



**UNIVERSITI PUTRA MALAYSIA**

***FACTORS ASSOCIATED WITH BODY WEIGHT STATUS USING  
ASIAN CUT-OFF POINTS AMONG UNDERGRADUATE UNIVERSITY  
STUDENTS IN UNIVERSITI PUTRA MALAYSIA***

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**FACTORS ASSOCIATED WITH BODY WEIGHT STATUS USING ASIAN  
CUT-OFF POINTS AMONG UNDERGRADUATE UNIVERSITY STUDENTS  
IN UNIVERSITI PUTRA MALAYSIA**

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



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## **LIST OF ABBREVIATION**

|               |                                                                                   |
|---------------|-----------------------------------------------------------------------------------|
| <b>BMI</b>    | <b>Body Mass Index</b>                                                            |
| <b>WHO</b>    | <b>World Health Organization</b>                                                  |
| <b>CVD</b>    | <b>Cardiovascular Diseases</b>                                                    |
| <b>NHMS</b>   | <b>National Health and Morbidity Survey</b>                                       |
| <b>UPM</b>    | <b>Universiti Putra Malaysia</b>                                                  |
| <b>BMI</b>    | <b>Body Mass Index</b>                                                            |
| <b>CGPA</b>   | <b>Cumulative Grade Point Average</b>                                             |
| <b>FFQ</b>    | <b>Food Frequency Questionnaire</b>                                               |
| <b>GPAQ</b>   | <b>Global Physical Activity Questionnaire</b>                                     |
| <b>DASS</b>   | <b>Depression, Anxiety and Stress Scale</b>                                       |
| <b>CPG</b>    | <b>Clinical Practice Guideline</b>                                                |
| <b>NCDs</b>   | <b>Non-communicable Diseases</b>                                                  |
| <b>PA</b>     | <b>Physical activity</b>                                                          |
| <b>US</b>     | <b>United States</b>                                                              |
| <b>DEFF</b>   | <b>Design effect</b>                                                              |
| <b>CF</b>     | <b>Conversion factor</b>                                                          |
| <b>RNI</b>    | <b>Recommended Nutrient Intake</b>                                                |
| <b>METs</b>   | <b>Metabolic Equivalents</b>                                                      |
| <b>IQR</b>    | <b>Interquartile range</b>                                                        |
| <b>SD</b>     | <b>Standard Deviation</b>                                                         |
| <b>SBP</b>    | <b>Systolic Blood Pressure</b>                                                    |
| <b>DBP</b>    | <b>Diastolic Blood Pressure</b>                                                   |
| <b>JKEUPM</b> | <b><i>Jawatankuasa Etika Universiti untuk Penyelidikan Melibatkan Manusia</i></b> |



## **ABSTRACT**

### **FACTORS ASSOCIATED WITH BODY WEIGHT STATUS USING ASIAN CUT-OFF POINTS AMONG UNDERGRADUATE UNIVERSITY STUDENTS IN UNIVERSITI PUTRA MALAYSIA**

**Nurfarah Aida binti Shaharuddin**

The prevalence of obesity is increasing at an alarming rate in many parts of the world, including Malaysia. Based on national prevalence in 2015, about 43.1 % of adults aged 18 to 24 years are overweight and obesity. Meanwhile, based on previous studies, the prevalence of overweight and obesity among university students ranges from 30.0 to 35.9 %, which is comparable to the national data. University students are vulnerable of being overweight and obesity as they tend to engage in unhealthy lifestyle. Thus, this study aims to determine the factors associated with body weight status using Asian cut-off points among undergraduate university students. A total of 235 university students in UPM were recruited in this study. Data collection was conducted from February to March 2018. The respondents completed a set of questionnaire consisting of several items, including sociodemographic background, academic background, nutritional status, physical activity level and psychological distresses. Blood pressure and anthropometric measurements were measured too. As a result, about 46.0 % of the respondents were categorized as having normal body weight, followed by overweight (25.5 %), underweight (15.3 %) and obese (13.2 %). By using Pearson correlation and Chi-square test, it was found that there was no significant association between both sociodemographic and academic background with body weight status. However, there were only four variables that were significantly associated with body weight status; waist circumference ( $r = 0.885$ ,  $p < 0.001$ ), systolic ( $r = 0.341$ ,  $p < 0.001$ ) and diastolic ( $r = 0.391$ ,  $p < 0.001$ ) blood pressure, total physical activity ( $r = 0.132$ ,  $p = 0.043$ ) and depression ( $r = -0.130$ ,  $p = 0.046$ ). In conclusion, future intervention programs focusing more on lifestyle related issues need to be taken into consideration to promote healthy lifestyle among university students to combat with these health problems like overweight and obesity.



## **ABSTRAK**

### **FAKTOR-FAKTOR YANG BERKAITAN DENGAN STATUS BERAT BADAN MENGGUNAKAN KATEGORI ASIA DALAM KALANGAN PELAJAR IJAZAH SARJANA MUDA DI UNIVERSITI PUTRA MALAYSIA**

**Nurfarah Aida binti Shaharuddin**

Keadaan obesiti semakin meningkat pada kadar yang membimbangkan di seluruh dunia, termasuk di Malaysia. Berdasarkan statistik kebangsaan pada 2015, kira-kira 43.1 % orang dewasa berumur 18 hingga 24 tahun berada dalam kategori kegemukan dan obesiti, manakala dalam kalangan pelajar universiti pula adalah antara 30.0 hingga 35.9 %, yang mana hampir sama dengan data kebangsaan. Pelajar universiti terdedah kepada kegemukan dan obesiti kerana mereka lebih cenderung untuk terlibat dengan gaya hidup tidak sihat. Oleh itu, kajian ini bertujuan untuk menentukan faktor-faktor yang berkaitan dengan status berat badan menggunakan kategori Asia dalam kalangan pelajar ijazah sarjana muda. Sejumlah 235 pelajar universiti di UPM telah mengambil bahagian dalam kajian ini. Pengumpulan data telah dijalankan dari bulan Februari sehingga Mac 2018. Para responden dikehendaki untuk melengkapkan satu set soal selidik yang terdiri daripada beberapa perkara, termasuk latar belakang sosiodemografi, latar belakang akademik, status pemakanan, tahap aktiviti fizikal dan tekanan psikologi. Tekanan darah dan ukuran antropometri juga turut diambil. Berdasarkan keputusan kajian, kira-kira 46.0 % responden dikategorikan sebagai mempunyai berat badan normal, diikuti dengan kegemukan (25.5 %), kekurangan berat badan (15.3 %) dan obes (13.2 %). Dengan menggunakan korelasi *Pearson* dan ujian *Chi-square*, didapati bahawa tiada hubungan yang signifikan antara latar belakang sosiodemografi dan akademik dengan status berat badan. Walau bagaimanapun, terdapat hanya empat pembolehubah yang berkorelasi dengan status berat badan; ukur lilit pinggang ( $r = 0.885$ ,  $p < 0.001$ ), tekanan darah sistolik ( $r = 0.341$ ,  $p < 0.001$ ), tekanan diastolik ( $r = 0.391$ ,  $p < 0.001$ ) dan depresi ( $r = -0.130$ ,  $p = 0.046$ ). Kesimpulannya, program intervensi perlulah dilaksanakan pada masa hadapan terutamanya berkenaan dengan isu-isu berkaitan gaya hidup untuk menggalakkan gaya hidup sihat di kalangan pelajar universiti untuk memerangi masalah kesihatan seperti berat badan berlebihan dan obesiti.

# **CHAPTER 1**

## **Introduction**

### **1.1 Background**

In adults, Body Mass Index (BMI) is a simple index of weight-for-height that is commonly used to classify body weight status into several categories including underweight, normal, overweight and obesity (WHO, 2017). Based on the global classification by WHO (2017), a normal BMI is between 18.5 and 24.9 kg/m<sup>2</sup>. However, there is a different classification of BMI for the Asian population. Using the Asian cut-off points, a normal BMI is between 18.5 and 22.9 kg/m<sup>2</sup> (Suehazlyn, Zaiton, Masni, Alexander, & Wan Mohd Izani, 2011). This is because there are evidences from several countries in Asia that reported increased risk of comorbidities that begins at a lower BMI (Suehazlyn et al., 2011). Besides, body fat distribution among Asians is also different as compared to the Caucasians and Europeans (Suehazlyn et al., 2011). Even with the same BMI, Asians have shown increased fat accumulation than Caucasians counterparts (Suehazlyn et al., 2011). Obesity and overweight is a public health nutrition concern. The proportion of Asians who developed type 2 diabetes mellitus and cardiovascular diseases (CVD) have the BMI below the overweight category which is 25.0 kg/m<sup>2</sup> (Chittaranjan & Yudkin, 2004).



The prevalence of obesity is increasing at an alarming rate in many parts of the world, including in Malaysia. By using Asian cut-off points, about 33.4 % adults aged  $\geq 18$  years are categorized in the overweight category, and 30.6 % are obese (Institute for Public Health, 2015). When comparing this data with the previous findings of National Health and Morbidity Survey (NHMS) 2011, the national prevalence of overweight and obesity had increased by 0.1 and 3.4 % respectively (Institute for Public Health, 2015). Moreover, the statistics from NHMS also showed that the prevalence of overweight and obesity among Malaysian youths aged 18 to 24 years are 22.6 and 20.5 % respectively (Institute for Public Health, 2015).

University students, who usually in young adulthood are also at risk of being overweight and obese. This is because most life-changing decisions are vulnerable during this period of time (Low, Tan, & Kassim, 2015). In contrast with their secondary school days, university students tend to have the freedom in deciding their own personal life (Bakare & Olumakaiye, 2016). University students are prone to engage in unhealthy eating behavior, substance abuse, interpersonal and psychological problems, physical inactivity and other unhealthy lifestyles (Gan, Mohd Nasir, Zalilah, & Hazizi, 2011). Therefore, it is important to promote healthy lifestyles among university students to reduce the risks of lifestyle-related disorders later in life including overweight and obesity.

In Malaysia, studies regarding body weight status among university students using Asian cut-off points were available. The prevalence of underweight among university students ranges from 14.8 to 21.0 %. About 47.1 to 55.0 % had normal body weight while overweight and obesity ranges from 30.0 to 35.9 % (Boo et al., 2010;



Gopalakrishnan et al., 2012; Low et al., 2015). These findings showed that dual-malnutrition issues (underweight and excess weight) is nearly half compared to normal body weight among university students in the study. However, their studies did not identified factors related to body weight status

Several risk factors were identified to be associated with body weight status among university students including socio-demographic factors (age, gender, ethnicity, living arrangement and monthly income), academic performance, nutritional status (blood pressure, dietary intake and fast food consumption), physical activity level and psychological factors (Bakare & Olumakaiye, 2016; Boo et al., 2010; Pengpid & Peltzer, 2014).

### **1.2 Problem Statement**

Previous studies conducted nationwide to identify factors that cause overweight and obesity among university students (Bakare & Olumakaiye, 2016; Boo et al., 2010; Gan, Mohd Nasir, Zalilah, & Hazizi, 2011; Maryam, Mohd Nasir, Fatimah, & Hazizi, 2013; Pengpid & Peltzer, 2014). These factors include fast food consumption, dietary intake, physical activity level and psychological factors. However, most of their studies reported using WHO cut-off points to define body weight status. The results may be different if were using Asian cut-off points which warrants future investigation.

Physical activity level has been studied in relation to body weight status. However, the results are controversial. While it is understood that low physical activity level may lead to increase in body weight, studies found that no association between these two variables (Boo et al., 2010; Pengpid & Peltzer, 2014). On the other hand, an association between physical activity level and body weight status existed among Iranian postgraduate students in UPM (Maryam et al., 2013) and university students from 22 countries (Peltzer, Pengpid, Samuels, & Özcan, 2014). Due to mixed findings, more studies are needed to confirm the results.

High intake of fast food and psychological factors are believed to influence body weight status. This belief is supported by several studies in Nigeria and India which found a positive association of these two factors with body weight status among university students (Bakare & Olumakaiye, 2016; Pengpid & Peltzer, 2014). Similarly, the role of fast food intake to promote weight gain among adults in Selangor is unclear (Abdullah, Mokhtar, Harriszamani, Bakar, & Al-kubaisy, 2015).

Hence, this study aimed to determine the factors associated with body weight status among undergraduate university students in UPM. This study addressed the following research questions:

1. How is the body weight status of university students based on Asian cut-off points?
2. Is there any association between socio-demographic background, academic background and performance, nutritional status, physical activity level and psychological factor with body weight status among undergraduate university students?

### **1.3 Significance of Study**

This study has been added to the body of knowledge on body weight status and its associated factors using Asian cut-off points. It has provided valuable knowledge and in-depth information on the factors associated with body weight status among the undergraduate university students in Malaysia. Moreover, this finding may provide baseline information that can be used for future intervention related to body weight status among university students.

Due to the alarming issues on overweight and obesity, policy makers and health care providers play an important role to develop intervention programs to combat these issues that may lead to more serious health risks including the development of non-communicable diseases such as heart diseases, diabetes mellitus type 2, stroke and hypertension. The findings from this study can help health care providers to give awareness and educate the university students to practice healthy lifestyle through campaigns and health promotion program. These efforts can lead to better health outcome and improve academic performances.



## **1.4 Objectives**

### **1.4.1 General Objective**

To determine association between socio-demographic background, academic background and performance, nutritional status, physical activity level and psychological factor with body weight status using Asian cut-off points among undergraduate university students in Universiti Putra Malaysia (UPM), Selangor.

### **1.4.2 Specific Objectives**

- 1) To determine the socio-demographic background, academic background and performance, nutritional status, physical activity level and psychological factor among undergraduate university students in Universiti Putra Malaysia (UPM), Selangor.
- 2) To determine the body weight status using Asian cut-off points among undergraduate university students in Universiti Putra Malaysia (UPM), Selangor.
- 3) To determine the association between socio-demographic backgrounds, academic background and performance, nutritional status, physical activity level and psychological factor with body weight status using Asian cut-off points among undergraduate university students in Universiti Putra Malaysia (UPM), Selangor.

### **1.5 Alternative Hypothesis**

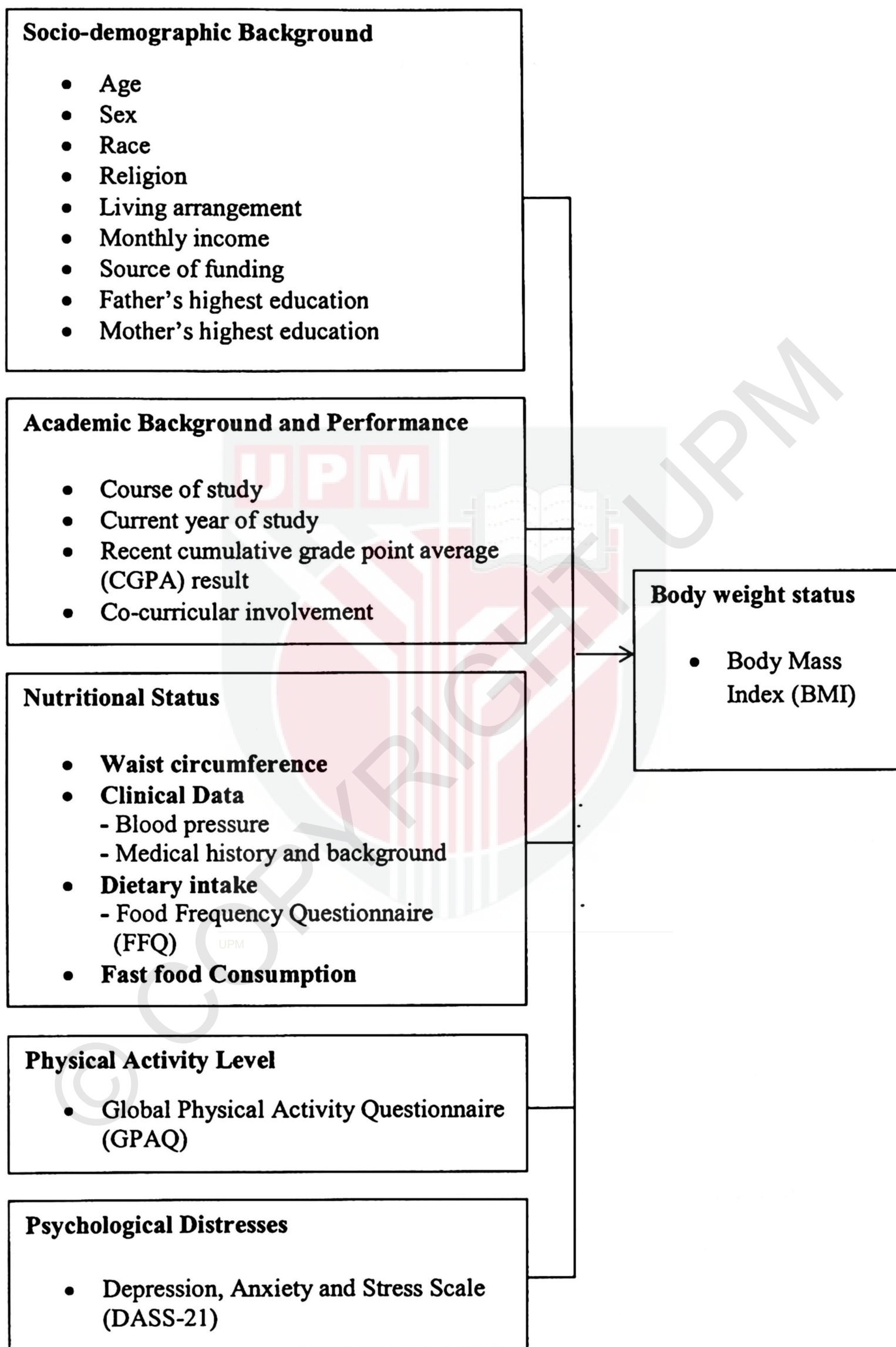
- 1) There is significant association between socio-demographic background and body weight status using Asian cut-off points among undergraduate university students in Universiti Putra Malaysia (UPM), Selangor.
- 2) There is significant association between academic background and performance and body weight status using Asian cut-off points among undergraduate university students in Universiti Putra Malaysia (UPM), Selangor.
- 3) There is significant association between nutritional status and body weight status using Asian cut-off points among undergraduate university students in Universiti Putra Malaysia (UPM), Selangor.
- 4) There is significant association between physical activity level and body weight status using Asian cut-off points among undergraduate university students in Universiti Putra Malaysia (UPM), Selangor.
- 5) There is significant association between psychological factor and body weight status using Asian cut-off points among undergraduate university students in Universiti Putra Malaysia (UPM), Selangor.

## **1.6 Conceptual Framework**

The conceptual framework for this study is shown in **Figure 1.1**. The independent variables consisted of socio-demographic background, academic background and performance, nutritional status, physical activity level and psychological distresses, while the dependent variable was body weight status using Asian cut-off points.

Socio-demographic background consisted of age, sex, race, religion, living arrangement, monthly income, source of funding, parents' highest education. Course of study, current year of study, recent cumulative grade point average (CGPA) result and co-curricular involvement were listed under academic background and performance. Next, nutritional status consisted of waist circumference, clinical data, dietary intake and fast food consumption. Blood pressure reading was listed under the clinical data sub-unit while dietary intake was assessed by using the Food Frequency Questionnaire (FFQ). An adapted questionnaire from a study by Anderson, Rafferty, Lyon-callo, Fussman & Imes (2011) was used to determine fast food consumption. Global Physical Activity Questionnaire (GPAQ) was used to measure the physical activity level of the respondents. Psychological distress was assessed by using the Depression, Anxiety and Stress Scale (DASS-21). As for body weight status, it was measured and classified by using Asian cut-off points from Clinical Practice Guideline for Obesity (CPG) 2004. The conceptual framework was as shown below (Figure 1.1).





**Figure 1.1: Conceptual Framework**

## CHAPTER 2

### Literature Review

#### 2.1 Young adults and university students

Emerging or young adulthood is a period of life where rapid changes may occur among young people who undergo transition from adolescence phase of life to adulthood (Benson & Elder, 2011). A young adult is commonly defined as aged between 15 and 29 years old (WHO, 2017). During this period, young adults may experience significant maturation, biological and psychological change although not as dramatic as changes that occurred during childhood and adolescence (Bonnie, Stroud, & Breiner, 2014)

Adolescence stage of life is often described as the most healthiest time among other stages which strength, speed, fitness and other cognitive abilities are at the highest level (Patton et al., 2009). Despite that, new health risks with potentially life-threatening consequences may start to emerge as major changes of health status occur around the puberty period (Patton et al., 2009). Young adults tend to live independently without their parents observations which make them less controlled by family's lifestyle and health behaviors (Bonnie et al., 2014). They live with less parental monitoring of sleep, curfews, peer relations, physical activity and dietary intake. Some

studies found that young adults were less likely to involve in physical activity, consume breakfast and get regular health checkups, however they tend to choose fast food as their meals, contract sexually transmitted diseases, cigarettes smoking, binge drinking and drugs abused (Bonnie et al., 2014).

According to the normal trend, majority of young adults are pursuing their studies after graduating from high school into higher education level like colleges, universities and other institutions. For many young adults, the transition into adulthood begins from the moment they further their studies into university level as they get the opportunity to decide their personal life by themselves (Bakare & Olumakaiye, 2016). However, some studies stated that health behaviors of university students are not optimal (Bakare & Olumakaiye, 2016). A study highlighted that university students were shown to involve in unhealthy behaviors, inadequate nutrient intake and having unbalanced body weight (Gan, Mohd Nasir, Zalilah, & Hazizi, 2011). Therefore, it is important to promote healthy lifestyles among university students to reduce the risks of lifestyle-related disorders later in life.

## **2.2 Body weight status using Asian cut-off points**

Body weight status can be classified by using Body Mass Index (BMI). Technically, BMI can be defined as the ratio of body weight (in kilograms, kg) and height (in meter squared, m<sup>2</sup>) (Suehazlyn et al., 2011). Based on the global classification, range for normal body weight is between 18.5 kg/m<sup>2</sup> and 24.9 kg/m<sup>2</sup> while 18.4 kg/m<sup>2</sup> and below will be classified as underweight (WHO, 2017). The BMI



value for overweight is between 25.0 kg/m<sup>2</sup> and 29.9 kg/m<sup>2</sup>, while 30.0 kg/m<sup>2</sup> and above will be categorized as obese.

As for the Asian population, different cut-off for BMI is used to define body weight status. Asians were shown to develop risks of comorbidities at a lower BMI value than the global classification for overweight and obesity (Suehazlyn et al., 2011). Due to that, some modifications of BMI classification were done to suit for Asian population, as follows (Table 2.1):

**Table 2.1: BMI classification for adults using Asian cut-off points**

| BMI Classification | Range (kg/m <sup>2</sup> ) |
|--------------------|----------------------------|
| Underweight        | <18.5                      |
| Normal             | 18.5-22.9                  |
| Overweight         | 23.0-27.4                  |
| Obese              | ≥27.5-                     |

Source: Clinical Practice Guideline on Management of Obesity 2004

Having normal body weight status is necessary to ensure good health conditions. This is because raised in BMI is one of the major risk factors for developing non-communicable diseases (NCDs) like cardiovascular diseases, type 2 diabetes mellitus, musculoskeletal disorders and some types of cancers (WHO, 2017). In Malaysia, about 33.3 % of Malaysian aged ≥ 18 years are overweight while 27.2 % are categorized as obese based on the Asian cut-off (NHMS, 2011). More than half of the Malaysian population is categorized as overweight and obesity. Thus, this indicates that obesity and overweight one of the alarming problems in Malaysia.

### **2.3 Socio-demographic background and body weight status**

Many studies have been conducted to determine the relationship between socio-demographic background and body weight status. Sex, race and monthly income are some of the factors that may be related with BMI.

Based on a study that was conducted among 414 university students of Universiti Sains Malaysia (USM), it was found that there is significant difference in the effects of socio-demographic factors like gender and monthly income with BMI (Low, Tan, & Kassim, 2015). This study used the BMI cut-off for Asian to determine the body weight status. From the results, they found that male students were more likely prone to have high BMI compared to female. Low and middle income household most likely to experience overweight and obesity compared to high income household.

Other than that, a study that was conducted among 290 medical students in Malaysia found that there was difference in prevalence of overweight and obesity between races (Gopalakrishnan, Ganeshkumar, Prakash, & Amalraj, 2012). They found that the prevalence of obesity were high in Indian students while overweight were high among Malays. However, they stated that the results obtained maybe due to majority of the respondents were Indian.

## **2.4 Academic background and performance and body weight status**

Performing well in academic is one of the main goals to be achieved by university students. Good academic performance during the university years may be a stepping stone for the students to pursue their dreams to get their desired occupations or further their studies to higher level.

Based on a study conducted among 470 university students in US, they found that there is a significant association between healthy body weights and improved in academic performance (Anderson & Good, 2017). Another study also found similar results as this study. A study conducted among 69 middle school students in Tehran found that the Grade Point Average (GPA) score, math and geometry score were found to be lower among overweight students (Heshmat, Larijani, Pourabbasi & Pourabbasi, 2014)

## **2.5 Nutritional status and body weight status**

Nutritional status can be described as a person condition of health that can be influenced by consumption of balanced and healthy food and normal utilization of nutrients. Nutritional status can be assessed by measuring the anthropometric, biochemical, clinical and dietary intake of individuals. Factors that related with nutritional status which may influence body weight status are dietary intake and fast food consumption.



Previous studies have shown mixed findings in the association between fast food consumption and body weight status. A study conducted among 360 university students in Nigeria reported a significant relationship between fast food consumption and obesity ( $p < 0.05$ ) (Bakare & Olumakaiye, 2016). This findings is also consistent with the results from another study that was done among 4311 US adults which reported a strong association too (Anderson et al., 2011). However, a study conducted among 240 clinical students in Malaysia clinical school found no association (Boo et al., 2010).

## **2.6 Physical activity level and body weight status**

The next factor that related with body weight status is level of physical activity. A study that was conducted 240 among clinical students in a Malaysia medical school stated that physical inactivity does not seem to play a major role in developing excess body weight among the study respondents (Boo et al., 2010). Other than that, in a study conducted among university students from 22 countries, they found that physical inactivity was related to overweight and obesity among males but not among females (Peltzer, Pengpid, Samuels, & Özcan, 2014).

However, there is study that was conducted among Iranian postgraduate university students in UPM reported a positive association between BMI and physical activity. They found that respondents with higher BMI were involved with less physical activity (Maryam, Mohd Nasir, Fatimah, & Hazizi, 2013).

## **2.7 Psychological factor and body weight status**

In response to challenges related to physical and psychological, stress is the process of adaptation that may affect health by interfering the balance of physical and psychological systems (Karen, Bursac, DiLillo, White, & West, 2009). Cumulative and repeated stress may increase the risks for obesity because individuals with stress condition were prone to increase their food intake and snacking (Sinha & Jastreboff, 2013). Stressed individuals sometimes tend to use food as one of the solutions to adapt with the stressful condition.

A study that was conducted among 800 university students in India reported a positive association between stress level and body weight status (Pengpid & Peltzer, 2014). Body weight status was classified in this study by using the Asian cut-off. Based on the results, they found that male students with high rate of depression may results in overweight and obesity (Pengpid & Peltzer, 2014).

Other than that, another study conducted among 1355 US adults found that increased levels of psychological stress may have positive association with body weight status. They found that stress that related to job may have association with having high baseline of BMI among the male respondents (Block, He, Zaslavsky, Ding, & Ayanian, 2009).

However, a study that was conducted among 268 university students in United Kingdom reported that higher level of stress is associated with both weight gain and weight loss. They found that the stress-weight change relationship was found stronger in female compared to male students (Serlachius, Hamer, & Wardle, 2007).

### **2.8 Research gap**

Physical activity level is one of the behavioral factors that may affect one's body weight status. Moreover, evidence exists to support that insufficient physical activity may significantly contribute to weight gain and increase health risks (Jakicic, 2009). However, the association between physical activity level and body weight status is controversial. No significant relationship was observed between these two factors in a study among clinical students in a Malaysian medical school (Boo et al., 2010).

In contrast, another study in UPM among Iranian postgraduate students reported that physical activity level was significantly associated with body weight status (Maryam et al., 2013). Since there are inconsistent findings and limited studies regarding the association between physical activity level and body weight status by using Asian cut-off points among university students, further study is required.



## **2.9 Other factors associated with body weight status**

There are other various factors that have been previously studied in relation with body weight status. Aside from nutritional status, physical activity level and psychological factors, sleep duration, alcohol consumption and body image perception may have relationship with body weight status based on previous studies.

Sleep duration is one of the factors that are related with body weight status among university students. From a study among 800 university students in India, short sleep duration was found to be associated with overweight and obesity among male university students while longer sleep duration was associated with overweight and obesity among women (Pengpid & Peltzer, 2014). In contrast, another study among clinical student in a Malaysian medical school reported that number of hours of sleep per day was not to be found as a significant risk factor for overweight and obesity (Boo et al., 2010).

For alcohol consumption factor, based on a study among 211 medical students in the Faculty of Medicine and Health Sciences of a public university in Malaysia, they reported a positive association between alcohol consumption and body weight status (Nor Afiah et al., 2014).

Apart from that, there is also study that linked between the body weights perceptions with body weight status. The result actually shows that the misconception of body weight actually have great impact on the weight control behavior than actual weight status. Some of university students have their own self-perception towards their

body weight status. For instance, in a study reported by Tanenbaum et al. (2016), the respondents who had an inaccurate perception of their current weight status were 46.0 % whilst there were 54.0 % of the respondents had an accurate perception towards their body weight status. This shows that, nearly half of the respondents have misconception about their weight.



## **CHAPTER 3**

### **Methodology**

#### **3.1 Study Design**

This study used cross-sectional design to determine the association of socio-demographic background, academic background and performance, nutritional status, physical activity level and psychological distresses with body weight status using Asian cut-off points among undergraduate university students in UPM, Serdang.

#### **3.2 Study Location**

This study was conducted in Universiti Putra Malaysia (UPM), Serdang. UPM which formerly known as Universiti Pertanian Malaysia, was founded in 1971 through the merger of Faculty of Agriculture, University Malaya and Agriculture College in Serdang. UPM is made up of 16 faculties, 16 centers, nine institutes, one school, and one academy. The main campus of UPM is situated in Serdang, which covers over 1,000 hectares of land, with a branch campus, set within 700 hectares that is located in Bintulu, Sarawak. Based on data in 2016, around 24,874 students attend UPM with just over half of the student body is made up of undergraduates which is 14,063, with around 10,811 studying at postgraduate level.



### 3.3 Sample Size Determination

The two population proportions formula (Lwanga S.K. & Lemeshow S., 1991) was used to determine the number of subjects in this study. Besides, some additional adjustments has been done when computing the sample size that involve cluster sampling which includes design effect (DEFF=1.3), response rate (90.0 %) and expected proposition eligible (90.0 %). The formula that was used in the calculation is as below:

**Two population proportions formula:**

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

Where:  $n$  = sample size,  
 $z_{1-\alpha/2}$  = z score for level of significance  $\alpha$  in two sided test  
 $z_{1-\beta}$  = z score for power of the test  
 $P_1$  = estimated proportion in group 1  
 $P_2$  = estimated proportion in group 2  
 $P$  = average proportion of group 1 and 2,  $P = (P_1 + P_2)/2$

**Figure 3.1: Prevalence Formula**

The calculations of the sample size for this study based on variables are as shown in **Table 3.1:**

**Table 3.1: Sample Size Calculation**

| Variable                                        | Value                                         | Calculation (n) | Source                               |
|-------------------------------------------------|-----------------------------------------------|-----------------|--------------------------------------|
| Gender with body weight status                  | $P_1 = 0.401$<br>$P_2 = 0.194$<br>$P = 0.298$ | 76              | (Boo et al., 2010)                   |
| Ethnicity with body weight status               | $P_1 = 0.571$<br>$P_2 = 0.426$<br>$P = 0.499$ | 186             | (Shaima'u, Salmiah, & Suriani, 2014) |
| Fast food consumption with body weight status   | $P_1 = 0.667$<br>$P_2 = 0.304$<br>$P = 0.486$ | 29              | (Hamam et al., 2017)                 |
| Physical activity level with body weight status | $P_1 = 0.472$<br>$P_2 = 0.081$<br>$P = 0.277$ | 19              | (Shaima'u et al., 2014)              |
| Psychological factor with body weight status    | $P_1 = 0.521$<br>$P_2 = 0.099$<br>$P = 0.310$ | 18              | (Hamam et al., 2017)                 |

Based from the calculations above, the highest value of calculated sample size ( $n = 186$ ) was used. Then, some adjustment in computing the sample size was done including design effect (DEFF), response rate and expected proposition eligible. The calculations of the adjustments are as shown in Table 3.2:

**Table 3.2: Additional Adjustment in Computing the Sample Size**

| Criteria                                    | Sample size calculation                                                                                                                                      |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Adjust for the estimated sample effect      | $n \times DEFF$<br><br>If design effect is estimated to be low, then $DEFF = 1.3$ (Aday & Cornelius, 2006),<br><br>therefore<br>$n = 186 \times 1.3$ $= 241$ |
| Adjust for the expected response rate       | $n / \text{Response rate}$<br><br>Response rate = 90 % (Shaima'u et al., 2014),<br><br>therefore<br>$n = \frac{252}{90} \times 100$ $= 269$                  |
| Adjust for the expected proportion eligible | $n / \text{Proportion eligible}$<br><br>% Eligible = 90 %,<br><br>therefore<br>$n = 280 \div 0.90$<br><br>$= 299 \text{ subjects}$                           |

Hence, the calculated sample size population for this study was 299 subjects.

However, the total of 235 respondents was able to be recruited for this study.

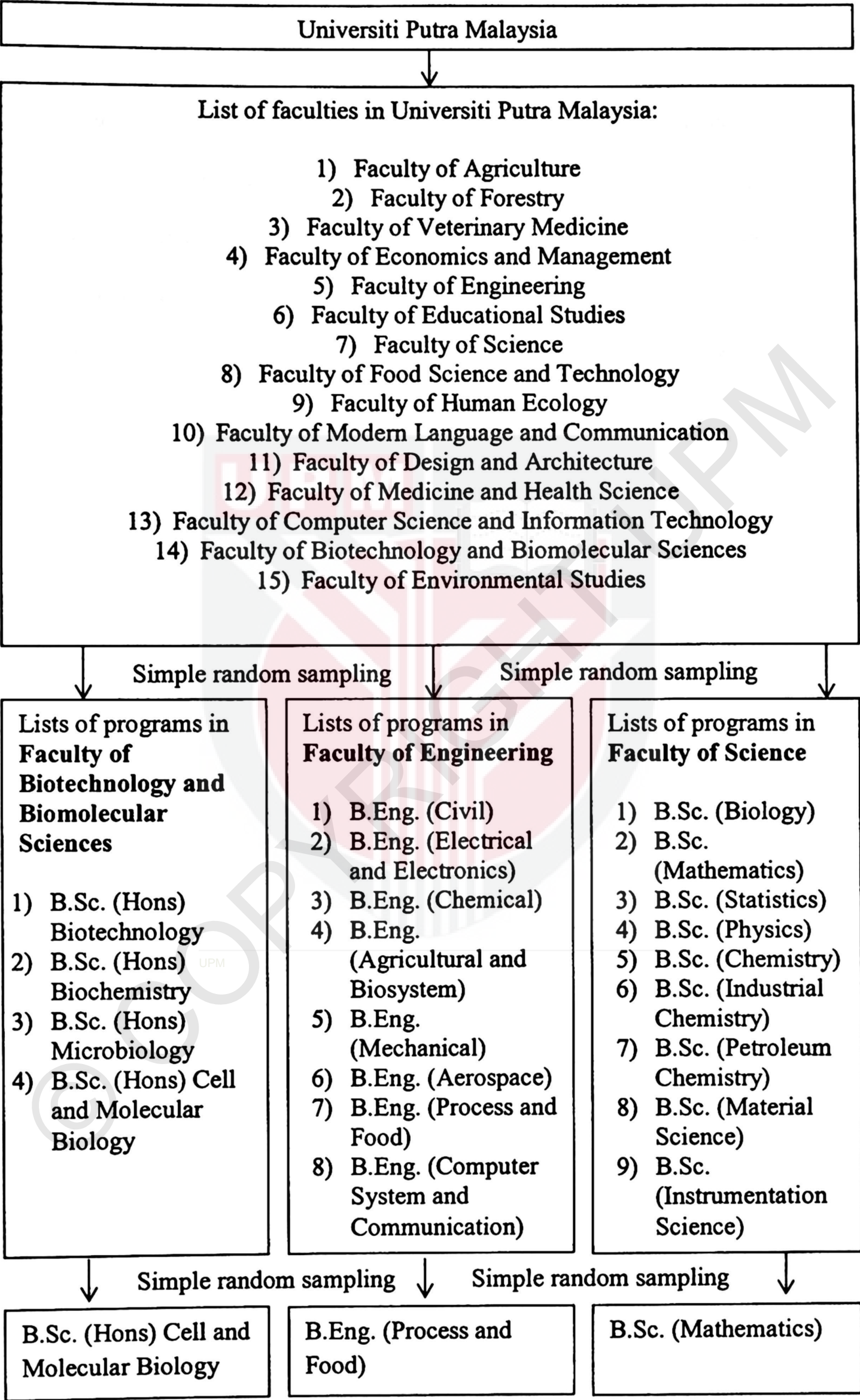


### **3.4 Sampling Design**

Multistage sampling method was applied in this research study. The methods used were simple random sampling and cluster sampling. Simple random sampling is a basic sampling technique where group of subjects from a larger group will be selected to participate in a study. Firstly, a total of 16 faculties in Universiti Putra Malaysia (UPM) were included in the sampling. The selection of the faculties was narrowed by using a simple random sampling. Three out of 16 faculties were randomly selected. In order to choose several faculties among all 16 faculties in UPM, simple random sampling software called RANDOM.ORG that was built by Dr Mads Haahr in 1998 was used.

From the software, Faculty of Engineering, Faculty of Biotechnology and Biomolecular Sciences and Faculty of Science have been randomly selected. Then, another simple random sampling was applied to choose a program from each faculty. As a result, Bachelor of Engineering (Process and Food) of Faculty of Engineering, Bachelor of Science in Cell and Molecular Biology with Honours of Faculty of Biotechnology and Biomolecular Sciences and Bachelor of Science (Mathematics) of Faculty of Science have been selected randomly. And lastly, cluster sampling was applied which means all the students from the randomly selected programs in the selected faculties who meet the inclusion criteria was invited to participate in this study. The flow chart of sampling design and selection of respondents are as shown in

**Figure 3.2:**



**Figure 3.2: Flow chart of sampling design and selection of respondents**

**3.5 Subject Selections**

The subjects that were chosen in this study are undergraduate university students that are studying in Universiti Putra Malaysia (UPM), Serdang. The priority population was chosen based on multistage random sampling which include simple random sampling and cluster sampling. In this study, a program from three randomly selected faculties was chosen through simple random sampling. And lastly, cluster sampling method was applied.

All students in the randomly selected programs in the particular faculties who meet the inclusion criteria were invited to participate in this study. Each student was required to be generally screened based on inclusion and exclusion criteria, as follows (Table 3.3):

**Table 3.3: Inclusion and Exclusion Criteria for Selection of Subjects**

| Inclusion criteria                                                                                                          | Exclusion criteria                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>Malaysian</li><li>Undergraduate university students aged 19 to 24 years old</li></ul> | <ul style="list-style-type: none"><li>Pregnant and breastfed women</li><li>Undergraduate students who had one or more chronic health conditions (cardiovascular diseases, respiratory diseases, type 2 diabetes mellitus, cancer, rheumatic disorders, chronic kidney disease)</li></ul> |



### **3.6 Measures**

The questionnaire contains several sections which include socio-demographic background, academic background and performance, nutritional status, physical activity level and lastly, psychological factor. Several different independent variables were measured in this study to test the association with body weight status among undergraduate university students in Universiti Putra Malaysia (UPM), Serdang, Selangor.

#### **3.6.1 Body Weight Status**

To collect the data about body weight status of the respondents, anthropometric measurements that include the height and weight was used. Body weight and height was used to calculate and determine the Body Mass Index (BMI) of the respondents. The BMI of the respondents was classified according to Asian cut-off points for adults, as shown in Table 3.4:

**Table 3.4: BMI classification for adults using Asian cut-off points**

| <b>BMI Classification</b> | <b>Range (kg/m<sup>2</sup>)</b> |
|---------------------------|---------------------------------|
| <b>Underweight</b>        | <b>&lt;18.5</b>                 |
| <b>Normal</b>             | <b>18.5-22.9</b>                |
| <b>Overweight</b>         | <b>23.0-27.4</b>                |
| <b>Obese</b>              | <b>≥27.5-</b>                   |

Source: Clinical Practice Guideline on Management of Obesity 2004

The weight of the respondents was measured using TANITA Digital Weight Scale HD-319 (Tanita Corporation USA) to the nearest 0.1 kg, whereas height was assessed using SECA Body Tape Measure SE206 to the nearest 0.1 cm. The reading of the weight and height was taken twice and the average readings was used to calculate the respondents' BMI. The body mass index was calculated by dividing the respondents' current weight in kilogram (kg) with the square of height in meter (m<sup>2</sup>). All this information was filled in the questionnaire by the researcher. The formula for calculating BMI is as follows (Figure 3.3):

**Body Mass Index (BMI) formula:**

$$\text{BMI (kg/m}^2\text{)} = \frac{\text{Weight (kg)}}{\text{Height (m}^2\text{)}}$$

**Figure 3.3: Body Mass Index Formula**

### **3.6.2 Socio-Demographic Status**

Socio-demographic status was determined by using a self-developed questionnaire consisting of age, sex, race, religion, accommodation, monthly stipend, source of funding, father's and mother's highest education level.

## **Academic Background and Performance**

Next, academic background and performance was also determined by using self-developed questionnaire which consists of course of study, current year of study, most recent cumulative grade point average (CGPA) result and co-curricular involvement.

### **3.6.4 Nutritional Status**

#### **3.6.4.1 Waist Circumference**

Waist circumference of the respondents was measured by using measuring tape. The measuring tape was positioned around the abdomen of the respondents at the top of the right iliac crest, which is the highest point of the bone on the right side. The tape was tightened at the end of normal exhalation to ensure it was snug but not compressed into the skin. The measurements were taken twice to obtain the average reading. The waist circumference of the respondents was compared to the high risk waist circumference classification for adults Asian cut-off points for adults, as shown in Table 3.5:

| <b>Table 3.5: High risk waist circumference classification for adults</b> |                             |                             |
|---------------------------------------------------------------------------|-----------------------------|-----------------------------|
|                                                                           | <b>Male</b>                 | <b>Female</b>               |
| <b>Waist circumference (cm)</b>                                           | <b><math>\geq 90</math></b> | <b><math>\geq 80</math></b> |

Source: International Diabetes Federation (IDF), 2006



**3.6.4.2 Clinical Data**

For this clinical sub-unit, blood pressure of the respondents was measured using automated blood pressure monitoring (OMRON-IA2, Kyoto, Japan). Respondents were asked to keep quiet, relaxed and do not cross legs to ensure the accuracy of the measurements before obtaining the blood pressure reading. The reading was taken twice and the average reading was recorded. The blood pressure of the respondents was classified according to American Heart Association (2017) guideline recommendations for adults aged  $\geq 18$  years, as shown in Table 3.6:

**Table 3.6: Blood pressure classification for adults ( $\geq 18$  years)**

| Blood pressure classification | SBP (mmHg) | DBP (mmHg) |
|-------------------------------|------------|------------|
| Normal                        | <120       | <80        |
| Elevated                      | 120–129    | <80        |
| Stage 1 Hypertension          | 130–139    | 80–89      |
| Stage 2 Hypertension          | $\geq 140$ | $\geq 90$  |
| Hypertensive crisis           | >180       | >120       |

Source: American Heart Association, 2017

**3.6.4.3 Dietary Intake**

Dietary intake of the respondents was assessed by using the Food Frequency Questionnaire (FFQ). The FFQ has been used in a survey among Malaysian adults in the Malaysian Adults Nutrition Survey (MANS) that was conducted between October 2002 and December 2003 to determine the food consumption pattern (Norimah Ak et al., 2008). It has been developed and calibrated for use among the Malay and Chinese Malaysian adults (Noor Azia, 2002; Chong & Norimah, 2002).

This questionnaire is consists of 126 food items that were listed into 15 food groups. The food groups are cereals and cereal products, meat and meat products, fish and seafood, eggs, legumes and products, milk and milk products, vegetables, fruits, beverages, alcoholic beverages, confectioneries, spreads and also condiments/miscellaneous. The respondents were required to reports the number of servings consumed each time they eat the food based on their habitual intake of the past year. The options for reporting the frequency of food intake according to the categories are number of times per day, number of times per week, number of times per month, number of times per year and never. However, for this questionnaire, the frequency of the food intake will be reported until number of times per months only. The Food Frequency Questionnaire consists of four main columns. Lists of food items were listed down in the first column while the second column describes the categories of frequency of intake. The third column is for the serving size of the food item while the last column consists of the number of servings consumed per intake.

The estimated amount of food intake was calculated by multiplying the conversion factor of the frequency of food intake, serving size, number of servings and weight of food in one serving. The formula for calculating the estimated amount of food intake and conversion factor are as shown in **Figure 3.4** and **Table 3.7** below:

Estimated amount of food intake formula:

Amount of food intake (g)

=

Frequency of intake (CF) x Serving size x No. of servings x Weight of food in one serving

**Figure 3.4: Estimated amount of food intake formula**

**Table 3.7: Conversion factor**

| Frequency of intake | Frequency | Conversion factor (CF) |
|---------------------|-----------|------------------------|
| Per day             | once      | 1                      |
|                     | twice     | 2                      |
|                     | 3 times   | 3                      |
| Per week            | once      | 1/7 (0.14)             |
|                     | twice     | 2/7 (0.29)             |
|                     | 3 times   | 3/7 (0.43)             |
| Per month           | once      | 1/30 (0.03)            |
|                     | twice     | 2/30 (0.07)            |
|                     | 3 times   | 3/30 (0.10)            |

Source: Malaysian Adult Nutrition Survey (2003)

Then, the calculated estimate amount of food intake was analyzed by using Nutritionist Pro™ Diet Analysis (Axxya Systems, Washington, DC, USA), including utilization of Nutrient Composition of Malaysian Foods (Tee, Mohd Ismail, Mohd Nasir, & Khatijah, 1997). The mean values for total energy and macronutrient intake of the respondents was compared with Recommended Nutrient Intake (RNI) for Malaysians (NCCFN, 2017) to determine intake adequacy.

According to RNI for Malaysians (2017), the recommended daily energy intake for adults should be at least 2440 kcal for male and 2000 kcal for female. Other than that, the recommendation for daily fat intake is about 25 to 30 %, 10 to 25 % for daily protein intake, while 50 to 60 % for daily carbohydrate intake.



#### **3.6.4.4 Fast Food Consumption**

For assessing the fast food consumption of the respondents, a questionnaire was developed based on the basis of current literature that was studied by Anderson, Rafferty, Lyon-callo, Fussman, & Imes (2011). The instrument that was developed by the same study was used by a study that was conducted in Selangor, Malaysia by Abdullah, Mokhtar, Harriszamani, Bakar, & Al-kubaisy (2015).

Originally, the questionnaire consists of 12 questions, including frequency and characteristics of fast food consumptions. Additional question regarding types of preferred fast food restaurant was added to the questionnaire. Some modification on the frequency of visiting the fast food restaurant was made to score it categorically based on a study by Braithwaite et al. (2014). There are three types of category for reporting the frequency of visiting fast food restaurant which are “Occasionally” which indicates as infrequent, “Once or twice per week” which indicates as frequent and “Three times or more per week” which indicates very frequent (Braithwaite et al., 2014).

#### **3.6.5 Physical Activity Level**

The Global Physical Activity Questionnaire (GPAQ) was used in this study to assess the respondents’ physical activity level. The World Health Organisation (WHO) has developed the GPAQ for physical activity surveillance in countries. This questionnaire can analyse physical activity participation in three domains which include activity at work, travel from places and recreational activities, as well as

sedentary behaviour. It had been tested in large scale population-based surveys with the general adult population.

There are two versions of GPAQ which are version 1 and version 2. It is advised to use version 2 of the GPAQ as it is more convenient to be administered. All questions must be answered by the respondents, as skipping or removing any questions or domains may interfere with the calculation of the results. Only question P1, P4, P7, P10, or P13 can be skipped if they have been answered negatively.

The intensity of these physical activities will be measured in metabolic equivalents (METs). MET is defined as the ratio of a working metabolic rate to a standard resting metabolic rate. Energy expenditure for sitting quietly can be defined as one MET, which is equivalent to caloric consumption of 1 kcal/kg/hour. From the GPAQ guideline, a person caloric consumption is four times higher when being moderately active and eight times higher when being vigorously active as compared to sitting quietly. Therefore, moderate activities will be considered as 4 METs while 8 METs is for vigorous activities when calculating the total energy expenditure.

The respondents can be scored continuously and categorically. The continuous score can be determined through the calculation of MET-minutes/week by multiplying the MET score of an activity (moderate activity, cycling and walking = 4 METs; vigorous activity = 8 METs) by the minutes and days of the activity that is being performed. The summation of MET-minutes/week for those physical activities can be used to calculate the total physical activity that being performed by an individual for the previous week.



Next, for the categorical score, the respondents will be classified into a certain percentage of a population as 'inactive' or 'insufficiently active' by setting up a cut-point for a specific amount of physical activity. For the categorical score calculations, the total time spent in physical activities during a typical week and the intensity of the physical activities is taken into account. According to WHO recommendation, an adult should do at least 150 minutes of moderate-intensity physical activity, 75 minutes of vigorous-intensity physical activity or an equivalent combination of moderate- and vigorous-intensity physical activity achieving at least 600 MET-minutes throughout a week. The respondents will be categorised into three categories of physical activity level based on their total score which are low (below 600 METs), moderate (between 600 and 2999 METs) and high (equal and higher than 3000 METs). These categories are based on the Guidelines for Data Processing and Analysis of the Global Physical Activity Questionnaire (GPAQ).

#### **3.6.6 Psychological Factor**

Psychological factor was measured by using the Depression, Anxiety and Stress Scale (DASS-21) questionnaire. The DASS-21 is a 21-items self-reported questionnaire that is widely used as a psychological instrument to measure the severity range of symptoms common to both depression and anxiety (Lovibond & Lovibond, 1995). Originally, this questionnaire was developed as a 42 scale items measuring three dimensions of negative emotional states, such as depression, anxiety and stress (Oei, Sawang, Goh, & Mukhtar, 2013). A shorter version of DASS, which is DASS-21 was later developed to reduce administration time of the questionnaire and measure



emotional distress in three subcategories; depression, anxiety and stress (Lovibond & Lovibond, 1995).

In completing the DASS-21, the respondents were required to indicate the presence of a symptom over the previous week. There are seven items for each subcategory (Stress item: question 1, 6, 8, 11, 12, 14 and 18; Anxiety items: question 2, 4, 7, 9, 15, 19 and 20; Depression item: question 3, 5, 10, 13, 16, 17 and 21). Each item was scored from 0 (Never - did not apply to me at all over the last week) to 3 (Almost always - applied to me very much or most of the time over the past week). Each item need to be multiplied by two to calculate comparable scores with full DASS-42. The scores for each scale was summed and categorized based on the following cut-off scores have been developed for defining normal, mild, moderate, severe and extremely severe, as shown in Table 3.8 below:

| Table 3.8: Depression, Anxiety and Stress Scale Scoring Interpretation |            |         |        |
|------------------------------------------------------------------------|------------|---------|--------|
| Severity                                                               | Depression | Anxiety | Stress |
| Normal                                                                 | 0-9        | 0-7     | 0-14   |
| Mild                                                                   | 10-13      | 8-9     | 15-18  |
| Moderate                                                               | 14-20      | 10-14   | 19-25  |
| Severe                                                                 | 21-27      | 15-19   | 26-33  |
| Extremely                                                              | 28+        | 20+     | 34+    |
| Severe                                                                 |            |         |        |

Source: Lovibond, S.H. & Lovibond, P.F. (1995). Manual for the Depression Anxiety & Stress Scales. (2nd Ed.) Sydney: Psychology Foundation

### **3.7 Pre-Testing**

Pre-test for the developed questionnaire was conducted prior to data collection to ensure the questionnaire was easy to be understood in terms of language and structure by the respondents. A total of 10 undergraduate students who met the inclusion criteria were randomly selected to answer the questionnaire. However, they were excluded from the study sample. Other than that, amount of time taken to complete the whole set of questionnaire was also assessed. The questionnaire was then modified based on the feedback from the pre-testing.

### **3.8 Procedures**

Prior to the commencement of this study, ethical clearance was obtained from *Jawatankuasa Etika Universiti untuk Penyelidikan Melibatkan Manusia (JKEUPM)* (reference number – JKEUPM-2017-256). Data collection was conducted from February to March 2018. During data collection, the respondents were given an information sheet which explains the purpose of this study together with a written consent form prior to the administration of the questionnaire. Data collection was based on self-administered questionnaire, and then followed by blood pressure readings and anthropometric measurements of the respondents. Lastly, the data collection procedure was considered as completed after collecting back the questionnaires that have been answered.

### **3.9 Statistical Analysis**

All the statistical analysis was performed by using IBM SPSS Version 22. The descriptive characteristics of the respondents in this study were analyzed by using univariate analysis. Next, the results of this study were presented in the form of percentages and frequencies for categorical variable such as sex, races, religion and living arrangement. Means and standard deviations will be calculated from the analysis of the continuous variables such as age and monthly income. Chi square or Pearson correlation test will be used to determine the association of socio-demographic background, academic background and performance, nutritional status, physical activity level and psychological factor with body weight status.



CHAPTER 4

Results and Discussion

4.1 Recruitment of the respondents

Multistage random sampling method was applied in this study. A simple random sampling was carried out to choose a program from three randomly selected faculties. And lastly, cluster sampling was applied. The flow of respondents' recruitment is as shown in the Figure 4.1 below:

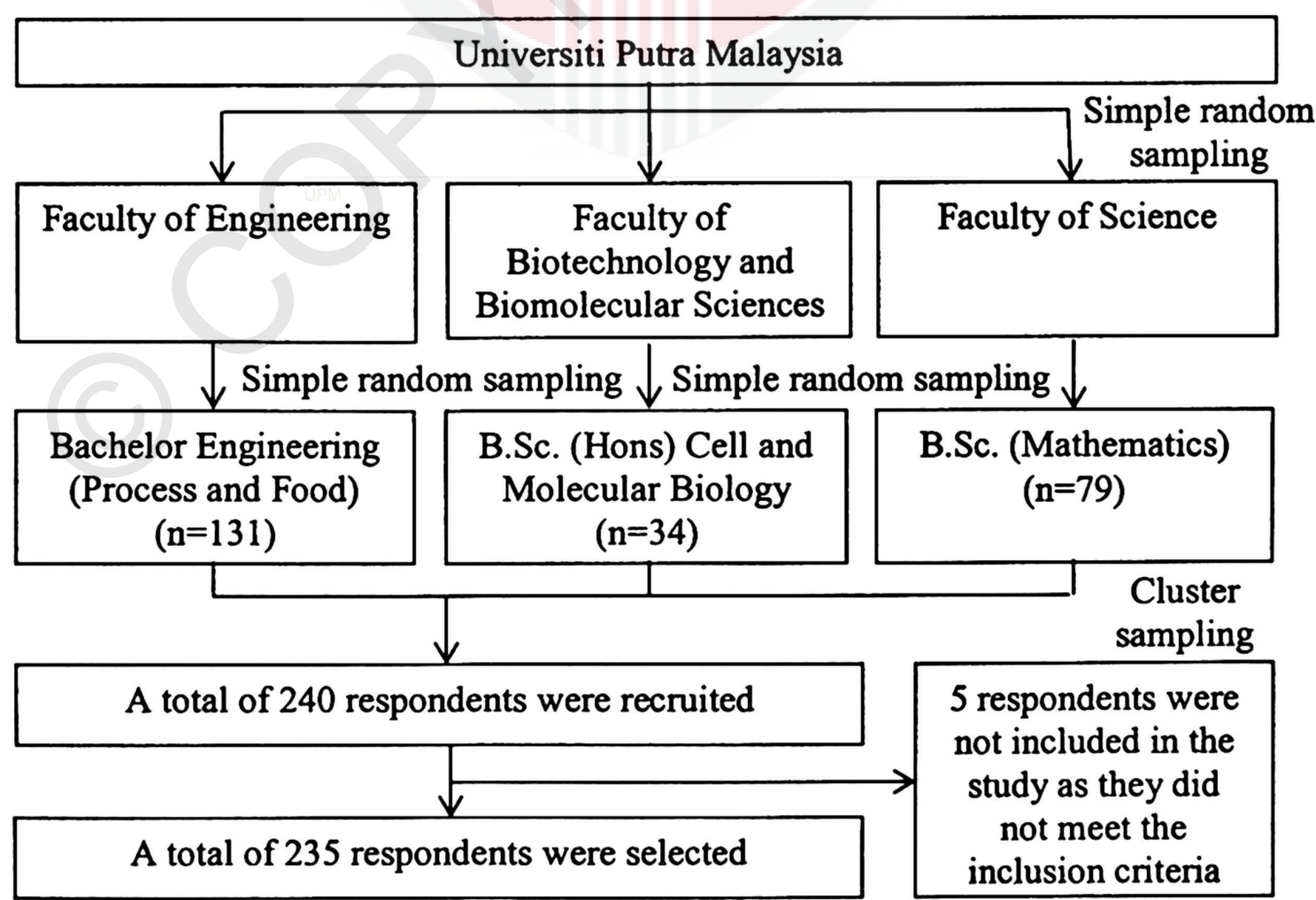


Figure 4.1: Flow chart of respondents' recruitment

## **4.2 Sociodemographic background**

The mean age of the respondents was  $21.77 \pm 1.24$  ranging from 19 to 25 years old. There were a total of 235 respondents that were recruited for this study with the response rate of 58.8 %. Female students made up the vast majority of the respondents (91.1 %). Among the other ethnicities, Malay respondents represented the highest proportion (80.4 %), followed by Chinese (14.5 %), Indian (3.0 %) and others (2.1 %). A majority of the respondents were Muslims (82.6 %), followed by Buddha (12.8 %), Hindu (2.6 %) and Christian (2.1 %).

Most of the respondents lived in college (86.4 %), while 11.5 % of them lived outside campus and 2.1 % lived at home with family members. Almost half of the respondents had the monthly stipend ranging from RM 100.01 to RM 300.00 (43.0 %). Besides, more than half of the respondents were having loan as their source of funding in university (59.1 %). As for the parents' education level, the highest proportion for both father and mother were secondary education level with 49.8 % for father's while 57.4 % for mother's. Table 4.1 demonstrates the distribution of the respondents according to their socio-demographic background.

**Table 4.1 Socio-demographic background of university students (n = 235)**

| <b>Variables</b>                  | <b>n (%)</b> | <b>Mean ± SD</b> |
|-----------------------------------|--------------|------------------|
| <b>Age</b>                        | -            | 21.77 ± 1.24     |
| <b>Sex</b>                        | -            | -                |
| Male                              | 21 (8.9)     | -                |
| Female                            | 214 (91.1)   | -                |
| <b>Ethnicity</b>                  |              |                  |
| Malay                             | 189 (80.4)   | -                |
| Chinese                           | 34 (14.5)    | -                |
| Indian                            | 7 (3.0)      | -                |
| Others                            | 5 (2.1)      | -                |
| <b>Religion</b>                   |              |                  |
| Islam                             | 194 (82.6)   | -                |
| Buddha                            | 30 (12.8)    | -                |
| Hindu                             | 6 (2.6)      | -                |
| Christian                         | 5 (2.1)      | -                |
| Others                            | -            | -                |
| <b>Accommodation</b>              |              |                  |
| College                           | 203 (86.4)   | -                |
| Home (with family)                | 5 (2.1)      | -                |
| Outside campus                    | 27 (11.5)    | -                |
| Others                            | -            | -                |
| <b>Monthly stipend</b>            |              |                  |
| ≤ RM 100.00                       | 22 (9.4)     | -                |
| RM 100.01 – RM 300.00             | 101 (43.0)   | -                |
| RM 300.01 – RM 500.00             | 76 (32.3)    | -                |
| RM 500.01 – RM 700.00             | 23 (9.8)     | -                |
| RM 700.01 – RM 900.00             | 5 (2.1)      | -                |
| > RM 900.00                       | 8 (3.4)      | -                |
| <b>Source of funding</b>          |              |                  |
| Scholarship                       | 54 (23.0)    | -                |
| Loan                              | 139 (59.1)   | -                |
| Self-funded                       | 42 (17.9)    | -                |
| Others                            | -            | -                |
| <b>Father's highest education</b> |              |                  |
| Primary education                 | 22 (9.4)     | -                |
| Secondary education               | 117 (49.8)   | -                |
| Tertiary education                | 95 (40.4)    | -                |
| No formal education               | 1 (0.4)      | -                |
| <b>Mother's highest education</b> |              |                  |
| Primary education                 | 22 (9.4)     | -                |
| Secondary education               | 135 (57.4)   | -                |
| Tertiary education                | 76 (32.3)    | -                |
| No formal education               | 2 (0.9)      | -                |



### **4.3 Academic background and performance**

**Table 4.2** demonstrates the distribution of the respondents according to their academic background and performances. More than half (55.7 %) of the respondents were students from the Faculty of Engineering, followed by Faculty of Science (31.9 %) and Faculty of Biotechnology and Biomolecular Sciences (12.3 %). One third of the respondents were in their second year of study (30.2 %) followed by fourth year (26.8 %), first year (22.6 %) and third year (20.4 %).

Half of the respondents (50.6 %) reported that they did involve in extra co-curricular activities with the mean number of hours per week was  $4.36 \pm 4.36$  hours. For recent Cumulative Grade Point Average (CGPA) of the respondents, a vast majority of the respondents were in the second class upper (69.4 %), then followed by first class (18.3 %), second class lower (11.9 %) and third class (0.4 %). Both first class and second class lower were higher among male (19.0 %) respondents as compared to female (14.3 %), while both second class upper and third class were high among the female (66.7 %) respondents as compared to male (0.5 %) respondents.

**Table 4.2: Academic background and performance of university students  
(n = 235)**

| Variables                               | n (%)       |                |               |
|-----------------------------------------|-------------|----------------|---------------|
|                                         | Male (n=21) | Female (n=214) | Total (n=235) |
| <b>Faculty</b>                          |             |                |               |
| Engineering                             | 14 (66.7)   | 117 (54.7)     | 131 (55.7)    |
| Science                                 | 3 (14.3)    | 72 (33.6)      | 75 (31.9)     |
| Biotechnology and Biomolecular Sciences | 4 (19.0)    | 25 (11.7)      | 29 (12.3)     |
| <b>Year of study</b>                    |             |                |               |
| 1 <sup>st</sup> year                    | 5 (23.8)    | 48 (22.4)      | 53 (22.6)     |
| 2 <sup>nd</sup> year                    | 4 (19.0)    | 67 (31.3)      | 71 (30.2)     |
| 3 <sup>rd</sup> year                    | 7 (33.3)    | 41 (19.2)      | 48 (20.4)     |
| 4 <sup>th</sup> year                    | 5 (23.8)    | 58 (27.1)      | 63 (26.8)     |
| <b>Recent CGPA result</b>               |             |                |               |
| 3.750-4.000                             | 4 (19.0)    | 39 (18.2)      | 43 (18.3)     |
| 3.000-3.749                             | 14 (66.7)   | 149 (69.6)     | 163 (69.4)    |
| 2.250-2.999                             | 3 (14.3)    | 25 (11.7)      | 28 (11.9)     |
| 2.000-2.249                             | 0 (0.0)     | 1 (0.5)        | 1 (0.4)       |
| <b>Co-curricular involvement</b>        |             |                |               |
| Yes                                     | 18 (85.7)   | 101 (47.2)     | 119 (50.6)    |
| Number of hours per week                |             |                |               |
| Mean ± SD                               | 6.78 ± 7.20 | 3.93 ± 3.52    | 4.36 ± 4.36   |
| No                                      | 3 (14.3)    | 113 (52.8)     | 116 (49.4)    |

**4.4 Nutritional status**

**4.4.1 Waist circumference**

The mean waist circumference of the respondents was based on Table 4.3. From the findings, it was shown that the mean waist circumference of the respondents was 72.02±11.71 cm.

Table 4.3 Waist circumference of university students (n = 235)

| Item                     | n (%)         |                |               |
|--------------------------|---------------|----------------|---------------|
|                          | Male (n=21)   | Female (n=214) | Total (n=235) |
| Waist circumference (cm) |               |                |               |
| Mean ± SD                | 81.75 ± 18.04 | 71.07 ± 10.48  | 72.02±11.71   |

Based on Figure 4.2, it is shown that most of the respondents (82.1 %) had normal classification for waist circumference; meanwhile about 17.9 % were in high risk category. The results of the findings also found that more female (18.2 %) were at high risk category than male respondents (14.3 %).

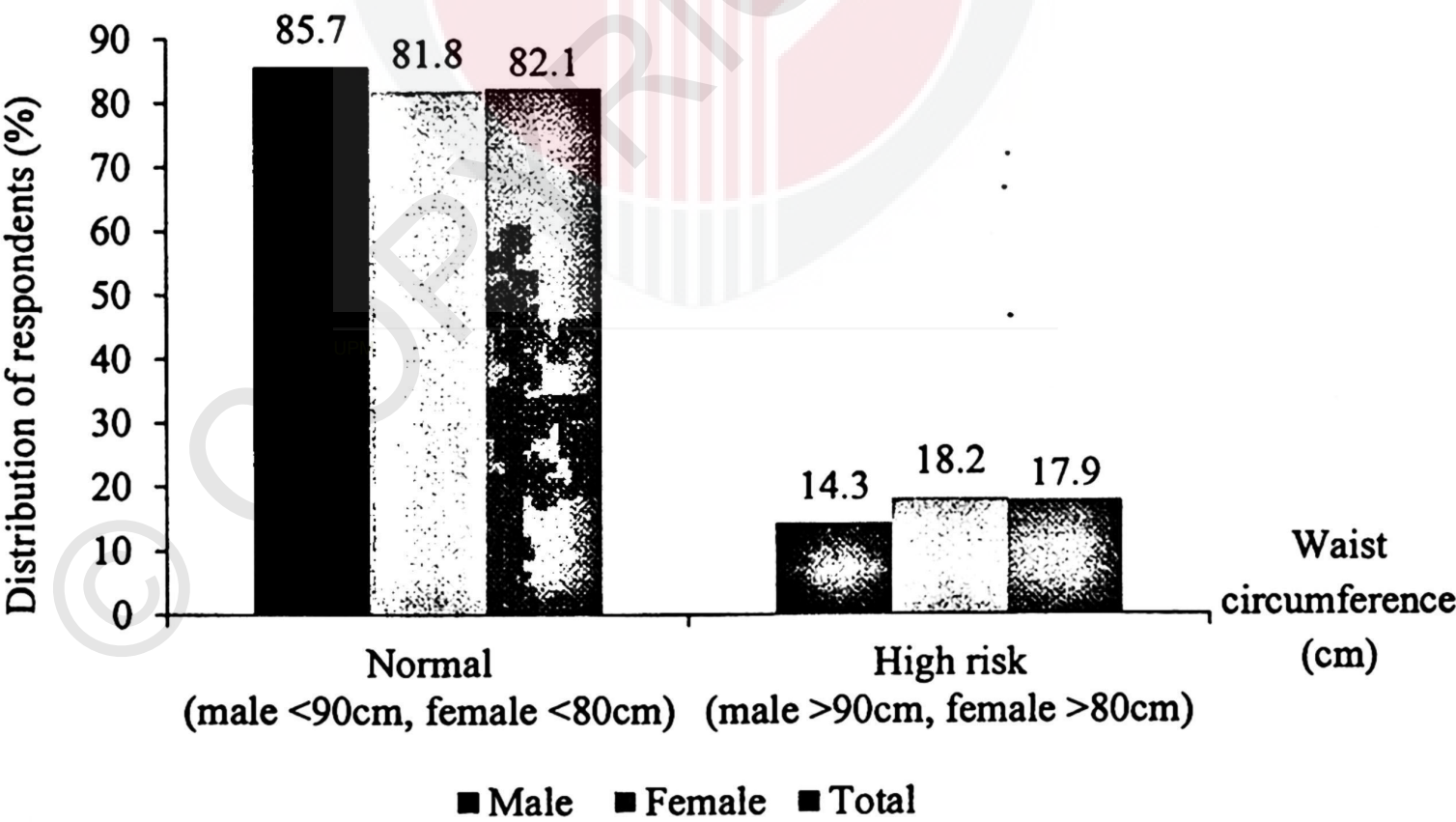


Figure 4.2: Proportions of respondents based on waist circumference category (n=235)



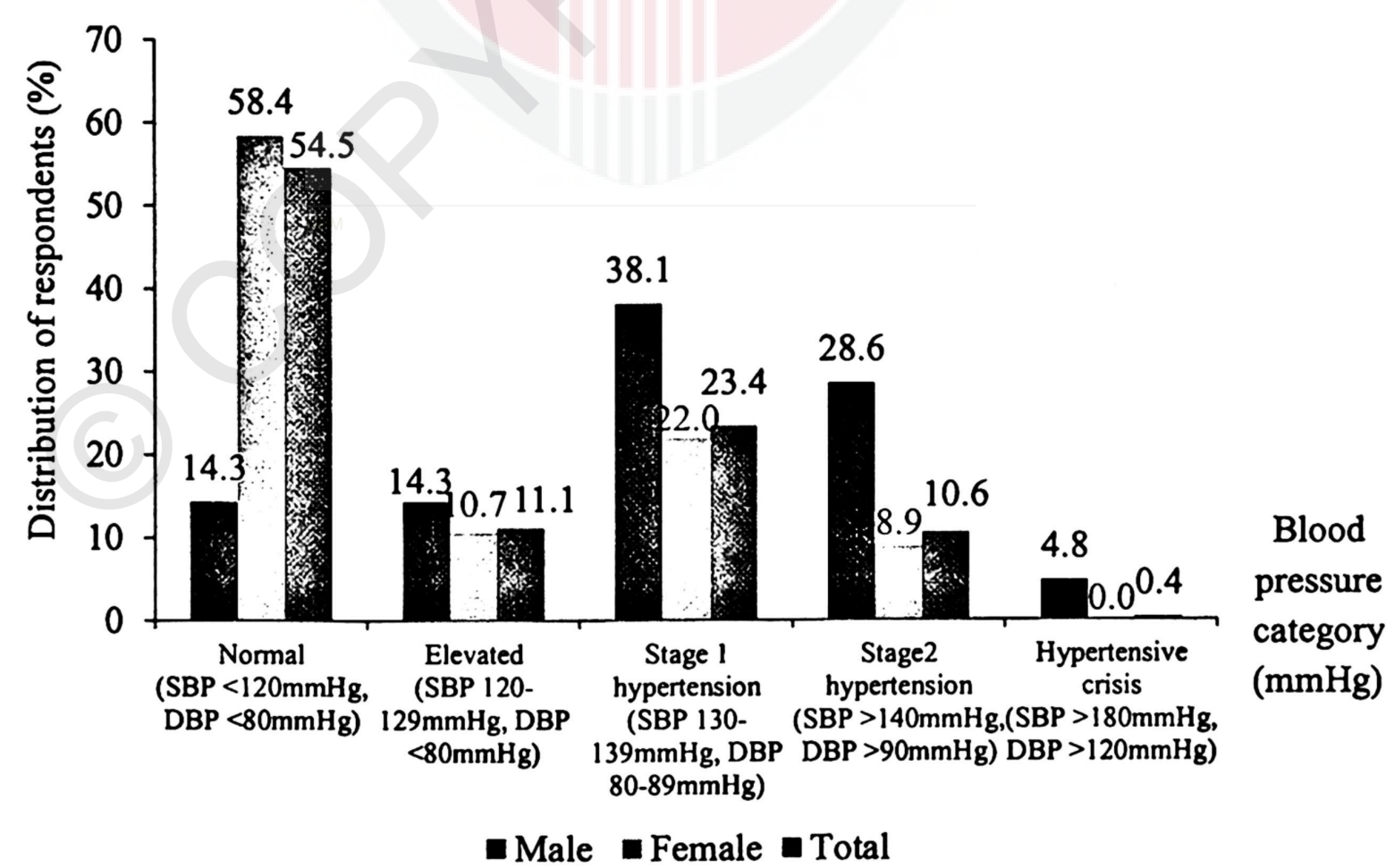
4.4.2 Clinical data

Table 4.4 demonstrates the distributions of respondents according to their family medical history and the mean blood pressure readings. It is shown that half of the respondents were having family medical history of diseases with 51.1 %, while another 48.9 % of the respondents did not having any. Almost three quarter of the respondents was having a family medical history of high blood pressure (73.3 %), then followed by diabetes type 2 (36.7 %), cancer (20.8 %), heart disease (18.3 %), other type diseases like gout and asthma (9.2 %), stroke (8.3 %) and lastly kidney disease (6.7 %), As for blood pressure, it is shown that the mean of systolic blood pressure of the respondents was  $117.07 \pm 13.28$  mmHg, while the mean of the diastolic blood of the respondents was  $75.42 \pm 9.48$  mmHg (Table 4.4).

Table 4.4 Clinical data of university students (n = 235)

| Item                                      | n (%)              |                    |                    |
|-------------------------------------------|--------------------|--------------------|--------------------|
|                                           | Male (n=21)        | Female (n=214)     | Total (n=235)      |
| <b>Family medical history of diseases</b> |                    |                    |                    |
| Yes                                       | 10 (47.6)          | 110 (51.4)         | 120 (51.1)         |
| Diabetes type 2                           | 2 (20.0)           | 42 (38.2)          | 44 (36.7)          |
| Heart disease                             | 2 (20.0)           | 20 (18.2)          | 22 (18.3)          |
| High blood pressure                       | 7 (70.0)           | 81 (73.6)          | 88 (73.3)          |
| Stroke                                    | 1 (10.0)           | 9 (8.2)            | 10 (8.3)           |
| Kidney disease                            | 1 (10.0)           | 7 (6.4)            | 8 (6.7)            |
| Cancer                                    | 1 (10.0)           | 24 (21.8)          | 25 (20.8)          |
| Others                                    | 1 (10.0)           | 10 (9.1)           | 11 (9.2)           |
| No                                        | 11 (52.4)          | 104 (48.6)         | 115 (48.9)         |
| <b>Blood pressure</b>                     |                    |                    |                    |
| Systolic blood pressure, mmHg             |                    |                    |                    |
| Mean $\pm$ SD                             | 132.57 $\pm$ 19.23 | 115.55 $\pm$ 11.53 | 117.07 $\pm$ 13.28 |
| Diastolic blood pressure, mmHg            |                    |                    |                    |
| Mean $\pm$ SD                             | 79.43 $\pm$ 10.70  | 75.02 $\pm$ 9.28   | 75.42 $\pm$ 9.48   |

The categories of blood pressure readings of the respondents were as shown in **Figure 4.3**. Based on the findings, it was shown that more than half of the respondents were categorized in the normal category based on their blood pressure reading on the day of the data collection (54.4 %), then followed by stage 1 hypertension (23.4 %), elevated (11.1 %), stage 2 hypertension (10.6 %) and lastly hypertensive crisis (0.4 %). Besides, the male respondents showed higher proportions for all at risk categories for high blood pressure which is elevated, stage 1 hypertension, stage 2 hypertension and hypertensive crisis as compared to the female respondents with 14.3 %, 38.1 %, 28.6 % and 4.8 % respectively. Meanwhile, the female respondents showed a higher proportion for the normal category of blood pressure than the male respondents with 58.4 %. When comparing within gender, it was showed that majority of the female respondents were in the normal category, while majority of the male respondents were in the stage 1 hypertension category.



**Figure 4.3: Proportions of respondents based on blood pressure category (n=235)**



4.4.3 Dietary intake

Dietary intake of the respondents was as shown below. Out of 235 respondents, only a total of 107 responses were able to be obtained. Some of the other respondents skipped this part in the questionnaire and some of them gave invalid response. Therefore, only 107 of them were able to be analyzed. Table 4.5 demonstrates the mean energy, carbohydrate, protein and fat intake of the respondents. From the findings, the mean of the energy intake was  $3282 \pm 2126$  kcal/day. As for macronutrient intake, the mean of carbohydrate intake was  $60.11 \pm 9.10$  %/day,  $14.95 \pm 3.35$  %/day for protein intake while  $24.93 \pm 6.82$  %/day for fat intake.

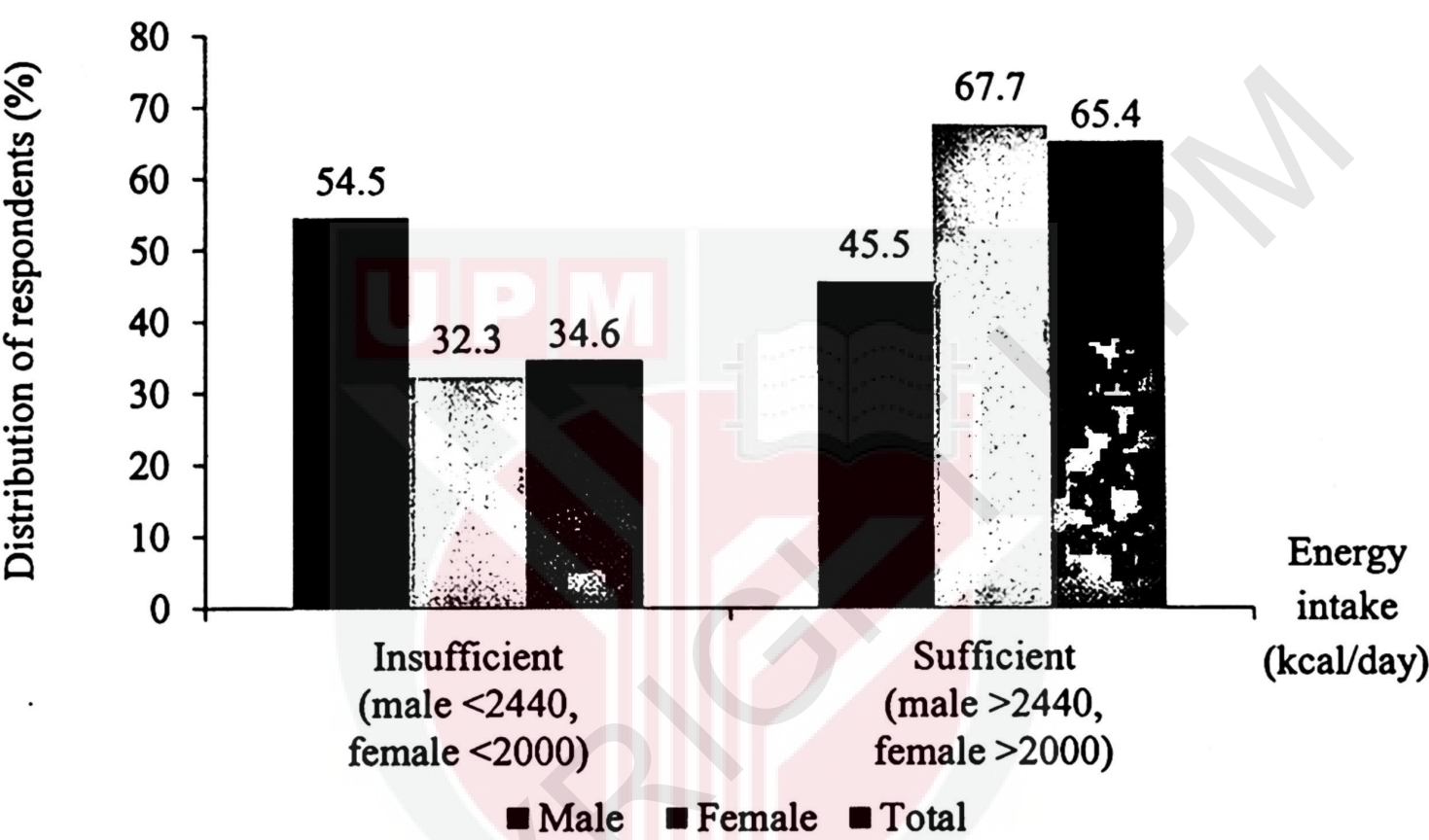
Table 4.5: Dietary intake of university students (n = 107)

| Item                     | n (%)                 |                       |                       |
|--------------------------|-----------------------|-----------------------|-----------------------|
|                          | Male (n=11)           | Female (n=96)         | Total (n=107)         |
| Energy intake (kcal/day) |                       |                       |                       |
| Mean $\pm$ SD            | 3377.01 $\pm$ 2794.23 | 3271.61 $\pm$ 2054.43 | 3282.45 $\pm$ 2126.10 |
| Carbohydrate (%/day)     |                       |                       |                       |
| Mean $\pm$ SD            | 59.35 $\pm$ 8.52      | 60.20 $\pm$ 9.21      | 60.11 $\pm$ 9.10      |
| Protein (%/day)          |                       |                       |                       |
| Mean $\pm$ SD            | 15.17 $\pm$ 3.14      | 14.92 $\pm$ 3.39      | 14.95 $\pm$ 3.35      |
| Fat (%/day)              |                       |                       |                       |
| Mean $\pm$ SD            | 25.48 $\pm$ 6.11      | 24.87 $\pm$ 6.92      | 24.93 $\pm$ 6.82      |

Figure 4.4 demonstrates the proportions of respondents based on energy intake. When comparing with the Malaysian Recommended Nutrient Intake (RNI) (male >2440, female >2000), a majority of the respondents were having sufficient energy intake per day with 65.4 %. There was a higher proportion among the female respondents who had sufficient energy intake per day with 67.7 %, while male

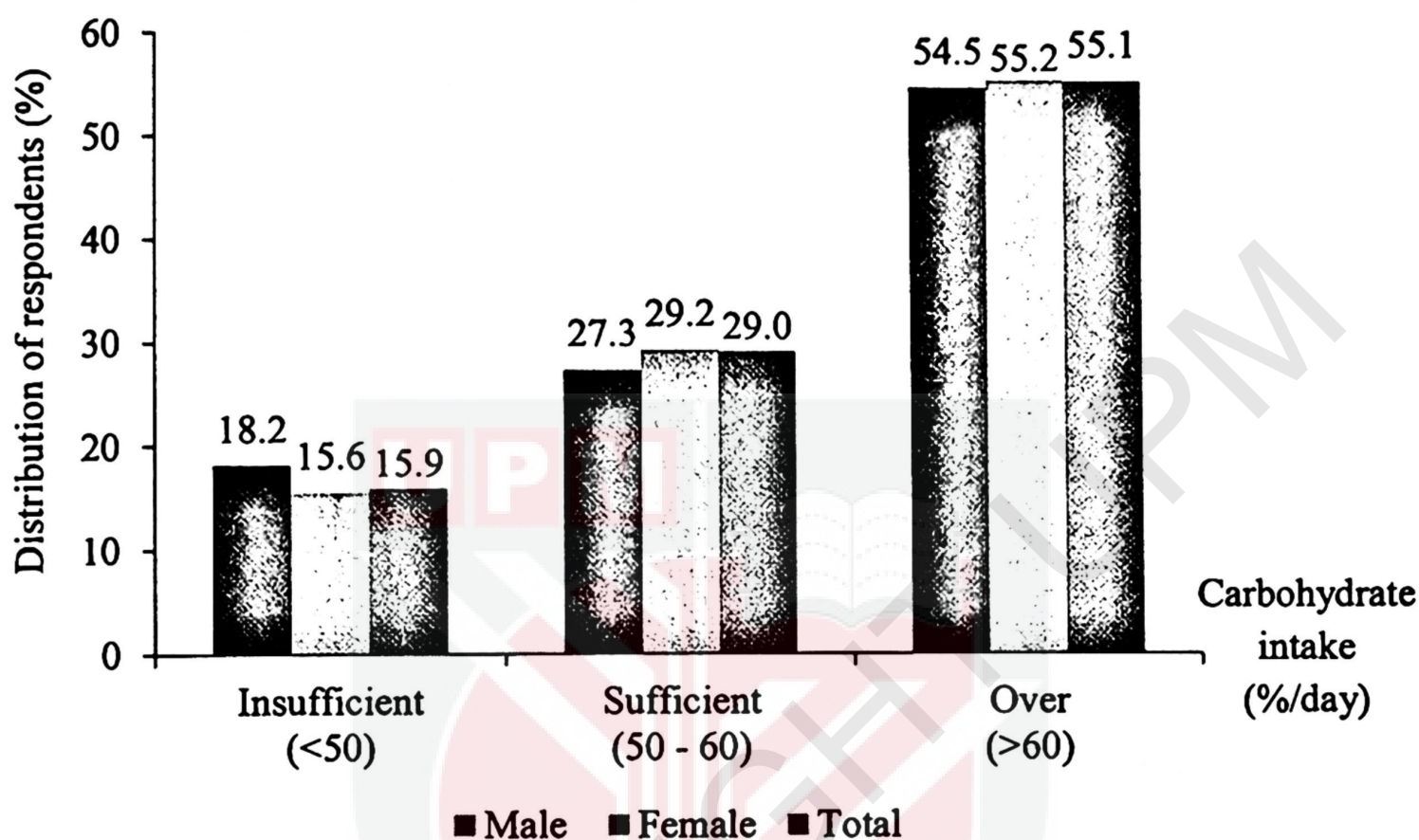


respondents showed a higher proportion for having insufficient energy intake among them 54.5 %.



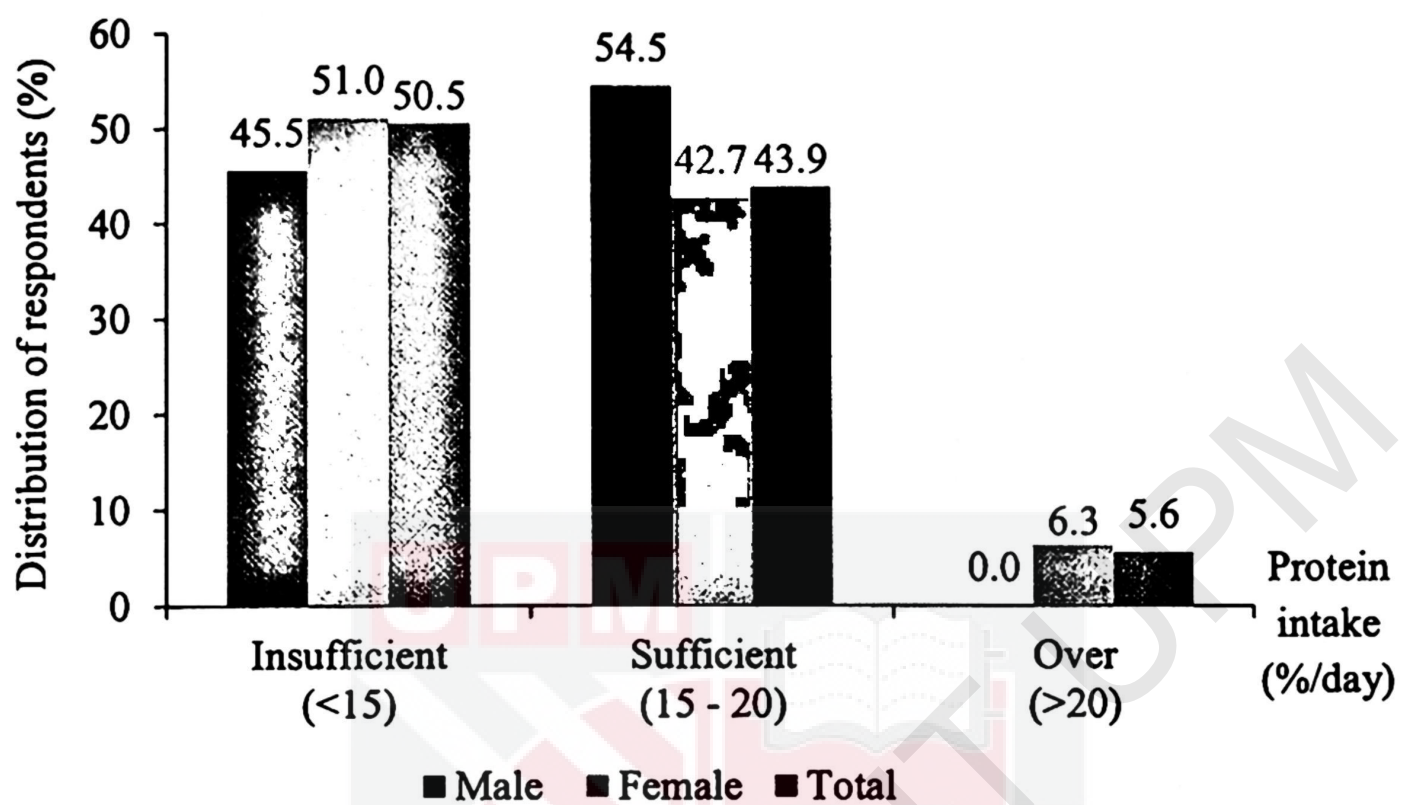
**Figure 4.4: Proportions of respondents based on energy intake**

The proportions of respondents based on carbohydrate intake were as shown in Figure 4.5. The recommended daily carbohydrate intake according to Malaysian RNI is 50 to 60 %. As a result, more than half of the respondents were having over intake of carbohydrate (55.1 %), and then followed by sufficient and insufficient intake of carbohydrate per day with 29.0 % and 15.9 % respectively. When comparing within gender, both male (54.5 %) and female (55.2 %) respondents showed higher distribution for excessive intake of carbohydrate per day.



**Figure 4.5: Proportions of respondents based on carbohydrate intake**

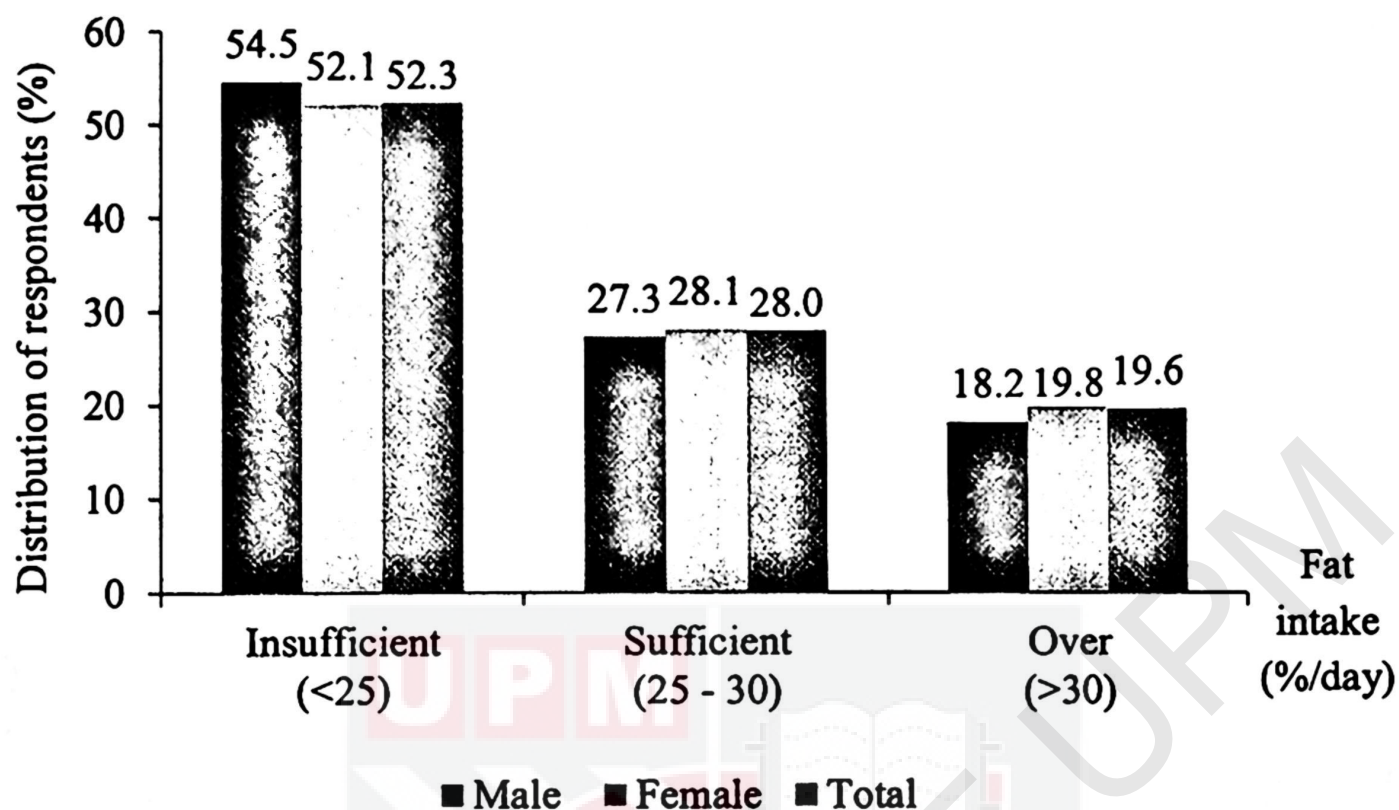
Figure 4.6 demonstrates the proportions of respondents based on protein intake. When comparing with the Malaysian RNI for daily protein intake (10 to 25 %), it was also found that a majority of the respondents were having insufficient intake of protein with 50.5 %, while 43.9 % and 5.6 % of the respondents were having sufficient and over intake of protein per day respectively. A majority of male students were having sufficient amount of daily protein intake (54.5 %), while most of the female respondents were having insufficient amount of protein intake per day (51.0 %).



**Figure 4.6: Proportions of respondents based on protein intake**

The distribution of the respondents by fat intake was as shown in Figure 4.7. The recommended intake of fat according to Malaysian RNI is 25 to 30 % daily. As a result, more than half of the respondents were having insufficient amount of fat consumed per day with 52.3 %, and then followed by sufficient and over intake with 28.0 % and 19.6 % respectively. Besides, both male and female respondents showed higher proportions for insufficient daily fat intake among their own gender with 54.4 % and 52.1 % respectively.

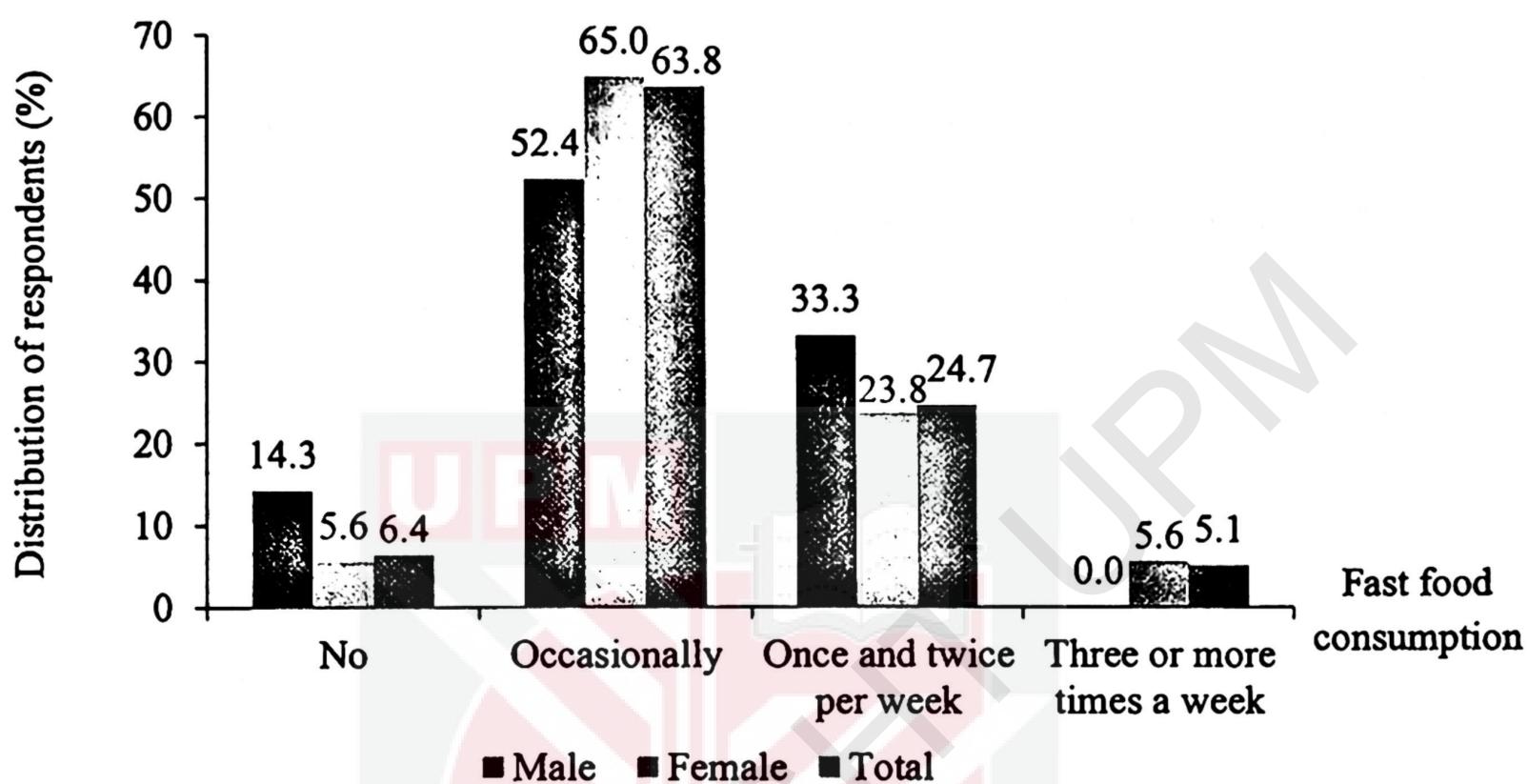




**Figure 4.7: Proportions of respondents based on fat intake**

#### **4.4.4 Fast food consumption**

**Figure 4.8** demonstrates the distributions of respondents according to their fast food consumption in the past one month. The frequency of visiting fast food was made to score it categorically based on a study by Braithwaite et al. (2014) which indicates “Occasionally” as infrequent, “Once or twice per week” as frequent and “Three times or more per week” as very frequent. Based on the results, it is shown that a majority of the respondents (63.8 %) consumed fast food occasionally in the past one month. About 24.7 % of the respondents consumed fast food once or twice per week and then followed by three or more times a week in the past one month with 5.1 %. Meanwhile, about 6.4 % of them reported that they did not consume any fast food for the past one month. Both male and female respondents showed higher proportions for consuming fast food occasionally within their own gender with 52.4 % and 65.0 % respectively.



**Figure 4.8: Proportions of respondents based on fast food consumption**

Table 4.6 describes the characteristics of fast food consumption of the respondents. Based on the findings, three most preferred fast food restaurants by the respondents were Kentucky Fried Chicken (KFC), McDonald’s and Texas Chicken with 78.3 %, 71.1 % and 38.7 % respectively. Meanwhile, three main reasons for choosing fast food restaurant instead of another type by the respondents were taste of the food, value or cost of the food and convenience with 66.8 %, 31.1 % and 28.9 % respectively.

Other than that, the respondents also reported that lunch was the most preferred type of meal when consuming fast food with 38.7 %. Besides, a vast majority of the respondents reported that they did not usually choose any of the “super-size” options



that are available when ordering food at fast food restaurants (84.7 %). Most of the respondents which is about 66.0 % reported that their most often companionship when going to fast food restaurants was their own friends.

Next, about 36.2 % which was the majority of the respondents reported that nutritional information at fast-food restaurants was available, and most of them did read that nutritional information at fast-food restaurants (55.3 %). Among the respondents who ever read the nutritional information, most of them which is about 51.1 % reported that those nutritional information did sometimes help them to decide when ordering food. Lastly, half of the respondents reported that they were sometimes tending to order the healthier food items available at the fast food restaurants on a usual basis (51.1 %). Characteristics of fast food consumption of the respondents were as shown below (Table 4.6).

**Table 4.6: Fast food intake of university students (n = 235)**

| Item                                       | n (%)       |                |               |
|--------------------------------------------|-------------|----------------|---------------|
|                                            | Male (n=21) | Female (n=214) | Total (n=235) |
| <b>Most preferred fast food restaurant</b> |             |                |               |
| KFC                                        | 10 (47.6)   | 174 (81.3)     | 184 (78.3)    |
| Texas Chicken                              | 11 (52.4)   | 80 (37.4)      | 91 (38.7)     |
| Mc Donald's                                | 14 (66.7)   | 153 (71.5)     | 167 (71.1)    |
| Marrybrown                                 | 1 (4.8)     | 12 (5.6)       | 13 (5.5)      |
| Pizza Hut                                  | 4 (19.0)    | 69 (32.2)      | 73 (31.1)     |
| Domino's Pizza                             | 7 (33.3)    | 41 (19.2)      | 48 (20.8)     |
| Burger King                                | 3 (14.3)    | 6 (2.8)        | 9 (3.8)       |
| Subway                                     | 7 (33.3)    | 40 (18.7)      | 47 (20.0)     |
| Fuel Shack                                 | 1 (4.8)     | 6 (2.8))       | 7 (3.0)       |
| Others                                     | 2 (9.5)     | 3 (1.4)        | 5 (2.1)       |



**Table 4.6 (Cont.): Fast food intake of university students (n = 235)**

| Item                                                                                          | n (%)       |                |               |
|-----------------------------------------------------------------------------------------------|-------------|----------------|---------------|
|                                                                                               | Male (n=21) | Female (n=214) | Total (n=235) |
| <b>Reasons for choosing fast food restaurant instead of another type</b>                      |             |                |               |
| Taste of the food                                                                             | 12 (57.1)   | 145 (67.8)     | 157 (66.8)    |
| Value or cost                                                                                 | 5 (23.8)    | 68 (31.8)      | 73 (31.1)     |
| Convenience, fast service                                                                     | 7 (33.3)    | 61 (28.5)      | 68 (28.9)     |
| Person you are with wants to go                                                               | 5 (23.8)    | 40 (18.7)      | 45 (19.1)     |
| Fast-food restaurants are conveniently located                                                | 7 (33.3)    | 32 (15.0)      | 39 (16.6)     |
| <b>Most often meal type</b>                                                                   |             |                |               |
| Breakfast                                                                                     | 2 (9.5)     | 4 (1.9)        | 6 (2.6)       |
| Lunch                                                                                         | 5 (23.8)    | 86 (40.2)      | 91 (38.7)     |
| Dinner                                                                                        | 12 (57.1)   | 70 (32.7)      | 82 (34.9)     |
| Snacks                                                                                        | 1 (4.8)     | 15 (7.0)       | 16 (6.8)      |
| All meals, no usual meal                                                                      | 1 (4.8)     | 39 (18.2)      | 40 (17.0)     |
| <b>Likeliness to order any of the “super-size” options that are available</b>                 |             |                |               |
| Yes                                                                                           | 7 (33.3)    | 29 (13.6)      | 36 (15.3)     |
| No                                                                                            | 14 (66.7)   | 185 (86.4)     | 199 (84.7)    |
| <b>Most frequent companionship to fast food restaurant</b>                                    |             |                |               |
| Family                                                                                        | 7 (33.3)    | 58 (27.1)      | 65 (27.7)     |
| Self                                                                                          | 1 (4.8)     | 14 (6.5)       | 15 (6.4)      |
| Friends                                                                                       | 13 (61.9)   | 142 (66.4)     | 155 (66.0)    |
| <b>Availability of nutritional information at fast-food restaurants</b>                       |             |                |               |
| Yes                                                                                           | 11 (52.4)   | 74 (34.6)      | 85 (36.2)     |
| No                                                                                            | 4 (19.0)    | 39 (18.2)      | 43 (18.3)     |
| Never noticed                                                                                 | 4 (19.0)    | 80 (37.4)      | 84 (35.7)     |
| Don’t know                                                                                    | 2 (9.5)     | 21 (9.8)       | 23 (9.8)      |
| <b>If yes, likeliness to read the nutritional information at fast-food restaurants (n=85)</b> |             |                |               |
| Yes                                                                                           | 6 (54.5)    | 41 (55.4)      | 47 (55.3)     |
| No                                                                                            | 5 (45.5)    | 33 (44.6)      | 38 (44.7)     |

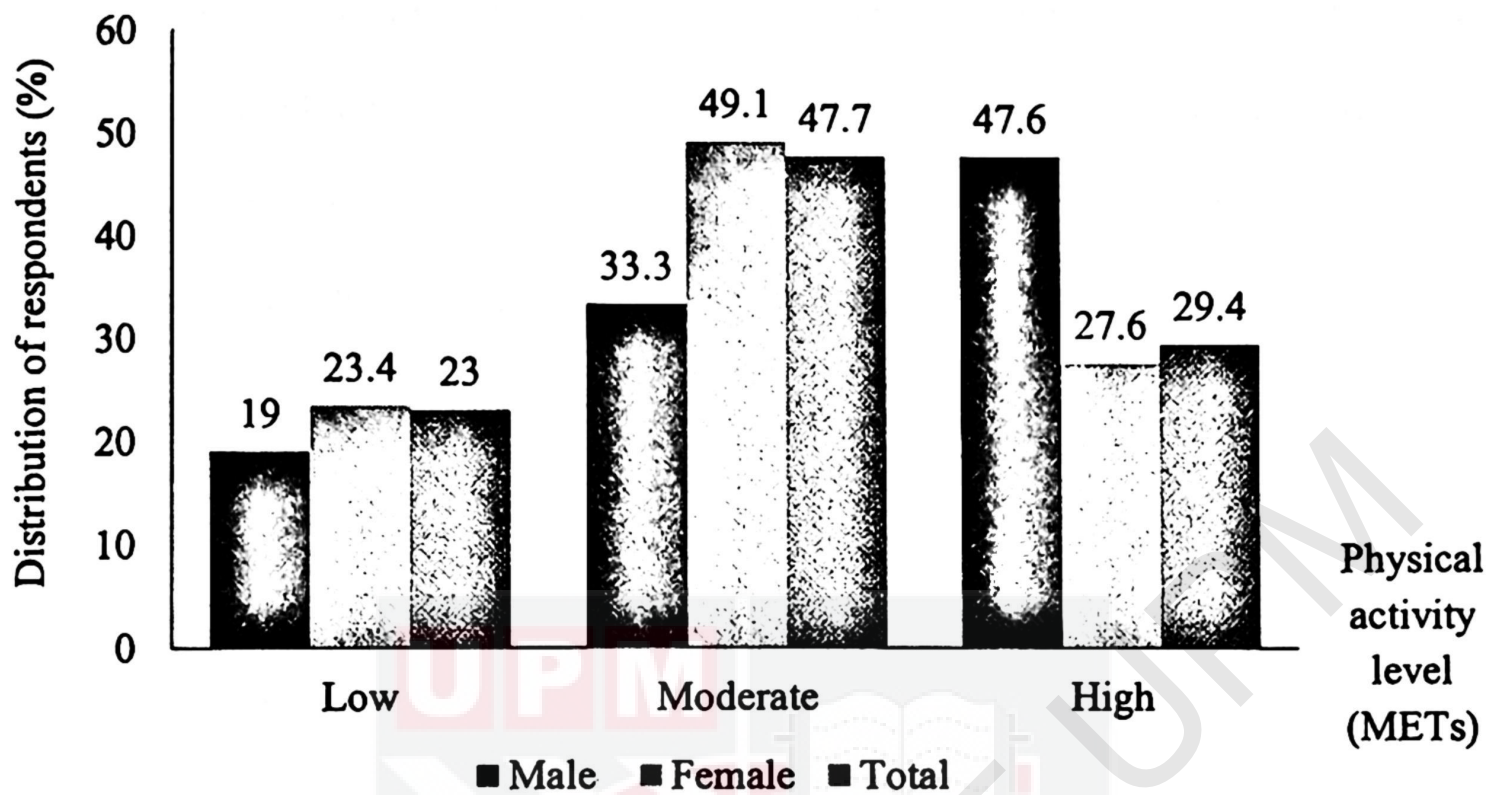
**Table 4.6 (Cont.): Fast food intake of university students (n = 235)**

| Item                                                                                           | n (%)       |                |               |
|------------------------------------------------------------------------------------------------|-------------|----------------|---------------|
|                                                                                                | Male (n=21) | Female (n=214) | Total (n=235) |
| <b>If yes, the frequency of ordering based on the nutritional information available (n=47)</b> |             |                |               |
| Very often                                                                                     | 1 (16.7)    | 5 (12.2)       | 6 (12.8)      |
| Fairly often                                                                                   | 1 (16.7)    | 8 (19.5)       | 9 (19.1)      |
| Sometimes                                                                                      | 3 (50.0)    | 21 (51.2)      | 24 (51.1)     |
| Almost never                                                                                   | 1 (16.7)    | 3 (7.3)        | 4 (8.5)       |
| Never                                                                                          | 0 (0.0)     | 4 (9.8)        | 4 (8.5)       |
| <b>Likeliness to order healthier food items in fast food restaurant</b>                        |             |                |               |
| Very often                                                                                     | 2 (9.5))    | 12 (5.6)       | 14 (6.0)      |
| Fairly often                                                                                   | 8 (38.1)    | 31 (14.5)      | 39 (16.6)     |
| Sometimes                                                                                      | 9 (42.9)    | 111 (51.9)     | 120 (51.1)    |
| Almost never                                                                                   | 1 (4.8)     | 36 (16.8)      | 37 (15.7)     |
| Never                                                                                          | 1 (4.8)     | 24 (11.2)      | 25 (10.6)     |

#### **4.5 Physical activity level**

The respondents were categorized into three categories of physical activity (PA) level based on their total METs score which are low (below 600 METs), moderate (between 600 and 2999 METs) and high (equal and higher than 3000 METs). As shown in **Figure 4.9**, a majority of the respondents were categorized in the moderate physical activity level which is about 47.7 %, and then followed by high and low physical activity level with 29.4 % and 23.0 % respectively. When comparing within gender, male respondents showed a higher proportion for high physical activity level (47.6 %), while female respondents had higher proportion for moderate physical activity with 49.1 %.





**Figure 4.9: Proportions of respondents based on physical activity level**

Based on Table 4.7, the mean of the METs score of the overall respondents for the past one week was  $2745.12 \pm 3293.59$  METs-min/week. The median for the total physical activity duration per day based on specific domains were 8.57 (0.00-42.86) minutes for activities at work, 7.14 (0.00-21.43) minutes for travel to and from places and 8.57 (0.00-25.71) minutes for recreational activities. As for the total overall activities, the median was 42.86 (17.14-102.86) minutes. Besides, the distribution of no physical activity by domain was the highest for activities at work with 61.28 %, and then followed by recreational activities and travel to and from places with 51.91 % and 43.40 % respectively.

Work related physical activities and recreational physical activities had been separated into two parts which were vigorous and moderate activities. The median for moderate work related physical activities was 60.00 (0.00-240.00) minutes, while 0.00



(0.00-0.00) minutes for vigorous work related physical activities. Meanwhile, the median for moderate recreational physical activities was 30.00 (0.00-120.00) minutes, while 0.00 (0.00-0.00) for vigorous recreational physical activities. Lastly, the mean for total sedentary activity duration among all the respondents was  $368.77 \pm 226.20$  minutes. Details about physical activity level of the respondents were as shown below (Table 4.7)

**Table 4.7: Physical activity level of university students (n = 235)**

| Item                             | n (%)                |                     |                      |
|----------------------------------|----------------------|---------------------|----------------------|
|                                  | Male (n=21)          | Female (n=214)      | Total (n=235)        |
| <b>Physical activity level</b>   |                      |                     |                      |
| Mean ± SD                        | 4408.57 ± 4330.39    | 2581.89 ± 3139.56   | 2745.12 ± 3293.59    |
| <b>Physical PA per day (min)</b> |                      |                     |                      |
| Activities at work               |                      |                     |                      |
| Median (IQR)                     | 17.14 (0.00-120.00)  | 8.57 (0.00-42.86)   | 8.57 (0.00-42.86)    |
| Travel to and from places        |                      |                     |                      |
| Median (IQR)                     | 0.00 (0.00-19.29)    | 7.14 (0.00-21.43)   | 7.14 (0.00-21.43)    |
| Recreational activities          |                      |                     |                      |
| Median (IQR)                     | 22.14 (6.43-68.57)   | 8.57 (0.00-21.43)   | 8.57 (0.00-25.71)    |
| Total overall activities         |                      |                     |                      |
| Median (IQR)                     | 77.14 (28.93-177.86) | 39.64 (17.14-94.29) | 42.86 (17.14-102.86) |
| <b>No PA by domain (%)</b>       |                      |                     |                      |
| Activity at work                 | 21 (50.00)           | 267 (62.38)         | 288 (61.28)          |
| Travel to and from places        | 13 (61.90)           | 89 (41.59)          | 102 (43.40)          |
| Recreational activities          | 13 (30.95)           | 231 (53.97)         | 244 (51.91)          |
| <b>Work related PA (min)</b>     |                      |                     |                      |
| Moderate                         |                      |                     |                      |
| Median (IQR)                     | 60.00 (0.00-360.00)  | 47.50 (0.00-195.00) | 60.00 (0.00-240.00)  |
| Vigorous                         |                      |                     |                      |
| Median (IQR)                     | 0.00 (0.00-300.00)   | 0.00 (0.00-0.00)    | 0.00 (0.00-0.00)     |

**Table 4.7 (Cont.): Physical activity level of university students (n = 235)**

| Item                                     | n (%)                  |                        |                        |
|------------------------------------------|------------------------|------------------------|------------------------|
|                                          | Male (n=21)            | Female (n=214)         | Total (n=235)          |
| <b>Recreational PA (min)</b>             |                        |                        |                        |
| Moderate                                 |                        |                        |                        |
| Median (IQR)                             | 60.00 (0.00-240.00)    | 22.50 (0.00-90.00)     | 30.00 (0.00-120.00)    |
| Vigorous                                 |                        |                        |                        |
| Median (IQR)                             | 120.00 (0.00-240.00)   | 0.00 (0.00-60.00)      | 0.00 (0.00-60.00)      |
| <b>Sedentary activity duration (min)</b> |                        |                        |                        |
| Mean ± SD                                | 314.29 ± 157.50        | 374.11 ± 231.43        | 368.77 ± 226.20        |
| Median (IQR)                             | 300.00 (180.00-480.00) | 300.00 (180.00-600.00) | 300.00 (180.00-540.00) |

**4.6 Psychological distresses**

As shown in Table 4.8, the mean score for depression among the respondents was  $8.85 \pm 7.22$  which indicates normal depression category. Other than that, the mean score for anxiety among the respondents was  $13.15 \pm 7.85$  which indicates moderate anxiety category, while  $13.72 \pm 8.40$  for stress which indicates normal stress category.

**Table 4.8: Psychological distresses of university students (n = 235)**

| Item                        | n (%)        |                |               |
|-----------------------------|--------------|----------------|---------------|
|                             | Male (n=21)  | Female (n=214) | Total (n=235) |
| <b>Depression (n = 295)</b> |              |                |               |
| Mean ± SD                   | 11.33 ± 7.60 | 8.61 ± 7.15    | 8.85 ± 7.22   |
| <b>Anxiety (n = 295)</b>    |              |                |               |
| Mean ± SD                   | 16.29 ± 7.98 | 12.84 ± 7.79   | 13.15 ± 7.85  |
| <b>Stress (n = 295)</b>     |              |                |               |
| Mean ± SD                   | 17.14 ± 7.81 | 13.38 ± 8.40   | 13.72 ± 8.40  |

Based on Figure 4.10, more than half of the respondents were in the normal category for depression with 55.3 %, and then followed by mild (21.3 %), moderate (15.3 %), extremely severe (2.1 %) and severe (0.6 %) category. Meanwhile, majority of the respondents were in the category of moderate for anxiety with 26.4 %, and then followed by normal (24.7 %), extremely severe (21.7 %), severe (18.7 %) and mild (8.5 %) category. Other than that, most of the respondents were in the normal category for stress with 59.1 %, and then followed by moderate, mild, severe and extremely severe with 15.7 %, 14.5 %, 9.8 % and 0.9 % respectively. The categories of psychological distresses of the respondents were as shown below (Figure 4.10).

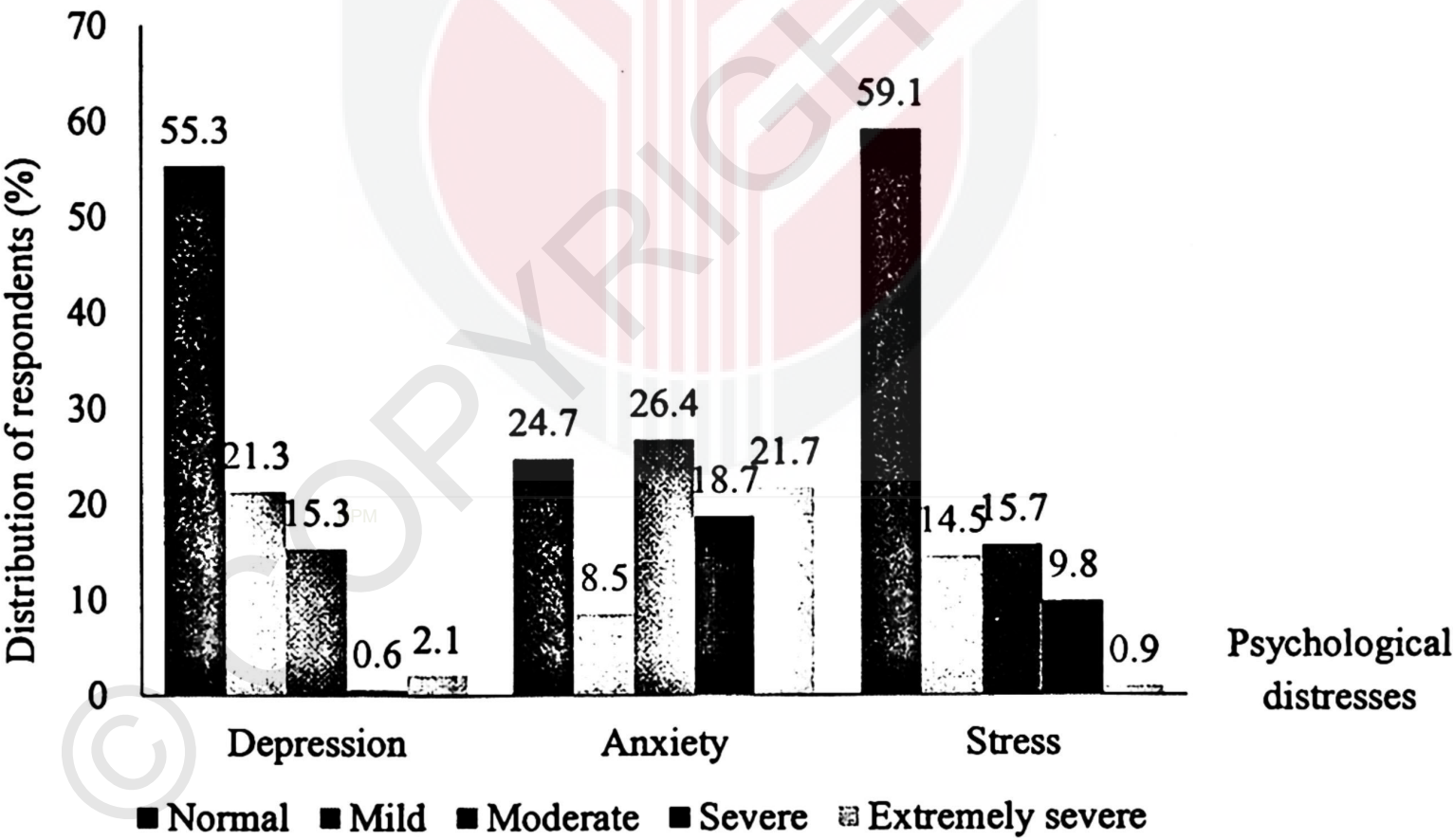


Figure 4.10: Psychological distresses of university students



**4.7 Body weight status**

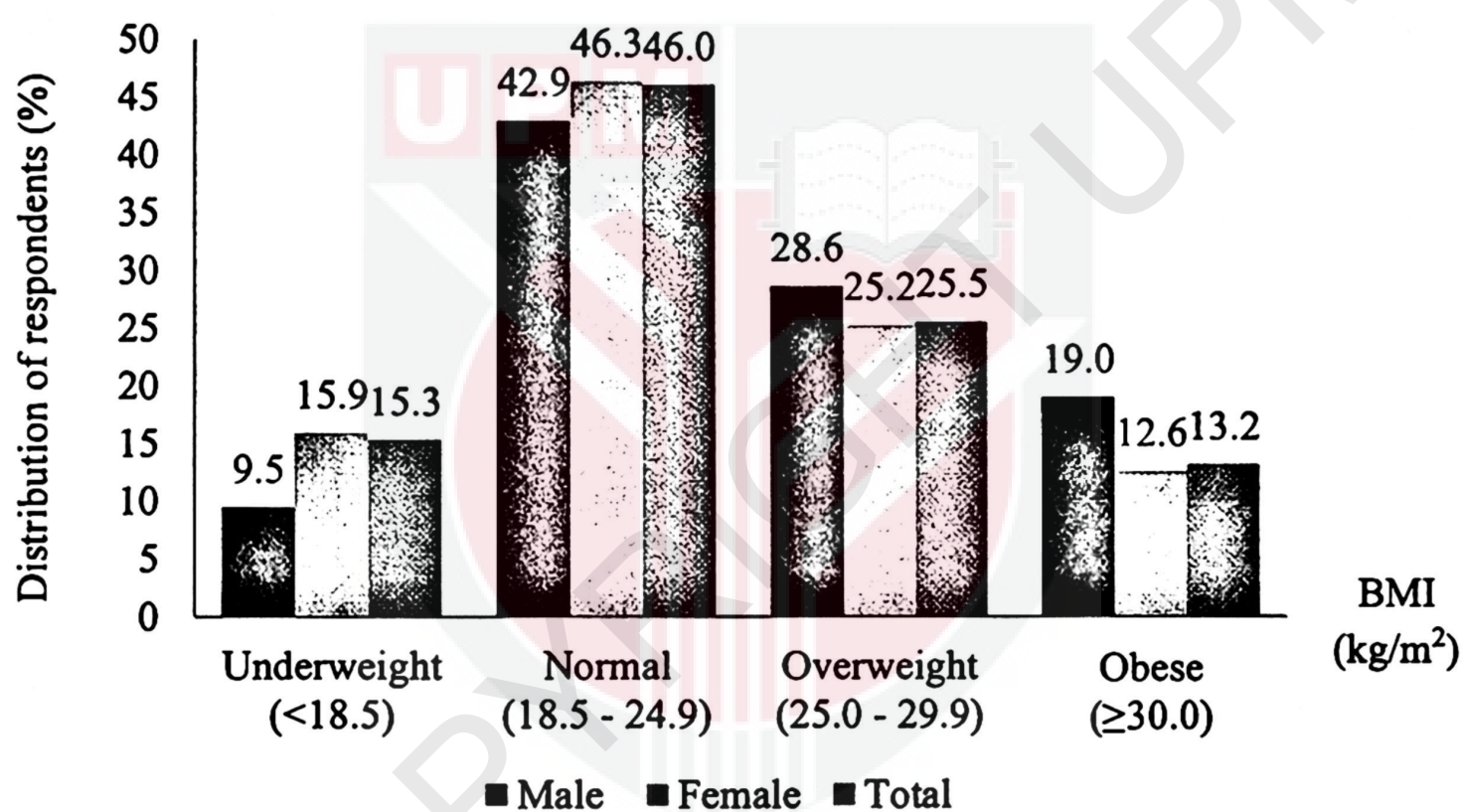
As shown in Table 4.9, the mean height of the respondents was  $156.88 \pm 8.56$  cm. The mean body weight for male respondents was  $68.45 \pm 21.85$  kg, while for female respondents was  $55.13 \pm 12.13$  kg. In total, the mean body weight for the overall respondents was  $56.76 \pm 15.55$  kg. For height, the male respondents had the mean of  $168.11 \pm 6.40$  cm, while  $156.25 \pm 5.08$  cm for female respondents. It was calculated that the total mean of height was  $156.88 \pm 8.56$  cm. As for Body Mass Index (BMI), the male respondents had higher BMI with  $24.09 \pm 6.53$  kg/m<sup>2</sup> as compared to female respondents with  $22.50 \pm 5.05$  kg/m<sup>2</sup>. The total BMI for the whole respondents was  $22.71 \pm 5.03$  kg/m<sup>2</sup>. Weight, height and BMI of the respondents were as shown in Table 4.9.

**Table 4.9: Weight, height and BMI of university students (n = 235)**

| Item                          | n (%)             |                   |                   |
|-------------------------------|-------------------|-------------------|-------------------|
|                               | Male (n=21)       | Female (n=214)    | Total (n=235)     |
| <b>Weight (kg)</b>            |                   |                   |                   |
| Mean $\pm$ SD                 | $68.45 \pm 21.85$ | $55.13 \pm 12.13$ | $56.76 \pm 15.55$ |
| <b>Height (cm)</b>            |                   |                   |                   |
| Mean $\pm$ SD                 | $168.11 \pm 6.40$ | $156.25 \pm 5.08$ | $156.88 \pm 8.56$ |
| <b>BMI (kg/m<sup>2</sup>)</b> |                   |                   |                   |
| Mean $\pm$ SD                 | $24.09 \pm 6.53$  | $22.50 \pm 5.05$  | $22.71 \pm 5.03$  |

The BMI was used to determine the body weight status of the respondents. The distribution of the respondents according to Asian classification for BMI was as shown in Figure 4.11. In total, most of the respondents were categorized as having normal body weight (46.0 %), followed by overweight (25.5 %), underweight (15.3 %) and

obese (13.2 %). The percentages of underweight and normal weight were higher among the female respondents as compared to male respondents with 15.9 % and 46.3 % respectively. Meanwhile, male respondents had higher percentage of overweight and obese as compared to female respondents with normal body weight status compared to female respondents 28.6 % and 19.0 % respectively.



**Figure 4.11: Proportions of respondents based on body weight status**

In this study, among the total 235 respondents, about 60 (25.5 %) were overweight and 31 (13.2 %) were categorized in the obesity category. In total, the overall prevalence of overweight and obese problem was 38.7 %. Based on the findings of NHMS 2015, overweight and obesity among the young adulthood population was about 43.1 % (Institute for Public Health, 2015). Therefore, when comparing this finding with the national prevalence, it shows that this finding was slightly lower by 4.4 %.



However, the result of this study was found higher if compared to the prevalence of overweight and obesity problems among the medical students in International Medical University, Malaysia. The study found that about 30.1 % of the respondents in their research were overweight and obesity (Boo et al., 2010). Besides, another study that was conducted among university students in Universiti Sains Malaysia, the prevalence of overweight and obesity that was reported was 31.9 %, which means that it is slightly lower than the finding of this study (Low et al., 2015). Other than that, in line with the result of this study, another study among university students in AIMST University found that about 35.9 % of their respondents were overweight and obese, which is almost similar to the findings of this study (Gopalakrishnan et al., 2012).

#### **4.8 Hypothesis testing**

##### **4.8.1 Association between sociodemographic factors with body weight status**

Chi-square test was performed to determine the association between sociodemographic backgrounds with body weight status among the respondents. As shown in Table 4.10, there was no significant association between sex ( $X = 0.132$ ,  $p = 0.43$ ), ethnicity, accommodation and monthly stipend with body weight status.



**Table 4.10: Association (Chi-square) between sociodemographic backgrounds with body weight status among undergraduate university students (n=235)**

| Item                   | n (%)       |           |                      | $X^2$ | $p$   |
|------------------------|-------------|-----------|----------------------|-------|-------|
|                        | Underweight | Normal    | Overweight and obese |       |       |
| <b>Sex</b>             |             |           |                      |       |       |
| Male (n=21)            | 2 (5.4)     | 9 (8.4)   | 10 (11.0)            | 1.074 | 0.584 |
| Female (n=214)         | 35 (94.6)   | 98 (91.6) | 81 (89.0)            |       |       |
| <b>Ethnicity</b>       |             |           |                      |       |       |
| Malay                  | 29 (78.4)   | 85 (79.4) | 75 (82.4)            | 0.394 | 0.821 |
| Non-Malay              | 8 (21.6)    | 22 (20.6) | 16 (17.6)            |       |       |
| <b>Accommodation</b>   |             |           |                      |       |       |
| College                | 30 (81.1)   | 96 (89.7) | 77 (84.6)            | 2.139 | 0.343 |
| Outside college        | 7 (18.9)    | 11 (10.3) | 14 (15.4)            |       |       |
| <b>Monthly stipend</b> |             |           |                      |       |       |
| ≤ RM 500.00            | 29 (78.4)   | 92 (86.0) | 78 (85.7)            | 1.347 | 0.510 |
| >RM 500.01             | 8 (21.6)    | 15 (14.0) | 13 (14.3)            |       |       |

In contrast with this finding, some previous studies that was conducted among university students in Universiti Sains Malaysia and AIMST university shown a significant relationship between gender and body weight status especially among the male students (Gopalakrishnan et al., 2012; Low et al., 2015). However, the contradiction of the finding might be due to the imbalance of male and female respondents that were involved in this study.

Next, for ethnicity, this study found that there is no significant relationship between these two variables. However, it is contradict to a study that was conducted among medical students in Malaysia. They found that there is association in body weight status between races (Gopalakrishnan et al., 2012). They also reported that the prevalence of obesity were higher among the Indian university students. However, they also stated that the results obtained maybe due to majority of the respondents were Indian (Gopalakrishnan et al., 2012).

As for accommodation, this study also discovered that there is no significant association between students' accommodation and body weight status. This finding was supported by a study that was conducted among Iranian postgraduate university students in UPM. The researchers reported that there is no association between BMI and accommodation (Maryam et al., 2013). Generally, university students were easily influenced by their peers while living independently outside from home. However, parents still might also be a more important social support, aside from their peers only. Despite living independently from home, the parents may influence the dietary intake of the students throughout the upbringing of their children (Deliens, Clarys, De Bourdeaudhuij, & Deforche, 2014).

#### **4.8.2 Association between academic background and performance with body weight status**

Chi-square ( $X^2$ ) test was performed to determine the association between academic background and performance with body weight status. Based on Table 4.11, there was no significant association between recent CGPA results with body weight status.

**Table 4.11: Associations (Chi-square) between academic background and performance with body weight status among undergraduate university students (n=235)**

| Item                      | n (%)       |           |                      | $X^2$ | $p$   |
|---------------------------|-------------|-----------|----------------------|-------|-------|
|                           | Underweight | Normal    | Overweight and obese |       |       |
| <b>Recent CGPA result</b> |             |           |                      |       |       |
| $\geq 3.750$              | 6 (16.2)    | 21 (19.6) | 16 (17.6)            | 0.265 | 0.876 |
| $\leq 3.749$              | 31 (83.8)   | 86 (80.4) | 75 (82.4)            |       |       |

In lined with this finding, it was found that academic performances do not have association with body weight status from a previous study, yet in different age group. There is a study among school students which reported no significant association between academic achievement and being overweight, obese, normal weight, or underweight (Abdelalim et al., 2012).

**4.8.3 Association between nutritional statuses with body weight status**

Chi-square ( $\chi^2$ ) and Pearson’s correlation coefficient (r) test were performed to determine the association between nutritional statuses with body weight status. Based on Table 4.12 and Table 4.13, it was found that there is a significant association between waist circumference (r = 0.885, p <0.001), systolic (r = 0.341, p <0.001) and diastolic blood pressure (r = 0.391, p <0.001). However, there was no significant association between dietary intake and fast food consumption with body weight status among the respondents.



**Table 4.12: Associations (Pearson *r*) between nutritional status with body weight status among undergraduate university students (n=235)**

| Item                        | Body weight status |         |
|-----------------------------|--------------------|---------|
|                             | R                  | p-value |
| Waist circumference         | 0.885**            | <0.001  |
| Systolic blood pressure     | 0.341**            | <0.001  |
| Diastolic blood pressure    | 0.390**            | <0.001  |
| Energy intake (n=107)       | -0.053             | 0.587   |
| Carbohydrate intake (n=107) | 0.016              | 0.873   |
| Protein intake (n=107)      | 0.048              | 0.621   |
| Fat intake (n=107)          | -0.046             | 0.641   |

\*\* Association is significant at the 0.01 level

**Table 4.13: Associations (Chi-square) between nutritional status with body weight status among undergraduate university students (n=235)**

| Item                                      | n (%)       |           |                      | <i>X</i> <sup>2</sup> | <i>p</i> |
|-------------------------------------------|-------------|-----------|----------------------|-----------------------|----------|
|                                           | Underweight | Normal    | Overweight and obese |                       |          |
| <b>Frequency of fast food consumption</b> |             |           |                      |                       |          |
| Occasionally                              | 21 (60.0)   | 64 (64.6) | 65 (75.6)            | 3.821                 | 0.148    |
| At least once                             | 14 (40.0)   | 35 (35.4) | 21 (24.4)            |                       |          |
| per week                                  |             |           |                      |                       |          |

Similar with the result of this study, a previous study did agreed that waist circumference is can be an index of general and central obesity, other than BMI. They also stated that waist circumference may be an important first step in determining the level and distribution of obesity (Hingorjo, Qureshi, & Mehdi, 2012).

For blood pressure, there was previous study which support that blood pressure does have significant association with body weight status. Based on a previous study among Tangkhul Naga Tribal males of North East India aged 20 to 70 years, the association analyses between BMI and both SBP and DBP found a significant positive association between them. From the result, it was found that both systolic and diastolic

BP increased with increase in BMI level. They also stated that their result is similar to a study conducted among Punjabi girls of Delhi, which a significant association of BMI with blood pressure was also found (Mungreiphy, Kapoor, & Sinha, 2011).

As for dietary intake, the result of this study was similar with a previous study that was conducted among metropolitan transit workers in Minnesota. They found that the total energy intake did not significantly associate with body weight category among the respondents (French, Harnack, Toomey, & Hannan, 2007).

**4.8.4 Association between physical activity level with body weight status**

There was a positive significant association between physical activity level with body weight status ( $r = 0.391, p < 0.001$ ) (Table 4.14). However, it was found that there is no significant association between duration of sedentary activity with body weight status ( $r = 0.039, p = 0.549$ ). From the finding, it shows that higher physical activity level is associated with higher body weight status.

**Table 4.14: Associations (Pearson  $r$ ) between total physical activity and sedentary activity duration per week with body weight status among undergraduate university students (n=235)**

| Variable                            | Body weight status |         |
|-------------------------------------|--------------------|---------|
|                                     | r                  | p-value |
| Total physical activity MET-minutes | 0.132*             | 0.043   |
| Sedentary activity duration         | 0.039              | 0.549   |

\*Association is significant at the 0.05 level



However, the finding of this research is in contrast to a previous study that was conducted among university students from 22 countries. This cross-sectional study found that physical inactivity was significantly associated with overweight and obesity among their respondents (Peltzer et al., 2014). Other than that, another study that was conducted among Iranian postgraduate university students in UPM also supported that there was a significant association between physical activity level and BMI (Maryam et al., 2013). They also reported that physically inactive respondents were vulnerable to have higher BMI than the physically active students.

**4.8.5 Association between psychological distresses with body weight status**

Chi-square ( $X^2$ ) test was performed to determine the association between psychological distresses with body weight status. Based on Table 4.15, it was found that there is a significant negative association between depressions with body weight status ( $r = -0.130, p = 0.046$ ). This study found that increase depression was associated with decrease in BMI. However, there was no significant association were found between both anxiety and stress with body weight status.

**Table 4.15: Associations (Pearson  $r$ ) between depression, anxiety and stress score with body weight status among undergraduate university students (n=235)**

| Variable   | Body weight status |         |
|------------|--------------------|---------|
|            | r                  | p-value |
| Depression | -0.130*            | 0.046   |
| Anxiety    | -0.052             | 0.427   |
| Stress     | -0.084             | 0.198   |

\*Association is significant at the 0.05 level



This result was in lined with a cross-sectional study among 43534 respondents aged 18 to 90 years old in Netherlands. They reported a U-shaped association between depression and body weight status among their respondents. This means that both overweight and underweight were found to be associated with the increase level of depression (De Wit, Van Straten, van Herten, Penninx, & Cuijpers, 2009). They stated that food intake may both increased and decreased due to depression. Therefore, it is relevant to say that both underweight and obesity problem may be associated with the increased level of depression (De Wit et al., 2009).

Other than that, based on a population-based study that was conducted among 11274 Australian adult aged 25 years and above, they also supported that there is no significant association between stress and BMI baselines among their respondents (Oei et al., 2013). Besides, another systematic review study also found no significant association between stress and body mass index or even weight change (Haidar, de Vries, Karavetian, & El-Rassi, 2018). Apart from that, this study also support that there is no significant association between anxiety and body mass index (Haidar et al., 2018).

## **CHAPTER 5**

### **Conclusion and Recommendations**

#### **5.1 Conclusion**

This study has been conducted among the students of Bachelor Engineering (Process and Food) from Faculty of Engineering, Bachelor of Science (Hons) Cell and Molecular Biology from Faculty of Biotechnology and Biomolecular Sciences and Bachelor of Science (Mathematics) from Faculty of Science in UPM. A majority of the respondents were female (91.1 %), Malay (80.4 %), Muslim (82.6 %), lived in college residents (86.4 %) with the mean age of 21 years old. Most of them had monthly stipend ranged from RM100.01 to RM300.00 (43.0 %) and having loan as their source of funding in university (59.1 %). The parents of the respondents were mostly having secondary education as their highest education level.

About 46.0 % of the respondents were categorized as having normal body weight, followed by overweight (25.5 %), underweight (15.3 %) and obese (13.2 %). These findings showed that there are double burden of malnutrition issues exists among this population. The issues are characterized by the coexistence of undernutrition along with overweight and obesity among the same population. Based

on this study, the total proportion of respondents who are underweight, overweight and obesity are higher as compared to the normal body weight respondents.

In nutritional status, it is found that about 17.9 % of the respondents were in the at high risk category for waist circumference. Half of the respondents (51.1 %) were having family medical history of diseases with almost three quarter of them was high blood pressure (73.3 %). For blood pressure reading, almost half of the respondents were in the high risk categories for high blood pressure (45.6 %). Besides, for dietary intake, it was found that 34.6 % of the respondents was having insufficient energy intake per day. For macronutrient intake, more than half of the respondents were having over intake of carbohydrate (55.1 %), while about 50.5 % and 52.3 % of the respondents had insufficient intake of protein and fat respectively. As for fast food consumption, about 29.8 % of the respondents frequently consumed fast food in the past one month.

In this study, it was also found that about 23.0 % of the respondents were categorized as physically inactive. For psychological distresses, most of the respondents were in the normal category for both depression and stress with 55.3 % and 59.1 % respectively. However, for anxiety, majority of the respondents were in the category of moderate with 26.4 %.

Factors that associated with body weight status include waist circumference ( $r = 0.885$ ,  $p < 0.001$ ), systolic blood pressure ( $r = 0.341$ ,  $p < 0.001$ ), diastolic blood pressure, total physical activity ( $r = 0.391$ ,  $p < 0.001$ ) and depression ( $r = -0.130$ ,  $p = 0.046$ ). The higher the BMI, the higher the waist circumference, blood pressure and



physical activity level among the respondents. Meanwhile, the lower the BMI correlates with the high score to depression.

In conclusion, this study showed that the prevalence of overweight and obesity among undergraduate university students in UPM was slightly similar to the national prevalence for young adult and also some previous local studies. Other than that, this study found that waist circumference, systolic and diastolic blood pressure, total physical activity and depression were associated with body weight status. Therefore, future intervention programs need to be taken into consideration to promote healthy lifestyle among university students to combat with these health problems like overweight and obesity.

## **5.2 Limitations**

There were some limitations from this study that need to be taken into consideration to ensure obtaining a more accurate and precise result. First, the design of this study was a cross-sectional design, due to that the results are limited in predicting a causal relationship as it involves a one-time point of data collection only. Next, some of the variables in this study used self-reported questionnaire like dietary intake and physical activity level which mostly relied on the respondents' honesty and the risk of misinterpretation might also occur. Other than that, dietary intake of the respondents was reported based on the food intake for the past one month. This method mostly relied on the respondents' memory; therefore the risk of being over and under reporting might increase.

In addition, this study had small number of sample size, which means the results of this study cannot be used to generalize the whole population of university students in Malaysia. Furthermore, majority of the respondents in this study were female. Therefore, the result somehow became unbalanced. Besides, Body Mass Index (BMI) was the only method that was used to determine the body weight status of the respondents in this study. Total body fat, muscle mass and bone mass of an individual were not distinguished which may results in less precise result to determine body weight status.

### **5.3 Recommendations**

For future researches implementation, there are some recommendations that could be proposed in order to obtain better and precise results. Firstly, longitudinal or case control study design should be conducted for future research on body weight status and its possible associated factors. A detailed result on the causal and effect relationship between variables can be acquired through all the follow up process within a period of time.

In addition, for self-reported questionnaire, a more suitable method of obtaining information from the respondents is through a face-to-face interview. This method will help the respondents to have a better understanding regarding the questions which required to be answered while minimizing the possibility of over and under reporting.

Next, larger number of sample size should be considered in future study to ensure a more representable data. Furthermore, the sample population in future studies need to be more balanced which represent both male and female respondents. Other than that, aside from using BMI only, other additional method in determining body weight status like total body fat and muscle mass can be used in the future. Lastly, the university policy makers and academicians should consider implementing health intervention program that are beneficial for the university students which can help in improving the students health status and well-being in the future.





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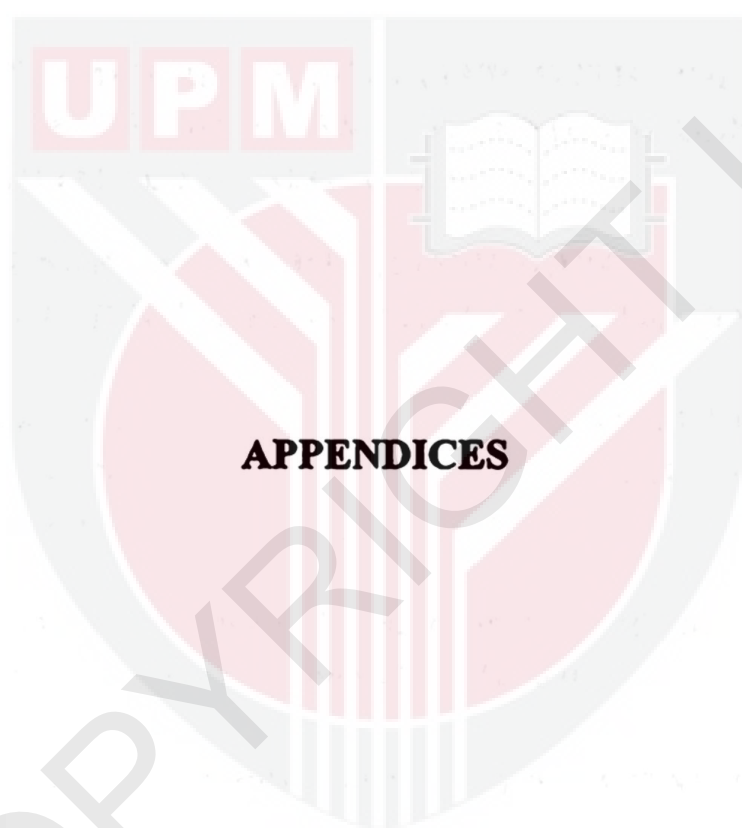
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UPM

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

|                       |                                                                                                                                                     |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Research title</b> | <b>: Factors Associated with Body Weight Status Using Asian Cut-off Points Among Undergraduate University Students in Universiti Putra Malaysia</b> |
| <b>Study Site</b>     | <b>: UPM</b>                                                                                                                                        |
| <b>JKEUPM Ref No.</b> | <b>: JKEUPM-2017-256</b>                                                                                                                            |
| <b>Researcher</b>     | <b>: Nurfarah Aida bt Shaharuddin</b>                                                                                                               |
| <b>Supervisor</b>     | <b>: Assoc Prof. Dr. Barakatun Nisak Mohd Yusof</b>                                                                                                 |

Documents received and reviewed with reference to the above study:

1. Ethics Application Form, Version 1 dated 28/11/2017
2. Respondent Information Sheet & Consent (English ), Version 1 dated 28/11/2017
3. Respondent Information Sheet & Consent (Malay ), Version 1 dated 28/11/2017
4. Proposal (English), Version 2 dated 12/1/2018
5. Questionnaire (English), Version 1 dated 28/11/2017
6. Questionnaire (Malay), Version 1 dated 28/11/2017
7. Curriculum Vitae of:
  - a. Assoc Prof. Dr. Barakatun Nisak Mohd Yusof

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

Decision by JKEUPM:

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

Please note that the approval is **VALID UNTIL 12 JANUARY 2019**

Researchers should comply with the following:

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



Reference No. :

Date of data collection :



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

**QUESTIONNAIRE  
SOAL SELIDIK**

**TITLE:  
TAJUK:**

**FACTORS ASSOCIATED WITH BODY WEIGHT STATUS USING  
ASIAN CUT-OFF POINTS AMONG UNDERGRADUATE UNIVERSITY  
STUDENTS IN UNIVERSITI PUTRA MALAYSIA  
FAKTOR-FAKTOR YANG BERKAITAN DENGAN STATUS BERAT BADAN  
MENGUNAKAN KATEGORI ASIA DALAM KALANGAN PELAJAR IJAZAH  
SARJANA MUDA DI UNIVERSITI PUTRA MALAYSIA**

**RESEARCHER:  
PENYELIDIK:**

**NURFARAH AIDA BINTI SHAHARUDDIN (180808)**

**SUPERVISOR:  
PENYELIA:**

**ASSOC. PROF. DR. BARAKATUN NISAK BINTI MOHD YUSOF**

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**The information given is for the study purpose only and will be kept confidentially  
and will not be revealed to other parties. Your cooperation in answering this  
questionnaire is fully appreciated.**

*Maklumat peribadi yang diberikan di dalam soal selidik ini adalah bertujuan untuk  
kajian sahaja dan akan disimpan secara sulit serta tidak akan didedahkan kepada mana-  
mana pihak. Oleh itu, kerjasama anda amat diperlukan bagi menyiapkan soal selidik ini.  
Penghargaan daripada pihak saya di atas kesudian anda dalam menjawab soal selidik  
ini.*

**GENERAL INSTRUCTION:**  
**ARAHAN AM:**

**This questionnaire consists of six (6) sections.**  
*Soal selidik ini mengandungi enam (6) bahagian.*

**Please fill in Section A, B, C, D and E according to the instructions.**  
*Sila isikan Bahagian A, B, C, D dan E berpandukan arahan yang diberikan.*

**Section F will be filled out by the researcher.**  
*Bahagian F akan diisi oleh penyelidik.*

**SECTION A: Sosio-demographic background**  
**BAHAGIAN A: Latar belakang sosio-demografi**

**INSTRUCTION: The following questions on your personal information. Please answer all the questions by writing in the space provided and tick (/) in the box for each statement.**  
*ARAHAN: Soalan-soalan berikut mengenai maklumat peribadi anda. Sila jawab semua soalan dengan menulis di ruangan yang disediakan dan tandakan (/) dalam petak untuk setiap kenyataan.*

| Information<br>Maklumat              | Options<br>Pilihan                                                                                                                                                                                                                                                                                               |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Date of birth<br>Tarikh Lahir        | ____/____/____ (dd/mm/yy)<br>____/____/____ (hr/bl/thn)                                                                                                                                                                                                                                                          |
| Age<br>Umur                          | ____ years old<br>____ tahun                                                                                                                                                                                                                                                                                     |
| Sex<br>Jantina                       | <input type="checkbox"/> Male / Lelaki <input type="checkbox"/> Female / Wanita                                                                                                                                                                                                                                  |
| Ethnicity<br>Etnik                   | <input type="checkbox"/> Malay / Melayu <input type="checkbox"/> Others, please specify /<br><input type="checkbox"/> Chinese / Cina                      Lain-lain, sila<br><input type="checkbox"/> Indian / India                      nyatakan: _____                                                        |
| Religion<br>Agama                    | <input type="checkbox"/> Islam <input type="checkbox"/> Others, please specify /<br><input type="checkbox"/> Buddha                                      Lain-lain, sila<br><input type="checkbox"/> Hindu                                      nyatakan: _____<br><input type="checkbox"/> Christian / Kristian |
| Accomodation<br>Tempat tinggal       | <input type="checkbox"/> College / Kolej<br><input type="checkbox"/> Home (with family) / Rumah (bersama keluarga)<br><input type="checkbox"/> Outside campus / Luar kampus<br><input type="checkbox"/> Others, please specify / Lain-lain, sila nyatakan: _____                                                 |
| Monthly stipend<br>Wang saku bulanan | <input type="checkbox"/> ≤ RM 100.00 <input type="checkbox"/> RM 500.01 – RM 700.00<br><input type="checkbox"/> RM 100.01 – RM 300.00 <input type="checkbox"/> RM 700.01 – RM 900.00<br><input type="checkbox"/> RM 300.01 – RM 500.00 <input type="checkbox"/> > RM 900.00                                      |



|   |                                                     |                                                                                                                                                                                                                      |                                                                                                                                                                                                       |
|---|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8 | Source of funding<br>Sumber kewangan                | <input type="checkbox"/> Scholarship / <i>Biasiswa</i><br><input type="checkbox"/> Loan / <i>Pinjaman</i><br><input type="checkbox"/> Self-funded / <i>Pembiayaan sendiri</i>                                        | <input type="checkbox"/> Others, please specify / <i>Lain-lain, sila nyatakan:</i> _____                                                                                                              |
|   | Father's highest education<br>Tahap pendidikan bapa | <input type="checkbox"/> Primary school / <i>Sekolah rendah</i><br><input type="checkbox"/> Secondary school / <i>Sekolah menengah</i><br><input type="checkbox"/> Vocational Institute / <i>Institut Vokasional</i> | <input type="checkbox"/> College / <i>Kolej</i><br><input type="checkbox"/> University/ <i>Universiti</i><br><input type="checkbox"/> Others, please specify / <i>Lain-lain, sila nyatakan:</i> _____ |
|   | Mother's highest education<br>Tahap pendidikan ibu  | <input type="checkbox"/> Primary school / <i>Sekolah rendah</i><br><input type="checkbox"/> Secondary school / <i>Sekolah menengah</i><br><input type="checkbox"/> Vocational Institute / <i>Institut Vokasional</i> | <input type="checkbox"/> College / <i>Kolej</i><br><input type="checkbox"/> University/ <i>Universiti</i><br><input type="checkbox"/> Others, please specify / <i>Lain-lain, sila nyatakan:</i> _____ |

**SECTION B: Academic background and performance**  
**BAHAGIAN B: Latar belakang dan pencapaian akademik**

**INSTRUCTION: Please answer all the questions by writing in the space provided and tick (/) the box for each statement.**  
**ARAHAN: Sila jawab semua soalan dengan menulis di ruangan yang disediakan dan tandakan (/) dalam petak untuk setiap kenyataan.**

| Information<br><i>Maklumat</i>                                              | Options<br><i>Pilihan</i>                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Course of study<br><i>Program pengajian</i>                                 | UPM                                                                                                                                                                                                                                                         |
| Current year of study<br><i>Tahun pengajian (semasa)</i>                    | <input type="checkbox"/> First Year / <i>Tahun Satu</i><br><input type="checkbox"/> Second Year / <i>Tahun Dua</i><br><input type="checkbox"/> Third Year / <i>Tahun Tiga</i><br><input type="checkbox"/> Fourth Year / <i>Tahun Empat</i>                  |
| Recent CGPA result<br><i>Keputusan PNGK (semasa)</i>                        | <input type="checkbox"/> 3.750-4.000<br><input type="checkbox"/> 3.000-3.749<br><input type="checkbox"/> 2.250-2.999<br><input type="checkbox"/> 2.000-2.249<br><input type="checkbox"/> <2.000                                                             |
| Co-curricular involvement<br><i>Penglibatan dalam aktiviti ko-kurikulum</i> | <input type="checkbox"/> Yes / <i>Ya</i><br><p><b>If yes, how long is the time allocated?</b><br/> <i>Jika ya, berapa lamakah masa yang diperuntukkan?</i></p> <p>_____ hours per week / <i>jam seminggu</i></p> <input type="checkbox"/> No / <i>Tidak</i> |



SECTION C: Nutritional status  
BAHAGIAN C: Status pemakanan

**INSTRUCTION:** The following questions on your nutritional status information. This section consists three (3) sub-sections. Please answer all the questions by writing in the space provided and tick (/) in the box for each statement.

*ARAHAN:* Soalan-soalan berikut mengenai maklumat latar status pemakanan anda. Bahagian ini mengandungi tiga (3) sub-seksyen. Sila jawab semua soalan dengan menulis di ruangan yang disediakan dan tandakan (/) dalam petak untuk setiap kenyataan.

a) Clinical data / Data klinikal

| No | Information<br>Maklumat                                                                                                                  | Options<br>Pilihan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----|------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <p><b>Do you have any family medical history of diseases?</b><br/><i>Adakah anda mempunyai sejarah penyakit dalam keluarga anda?</i></p> | <div><input type="checkbox"/> <b>Yes / Ya</b></div> <div><p><b>If yes, please state the diseases (select one or more).</b><br/><i>Jika ya, sila nyatakan penyakit tersebut (pilih satu atau lebih).</i></p><div><input type="checkbox"/> <b>Diabetes type 2 / Kencing manis tahap 2</b></div><div><input type="checkbox"/> <b>Heart disease / Penyakit jantung</b></div><div><input type="checkbox"/> <b>High blood pressure / Tekanan darah tinggi</b></div><div><input type="checkbox"/> <b>Stroke / Strok</b></div><div><input type="checkbox"/> <b>Kidney disease / Penyakit buah pinggang</b></div><div><input type="checkbox"/> <b>Cancer / Kanser</b></div><div><input type="checkbox"/> <b>Others, please specify /</b><br/><i>Lain-lain, sila nyatakan:</i> _____</div></div> <div><input type="checkbox"/> <b>No / Tidak</b></div> |

b) Dietary intake / *Kekerapan pengambilan makanan*

Please answer the following questions by fill in the frequency of consumption of each type of foods and the number of servings per meal according to meal size. Please fill in only one of the four boxes provided under the “Frequency of consumption” column and choose either one type of meal size measurement to indicate the number of servings per meal.

*Sila jawab soalan-soalan berikut dengan menulis kekerapan pengambilan setiap jenis makanan bilangan sajian setiap kali makan berdasarkan saiz hidangan. Sila isikan maklumat dalam salah satu kotak sahaja dalam bahagian "Kekerapan pengambilan" dan pilih salah satu ukuran saiz sajian untuk menyatakan bilangan sajian setiap kali makan.*

| Code<br>Kod                                                   | Type of food<br>Jenis makanan                                          | Frequency of consumption<br>(how many times per-)<br><i>Kekerapan pengambilan<br/>(berapa kali se-)</i> |                |                |                                   | Meal size<br>(Choose one<br>type of<br>measurement<br>only)<br><i>Ukuran sajian<br/>(Pilih satu<br/>jenis ukuran<br/>sahaja)</i> | Number<br>of<br>servings<br>per meal<br><i>Berapa<br/>banyak<br/>sajian<br/>setiap kali<br/>makan</i> |
|---------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|----------------|----------------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
|                                                               |                                                                        | Day<br>Hari                                                                                             | Week<br>Minggu | Month<br>Bulan | Does<br>not eat<br>Tidak<br>makan |                                                                                                                                  |                                                                                                       |
| Cereals and cereal products/ <i>Bijirin dan hasil bijirin</i> |                                                                        |                                                                                                         |                |                |                                   |                                                                                                                                  |                                                                                                       |
| A1                                                            | White rice/<br><i>Nasi putih</i>                                       |                                                                                                         |                |                |                                   | Plate/ <i>Pinggan</i>                                                                                                            |                                                                                                       |
|                                                               |                                                                        |                                                                                                         |                |                |                                   | Chinese bowl/<br><i>Mangkuk cina</i>                                                                                             |                                                                                                       |
|                                                               |                                                                        |                                                                                                         |                |                |                                   | Cup/ <i>Cawan</i>                                                                                                                |                                                                                                       |
|                                                               |                                                                        |                                                                                                         |                |                |                                   | Scoop/ <i>Senduk</i>                                                                                                             |                                                                                                       |
| A2                                                            | Rice porridge/<br><i>Bubur nasi</i>                                    |                                                                                                         |                |                |                                   | Chinese bowl/<br><i>Mangkuk cina</i>                                                                                             |                                                                                                       |
|                                                               |                                                                        |                                                                                                         |                |                |                                   | Cup/ <i>Cawan</i>                                                                                                                |                                                                                                       |
|                                                               |                                                                        |                                                                                                         |                |                |                                   | Scoop/ <i>Senduk</i>                                                                                                             |                                                                                                       |
| A3                                                            | Glutinous rice/<br><i>Pulut</i>                                        |                                                                                                         |                |                |                                   | Chinese bowl/<br><i>Mangkuk cina</i>                                                                                             |                                                                                                       |
|                                                               |                                                                        |                                                                                                         |                |                |                                   | Cup/ <i>Cawan</i>                                                                                                                |                                                                                                       |
|                                                               |                                                                        |                                                                                                         |                |                |                                   | Scoop/ <i>Senduk</i>                                                                                                             |                                                                                                       |
| A4                                                            | Brown rice/<br><i>Nasi beras<br/>perang</i>                            |                                                                                                         |                |                |                                   | Plate/ <i>Pinggan</i>                                                                                                            |                                                                                                       |
|                                                               |                                                                        |                                                                                                         |                |                |                                   | Chinese bowl/<br><i>Mangkuk cina</i>                                                                                             |                                                                                                       |
|                                                               |                                                                        |                                                                                                         |                |                |                                   | Cup/ <i>Cawan</i>                                                                                                                |                                                                                                       |
|                                                               |                                                                        |                                                                                                         |                |                |                                   | Scoop/ <i>Senduk</i>                                                                                                             |                                                                                                       |
| A5                                                            | Flavoured rice/<br><i>Nasi berperisa<br/>seperti nasi<br/>beriyani</i> |                                                                                                         |                |                |                                   | Plate/ <i>Pinggan</i>                                                                                                            |                                                                                                       |
|                                                               |                                                                        |                                                                                                         |                |                |                                   | Chinese bowl/<br><i>Mangkuk cina</i>                                                                                             |                                                                                                       |
|                                                               |                                                                        |                                                                                                         |                |                |                                   | Cup/ <i>Cawan</i>                                                                                                                |                                                                                                       |
|                                                               |                                                                        |                                                                                                         |                |                |                                   | Scoop/ <i>Senduk</i>                                                                                                             |                                                                                                       |
| A6                                                            | Mihun/ kueh<br>teow/ laksa/<br>laksam                                  |                                                                                                         |                |                |                                   | Plate/ <i>Pinggan</i>                                                                                                            |                                                                                                       |
|                                                               |                                                                        |                                                                                                         |                |                |                                   | Chinese bowl/<br><i>Mangkuk cina</i>                                                                                             |                                                                                                       |
|                                                               |                                                                        |                                                                                                         |                |                |                                   | Scoop/ <i>Senduk</i>                                                                                                             |                                                                                                       |



| Code<br>Kod                 | Type of food<br>Jenis makanan                                                             | Frequency of consumption<br>(how many times per-)<br>Kekerapan pengambilan<br>(berapa kali se-) |                |                |                                   | Meal size<br>(Choose one<br>type of<br>measurement<br>only)<br>Ukuran sajian<br>(Pilih satu<br>jenis ukuran<br>sahaja) | Number<br>of<br>servings<br>per meal<br>Berapa<br>banyak<br>sajian<br>setiap kali<br>makan |
|-----------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|----------------|----------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
|                             |                                                                                           | Day<br>Hari                                                                                     | Week<br>Minggu | Month<br>Bulan | Does<br>not eat<br>Tidak<br>makan |                                                                                                                        |                                                                                            |
| A7                          | Yellow noodles/<br>mee siput/<br>instant noodles/<br>Mee kuning/ mee<br>siput/ mee segera |                                                                                                 |                |                |                                   | Plate/Pinggan                                                                                                          |                                                                                            |
|                             |                                                                                           |                                                                                                 |                |                |                                   | Chinese bowl/<br>Mangkuk cina                                                                                          |                                                                                            |
|                             |                                                                                           |                                                                                                 |                |                |                                   | Scoop/Senduk                                                                                                           |                                                                                            |
| A8                          | Loh shi fun                                                                               |                                                                                                 |                |                |                                   | Chinese bowl/<br>Mangkuk cina                                                                                          |                                                                                            |
|                             |                                                                                           |                                                                                                 |                |                |                                   | Scoop/Senduk                                                                                                           |                                                                                            |
| A9                          | Pasta                                                                                     |                                                                                                 |                |                |                                   | Plate/Pinggan                                                                                                          |                                                                                            |
|                             |                                                                                           |                                                                                                 |                |                |                                   | Scoop/Senduk                                                                                                           |                                                                                            |
| A10                         | Sago/<br>Sagu/ambuyat/<br>linut                                                           |                                                                                                 |                |                |                                   | Slice / Potong                                                                                                         |                                                                                            |
|                             |                                                                                           |                                                                                                 |                |                |                                   | Cup/Cawan                                                                                                              |                                                                                            |
|                             |                                                                                           |                                                                                                 |                |                |                                   | Spoon/Sudu                                                                                                             |                                                                                            |
| A11                         | Bread/Roti                                                                                |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
| A12                         | Wholemeal<br>bread/Roti<br>bijiran mil penuh                                              |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
| A13                         | Bun bread/<br>Roti bun                                                                    |                                                                                                 |                |                |                                   | Whole/Biji                                                                                                             |                                                                                            |
| A14                         | Roti canai                                                                                |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
| A15                         | Capati                                                                                    |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
| A16                         | Tosai                                                                                     |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
| A17                         | Breakfast<br>cereals/ Bijirin<br>sarapan pagi                                             |                                                                                                 |                |                |                                   | Chinese bowl/<br>Mangkuk cina                                                                                          |                                                                                            |
|                             |                                                                                           |                                                                                                 |                |                |                                   | Cup/Cawan                                                                                                              |                                                                                            |
| A18                         | Instant cereals/<br>Bijirin tersedia<br>perlu dibancuh                                    |                                                                                                 |                |                |                                   | Chinese bowl/<br>Mangkuk cina                                                                                          |                                                                                            |
|                             |                                                                                           |                                                                                                 |                |                |                                   | Cup/Cawan                                                                                                              |                                                                                            |
| A19                         | Corn/Jagung                                                                               |                                                                                                 |                |                |                                   | Whole/Biji                                                                                                             |                                                                                            |
|                             |                                                                                           |                                                                                                 |                |                |                                   | Cup/Cawan                                                                                                              |                                                                                            |
| B. Fast food/Makanan segera |                                                                                           |                                                                                                 |                |                |                                   |                                                                                                                        |                                                                                            |
| B1                          | Burger/Burger                                                                             |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
| B2                          | Fried chicken/<br>Ayam goreng                                                             |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
| B3                          | Pizza/Pizza                                                                               |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
| B4                          | French fries/<br>Kentang goreng                                                           |                                                                                                 |                |                |                                   | Packet/ paket                                                                                                          |                                                                                            |
| B5                          | Coleslaw/<br>Coleslow                                                                     |                                                                                                 |                |                |                                   | Cup/cawan                                                                                                              |                                                                                            |
| B6                          | Nugget/Nugget                                                                             |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |



| Code<br>Kod                                                | Type of food<br>Jenis makanan                                                         | Frequency of consumption<br>(how many times per-)<br>Kekerapan pengambilan<br>(berapa kali se-) |                |                |                                   | Meal size<br>(Choose one<br>type of<br>measurement<br>only)<br>Ukuran sajian<br>(Pilih satu<br>jenis ukuran<br>sahaja) | Number<br>of<br>servings<br>per meal<br>Berapa<br>banyak<br>sajian<br>setiap kali<br>makan |
|------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|----------------|----------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
|                                                            |                                                                                       | Day<br>Hari                                                                                     | Week<br>Minggu | Month<br>Bulan | Does<br>not eat<br>Tidak<br>makan |                                                                                                                        |                                                                                            |
| B7                                                         | Mashed potatoes<br>/Kentang lenyek                                                    |                                                                                                 |                |                |                                   | Small<br>container/<br>Bekas kecil                                                                                     |                                                                                            |
| B8                                                         | Sosej/hotdog/<br>frankfurter                                                          |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
| <b>C. Meat and meat products/Daging dan hasil daging</b>   |                                                                                       |                                                                                                 |                |                |                                   |                                                                                                                        |                                                                                            |
| C1                                                         | Chicken/Ayam                                                                          |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
| C2                                                         | Beef/<br>Lembu/Kerbau                                                                 |                                                                                                 |                |                |                                   | Matchbox/<br>Kotak mancis                                                                                              |                                                                                            |
| C3                                                         | Mutton/Kambing                                                                        |                                                                                                 |                |                |                                   | Matchbox/<br>Kotak mancis                                                                                              |                                                                                            |
| C4                                                         | Internal organs<br>(liver, spleen,<br>lungs)/<br>organ dalaman<br>(hati, limpa, paru) |                                                                                                 |                |                |                                   | Matchbox/<br>Kotak mancis                                                                                              |                                                                                            |
| C5                                                         | Chicken ball<br>/meat ball<br>Bebola ayam<br>/daging                                  |                                                                                                 |                |                |                                   | Balls/Bebola                                                                                                           |                                                                                            |
| C6                                                         | Quail/<br>Burung puyuh                                                                |                                                                                                 |                |                |                                   | Whole/ekor                                                                                                             |                                                                                            |
| C7                                                         | Duck/Itik                                                                             |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
| <b>For non-islam participants/bagi peserta bukan Islam</b> |                                                                                       |                                                                                                 |                |                |                                   |                                                                                                                        |                                                                                            |
| C8                                                         | Ham                                                                                   |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
| C9                                                         | Bacon                                                                                 |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
| C10                                                        | Luncheon meat                                                                         |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
| C11                                                        | Pork/Babi                                                                             |                                                                                                 |                |                |                                   | Matchbox/<br>Kotak mancis                                                                                              |                                                                                            |
| <b>D. Fish and seafoods/Ikan dan makanan laut</b>          |                                                                                       |                                                                                                 |                |                |                                   |                                                                                                                        |                                                                                            |
| D1                                                         | Saltwater fish/<br>Ikan laut                                                          |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
|                                                            |                                                                                       |                                                                                                 |                |                |                                   | Whole/Ekor                                                                                                             |                                                                                            |
| D2                                                         | Freshwater fish/<br>Ikan air tawar                                                    |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
|                                                            |                                                                                       |                                                                                                 |                |                |                                   | Whole/Ekor                                                                                                             |                                                                                            |
| D3                                                         | Anchovies/<br>Ikan bilis                                                              |                                                                                                 |                |                |                                   | Table spoon/<br>Sudu makan                                                                                             |                                                                                            |
| D4                                                         | Canned fish/<br>Ikan dalam tin                                                        |                                                                                                 |                |                |                                   | Whole/Ekor                                                                                                             |                                                                                            |
| D5                                                         | Shellfish/<br>Kekerang                                                                |                                                                                                 |                |                |                                   | Table spoon/<br>Sudu makan                                                                                             |                                                                                            |

| Code<br>Kod                                            | Type of food<br>Jenis makanan               | Frequency of consumption<br>(how many times per-)<br>Kekerapan pengambilan<br>(berapa kali se-) |                |                |                                   | Meal size<br>(Choose one<br>type of<br>measurement<br>only)<br>Ukuran sajian<br>(Pilih satu<br>jenis ukuran<br>sahaja) | Number<br>of<br>servings<br>per meal<br>Berapa<br>banyak<br>sajian<br>setiap kali<br>makan |
|--------------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------|----------------|----------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
|                                                        |                                             | Day<br>Hari                                                                                     | Week<br>Minggu | Month<br>Bulan | Does<br>not eat<br>Tidak<br>makan |                                                                                                                        |                                                                                            |
| D6                                                     | Fresh prawn/<br>Udang basah                 |                                                                                                 |                |                |                                   | Medium size/<br>Saiz sederhana                                                                                         |                                                                                            |
| D7                                                     | Fresh cuttlefish/<br>Sotong basah           |                                                                                                 |                |                |                                   | Medium<br>piece/Potong<br>sederhana                                                                                    |                                                                                            |
| D8                                                     | Dried cuttlefish/<br>Sotong kering          |                                                                                                 |                |                |                                   | Medium size/<br>Saiz sederhana                                                                                         |                                                                                            |
|                                                        |                                             |                                                                                                 |                |                |                                   | Medium<br>piece/Potong<br>sederhana                                                                                    |                                                                                            |
| D9                                                     | Crab/Ketam                                  |                                                                                                 |                |                |                                   | Whole/Ekor                                                                                                             |                                                                                            |
| D10                                                    | Dried fish/<br>Ikan kering                  |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
|                                                        |                                             |                                                                                                 |                |                |                                   | Whole/Ekor                                                                                                             |                                                                                            |
| D11                                                    | Fish balls/cake/<br>Bebola ikan/kek<br>ikan |                                                                                                 |                |                |                                   | Balls/Bebola                                                                                                           |                                                                                            |
|                                                        |                                             |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
| D12                                                    | Keropok lekor                               |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
| D13                                                    | Snail/Siput sedut                           |                                                                                                 |                |                |                                   | Pieces/biji                                                                                                            |                                                                                            |
| <b>E. Egg/Telur</b>                                    |                                             |                                                                                                 |                |                |                                   |                                                                                                                        |                                                                                            |
| E1                                                     | Chicken egg/<br>Telur ayam                  |                                                                                                 |                |                |                                   | Whole/Biji                                                                                                             |                                                                                            |
| E2                                                     | Duck egg/<br>Telur itik                     |                                                                                                 |                |                |                                   | Whole/Biji                                                                                                             |                                                                                            |
| E3                                                     | Quail egg/<br>Telur puyuh                   |                                                                                                 |                |                |                                   | Whole/Biji                                                                                                             |                                                                                            |
| E4                                                     | Salted egg/<br>Telur masin                  |                                                                                                 |                |                |                                   | Whole/Biji                                                                                                             |                                                                                            |
| <b>F. Nuts and nut products/Kekacang dan hasilnya</b>  |                                             |                                                                                                 |                |                |                                   |                                                                                                                        |                                                                                            |
| F1                                                     | Legumes/<br>Kekacang                        |                                                                                                 |                |                |                                   | Table spoon/<br>Sudu makan                                                                                             |                                                                                            |
| F2                                                     | Tofu/Tauhu                                  |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
| F3                                                     | Tempe/Tempe                                 |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
|                                                        |                                             |                                                                                                 |                |                |                                   | Table spoon/<br>Sudu makan                                                                                             |                                                                                            |
| F4                                                     | Ground nuts/<br>Kacang tanah                |                                                                                                 |                |                |                                   | Table spoon/<br>Sudu makan                                                                                             |                                                                                            |
| <b>G. Milk and milk products/Susu dan hasil tenusu</b> |                                             |                                                                                                 |                |                |                                   |                                                                                                                        |                                                                                            |
| G1                                                     | Fresh milk /<br>UHT<br>Susu segar / UHT     |                                                                                                 |                |                |                                   | Cup/Cawan                                                                                                              |                                                                                            |
|                                                        |                                             |                                                                                                 |                |                |                                   | Glass/Gelas                                                                                                            |                                                                                            |



| Code<br>Kod                        | Type of food<br>Jenis makanan                                          | Frequency of consumption<br>(how many times per-)<br>Kekerapan pengambilan<br>(berapa kali se-) |                |                |                                   | Meal size<br>(Choose one<br>type of<br>measurement<br>only)<br>Ukuran sajian<br>(Pilih satu<br>jenis ukuran<br>sahaja) | Number<br>of<br>servings<br>per meal<br>Berapa<br>banyak<br>sajian<br>setiap kali<br>makan |
|------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|----------------|----------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
|                                    |                                                                        | Day<br>Hari                                                                                     | Week<br>Minggu | Month<br>Bulan | Does<br>not eat<br>Tidak<br>makan |                                                                                                                        |                                                                                            |
| G2                                 | <b>Powdered milk</b><br><i>Susu tepung</i>                             |                                                                                                 |                |                |                                   | <b>Table spoon/</b><br><i>Sudu makan</i>                                                                               |                                                                                            |
| G3                                 | <b>Evaporated milk</b><br><i>Susu sejat/ cair</i>                      |                                                                                                 |                |                |                                   | <b>Table spoon/</b><br><i>Sudu makan</i>                                                                               |                                                                                            |
| G4                                 | <b>Condensed milk</b><br><i>Susu pekat manis</i>                       |                                                                                                 |                |                |                                   | <b>Table spoon/</b><br><i>Sudu makan</i>                                                                               |                                                                                            |
| G5                                 | <b>Yogurt/ lassi/<br/>tairu</b>                                        |                                                                                                 |                |                |                                   | <b>Cup/Cawan</b>                                                                                                       |                                                                                            |
|                                    |                                                                        |                                                                                                 |                |                |                                   | <b>Table spoon/</b><br><i>Sudu makan</i>                                                                               |                                                                                            |
| G6                                 | <b>Cheese/</b><br><i>Keju</i>                                          |                                                                                                 |                |                |                                   | <b>Piece/Keping</b>                                                                                                    |                                                                                            |
| <b>H. Vegetables/Sayur-sayuran</b> |                                                                        |                                                                                                 |                |                |                                   |                                                                                                                        |                                                                                            |
| H1                                 | <b>Green leafy<br/>vegetables/</b><br><i>Sayuran berdaun<br/>hijau</i> |                                                                                                 |                |                |                                   | <b>Cup/Cawan</b>                                                                                                       |                                                                                            |
| H2                                 | <b>Other types of<br/>legumes/</b><br><i>Sayuran kacang</i>            |                                                                                                 |                |                |                                   | <b>Cup/Cawan</b>                                                                                                       |                                                                                            |
| H3                                 | <b>Starchy<br/>vegetables/</b><br><i>Sayuran berubi</i>                |                                                                                                 |                |                |                                   | <b>Cup/Cawan</b>                                                                                                       |                                                                                            |
| H4                                 | <b>Cabbage/</b><br><i>Sayuran kobis</i>                                |                                                                                                 |                |                |                                   | <b>Cup/Cawan</b>                                                                                                       |                                                                                            |
| H5                                 | <b>Luffa/ pumpkin/<br/>cucumber/</b><br><i>Petola/ labu/<br/>timun</i> |                                                                                                 |                |                |                                   | <b>Cup/Cawan</b>                                                                                                       |                                                                                            |
| H6                                 | <b>Salted/dried<br/>vegetable/</b><br><i>Sayuran asin<br/>/kering</i>  |                                                                                                 |                |                |                                   | <b>Cup/Cawan</b>                                                                                                       |                                                                                            |
| H7                                 | <b>Ulam-ulam</b>                                                       |                                                                                                 |                |                |                                   | <b>Cup/Cawan</b>                                                                                                       |                                                                                            |
| H8                                 | <b>Baby corn/</b><br><i>Putik jagung</i>                               |                                                                                                 |                |                |                                   | <b>Table spoon/</b><br><i>Sudu makan</i>                                                                               |                                                                                            |
| H9                                 | <b>Fresh/ dried<br/>mushroom/</b><br><i>Cendawan basah/<br/>kering</i> |                                                                                                 |                |                |                                   | <b>Cup/Cawan</b>                                                                                                       |                                                                                            |
| H10                                | <b>Chillies/Cili</b>                                                   |                                                                                                 |                |                |                                   | <b>Whole/biji</b>                                                                                                      |                                                                                            |



| Code<br>Kod                  | Type of food<br>Jenis makanan                     | Frequency of consumption<br>(how many times per-)<br>Kekerapan pengambilan<br>(berapa kali se-) |                |                |                                   | Meal size<br>(Choose one<br>type of<br>measurement<br>only)<br>Ukuran sajian<br>(Pilih satu<br>jenis ukuran<br>sahaja) | Number<br>of<br>servings<br>per meal<br>Berapa<br>banyak<br>sajian<br>setiap kali<br>makan |
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|                              |                                                   | Day<br>Hari                                                                                     | Week<br>Minggu | Month<br>Bulan | Does<br>not eat<br>Tidak<br>makan |                                                                                                                        |                                                                                            |
| H11                          | Bean sprouts /<br>Taugeh                          |                                                                                                 |                |                |                                   | Cup/Cawan                                                                                                              |                                                                                            |
| H12                          | Ladies<br>finger/Bendi                            |                                                                                                 |                |                |                                   | Whole/biji                                                                                                             |                                                                                            |
| H13                          | Tomatoes/<br>Tomato                               |                                                                                                 |                |                |                                   | Whole/biji                                                                                                             |                                                                                            |
| H14                          | Eggplant/terung                                   |                                                                                                 |                |                |                                   | Cup/Cawan                                                                                                              |                                                                                            |
| <b>I. Fruits/Buah-buahan</b> |                                                   |                                                                                                 |                |                |                                   |                                                                                                                        |                                                                                            |
| I1                           | Papaya/Betik                                      |                                                                                                 |                |                |                                   | Slice/Potong                                                                                                           |                                                                                            |
| I2                           | Guava/<br>Jambu batu                              |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
| I3                           | Local citrus<br>fruit/<br>Limau manis<br>tempatan |                                                                                                 |                |                |                                   | Whole/Biji                                                                                                             |                                                                                            |
| I4                           | Mango/Mangga                                      |                                                                                                 |                |                |                                   | Slice/Potong                                                                                                           |                                                                                            |
| I5                           | Pineapple/Nenas                                   |                                                                                                 |                |                |                                   | Slice/Potong                                                                                                           |                                                                                            |
| I6                           | Banana/Pisang                                     |                                                                                                 |                |                |                                   | Whole/Biji                                                                                                             |                                                                                            |
| I7                           | Watermelon/<br>Tembikai                           |                                                                                                 |                |                |                                   | Slice/Potong                                                                                                           |                                                                                            |
| I8                           | Starfruit/<br>Belimbing                           |                                                                                                 |                |                |                                   | Whole/Biji                                                                                                             |                                                                                            |
| I9                           | Jackfruit/<br>Nangka                              |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
| I10                          | Apple/Epal                                        |                                                                                                 |                |                |                                   | Whole/Biji                                                                                                             |                                                                                            |
| I11                          | Orange/<br>mandarin/<br>Oren/mandarin             |                                                                                                 |                |                |                                   | Whole/Biji                                                                                                             |                                                                                            |
| I12                          | Pear/lai/Pir/lai                                  |                                                                                                 |                |                |                                   | Whole/Biji                                                                                                             |                                                                                            |
| I13                          | Grape/Anggur                                      |                                                                                                 |                |                |                                   | Whole/Biji                                                                                                             |                                                                                            |
| I14                          | Durian                                            |                                                                                                 |                |                |                                   | Piece/Ulas                                                                                                             |                                                                                            |
| I15                          | Rambutan                                          |                                                                                                 |                |                |                                   | Whole/Biji                                                                                                             |                                                                                            |
| I16                          | Fresh longan/<br>Longan segar                     |                                                                                                 |                |                |                                   | Whole/Biji                                                                                                             |                                                                                            |
| I17                          | Fresh lychee/<br>Laici segar                      |                                                                                                 |                |                |                                   | Whole/Biji                                                                                                             |                                                                                            |
| I18                          | Honey dew/<br>Tembikai susu                       |                                                                                                 |                |                |                                   | Slice/Potong                                                                                                           |                                                                                            |
| I19                          | Canned fruit/<br>Buahan dalam tin                 |                                                                                                 |                |                |                                   | Slice/Potong                                                                                                           |                                                                                            |

| Code<br>Kod                 | Type of food<br>Jenis makanan                                                     | Frequency of consumption<br>(how many times per-)<br>Kekerapan pengambilan<br>(berapa kali se-) |                |                |                                   | Meal size<br>(Choose one<br>type of<br>measurement<br>only)<br>Ukuran sajian<br>(Pilih satu<br>jenis ukuran<br>sahaja) | Number<br>of<br>servings<br>per meal<br>Berapa<br>banyak<br>sajian<br>setiap kali<br>makan |
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|                             |                                                                                   | Day<br>Hari                                                                                     | Week<br>Minggu | Month<br>Bulan | Does<br>not eat<br>Tidak<br>makan |                                                                                                                        |                                                                                            |
| I20                         | Dried fruit/<br>Buahan kering                                                     |                                                                                                 |                |                |                                   | Slice/Potong                                                                                                           |                                                                                            |
| I21                         | Pickled<br>fruits/Buahan<br>jeruk, acar                                           |                                                                                                 |                |                |                                   | Cup/Cawan                                                                                                              |                                                                                            |
| I22                         | Young coconut/<br>Kelapa muda                                                     |                                                                                                 |                |                |                                   | Cup/Cawan                                                                                                              |                                                                                            |
| I23                         | Mangosteen/Man<br>ggis                                                            |                                                                                                 |                |                |                                   | Whole/Biji                                                                                                             |                                                                                            |
| I24                         | Dragon fruit/<br>Buah naga                                                        |                                                                                                 |                |                |                                   | Slice/Potong                                                                                                           |                                                                                            |
| <b>J. Beverages/Minuman</b> |                                                                                   |                                                                                                 |                |                |                                   |                                                                                                                        |                                                                                            |
| J1                          | Plain water/<br>Air kosong                                                        |                                                                                                 |                |                |                                   | Glass/Gelas                                                                                                            |                                                                                            |
| J2                          | Tea/Teh                                                                           |                                                                                                 |                |                |                                   | Cup/Cawan                                                                                                              |                                                                                            |
| J3                          | Coffee/Kopi                                                                       |                                                                                                 |                |                |                                   | Cup/Cawan                                                                                                              |                                                                                            |
| J4                          | Chocolate drink/<br>Minuman<br>bercoklat                                          |                                                                                                 |                |                |                                   | Cup/Cawan                                                                                                              |                                                                                            |
| J5                          | Malt drink<br>(horlick/neslo<br>malt)/Minuman<br>bermalt (horlick/<br>nesto malt) |                                                                                                 |                |                |                                   | Cup/Cawan                                                                                                              |                                                                                            |
| J6                          | Cordial syrup/<br>Sirap Kordial                                                   |                                                                                                 |                |                |                                   | Glass/Gelas                                                                                                            |                                                                                            |
| J7                          | Fruit juice/<br>Jus buah-buahan                                                   |                                                                                                 |                |                |                                   | Cup/Cawan                                                                                                              |                                                                                            |
| J8                          | Carbonated<br>drinks/<br>Minuman bergas                                           |                                                                                                 |                |                |                                   | Glass/can<br>Gelas/tin                                                                                                 |                                                                                            |
| J9                          | Soy milk/<br>Air kacang soya                                                      |                                                                                                 |                |                |                                   | Glass/Gelas                                                                                                            |                                                                                            |
|                             |                                                                                   |                                                                                                 |                |                |                                   | Box/Kotak                                                                                                              |                                                                                            |
| J10                         | Botanical/ herbs<br>drinks/<br>Minuman<br>botani/herba                            |                                                                                                 |                |                |                                   | Glass/Gelas                                                                                                            |                                                                                            |
|                             |                                                                                   |                                                                                                 |                |                |                                   | Box/Kotak                                                                                                              |                                                                                            |
| J11                         | Energy drinks/<br>Minuman<br>bertenaga                                            |                                                                                                 |                |                |                                   | Glass/Gelas                                                                                                            |                                                                                            |
|                             |                                                                                   |                                                                                                 |                |                |                                   | Box/Kotak                                                                                                              |                                                                                            |



| Code<br>Kod                                                                                                                              | Type of food<br>Jenis makanan                                       | Frequency of consumption<br>(how many times per-)<br>Kekerapan pengambilan<br>(berapa kali se-) |                |                |                                   | Meal size<br>(Choose one<br>type of<br>measurement<br>only)<br>Ukuran sajian<br>(Pilih satu<br>jenis ukuran<br>sahaja) | Number<br>of<br>servings<br>per meal<br>Berapa<br>banyak<br>sajian<br>setiap kali<br>makan |
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|                                                                                                                                          |                                                                     | Day<br>Hari                                                                                     | Week<br>Minggu | Month<br>Bulan | Does<br>not eat<br>Tidak<br>makan |                                                                                                                        |                                                                                            |
| J12                                                                                                                                      | Yogurt drinks/<br>Minuman yogurt                                    |                                                                                                 |                |                |                                   | Cup/Cawan                                                                                                              |                                                                                            |
| <b>K. Alcoholic beverages (specifically for non-Muslim participants)/</b><br><i>Minuman beralkohol (khusus bagi peserta bukan Islam)</i> |                                                                     |                                                                                                 |                |                |                                   |                                                                                                                        |                                                                                            |
| K1                                                                                                                                       | Syandi                                                              |                                                                                                 |                |                |                                   | Can/Tin                                                                                                                |                                                                                            |
| K2                                                                                                                                       | Beer/Bir                                                            |                                                                                                 |                |                |                                   | Glass/Gelas                                                                                                            |                                                                                            |
|                                                                                                                                          |                                                                     |                                                                                                 |                |                |                                   | Can/Tin                                                                                                                |                                                                                            |
|                                                                                                                                          |                                                                     |                                                                                                 |                |                |                                   | Bottle/Botol                                                                                                           |                                                                                            |
|                                                                                                                                          |                                                                     |                                                                                                 |                |                |                                   | Wine glass/<br>Gelas wain                                                                                              |                                                                                            |
| K3                                                                                                                                       | Wine/Wain                                                           |                                                                                                 |                |                |                                   | Glass/Gelas                                                                                                            |                                                                                            |
| K4                                                                                                                                       | Spirit                                                              |                                                                                                 |                |                |                                   | Glass/Gelas                                                                                                            |                                                                                            |
| K5                                                                                                                                       | Liqueur/Likeur                                                      |                                                                                                 |                |                |                                   | Glass/Gelas                                                                                                            |                                                                                            |
| K6                                                                                                                                       | Todi/Tuak kelapa<br>atau bahar                                      |                                                                                                 |                |                |                                   | Glass/Gelas                                                                                                            |                                                                                            |
| K7                                                                                                                                       | Rice wine/Wain<br>beras, tuak bera                                  |                                                                                                 |                |                |                                   | Glass/Gelas                                                                                                            |                                                                                            |
| <b>L. Confectionery/Konfeksi</b>                                                                                                         |                                                                     |                                                                                                 |                |                |                                   |                                                                                                                        |                                                                                            |
| L1                                                                                                                                       | Local kuih/<br>Kuih tempatan                                        |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
| L2                                                                                                                                       | Cake/Kek                                                            |                                                                                                 |                |                |                                   | Slice/Potong                                                                                                           |                                                                                            |
| L3                                                                                                                                       | Biscuit/Biskut                                                      |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
| L4                                                                                                                                       | Candies/<br>Gula-gula                                               |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
|                                                                                                                                          |                                                                     |                                                                                                 |                |                |                                   | Slice/Potong                                                                                                           |                                                                                            |
| L5                                                                                                                                       | Ice cream (milk)/<br>Aiskrim (susu)                                 |                                                                                                 |                |                |                                   | Cup/Cawan                                                                                                              |                                                                                            |
|                                                                                                                                          |                                                                     |                                                                                                 |                |                |                                   | Scoop/Senduk                                                                                                           |                                                                                            |
| L6                                                                                                                                       | ABC (air batu<br>campur)/ice/<br>Lolipop                            |                                                                                                 |                |                |                                   | Bowl/<br>Mangkuk                                                                                                       |                                                                                            |
|                                                                                                                                          |                                                                     |                                                                                                 |                |                |                                   | Stick/Batang                                                                                                           |                                                                                            |
|                                                                                                                                          |                                                                     |                                                                                                 |                |                |                                   | Cup/Cawan                                                                                                              |                                                                                            |
| L7                                                                                                                                       | Jelly/custard/<br>Jeli/kastard                                      |                                                                                                 |                |                |                                   | Slice/Potong                                                                                                           |                                                                                            |
|                                                                                                                                          |                                                                     |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |
| L8                                                                                                                                       | Snack/crackers/<br>chips/<br>Snek/keropok/<br>kerepek               |                                                                                                 |                |                |                                   |                                                                                                                        |                                                                                            |
| L9                                                                                                                                       | Chocolate<br>bar/Coklat bar                                         |                                                                                                 |                |                |                                   | Small size/<br>saiz kecil                                                                                              |                                                                                            |
| L10                                                                                                                                      | Flavoured, cream<br>filled cookies/<br>Biskut berperisa,<br>berkrim |                                                                                                 |                |                |                                   | Piece/Keping                                                                                                           |                                                                                            |



| Code<br>Kod                           | Type of food<br>Jenis makanan                         | Frequency of consumption<br>(how many times per-)<br>Kekerapan pengambilan<br>(berapa kali se-) |                |                |                                   | Meal size<br>(Choose one<br>type of<br>measurement<br>only)<br>Ukuran sajian<br>(Pilih satu<br>jenis ukuran<br>sahaja) | Number<br>of<br>servings<br>per meal<br>Berapa<br>banyak<br>sajian<br>setiap kali<br>makan |
|---------------------------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------------------|----------------|----------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
|                                       |                                                       | Day<br>Hari                                                                                     | Week<br>Minggu | Month<br>Bulan | Does<br>not eat<br>Tidak<br>makan |                                                                                                                        |                                                                                            |
| L11                                   | Pastry (pie,<br>croissant)/Pastri<br>(pai, croissant) |                                                                                                 |                |                |                                   | Whole/Biji                                                                                                             |                                                                                            |
| <b>M. Bread spread/Sapuan roti</b>    |                                                       |                                                                                                 |                |                |                                   |                                                                                                                        |                                                                                            |
| M1                                    | Jam/Jem                                               |                                                                                                 |                |                |                                   | Tea spoon/<br>Sudu teh                                                                                                 |                                                                                            |
| M2                                    | Coconut jam/<br>Sri kaya                              |                                                                                                 |                |                |                                   | Tea spoon/<br>Sudu teh                                                                                                 |                                                                                            |
| M3                                    | Butter/Mentega                                        |                                                                                                 |                |                |                                   | Tea spoon/<br>Sudu teh                                                                                                 |                                                                                            |
| M4                                    | Margarine/<br>Majerin                                 |                                                                                                 |                |                |                                   | Tea spoon/<br>Sudu teh                                                                                                 |                                                                                            |
| M5                                    | Peanut butter/<br>Mentega kacang                      |                                                                                                 |                |                |                                   | Tea spoon/<br>Sudu teh                                                                                                 |                                                                                            |
| M6                                    | Cream cheese/<br>Krim keju                            |                                                                                                 |                |                |                                   | Tea spoon/<br>Sudu teh                                                                                                 |                                                                                            |
| <b>N. Seasonings/Perencah/ perasa</b> |                                                       |                                                                                                 |                |                |                                   |                                                                                                                        |                                                                                            |
| N1                                    | Sugar/Gula                                            |                                                                                                 |                |                |                                   | Tea spoon/<br>Sudu teh                                                                                                 |                                                                                            |
| N2                                    | Honey/Madu                                            |                                                                                                 |                |                |                                   | Tea spoon/<br>Sudu teh                                                                                                 |                                                                                            |
| N3                                    | Shrimp paste/<br>Sambal belacan                       |                                                                                                 |                |                |                                   | Table spoon/<br>Sudu makan                                                                                             |                                                                                            |
| N4                                    | Budu                                                  |                                                                                                 |                |                |                                   | Tea spoon/<br>Sudu teh                                                                                                 |                                                                                            |
| N5                                    | Cencalok                                              |                                                                                                 |                |                |                                   | Tea spoon/<br>Sudu teh                                                                                                 |                                                                                            |
| N6                                    | Dark soy sause/<br>Kicap pekat                        |                                                                                                 |                |                |                                   | Tea spoon/<br>Sudu teh                                                                                                 |                                                                                            |
| N7                                    | Light soy sauce/<br>Kicap cair                        |                                                                                                 |                |                |                                   | Table spoon/<br>Sudu makan                                                                                             |                                                                                            |
| N8                                    | Chilli/tomato<br>sauce/<br>Sos cili/tomato            |                                                                                                 |                |                |                                   | Table spoon/<br>Sudu makan                                                                                             |                                                                                            |
| N9                                    | Oyster sause/<br>Sos tiram                            |                                                                                                 |                |                |                                   | Tea spoon/<br>Sudu teh                                                                                                 |                                                                                            |
| N10                                   | Fish sause/<br>Sos ikan                               |                                                                                                 |                |                |                                   | Tea spoon/<br>Sudu teh                                                                                                 |                                                                                            |
| N11                                   | Petis/ heko/ otak<br>udang/                           |                                                                                                 |                |                |                                   | Tea spoon/<br>Sudu teh                                                                                                 |                                                                                            |



c) **Fast food consumption / Pengambilan makanan segera**

Please answer all the questions by tick (✓) in the box for each statement.

Sila jawab semua soalan dengan tandakan (✓) dalam petak untuk setiap kenyataan.

| No | Information<br>Maklumat                                                                                                                                                                                                                                                       | Options<br>Pilihan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | In the past one month, did you go to any fast food restaurant?<br><i>Dalam sebulan yang lalu, adakah anda pergi ke mana-mana restoran makanan segera?</i>                                                                                                                     | <input type="checkbox"/> Yes / Ya<br><input type="checkbox"/> No / Tidak → Proceed to question 3/<br>Terus ke soalan 3                                                                                                                                                                                                                                                                                                                                                                                            |
| 2  | If yes, how frequent in the past one month?<br><i>Jika ya, berapa kerap dalam tempoh sebulan yang lalu?</i>                                                                                                                                                                   | <input type="checkbox"/> Occasionally/Kadang-kadang<br><input type="checkbox"/> Once or twice per week/Sekali atau dua kali seminggu<br><input type="checkbox"/> Three or more times a week/Tiga kali atau lebih seminggu                                                                                                                                                                                                                                                                                         |
| 3  | Which fast food restaurant you prefer the most (please select three)?<br><i>Restoran makanan segera manakah yang anda lebih suka (sila pilih tiga)?</i>                                                                                                                       | <input type="checkbox"/> KFC<br><input type="checkbox"/> Texas Chicken<br><input type="checkbox"/> Mc Donald's<br><input type="checkbox"/> Marrybrown<br><input type="checkbox"/> Pizza Hut<br><input type="checkbox"/> Domino's Pizza<br><input type="checkbox"/> Burger King<br><input type="checkbox"/> Subway<br><input type="checkbox"/> Fuel Shack<br><input type="checkbox"/> Others, please specify /<br>Lain-lain, sila nyatakan: _____                                                                  |
| 4  | When you go to a fast-food restaurant, what is the <u>main reason</u> you choose this type of restaurant instead of another type?<br><i>Apabila anda pergi ke restoran makanan segera, apakah <u>alasan utama</u> anda memilih restoran jenis ini daripada restoran lain?</i> | <input type="checkbox"/> Taste of the food/Rasa makanan<br><input type="checkbox"/> Value or cost/Nilai atau kos<br><input type="checkbox"/> Convenience, fast service/Kemudahan, servis pantas<br><input type="checkbox"/> Person you are with wants to go/Kemahuan orang yang bersama anda untuk pergi<br><input type="checkbox"/> Fast-food restaurants are conveniently located/Kedudukan tempat restoran yang sesuai<br><input type="checkbox"/> Others, please specify /<br>Lain-lain, sila nyatakan: _____ |
| 5  | When you go to a fast-food restaurant, do you <u>usually</u> eat breakfast, lunch, dinner or a snack?<br><i>Apabila anda pergi ke restoran makanan segera, adakah anda <u>biasanya</u> makan sarapan, makan tengahari, makan malam atau snek?</i>                             | <input type="checkbox"/> Breakfast/Sarapan<br><input type="checkbox"/> Lunch/Makan tengahari<br><input type="checkbox"/> Dinner/Makan malam<br><input type="checkbox"/> Snacks/Snek<br><input type="checkbox"/> All meals, no usual meal/Semua jenis, tiada kebiasaan<br><input type="checkbox"/> Others, please specify /<br>Lain-lain, sila nyatakan: _____                                                                                                                                                     |
| 6  | When you go to a fast food restaurant, do you usually order any of the "super-size" options that are available?<br><i>Apabila anda pergi ke restoran makanan segera, adakah anda kerap memesan mana-mana pilihan "bersaiz besar" yang tersedia?</i>                           | <input type="checkbox"/> Yes/Ya<br><input type="checkbox"/> No/Tidak                                                                                                                                                                                                                                                                                                                                                                                                                                              |



|     |                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                        |                                          |                                          |                                                   |                                     |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|------------------------------------------|---------------------------------------------------|-------------------------------------|
| 7   | <p><b>When you go to a fast-food restaurant, do you <u>usually</u> go with family, friends or by yourself?</b><br/> <i>Apabila anda pergi ke restoran makanan segera, adakah anda <u>biasanya</u> pergi bersama keluarga, rakan-rakan atau sendiri?</i></p>                                                                                                                                                                                 | <input type="checkbox"/> <b>Family/Keluarga</b><br><input type="checkbox"/> <b>Self/Sendiri</b><br><input type="checkbox"/> <b>Friends/Rakan-rakan</b><br><input type="checkbox"/> <b>Others, please specify /</b><br><i>Lain-lain, sila nyatakan: _____</i>                                                                                                                                           |                                          |                                          |                                                   |                                     |
| 8   | <p><b>Sometimes fast-food restaurants have information available about the nutritional contents of their foods. Is this type of nutritional information available at the fast-food restaurants you usually go to?</b><br/> <i>Kadang-kadang restoran makanan segera mempunyai maklumat mengenai kandungan nutrisi makanan mereka. Adakah maklumat pemakanan ini boleh didapati di restoran makanan segera yang biasanya anda pergi?</i></p> | <input type="checkbox"/> <b>Yes/Ya</b><br><input type="checkbox"/> <b>No/Tidak</b> → <b>Proceed to question 11/</b><br><i>Terus ke soalan 11</i><br><input type="checkbox"/> <b>Never noticed/</b> → <b>Proceed to question 11/</b><br><i>Tidak perasan Terus ke soalan 11</i><br><input type="checkbox"/> <b>Don't know/</b> → <b>Proceed to question 11/</b><br><i>Tidak tahu Terus ke soalan 11</i> |                                          |                                          |                                                   |                                     |
| 9   | <p><b>Do you ever read this nutritional information at fast-food restaurants?</b><br/> <i>Adakah anda pernah membaca maklumat pemakanan ini di restoran makanan segera?</i></p>                                                                                                                                                                                                                                                             | <input type="checkbox"/> <b>Yes/Ya</b><br><input type="checkbox"/> <b>No/Tidak</b> → <b>Proceed to question 11/</b><br><i>Terus ke soalan 11</i>                                                                                                                                                                                                                                                       |                                          |                                          |                                                   |                                     |
|     |                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Very often</b><br><i>Sangat kerap</i>                                                                                                                                                                                                                                                                                                                                                               | <b>Fairly often</b><br><i>Agak kerap</i> | <b>Sometimes</b><br><i>Kadang-kadang</i> | <b>Almost never</b><br><i>Hampir tidak pernah</i> | <b>Never</b><br><i>Tidak pernah</i> |
| 10. | <p><b>How often does this nutritional information help you decide what to order?</b><br/> <i>Berapa kerapkah maklumat pemakanan ini membantu anda untuk membuat keputusan semasa membuat pesanan?</i></p>                                                                                                                                                                                                                                   | <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                               | <input type="checkbox"/>                 | <input type="checkbox"/>                 | <input type="checkbox"/>                          | <input type="checkbox"/>            |
| 11. | <p><b>Some fast-food restaurants include healthier items on their menu. On a usual basis, how likely are you to order healthier food items?</b><br/> <i>Sesetengah restoran makanan segera turut menyediakan pilihan makanan yang lebih sihat dalam menu mereka. Kebiasaannya, adakah anda cenderung untuk memesan makanan yang lebih sihat?</i></p>                                                                                        | <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                               | <input type="checkbox"/>                 | <input type="checkbox"/>                 | <input type="checkbox"/>                          | <input type="checkbox"/>            |



**SECTION D: Physical activity level**  
**BAHAGIAN D: Tahap aktiviti fizikal**

**INSTRUCTION:** The following questions on your physical activity information. Please answer all the questions by circle writing in the space provided.

**ARAHAN:** Soalan-soalan berikut mengenai maklumat latar status pemakanan anda. Sila jawab semua soalan dengan menulis di ruangan yang disediakan.

**Physical activity/Aktiviti fizikal**

Next we are going to ask you about the time you spend doing different types of physical activity in a typical week. Please answer these questions even if you do not consider yourself to be a physically active person.

Seterusnya, kami akan menyoal anda berkenaan dengan tempoh masa yang anda luangkan untuk melakukan pelbagai kegiatan aktiviti fizikal yang berbeza dalam satu minggu yang biasa. Sila jawab soalan-soalan ini walaupun anda menganggap diri anda tidak aktif.

Think first about the time you spend doing work. Think of work as the things that you have to do such as paid or unpaid work, study/training, household chores, harvesting food/crops, fishing or hunting for food, seeking employment. In answering the following questions 'vigorous-intensity activities' are activities that require hard physical effort and cause large increases in breathing or heart rate, 'moderate-intensity activities' are activities that require moderate physical effort and cause small increases in breathing or heart rate.

Fikirkan dahulu tentang masa yang anda gunakan untuk bekerja. Anggapkan pekerjaan sebagai perkara yang anda perlu lakukan untuk kehidupan seperti kerja yang berbayar atau tidak berbayar, belajar/berlatih, kerja rumah, menuai hasil tanaman, memancing atau memburu untuk makanan, mencari pekerjaan, dan sebagainya. Ketika menjawab soalan-soalan berikut, 'aktiviti berat' ialah aktiviti-aktiviti yang memerlukan keupayaan fizikal yang tinggi dan mengakibatkan peningkatan kadar pernafasan ataupun denyutan jantung yang banyak; 'aktiviti sederhana' ialah aktiviti-aktiviti yang memerlukan keupayaan fizikal yang sederhana dan mengakibatkan peningkatan kadar pernafasan ataupun denyutan jantung yang sedikit.

| Question/Soalan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Response/Maklumbalas                                                                            | Code/Kod |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|----------|
| <b>Activity at work/Aktiviti fizikal berkaitan pekerjaan</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                 |          |
| <p>1. Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate like carrying or lifting heavy loads, digging or construction work for at least 10 minutes continuously?</p> <p><i>Adakah pekerjaan anda melibatkan aktiviti kerja berat yang mengakibatkan peningkatan yang banyak dalam kadar pernafasan ataupun denyutan jantung seperti membawa atau mengangkat barang berat, menggali, mencangkul atau melakukan kerja pembinaan sekurang-kurangnya 10 minit secara berterusan?</i></p> | <p>Yes/Ya      1</p> <p>No/Tidak    2</p> <p>If "No", go to P4<br/>Jika "Tidak", sila ke P4</p> | P1       |



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                       |             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------|
| 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>In a typical week, on how many days do you do vigorous intensity activities as part of your work?</b><br><i>Biasanya dalam seminggu, berapa harikah anda melakukan kerja-kerja berat dalam pekerjaan anda?</i>                                                                                                                                                                                                                                                                                                                        | Number of days/<br>Jumlah hari:<br><br>_____ days/hari                                | P2          |
| 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>How much time do you spend doing vigorous-intensity activities at work on a typical day?</b><br><i>Pada hari biasa yang anda lakukan kerja berat, berapa lamakah anda melakukannya?</i>                                                                                                                                                                                                                                                                                                                                               | Hours : Minutes<br>Jam : Minit<br><br>_____ : _____                                   | P3<br>(a-b) |
| 4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Does your work involve moderate-intensity activity that causes small increases in breathing or heart rate such as brisk walking, carrying light loads, fishing or doing house chores for at least 10 minutes continuously?</b><br><i>Adakah pekerjaan anda melibatkan aktiviti kerja sederhana yang mengakibatkan peningkatan yang sedikit dalam kadar pernafasan ataupun denyutan jantung seperti berjalan pantas, membawa barang yang ringan, memancing atau membuat kerja rumah sekurang-kurangnya 10 minit secara berterusan?</i> | Yes/Ya      1<br>No/Tidak    2<br><br>If "No", go to P7<br>Jika "Tidak", sila ke P7   | P4          |
| 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>In a typical week, on how many days do you do moderate intensity activities as part of your work?</b><br><i>Biasanya dalam seminggu, berapa harikah anda melakukan kerja-kerja sederhana dalam pekerjaan anda?</i>                                                                                                                                                                                                                                                                                                                    | Number of days/<br>Jumlah hari:<br><br>_____ days/hari                                | P5          |
| 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>How much time do you spend doing moderate-intensity activities at work on a typical day?</b><br><i>Pada hari biasa yang anda lakukan kerja sederhana, berapa lamakah anda melakukannya?</i>                                                                                                                                                                                                                                                                                                                                           | Hours : Minutes<br>Jam : Minit<br><br>_____ : _____                                   | P6<br>(a-b) |
| <b>Travel to and from places/ Aktiviti Fizikal Berkaitan Perjalanan</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                       |             |
| <p>The next questions EXCLUDE the physical activities at work that you have already mentioned. Now I would like to ask you about the usual way you travel to and from places. For example to work, for shopping, to market, to place of worship and others.</p> <p><i>Soalan-soalan seterusnya TIDAK termasuk aktiviti fizikal semasa bekerja yang telah anda nyatakan. Sekarang, saya ingin bertanya mengenai kaedah yang biasa anda gunakan untuk bergerak dari satu tempat ke tempat yang lain (seperti ke tempat kerja, pasar, membeli-belah, masjid, dan sebagainya)</i></p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                       |             |
| 7.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Do you walk or use a bicycle for at least 10 minutes continuously to get to and from places?</b><br><i>Adakah anda berjalan atau berbasikal secara berterusan sekurang-kurangnya 10 minit untuk menuju ke, dan dari sesuatu tempat?</i>                                                                                                                                                                                                                                                                                               | Yes/Ya      1<br>No/Tidak    2<br><br>If "No", go to P10<br>Jika "Tidak", sila ke P10 | P7          |



|                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                               |              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|--------------|
| 8.                                                                                                                                                                                                                                                                                                                                                                                                                             | <p><b>In a typical week, on how many days do you walk or bicycle for at least 10 minutes continuously to get to and from places?</b></p> <p><i>Dalam satu minggu yang biasa, berapa harikah anda berjalan atau berbasikal secara berterusan sekurang-kurangnya 10 minit untuk menuju ke, dan dari sesuatu tempat?</i></p>                                                                                                                                                                                                               | <p><b>Number of days/<br/>Jumlah hari:</b></p> <p>_____days/hari</p>                                                          | P8           |
| 9.                                                                                                                                                                                                                                                                                                                                                                                                                             | <p><b>How much time do you spend walking or bicycling for travel on a typical day?</b></p> <p><i>Dalam satu hari yang biasa, berapa lamakah anda berjalan atau berbasikal untuk bergerak dari satu tempat ke tempat yang lain?</i></p>                                                                                                                                                                                                                                                                                                  | <p><b>Hours : Minutes<br/>Jam : Minit</b></p> <p>_____ : _____</p>                                                            | P9<br>(a-b)  |
| <p><b>Recreational activities/ Aktiviti Fizikal Pada Waktu Lapang</b></p>                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                               |              |
| <p><b>The next questions EXCLUDE the work and transport activities that you have already mentioned. Now I would like to ask you about sports, fitness and recreational activities.</b></p> <p><i>Soalan-soalan seterusnya TIDAK termasuk aktiviti semasa bekerja dan semasa perjalanan yang telah andanyatakan. Sekarang, saya ingin bertanya tentang aktiviti yang anda lakukan untuk rekreasi, kecergasan dan sukan.</i></p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                               |              |
| 10.                                                                                                                                                                                                                                                                                                                                                                                                                            | <p><b>Do you do any vigorous-intensity sports, fitness or recreational (leisure) activities that cause large increases in breathing or heart rate like running or football, for at least 10 minutes continuously?</b></p> <p><i>Pada masa lapang, adakah anda melakukan aktiviti sukan, kecergasan atau riadah yang lasak yang mengakibatkan peningkatan yang banyak dalam kadar pernafasan ataupun denyutan jantung, seperti berlari, jogging, aerobik atau bermain bola sepak, sekurang-kurangnya 10 minit secara berterusan?</i></p> | <p><b>Yes/Ya      1</b></p> <p><b>No/Tidak    2</b></p> <p><b>If "No", go to P13</b><br/><i>Jika "Tidak", sila ke P13</i></p> | P10          |
| 11.                                                                                                                                                                                                                                                                                                                                                                                                                            | <p><b>In a typical week, on how many days do you do vigorous-intensity sports, fitness or recreational (leisure) activities?</b></p> <p><i>Biasanya dalam seminggu pada waktu lapang, berapa harikah anda melakukan aktiviti-aktiviti sukan, kecergasan atau riadah yang lasak?</i></p>                                                                                                                                                                                                                                                 | <p><b>Number of days/<br/>Jumlah hari:</b></p> <p>_____days/hari</p>                                                          | P11          |
| 12.                                                                                                                                                                                                                                                                                                                                                                                                                            | <p><b>How much time do you spend doing vigorous-intensity sports, fitness or recreational activities on a typical day?</b></p> <p><i>Dalam satu hari yang biasa, berapa lamakah anda melakukan aktiviti-aktiviti sukan, kecergasan atau riadah yang lasak?</i></p>                                                                                                                                                                                                                                                                      | <p><b>Hours : Minutes<br/>Jam : Minit</b></p> <p>_____ : _____</p>                                                            | P12<br>(a-b) |



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                   |              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|--------------|
| 13.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p><b>Do you do any moderate-intensity sports, fitness or recreational (leisure) activities that cause a small increase in breathing or heart rate such as brisk walking, cycling, swimming, volleyball for at least 10 minutes continuously?</b></p> <p><i>Pada masa lapang, adakah anda melakukan aktiviti sukan, kecergasan atau riadah yang sederhana yang mengakibatkan peningkatan yang sedikit dalam kadar pernafasan ataupun denyutan jantung, seperti berjalan pantas, berbasikal, berenang atau bermain bola tampar sekurang-kurangnya 10 minit secara berterusan?</i></p> | <p>Yes/Ya      1</p> <p>No/Tidak    2</p> <p>If "No", go to P16<br/>Jika "Tidak", sila ke P16</p> | P13          |
| 14.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p><b>In a typical week, on how many days do you do moderate-intensity sports, fitness or recreational (leisure) activities?</b></p> <p><i>Biasanya dalam seminggu pada waktu lapang, berapa hariakah anda melakukan aktiviti-aktiviti sukan, kecergasan atau riadah yang sederhana?</i></p>                                                                                                                                                                                                                                                                                         | <p>Number of days/<br/>Jumlah hari:</p> <p>_____ days/hari</p>                                    | P14          |
| 15.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p><b>How much time do you spend doing moderate-intensity sports, fitness or recreational (leisure) activities on a typical day?</b></p> <p><i>Dalam satu hari yang biasa, berapa lamakah anda melakukan aktiviti-aktiviti sukan, kecergasan atau riadah yang sederhana?</i></p>                                                                                                                                                                                                                                                                                                     | <p>Hours : Minutes<br/>Jam : Minit</p> <p>_____ : _____</p>                                       | P15<br>(a-b) |
| <p><b>Sedentary behaviour/Aktiviti Sedentari atau tidak aktif</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                   |              |
| <p><b>The following question is about sitting or reclining at work, at home, getting to and from places or with friends including time spent sitting at a desk, sitting with friends, travelling in car, bus, train, reading, playing cards or watching television, BUT DO NOT INCLUDE time spent sleeping.</b></p> <p><i>Soalan berikut adalah berkaitan dengan aktiviti duduk atau baring/sandar di tempat kerja, di rumah, semasa dalam perjalanan atau semasa bersama rakan-rakan. Contohnya, duduk menulis, mengguna komputer, duduk bersama rakan-rakan, perjalanan dalam kereta, bas, keretapi, duduk membaca, bermain kad atau menonton televisyen, TETAPI TIDAK TERMASUK waktu tidur.</i></p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                   |              |
| 16.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p><b>How much time do you usually spend sitting or reclining on a typical day?</b></p> <p><i>Dalam satu hari yang biasa, berapakah jumlah masa yang anda gunakan untuk duduk atau baring/bersandar?</i></p>                                                                                                                                                                                                                                                                                                                                                                         | <p>Hours : Minutes<br/>Jam : Minit</p> <p>_____ : _____</p>                                       | P16          |



**SECTION E: Psychological factor**  
**BAHAGIAN E: Faktor Psikologi**

**INSTRUCTION:** Please read each statement and circle a number 0, 1, 2, or 3 which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement.

**ARAHAN:** Sila baca setiap kenyataan di bawah dan bulatkan pada nombor 0,1,2 atau 3 bagi menggambarkan keadaan anda sepanjang minggu yang lalu. Tiada jawapan yang betul atau salah. Jangan mengambil masa yang terlalu lama untuk menjawab mana-mana kenyataan

The rating scale is as follows/Skala pemarkahan adalah seperti berikut:

0 – Did not apply to me at all/ Tidak langsung menggambarkan keadaan saya

1 – Applied to me to some degree, or some of the time/ Sedikit atau jarang-jarang menggambarkan keadaan saya

2 – Applied to me to a considerable degree, or a good part of time/ Banyak atau kerap kali menggambarkan keadaan saya

3 – Applied to me very much, or most of the time/ Sangat banyak atau sangat kerap menggambarkan keadaan saya

|     |                                                                                                                                                                                                                                                                          |   |   |   |   |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|
| 1.  | <b>I found it hard to wind down</b><br><i>Saya dapati diri saya sukar ditenteramkan</i>                                                                                                                                                                                  | 0 | 1 | 2 | 3 |
| 2.  | <b>I was aware of dryness of my mouth</b><br><i>Saya sedar mulut saya terasa kering</i>                                                                                                                                                                                  | 0 | 1 | 2 | 3 |
| 3.  | <b>I couldn't seem to experience any positive feeling at all</b><br><i>Saya tidak dapat mengalami perasaan positif sama sekali</i>                                                                                                                                       | 0 | 1 | 2 | 3 |
| 4.  | <b>I experienced breathing difficulty (eg : excessively rapid breathing, breathlessness in the absence of physical exertion)</b><br><i>Saya mengalami kesukaran bernafas (contohnya pernafasan yang laju, tercungap-cungap walaupun tidak melakukan senaman fizikal)</i> | 0 | 1 | 2 | 3 |
| 5.  | <b>I found it difficult to work up the initiative to do things</b><br><i>Saya sukar untuk mendapatkan semangat bagi melakukan sesuatu perkara</i>                                                                                                                        | 0 | 1 | 2 | 3 |
| 6.  | <b>I tended to over-react to situations</b><br><i>Saya cenderung untuk bertindak keterlaluan dalam sesuatu keadaan</i>                                                                                                                                                   | 0 | 1 | 2 | 3 |
| 7.  | <b>I experienced trembling (eg: in the hands)</b><br><i>Saya rasa menggeletar (contohnya pada tangan)</i>                                                                                                                                                                | 0 | 1 | 2 | 3 |
| 8.  | <b>I felt that I was using a lot of nervous energy</b><br><i>Saya rasa saya menggunakan banyak tenaga dalam keadaan cemas</i>                                                                                                                                            | 0 | 1 | 2 | 3 |
| 9.  | <b>I was worried about situations in which I might panic and make a fool of myself</b><br><i>Saya bimbang keadaan di mana saya mungkin menjadi panik dan melakukan perkara yang membodohkan diri sendiri</i>                                                             | 0 | 1 | 2 | 3 |
| 10. | <b>I felt that I had nothing to look forward to</b><br><i>Saya rasa saya tidak mempunyai apa-apa untuk diharapkan</i>                                                                                                                                                    | 0 | 1 | 2 | 3 |
| 11. | <b>I found myself getting agitated</b><br><i>Saya dapati diri saya semakin gelisah</i>                                                                                                                                                                                   | 0 | 1 | 2 | 3 |
| 12. | <b>I found it difficult to relax</b><br><i>Saya rasa sukar untuk relaks</i>                                                                                                                                                                                              | 0 | 1 | 2 | 3 |
| 13. | <b>I felt down-hearted and blue</b><br><i>Saya rasa sedih dan murung</i>                                                                                                                                                                                                 | 0 | 1 | 2 | 3 |



|     |                                                                                                                                                                                                                                                                                                                    |   |   |   |   |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|
| 14. | <b>I was intolerant of anything that kept me from getting on with what I was doing</b><br><i>Saya tidak dapat menahan sabar dengan perkara yang menghalang saya meneruskan apa yang saya lakukan</i>                                                                                                               | 0 | 1 | 2 | 3 |
| 15. | <b>I felt I was close to panic</b><br><i>Saya rasa hampir-hampir menjadi panik/cemas</i>                                                                                                                                                                                                                           | 0 | 1 | 2 | 3 |
| 16. | <b>I was unable to become enthusiastic about anything</b><br><i>Saya tidak bersemangat dengan apa jua yang saya lakukan.</i>                                                                                                                                                                                       | 0 | 1 | 2 | 3 |
| 17. | <b>I felt I wasn't worth much as a person</b><br><i>Saya tidak begitu berharga sebagai seorang individu</i>                                                                                                                                                                                                        | 0 | 1 | 2 | 3 |
| 18. | <b>I felt that I was rather touchy</b><br><i>Saya rasa yang saya mudah tersentuh</i>                                                                                                                                                                                                                               | 0 | 1 | 2 | 3 |
| 19. | <b>I was aware of the action of my heart in the absence of physical exertion (eg : sense of heart rate increase, heart missing a beat)</b><br><i>Saya sedar tindakbalas jantung saya walaupun tidak melakukan aktiviti fizikal (contohnya kadar denyutan jantung bertambah, atau denyutan jantung berkurangan)</i> | 0 | 1 | 2 | 3 |
| 20. | <b>I felt scared without any good reason</b><br><i>Saya berasa takut tanpa sebab yang munasabah</i>                                                                                                                                                                                                                | 0 | 1 | 2 | 3 |
| 21. | <b>I felt that life was meaningless</b><br><i>Saya rasa hidup ini tidak bermakna</i>                                                                                                                                                                                                                               | 0 | 1 | 2 | 3 |

**SECTION F: Anthropometric and blood pressure measurement**  
**BAHAGIAN F: Ukuran antropometri dan tekanan darah**

**INSTRUCTIONS: This section will be filled out by the assessor**  
**ARAHAN: Bahagian ini akan diisi oleh penilai**

|    |                                                                                          | <b>Reading 1</b><br><i>Bacaan 1</i> | <b>Reading 2</b><br><i>Bacaan 2</i> | <b>Average</b><br><i>Purata</i> |
|----|------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|---------------------------------|
| 1. | <b>Waist Circumference (cm)</b><br><i>Ukur lilit pinggang (cm)</i>                       |                                     |                                     |                                 |
| 2. | <b>Height (cm)</b><br><i>Tinggi (cm)</i>                                                 |                                     |                                     |                                 |
| 3. | <b>Weight (kg)</b><br><i>Berat (kg)</i>                                                  |                                     |                                     |                                 |
| 4. | <b>Body Mass Index</b><br><i>Indeks Jisim Badan</i>                                      | ..... kg/m <sup>2</sup>             |                                     |                                 |
| 5  | <b>Systolic Blood Pressure (mm Hg)</b><br><i>Tekanan Darah Tinggi Sistolik (mm Hg)</i>   |                                     |                                     |                                 |
| 6  | <b>Diastolic Blood Pressure (mm Hg)</b><br><i>Tekanan Darah Tinggi Diastolik (mm Hg)</i> |                                     |                                     |                                 |

**END OF THE QUESTIONNAIRE**  
**TAMAT SOAL SELIDIK**

**THANK YOU FOR YOUR PARTICIPATION AND COOPERATION**  
**TERIMA KASIH ATAS KERJASAMA ANDA**





**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 body weight status using Asian cut-off points among undergraduate university students in Universiti Putra Malaysia.

**2. INTRODUCTION:**

Based on the national prevalence, about 43.1 % of adults aged 18 to 24 years are overweight and obesity (Institute for Public Health, 2015), while among university students ranges from 30.0 to 35.9 %, which is comparable to the national data (Boo et al., 2010; Gopalakrishnan et al., 2012; Low et al., 2015). There are evidences from several countries in Asia that reported increased risk of comorbidities that begins at a lower BMI. Due to that, Asian cut-off points will be used to define body weight status in this study. University students are vulnerable of being overweight and obesity as they tend to engage in unhealthy lifestyle. Having unhealthy body weight may increase the risks of developing non-communicable diseases. Thus, this study aims to determine the factors associated with body weight status using Asian cut-off points among undergraduate university students.

This study is part of the graduation requirements for Bachelor of Science (Nutrition and Community Health) from the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia which is expected to be completed within one year of study. A total of 299 undergraduate university students in Universiti Putra Malaysia will participate in this study. Your participation in this study only takes about 20 minutes. And it is voluntary. You can withdraw from this study at any time without giving any reasons and no penalty will be charged to you.

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

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

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

You are required to complete a questionnaire consisting of six (6) sections which are sociodemographic background, academic background and performance, nutritional status, physical activity level, psychological factor and anthropometric and blood pressure measurement. In nutritional status section, it consists of three (3) subsections which are clinical data, dietary intake and fast food consumption. As for the anthropometric section, your height, weight and waist circumference measurements will be obtained.

After completing the questionnaire, you are required to return it to the researcher. Your height, weight, waist circumference and blood pressure will be measured by the researcher.



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

If you are a non-Malaysian citizens, had one or more chronic health conditions (e.g., type 2 diabetes mellitus, hypertension, heart disease, cancer, stroke, etc.), pregnant or breastfed women, pre-university or postgraduate university students and university staffs, you should not participate in the study.

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

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

You will receive no direct benefits from participating in this research study. However, your responses may help the researcher to learn more about the factors associated with body weight status among undergraduate university students. Other than that, you will be able to get information about your current body weight status through this study.

##### (b) TO THE INVESTIGATOR?

Investigators able to know the prevalence of overweight and obesity among undergraduate university students and its associated factors. Findings of this study could serve as a baseline data for future research. Investigators could develop effective nutrition education and health promotion programs on healthy eating and lifestyle to improve nutritional status among young adults especially university students.

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

This study has minimal risk as it involves non-invasive procedures. The procedures only involve measurements of height, weight, waist circumference and blood pressure 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 part 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 additional questions during the course of this research, you may contact:

Nurfarah Aida binti Shaharuddin (Researcher)  
[nurfarahaida.nfa@gmail.com](mailto:nurfarahaida.nfa@gmail.com) 019-5570773

Assoc. Prof. Dr. Barakatun Nisak binti Mohd  
Yusof (Supervisor)  
[bnisak@upm.edu.my](mailto:bnisak@upm.edu.my) 03-89472524

If you have any enquiries regarding your rights as a respondent in this study, please contact:

Ethics Committee for Research Involving Human Subjects (JKEUPM) via 03-89471601 or email to [dir.rmc@upm.edu.my](mailto:dir.rmc@upm.edu.my)

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

9. CONSENT

I ..... Identity Card No. ....  
address.....

.....hereby voluntarily agree to take part in the research stated  
above \*(clinical /drug trial/video recording/ focus group/interview-based/ questionnaire-based).

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

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

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

\* delete where necessary

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

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

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

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





## **BORANG 2.4: PENERANGAN DAN PERSETUJUAN RESPONDEN**

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

### **1.TAJUK KAJIAN**

Faktor-faktor yang berkaitan dengan status berat badan menggunakan kategori Asia dalam kalangan pelajar ijazah sarjana muda di Universiti Putra Malaysia.

### **2. PENGENALAN**

Berdasarkan statistik kebangsaan, kira-kira 43.1 % orang dewasa berumur 18 hingga 24 tahun berada dalam kategori kegemukan dan obesiti (Institut Kesihatan Umum, 2015), manakala dalam kalangan pelajar universiti pula adalah antara 30.0 hingga 35.9 %, yang mana ia boleh dibandingkan dengan data kebangsaan (Boo et al., 2010; Gopalakrishnan et al., 2012 et al., 2015). Terdapat bukti dari beberapa negara di Asia yang melaporkan risiko peningkatan komorbiditi yang bermula pada BMI yang lebih rendah. Oleh itu, titik pemotongan Asia akan digunakan untuk menentukan status berat badan dalam kajian ini. Pelajar universiti berisiko untuk mempunyai kelebihan berat badan dan obesiti kerana mereka lebih cenderung untuk terlibat dalam gaya hidup tidak sihat. Mempunyai berat badan yang tidak seimbang boleh meningkatkan risiko mendapati penyakit tidak berjangkit. Oleh itu, kajian ini bertujuan untuk menentukan faktor-faktor yang berkaitan dengan status berat badan menggunakan kategori Asia dalam kalangan pelajar ijazah sarjana muda.

Kajian ini merupakan sebahagian daripada syarat bergraduat bagi Bacelor Sains (Pemakanan dan Kesihatan Komuniti) daripada Fakulti Perubatan dan Sains Kesihatan, Universiti Putra Malaysia yang dijangka akan mengambil masa selama setahun untuk diselesaikan. Sejumlah 299 pelajar universiti ijazah sarjana di Universiti Putra Malaysia akan mengambil bahagian dalam kajian ini. Penyertaan anda dalam kajian ini hanya mengambil masa kira-kira 20 minit dan adalah secara sukarela. Anda boleh menarik diri daripada kajian ini pada bila-bila masa tanpa memberi sebarang alasan dan tiada penalti akan dikenakan kepada anda.

Kajian ini telah diluluskan oleh Jawatankuasa Etika Universiti untuk Penyelidikan Melibatkan Manusia (JKEUPM), Universiti Putra Malaysia.

### **3. APAKAH YANG PERLU ANDA LAKUKAN?**

Anda perlu membaca dan memahami maklumat mengenai kajian yang terdapat dalam borang "Penerangan dan Persetujuan Responden" ini. Sekiranya anda bersetuju untuk menyertai kajian ini, sila tandatangan pada borang persetujuan responden di halaman 3. Sila berikan borang yang telah ditandatangani kepada penyelidik.

Anda dikehendaki melengkapkan borang soal selidik yang terdiri daripada enam (6) bahagian latar belakang sosiodemografik, latar belakang dan pencapaian akademik, status pemakanan, tahap aktiviti fizikal, faktor psikologi dan ukuran antropometrik dan tekanan darah. Dalam bahagian status pemakanan, terdapat tiga (3) subseksyen iaitu data klinikal, kekerapan pengambilan makanan dan pengambilan makanan segera. Pada bahagian antropometrik, ukuran ketinggian, berat badan dan ukuran pinggang akan diperoleh.



Sekiranya borang soal selidik telah dilengkapkan, anda dikehendaki untuk memulangkannya semula kepada penyelidik. Ketinggian, berat badan, ukuran pinggang dan tekanan darah anda akan diambil oleh penyelidik.

#### **4. SIAPA YANG TIDAK BOLEH MENYERTAI KAJIAN INI?**

Sekiranya anda bukan warganegara Malaysia, mempunyai satu atau lebih masalah kesihatan kronik (contohnya diabetes mellitus tahap 2, hipertensi, penyakit jantung, kanser, strok, dan lain-lain), wanita hamil atau menyusui, pelajar pra-universiti atau pasca-siswazah dan kakitangan universiti, anda tidak boleh mengambil bahagian dalam kajian ini.

#### **5. APAKAH FAEDAH MENYERTAI KAJIAN INI?**

##### **a) KEPADA ANDA SEBAGAI PESERTA?**

Anda tidak akan mendapat faedah secara langsung daripada menyertai kajian ini. Walau bagaimanapun, jawapan yang anda telah berikan dapat membantu penyelidik untuk mengetahui lebih lanjut mengenai faktor yang berkaitan dengan status berat badan dalam kalangan pelajar ijazah sarjana muda. Selain itu, anda dapat mengetahui status berat badan anda melalui kajian ini.

##### **b) KEPADA PENYELIDIK?**

Penyelidik dapat mengetahui kelaziman kegemukan dan obesiti dalam kalangan pelajar ijazah sarjana muda dan faktor-faktor yang berkaitan dengannya. Hasil penemuan daripada kajian ini dapat dijadikan sebagai rujukan untuk kegunaan penyelidikan pada masa akan datang. Penyelidik juga dapat membuat program promosi kesihatan mengenai pemakanan dan gaya hidup sihat untuk meningkatkan status pemakanan dalam kalangan golongan belia terutamanya pelajar universiti.

#### **6. ADAKAH IA BERISIKO?**

Kajian ini berisiko rendah kerana ia melibatkan prosedur bukan invasif. Prosedur yang terlibat adalah pengukuran berat badan, ketinggian, ukuran pinggang dan tekanan darah serta pengisian borang soal selidik.

#### **7. ADAKAH MAKLUMAT DAN IDENTITI SAYA KEKAL RAHSIA?**

Semua maklumat yang diberikan akan kekal sulit dan hanya digunakan untuk tujuan akademik sahaja. Penyelidik tidak akan mendedahkan nama atau sebarang maklumat peribadi anda kepada pihak ketiga. Tiada penerangan individu akan dilakukan pada mana-mana bahagian kajian atau penerbitan.

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

Jika anda mempunyai sebarang soalan semasa mengikuti penyelidikan ini, anda boleh menghubungi:

Nurfarah Aida binti Shahrudin (Penyelidik)  
[nurfarahaida.nfa@gmail.com](mailto:nurfarahaida.nfa@gmail.com) 019-5570773

Dr. Barakatun Nisak binti Mohd Yusof (Penyelia)  
[bnisak@upm.edu.my](mailto:bnisak@upm.edu.my) 03-89472524

Jika anda mempunyai sebarang pertanyaan mengenai hak anda sebagai responden dalam kajian ini, anda boleh menghubungi:

Jawatankuasa Etika Universiti untuk Penyelidikan Melibatkan Manusia (JKEUPM), Universiti Putra Malaysia melalui 03-89471601 atau e-mel kepada [dir.rmc@upm.edu.my](mailto:dir.rmc@upm.edu.my)

*Sila tandatangan di sini sekiranya anda telah membaca dan memahami kandungan halaman ini* \_\_\_\_\_



9. PERSETUJUAN

Saya..... No Kad Pengenalan. ....  
beralamat.....

.....dengan ini bersetuju untuk mengambil bahagian secara sukarela dalam penyelidikan yang tersebut di atas \*(kajian klinikal/percubaan ubat-ubatan/rakaman video/kumpulan sasaran/temuduga/ soal selidik).

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

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

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

\*potong yang tidak berkenaan

Tandatangan ..... Tandatangan .....  
(Responden) (Saksi)

Tarikh :..... Nama :.....  
No. K/P: .....

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

Tarikh ..... Tandatangan .....  
(Penyelidik)