UNIVERSITI PUTRA MALAYSIA

ASSOCIATIONS BETWEEN SOCIO-DEMOGRAPHIC FACTORS, LIFESTYLE FACTORS, BODY WEIGHT STATUS AND NIGHT EATING SYNDROME (NES) AMONG UNDERGRADUATE STUDENTS IN SELANGOR

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BY

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

ACKNOWLEDGEMENTS

First and foremost, I would like to extend my deepest appreciation and thanks to my respected supervisor, Assoc. Prof. Dr. Chin Yit Siew, who had provided me with persistence guidance and support throughout the journey in completing this research. As someone whom I looked up to, her immense knowledge and profound experiences inspired me in so many ways. It was truly my privilege to conduct this research under her supervision.

I also wish to express my sincere thanks to all my friends and postgraduates who assisted me throughout the data collection and data analysis. Without their support and assistance, all of this would not have been possible.

Last but not least, my deepest thanks goes to my parents and family. Their unwavering support and encouragement is my source of strength.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

ASSOCIATIONS BETWEEN SOCIO-DEMOGRAPHIC FACTORS, LIFESTYLE FACTORS, BODY WEIGHT STATUS AND NIGHT EATING SYNDROME (NES) AMONG UNDERGRADUATE STUDENTS IN SELANGOR

Nurul Huda Ali

Night eating syndrome (NES) is a disorder characterized by morning anorexia, evening hyperphagia, and insomnia with awakenings followed by nocturnal food ingestion. With the challenges to adapt with new environment and to cope with hectic schedule, stressful events faced in university could alter eating behaviors among undergraduate students. Hence, this study was conducted to determine the associations between socio-demographic factors, lifestyle factors, body weight status and NES among undergraduate students in Selangor. This cross-sectional study involved 263 undergraduate students (mean age: 21.6±1.28 years), who were recruited from both public and private universities in Selangor, Malaysia. The questionnaire that assessed socio-demographic background, smoking, alcohol consumption, psychological distress, physical activity, sleep quality and eating behaviors were completed by the undergraduate students. Anthropometric measurements of the undergraduate students were measured by the researcher. The results showed that the prevalence of NES was 11.2% with a mean NES score of 16.11 ± 6.03. Male undergraduates have higher mean NES score than their female counterparts (t=2.585, p=0.010). About one in ten of the undergraduate students were underweight (12.1%) while 23.1% of them were overweight and obese. Further, severity of depression (r=0.331, p=<0.001), anxiety (r=0.280, p=<0.001), stress (r=0.265, p=<0.001), poorer sleep quality (r=0.460, p=<0.001), higher risk of emotional and restrained eating (r=0.249, p=<0.001; r=0.139, p=0.029), as well as frequent snacking in supper (r=0.376, p=<0.001) were correlated with higher severity of NES. In conclusion, about one in ten of the undergraduate students were facing NES. It is suggested that future health promotion intervention program among university students should consider psychological well-being, proper meal and snack time as well as sleeping pattern.

ABSTRAK

KOLERASI ANTARA FAKTOR SOSIO-DEMOGRAFI, FAKTOR GAYA HIDUP DAN INDEX JISIM BADAN DENGAN SINDROM MAKAN MALAM (NES) DALAM KALANGAN SISWAZAH SARJANA MUDA DI SELANGOR

Nurul Huda Ali

Sindrom makan malam (NES) merujuk kepada gangguan pada pola pemakanan yang boleh dicirikan kepada tabiat untuk tidak mengambil sarapan di waktu pagi, cenderung untuk makan pada lewat malam dengan kadar berlebihan, gangguan pada pola tidur dan diikuti dengan keinginan yang tinggi untuk makan selepas waktu makan malam. Dengan cabaran untuk menyesuaikan diri dengan persekitaran baru dan disamping jadual yang sibuk, perkara yang mengundang tekanan yang dialami di universiti mampu mengubah tingkah laku pemakanan dalam kalangan siswazah. Oleh itu, kajian yang akan dilakukan ini dibuat bertujuan untuk menyelidik kolerasi antara faktor sosio-demografi, faktor gaya hidup dan jisim index badan dengan sindrom makan malam dalam kalangan siswazah sarjana muda di Selangor. Kajian yang disertai seramai 263 orang siswazah sarjana muda (purata umur: 21.6±1.28 tahun) ini melibatkan pelajar dari universiti awam dan swasta di Selangor, Malaysia. Satu set soal selidik yang meliputi soalan mengenai latar belakang sosio-demografi, tabiat merokok dan pengambilan alcohol, gangguan emosi, tahap aktiviti fizikal, kualiti tidur dan corak pemakanan telah dilengkapkan oleh siswazah sarjana muda. Komposisi badan mereka juga diukur oleh penyelidik. Hasil soal selidik mendapati bahawa seramai 11.2% siswazah sarjana muda mempunyai sindrom makan malam dengan purata markah NES sebanyak 16.11 ± 6.03. Siswazah lelaki mempunyai purata markah NES yang lebih tinggi berbanding siswazah perempuan (t=2.585, p=0.010). Kira-kira satu per sepuluh dari mereka mengalami masalah kurang berat badan (12.1%) manakala 23.1% mengalami masalah berat badan berlebihan dan obesiti. Sebagai tambahan, kemurungan pada tahap tinggi (r=0.331, p=<0.001), kebimbangan (r=0.280, p=<0.001), tekanan (r=0.265, p=<0.001), kualiti tidur yang rendah (r=0.460, p=<0.001), risiko yang tinggi untuk makan secara beremosi dan makan secara terkawal (r=0.249, p=<0.001; r=0.139, p=0.029), serta pengambilan snek yang kerap pada waktu malam (r=0.376, p=<0.001) mempunyai kolerasi dengan keterukan yang lebih tinggi untuk mengalami sindrom makan malam. Kesimpulannya, kira-kira satu dari sepuluh siswazah sarjana muda mengalami NES. Oleh itu, program intervensi kesihatan dalam kalangan pelajar universiti adalah dicadangkan dan program ke arah kesejahteraan psikologi, pengambilan makanan dan snek yang sesuai serta pola tidur yang teratur harus dipertimbangkan.

CHAPTER 1

INTRODUCTION

1.1 Background

Night Eating Syndrome (NES) was identified earlier in 1955 among obese patients and were characterized by evening hyperphagia (25% of total energy intake after 7 pm), insomnia (at least half of the time) and morning anorexia (Stunkard, Grace, & Wolff, 1955). However, the evolution of studies changed the way it was defined. It varied over time with several revision and studies being conducted among different populations. After the first conceptualization back in 1955, the emotional component of 'eating with tension' and 'without enjoyment' was added (Rand & Kuldao, 1986). However, it was removed again in 1996 by Stunkard after revising the syndrome. It was further refined with criteria of no appetite for breakfast, 50% or more food taken in the late evening after 1900 hours and difficulty in getting to sleep and/ or staying asleep as well as nocturnal awakenings to eat. Birketvedt et al. (1999) then formally added the nocturnal ingestions, with a 3-month minimum duration of symptoms required. Further refinement was done by Stunkard (2003) in order to seek for differentiation of NES from other eating disorders. The researcher particularly emphasized on nocturnal eating and put into account the cultural difference by eliminating the 1900 hours-time restriction.

Further assessment acknowledged that the criteria set earlier were too restrictive and it were revised and broadened again by including "at least 25% of food consumed after the evening meal and/or at least two episodes of nocturnal eating per week". Distress as emotional component also reappeared as a core criterion (Allison, 2008). The latest

proposed diagnostic criteria of NES includes a significant increase in the evening intake, as manifested by excess food consumption after the evening meal and/or eating after awakening from sleep. It is also proposed that those with NES are aware and could recall their nocturnal eating episodes and this syndrome is reported to have an association with significant distress (Allison et al., 2010). Aside from that, at least three of the following descriptors are required to be met: (1) morning anorexia, (2) as strong desire or urge to eat between dinner and sleep initiation an/or upon awakenings at night from sleep, (3) sleep onset and maintenance insomnia, (4) the belief that one must sleep in order to sleep, (5) depressed or worsening of mood in the evening. NES must be present for at least 3 month and cannot be secondary to another medical or any psychiatric disorder. NES has now been identified as an eating disorder in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) under the classification of "Other Specified Feeding or Eating Disorder", OSFED (American Psychiatric Association, 2013).

Night eating syndrome (NES) differed from other sleep-related eating disturbance that have been documented previously such as Sleep-Related Eating Disorder (SRED) despite having similarities in some of its features. American Academy of Sleep Medicine (AASM, 2005) describes SRED as "recurrent episodes of involuntary eating and drinking during arousals from sleep that involve problematic consequences". Some of the consequences includes consumption of inedible food and/or substances, sleep-related injury, morning anorexia and/or negative impact on health such as weight gain. However, the episodes are characterized as out of control and those affected were not able to recall the night eating episodes that they had. This is contradicts with those with NES in which

they are conscious of what they were eating the night before (Allison et al., 2010) and this differentiates between SRED and NES.

With the global increased in the prevalence of overweight and obesity, problematic eating behaviors that could lead to high and uncontrolled consumption of food such as NES is seen as worth to be studied in order to better understand the nature of it. Occurrence of NES was more common in obese population compared to people with no weight issue (Gallant, Lundgren & Drapeau, 2012). In a research conducted among 68 overweight and obese individuals with serious mental illness, recruited from a behavioral weight loss treatment study, NES shows a prevalence of 25.0% among the obese people (Lundgren et al.,2013). Despite that, NES was also observed in general population. In a study conducted among college students, it showed that NES is prevalent among people of younger age, aged 18 to 30 years old and least common among older adults age 65 years old and above (Striegel-Moore et al., 2006).

Since nutritional development in the early adulthood is an investment for future health (Brown et al., 2005), the presence of NES among younger adults especially university students has receives great attention. In Asian region, a study done on Korean adolescents aged 12 to 18 years old shows that 21.0% of them appear to be a night eaters (Hernandez et al., 2016). The similar pattern can be observed in a research reported among university students in Turkey with a prevalent of 10.6% (Öner et al., 2018). However, the study on NES in local context is still scarce. To date, the only published studies on NES were conducted by Sarina and Poh (2015) which yield a prevalence of 23.4% as well as a study from Gan, Chin, and Law (2019) which showed that 12.2% of university students in a

public university have NES. Hence, more study and information is needed in order to better understand NES, especially among university students.

With the challenges and stressful events faced in university, it is common for university students to have high levels of psychological distress, sleep disturbance and altered eating behaviours, which have been shown to be related to NES (He et al., 2017; Nolan & Geliebter, 2012; Yahia et al., 2017). University or college years are the time where students are transitioning from adolescents into adulthood stage of life. At the age range of being a younger adults, students engaged with new environments, begin to gain independence and deal with many difficult changes. Changes in eating behaviors was one of it (Wasko, 2012) and this could lead to disturbed dietary pattern, which includes NES. Aside from that, university students also struggled and encounter with new challenges especially among those in their sophomore years (Barker & Galambos, 2007). Hence, their living environments could trigger emotional and lifestyle imbalance that would contribute to NES. Therefore, further investigation on the factors that are associated with NES especially among university students is highly warranted in local context.

1.2 Problem Statements

Night eating syndrome (NES) was considered as a dysfunction of circadian rhythm with a disassociation between eating and sleeping, which is characterized by an onset delay of appetite in the morning continued with evening eating. NES if not treated, would have a negative impact on one's health. Based on the previous studies conducted, the night shift workers who consumed a majority of daily nutrients in the evening tend to have a higher prevalence of overweightness, abdominal obesity (Macagnan et al., 2012) elevated triglycerides (Di Lorenzo et al., 2003) and impaired glucose tolerance

(Lennernas, Akerstedt & Hambraeus, 1994) compared to day workers. Those with NES tend to have obesity as they experienced a disturbed sleep pattern. A disturbed sleep pattern may lowered down the serotonin levels and this lead to a higher demands for carbohydrate of exogenous sources (Cleator et al., 2012). Therefore, this showed that there is a need to conduct NES to better understand its associated factor in order to tackle this issue.

Despite the negative implications of NES on health, NES is prevalent among university students. Nolan and Geliebter (2012) in a study among 246 university students in United States reported a prevalence of 5.6%. Likewise, Runfola et al., (2014) yield a prevalence of 4.2%. However, Sevincer et al. (2016) and Öner et al. (2018) in a study among university students in Turkey reported a higher prevalence compared to Western countries with a percentage of 9.5% and 10.6% respectively. Borges, dos Santos Figueiredo and do Souto (2017) reported a prevalence of 15.0% among 200 Brazilian university students. In Malaysia, 23.4% university students had NES (Sarina & Poh, 2015). These findings alarms for a need to study on NES further.

Aside from that, there were limited published study reported on NES and the factors associated with it among university students. Most of the studies found were from Western countries (Borges, Borges, dos Santos Figueiredo & do Souto, 2017; Nolan & Geliebter, 2012; Runfola et al., 2014) and very few were conducted in Asian region (Öner et al., 2018; Sevincer et al., 2016). The study on this issue is still scarce. Since development of eating disorder is related to socio-cultural background, given this factor significantly contributing to the occurrence of it (Keel & Klump, 2003), the related findings and the correlates of NES from the studies reported among Western populations

might differ from the one done in Malaysia. Hence, this urged for a need to study on NES issue in Malaysia, particularly among university students.

Locally, there is a research done on NES among university students that study the associations of socio-demographic status and body mass index with NES (Sarina & Poh, 2015). This study however, does not include other factors as variable in consideration and hence shows that there is a need for a further investigation. This study also propose that there is a need to include other parameters in the future studies.

Next, the previous published papers on NES demonstrated inconsistent findings especially in regards to sex. Some suggested that sex has an associations with occurrences of NES with higher prevalence being in males (He et al., 2017; Sarina & Poh, 2015). However, other studies done on the same variable reports on no sex difference (Nolan & Geliebter, 2012; Öner et al., 2018). The similar inconsistencies can be seen on the associations between body weight status and NES. Though NES is more common among those with weight issue in comparison with general community (Gallant et al., 2012), the findings from He et al. (2017) shows negative associations with body weight status. Sarina and Poh (2015) found out that high prevalence of NES occurred in respondents with normal weight. This inconsistency in the findings shows that further research is needed.

In order to better understand current situation and fill in the gap, the present study focusing on exploring the potential determinants for night eating syndrome such as lifestyle factors and body weight status in additional to socio-demographic factors is much needed. By studying this issue among university students, identification of the factors associated and the early symptoms of NES can be done. Hence, the research question needed to be answered in this study is;

1. Are socio-demographic, lifestyle factors and body weight status associated with NES among undergraduates in Selangor.

1.3 Significance of the Study

This research is done in the hope that the findings will fill the gap and the inconsistency in existing data on the associations between socio-demographic, lifestyle factors as well as body weight status on NES specifically among university students. Since there were limited published paper on NES especially among local university students, the findings can serve as baseline data for future studies on NES and add to the body of knowledge regarding this issue.

Next, the outcome from this study will benefits the health promotion planners in their upcoming intervention program. Often, the planners find difficulties in addressing the health issues especially among undergraduate students in university due to limited data and information available. Thus, the findings will help in planning a more appropriate intervention program by tackling the right issue and factors to the problem. For example, a proper stress management program can be planned to ensure that the students can cope with negativity of their emotions in a right manner and hence, preventing themselves from being at risk of having night eating syndrome. Nolan and Geliebter (2012) also suggest that studying NES among college students is informative and appropriate, given that disordered eating being the most common mental issue in college students (Zivin et al., 2009).

Aside from that, this study will allow for a better insight of this issue. Night Eating Questionnaire can be used to screen for the symptoms of NES and this, when being done among university students, will inform and raise awareness among them on the

importance of having a healthy eating behavior. This is also in line with the suggestion from a study by He et al. (2017), where the researchers claimed that more attention need to be given on the prevention, detection and treatment of NES among the college students.

1.4 Research Objectives

1.4.1 General Objective

To determine the factors associated with night eating syndrome (NES) among undergraduate students in Selangor.

1.4.2 Specific Objectives

1. To determine the socio-demographic factors (age, sex, ethnicity, living arrangement, monthly household income), lifestyle factors (smoking, alcohol consumption, psychological distress, sleep quality, physical activity, eating behaviors) and body weight status among undergraduate students in Selangor.

2. To determine the prevalence of night eating syndrome (NES) among undergraduate students in Selangor.

3. To determine the associations between socio-demographic factors, lifestyle factors, body weight status and night eating syndrome (NES) among undergraduate students in Selangor.

1.5 Hypotheses

1. There are associations between socio-demographic factors and NES among undergraduate students in Selangor.

2. There are associations between lifestyle factors and NES among undergraduate students in Selangor.

3. There are associations between body weight status and NES among undergraduate students in Selangor.

1.6 Conceptual Framework

This study aims to determine the factors associated with NES among undergraduate students in Selangor. Based on Figure 1.1, socio-demographic, lifestyle factors and body weight status were the independent variables that hypothesized to have an impact on NES. NES is the dependent variable in this study.

Socio-demographic characteristics played a role in which NES was reported to commonly occur among people of younger age, range from 18 to 30 years old and least common among older adults of 65 years old and above (Striegel-Moore et al., 2006). In relation to sex, a few studies claimed that occurrence of NES is more prevalent among males than females (He et al., 2017; Sarina & Poh, 2015). Living arrangement is also hypothesized to have an association as those living far away from family developed unfavorable eating habits due to an altered dietary patterns (Papadaki et al., 2007). This may contribute to the occurrence of NES.

Next, lifestyle factors were hypothesized to have an association with NES. There were limited studies being conducted on physical activity and NES. However, Mensink, Loose and Oomen (1997) reported an association between physical activity and breakfast skipping, which is one of the features describing NES. Hence, further studies need to be done on this variable. Aside from that, stress, anxiety and depression were also significantly associated with NES (He et al., 2017; Sevincer et al., 2016; Thompson & DeBate, 2009). Eating behaviors such as breakfast skipping will be included, given that this behavior was one of the criteria explained for NES (Allison et al., 2010). Other than

that, emotional and restrained eating have a significant associations with NES at different severity levels (Nolan & Geliebter, 2012).

Next, NES was associated with a poor sleep quality (Yahia et al., 2017) in which altered eating pattern in NES individuals disturbed the circadian rhythm and sleeping pattern (DiGiulio, 2017). Body composition, particularly body mass index also plays a role in occurrence of NES as being reported by Harb et al. (2012). Though NES was first identified among obese populations and was common among people with a high BMI, a severe NES episode was also reported among normal weight respondents (Sarina & Poh, 2015).

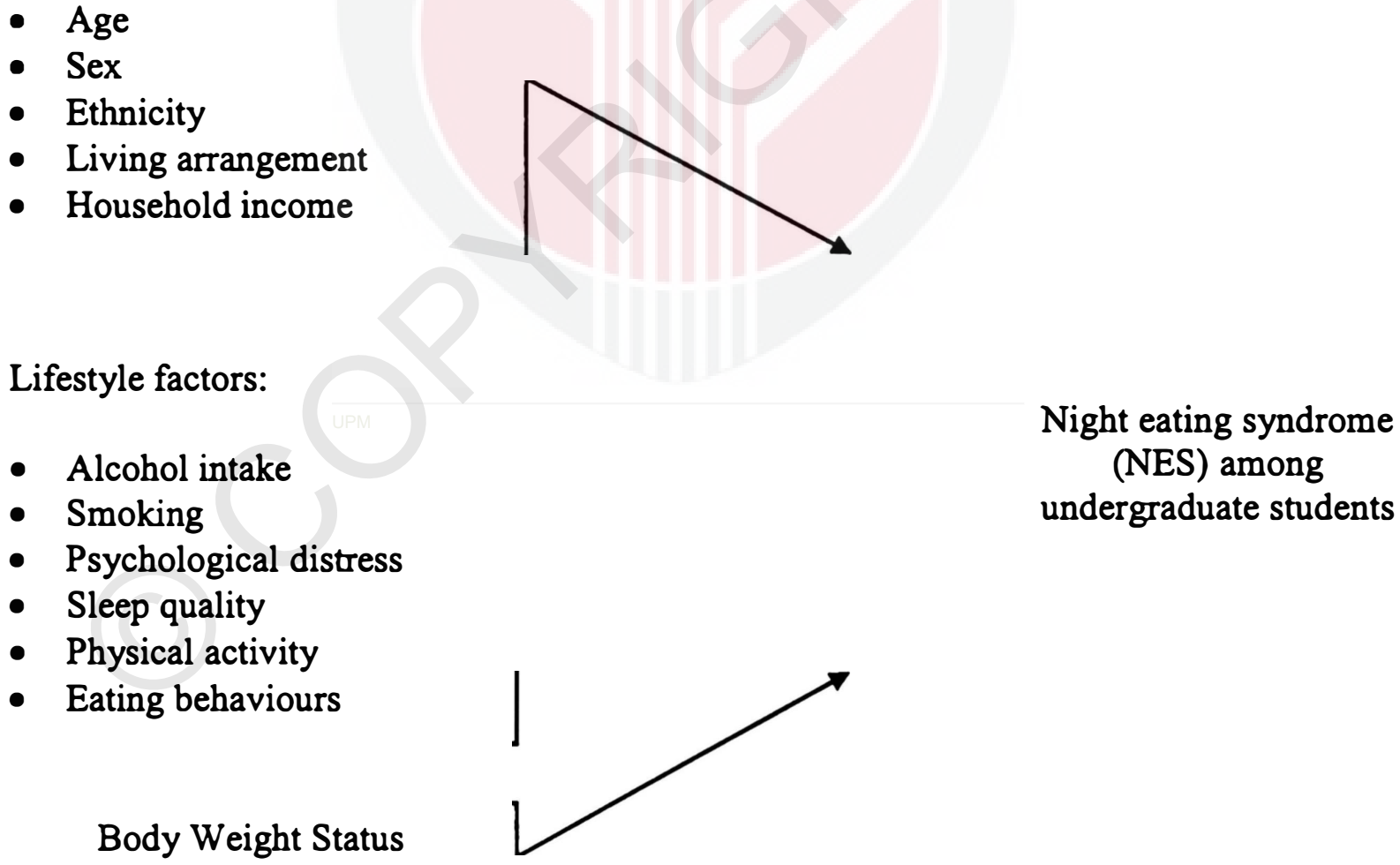


Figure 1.1: Conceptual framework of this study

CHAPTER 2

LITERATURE REVIEW

2.1 Night Eating Syndrome

Night eating syndrome (NES) can be referred to a delayed circadian pattern of food intake (Allison et al., 2010) with the core criteria of significant increase in the energy intake as manifested by excess food consumption after the evening meal or eating after awakening from sleep as well as awareness to recall the episodes of nocturnal eating. Those with NES tend to have lack of appetite in the morning, which results in excess amount of food being eaten later on and waking up at night to eat, in order to get back to sleep.

This syndrome was reported to be prevalent among younger adult aged 18 to 30 years old (Striegel-Moore et al., 2006), especially among university students (Nolan & Geliebter, 2012; Öner et al., 2018; Runfola et al., 2014; Sarina & Poh, 2015). University students may face difficulty to maintain a healthy eating behaviors as their hectic schedule potentially alter their dietary intake. As being reported by Boek et al. (2012), university students usually have poor eating habits and lacking in adequate dietary nutritional intake. Hence, this might lead to the episodes of nocturnal eating or NES.

Aside from the unhealthy eating behaviors that were associated with NES (Allison et al., 2005; Nolan & Geliebter, 2012), other factors that were associated with this syndrome includes the unhealthy lifestyle, characterized by alcohol consumption, lacking of physical activity as well as poor sleep quality (Lloyd-Richardson et al., 2008; Mensink, Loose, & Oomen, 1997; Yahia et al., 2017).

NES may negatively affect one's health and results in obesity if left untreated. This happened when people with NES have a disturbed sleep, causing them to have a lower serotonin level and leads to a high carbohydrate demands (Cleator et al., 2012).

2.2 Socio-demographic and NES

Socio-demographic is one of the variable studied. 'Demographic' refers to the certain characteristics in a population and it commonly includes the age, race, gender, ethnicity, religion, income and education, home ownership, sexual orientation, marital status, family size, health and disability status as well as psychiatric diagnosis of an individual. This variable will usually be put into consideration in a research. Demographic data of the targeted participants provided in a research helps in identification of whether the individuals selected are representative of the whole sample. This is important for generalization purposes of the findings (Salkind, 2010). From the study conducted by He et al. (2017), gender is shown to have correlation with NES where it is more likely to appear in males compared to females. Likewise, Sarina and Poh (2015) reported that in a study among university students in Shah Alam, Selangor, the prevalence of NES among males exceeded females with a percentage of 37.5% compared to 16.7%. According to Andersen et al. (2004), men have higher tendency to have NES due to the increase risk of developing obstructive sleep apnea that perpetuate in night eating behavior. Besides that, NES was significantly associated with age, supported with higher prevalence among younger age population. As being reported by Striegel-Moore et al. (2006), higher percentage of university students were diagnosed and met the criteria for NES. Aside from that, living arrangement of the university students is also considered because Papadaki et al. (2007) reported that those who lives away from their family have an altered dietary

patterns where they developed unfavorable eating habits. This may contribute to the occurrence of NES.

2.3 Lifestyle Factors and NES

Lifestyle is a modifiable variable that plays a role in our overall well-being and ultimately under one's own control (Sharma al., 2013). In this study, the lifestyle factors to be reviewed focuses primarily on smoking, alcohol consumption, psychological distress, sleep quality, physical activity as well as eating behaviors.

2.3.1 Smoking

Cigarette smoking is a modifiable factor that commonly affects dietary habits. In a study on smoking and diet among Iranian adults, smokers significantly reported to eat more fast food and white meat but less on fruit, vegetables and dairy products (<0.0001) (Heydari et al., 2014). This unhealthy food choices may be explained by taste preference due to metabolic effect of nicotine. This poor dietary habits could lead to NES in which an observational study reflects that a low diet quality was found among adult late sleepers who are also a late-eaters (Baron et al., 2011). The study reported that those late-eaters, reflecting the behavior of having NES, consumed fewer daily servings of fruits and vegetables as well as greater weekly servings of fast food compare to early-eaters. This information suggest that smoking might be associated with NES but further studies need to be done on this.

2.3.2 Alcohol Consumption

Malaysia is among the tenth of the largest consumer of alcohol in the world (Yahaya, 2000) and alcoholism among Malaysian youth has become a growing concern. In a study to identify the characteristics of current drinker and risky alcohol-drinking

pattern by profiles in Malaysia, it was reported that the onset for alcohol drinking was 21 years old, with a higher prevalence among urbanites, Chinese, those with high education as well as those with high household income (Mutalip et al., 2014). Alcohol consumption lead to alteration of eating pattern and have a significant influence on the eating habits of college freshman in a study conducted by Lloyd-Richardson et al. (2008). The study reported that moderate-risk drinkers is more likely to report increase in appetite after drinking, characterized by overeating and consumption of unhealthy food. The students were reported to have a high levels of late-night eating and consumed high fat food after the drinking episodes. Though alcohol is a calorie-dense nutrient that usually suppress brain appetite (Yeomans, 2010), a study by Cains et al. (2017) showed that alcohol containing ethanol triggers a signal in brain and sustains a false "starvation alarms" and hence, making the brain think that it is hungry despite of the cellular nutrient sufficiency. This suggest that with the excessive food consumption after drinking, alcohol consumption might have a potentially association with NES. However, further studies needed to confirm the findings.

2.3.3 Psychological Distress

Depression

Depression by definition referred to a medical illness that affect one's emotions, thought and behavior negatively. This feelings of sadness may cause one to loss passion in events that they once enjoyed with and potentially lead to many problems that decline one's ability to function productively (American Psychiatric Association, 2017). This psychological distress reflects much about NES in which Allison et al. (2010) described

that worsening of mood, notably in evening was one of the criteria explained for NES. Hence, it is appropriate to study the relationship between this factor and NES.

According to Eating Disorder Hope (2015), NES is usually accompanied by a few morbid conditions and this was supported by a high prevalence in a study among 155 depressed outpatients, recruited from a hospital in Turkey. This study yield a result showing that among those patients, 21.3% of them were identified with NES. The logistic regression used in finding the predictors for NES among them shows that the average Beck Depression Inventory scores is significantly higher in NES group ($t=3.023$, $p< 0.001$). This indicates that people with NES comorbid diagnosis shows a greater severity in depressive score.

Among general population, a high percentage of being depressed was observed among United States adults aged 18 years old and above with higher prevalence occur among females (National Institute of Mental Health, 2017). Locally, National Health and Morbidity Survey (2017) on Adolescents Mental Health reports an increase prevalence in depression among Malaysian adolescents with a percentage of 18.3%, compared to the one in NHMS 2012.

University students especially are more likely to deal with unfavorable events that affect emotions and depression were found to be prevalent among them (Shamsuddin et al., 2013). Several studies highlighted the correlation of depression with NES (He et al., 2017; Sevincer et al., 2016). From the sample of 210 university students in Istanbul, Turkey in identifying the factors associated with problematic eating behaviors among them, the score of Beck Depression Inventory (BDI) in assessing depressive symptoms shows a positive correlation with Night Eating Questionnaire (NEQ) score ($r=0.38$, $p<$

0.001) (Sevincer et al., 2016). This was supported by He et al. (2017) which yield the same result using the same instruments in measuring those variables. These findings shows that it is reasonable to further study this variable in relation to NES.

Anxiety

In relation to NES, anxiety is another psychological factors to be studied. Anxiety can be defined as an emotion, characterized by a sense of tension, worrisome and physical changes (American Psychological Association). Those who have this anxiety disorders usually engaged with intrusive thoughts and concerns. Sweating, trembling, dizziness and rapid heartbeat were among the symptom associated with anxiety. The episodes of anxiety may altered the eating habits which leads to NES. Looking back at the prevalence of anxiety among university students, a study conducted on 1350 randomly recruited medical students in Brazil shows that the prevalence was 81.7% and 85.6% for state-anxiety and trait-anxiety respectively (Mayer et al., 2016). This high prevalence is accordance with the one reported by Abdel Wahed and Hassan (2017) in a cross-sectional study among medical students of Fayoum University, where the prevalence of anxiety was 64.3%. This proves that anxiety is common among university students.

Similarly, He et al. (2017) in a study to investigate the prevalence and factors associated with NES among 909 Chinese college students reported that anxiety is significantly correlated with Night Eating Questionnaire (NEQ) scores ($r=.456$, $p<0.001$). It was supported by Sevincer et al. (2016) in the study, reporting on the same findings while the screening of NES in a research by Hilbert et al. (2014) shows an association between anxiety and NES. Three different instruments; DASS-21, Beck Anxiety Inventory (BAI) and Patient Health Questionnaire (PHQ-4) were used in assessing

anxiety and all came out with similar correlation findings. The linkage of anxiety with the occurrence of NES were found and it tends to co-occur with anxiety based to a literature review made (Vander Wal, 2012), making this variable appropriate to be considered.

Stress

According to Butler (1993), there are three ways of defining stress and each refers to different concept. It could be defined according to stimulus-based where it usually results from pressure, a response-based where stress is seen as a response produced against an aversive stimuli as well as stress as a dynamic process. Either way, this variable affect human functioning in many aspects and coping with this issue is much needed especially among university students where most of them are susceptible to hurried lifestyle that could induce stress. Those living in stressful environment would opt for eating more than normal as a coping method (Gower, Hand & Crooks, 2008). In several studies done, stress have been found out to have an association with night eating syndrome (He et al., 2017; Meule et al., 2014; Sevincer et al., 2016). The same result was also shown is a study among 95 undergraduate age 18-25 years old in southern California, where perceived stress is found to have an association with NES (Wichianson et al., 2009). From the mediation analyses done in this study, it suggests that maladaptive coping strategies is used while experiencing with high stress level and this lead to NES.

2.3.4 Sleep Quality

Recurrent episodes of eating during the night were faced by sleeping teenagers and adults, whether they are dreaming or not. The eating habits may represent either a sleep disorder or an eating disorder, such as NES, depending on few factors (Kaufman & Milstein, 2013). Sleep quality is shown to have significant association with NES in several

studies (Mok, 2015; Yahia et al., 2017). By using Pittsburgh Sleep Quality Index (PSQI) among 431 undergraduate students of Central Michigan University, NES is significantly associated with sleep duration (p= 0.023) (Yahia et al., 2017). Comparison were also made between students there and those complying with NES reported to have shorter sleep time and high PSQI score than those without. To explain this matter, dietary factors potentially affect our circadian rhythm and sleeping pattern (DiGiulio, 2017). Those affected with NES were described to have altering eating patterns reflected by high dietary fats percentage (Gallant et al., 2014) and this was associated with lighter and less restorative sleep with more arousals (St-Onge et al., 2016). In a study conducted among Hong Kong adolescents by Mok (2015), it was reported that sleep apnea, difficulty in breathing during sleeping and snoring is associated with NES.

2.3.5 Physical Activity

Physical activity is also hypothesized to have an association with NES. Physical activity refers to any bodily movement produced by skeletal muscle that require energy expenditure (World Health Organization, 2018). Insufficient of physical activity has always been a concern and it was reported that the levels of insufficiency did not show significant improvement over the past 15 years (28.5% in 2001; 27.5% in 2016). When being stratified into gender, women shows a higher physical inactivity in comparison to men with a prevalence difference of 10% across all regions (except for Western Pacific Region) and it was even higher in South East Asia Region. Since physical inactivity were prevalent among a wide range of group, university students are not the exceptional. The local prevalence among university students does not differ much from the global statistics. In a study among 894 university students of Universiti Putra Malaysia, Said and Azuhairi

(2014) reported a high prevalence of physical inactivity among them (41.4%). The lacking of physical activity engagement might be attributed by the factor of cost-effective facilities, motivation and skills as well as the time constraint (Samir, Mahmud, & Khuwaja, 2011).

Lacking of physical activity might affect the overall quality of life of an individual (Bize, Johnson, & Plotnikoff, 2007) as well as impacting the eating behaviors. Currently, there are limited paper discussing on the linkage between physical activity and NES. However, Roura et al. (2016) reported that physical activity have an association with eating habits. The study found that among 2519 Spanish adolescents studied, those who engaged in low or very low physical activity have an unhealthy dietary habits, characterized by less fruits and excessive fried food consumed. Since those undesirable diets were related with being a night eaters (Hernandez et al., 2016) and were affected by physical activity, this study proposed that physical activity could have an associations with NES. In addition to that, Öner et al. (2018) in a study on night eating syndrome among young adolescents discussed that the combination of poor psychosocial functioning as well as poor physical activity make them more sensitive to develop night eating syndrome. Mensink, Loose and Oomen (1997) also reported that physically active individuals are often a routine breakfast consumers, indicating that are less likely to skip breakfast. Since breakfast skipping is one of the features that describe NES and it has a relationship with being physically active, it is appropriate to study the relationship between this factor and NES. Further studies need to be done to confirm the findings.

2.3.6 Eating Behaviors

Emotional Eating

Eating behaviors played a crucial roles in the risk of having night eating symptoms particularly among university students. In a study to examine the food choice determinants among 405 college students by Boek et al. (2012), it was observed that students usually have poor eating habits and lack in adequate dietary nutritional intake. This could be attributed by various unhealthy dietary behavior practiced, which include disordered eating behavior.

Disordered eating refers to a pattern of abnormal eating behaviors that may ultimately lead to an eating disorder (Bryla, 2003). Some of the examples of disordered eating includes dieting, restrictive eating, binge eating and emotional eating. Occurrence of disordered eating was quite common among university students as being reported by Eow and Gan (2013) which yield a high prevalence of 21.8%. This behaviors potentially increase in severity and lead to eating disorder if not well studied and treated. Hence, it is appropriate to include emotional eating in this study as research found an association between this behavior and NES.

Emotional eating is characterized by increased eating in response to negative affect (Lindeman & Stark, 2001) and distress (Van Strien & Ouwens, 2007). Nolan & Geliebter (2012) in a study among 246 university students to look at the correlations between emotional and restrained eating with NES reported that emotional eating is associated with NES at different levels. The analysis revealed that those in full syndrome NES category had a significantly higher emotional scores (p=.004) compared to those in moderate, mild and normal category. In coping with stressful life events in university,

females especially tend to increase their food consumption as food were used as distraction to escape unpleasant feelings (Bennett, Greene & Schwartz-Barcott, 2012). This unhealthy eating behaviors will potentially lead to NES.

Restrained Eating

Restrained eating behavior refers to tendency to restrict dietary intake with the intention to lose body weight or avoid from gaining weight (Pietrowsky, Straub, & Hachl, 2003). According to a study by Nolan & Geliebter (2012), NES is associated with restrained eating in which moderate category of NES reported a lower restrained score compared to normal and full NES category. This is supported by Allison et al. (2005) that showed higher restraints scores in individuals with NES compared to non-NES in a study using EDE in assessing restrained eating. However, limited study conducted requires for a further studies to determine the correlation between restrained eating and NES.

Meal Skipping and Snacking

Meal skipping refers to an act of skipping one or more traditional main meals which could either be breakfast, lunch or dinner throughout the day. It was observed that university students skipped breakfast the most, out of other main meals according to a local study done (Gan et al., 2011). In relation to NES, a study conducted among 3903 Korean populations with night eating, aged 20 years old and above shows a positive correlation between breakfast skipping and NES. Similarly, those night eaters who consumed 500 kcal of energy and above shows association in being a breakfast skipper in a study by Suh, Lee and Chung (2012). The delay in the circadian pattern of food intake in those with NES (Sevincer et al., 2016) might be the possible explanation to the

breakfast skipping episodes. Study by Martin et al. (2000) also reported that breakfast skipping will cause overeating later in the evening and hence leading to NES.

Snacking is also found to have a relation with NES according to Gallant et al. (2014) and this was supported by Jun, Choi, and Bae (2015) in a study among 664 university students in Korea where 77.3% of them regularly ate night time snacks. Masoumeh and Vahideh (2015) explained that snacking in the midnight reduce the overnight fasting period and hence, suppress hunger as well as increase the likelihood of skipping breakfast. This study support the fact that both breakfast skipping and snacking are closely related and potentially have a significant effect on NES. However, further research need to be done to confirm the findings on these variables.

2.4 Body Weight Status and NES

Night eating syndrome was first reported among obese patients who sought for weight loss treatment back in 1955 (Stunkard et al., 1955). Since then, several studies have been conducted among various populations to better understand about this syndrome. According to Gallant, Lundgren and Drapeau (2012), the trends in the past literature revealed that weight-problems individuals were among the populations that are at greater risk for developing NES. In exploring the relationship between obesity and NES, several studies had been conducted by taking body mass index into account (Gluck, Geliebter, & Satov, 2001; Runfola et al., 2014; Sarina & Poh, 2015).

In relation to NES, BMI is hypothesized to have a significant associations. Sarina and Poh (2015) did a research among university students in Shah Alam, Selangor and among 124 respondents studied, it was found that high prevalence occur among normal weight respondents. Runfola et al. (2014) on the other hand reported that students with

NES are more likely to have histories of underweight and anorexia. This indicates that those with NES do not necessarily linked to high BMI. However, several studies done supported that BMI is correlated with NES. The screening result of NES from a study done among German population shows that BMI is significantly associated with NES. Sevincer et al. (2016) reported the same findings. Contradicts with those results, several studies (He et al., 2017; Nolan & Geliebter, 2012; Öner et al., 2018; Yahia et al., 2017) reported a negative association. Thus, further study need to be done on this variable to confirm the findings among Malaysian university students.

CHAPTER 3

METHODOLOGY

3.1 Study Design

This was a cross-sectional study, which aimed to determine the associations between socio-demographic factors, lifestyle factors, body weight status and night eating syndrome (NES) among undergraduate students in Selangor.

3.2 Study Location

This study was conducted in selected universities in Selangor. Selangor is centrally located on the west coast of Peninsular Malaysia and is known to be one of the most prosperous and developed states in Malaysia. Both of Malaysia's capital and federal administrative capital; Kuala Lumpur and Putrajaya, lie within the bound of Selangor. This urban state was characterized by its excellent healthcare, recreational centers and educational institute. Selangor has also the most institution of higher learning in Malaysia. The selected universities in this study were Universiti Putra Malaysia, representing the local institute as well as University of Nottingham Malaysia, representing the private institute.

3.3 Sample Size Determination

To date, there were limited study conducted on NES in Malaysia among university students. Hence, both local and the oversea study among university students in assessing the prevalence and associate factors with NES were taken into account. The formula chosen to calculate the number of sample size was based on the study's objectives.

1. To determine the prevalence of NES among undergraduate students in Selangor.

The proportion formula by Lemeshow et al. (1990) was used to determine the sample size of this study.

$$n = \frac{\{z_{1-\frac{\alpha}{2}}\sqrt{2P(1-P)} + z_{1-\beta}\sqrt{P1(1-P1) + P2\,(1-P2)}\}^2}{(P1-P2)^2}$$

Where,

n = Sample Size

$z_{1-\frac{\alpha}{2}}$ = z score for level of significance in two-sided test (level confidence of 95% = 1.96)

$z_{1-\beta}$ = z score for power of the test (90% of power = 1.28)

P1 = Estimated proportion in group 1

P2 = Estimated proportion in group 2

P = Average proportion of group 1 and 2, (P1 + P2)/2

$$n = \frac{\{1.96\sqrt{2(0.271)(1-0.271)} + 1.28\sqrt{0.375(1-0.375) + 0.167\,(1-0.167)}\}^2}{(0.375-0.167)^2}$$

$$n = \frac{\{1.96\sqrt{3} + 1.28\sqrt{(0.23+0.14)}\}^2}{0.043}$$

n =71

P value from a study conducted among Malaysian university students was used. According to Sarina and Poh (2015), the proportion of NES among male university students was 37.5 % while the proportion of NES among female university students was 16.7 %. This results in P1= 0.375, P2= 0.167, P= 0.271 and n= 71 for each group. Hence, the total sample size needed was 142.

Based on the calculation made, the number of sample size obtained was 142. Due to the cluster sampling design of this study, an adjustment was made with estimation of low design effect (DEFF). The DEFF is 1.3 (Aday & Cornelius, 2006). The design effect for the sample was computed in the additional adjustment calculation (Table 3.1).

Table 3.1: Additional Adjustment in Computing the Sample Size

No.	Criteria	Sample Size Calculation
1.	Adjust for the estimated sample size	n x DEEF DEEF = 1.3, therefore n = 142 x 1.3 = 184.6 = 185
2.	Adjust for the estimated response rate	n/ response rate Response Rate = 0.80, therefore n = 185 / 0.80 = 232
3.	Adjust for the expected proportion eligible	n/ proportion eligible % eligible = 0.90, therefore n = 232/ 0.90 = 258

Therefore, the sample size required to be recruited for this study was approximately 258.

3.4 Sampling Design

This study involved undergraduates students from selected universities in Selangor area as the target populations. Multistage sampling method was used in recruiting the participants. First, the selection of 40 universities in the Selangor area was stratified into public universities and private universities. Then, one university and one faculty was chosen via simple random sampling. One program from the faculty selected was also chosen. The selected programs were Bachelor of Landscape Architecture

(n=183) from Universiti Putra Malaysia and Bachelor of Biomedical Sciences (n=80) from University of Nottingham Malaysia. An approximate of 263 participants were invited to participate in the present study.

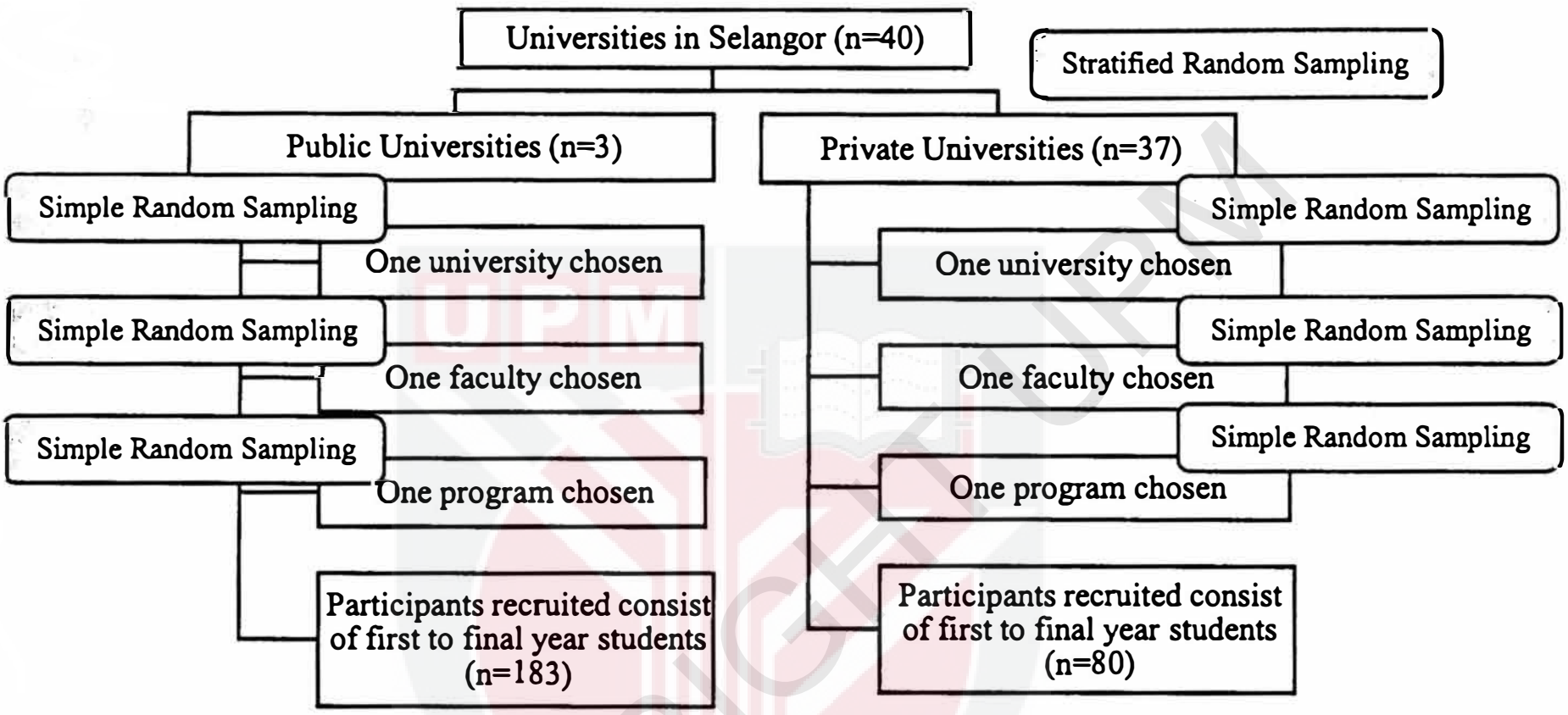


Figure 3.1: Flow chart of the sampling design and selection of target participants

The present study had collected data from 263 out of 301 respondents. The response rate obtained was 87.4%.

3.5 Subjects

In this study, the undergraduate students from selected universities around Selangor were recruited as the participants. The subjects were selected with the consideration of inclusion and exclusion criteria as follows;

Table 3.2: Inclusion and exclusion criteria for the subjects

Inclusion	Exclusion
- Undergraduate students	- International students
- Males or Females	- Pregnant students
- 18 years old and above	- Having physical disabilities
- Malaysian students	- Taking medication (example; antidepressant, Lorcaserin) that would potentially affects sleeping pattern and appetite

3.6 Measures

3.6.1 Self-administered questionnaire

Self-administered questionnaire was used in assessing the socio-demographic factors, lifestyle factors and night eating syndrome (NES) of the undergraduate students. The details are as listed below.

3.6.1.1 Socio-demographic factors

Socio-demographic factors consist of 9 items, to seek information on age, sex, ethnicity, faculty, program, year of study, living arrangement, parent's educational level and monthly household income of the undergraduate students.

3.6.1.2 Lifestyle Factor

Smoking Status

In determining the smoking status of the participants, three questions were adopted from validated Global Adult Tobacco Survey (GATS) questionnaire (CDC, 2011). GATS was developed by World Health Organization (WHO) and Centers for

Disease Control and Prevention (CDC) to provide a global standard protocol for consistent monitoring of adult tobacco use.

In this questionnaire, there were three questions being asked; 1) Do you currently smoke tobacco on a daily basis, less than daily or not at all? 2) Have you smoke tobacco daily in the past? 3) In the past, have you smoked tobacco on a daily basis, less than daily or not at all?. The first question was used to measure the current use. Those who answered "less than daily" proceeded to the second question which measured the past daily use for current, less than daily smokers. The third question measured the past use for current non-smokers. This instrument provided data on the prevalence of current tobacco smoker, former tobacco smoker and non-smokers.

Alcohol Intake

In determining the alcohol intake of the participants, questions used was adopted from National Health Survey (2004), which was based on the Behavioural Risk Factor Surveillance System Questionnaire (CDC, 1998). There were two questions; 1) Have you ever consume alcoholic beverages, 2) How frequent do you consume alcoholic beverage. Data on the prevalence of alcohol drinker and non-alcoholic drinker were obtained from the first question with the option answers of "yes" or "no". Participants who consumed alcohol were required to answer the second question in order to further classify them according to the frequency of alcohol consumption. The answers options for frequency and the classification were as shown in Table 3.3.

Table 3.3: Classification of alcohol consumption

Classification	Frequency of alcohol consumption
Regular drinker	> 4 days a week
Frequent drinker	1-4 days a week
Occasional drinker	≤ 3 days a month

Psychological Distress

The instrument used to measure the emotional states of three distinct psychometric components of depression, anxiety and stress factors among the respondents is the Depression, Anxiety and Stress Scale Questionnaire (DASS-21) by Lovibond and Lovibond (1995). This questionnaire originated from DASS-42, which consists of 42-items that are used to measure the severity and presence of common symptoms for depression, anxiety and stress. However, the shorter version of the questionnaire, which is DASS-21 was used in the study. It consist of 21 items that can be divided into scales of Depression, Anxiety and Stress. Each of the scales consist of 7 questions, respectively. The component of DASS-21 is shown in the following Table 3.4.

Table 3.4: Components of Depression, Anxiety and Stress in DASS-21

Components	Number of item for each subscale	Items numbers in the questionnaire
Depression	7	3, 5, 10, 13, 16, 17, 21
Anxiety	7	2, 4, 7, 9, 15, 19, 20,
Stress	7	1, 6, 8, 11, 12, 14, 18

This instrument rate the questions by using the 4-point Likert scales consisting of "0" until "3" that represent the frequency or severity. It ranges from "not apply to me at all" to "applied to me very much". Summation of the rating scores of each scale will results

in total score for that particular component. Final score was obtained when the total score is multiplied by 2. Final score for each scale was then compared with the cut-offs scores to determine the severity of each scales as shown in Table 3.5. Higher scores of depression, anxiety and stress also indicate a greater severity of each respective scales (Lovibond & Lovibond, 1995). This instrument has a good Cronbach alpha of 0.863, 0.850 and 0.837 for depression, anxiety and stress respectively. The overall Cronbach alpha was 0.940 (Nordin et al., 2017).

Table 3.5: Recommended cut-offs for severity of Depression, Anxiety and Stress

Meaning	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 Severe	28+	20+	34+

Sleep Quality

In order to assess sleep quality, the Pittsburgh Sleep Quality Index (PSQI) (Buysse et al., 1989) was used in this study. This instrument consist of 9 items, which measured the components of sleep quality, latency, duration, efficiency, disturbances, daytime dysfunction and sleep medication use. It used a 3-point Likert scales for all of the components. The components scores 0 (no difficulty) to 3 (severe difficulty). The summation of the components scores produced a global score that range from 0 to 21 with higher scores indicate a worse sleep. The scoring of PSQI for further categorization were tabulated in Table 3.6. Aside from that, the summation of all the subscales can also be used to classify a good and a bad sleeper. Undergraduate students with a global score of

higher than 5 were classified as poor sleepers and those below than 5 were the good one. The internal consistency of this tool is good with alpha value of 0.83 (Allison et al., 2008). A study in Malaysia also supported the validity of PSQI with a Cronbach alpha of 0.63 (Yunus et al., 2017).

Table 3.6: The scoring for PSQI

Components	Item and scoring method
Sleep Quality	Item 7 (0=0; 1=1; 2=2; 3=3)
Sleep Latency	Item 2 (≥0 and ≤15 = 0; >15 and ≤30 = 1; >30 and ≤60 = 2; >60 = 3) (If sum of item 2 and 5 is equal to 0=0; 1-2=1; 3-4=2; 5-6=3)
Sleep Duration	Item 4 (≥7= 0; <7 and ≥6= 1; <6 and ≥5= 2; <5= 3)
Sleep Efficiency	Diffsec = Item 3-Item 1 Diffhour = value of diffsec/ 3600 Sleeping time = (Item 4/ diffhour-24 @ diffhour) x 100 (If sleeping time ≥85= 0; ; <85 and ≥75= 1; <75 and ≥65= 2; <65= 3)
Sleep Disturbances	Item 5b to 5j (0=0; ≥1 and ≤9 = 1; >9 and ≤18 = 2; > 18=3)
Daytime Dysfunction	If sum of item 8 and 5 is equal to 0=0; 1-2=1; 3-4=2; 5-6=3)
Sleep medication used	Item 7 (0=0; 1=1; 2=2; 3=3)

Physical Activity

Global Physical Activity Questionnaire (GPAQ) (WHO, 2002) was used to assess the physical activity level among the participants. This questionnaire was developed by WHO to gather the data regarding participation of physical activity in three domains; activity at work, travel to and from places, recreational activities. This questionnaire that contain 16 questions also assessed the sedentary behaviors of the participants. GPAQ was analyzed by using the METs (Metabolic Equivalent) value, which express the intensity of

the physical activity. METs value was calculated based on the following; walking = 4.0 METs, moderate = 4.0 METs and vigorous = 8.0 METs. MET-min per week was calculated based on formula shown below:

MET-min per week = MET level × minutes of activity/day × days per week

GPAQ scores was further classified according to high, moderate and low intensity of physical activity as shown in Table 3.7. Based on a validity study conducted among nine countries, overall GPAQ items showed a good reproducibility with pooled correlations of mostly greater than 0.72 (Bull, Maslin & Armstrong, 2009).

Table 3.7: The classification for GPAQ

Classifications	Descriptions
High	Vigorous-intensity activity on at least 3 days achieving a minimum of at least 1,500 MET-min week^{-1} OR 7 or more days of any combination of walking, moderate or vigorous intensity activities achieving a minimum of at least 3,000 MET-min week^{-1}
Moderate	3 or more days of vigorous-intensity activity of at least 20 minutes per day OR or more days of moderate-intensity activity or walking of at least 30 minutes per day OR 5 or more days of any combination of walking, moderate- or vigorous intensity activities achieving a minimum of at least 600 MET-min week^{-1}
Low	Those who did not meet either the criteria of high or moderate physical activity level.

Eating Behavior

In assessing eating behaviors among the undergraduate students, two different questionnaires were used. The first one was Eating Behavior Questionnaire (EBQ) (Chin & Mohd Nasir, 2009) which consist of 9 items that measured meal consumption and skipping behaviors, snacking behaviors, frequency of eating outside and take-away food, use of dietary supplement, type of dietary consumption and participation in body change programs . The present study only includes components that assessed meal skipping and snacking behavior. Snacking was assessed with the questions asking for frequency in consuming morning tea, afternoon tea and supper while for meal skipping, those who skipped at least one meal (either breakfast, lunch and/or dinner) per day were considered as skipping meal (Chin & Mohd Nasir, 2009). Snacking was scored in an eight-point frequency scale (0=0 day per week, 1=1 day per week, 2=2 days per week, 3=3 days per week, 4=4 days per week, 5=5 days per week, 6=6 days per week, 7=7 days per week) with higher scores indicates a higher frequency. For meal skipping behavior, those who scored less than 21 were considered as a meal skipper. Although it was originally used to assess the eating behaviors among local adolescents, there is a study being done using the same questionnaire on local university students (Gan, Mohd, Zalilah, & Hazizi, 2011), reflecting its reliability to be used in different population.

Three Factor Eating Questionnaire (TFEQ) (Karlsson et al., 2000) was used in assessing the three aspects of eating behavior known as cognitive restraint, uncontrolled eating and emotional eating (Karlsson et al., 2000). TFEQ differs from EBQ in which the eating behaviors measured are specific tendencies that are associated with disordered eating behaviors (Angle et al., 2009). The present study only includes cognitive restrained

and emotional eating subscales. Originally, TFEQ was developed by Stunkard and Messick (1985) and contained 51 items. Later, it has been revised and re-conceptualized by Karlsson et al. (2000). The revised version consist of 18 items and was answered by the undergraduate students using a 4-point response scale with the scoring ranges from 1 for "definitely false" statement to 4 for "definitely true" statement. The total scores range between 18 and 72 points. Item scores are summated into scale scores for cognitive restrained (I(a) 2, 3, 5, I(b) 2, 11, 12), uncontrolled eating (I(a) 1, 4, I(b) 1, 4, 5, 7, 8, 9, 13) and emotional eating (I (b) 3, 6 and 10). The raw scale score obtained was transformed to a 0-100 scale with higher scores in the respective scale as indicative of greater cognitive restraint, uncontrolled eating and emotional eating. The formula for the converted score were calculated as follows:

Raw Score – Lowest Possible Raw Score / Possible Raw Score Range x 100

The psychometric properties of TFEQ have been reported in numerous studies before and have been adapted to Spanish, Greek, German and Malay (Jáuregui-Lobera et al., 2014; Kavazidou et al., 2012; Löffler et al., 2015; Rosnah, Noor Hassim, & Shafizah, 2013). In a study among overweight and obese Iranian women, the Cronbach's alpha reported were 0.84, 0.64 and 0.7 for hunger, cognitive restraint and emotional eating respectively (Mostafavi et al., 2017).

3.6.1.3 Night Eating Syndrome

Night Eating Questionnaire (NEQ), a 17-item questionnaire was used to assess the behavioral and psychological symptoms of night eating syndrome (NES) (Allison et al., 2008). This version uses a 5-point Likert scale which range from 0 (e.g., not at all) to 4

(e.g., extremely) with the exception of item 7. Item 7 was put into account as an additional option and will be scored based on Table 3.8 (Allison et al., 2008).

Table 3.8: Options for item 7 of Night Eating Questionnaire (NEQ) and the respective score

Options	Scores
Mood does not change during the day	0
Early morning	0
Late morning	1
Afternoon	2
Early evening	3
Late Evening	4

If the respondents rated item 9 or item 12 with a '0', they did not have to answer the questionnaire any further. There is an additional item 15, to confirm the symptoms that have presented for at least 3 months. However, this was not included in the scoring (Allison, 2015). Item 1, 4 and 14 were reversed scored. All of the item are summed to obtain a global score except for item 13, 15, 16 and 17. Item 13 was not included in total score because it was used to rule out the parasomnia, Noctural Sleep Related Eating Disorder (NS-RED). Item 16-17 were used to confirm the presence of distress or impairment if NES is present. The summation of all scores yield a global scores of 0-52. Higher scores is an indicative of greater NES severity (Randhawa et al., 2014). NES can also be further categorized. A score of 25 or greater indicates the present of NES while a score of 24 and below indicates that NES is absent (Allison et al., 2008). This questionnaire has been validated and shows a good reliability in both Western and Asian countries. Cronbach's alpha reported in validation made were α= 0.70, α= 0.78 and α=

o.79 in United States, Brazil and Spain respectively. In China, the Cronbach's alpha reported was 0.82 (Tu et al., 2017). Though there is lacked of validation of NEQ in Malaysia, this questionnaire has been used in a previous study in determining the association of NES with body mass status and socio-demographic on local university students (Sarina & Poh, 2015).

3.6.2 Anthropometric Measurements

3.6.2.1 Body Weight and Height

Anthropometric measurements involved the measurements of participants' weight and height to determine their body mass index (BMI). Body weight was measured to the nearest 0.1 kilograms (kg), by using a TANITA Digital Weight Scale HD306 (TANITA Corporation, USA), while height was assessed using a SECA Body Tape Measure SE206 (SECA, Germany) to the nearest 0.1 cm. Body mass index (BMI) was calculated with the formula of weight in kilograms, divided by the square of height in meter. Classification from WHO 1995 was used as the guidance to classify the BMI of the participants as shown in Table 3.9.

Table 3.9: Classification of BMI

BMI ($kg/m^{2)}$	Classifications
<18.50	Underweight
18.50-24.99	Normal weight
25.00-29.99	Overweight
≥30.00	Obesity

3.7 Pretest

A pretest for the questionnaires was conducted prior to the data collection to refine the questionnaire and hence, ensuring that they are well-understood and the undergraduate students have no problem in answering and recording of data. This also allow for the estimation of time taken needed to complete the questionnaires as well as to assess the feasibility of using the instruments. According to Perneger et al. (2015), a sample size of 30 and above is preferable during the pretest to detect any prevalence problem. Therefore, the pretest was conducted on 30 undergraduate students that have similar criteria with the targeted respondents. From the pre-test, the estimated time taken for undergraduate students to complete the questionnaire was approximately 25 minutes. An improvements have been made to the formatting of the questionnaire for a better understanding and reduce the time taken spent by the students in answering during actual data collection.

3.8 Ethical Approval

Ethical approval was obtained from the Ethics Committee for Research Invilving Human Subjects Universiti Putra Malaysia (Reference number: JKEUPM-2018-417; see Appendix A) prior to data collection. After getting approval from Ethics Committee, permission from Faculty of Landscape and Architecture, Universiti Putra Malaysia (see Appendix B) as well as Faculty of Science, University of Nottingham Malaysia (see Appendix C) were obtained.

3.9 Data Collection

Data collection was conducted from early February 2019 to end of March 2019. Arrangement of time and places were done with the class representative of the programs selected in order to conduct the anthropometric measurements as well as to complete the

questionnaires. Information sheet (see Appendix D) which consists of a brief explanation on the study as well as the consent form (see Appendix E) was given to the undergraduate students prior to data collection. Undergraduate students completed a set of questionnaire which assessed socio-demographic background, smoking, alcohol consumption, psychological distress, physical activity, sleep quality and eating behaviors. After that, anthropometric measurements were measured by the researchers.

3.10 Data Analysis

Descriptive data collected from self-administered questionnaire were analyzed by using the IBM SPSS Statistic version 22. Univariate analysis was used to analyze descriptive data and the results were presented as frequencies and percentages for categorical variables and as means and standard deviations for continuous variables. Exploratory Data Analysis (EDA) was used to check for the normality of the data. Monthly household income was not normally distributed, hence, this continuous data was presented in median and interquartile range. Pearson's Product Moment Correlation test were conducted to determine the correlations between normally distributed continuous variables with night eating syndrome. Meanwhile, Spearman's Rank Order Correlation test were conducted for the non-parametric data such as household income and physical activity level. Independent *t*-test was used to compare between means scores of different sexes, smoking status, alcohol consumptions and breakfast skipping. Meanwhile, one way ANOVA was used to compare between mean scores of different ethnicities and living arrangements. Statistical significance for all test is set at $p<0.05$.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Socio-demographic background of undergraduate students

The socio-demographic background of the undergraduate students are shown in Table 4.1. Among 263 undergraduate students participated in the study, 33.8% (n=89) of them were males, while another 66.2 (n=174) were females. With the age range between 18 to 26 years old, the mean age of the undergraduate students was 21.64 ± 1.28 years. Malay ethnicity accounted for the majority of the participation (65.4%), followed by Chinese (22.1%), Indian (9.55%) and others (3.0%). Undergraduate students from public university took up the biggest part in the present study (69.6%) and followed by those from private university (30.4%). In terms of year of study, most of the respondents were the first year students (31.6%), followed by second year (28.5%) as the second highest as well as third year (27.0%) and forth year (12.9%) students. In terms of father's educational level, the highest level received was from secondary education (35.1%), followed by tertiary (30.9%), pre-university (16.2%), primary education (12.4%) and no formal education (5.4%). The similar pattern can be seen for mother's education level with a percentage of 43.2% with secondary education level being the highest, followed by 23.9%, 15.1%, 10.8% and 6.9% respectively. The present study also shows that undergraduate students living in campus (81.7%) accounted for the highest proportion among the respondents and this was followed by those living out campus (10.3) and those stays at home with their families (8.0%). The median household income of the undergraduate students was RM 4000 (IQR = 4500.00) and the highest percentage of them

were in the category of having household income between RM2300.00 – RM 5599.99 (47.1%).

Table 4.1: Distribution of undergraduates by socio-economic status (n=263)

Characteristics	n (%)	Median (IQR)/ Mean ± SD
Age		21.64 ± 1.28
18-21	127 (48.3)	
≥22	136 (51.7)	
Sex		
Male	89 (33.8)	
Female	174 (66.2)	
Ethnicity		
Malay	172 (65.4)	
Chinese	58 (22.1)	
Indian	25 (9.5)	
Others[a]	8 (3.0)	
Universities		
Public University	183 (69.6)	
Private University	80 (30.4)	
Year of study		
1st year	83 (31.6)	
2nd year	75 (28.5)	
3rd year	71 (27.0)	
4th year	34 (12.9)	
Father's education level		
No formal education	14 (5.4)	
Primary education	32 (12.4)	
Secondary education	91 (35.1)	
Pre-university	42 (16.2)	
Tertiary education	80 (30.9)	

Characteristics	n (%)	Median (IQR)/ Mean ± SD
Mother's education level		
No formal education	18 (6.9)	
Primary education	28 (10.8)	
Secondary education	112 (43.2)	
Pre-university	39 (15.1)	
Tertiary education	62 (23.9)	
Living Arrangement		
In Campus	215 (81.7)	
Out Campus	27 (10.3)	
Home with family	21 (8.0)	
Household Income (RM) [b]		[c] 4000 (7000 – 2500)
<2300.00	61 (23.2)	
2300.00 – 5599.99	124 (47.1)	
≥ 5600.00	78 (29.7)	

[a] Others including Bumiputera Sabah and Sarawak
[b] Based on 10th Malaysia Plan (Economic Planning Unit, 2010)
[c] Data was reported in Median (IQR)

4.2 Smoking status

The distribution of undergraduate students according to their smoking status was shown in Table 4.2. With 93.1% of the students who never smoke before, this makes it the highest proportion among all. In this study, the prevalence of smoking was less than 10.0%. A total of 6.1 % of them were current smoker while another 0.6% of them were former smoker. This percentage is in line with the studies conducted among medical university students in Malaysia by Rashid and Azizah (2011), where they reported a percentage of lesser than 10% smoking prevalence among them. According to this study that was conducted in Penang Medical School, 5.3% of them were reported to be a current smoker. Similarly, Frisch, Kurtz, and Shamsuddin (1999) in a study among 146 university

students from National University of Malaya reported a prevalence of 8.8% for being a current smoker, which is less than 10.0%.

Table 4.2: Distribution of undergraduates based on smoking status (n=263)

Items	n (%)				
	Male	**Female**	**Total**	x^2	***p*-value**
Smoking status				7.734*	0.005
Current	10 (11.2)	5 (2.9)	16 (6.1)		
Former	1 (1.1)	1 (0.6)	2 (0.8)		
Never	78 (87.6)	168 (96.6)	245 (93.1)		

*Significant at the 0.05 level (2-tailed)

The present study also showed that there is an association between sex and smoking status (χ^2=7.734, p=0.005), with a higher percentage of male being a current and former smoker compared to female. This was supported by a local study that shows similar findings (Rashid & Azizah, 2011). A lower smoking rate reported among female students in Malaysia may reflects that smoking is still perceived as an unacceptable behavior among females in the Malaysian community (Tessier et al., 1992).

4.3 Alcohol consumption

Based on Table 4.3, a majority of the undergraduate students (74.5%) reported that they currently did not take any type of alcoholic beverages. In this study, Malay ethnicity accounted for the majority of the participants, and religion could be the contributing factors that forbid them from consuming alcohol. A percentage of 25.9% of them were reported to be a current drinker and this exceeded the prevalence of current alcohol use among Malaysian from National Health and Morbidity Survey (2011) which showed a prevalence of 11.6%. The respondents were further categorized according to the frequency of alcohol consumption. The results showed that the proportion of regular

drinker was 1.5%, followed by frequent drinker (8.8%) and occasional drinker (89.7%). Most of the respondents were categorized as an occasional drinker, with a frequency of less than or equal to 3 drinks per month.

Table 4.3: Distribution of undergraduates based on alcohol consumption (n=263)

Items	n (%)		
	Male	**Female**	**All**
Alcohol Intake			
Yes	29 (32.6)	39 (22.4)	68 (25.9)
No	60 (67.4)	135 (77.6)	195 (74.1)
Frequency of Alcohol Consumption			
Regular drinker	1 (3.4)	0 (0.0)	1 (1.5)
Frequent drinker	5 (17.2)	1 (2.6)	6 (8.8)
Occasional drinker	23 (79.3)	38 (97.4)	61 (89.7)

4.4 Psychological Distress

As shown in Table 4.4, the prevalence of undergraduate students who were at risk of having depression, anxiety and stress were 46.7%, 68.1% and 38.7%, respectively. For depression symptoms, 53.2% of the undergraduate students were normal while another 14.4%, 22.1% 5.3% and 4.9% of them fall under mild, moderate, severe and extremely severe category, respectively with a mean score of 10.13 ± 8.57. For anxiety symptom, the mean score reported was 12.07 ± 8.07 and 31.9% of them were reported to be in normal category. This is followed by 1.2%, 21.3%, 14.1% and 20.5% of them, be in mild, moderate, severe and extremely severe group, respectively. Last but not least, 61.2% of the undergraduate students were classified as normal. This is followed by another 16.7%, 12.9%, 12.9%, 6.8% and 2.3% of them being in mild, moderate, severe and extremely severe group respectively, with a mean score of 13.48 ± 8.06.

Table 4.4: Distribution of undergraduates by Depression, Anxiety and Stress classification in DASS-21 (n=263)

Psychological Distress	n (%)					Mean ± SD				
	Male	Female	Total	x^2	p	Male	Female	Total	t	p
Depression				4.429	0.351	10.90 ± 8.85	9.74± 8.42	10.13 ± 8.57	1.770	0.78
Normal (0-9)	40 (44.9)	100 (57.5)	140 (53.2)							
Mild (10-13)	16 (18.0)	22 (12.6)	38 (14.4)							
Moderate (14-20)	21 (23.6)	37 (21.3)	58 (22.1)							
Severe (21-27)	6 (6.7)	8 (4.6)	14 (5.3)							
Extremely Severe (≥ 28)	6 (6.7)	7 (4.0)	13 (4.9)							
				7.283	0.122					
Anxiety						12.56 ± 8.74	11.82 ± 7.72	12.07 ± 8.07	0.623	0.534
Normal (0-7)	31 (34.8)	53 (30.5)	84 (31.9)							
Mild (8-9)	9 (10.1)	23 (13.2)	32 (12.2)							
Moderate (10-14)	14 (15.7)	42 (24.1)	56 (21.3)							
Severe (15-19)	10 (11.2)	27 (15.5)	37 (14.1)							
Extremely Severe (≥ 20)	25 (28.1)	29 (16.7)	54 (20.5)							
Stress				0.821	0.936	13.69 ± 8.32	13.37 ± 7.95	13.48 ± 8.06	0.450	0.653
Normal (10-14)	54 (60.7)	107 (61.5)	161 (61.2)							
Mild (15-18)	14 (15.7)	30 (17.2)	44 (16.7)							
Moderate (19-25)	12 (13.5)	22 (12.6)	34 (12.9)							
Severe (26-33)	6 (6.7)	12 (6.9)	18 (6.8)							
Extremely Severe (≥ 34)	3 (3.4)	3 (1.7)	6 (2.3)							

The prevalence of depression, anxiety and stress from the present study is lower compared to a local study conducted by Shamsuddin et al. (2013). Among the university students studied, Shamsuddin et al. (2013) reported a percentage of 37.2%, 63.0% and 23.7% for depression, anxiety and stress respectively. However, both findings from previous study and the current one showed that anxiety was the most prevalent psychological distress experienced by university students among those three and this is followed by depression and stress.

The present study also found that male undergraduates had a higher prevalence of depression (55.1%) and stress (39.3%) compared to female (depression = 42.5%, stress = 38.5%). However, in terms of anxiety, the proportions of female (65.2%) were higher compared to male (65.2%). Although female had a higher probability to suffer from psychological distress (Bothmer & Frindlur, 2005), there are arguments that claimed both male and female actually face an equal number of challenges in their everyday life. This is a result of social position and roles that could contributes to stress (Misigo, 2015). This could perhaps explained the findings that more males were found to have higher percentage of stress level.

However, present study did not find any significant difference between sex and mean score of depression (t=1.770, p=0.78), anxiety (t=0.623, p=0.534) and stress (t =0.450, p=0.653). With regards to depression subscales, it was supported by Hakami (2018) in which there is no significant difference found between sex. With regards to relationship between sex and psychological distress, current findings shows that prevalence of depression (χ^2=4.429, p=0.351), anxiety (χ^2=7.283, p=0.122) and stress (χ^2=0.821, p=0.936) was not associated with sex.

4.5 Sleep Quality

As presented in Table 4.5, 14.8% of undergraduates rated their overall sleep quality as very good. However, majority of them rate their sleep as fairly good (63.5%), followed by fairly bad (19.8%) and very bad (1.9%). This finding is consistent with local study conducted among students of tertiary institutions in Malaysia which reported that a higher percentage of them reported that their sleep to be fairly good. This is then followed by having a very good sleep, fairly bad sleep and very bad one (Pay & Yee, 2013).

A majority of the undergraduate students did not experience sleep disturbance during the past month. A slight difference in percentage was seen between those who claimed to not experience it within the past month and have experience them for less than once a week. It was observed that students reported they are not able to fall asleep within 30 minutes (31.9%) and felt too hot (29.3%) for less than once a week, which leads them to have sleep disturbance in the past month.

Table 4.5: Distribution of undergraduates by items in Pittsburgh Sleep Quality Index (n=263)

Reasons for having trouble sleeping	Not during the past month n (%)	Less than once a week n (%)	Once or twice a week n (%)	Three or more times a week n (%)
Cannot get back to sleep within 30 minutes	81 (30.8)	84 (31.9)	49 (18.6)	49 (18.6)
Wake up in the middle of the night/ early morning	73 (27.8)	73 (27.8)	73 (27.8)	44 (16.7)
Have to get up to use the bathroom	126 (47.9)	70 (26.6)	49 (18.6)	18 (6.8)
Cannot breathe comfortably	203 (77.2)	37 (14.1)	14 (5.3)	9 (3.4)
Cough or snore loudly	193 (73.4)	40 (15.2)	16 (6.1)	14 (5.3)

Reasons for having trouble sleeping	Not during the past month n (%)	Less than once a week n (%)	Once or twice a week n (%)	Three or more times a week n (%)
Fell too cold	97 (36.9)	79 (30.0)	62 (23.6)	25 (9.5)
Fell too hot	76 (28.9)	77 (29.3)	62 (23.6)	48 (18.3)
Have bad dreams	113 (43.0)	93 (35.4)	42 (16.0)	15 (5.7)
Have pain	174 (66.2)	52 (19.8)	24 (9.1)	13 (4.9)
Other reasons	48 (55.2)	9 (10.3)	12 (13.8)	18 (20.7)
How often have you take medicine to help you sleep?	240 (91.6)	10 (3.8)	10 (3.8)	2 (0.8)
How often had trouble staying awake during social activities?	152 (58.2)	65 (24.9)	35 (13.4)	9 (3.4)
Sleep Quality	**Very good**	**Fairly good**	**Fairly bad**	**Very bad**
How would you rate your overall sleep quality?	39 (14.8)	167 (63.5)	52 (19.8)	5 (1.9)

Table 4.6 showed the distribution of undergraduates based on their sleep quality. A higher percentage of undergraduates have poor sleep quality (58.2%) compared to having a good sleep one (41.8%). The prevalence of having a good sleep in current study was quite lower compared to a local study conducted by Mohd Zaid, A Rahman, and Haque (2018), which showed that a percentage of 65% for having a poor sleep. This difference might be contributed to the study population difference, difference in level of study and living condition which influence the stress levels and eventually sleep quality. Despite that, current findings supported previous study which shows no associations between sex and sleep quality. Burgard, Ailshire and Burgard (2013) reported that though women generally slept longer than men considering adults at the similar life course stage, the difference reported were not much and it ranges from 5 minutes favoring men to about 28 minutes favoring women. This might explained the insignificance in the findings.

There is also no significance difference in the mean score of total PSQI scores between males and females.

Table 4.6: Distribution of undergraduates by sleep quality in PSQI (n=261)

Variable	n (%)				
	Male	Female	Total	x^2/t	*p*-value
Sleep Quality				0.533	0.465
Good Sleeper (≤ 5)	34 (38.6)	75 (43.4)	109 (41.8)		
Poor Sleeper (≥ 5)	54 (61.4)	56.3 (56.6)	152 (58.2)		
Mean ± SD	6.28 ± 2.80	6.31 ± 2.69	6.30 ± 2.72	-0.079	0.937

4.6 Physical Activity

Table 4.7 showed that the average total physical activity score of undergraduates was 1965.81 ± 1831.72 MET-minutes/week whereby male and female students had an average score of 2647.51 ± 2008.48 MET-minutes/week and 1617.13 ± 1633.39 MET-minutes/week respectively. Majority of the students were categorized in moderate-intensity physical activity (50.2%) and this is followed by low-intensity (25.9%). High-intensity group being the minority among those three groups with percentage of 24.0%. Aside from that, there is an associations between sex and physical activity (χ^2=17.19, p <0.001) in the current study. It showed that out of 25.9% of physical inactivity reported, females (31.0%) outnumbered males (15.7%) with twice likelihood to be physically inactive. Similar findings was found in a study among 174 undergraduates students in Universiti Putra Malaysia by Hazizi et al. (2012), where female students were reported to be twice as sedentary than the males. A significant difference in the mean score of total physical activity between males and females was also found (t=4.184, p=<0.001). The weaker influences that females receive at the school and family levels as well as lower

participation in extracurricular sport from school days (Telford et al. (2016) might contribute to low physical activity engaged when they reach adulthood.

Table 4.7: Distribution of undergraduates by intensity of physical activity in GPAQ (n=263)

Physical Activity Level	n (%)				
	Male	Female	Total	x^2/t	*p*-value
Low- intensity	14 (15.7)	54 (31.0)	68 (25.9)	17.190**	<0.001
Moderate- intensity	41 (46.1)	91 (52.3)	132 (50.2)		
High- intensity	34 (38.2)	29 (16.7)	63 (24.0)		
Mean ± SD	2647.51 ± 2008.48	1617.13 ± 1633.39	1965.81 ± 1831.72	4.184**	<0.001

**Significant at 0.01 level (2-tailed)

4.7 Eating Behavior

4.7.1 Meal skipping and snacking

Table 4.8 showed the frequency of meal and snack consumed by undergraduates throughout the week. Overall, the mean number of days for the consumption of breakfast, lunch and dinner among them were 4.03 ± 2.33, 6.12 ± 1.45 and 5.80 ± 1.64 respectively. The traditional meal that had least daily consumption was breakfast, where only 25.5% of them had breakfast every day. This is followed by dinner (54.4%) and lunch (65.4%), whereby it was the meal being consumed the most throughout the week by the students. Among those three meals, only dinner shows a significant difference (t=2.008, p=0.046) with sex in which males were reported to consume significantly higher consumption of dinner compared to females. In regards to snacks consumption, the frequency of morning tea, afternoon tea and supper consumed by the students were 2.48 ± 2.45, 1.99 ± 2.10 and 2.44 ± 2.02 respectively. The most snacks being consumed among the students was supper

(78.7%), followed by morning tea (67.3%) and afternoon tea (62.7%). However, no significant difference were found between snacks consumption with sex.

Table 4.8: Meal and snack consumption of undergraduates assessed using Eating Behavior Questionnaire (n=263)

Meal and Snack Consumption	**Mean ± Std. Deviation				
	Male	Female	Total	*t*	*p*-value
Meal consumption					
Breakfast	3.87 ± 2.44	4.11 ± 2.28	4.03 ± 2.33	-0.821	0.413
Lunch	6.06 ± 1.48	6.16 ±1.43	6.12 ± 1.45	-0.524	0.600
Dinner	6.07 ± 1.42	5.67 ± 1.73	5.80 ± 1.64	2.008*	0.046
Snack consumption					
Morning Tea	2.27 ± 2.41	2.59 ± 2.47	2.48 ± 2.45	-0.991	0.323
Afternoon Tea	2.13 ±1.97	1.91 ± 2.17	1.99 ± 2.10	0.806	0.421
Supper	2.62 ± 1.97	2.36 ± 2.05	2.44 ± 2.02	0.992	0.322

**Mean refers to the mean number of days for meal and snack consumption
*Difference in sex is significant at the 0.05 level (2-tailed)

Meal skipping can be referred to as an act of skipping any main meals (breakfast, lunch or/and dinner) throughout the day. As shown in Table 4.9, about eight out of ten (81.6%) of the undergraduates accounted as a meal skipper. The most frequently skipped was breakfast (74.5%) and this is followed by dinner (45.6%) and lunch (34.6%). The findings from present study is consistent with previous local study whereby it reported that the most skipped meals among university students was breakfast, followed by dinner. Lunch was the most consumed by the students (Gan et al., 2011). A study conducted by Moy et al. (2009) among undergraduates in a public university in Kuala Lumpur suggested that students skipped their breakfast due to limited time to eat, lack of appetite, dislike eating early in the morning as well as oversleeping. Despite that, the present study did not find any significant associations between sex and meal skipping behavior,

suggesting that being either male or female does not influence the behavior of skipping meal.

Table 4.9: Distribution of undergraduates by meal skipping behaviors (n=263)

Meal skipping behavior	n (%)			x^2	*p*-value
	Male	Female	Total		
*Meal Skippers	74 (83.1)	142 (81.6)	216 (47)	0.095	0.758
Non-Meal Skippers	15 (16.9)	32 (18.4)	47 (17.9)		
Breakfast					
**Skipper	67 (75.3)	129 (74.1)	196 (74.5)		
Non-skipper	22 (24.7)	45 (25.9)	67 (25.5)		
Lunch					
**Skipper	31 (34.8)	60 (34.5)	91 (34.6)		
Non-skipper	58 (65.2)	114 (65.5)	172 (65.4)		
Dinner					
**Skipper	34 (38.2)	86 (49.4)	120 (45.6)		
Non-skipper	55 (61.8)	88 (50.6)	143 (54.4)		

*Refer to those who skip any main meal (breakfast, lunch or/and dinner) throughout the day (Dubois et al., 2008)
**Skipper for each meal refers to consumption of <7 days per week (Wijtzes, 2016)

4.7.3 Emotional and Restrained Eating

Table 4.10 showed that mean score of TFEQ-R18 for emotional eating among undergraduate students was 38.12 ± 26.27 whereby male and female had a mean score of 33.84 ± 26.58 and 40.31 ± 25.92 respectively. In regards to restrained eating, the mean score of TFEQ-R18 for that particular subscales was 45.09 ± 20.46. Male and female had a mean score of 43.54 ± 22.07 and 45.90 ± 19.58. For both eating behaviors, it was observed that females scored higher compared to males. The high restraint score among females might be due to their tendency to opt for dieting (De Lauzon, 2006). Nevertheless,

the difference between them were not statistically significant, unlike the one reported in previous studies by Lluch et al. (2000) where significant difference were observed between scores of emotional eating and restrained eating with sex.

Table 4.10: Distribution of undergraduates by emotional and restrained eating behavior (n=263)

*TFEQ-R18	Mean ± Std. Deviation				
	Male	**Female**	**Total**	***t***	***p*-value**
Emotional Eating	33.84 ± 26.58	40.31 ± 25.92	38.12 ± 26.27	-1.889	0.06
Restrained Eating	43.54 ± 22.07	45.90 ± 19.58	45.09 ± 20.46	-0.867	0.387

*TFEQ-R18= Three-Factor Eating Questionnaire-R18; higher scores indicates severe eating behavior (total TFEQ-R18 for each subscales range from 0-100)

4.8 Night Eating Syndrome

Overall, the average score of night eating in the present study was 16.11 ± 6.03, with a prevalence of 11.2% as tabulated in Table 4.11. The result showed that about one in every ten undergraduate students met the criteria of having NES. The prevalence of male students was 19.3%, with a mean score of 17.44 ± 6.50 while the prevalence of female was 7.1%, with a mean score of 15.42 ± 5.67.

The findings from present study showed that the difference in the mean score between male and females was statistically significant (t=2.585, p=0.010). This was supported by local study conducted by Sarina and Poh (2015) among 124 university students in Shah Alam, Selangor where it reported the similar findings. Males have a higher likelihood to have NES due to the higher risk of developing obstructive sleep apnea

that prolonged in night eating behavior (Andersen et al., 2004). Women are protected from night eating because they were more concern on overeating, weight and shape (Grilo & Masheb, 2004).

The prevalence of NES from the present study was quite high in comparison with previous study conducted in China (He et al., 2017), Turkey (Sevincer et al., 2016) and USA (Nolan & Geliebter, 2012) where they yield a prevalence of 2.8%, 9.5% and 5.6% respectively. Given that socio-cultural background possibly contributes to the development of eating disorder (Keel & Klump, 2003), this might explained the difference in the prevalence reported. Aside from that, Noraziah Ali & Mohd Azlan Abdullah (2012) in their study claimed that 24-hours restaurants is highly accessible in Malaysia, and this potentially encourages the late night meal consumption of students and late sleepers.

The latest findings from a local study by Gan, Chin and Law (2019) in public university in Malaysia which reported a percentage of 12.2% of students engaged with NES suggested that the prevalence from current study was quite consistent and did not differ much from theirs. However, since the study on NES is still limited in Malaysia, further investigation need to be done to investigate the prevalence of NES in Malaysia to ensure that there is sufficient information is available for comparison to be made between local studies.

Table 4.11: Distribution of undergraduates by NES category (n=258)

Variable	n (%)				
	Male	Female	Total	x^2/t	*p*-value
Night Eating Syndrome				8.735*	0.003
Absence of NES (≤ 24)	71 (80.7)	158 (92.9)	229 (88.8)		
Presence of NES (≥ 25)	17 (19.3)	12 (7.1)	29 (11.2)		
Mean ± Std. Deviation	17.44 ± 6.50	15.42 ± 5.67	16.11 ± 6.03	2.585*	0.010

*Difference in sex is significant at the 0.05 level (2-tailed)

4.9 Body Weight Status

The mean BMI of undergraduate students were 22.75 ± 4.55 kg/m^2 as presented in Table 4.12. Current study showed that there is significant difference (t=2.995, p=0.003). in the mean BMI between males and females where males had a higher mean BMI of 23.99 ± 4.83 kg/m^2 compared to female with a mean BMI of 22.13 ± 4.29 kg/m^2.

Table 4.12: Distribution of undergraduates by weight, height and body mass index (n=256)

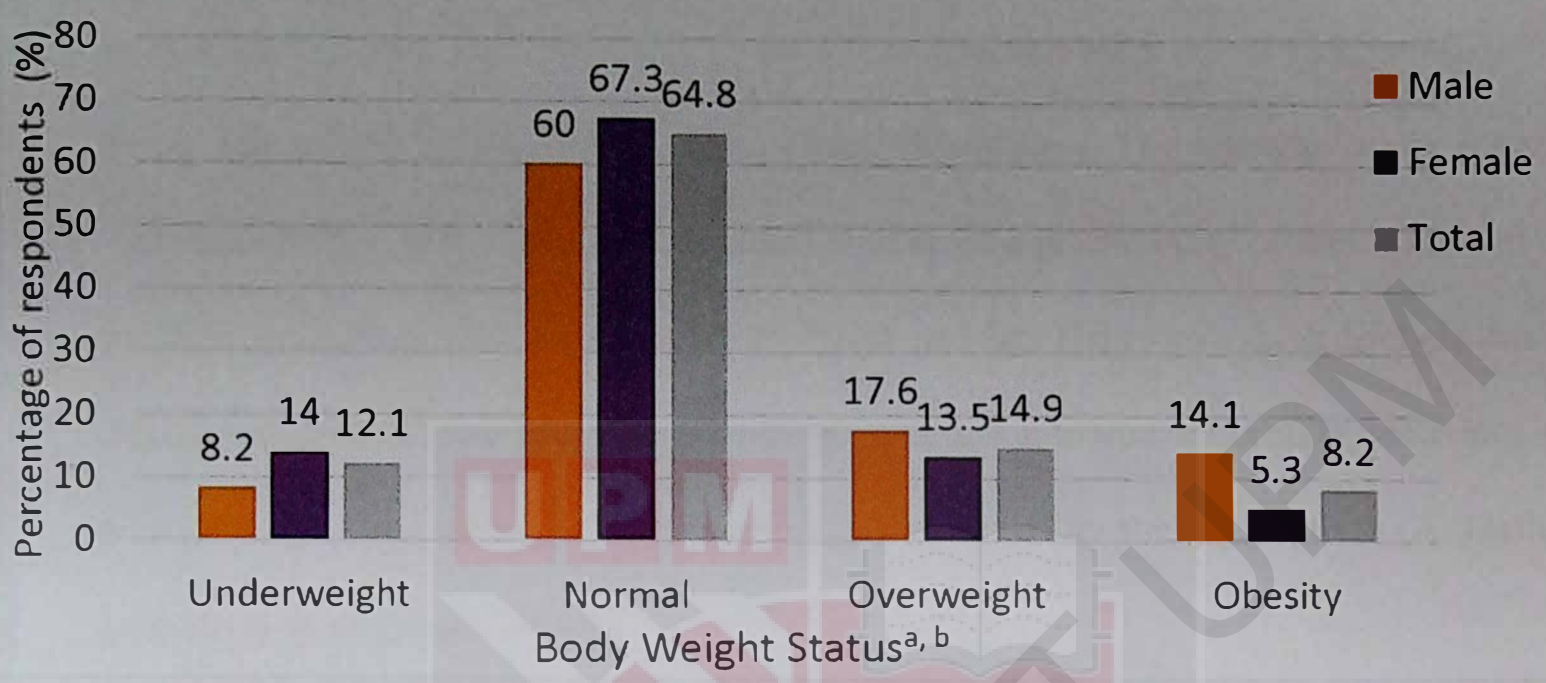
Variables	Mean ± SD				
	Male	Female	Total	*t*	*p*-value
Height (cm)	169.83 ± 6.94	158.50 ± 6.15	162.26 ± 8.35		
Weight (kg)	69.22 ± 14.94	55.65 ± 11.50	60.16 ± 14.23		
Body Mass Index (kg/m^2)	23.99 ± 4.83	22.13 ± 4.29	22.75 ± 4.55	2.995*	0.003

*Difference in sex is significant at the 0.05 level (2-tailed)

Based on Figure 4.1, majority of undergraduates were reported having a normal body weight status (64.8%) and this is followed by being overweight (14.9%), underweight (12.1%) and obesity (8.2%). About one-fifth (23.1%) of the undergraduates were reported to be either overweight or obese. According to NHMS 2015, 18.9% of the Malaysian adults aged 18 to 24 years old were either overweight or obese and the prevalence was quite lower than current findings. Possibly, current findings showed higher percentage due to the difference in the sample used in both studies. The sample from present study only consist of undergraduates students from one public and one private universities in Selangor while the sample used in NSM 2015 were young adults recruited from the whole country. Hence, generalization and direct comparison cannot be made.

There were more female students reported to be in underweight category (14.0%) compared to males (8.2%) while a higher percentage of males seen in overweight (17.6%) and obesity (14.1%) group compared to female (overweight=13.5%, obesity=5.3%). There is also an association between sex and body weight status among these undergraduates (χ^2=8.138, p= 0.043). This was consistent and supported by previous local study by Kuan et al. (2011) in which among 600 undergraduates of Universiti Malaysia Sarawak studied, a higher percentage of males were reported to be overweight, while more females were underweight. The sex difference in BMI was also statistically significant.

Figure 4.1`: Distribution of undergraduates by weight, height and body mass index (n=256)



[a] Significant at the 0.05 level (2-tailed) activity (χ^2=8.138, p= 0.043)
[b] Based on World Health Organization Classification 1995

4.9 Hypotheses Testing

4.9.1 Socio-demographic factors and night eating syndrome (NES)

a) There are associations between socio-demographic factors and NES among undergraduate students in Selangor.

Table 4.13: Associations between socioeconomic status (age and household income) and NES (n=263)

Socio-economic status	NES			
	r	*p-value*	r_s	*p-value*
Age	0.035	0.577	-	-
Household income	-	-	-0.135*	0.030

*. Correlation is significant at 0.05 level (2-tailed)

The null hypothesis was analyzed by using Pearson Product Moment Correlation for age while Spearman's Rank-Order Correlation was used for household income. Sex

variable was analyzed using Independent *t*-test while ethnicity and living arrangement were analyzed using One-Way Anova. As shown by Table 4.13, there was a significant and negative correlation between household income and NES (r_s=-0.135, p=<0.030) as being determined by Spearman's Rank-Order Correlation. The previous study reported that those from a lower income household purchased a poor quality of diet. This diet can be characterized as diets high in carbohydrates and fats (Drewnowski & Eichelsdoerfer, 2010), which could also lead to night eating. In addition to that, this eating behaviors was also consistent and reflects the diet typically consumed by the night eaters (A. Gallant, Lundgren, & Drapeau, 2014b).

Next, the result showed that there was no significant correlation found between age and NES (p=0.577), suggesting that age does not influence the occurrence of NES. This was inconsistent with previous study which showed that age played a role. This study reported that NES prevalently occur among people of younger adults aged 18 to 30 years old but the lowest among older adults (Striegel-Moore et al., 2006). Despite that, He et al (2017) in a study among Chinese college students found the similar insignificance correlation between age and NES. This might be due to present study focusing only on university students with a limited age range (mean age range: 21.64 years old). Hence, the difference in the age range in samples used might results in the inconsistency of the findings.

Table 4.14: Mean scores of NES between different sexes (n=263)

Variable	Mean	Std. Deviation	*t-value*	*p-value*
Sex			2.585*	0.010
Male	17.44	6.50		
Female	15.42	5.67		

*. Difference in sex is significant at the 0.05 level (2-tailed)

As being reported, the difference in the mean score of NES between male and females was statistically significant (t=2.585, p=0.010). Male undergraduates were reported to have a higher scores (17.44 ± 6.50) compared to female undergraduates (15.42 ± 5.67). This findings was consistent with the previous study which shows that sex played a role in the occurrence of NES (He et al., 2017; Sarina & Poh, 2015). According to Maestripieri (2014), men are more likely than women to identify themselves as night owls and those night-owls sleep late in the evening as well as waking up late in the morning (Adan et al., 2012) which could lead to the episodes of eating at night. Hence, this contributes to the occurence of NES. In another study conducted on risk factors of NES, Aronoff, Geliebter and Zammit (2001) found that gender have a significant effect on night eating with male being more likely to NES. This study implicates that being a male as a risk factor for NES. Andersen et al. (2004) further supported the findings, claiming that obstructive sleep apnoe among male is as twice compared to females and it may be perpetuating in night eating due to the frequent awakenings. However, since females undergraduates accounted for majority of the total respondents, further investigations on the effect of sex on NES need to be done.

Table 4.15: Mean scores of NES between different ethnicities (n=263)

Variable	Mean	Std. Deviation	F-*value*	*p-value*
Ethnicities			4.595*	0.004
Malay	16.90	5.93		
Chinese	13.63	5.58		
Indian	16.76	6.37		
Others	15.00	6.48		

*. Difference in sex is significant at the 0.05 level (2-tailed)
Post-Hoc Test (Tukey) showed significant different between Malay and Chinese (p=0.002)

Based on ANOVA analysis used, present study showed that there was a significant difference in mean night eating syndrome scores between ethnicities (F=4.595, p=0.004). The highest mean score was reported in Malay (16.90 ± 5.93) while the lowest mean score was in Chinese ethicnity (13.63 ± 5.58). Post-hoc test further potrayed that there was a significant difference between Malay and Chinese (p=0.002) in which Malay ethnicity has higher NES scores compared to Chinese. Striegel-Moore et al. (2004) in a Western study reported that ethnicity played a role, whereby recurrent night eating was significantly more common among black girls compared to white girls when definitions of night eating focused on eating after 7 pm and after 11 pm. Striegel-Moore et al. (2004) suggested that due to cultural norms and working patterns, black families may eat later in the day than white family. However, some other studies found contradicts findings where no associations between ethnicities and NES were found (Gan et al., 2019; Runfola et al., 2014). Previous studies on NES have not examined and further explained the contribution of ethnicity to NES, making it difficult to understand this findings. With the current data showing almost 65.4% Malay ethnicity make up the majority of total respondents, this study begs further exploration on effect of ethnicity on NES.

Table 4.16: Mean scores of NES between different living arrangement (n=263)

Variable	Mean	Std. Deviation	F-*value*	*p-value*
Living arrangement			0.033	0.967
In Campus	16.15	6.25		
Out Campus	15.85	3.60		
Home with Family	16.00	6.37		

Based on Table 4.16, there was no significant difference in the mean NES scores between different living arrangements (F=0.033, *p*=0.967). The highest mean score was reported for students living in campus (16.15 ± 6.25) while the lowest mean score was in students living out campus (15.85 ± 3.60). Previously, it was suggested that students living away from home tend to developed an unfavorable eating habits than those who are not (Papadaki et al., 2007), which could contribute to NES. However, Story, Neumark-Sztainer and French (2002) explained that with the increase in the independence and autonomy level, parental influences on the dietary habits of undergraduates becomes less significant. At this stage of life, parents have not much of control over the dietary behaviors of the undergraduates and individual, social as well as physical factors were the main factors influencing their eating pattern. This could explained on why there is no significant difference in the mean scores of NES among students living in different places.

9.1 Lifestyle factors and night eating syndrome (NES)

b) There are associations between lifestyle factors (smoking and alcohol) and NES among undergraduate students in Selangor.

Table 4.17: Mean scores of NES between smoking status (n=263)

Variable	Mean	Std. Deviation	*t-value*	*p-value*
Smoking status			4.215**	<0.001
Yes	21.88	5.84		
No	15.70	5.84		

**Correlation is significant at 0.01 level (2-tailed)

In the present study, there was a significant difference found in the mean NES scores between a smoker and a non-smoker (t=4.215, p=<0.00) as shown in Table 4.17. A higher scores were reported among smoker (21.88 ± 5.84) while non-smokers scores lesser (15.70 ± 5.84). Though there are limited published papers discussing on the relationship of smoking with night eating, a study by Baron (2011) explained that due to the metabolic effect of nicotine, smokers were reported to eat more unhealthy food, which refers to the dietary habits of a late-eaters (Heydari et al., 2014). In another study by Audrain-Mcgovern and Benowitz (2011), nicotine affected the hormones in two different ways. The acute effect of it was consistent with the activation of systems that decreased appetite and increased the body metabolism. However, complex effects of nicotine activate the system that increased the appetite as well as decreased the metabolism rate. The present study only assessed the smoking status among undergraduates and does not identify how long they have been smoking. Possibly, those who smoked have been engaged with this in a long term and cause complex effect of nicotine to take place. Hence, leading to higher consumption of food which can cause night eating episodes. This might explained on why those smokers have higher mean NES scores compared to non-smokers.

Table 4.18: Mean scores of NES between alcohol consumption (n=263)

Variable	Mean	Std. Deviation	*t-value*	*p-value*
Alcohol consumption			-2.994*	0.003
Yes	14.19	5.92		
No	16.71	5.90		

*Correlation is significant at 0.05 level (2-tailed)

Aside from that, a significant difference was also found between a drinker and non-drinker with mean night eating syndrome scores (t=-2.994, p=0.003) as shown in Table 4.18. It was suggested before that alcohol could induced binge eating. Lloyd-Richardson et al. (2008) in a study to determine the relationship between alcohol use and eating habits among college freshman reported that moderate-risk drinkers were more likely to eat more food and make a less healthy food choices after drinking, which implies that alcohol increased their appetite. They were also reported to have a high levels of late night eating and consumed high fat food after drinking episodes.

However, the present study did not support previous findings in which undergraduate students who drink, reported a lower NES score (14.19 ± 5.92) compared to non-drinker (16.71 ± 5.90). Kokavec (2008) in a paper to review the specific effects of alcohol toxicity in discouraging carbohydrate intakes suggested that consumption of alcohol possibly lead to alteration in appetite for carbohydrate, in which the needs for carbohydrate will be reduced. Alcoholic drinker tend to feel full after drinking episodes and this would prevent them from munching at night. This could explain the low NES score among a non-drinker compared to a drinker.

c) There are associations between lifestyle factors (psychological distress, sleep quality, physical activity, eating behavior) and NES among undergraduate students in Selangor.

Table 4.19: Associations between lifestyle factor and NES (n=263)

Lifestyle Factor	NES			
	r	*p-value*	r_s	*p-value*
Psychological Distress				
Depression	0.331**	<0.001	-	-
Anxiety	0.280**	<0.001	-	-
Stress	0.265**	<0.001	-	-
Sleep Quality	0.460**	<0.001	-	-
Physical Activity	-	-	0.038	0.542
Eating Behavior				
Snacking				
Morning Tea	-0.021	0.742	-	-
Afternoon Tea	0.174**	0.005	-	-
Supper	0.376**	<0.001	-	-
Emotional Eating	0.249**	<0.001	-	-
Restrained Eating	0.139*	0.029	-	-

*Correlation is significant at 0.05 level (2-tailed)
**Correlation is significant at 0.01 level (2-tailed)

Based on Table 4.19, Product's Moment Correlation was used to analyze the correlation between psychological distresses (depression, anxiety, and stress), sleep quality and eating behaviors (emotional eating, restrained eating, and snacking) with NES. Spearman's Rank-Order Correlation was used to analyze physical activity level and NES among undergraduates. Meanwhile, Independent *t*-test were used to analyze the difference in the mean scores of NES with smoking status, alcohol consumption and breakfast skipping.

In the present study, significant correlation were found between depression (r=0.331, p–<0.001), anxiety (r=0.280, p=<0.001) as well as stress (r=0.265, p=<0.001) and NES. The significant correlations found in the present study were consistent with the previous study conducted by He et al. (2017) which also found significant correlation between psychological distress and NES. The study from Sevincer et al. (2016), Hilbert et al. (2014) and Meule et al. (2014) were also in line with the current findings, which further support that depression, anxiety and stress respectively have effect on NES.

From the previous study conducted, having to live in a stressful environments would lead to the episodes of eating more than normal as a coping method (Gower, Hand & Crooks, 2008). University students have higher likelihood to deal with unfavorable events that affect emotion, which includes stress. Hence, causing them to binge eating and this could lead to NES (Shamsuddin et al., 2013). Changes in the hormones levels as a result of stress could also altered the eating behaviors. According to a study by Temel et al., (2003), stress is related with serotonin whereby serotonin levels lowered with increase in stress. Since people with NES tend to have low serotonin levels (Milano et al., 2012), the researcher believes that decrease in this hormones would lead to disturbances in feeding rhythms as high consumption of food were observed.

The present study also found a significant correlations between sleep quality and NES (r=0.460, p=<0.001). Likewise, this findings was consistent with previous study (Mok, 2015; Yahia et al., 2017). Those with NES were reported to have an altered eating patterns, which is reflected by a high percentage of dietary fats (Gallant et al., 2014). This eating behaviors was also related with a lighter and less restorative sleep with more arousals (St-Onge et al. (2016). In addition, Spaeth, Dinges and Goel (2013) reported that

reduced sleep time plays roles in night time food intake as it causes people to susceptible to greater caloric intake. Melatonin hormones also played significant roles in regulating sleep and eating pattern. Melatonin is secreted in brain and helps in regulating other hormones functioning in circadian rhythm. However, it was reported that low melatonin results in sleep disturbances and this affected people with NES (Birketvedt et al. 2014).

Next, no significant correlation was observed between physical activity and NES ($p = 0.542$). Although there is lack of statistical significance from published papers, it was suggested that this insignificance might be due to high percentage of respondents in present study engaged in moderate and high intensity physical activity (74.2%). Previous study by Wunsch, Kasten and Fuchs (2017) reported that university students who practiced active lifestyle have better sleep quality and a better sleep efficiency results in lower number of eating episodes per night (Vetrugno et al., 2006). Hence, this possibly reduces the likelihood of having NES.

In terms of eating behavior, present study demonstrated that there was a significant correlation found between snacking in afternoon tea and supper (r=0.174, p=0.005; r=0.376, p=<0.001) with NES. Currently, there are not much of published paper that discussed on the relationship between afternoon snacking and NES, hence not much of comparison can be made and further studies on this is needed. However, significant associations reported between present study on supper and night eating was supported by Allison et al. (2008) given that nocturnal snacking was also identified as one of the diagnostic characteristics of having NES. Colles, Dixon, and O'Brien (2007) reported that snacking in the midnight was due to higher symptoms of depression and hunger found among those with NES. This relation provides significance to the behavior of having

nocturnal snacking among them. In addition, lower evening leptin levels may also contribute to the nighttime hunger and stimulate nocturnal snacking (Birketvedt et al., 2014).

Besides that, emotional eating showed a positive and significant correlation with NES (r=0.249, p=<0.001). This findings was consistent with the previous study which was conducted among 246 college student. Nolan & Geliebter (2012) reported that emotional eating was associated with NES at different levels. Those with full syndrome NES category had a significantly higher scores compared to other levels. Emotional eating could lead to NES as for many students, the transition from the high school environment into university is usually accompanied by emotional distress (Robotham, 2008). In order to cope with stressful life events in university, food tend to be used as a distraction and coping mechanisms to escape unpleasant feelings (Bennett, Greene & Schwartz-Barcott, 2012). The increased in food consumption observed would potentially lead to night eating syndrome.

Restrained eating also showed a positive and significant correlation with NES (r=0.139, p=0.029), the associations might be due to the restriction in diet which occur especially at day time. As a result of this, the students will have an increase in the physical pressure to eat at night (Runfola et al., 2014a). Those who have NES were also reported to have control over their eating during the day. However, this control was lost after supper-hours and at night, hence leading to episodes of night eating (Allison et al., 2005).

Table 4.20: Mean scores of NES between a skipper and non-skipper for breakfast (n=263)

Variable	Mean	Std. Deviation	*t-value*	*p-value*
Breakfast			2.908	0.004
Skipper	16.74	5.90		
Non-skipper	14.27	6.08		

*Correlation is significant at 0.05 level (2-tailed)

Last but not least, Table 4.20 showed that a significant difference in NES score was found between skipper and non-skipper for breakfast meal (t=-2.908, p=0.004). A breakfast skipper (16.74 ± 5.90) scored higher compare to a non-skipper (14.27 ± 6.08), which implies that those who skips breakfast has higher severity of NES. This is in line with previous study which showed that a breakfast skipper tend to consume high percentage of food later in the evening (Martin et al., 2000), hence leading to NES. Similarly, Suh, Lee and Chung (2012) also reported that being a breakfast skipper was associated with night eaters consuming 500 kcal of energy and above.

4.9.2 Body weight status and night eating syndrome (NES)

d) There are associations between body weight status and NES among undergraduate students in Selangor.

Table 4.21: Associations between body mass index and NES (n=256)

Variable	NES	
	r	*p-value*
Body mass index (kg/m²)	-0.013	0.834

The hypothesis was analyzed using Pearson's Product Moment Correlation test. There was no significant correlation found between BMI (p=0.834) and NES as shown in Table 4.14. In contrast, previous study found significant associations between BMI and NES, where it prevalently occur among normal weight students (Sarina & Poh, 2015).

Despite that, few other studies also found similar findings with the present study (Nolan & Geliebter, 2012). The lack of relationship observed might be due to the relatively young age of the respondents from present study (mean age: 21.64 years). Striegel-Moore (2006) supported by suggesting that effects of NES may not yet be observed in younger adults, as weight changes emerging only over time. This suggest that the undergraduate students might potentially develop NES later on in their life with increasing of weight.

CHAPTER 5

CONCLUSION, LIMITATION AND RECOMMENDATIONS

5.1 Conclusions

The present study found that the prevalence of NES was 11.2% with a mean NES score of 16.11 ± 6.03. Male undergraduate students have higher mean NES score than their female counterparts (t=2.585, p=0.010).

This study was participated by 263 undergraduate students with a mean age of 21.64 ± 1.28 years. More than half of the participants were female undergraduate students (66.2%) and Malay ethnicity accounted for the majority of the respondents with a percentage of 65.4%. Undergraduate students from public university took up the biggest part in the present study (69.6%) and the highest proportion were from the first year (31.6%). With 81.7% living in campus. In regards to their lifestyle factors, the findings found that a majority of the undergraduate students never smoke (93.1%) before. Despite that, one in four respondents consumed alcohol (25.9%) and majority of that portion (89.7%) were an occasional drinker (drink less than or equal to 3 drinks per month. The prevalence of undergraduates who were at risk of having depression, anxiety and stress were 46.7%, 68.1% and 38.7% respectively. More than half of the undergraduates were reported to have poor sleep quality (58.2%) majority of undergraduates had moderate-intensity physical activity (50.2%). Females (31.0%) also outnumbered males (15.7%) with twice likelihood to be physically inactive. About eight out of ten (81.6%) of the undergraduates were meal skippers whereby the most frequently skipped meal was breakfast, followed by dinner and lunch. The most snacks being consumed among the

students was supper, followed by morning tea and afternoon tea. About one-tenth of the undergraduates were underweight (12.1%) while one-fifth of them were classified as overweight and obese (23.1%).

Bivariate analysis showed that there was a significant correlation found between sex, monthly household income, smoking, alcohol consumption, psychological distress, sleep quality and eating behavior (breakfast skipping, afternoon tea and supper snacking, emotional eating, restrained eating) with NES. However, no correlation was found between age, living arrangements, physical activity and BMI with NES among undergraduate students. It is worth noticing that about one in ten of the undergraduate students were facing NES. In the upcoming intervention program among university students, proper measures on psychological well-being, proper meal and snack time as well as sleeping pattern should be formulated and considered.

5.2 Limitations

There were several limitations found and should be addressed in the future study. Firstly, since the study conducted was a cross-sectional study, no causal relationship between variables could be established. Secondly, the present study involved undergraduates from one university each from public and private university in Selangor. Hence, the findings on prevalence and associated factors from present study may not be generalized to all Malaysian undergraduates.

Aside from that, self-administered questionnaire used in this study might also be another limiting factor. The usage of self-administered questionnaire relied on the interpretation of the undergraduates towards the questions as well as their honesty in answering it. Some questionnaire required undergraduates to recall their activities back in

the past week or past month and therefore, this could be subjected to reporting bias. In addition, social desirable bias might influence the responses given by undergraduates. Responding in a way that will be favorable to the researcher by denying undesirable trait or reporting a trait that is socially desirable could affect the findings. Hence, there is a possibility that the responses given by undergraduates does not reflects their actual behavior or condition of the studied factors.

Last but not least, the present study did not include dietary intake in assessing the body weight status and night eating syndrome among the undergraduates. According to Choi et al. (2016), the relationship between BMI and night eating can only be accurately characterized if energy intake caused by night eating, total energy intake and energy expenditure are analyzed together. Therefore, this might affect the present findings.

5.3 Recommendations

Due to the lack of published study in Malaysia, the findings from the present study were able to provide significant information regarding factors correlated with NES. It was found out that about one in ten undergraduates having NES. Severity of psychological distress, poorer sleep quality, higher risk of emotional and restrained eating as well as frequent snacking in supper were also found to be correlated with higher severity of NES in the present study. Therefore, it is suggested that future health promotion intervention program among university students should consider psychological well-being, proper meal and snack time as well as sleeping pattern.

Other than that, it is recommended for a longitudinal study be conducted to determine the causal relationship between the correlated factors and night eating syndrome. More factors should also be considered and explored by future study which include the dietary

intake to better understand the etiology of NES. It is also recommended to conduct future study on NES in a larger scale. Inclusion of more locations and different populations should be considered to ensure that the data collected as well as the findings could be generalized to the general populations.

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Appendix C –Approval Letter from selected faculty (UNMC)

RE: UPM/FPSK/JPD/PKK4999A/9 Research study in University of Nottingham Malaysia

From: PAN YAN (Pan.Yan@nottingham.edu.my)

To: chinys@upm.edu.my

Cc: yvonnelim1210@gmail.com; Kang-Nee.Ting@nottingham.edu.my; nurulhuda_ali96@yahoo.com

Date: Tuesday, 12 February 2019, 5:10 pm GMT+8

Dear Dr Chin,

There should be fine that your students come and collect the data as long as our students signed the informed consent before the data collection.

Best wishes,

Pan Yan (PhD, PGCHE, fellow of HEA)

5/25/2019 Yahoo Mail - RE: UPM/FPSK/JPD/PKK4999A/9 Research study in University of Nottingham Malaysia

RE: UPM/FPSK/JPD/PKK4999A/9 Research study in University of Nottingham Malaysia

From: PAN YAN (Pan.Yan@nottingham.edu.my)

To: nurulhuda_ali96@yahoo.com

Date: Tuesday, 19 February 2019, 12:27 pm GMT+8

Hi Huda,

We don't have official approved letter for such activity. Perhaps you can include my email in your appendix. Unless you have collaborators in our University, and then the study will need to get ethics approval from our ethic committee. In your situation, you are just recruiting our students as volunteers, hence, as long as you get the ethics approval from your university and you get signed informed consent before the study, it should be fine from our side.

Best wishes,

Pan Yan (PhD, PGCHE, fellow of HEA)

Appendix D–Information Sheet (a)

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

FORM 2A: 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

a) Associations between socio-demographic characteristics, psychological factors, lifestyle factors and academic performance among undergraduate students in Selangor.

b) Associations between socio-demographic factors, lifestyle factors, body weight status and night eating syndrome (NES) among undergraduate students in Selangor

2. INTRODUCTION

This study involved the research of 2 topics from two different students of Bachelor of Science (Nutrition and Community Health) from Faculty of Medicine and Health Sciences, Universiti Putra Malaysia. This study is expected to be completed within a year. An approximate of 267 undergraduate students will be recruited in this study. This study has been approved by the Ethic Committee for Research Involving Human Subject (JKEUPM). A brief introduction about the topics are as follows:

- Academic performance can be defined as the extent to which a student has achieved certain goals in their studies. It also refers to behavior change in terms of cognitive, affective and psychomotor. Undergraduate students experienced various challenges related to their educational social and lifestyle changes that can have a positive and negative impact on student health. This will affect their academic performance and bring an impact on their future career success. There are several factors related to student's academic performance such as stress, eating behavior, sleep quality and social influences. However, there are limited studies on academic performance among undergraduate students in Malaysia. Therefore, the purpose of this study is to examine the associations between socio-demographic characteristics, psychological factors, lifestyle factors and academic performance among undergraduate students in Selangor.

- Night eating syndrome (NES) refers to an eating disorder that can be characterized by breakfast skipping, increased appetite for food in the evening and urge to eat after waking up from the sleep. This is followed by eating at night. The food consumed after the evening meal are usually in excess. This syndrome is also accompanied and associated with sleep disturbance and psychological distress. With the challenges to adapt with new environment and having to cope with hectic schedule, stressful events faced in university could alter student's eating behavior and this might leads to NES. NES is quite prevalent in general population, however, there are limited studies being done in Malaysia regarding this issue, particularly among university students. Therefore, this research will be conducted with the aim to study NES in-depth as well as identifying the associations between socio-

Appendix D–Information Sheet (b)

demographic factors, lifestyle factors, body weight status and night eating syndrome (NES) among undergraduates in Selangor.

3. WHAT WILL YOU HAVE TO DO?

Students are required to read and understand about this study in "Respondent's Information Sheet". Your participation in this study is voluntary and are entitled to withdraw from this study at any time without penalty. If you voluntarily agree to participate, you are required to sign the respondents' consent form. Upon completion of the respondent's consent form, kindly return it to the researcher. Your participation in this study will take an approximate of 30 minutes.

Things that you need to do are as follows:

a) Complete a set of questionnaire comprises of socio-demographic factors, psychological factors and lifestyle factors. After completing the questionnaire, please return it to the researcher.
b) Your height, weight, body fat percentage and waist circumference will be measured by the researcher.

4. WHO SHOULD NOT PARTICIPATE IN THE STUDY?

- Non-Malaysian
- Postgraduate students
- Pregnant/ Breastfeeding students
- Having physical and mental disabilities
- Taking medication (example: *anti-depressants, Atenolol, Lorcaserin*) that would potentially affects the sleeping pattern and appetite

5. WHAT WILL BE THE BENEFITS OF THIS STUDY?

a) TO YOU AS THE SUBJECT?

You will be able to know your body composition such as your recent height, weight and body fat percentage. Once you have successfully completed this study, goodies will be given to you as a token of appreciation for your participation in this study.

b) TO THE INVESTIGATOR?

Information obtained from this study will be used by the researcher to identify:

- The associations between socio-demographic characteristics, psychological factors, lifestyle factors and academic performance among undergraduate students in Selangor.
- The associations between socio-demographic factors, lifestyle factors, body weight status and night eating syndrome (NES) among undergraduate students in Selangor.

The findings from this study could also serve as a baseline data in planning an intervention program to enhance the academic performance as well as promote healthy eating behaviors among university students.

Appendix D–Information Sheet (c)

6. WHAT ARE THE POSSIBLE RISK?

This research has a *minimal risk*. It involves survey via questionnaires and anthropometric measurements of height, weight, body fat percentage and waist circumference that are *likely to cause only a slight discomfort.*

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

Students will not be identified individually if the findings of this research were to be published later. 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.

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

If you need further information regarding this research, please feel free to contact:

Researcher 1:
Lim Hooi Sian
Tel: 016-4517056 (H/P)
E-mail: yvonnelim1210@gmail.com

Researcher 2:
Nurul Huda Ali
Tel: 017-2154824 (H/P)
E-mail: nurulhuda_ali96@yahoo.com

Supervisor:
Dr. Chin Yit Siew
Tel/ Fax: 03-89472680
E-mail: chinys@upm.edu.my
Department of Nutrition and Dietetics
Faculty of Medicine and Health Sciences
Universiti Putra Malaysia

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

Appendix D–Consent Form

9. CONSENT

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

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

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

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

*** delete where necessary*

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

Date : ..... Name : .....

I/C No. : .....

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

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

Appendix E–Questionnaires

Reference No. /No. Rujukan

DEPARTMENT OF NUTRITION AND DIETETICS
JABATAN PEMAKANAN DAN DIETITIK
FACULTY OF MEDICINE AND HEALTH SCIENCES
FAKULTI PERUBATAN DAN SAINS KESIHATAN

PKK 4999A
FINAL YEAR PROJECT
PROJEK ILMIAH TAHUN AKHIR

SELF-ADMINISTERED QUESTIONNAIRES
BORANG SOAL SELIDIK

Associations between socio-demographic characteristics, psychological factors, lifestyle factors and academic performance among undergraduate students in Selangor

Perkaitan Antara Faktor Socio-Demografi, Faktor Psikologikal dan Faktor Cara Kehidupan dengan Prestasi Akademik dalam Kalangan Pelajar Universiti di Selangor

Associations between socio-demographic factors, lifestyle factors, body weight status and night eating syndrome among undergraduate students in Selangor

Perkaitan Antara Faktor Socio-Demografi, Faktor Cara Kehidupan dan Indeks Jisim Badan dengan Sindrom Makan Malam dalam Kalangan Pelajar Universiti di Selangor

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Course of Study / *Program*: B. Sc. (Nutrition and Community Health)

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Date / *Tarikh*: _____ (dd) / _____ (mm) / _____ (yyyy)

Note / *Arahan*:
Questionnaires include ten sections. Please complete ALL items in EACH section by selecting the answer that corresponds to you. All information provided is confidential and solely for research purposes only. Your honesty and sincerity in providing information is highly needed. All the co-operation is greatly appreciated.

Soal selidik merangkumi sepuluh bahagian. Sila lengkapkan SEMUA item dalam SETIAP bahagian dengan memilih jawapan yang bersepadan dengan anda. Segala maklumat yang diberikan adalah sulit dan hanya untuk tujuan penyelidikan semata- mata. Kejujuran dan ketelusan anda dalam memberi maklumat adalah amat dihargai. Segala kerjasama yang diberikan amat dikargai dan didahului dengan ucapan jutaan terima kasih.

SECTION A: Please fill in the relevant questions.

Bahagian A: *Sila isi atau tanda pada pernyataan yang berkenaan.*

1. Age / *Umur* : _____

2. Sex / *Jantina* :

□ Male / *Lelaki* □ Female / *Perempuan*

3. Ethnicity / *Bangsa* :

□ Malay / *Melayu*
□ Chinese / *Cina*
□ Indian / *India*
□ Others (Please specify) / *Lain-lain (Sila nyatakan):*_____

4. Marital Status / *Status perkahwinan* :

□ Single / *Bujang*
□ Married / *Berkahwin*

5. Course of Study / *Program Pengajian* : _____

6. Year of Study / *Tahun Pengajian* :

□ First year / *Tahun pertama*
□ Second year / *Tahun kedua*
□ Third year / *Tahun ketiga*
□ Fourth year / *Tahun keempat*

7. Accommodation / *Tempat kediaman* :

□ In Campus / *Dalam kampus*
□ Out Campus / *Luar kampus*
□ Home with family / *Rumah bersama keluarga*

8. CGPA (previous semester) / *CGPA (semester lepas)* : _____

9. Monthly Household Income / *Pendapatan isi rumah* : RM _____

10. Household Size / *Bilangan ahli keluarga* : _____

11. Types of Sponsorship / *Jenis Tajaan* :

- ☐ PTPTN Loan / *Pinjaman PTPTN*
- ☐ Scholarship / *Biasiswa*
- ☐ Parents / *Ibu bapa*
- ☐ Extra Income (eg. part time job) / *Pendapatan tambahan (cth: kerja sambilan)*
- ☐ Others (Please specify) / *Lain-lain (Sila nyatakan):* _____

12. Father's Education Level:

- ☐ No formal education / *Tidak bersekolah formal*
- ☐ Primary education /*Sekolah rendah*
- ☐ Secondary education /*Sekolah menengah*
- ☐ Pre-University / *Pra-Universiti* (A-level/ Foundation/ STPM/ Diploma)
- ☐ Tertiary education / *Pengajian Tinggi* (Bachelor / Master / PhD)

13. Mother's Education Level:

- ☐ No formal education / *Tidak bersekolah formal*
- ☐ Primary education /*Sekolah rendah*
- ☐ Secondary education /*Sekolah menengah*
- ☐ Pre-University / *Pra-Universiti* (A-level/ Foundation/ STPM/ Diploma)
- ☐ Tertiary education / *Pengajian Tinggi* (Bachelor / Master / PhD)

SECTION B: Please fill in the relevant questions. **Choose one answer only.**

Bahagian B: *Sila isi atau tanda pada pernyataan yang berkenaan.* ***Pilih satu jawapan sahaja.***

1. Do you currently smoke tobacco on a daily on daily basis, less than daily or not at all?
   Adakah anda kini, sedang merokok tembakau pada setiap hari, kurang dari sehari atau langsung tidak merokok?

□ Daily * / *Setiap Hari* ⟶ *End of Section*
□ Less Than Daily / *Kurang Dari Setiap Hari* ⟶ *Go to Question 2, Skip Question 3*
□ Not at all **/ *Langsung tidak merokok* ⟶ *Go to Question 3*

2. Have you smoked tobacco daily in the past?
   Adakah anda merokok tembakau setiap hari pada masa yang lalu?

□ Yes / *Ya* □ No/ *Tidak*

3. In the past, have you smoked tobacco on a daily basis, less than daily or not at all?
   Pada masa yang lalu, adakah anda merokok tembakau pada setiap hari, kurang dari sehari atau langsung tidak merokok?

□ Daily * / *Setiap Hari*
□ Less Than Daily / *Kurang Dari Setiap Hari*
□ Not at all **/ *Langsung tidak merokok***

Daily: Smoking at least one tobacco product every day or nearly every day over a period of a month or more
****Not at all: Rare instances of smoking (tried once or twice in a lifetime)***

SECTION C: Please fill in the relevant questions. **Choose one answer only.**

Bahagian C: *Sila isi atau tanda pada pernyataan yang berkenaan.* ***Pilih satu jawapan sahaja.***

1. Have you ever consumed alcoholic beverages?
   Pernahkah anda minum sebarang minuman beralkohol?

□ Yes / *Ya* ⟶ *Go to Question 2* □ No/ *Tidak* ⟶ *End of Section*

2. How frequent do you consume alcoholic beverages?
   Berapa kerapkah anda mengambil minuman beralkohol?

□ More than 4 days a week / *Lebih dari 4 hari dalam seminggu*
□ 1 to 4 days a week / *1 hingga 4 hari dalam seminggu*
□ ≤ 3 days a month / *Kurang atau Sama dengan 3 hari sebulan*

1 alcoholic drink: 1 can/ small bottle (~285 ml) of beer or 1 glass (~120 ml) of wine or 1 measure (~30 ml) of spirits.

SECTION D
Bahagian D

Please read each statement and **tick** either number 0, 1, 2 or 3 which indicates how much the statement applied to you over the past week. There is no right or wrong answers.

*Sila baca setiap kenyataan di bawah dan **tandakan** pada nombor 0, 1, 2 atau 3 bagi menggambarkan keadaan anda sepanjang minggu yang lalu. Tiada jawapan yang betul atau salah.*

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 kerapkali menggambarkan keadaan saya

3 Applied to me very much, or most of the time

Sangat banyak atau sangat kerap menggambarkan keadaan saya

	Statement	0	1	2	3
1.	I found it hard to wind down *Saya dapati diri saya sukar ditenteramkan*				
2.	I was aware of dryness of my mouth *Saya sedar mulut saya terasa kering*				
3.	I couldn't seem to experience any positive feeling at all *Saya tidak dapat mengalami perasaan positif sama sekali*				
4.	I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion) *Saya mengalami kesukaran bernafas (contohnya pernafasan yang laju, tercungap-cungap walaupun tidak melakukan senaman fizikal)*				
5.	I found it difficult to work up the initiative to do things *Saya sukar untuk mendapatkan semangat bagi melakukan sesuatu perkara*				
6.	I tended to over-react to situations *Saya cenderung untuk bertindak keterlaluan dalam sesuatu keadaan*				
7.	I experienced trembling (eg, in the hands) *Saya rasa menggeletar (contohnya pada tangan)*				
8.	I felt that I was using a lot of nervous energy *Saya rasa saya menggunakan banyak tenaga dalam keadaan cemas*				
9.	I was worried about situations in which I might panic and make a fool of myself *Saya bimbang keadaan di mana saya mungkin menjadi panik dan melakukan perkara yang membodohkan diri sendiri*				

10.	I felt that I had nothing to look forward to *Saya rasa saya tidak mempunyai apa-apa untuk diharapkan*				
	Statement	**0**	**1**	**2**	**3**
11.	I found myself getting agitated *Saya dapati diri saya semakin gelisah*				
12.	I found it difficult to relax *Saya rasa sukar untuk relaks*				
13.	I felt down-hearted and blue *Saya rasa sedih dan murung*				
14.	I was intolerant of anything that kept me from getting on with what I was doing *Saya tidak dapat menahan sabar dengan perkara yang menghalang saya* *meneruskan apa yang saya lakukan*				
15.	I felt I was close to panic *Saya rasa hampir-hampir menjadi panik/cemas*				
16.	I was unable to become enthusiastic about anything *Saya tidak bersemangat dengan apa jua yang saya lakukan*				
17.	I felt I wasn't worth much as a person *Saya tidak begitu berharga sebagai seorang individu*				
18.	I felt that I was rather touchy *Saya rasa yang saya mudah tersentuh*				
19.	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) *Saya sedar tindakbalas jantung saya walaupun tidak melakukan aktiviti* *fizikal (contohnya kadar denyutan jantung bertambah, atau denyutan jantung berkurangan)*				
20.	I felt scared without any good reason *Saya berasa takut tanpa sebab yang munasabah*				
21.	I felt that life was meaningless *Saya rasa hidup ini tidak bermakna*				

SECTION E
Bahagian E

Below is a list of statements dealing with your general feelings about yourself. Please **tick** either number 0, 1, 2 or 3 which indicates how much the statement applied to you.

*Di bawah adalah senarai penyataan mengenai perasaan anda terhadap diri sendiri. Sila **tandakan** pada nombor 0, 1, 2 atau 3 bagi menggambarkan keadaan anda.*

0 Strongly Agree / *Sangat Setuju*
1 Agree / *Setuju*
2 Disagree / *Tidak Setuju*
3 Strongly Disagree / *Sangat Tidak Setuju*

N	Statement	0	1	2	3
1.	On the whole, I am satisfied with myself *Selalunya saya berpuas hati dengan diri saya*				
2.	At times I think I am no good at all *Kadangkala saya terfikir yang saya bukan baik selalu*				
3.	I feel that I have a number of good qualities *Saya rasa yang saya ada beberapa kualiti yang baik*				
4.	I am able to do things as well as most other people *Saya boleh melakukan tugas sama baiknya seperti orang lain*				
5.	I feel I do not have much to be proud of *Saya boleh merasakan yang tidak banyak yang boleh saya banggakan*				
6.	I certainly feel useless at times *Adakalanya saya rasa diri saya ini tidak berguna langsung*				
7.	I feel that I'm a person of worth, at least on an equal plane with others *Saya rasa saya seorang yang mempunyai nilai sekurang-kurangnya sama seperti orang lain*				
8.	I wish I could have more respect for myself *Hajat saya ialah saya lebih menghormati diri saya*				
9.	All in all, I am inclined to feel that I am a failure *Saya selalu rasa yang saya ini seorang yang gagal*				
10.	I take a positive attitude toward myself *Saya mengambil sikap yang positif terhadap diri saya*				

SECTION F ***Bahagian F***	
The following questions relate to your usual sleep habits during the **past month** only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions. *Soalan-soalan berikut adalah berkaitan dengan tabiat tidur anda yang biasa dalam tempoh bulan yang lalu (30 hari yang lalu) sahaja. Jawapan-jawapan anda harus menunjukkan keadaan yang paling tepat bagi kebanyakan waktu siang dan malam dalam tempoh bulan yang lalu. Sila jawab semua soalan.*	
1.	During the past month, what time have you usually gone to bed at night? *Dalam tempoh bulan yang lalu, pada pukul berapakah biasanya anda masuk tidur pada waktu malam?* BED TIME _____ *WAKTU MASUK TIDUR* _____
2.	During the past month, how long (in minutes) has it usually takes you to fall asleep each night? *Dalam tempoh bulan yang lalu, berapa lamakah (dalam minit) biasanya anda ambil untuk mula tidur pada setiap malam?* NUMBER OF MINUTES _____ *JUMLAH MINIT* _____
3.	During the past month, what time have you usually gotten up in the morning? *Dalam tempoh bulan yang lalu, pada pukul berapakah biasanya anda bangun dari katil pada waktu pagi?* GETTING UP TIME _____ *WAKTU BANGUN DARI KATIL* _____
4.	During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spent in bed.) *Dalam tempoh bulan yang lalu, berapa jamkah sebenarnya anda tidur pada waktu malam? (Ini mungkin berbeza dengan jumlah jam yang anda gunakan untuk berbaring di atas katil.)* HOURS OF SLEEP PER NIGHT _____ *JUMLAH JAM TIDUR UNTUK SATU MALAM* _____

5.	During the past month, how often have you had trouble sleeping because you… *Dalam tempoh bulan yang lalu, berapa kerapkah anda telah mengalami masalah tidur kerana anda . . .*	**Not during the past month** *Tidak dalam tempoh yang lalu*	**Less than once a week** *Kurang daripada sekali seminggu*	**Once or twice a week** *Satu atau dua kali seminggu*	**Three or more times a week** *Tiga kali atau lebih seminggu*
a.	Cannot get to sleep within 30 minutes *Tidak boleh tidur dalam tempoh 30 minit*				
b.	Wake up in the middle of the night or early morning *Bangun pada waktu tengah malam atau awal pagi*				
c.	Have to get up to use the bathroom *Perlu bangun tidur untuk menggunakan tandas*				
d.	Cannot breathe comfortably *Tidak boleh bernafas dengan selesa*				
		Not during the past month *Tidak dalam tempoh yang lalu*	**Less than once a week** *Kurang daripada sekali seminggu*	**Once or twice a week** *Satu atau dua kali seminggu*	**Three or more times a week** *Tiga kali atau lebih seminggu*
e.	Cough or snore loudly *Batuk atau berdengkur dengan kuat*				
f.	Feel too cold *Rasa begitu sejuk*				
g.	Feel too hot *Rasa begitu panas*				
h.	Have bad dreams *Mengalami mimpi yang buruk*				

i.	Have pain *Mengalami kesakitan*				
j.	Other reason(s), please describe: _____ __ How often during the past month have you had trouble sleeping **because of this**? *Alasan (-alasan) yang lain, sila terangkan: Berapa kerapkah dalam tempoh bulan yang lalu anda telah mengalami masalah tidur **kerana alasan tersebut?***				
		Very good *Sangat baik*	**Fairly good** *Agak baik*	**Fairly bad** *Agak buruk*	**Very bad** *Sangat buruk*
6.	During the past month, how would you rate your sleep quality overall? *Dalam tempoh bulan yang lalu, bagaimanakah anda nilai kualiti tidur anda secara keseluruhan?*				
		Not during the past month *Tidak dalam tempoh yang lalu*	**Less than once a week** *Kurang daripada sekali seminggu*	**Once or twice a week** *Satu atau dua kali seminggu*	**Three or more times a week** *Tiga kali atau lebih seminggu*
7.	During the past month, how often have you taken medicine to help you sleep (prescribed or "over the counter")? *Dalam tempoh bulan yang lalu, berapa kerapkah anda telah mengambil ubat untuk membantu anda untuk tidur (ubat yang*				

	dinasihati oleh doktor anda atau ubat yang dibeli sendiri tanpa preskripsi)?				
8.	During the past month, how often have you had trouble staying awake while driving, eating meals,or engaging in social activity? *Dalam tempoh bulan yang lalu, berapa kerapkah anda mengalami masalah untuk berjaga semasa memandu kenderaan, makan, atau melibatkan diri dengan aktiviti sosial?*				
		No problem at all *Tiada masalah langsung*	**Only a very slight problem** *Hanya sedikit masalah*	**Somewhat of a problem** *Agak banyak masalah*	**A very big problem** *Satu masalah yang besar*
9.	During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done? *Dalam tempoh bulan yang lalu, berapa banyakkah masalah anda untuk memastikan anda cukup semangat untuk menyelesaikan kerja?*				

SECTION G

BAHAGIAN G

We are interested to know the amount of time you spend doing different types of physical activities in a typical week. Please answer these questions even if you do not consider yourself to be a physically active person.

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.

Activity At Work ***Aktiviti Fizikal Berkaitan Pekerjaan***			
No. ***No.***	**Questions** ***Soalan***	**Response** ***Maklumbalas***	**Code** ***Kod***
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? *Adakah pekerjaan anda melibatkan aktiviti kerja berat yang mengakibatkan peningkatan yang banyak dalam kadar pernafasan ataupun denyutan jantung seperti berlari, membawa atau mangangkat barang yang berat, menggali, mencangkul, menuai, berkebun, memburu atau melakukan kerja pembinaan sekurang-kurangnya 10 minit secara berterusan?*	Yes 1 *Ya 1* No 2 *Tidak 2* If 'No', go to P4 *Jika 'Tidak', sila ke P4*	P1
2.	In a typical week, on how many days do you do vigorous-intensity activities as part of your work? *Biasanya dalam seminggu, berapa harikah anda melakukan kerja-kerja berat dalam pekerjaan anda?*	Number of days [__] *Jumlah hari [__]*	P2
3.	How much time do you spend doing vigorous-intensity activities at work on a typical day? *Pada hari biasa yang anda lakukan kerja berat, berapa lamakah anda melakukannya?*	Hours : Minutes [__][__] : [__][__] *Jam : Minit* *[__][__] : [__][__]*	P3 (a-b)
4.	Does your work involve moderate-intensity activity that causes small increases in breathing or heart rate such as brisk walking (or carrying light loads) for at least 10 minutes continuously? *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, membuat kerja rumah, mencuci kereta atau mengecat rumah sekurang-kurangnya 10 minit secara berterusan?*	Yes 1 *Ya 1* No 2 *Tidak 2* If 'No', go to P7 *Jika 'Tidak', sila ke P7*	P4
No. ***No.***	**Questions** ***Soalan***	**Response** ***Maklumbalas***	**Code** ***Kod***
5.	In a typical week, on how many days do you do moderate-intensity activities as part of your work?	Number of days [__] *Jumlah hari [__]*	P5

	Biasanya dalam seminggu, berapa harikah anda melakukan kerja-kerja sederhana dalam pekerjaan anda		
6.	How much time do you spend doing moderate-intensity activities at work on a typical day? *Pada hari biasa yang anda lakukan kerja sederhana, berapa lamakah anda melakukannya?*	Hours : Minutes [_][_] : [_][_] *Jam : Minit* *[_][_] : [_][_]*	P6 (a-b)

Travel To And From Places

Aktiviti Fizikal Berkaitan Perjalanan

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.

*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).*

No. ***No.***	**Questions** ***Soalan***	**Response** ***Maklumbalas***	**Code** ***Kod***
7.	Do you walk or use a bicycle (pedal cycle) for at least 10 minutes continuously to get to and from places? *Adakah anda berjalan atau berbasikal secara berterusan sekurang-kurangnya 10 minit untuk menuju ke, dan dari sesuatu tempat?*	Yes 1 *Ya 1* No 2 *Tidak 2* If 'No', go to P10 *Jika 'Tidak', sila ke P10*	P7
8.	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? *Dalam satu minggu yang biasa, berapa harikah anda berjalan atau berbasikal secara berterusan sekurang kurangnya 10 minit untuk menuju ke, dan dari sesuatu tempat?*	Number of days [_] *Jumlah hari [_]*	P8
No. ***No.***	**Questions** ***Soalan***	**Response** ***Maklumbalas***	**Code** ***Kod***
9.	How much time do you spend walking or bicycling for travel on a typical day?	Hours : Minutes [_][_] : [_][_] *Jam : Minit* *[_][_] : [_][_]*	P9 (a-b)

	Dalam satu hari yang biasa, berapa lamakah anda berjalan atau berbasikal untuk bergerak dari satu tempat ke tempat yang lain?		

Recreational Activities
Aktiviti Fizikal Pada Waktu Lapang

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 (leisure).
*Soalan-soalan seterusnya **tidak termasuk** aktiviti semasa bekerja dan semasa perjalanan yang telah anda nyatakan. Sekarang, saya ingin bertanya tentang aktiviti yang anda lakukan untuk rekreasi, kecergasan, dan sukan.*

No. *No.*	**Questions** *Soalan*	**Response** *Maklumbalas*	**Code** *Kod*
10.	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? *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?*	Yes 1 *Ya 1* No 2 *Tidak 2* If 'No', go to P13 *Jika 'Tidak', sila ke P13*	P10
11.	In a typical week, on how many days do you do vigorous-intensity sports, fitness or recreational (leisure) activities? *Biasanya dalam seminggu pada waktu lapang, berapa harikah anda melakukan aktiviti-aktiviti sukan, kecergasan atau riadah yang lasak?*	Number of days [__] *Jumlah hari [__]*	P11
12.	How much time do you spend doing vigorous-intensity sports, fitness or recreational activities on a typical day? *Dalam satu hari yang biasa, berapa lamakah anda melakukan aktiviti-aktiviti sukan, kecergasan atau riadah yang lasak?*	Hours : Minutes [__][__] : [__][__] *Jam : Minit* *[__][__] : [__][__]*	P12 (a-b)
No. *No.*	**Questions** *Soalan*	**Response** *Maklumbalas*	**Code** *Kod*

13.	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? *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, menanam pokok bunga atau bermain bola tampar, sekurang-kurangnya 10 minit secara berterusan?*	Yes 1 *Ya 1* No 2 *Tidak 2* If 'No', go to P16 *Jika 'Tidak', sila ke P16*	P13
14.	In a typical week, on how many days do you do moderate-intensity sports, fitness or recreational (leisure) activities? *Biasanya dalam seminggu pada waktu lapang, berapa harikah anda melakukan aktiviti-aktiviti sukan, kecergasan atau riadah yang sederhana?*	Number of days [__] *Jumlah hari [__]*	P14
15.	How much time do you spend doing moderate-intensity sports, fitness or recreational (leisure) activities on a typical day? *Dalam satu hari yang biasa, berapa lamakah anda melakukan aktiviti-aktiviti sukan, kecergasan atau riadah yang sederhana?*	Hours : Minutes [__][__] : [__][__] *Jam : Minit* *[__][__] : [__][__]*	P15 (a-b)
Sedentary Behaviour ***Aktiviti Sedentari Atau Tidak Aktif***			
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**. *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 rakanrakan, perjalanan dalam kereta, bas, keretapi, duduk membaca, bermain kad atau menonton televisyen, **tetapi tidak termasuk** waktu tidur.*		
16.	How much time do you usually spend sitting or reclining on a typical day? *Dalam satu hari yang biasa, berapakah jumlah masa yang anda gunakan untuk duduk atau baring/bersandar?*	Hours : Minutes [__][__] : [__][__] *Jam : Minit* *[__][__] : [__][__]*	P16 (a-b)

SECTION H
Bahagian H

The following questions are about your dietary behavior. Please choose **one** of the choices and **circle it.**
*Berikut adalah soalan mengenai tingkah laku makan anda. Sila pilih **satu** jawapan dan **bulatkannya**.*

No.	Statement	Number of days in a week							
		0	1	2	3	4	5	6	7
1a.	How frequent do you consume breakfast? *Berapa kerapkah anda mengambil sarapan pagi?*	0	1	2	3	4	5	6	7
1b.	How frequent do you consume morning tea? *Berapa kerapkah anda mengambil minum pagi?*	0	1	2	3	4	5	6	7
1c.	How frequent do you consume lunch? *Berapa kerapkah anda mengambil makan tengahari?*	0	1	2	3	4	5	6	7
1d.	How frequent do you consume afternoon tea? *Berapa kerapkah anda mengambil minum petang?*	0	1	2	3	4	5	6	7
1e.	How frequent do you consume dinner? *Berapa kerapkah anda mengambil makan malam?*	0	1	2	3	4	5	6	7
1f.	How frequent do you consume supper? *Berapa kerapkah anda mengambil makan lewat malam?*	0	1	2	3	4	5	6	7
2.	Please list out **3 types of foods or beverages** that you usually take in between of main meals (snacks, e.g. tea, milk, kuih, ais cream, fruits, pisang goreng etc.) and its **frequency** of consumption. *Sila nyatakan 3 jenis makanan atau minuman utama yang biasa anda ambil di antara waktu masa makan utama (seperti teh, susu, kuih-muih, aiskrim, buah-buahan, snek bungkusan, pisang goreng dan lain-lain lagi) dan kekerapan pengambilannya.*								
	i.	0	1	2	3	4	5	6	7
	ii.	0	1	2	3	4	5	6	7
	iii.	0	1	2	3	4	5	6	7

3.	How frequent do you eat at western fast food restaurants (e.g. KFC,McDonald's, Pizza Hut etc.)? *Berapa kerapkah anda makan di restoran makanan barat (seperti KFC,McDonald's, Pizza Hut dan lain-lain)?*	0	1	2	3	4	5	6	7
No.	**Statement**	**Number of days in a week**							
4.	How frequent do you buy/take-away food from western fast food restaurants (e.g. KFC,McDonald's, Pizza Hut etc.)? *Berapa kerapkah anda membungkus/membeli dengan penghantaran (delivery) makanan dari restoran makanan barat (seperti KFC,McDonald's, Pizza Hut dan lain-lain)?*	0	1	2	3	4	5	6	7

SECTION I (a)

BAHAGIAN I

Please read each statement and **circle** from the multiple choice options.

*Sila baca setiap kenyataan dan **bulatkan** satu jawapan dari pilihan yang diberikan.*

1. How often do you feel hungry?
Berapa kerapkah anda berasa lapar?

   a. Only at meal times
   Hanya pada waktu makan

   b. Sometimes between meals
   Kadangkala antara waktu makan

   c. Often between meals
   Kerap antara waktu makan

   d. Almost always
   Hampir selalu

2. How frequently do you avoid "stocking up" on tempting foods?
Berapa kerapkah anda mengelakkan diri anda daripada "menyimpan" makanan yang lazat?

   a. Almost never
   Hampir tidak pernah

   b. Seldom
   Jarang

   c. Moderately likely
   Biasanya

   d. Almost always
   Hampir selalu

3. How likely are you to consciously eat less than you want?
Adakah anda sedar bahawa anda sengaja makan kurang daripada apa yang ada inginkan?

   a. Unlikely
   Tidak mungkin

   b. Slighly likely
   Sedikit kemungkinan

   c. Moderately likely
   Sederhana kemungkinan

   d. Very likely
   Kemungkinan besar

4.	Do you go on eating binges though you are not hungry? *"Binge" adalah tabiat pemakanan yang berlebihan dan tidak terkawal. Adakah anda akan makan secara "binge" walaupun anda tidak berasa lapar?* a. Never *Tidak pernah* b. Rarely *Jarang* c. Sometimes *Kadang-kadang* d. At least once a week *Sekurang-kurangnya sekali seminggu*
5.	On a scale of 1 to 8, where 1 means no restrained in eating (eating whatever you want, whenever you want it) and 8 means total restraint (constantly limiting food intake and never "giving in"), what number would you give yourself? *Pada skala 1 hingga 8, dimana 1 bererti makan tanpa kawalan (makan apa-apa sahaja yang anda mahu, bila-bila masa yang anda inginkan) dan 8 bermaksud makan dengan penuh kawalan (sentiasa menghadkan diri anda daripada pengambilan makanan), apakah nombor yang akan anda berikan untuk diri anda?* 1 2 3 4 5 6 7 8

SECTION I (b)
BAHAGIAN I

Please read each statement and **circle** from the multiple choice options. The ratings scale is as follows;

Sila baca setiap kenyataan dan bulatkan satu jawapan dari pilihan yang diberikan. Skala pemarkahan adalah seperti berikut;

1. Definitely False/ *Langsung Tidak Benar*
2. Mostly False/ *Kebanyakannya Tidak Benar*
3. Mostly True/ *Kebanyakannya Benar*
4. Definitely True/ *Sangat Benar*

No.	Statement/ *Kenyataan*	Scale/ *Skala*			
1.	When I smell a delicious food, I find it very difficult to keep from eating, even if I have just finished a meal. *Apabila saya menghidu bau daging bakar atau sekeping daging yang enak, saya berasa amat sukar untuk menahan diri saya daripada makan, walaupun saya baru sahaja selesai makan.*	1	2	3	4
2.	I deliberately take small helpings as a means of controlling my weight. *Saya sengaja makan hanya sebahagian kecil sesuatu hidangan sebagai cara untuk mengawal berat badan saya.*	1	2	3	4
3.	When I feel anxious, I find myself eating. *Apabila saya berasa gelisah, saya mendapati diri saya akan makan.*	1	2	3	4
4.	Sometimes when I start eating, I just can't seem to stop. *Kadangkala saya seolah-olah tidak dapat menghentikan diri apabila saya mulai makan.*	1	2	3	4

5.	Being with someone who is eating often makes me hungry enough to eat also. *Bersama-sama dengan seseorang yang sering makan menjadikan saya juga berasa lapar dan ingin makan.*	1	2	3	4
6.	When I feel blue, I often overeat. *Saya akan makan berlebih-lebihan apabila saya berasa sedih.*	1	2	3	4
7.	When I see a real delicacy, I often get so hungry that I have to eat right away. *Apabila saya melihat hidangan yang lazat, saya berasa begitu lapar sehingga perlu makan serta-merta.*	1	2	3	4
No.	**Statement/ *Kenyataan***	**Scale/ *Skala***			
8.	I get so hungry that my stomach often seems like a bottomless pit. *Saya berasa begitu lapar dimana perut saya ibarat sebuah lubang yang sangat dalam.*	1	2	3	4
9.	I am always hungry so it is hard for me to stop eating before I finish the food on my plate. *Saya sentiasa berasa lapar jadi sukar untuk saya berhenti makan sebelum saya menghabiskan makanan dalam pinggan saya.*	1	2	3	4
10.	When I feel lonely, I console myself by eating. *Apabila saya berasa kesepian, saya menenteramkan diri saya dengan makan.*	1	2	3	4
11.	I consciously hold back at meals in order not to weight gain. *Saya sedar yang saya teragak-agak untuk makan supaya berat badan saya tidak meningkat.*	1	2	3	4
12.	I do not eat some foods because they make me fat. *Saya tidak makan sesetengah makanan kerana makanan ini akan menjadikan saya gemuk.*	1	2	3	4
13.	I am always hungry enough to eat at any time. *Saya sentiasa berasa begitu lapar sehingga dapat makan pada bila-bila masa sahaja.*	1	2	3	4

SECTION J

BAHAGIAN J

This section reflects the eating behaviors at night. Please read every question and **circle ONE** answer for each question.

*Bahagian ini merangkumi soalan yang menggambarkan tingkah laku pengambilan makanan pada waktu malam. Sila baca setiap soalan dan jawab dengan **membulatkan** jawapan yang bertepatan dengan anda*

1.	How hungry are you usually in the morning? *Bagaimanakah tahap kelaparan anda pada waktu pagi?*					
	0 Not at all *Tidak Sama Sekali*	**1** A little *Sedikit*	**2** Somewhat *Agak*	**3** Moderately *Sederhana*	**4** Very *Sangat*	

2.	When do you usually eat for the first time? *Bilakah pengambilan makanan pertama anda untuk sehari?* **0** Before 9am *Sebelum 9 am*; **1** 9:01 am; **2** 12:01 am; **3** 3:01 – 6 pm; **4** 6:01 or later */ atau selepasnya*
3.	Do you have cravings or urges to eat snacks after supper, but before bedtime? *Adakah anda mempunyai keinginan untuk mengambil makanan ringan selepas waktu minum malam, tetapi sebelum waktu tidur?* **0** Not at all *Tidak Sama Sekali*; **1** A little *Sedikit*; **2** Somewhat *Agak*; **3** Very Much So *Sangat*; **4** Extremely So *Sangat Banyak*
4.	How much control do you have over your eating between supper and bedtime? *Berapa banyak kawalan yang anda ada pada pengambilan makanan di antara waktu minum malam dan waktu tidur?* **0** Not at all *Tidak Sama Sekali*; **1** A little *Sedikit*; **2** Some *Agak*; **3** Very Much *Banyak*; **4** Complete *Penuh*
5.	How much of your daily food intake do you consume *after* suppertime? Berapa banyak dari pengambilan makanan harian anda datang daripada pengambilan selepas waktu minum malam? **0** 0% (none) *Tiada*; **1** 1-25% (up to a quarter) *Sehingga suku*; **2** 26-50% (about half) *Lebih kurang*; **3** 51-75% (more than half) *Lebih dari separuh*; **4** 76-100% (almost all) *Hampir semua*
6.	Are you currently feeling blue or down in the dumps? *Adakah anda kini berasa suram atau sedih?* **0** Not at all *Tidak Sama Sekali*; **1** A little *Sedikit*; **2** Somewhat *Agak*; **3** Very Much So *Banyak*; **4** Extremely *Sangat Banyak*
7.	When you are feeling blue, is your mood lower in the: *Semasa anda berasa suram, adakah mood anda lebih rendah pada waktu* **0** Early Morning *Awal Pagi*; **1** Late Morning *Lewat pagi*; **2** Afternoon *Tengah Hari*; **3** Early evening *Awal Petang*; **4** Late evening/Nightime *Lewat Petang/ Malam*

_ tanda sini jika mood anda tidak

8.	How often do you have trouble getting to sleep? *Berapa kerap anda mempunyai masalah untuk tidur?* **0** Never *Tidak pernah* · **1** Sometimes *Kadang-kadang* · **2** About half *Lebih kurang* · **3** Usually *Sentiasa* · **4** Always *Selalu*
9.	Other than only to use the bathroom, how often do you get up at least once in the middle of the night? *Selain daripada penggunaan tandas, berapa kerap anda bangun sekurang-kurangnya sekali pada tengah malam?* **0** Never *Tidak pernah* · **1** Less than *Kurang daripada* · **2** About once *Lebih kurang* · **3** More than once *Lebih daripada* · **4** Always *Selalu* *******************IF 0 on #9, PLEASE STOP HERE ******************* ***************** *JIKA ANDA JAWAB 0 DI#9, SILA BERHENTI DI SINI* *******************
10.	Do you have cravings or urges to eat snacks when you wake up at night? *Setelah anda bangun pada waktu malam, adakah anda mempunyai keinginan untuk mengambil makanan ringan?* **0** Not at all *Tidak Ada* · **1** A little *Sedikit* · **2** Somewhat *Agak* · **3** Very Much So *Banyak* · **4** Extremely *Sangat Banyak*
11.	Do you need to eat in order to get back to sleep when you awake at night? *Setelah anda bangun pada waktu malam, adakah anda perlu mengambil makanan untuk kembali tidur?* **0** Not at all *Tidak perlu* · **1** A little *Sedikit* · **2** Somewhat *Kadang-kadang* · **3** Very Much So *Sentiasa* · **4** Extremely *Selalu*
12.	When you get up in the middle of the night, how often do you snack? *Berapa kerap anda mengambil makanan ringan semasa anda bangun pada tengah malam?* **0** Never *Tidak pernah* · **1** Sometimes *Kadang-kadang* · **2** About half *Lebih kurang* · **3** Usually *Sentiasa* · **4** Always *Selalu* *******************IF 0 on #12, PLEASE STOP HERE ******************* ***************** *JIKA ANDA JAWAB 0 DI#12, SILA BERHENTI DI SINI* *******************

13.	When you snack in the middle of the night, how aware are you of your eating? *Semasa anda ambil makanan ringan pada tengah malam, bagaimanakah tahap kesedaran anda tentang pengambilan makanan anda?* **0** Not at all *Tidak Sama Sekali* · **1** A little *Sedikit* · **2** Somewhat *Agak* · **3** Very Much So *Banyak* · **4** Completely *Sepenuh*
14.	How much control do you have over your eating while you are up at night? *Setelah anda bangun pada waktu malam, adakah anda mampu mengawalkan pengambilan makanan anda?* **0** Not at all *Tidak Sama Sekali* · **1** A little *Sedikit* · **2** Some *Agak* · **3** Very Much *Banyak* · **4** Complete *Sepenuh*
15.	How long have your current difficulties with night eating been going on? *Berapa lama anda mempunyai masalah pengambilan makanan pada waktu malam?* _____ Months _____Years / _____ *Bulan* _____ *Tahun*
16.	Is your night eating upsetting you? *Adakah tingkah laku pengambilan makanan pada waktu malam mengecewakan anda?* **0** Not at all *Tidak Sama Sekali* · **1** A little *Sedikit* · **2** Somewhat *Agak* · **3** Very Much So *Banyak* · **4** Extremely So *Sentiasa*
17.	How much have your night eating affected your life? *Bagaimanakah tingkah laku pengambilan makanan pada waktu malam menjejaskan kehidupan anda?* **0** Not at all *Tidak Sama Sekali* · **1** A little *Sedikit* · **2** Somewhat *Agak* · **3** Very Much So *Sangat* · **4** Extremely *Sangat Banyak*

Question Ended. Thank You!

Soalan Tamat. Terima kasih!

(Questionnaires should to be return to researcher)

(Borang soal selidik perlu dikembalikan kepada penyelidik)

*ANTHROPOMETRIC MEASUREMENTS

UKURAN ANTHROPOMETRI

Reading ***Bacaan***	**Height (cm)** ***Tinggi (cm)***	**Weight (kg)** ***Berat (kg)***	**BMI (kg/m^2)** ***BMI (kg/m^2)***	**Waist circumference (cm)** ***Ukur lilit pinggang (cm)***	**Body fat percentage (%)** ***Peratus lemak badan (%)***
1					
2					
Average ***Purata***					

*This section will be filled in by the researchers