ) Don't know

15. Body Mass Index is indicator of
( ) Height status
( ) Healthy body weight for their height
( ) Dietary patterns
( ) Blood condition
( ) Don't know

16. Cooking method that can **increase fat content** is:
( ) Roast *(panggang)*
( ) Boil *(rebus)*
( ) Steam (kukus)
( ) Fry *(goreng)*
( ) Don't know

17. Excessive energy intake (calories) will cause:
( ) Dengue
( ) Obesity
( ) Tuberculosis *(penyakit batuk kering)*
( ) Don't know

18. Obesity can increase the risk of **one** of the following disease:
( ) Tuberculosis *(penyakit batuk kering)*
( ) Malaria
( ) Heart disease
( ) Dengue
( ) Don't know

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19. To avoid obesity and maintain ideal body weight, we need to balance our dietary intake with:

( ) Knowledge
( ) Types of drink
( ) Physical activity
( ) Income
( ) Don't know

20. The risk of excessive consumption of sugary food:

( ) Diabetes mellitus
( ) Tuberculosis *(penyakit batuk kering)*
( ) Hypertension
( ) Malaria
( ) Don't know

SECTION D

Instruction: Please answer the following questions as best as possible by circling the appropriate option.

Question	No	Yes
1. Do you perform moderate-intensity of physical activity (> 150 minutes a week or more than 30 minutes a day)?	***0***	***1***
2. Do you follow a diet which claims a drastic change (reduce more than 1 kg in a week)?	***0***	***1***
3. Do you consume food or drink which claims to burn your fat (slimming product such as shaker with a specific formula, slimming tea, high-fiber drink)?	***0***	***1***
4. Do you consume slimming pills or fat burner pills?	***0***	***1***
5. Do you avoid certain food or drink and replace them with vitamin and mineral supplements?	***0***	***1***
6. Do you only consume/eat one type of food group?	***0***	***1***
7. Do you *combine* certain *foods* or *eating foods* at specific times of day (Example: food combining diet forbids eating carbohydrates with protein and requires fruit be eaten alone)	***0***	***1***
8. Do you reduce your frequency of eating food (do not breakfast or do not dinner)?	***0***	***1***
9. Do you follow a diet that warns you one food or food group will make you seriously ill or worse?	***0***	***1***
10. Do you follow a diet that claims high performance in certain body parts if you are eating certain foods?	***0***	***1***

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11. Do you follow a diet that offers testimonials from celebrities promising a quick fix?	***0***	***1***
12. Do you follow a diet that has rigid rules for a short period of time? *(e.g.: 2 weeks, 1 month)*	***0***	***1***
13. Do you currently practising any fad diets?	***0***	***1***

13 (a) If **yes**, what type of fad diet are you practising now? Please **tick**.

- Atkins ( )
- Ornish ( )
- Pritikin ( )
- Paleo ( )
- South Beach ( )
- Dukan ( )
- Zone ( )
- Ketogenic Diet ( )
- Others, please specify: _____

----- THE END ----

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