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FACTORS ASSOCIATED WITH SNACKING AMONG 15-17 YEARS OLD ADOLESCENTS IN KUALA SELANGOR, SELANGOR

AIDA NURSABRINA BINTI BADDRI

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BY

AIDA NURSABRINA BINTI BADDRI

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Supervisor's Signature

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ABSTRACT

FACTORS ASSOCIATED WITH SNACKING AMONG 15-17 YEARS OLD ADOLESCENTS IN KUALA SELANGOR, SELANGOR

Aida Nursabrina Binti Baddri

Snacking can be defined as food consumed between main meals, which are breakfast, lunch, and dinner. Snacking trend among adolescents has been increased over the years. High consumption of energy-dense snacks among adolescents may lead to the risk of developing certain diseases and health complications. There are several factors associated with snacking among adolescents. However, limited studies and inconsistent findings were observed, especially in Malaysia. Thus, this cross-sectional study aimed to determine the associations of sociodemographic characteristics, snack availability at home, screen viewing activity, and snacking among adolescents. A self-administered online questionnaire that assessed sociodemographic characteristics, snacking pattern, snack availability at home, and screen viewing activity was completed by the respondents. A total of 86 adolescents from two secondary schools in Kuala Selangor (43% male and 57% females) with a mean age of 16 ± 0.82 years old were recruited in the study. The majority of the adolescents were found to snack at least once a day (89.5%). The total mean energy intake from snacking was 406.08 ± 242.05 kcal, while the total mean percentage energy of snacking from total energy intake was 25.09%. There were no significant associations between sociodemographic characteristics, snack availability at home, screen viewing activity, and frequency of snacking among adolescents (p>0.05). Meanwhile, there were significant associations between maternal education level (t=2.167; p=0.033), chocolates or candies availability at home (t=2.115, p=0.037), and percentage energy of snacking from total energy intake among adolescents. Despite several limitations of the study, the data can be used to develop intervention programs pertaining to

snacking awareness to improve the nutritional status of adolescents. Further studies should also be conducted to understand better the factors associated with snacking among adolescents in Malaysia.

ABSTRAK

FAKTOR YANG MEMPENGARUHI PENGAMBILAN KUDAPAN DALAM KALANGAN KANAK-KANAK BERUMUR 15-17 TAHUN DI KUALA SELANGOR, SELANGOR

Aida Nursabrina Binti Baddri

Pengambilan kudapan atau snek boleh didefinisikan sebagai makanan atau minuman yang diambil antara selang masa sarapan, makan tengah hari dan makan malam. Saban tahun, pengambilan kudapan dalam kalangan remaja semakin menunjukkan corak peningkatan. Pengambilan kudapan yang padat dengan tenaga boleh meninggikan risiko untuk mendapat pelbagai penyakit dan komplikasi kesihatan. Terdapat beberapa faktor yang mempengaruhi pengambilan kudapan dalam kalangan remaja. Namun, penemuan tentang faktor yang mempengaruhi pengambilan kudapan ini amat terhad dan sering bertentangan, terutamanya di Malaysia. Oleh itu, kajian keratan rentas ini bertujuan untuk menentukan hubungan antara ciri-ciri sosiodemografik, ketersediaan kudapan di rumah dan aktiviti paparan skrin dengan pengambilan kudapan dalam kalangan remaja. Satu set borang soal selidik atas talian yang menilai ciri-ciri sosiodemografik, corak pengambilan kudapan, ketersediaan kudapan di rumah dan aktiviti paparan skrin telah diedarkan dan dilengkapkan oleh para responden. Seramai 86 remaja dari dua buah sekolah di Kuala Selangor (43% lelaki, 57% perempuan) dengan min umur 16 ± 0.82 tahun dalam kajian ini. Majoriti remaja didapati mengambil kudapan sekurang-kurangnya sekali sehari (89.5%). Jumlah min tenaga daripada pengambilan kudapan ialah 406.08 ± 242.05 kkal, manakala jumlah min peratusan tenaga kudapan daripada jumlah tenaga harian ialah 25.09%. Tiada hubungan statistik yang signifikan ditemukan antara ciri-ciri sosiodemografik, ketersediaan kudapan di rumah dan aktiviti paparan skrin dengan frekuensi pengambilan kudapan dalam kalangan remaja (p>0.05). Selain itu, terdapat hubungan

statistik yang signifikan antara tahap pendidikan ibu (t=2.167; p=0.033), ketersediaan coklat dan gula-gula di rumah (t=2.115, p=0.037) dengan peratusan tenaga kudapan daripada jumlah tenaga harian. Meskipun terdapat beberapa batasan dalam kajian yang dijalankan, data yang dikumpul boleh menyumbang kepada pelaksanaan program intervensi berkaitan dengan kesedaran pengambilan makanan untuk meningkatkan status kesihatan remaja. Lebih banyak penyelidikan juga perlu dijalankan untuk memahami faktor yang mempengaruhi pengambilan kudapan dalam kalangan remaja.

CHAPTER 1

INTRODUCTION

1.1 Background

Adolescence is a stage between childhood and adulthood in human development and growth (World Health Organization, 2005). Nutrition during this period should be taken seriously because the growth of adolescents accelerates in a fast manner (Institute for Public Health, 2017). It is also a critical period for the development of eating habits and lifestyles as adolescents are vulnerable to malnutrition (Akseer, Al-Gashm, Mehta, Mokdad, & Bhutta, 2017). Malaysian adolescents are reported to face a double burden of malnutrition, whereby overnutrition showed a greater number than undernutrition (Institute for Public Health, 2017). Stunting still exists among Malaysian adolescents, with the highest prevalence at 13.6% among Bumiputera Sabah.

There are several definitions of snacking. Snacking can be defined as the intake of food and drinks between each meal (Blaine et al., 2017; Chaplin & Smith, 2011). It can also be defined as food intake other than food consumed at breakfast (8-10 a.m.), lunch (12-2 p.m.), and dinner (6-8 p.m.) (Boon & Sedek, 2012; Gregori & Maffeis, 2007). Snacking behaviour can be healthy or unhealthy depending on the types of food consumed as a snack. Traditionally, snacks are seen and interpreted as unhealthy food by the public (Chaplin & Smith, 2011). Several studies found that the foods and drinks consumed during snacking were typically energy-dense and low in nutrients (Blaine et al., 2017; Lucan et al., 2010; Monteiro et al., 2011). However, in a study by Kerver et al. (2006), participants who consumed snacks 2 times or more in addition to 3 regular meals have higher dietary fiber and micronutrient (iron, magnesium, folic acid, calcium, vitamin C, and potassium) intakes than the participants who consumed 3 regular meals with no snack

consumption. This finding can also be supported by another study conducted by Boon & Sedek (2012) which reported a higher intake of micronutrients such as vitamin C, calcium, and iron in participants who consumed 3 meals with 3 snacks than those who consumed 3 meals without snacks. These findings explained that snacking could provide more nutrients for the body.

Globally, snacking trend of adolescents has increased over time. A study in Australia reported that there was an increase in the prevalence of snacking from 1995 (92.5%) to 2007 (98.1%), but the prevalence slightly declined in 2012 (95.8%) among 2-16 years old children and adolescents (Fayet-Moore et al., 2017). NHANES 2013-2014 found that the prevalence of children and adolescents aged 2-19 years old in United States who were frequently snacked was 95% (U.S. Department of Agriculture, 2016). The frequency of snacking among adolescents varies among countries. Children and adolescents in Australia reported the highest daily snacking occasion (>5 times), followed by Mexico and United States (2-3 times), and China with one time or no snack at all (Wang et al., 2018). According to a local study, 48.7% of adolescents in Malaysia consumed snacks once a day, followed by snacked twice (34.6%), more than three times (14.1%) and no snacking (2.6%) (Boon & Sedek, 2012). The National Health and Morbidity Survey 2017 (NHMS 2017) also reported that 64.8% of Malaysian adolescents snacked 1 to 3 times a week, 23.8% snacked 4 to 6 times a week, 7.6% snacked 7 times or more in a week, while only 3.8% reported no snacking habit.

1.2 Problem statement

There are multiple factors associated with snacking among adolescents, such as demographic and socioeconomic factors, snack availability at home, and screen viewing activity. However, there are insufficient and inconsistent findings on the prevalence or trend of snacking and factors associated with snacking among adolescents, especially in Malaysia. The National Health and Morbidity Survey 2017 (NHMS 2017) also did not examine the overall factors of snacking consumption of adolescents but only reported on the frequency of snacking in a week, intake of sugar and soft drinks consumption of the adolescents.

According to Larson et al. (2016), adolescents with low and middle socioeconomic status consumed more energy-dense and low nutrient snacks than adolescents with high socioeconomic status. This finding was also supported by a study among female adolescents living in low socioeconomic status communities that reported a high snacking trend (Loth et al., 2016). However, Mithra et al. (2018) found that adolescents with high socioeconomic status have a higher snacking frequency than adolescents with low and middle socioeconomic status.

Several studies suggested that television viewing is one of the factors associated with snacking of adolescents (Pearson et al., 2014; Vader et al., 2009). Television viewing has been linked to the consumption of unhealthy and energy-dense snacks (Borgogna et al., 2015) but low intake of fruits and vegetables (Hobbs et al., 2015; Pearson et al., 2011; Francis et al., 2003) among adolescents. Scully et al. (2012) also reported that adolescents who were exposed to the food advertisement on television for more than 2 hours per day recorded a high consumption of energy-dense snacks compared to adolescents who did not watch any food advertisement on television. Nonetheless, a study by Pearson et al. (2017) showed a different finding in that energy-dense food, fruits, and vegetables as snacks were positively correlated with television viewing.

Snack availability at home could influence snacking among adolescents. However, there are very limited studies on the association between snack availability at home and snacking among adolescents. Loth et al. (2016) reported that adolescents with low healthy home food availability have a high daily consumption of snack foods. Studies by Pearson et al. (2014; 2017) also reported an increase in snack consumption among adolescents with respect to energy-dense snack availability at home. Therefore, this study aims to determine the association of the demographic, socioeconomic, snack availability at home, and screen viewing with snacking among adolescents.

Research Questions:

1. What are the snacking frequency and percentage energy of snacking from total energy intake among adolescents in Malaysia?
2. Are demographic, socioeconomic, snack availability at home and screen viewing associated with snacking among adolescents?

1.3 Research objectives

General objectives:

To determine factors associated with snacking among adolescents in Kuala Selangor, Selangor.

Specific objectives:

1. To assess
    a. Demographic and socioeconomic characteristics (age, sex, ethnicity, household income, parental education level, and parental employment status)
    b. Snack availability at home
    c. Screen viewing (television and computer viewing)

of adolescents in Kuala Selangor, Selangor.

2. To identify the frequency of snacking and percentage energy of snacking from total energy intake among adolescents in Kuala Selangor, Selangor.
3. To determine the associations of
    a. Demographic and socioeconomic characteristics
    b. Snack availability at home
    c. Screen viewing

and snacking among adolescents in Kuala Selangor, Selangor.

1.4 Research hypothesis

1. There are associations between demographic and socioeconomic characteristics with snacking among adolescents.

2. There is an association between snack availability at home and snacking among adolescents.

3. There is an association between screen viewing with snacking among adolescents.

1.5 Research Framework

The research framework for this study is presented in Figure 1.1. Demographic and socioeconomic characteristics, snack availability at home and screen viewing activity are the independent variables, while the dependent variables are the frequency of snacking and percentage energy of snacking from total energy intake among adolescents in Kuala Selangor.

Studies by Pearson et al. (2011) and Mithra et al. (2018) reported that female adolescents frequently snacked on fruits and vegetables while male adolescents had higher consumption of energy-dense drinks. Mithra et al. (2018) and Tripicchio et al. (2019) showed that adolescents with high socioeconomic status have a higher snacking frequency than adolescents with low and middle socioeconomic status. Campbell et al. (2007) found that the availability of unhealthy snack foods influenced snacking, particularly among female adolescents. In another study, home availability of energy-dense snacks increased the consumption of snacks and was associated with television viewing on weekends and weekdays (Pearson et al., 2014). Similarly, Vader et al. (2009) also reported that adolescents who ate 2 or more snacks daily tend to spend 3 hours or more on television viewing.

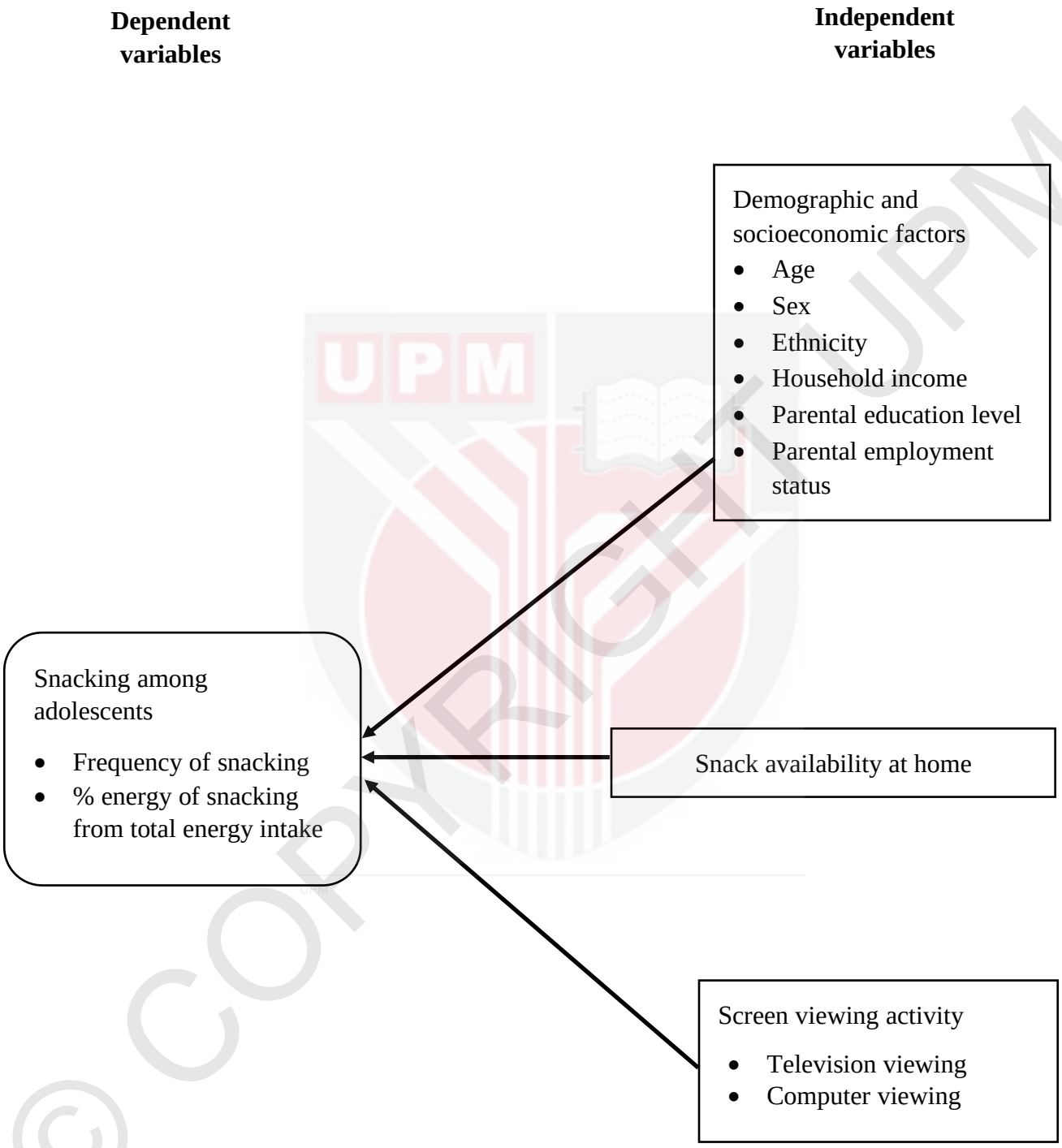

Figure 1.1: Research framework

1.6 Significance of study

There are few research studies related to snacking among adolescents that have been conducted in other countries. However, there are limited studies pertaining to snacking, particularly among adolescents in Malaysia. Therefore, this study would be a contribution to current knowledge in several aspects. First, the data of this study will give an insight into the snacking situation among adolescents in Malaysia and provide recent data on Malaysian adolescents' snacking habits. Second, the findings of this study can be used as baseline data for future studies in understanding the factors associated with snacking among adolescents. Third, knowledge regarding snacking and the associated factors examined in this study can initiate more studies on snacking in the Malaysian population. Fourth, policies and intervention programs that aim to promote and improve adolescents' health and nutritional status can be developed while considering the data from the study.

CHAPTER 2

LITERATURE REVIEW

2.1 Snacking among adolescents

The definition of 'snacking' or 'snacks' is still unclear and there is no universally accepted definition for the term. Nevertheless, snacking is generally defined as food intake between main meals, which are breakfast, lunch and dinner (Blaine et al., 2017; Boon & Sedek, 2012; Chaplin & Smith, 2011; Gregori & Maffeis, 2007). The foods and beverages consumed during snacking were commonly high energy density and low in nutrients, such as potato chips, chocolates and carbonated soft drinks (Blaine et al., 2017; Lucan et al., 2010; Monteiro et al., 2011).

The prevalence and frequency of snacking among adolescents vary by country. The National Health and Morbidity Survey (2017) reported that more than half of Malaysian adolescents snacked 1 to 3 times a week (64.8%), followed by 23.8% snacked 4 to 6 times a week, 7.6% snacked 7 times or more in a week, and only 3.8% reported no snacking (Institute for Public Health, 2017). The NHMS (2017) also found that 1 in 10 adolescents had 7 times or more snacking occasions a week. A study among adolescents in Malaysia found that only 2.6% reported no snacking occasion in a day, while 97.4% consumed snacks at least once a day (Boon & Sedek, 2012). In the United States, NHANES 2013-2014 showed that 95% of children and adolescents aged 2-19 years old frequently snacked (U.S. Department of Agriculture, 2016). The snacking occasion was defined by any food intake reported by respondents as snacks and food intake other than main meals (breakfast, lunch, dinner, supper and brunch). On the other hand, adolescents and children in Australia showed an increase in the prevalence of snacking from 1995 (92.5%) to 2007 (98.1%), but the prevalence slightly declined in 2012 (95.8%) (Fayet-Moore et al., 2017).

Although fruits and vegetables are also considered as snacks (Chaplin & Smith, 2011), snacking among adolescents usually correlates with energy-dense foods (Larson et al., 2016). A report from NHANES 2013-2014 showed that adolescents' snack consumption in the United States contributed to ~25% of total daily energy intake (U.S. Department of Agriculture, 2016). Similarly, a study among adolescents in Malaysia found that the mean energy intake of snacking was 24.4% of the total daily energy intake (Boon & Sedek, 2012). This study also showed that snacks contributed to higher carbohydrate than protein and fat intake. Washi & Ageib (2010) reported that snacks consumed by adolescents were relatively low in nutrients such as minerals and vitamins but high in fat, sugar, and sodium.

In 2012, the Global School-based Health Survey (GSHS) reported that 29.3% of Malaysian adolescents drank carbonated soft drinks once or more per day (Centers for Disease Control, 2012). However, according to the NHMS 2017 (Institute for Public Health, 2017), 36% of Malaysian adolescents consumed carbonated soft drinks at least once daily. These findings showed an increase in carbonated soft drinks consumption among adolescents in Malaysia over the years. In neighbouring countries such as Thailand and Indonesia, the prevalence of adolescents who consumed carbonated soft drinks once or more daily were 55.4% and 27.3%, respectively (World Health Organisation, 2015), much higher than the reported prevalence in Malaysia.

The high consumption of energy-dense snacks has been shown to be associated with adolescent weight status. Williamson et al. (2020) found that snacking with larger portions and higher energy-dense snacks were associated with inadequate nutrients, low quality of diet, high sugar intake, saturated fat, and sodium. Snack frequency was also reported to positively correlate with an increased risk of being overweight and abdominal obesity (Murakami & Livingstone, 2016). Another study assessing the relationship between snacking and weight status also found

that daily high-calorie snacks, added sugar, sodium, and saturated fat consumption are higher among overweight and obese adolescents than adolescents with normal weight (Tripicchio et al., 2019).

Other than weight status, consumption of energy-dense snacks also has been found to develop the risk of certain diseases and health problems. Lendrawati et al. (2019) reported that adolescents in Indonesia with high consumption of sugary snacks were more likely to develop dental caries (OR: 4.29, 95% CI: 1.96-9.42). A study in Iran found an association between energy-dense snacks and the risk of developing non-alcoholic fatty liver disease (NAFLD) in which adults in the 4th quartile (consumed more alcohol and snacks with less physical activity) were almost twice more likely to develop the risk of NAFLD (OR: 1.94, 95% CI: 1.16–3.26) than adults in the 1st quartile (reference group) (Yari et al., 2020). Several studies also have reported an association between high consumption of energy-dense snacks and metabolic syndromes. Asghari et al. (2016) reported that consuming sweet and salty energy-dense snacks increased the risk of developing metabolic syndromes, while salty snacks increased the risk of developing hypertension. A study among adults in Tehran reported that the consumption of salty energy-dense snacks increased the incidence of metabolic syndromes, while sweet energy-dense snacks and soft drinks had a borderline effect on the risk of metabolic syndromes (Mirmiran et al., 2014).

2.2 Factors associated with snacking among adolescents

2.2.1 Demographic and socioeconomic factors

2.2.1.1 Sex

Demographic and socioeconomic characteristics have significant associations with snacking among adolescents. A study on the eating behaviour of the Swiss population found that the mean frequency of consuming snacks was lower in males (5.2 times/week) than females (6.6 times/week) (Hartmann et al., 2013). Jensen et al. (2019) also reported that the mean frequency of snacking among female adolescents (2.47 snacks/day) from low-income and middle-income communities in Santiago, Chile was slightly higher than male adolescents (2.19 snacks/day). According to the study, higher consumption of snacks among female adolescents was due to lower consumption of main meals than male adolescents, which lead to more snacking occasions.

On the contrary, Mithra et al. (2018) found that the prevalence of male adolescents (69.3%) snacking more than two times per day was higher (p<0.001) than female adolescents (57.2%). Male adolescents were reported to consume high carbonated beverages, while female adolescents tend to include fruits as snacks (Boon & Sedek, 2012; Mithra et al., 2018). A school-based study supported this finding, which stated male adolescents were 1.6 times more likely (adjusted OR: 1.66, 95% CI: 1.41-1.95) to consume sugar-sweetened beverages than female adolescents (Park et al., 2012). From the studies, snack consumption among male adolescents was high because they were less likely to be conscious of their eating habits than female adolescents. On the other hand, female adolescents tend to choose healthier option of snacks and were more mindful of their diet habits. However, Llauradó et al. (2016) stated no significant difference in snacking frequency for male and female adolescents who lived in United Kingdom.

2.2.1.2 Household income

Mithra et al. (2018) reported that adolescents who went to private college (higher household income) were frequently snacking more than twice per day (p<0.001) compared to adolescents who went to government college (lower household income). A study in Iran also found that there was a high frequency of snacking among adolescents with middle (27%), higher-middle (45%), and high (45%) household income (Feyzabadi et al., 2017). According to Upreti et al. (2020), fathers with a higher income were more likely to give allowance to their children. Hence, the children would use the allowance to buy and consume snacks regularly. Adolescents with individual allowance also had the independence to buy foods, which could lead to high consumption of snacks (Li et al., 2017).

Nevertheless, a cross-sectional population-based study among school students in Australia reported that lower household income among male adolescents was strongly associated with high intake of soft drinks (p = 0.002), but less strongly associated with high intake of snacks (p = 0.045) (Hardy et al., 2012). In comparison, lower household income among female adolescents was strongly associated with a high intake of soft drinks (p <0 .001) but no association with a high intake of snacks (p = 0.344). An observational study among a broad and multi-ethnic adolescent population found a negative association between household income and snack consumption patterns in which low economic status associated with high snacks consumption and high economic status were associated with low snack consumption (Cutler et al., 2011). Previous studies suggested that the residence of low-income families have easier access to unhealthy and high-energy-density food outlets (Gordon et al., 2011; Larson et al., 2009). Thus, the findings explained the high consumption of energy-dense snacks and soft drinks among adolescents with low-income families.

2.2.1.3 Parental education and employment status

Parental education influences snacking habits among adolescents. According to Chen et al. (2019), adolescents with higher ranks occupation and educated parents had a high proportion of healthy diet patterns and low snacks and sweets consumption (p<0.001). A study among adolescents attending public school in San Francisco also reported that parents who finished college degree (adjusted OR: 1.44, 95% CI: 1.12–1.86) had healthier food rules at home which may increase the association with consumption of healthier snacks than parents who did not finish high school (adjusted OR: 1.01, 95% CI: 0.78–1.30) (Wang & Fielding-Singh, 2018).

Parents with high education levels tend to have a high knowledge and were more conscious of healthy eating habits (MacFarlane et al., 2007). Thus, adolescents with highly educated parents have a healthier diet and low snack consumption than adolescents with low parental education levels. Campbell et al. (2007) also stated that parents who were aware and concerned with their children's dietary habits had a tendency to praise them for their healthy and mindful eating. This action was to encourage more healthy eating occasions by their children.

2.2.1.4 Body mass index (BMI)

A study among adolescents in Mauritius found no significant association between BMI and snacking habits (p>0.05) (Balluck et al., 2016). Underweight adolescents showed the highest prevalence of snacking habits (85.2%), followed by normal weight (72.1%), obese (66.7%), and overweight (56.5%). This finding was supported by a local study that reported no significant association between meal, snacking pattern and BMI (p>0.05) (Boon & Sedek, 2012). In the study, the prevalence of normal weight adolescents who reported to snack three times a day in addition to three main meals were the highest (72%), while underweight, overweight and obese adolescents reported 16%, 8% and 4%, respectively. Weak association found in the previous studies could be

due to adolescents were more likely to misreport the energy intake, in which normal weight was usually over-reporting the energy intake, while under-reporting was common among overweight or obese (Murakami & Livingstone, 2016).

In contrast, a study determining the prevalence and risk factors of overweight and obesity among adolescents in Egypt reported a significant association between snack consumption and BMI (p<0.01) (Talat & El Shahat, 2016). The study suggested that skipping meals habits, particularly among overweight and obese adolescents, lead to higher snacking occasions to compensate for insufficient nutrients and food intake. According to Tripicchio et al. (2019), significant associations were also found between snack frequency, energy from snacks and BMI among adolescents in United States (p<0.01).

2.2.2 Snack availability at home

Snack availability at home has been shown to be associated with snacking. A cross-sectional study involving adolescents in the United Kingdom reported that there was a positive association (p<0.001) between energy-dense snacks availability at home and consumption of energy-dense snacks (Pearson et al., 2017). This study also showed a negative association between energy-dense snacks availability at home and fruit and vegetable availability (p<0.001). In a study to determine the relationship of multiple home food environment aspects and frequency of snacks, energy-dense drinks and take-out foods consumption, unhealthy food availability at home was reported to have a positive association with consumption of savoury snacks among the male adolescents (p=0.002) and consumption of sweet and savoury snacks among female adolescents (p=0.001 and p<0.002, respectively) (Campbell et al., 2007). In addition, female adolescents showed an association between unhealthy food availability at home and energy-dense drinks consumption in the bivariate analysis (p=0.002). Larson et al. (2017) also found that home

availability of unhealthy snacks was significantly associated with greater consumption of snacks among both male and female adolescents (p<0.001).

Another study reported that high unhealthy food availability at home was positively associated with snack food consumption pattern and negatively associated with starchy foods, fruits and vegetables consumption pattern, whereas high healthy food availability at home was associated with high starchy foods, fruits, and vegetable consumption patterns, and negatively associated with the snack food consumptions pattern (Cutler et al., 2011). A study among adolescents at 24 schools in 4 different countries (Portugal, Netherlands, the United Kingdom and Poland) found that 60.3% of adolescents 'agree' and 'strongly agree' that snacks and sweetened beverages were available at home (Luszczynska et al., 2013). There was also a significant correlation (p<0.001) between snacks and sweetened beverages consumption and home availability of snacks and sweetened beverages shown in the study. Nonetheless, Martens et al. (2010) reported no significant association between snacks and sweetened beverages availability at home and the intake of snacks and sweetened beverages among adolescents.

Snacking occasions were more likely to happen at home due to snack food items were usually available and sourced from home than other places (Vatanparast et al., 2020). Feyzabadi et al. (2017) also reported that high weekly consumption of snacks among adolescents was due to availability and easy access to less healthy snack food at home. Furthermore, Niven et al. (2015) suggested that adolescents consider snack food at home to be convenient and readily eat than fruits and vegetables. Thus, increasing snack consumption among adolescents. Limited studies have been found in the association between snack availability at home and snacking among adolescents. Thus, further studies need to be conducted to support the existing evidence of the association.

2.2.3 Screen viewing

Screen viewing activity, including television, computer and mobile phone, is an important factor in relation to snacking. According to the NHMS 2017, the use of media such as screen viewing had a significant role in meal patterns, including snacking. Malaysian adolescents had mainly reported television and social media such as YouTube, Facebook and Instagram, as the media sources which influence meal patterns (37.9% (95% CI: 36.66, 39.24) and 36.7% (95% CI: 35.22, 38.18), respectively) (Institute for Public Health, 2017). Besides, only about one-fourth of the adolescents reported that their meal patterns were not influenced by media sources (28.7%, 95% CI: 27.20, 30.31).

Consistent findings suggested that screen viewing was associated with snacking among adolescents. Larson et al. (2017) reported a significant association between screen viewing (television viewing and video gaming) and energy-dense snack food intake (p<0.001). This finding was supported by a previous study by Vader et al. (2009) that reported television viewing was positively associated with snack consumption in which fourth grade and eighth-grade students in Texas who consumed two or more snacks per day tend to watch three or more hours of television daily than those who consumed one or no snacks daily.

In the context of an association between sex, screen viewing and snacking, a study among Brazilian adolescents showed that 40% of the adolescents ate snacks in front of screens (Oliveira et al., 2016). This habit was more prevalent among female adolescents than male adolescents. However, even though the study found that girls tend to snack in front of the screen, the prevalence of excess exposure to screen time (>2 hours) was higher among boys (74.7%, 95% CI: 73.0-76.4) than girls (72.3%, 95% CI: 70.8-73.7). Another study also found a similar finding in which the

prevalence of screen exposure was higher among male (85.5%) adolescents than female adolescents (70.5%) (Hardy et al., 2012). Nonetheless, female adolescents were more associated with screen time and unhealthy habits, which observed/expected ratio was 2.3 (95% CI: 1.3, 3.9) for low fruit and vegetable intake, high screen time, and high intakes of snacks and soft drinks

Television viewing has also shown its relation to the consumption of unhealthy and energy-dense snacks but low intake of fruits and vegetables among adolescents (Borgogna et al., 2015; Hobbs et al., 2015; Pearson et al., 2011; Francis et al., 2003). According to Scully et al. (2012), adolescents who watched television for more than 2 hours per day were 1.9 times more likely to consume sweet snacks (adjusted OR: 1.91, 95% CI: 1.60-2.27) and 1.8 times more likely to consume salty snacks (adjusted OR: 1.84, 95% CI: 1.59–2.12) 3 to 4 times per week than the adolescent who watched television lesser than 2 hours per day. Pearson et al. (2014) also reported a significant association between television viewing and energy-dense snack consumption among male and female adolescents in a cohort study involving adolescents in Melbourne, Australia (p<0.001).

A study in 20 public middle schools and high schools located in Minnesota revealed that the adolescents who had snacks while watching television consume 1.3 lesser serving of fruits and vegetables per day (β = -0.31, SEE = 0.036, p<0.001) than adolescents who never had snacks while watching television (Larson et al., 2016). Nevertheless, Pearson et al. (2017) reported that adolescents who consumed snacks consumed energy-dense snacks during television viewing also consumed fruits and vegetables as snacks. This study suggested that snacking during television viewing can be healthy and unhealthy depending on snack food choices. As inconsistent findings have been shown, further research should be conducted to understand this association better.

According to Robinson & Matheson (2015), exposure to the food commercial during screen viewing, especially television viewing, affected individual's food choices. Food commercials that were shown on the media and television were mainly fast food and energy-dense food. Therefore, it will influence the intake of energy-dense food as snacks among children and adolescents. Schaan et al. (2019) also suggested that the intake of snacks during screen viewing would cause ‘mindless eating’ where the individual may disregard the sign of satiety or fullness and depend on the screen viewing activity to end as the sign of satiety, resulting to excess energy intake from snacks.

CHAPTER 3

METHODOLOGY

3.1 Study Design

This was a cross-sectional study that aimed to determine factors that are associated with snacking among adolescents.

3.2 Study Location

The study location was in Kuala Selangor district of Selangor. It is located between Klang district and Sabak Bernam district. Kuala Selangor consists of 9 *mukim* which are Kuala Selangor, Tanjong Karang, Api-Api, Ulu tinggi, Hujung Permatang, Pasangan, Ijok, Bestari Jaya and Jeram. There are 20 secondary schools with adolescents aged 13-17 in Kuala Selangor. These secondary schools are divided into six sub-districts (Kuala Selangor, Tanjong Karang, Jeram, Bestari Jaya, Puncak Alam, and Sungai Buloh). The number of students in each school is approximately 200-2000 students. The study involved adolescents aged 15-17 from two secondary schools in Kuala Selangor district.

3.3 Study Population

The study population was adolescents aged 15-17 in Kuala Selangor district. The inclusion criteria were Malaysian adolescents, male or female, who attended secondary school in Kuala Selangor district and apparently healthy. The exclusion criteria of the respondents were adolescents with physical disabilities and had self-reported chronic diseases such as cardiovascular disease, hypertension, and diabetes.

3.4 Sample Size Determination

Sample size formula for correlation studies (Hulley, Cummings, Browner, Grady & Newman, 2007) was used to calculate the sample size of this study.

$$n = [\frac{(Z\alpha + Z\beta)}{C}]^2 + 3$$

Where,

n = number of sample size required

Zα = the standard deviation for α (1.96)

Zβ = the standard deviation for β (0.84)

r = expected correlation coefficient C= $0.5 \times ln[\frac{(1+r)}{(1-r)}]$

Based on Table 3.1 (appendix A), the largest sample size of this study was 49. However, after considering the response rate of 80% and the expected proportion of eligibility of 90%, the total minimum sample size required for this study was 59 respondents.

3.5 Sampling Procedure

In this study, multistage sampling was used, as shown in Figure 3.1. Two out of six sub-districts, which were Tanjong Karang and Kuala Selangor, were randomly selected. Next, two secondary schools were randomly selected after calculating the required sample size among ten secondary schools located at Tanjong Karang sub-district and Kuala Selangor sub-district. SMK Tiram Jaya from Tanjong Karang sub-district and SMK Seri Tanjung from Kuala Selangor sub-district were chosen. The students who met inclusion criteria and completed the online questionnaire in Google Form were recruited.

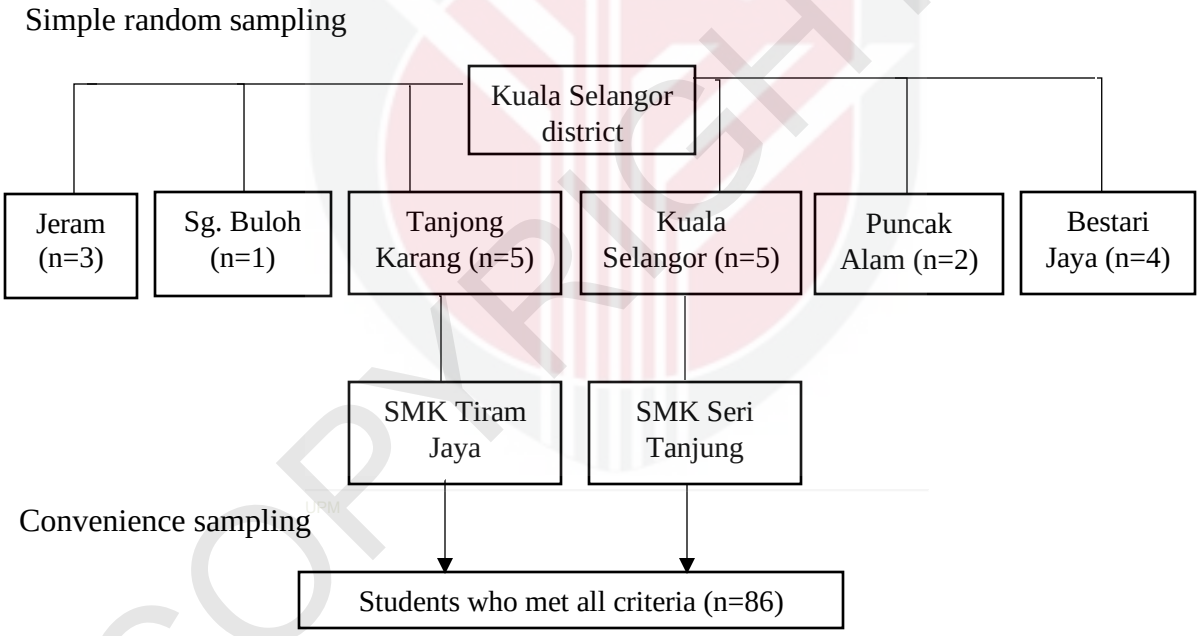

Figure 3.1: Sampling procedure for secondary schools in Kuala Selangor district

3.6 Study Measurements

A bilingual (English and Malay) semi self-administered questionnaire was used to collect the data for the study. The questionnaire was distributed through 'Google Forms' online platform. Parents and adolescents were given a consent form before participating in the study.

3.6.1 Demographic and socioeconomic status

Demographic and socioeconomic information consists of age, sex, ethnicity, household income, parental education level, and parental employment status of the adolescents.

3.6.2 Snacking pattern

Daily frequency of snacking was determined by a question asking, 'How often do you take snacks in a day?' (Boon & Sedek, 2012). Response scale to the question was 'never take a snack', 'once', 'twice' and '3 times or more'. Two days of 24-hour diet recall on one weekend and one weekday were used to measure the percentage energy of snacking intake from total energy intake. Consumption of food between breakfast and lunch (morning snack), between lunch and dinner (evening snack), and after dinner (night snack) will be considered as snacking (Boon & Sedek, 2012; Gregori & Maffeis, 2007). Energy intake from snacking was derived from food intake during morning snacks, evening snacks and night snacks. Total energy intake and energy intake from snacking were analysed using Nutritionist Pro Software, while the percentage energy of snacking from total energy intake was calculated by using the formula:

Percentage energy of snacking from total energy intake (%)

= (Energy intake from snacking (kcal) / total energy intake (kcal)) x 100

3.6.3 Snack food availability at home

Snack food availability at home was determined by a modified food availability at home questionnaire (MacFarlane et al., 2007). Respondents were asked 'How often are the following foods available in your home?' followed by eight food items listed, including fruit, vegetables, cakes/sweet biscuits, fruit juice, potato chips/salty snack foods, chocolate/lollies, soft drink, and sports/energy drinks. They were required to choose one answer from 'never', 'sometimes', 'usually' or 'always' for each item.

3.6.4 Screen viewing

Screen viewing activity of the adolescent was measured by using a television viewing questionnaire adapted from Eisenmann et al. (2002) and Cheah et al. (2011). In the questionnaire, respondents were asked to indicate the time spent viewing television (including DVDs or videos) and computer (including internet surfing) during weekdays and weekends in hours.

3.7 Ethical Approval

Ethical approval was sought from the Ethics Committee for Research Involving Human Subjects Universiti Putra Malaysia (JKEUPM) prior to data collection. Approval was also obtained from the Ministry of Education (MOE) and respective schools prior to the study. Respondents and their parents were given the information sheet on the study's details and were required to sign the consent form prior to study participation.

3.8 Pre-testing

Pre-testing was conducted online by using 'Google Forms' before the actual data collection. Twenty adolescents aged 15-17 from Selangor who met the inclusion criteria but did not attend the selected secondary schools for actual data collection were recruited. The respondents were given a questionnaire on demographic and socioeconomic characteristics, 24-hour diet recall for one weekend and one weekday, snacking pattern, snack availability at home and screen viewing activity. The pre-testing aimed to evaluate the understanding of adolescents towards the items in the questionnaire and to identify the time taken for the respondents to complete the questionnaire. Respondents involved in the pre-test were excluded from the study sample.

3.9 Data Collection

Data collection was conducted online from February 2021 until April 2021. The permission letter was sent to the respective schools involved in the study. The consent form, questionnaire, and information sheet containing an explanation regarding the study and how to answer the questionnaire were distributed to 15-17 years old respondents using 'Google Forms'. Before completing the questionnaire, consent was obtained from both parents and respondents. The questionnaire consists of 3 sections. The first section was the demographic and socioeconomic characteristics, including age, sex, ethnicity, household income, parental education level, and parental employment status of the adolescents. The second section was a question to assess the daily frequency of snacking and 24-hour diet recall to measure the percentage energy of snacking from total energy intake. The third section measured snack availability at home, time spent on television viewing during weekdays and weekends and time spent on computer viewing during weekdays and weekends. Upon completion of data collection, all responses were checked thoroughly before data entry and analysis. Respondents with missing information were excluded from the study.

3.10 Data Analysis

Data were analysed by using IBM SPSS Statistics 25 (SPSS Inc., Chicago, IL, USA). The variables were analysed by using descriptive statistics. Categorical variables were presented in the form of frequency and percentages, while continuous variables were presented in the form of means and standard deviations. A chi-square test was used to identify the association between categorical independent variables and dependent variables (frequency of snacking). On the other hand, an independent *t*-test was conducted to determine the association between categorical independent variables and continuous dependent variables (percentage energy of snacking from total energy intake). The statistical significance level was set at $p<0.05$.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Demographic and socioeconomic characteristics

Demographic and socioeconomic characteristics are presented in Table 4.1. A total of 86 adolescents aged 15 to 17 years old from secondary schools in Kuala Selangor participated in this study. Forty-nine (57%) male adolescents and 37 (43%) female adolescents were included in the study with a mean age of 16 years old (SD: 0.82). By ethnicity, 68.6% of the adolescents were Malay, 11.6% were Chinese, 17.4% were Indian, and 2.3% were Bumiputera Sabah. More than half (72.1%) of the adolescents came from a low-income family (<RM4850) or classified as 'B40' by the, and 27.9% of the adolescents came from middle-income families or 'M40' (Department of Statistic Malaysia, 2020). Most of the fathers and mothers attained their secondary (51.2% and 53.5%, respectively) and tertiary (41.9% and 33.7%, respectively) education levels. Majority of the fathers were self-employed (32.6%) and working in the private sector (36%), while the mothers were mainly self-employed (32.6%) and working in the government sector (33.7%).

Table 4.1: Demographic and socioeconomic characteristics of adolescents (n=86)

Characteristic	N (%)	Mean ± SD
Age (year)		16.00 ± 0.82
15	29 (33.7)	
16	28 (32.6)	
17	29 (33.7)	
Sex		
Male	37 (43.0)	
Female	49 (57.0)	
Ethnicity		
Malay	59 (68.6)	
Chinese	10 (11.6)	
Indian	15 (17.5)	
Bumiputera Sabah	2 (2.3)	
Household income (monthly) [a]		
Low (<RM4850)	62 (72.1)	
Middle (RM4850 – RM10960)	24 (27.9)	
High (>RM10960)	0 (0.0)	

Father's education level	
No formal education	1 (1.2)
Primary	5 (5.8)
Secondary	44 (51.2)
Tertiary	36 (41.9)
Mother's education level	
No formal education	3 (3.5)
Primary	8 (9.3)
Secondary	46 (53.5)
Tertiary	29 (33.7)
Father's occupation	
Self-employed	28 (32.6)
Government sector	22 (25.6)
Private sector	31 (36.0)
Retiree	5 (5.8)
Unable to work	0 (0.0)
Mother's occupation	
Self-employed	28 (32.6)
Government sector	29 (33.7)
Private sector	10 (11.6)
Retiree	2 (2.3)
Unable to work	17 (19.8)

[a] Malaysian household income threshold (Department of Statistics Malaysia, 2020)

4.2 Snack availability at home

Table 4.2 shows the distribution of adolescents' snack availability at home. For availability of "fruits" at home, more than half of adolescents responded "sometimes" (51.2%) and followed by "always" (29.1%), "seldom" (18.6%), and "never" (1.2%). Most adolescents responded with "always' (57%), "sometimes" (27.9%), and seldom (15.1%) for "vegetables" availability at home. Still, no adolescent responded with "never". More than 30% of adolescents responded "seldom" and "sometimes" for items "fruit juice" (37.2% and 55.8% respectively), "cakes or sweet biscuits" (38.4% and 41.9% respectively), "potato chips or salty snacks" (38.4% and 43% respectively) and "chocolates or candies" (43% and 43% respectively). For item "soft drinks", majority of adolescents responded "seldom" (44.2%) followed by "sometimes" (29.1), "never" (25.6%) and "always" (1.2%). Thirty-six percent (36%) of adolescents responded "seldom" for item "sport or energy drinks". In comparison, 30.2%, 25.6% and 8.1% of adolescents responded "never", "sometimes" and "always" respectively.

Table 4.2: Snack availability at home

Item	Never	Seldom	Sometimes	Always
	N (%)			
Snack availability at home				
Fruits	1 (1.2)	16 (18.6)	44 (51.2)	25 (29.1)
Vegetables	0 (0.0)	13 (15.1)	24 (27.9)	49 (57.0)
Fruit juice	4 (4.7)	32 (37.2)	48 (55.8)	2 (2.3)
Cakes or sweet biscuits	2 (2.3)	33 (38.4)	36 (41.9)	15 (17.4)
Potato chips or salty snacks	4 (4.7)	33 (38.4)	37 (43.0)	12 (14.0)
Chocolates or candies	2 (2.3)	37 (43.0)	37 (43.0)	10 (11.6)
Soft drinks	22 (25.6)	38 (44.2)	25 (29.1)	1 (1.2)
Sport or energy drinks	26 (30.2)	31 (36.0)	22 (25.6)	7 (8.1)

4.3 Screen viewing activity

Screen viewing activity among adolescents is tabulated in Table 4.3. For television viewing, almost half (47.7%) of the adolescents watched television for equal and more than 4 hours in a day, followed by 37.2 % of adolescents watched television for 2 to 3 hours a day, and 15.1% of adolescents watched television for 1 hour or less in a day. Majority of the adolescents spent equal to or more than 4 hours a day (74.4%) for computer and internet viewing and followed by 2 to 3 hours a day (19.8%). Only 5.8% of adolescents reported spending 1 hour or less for computer and internet viewing. Due to the COVID-19 situation, adolescents had to attend online learning classes, which explained more time spent on computer or internet viewing. According to Pietrobelli et al. (2020), screen viewing activity among adolescents in Italy were increased by 4.85 ± 2.40 hours a day during lockdown because of the COVID-19 situation. On the other hand, a previous study among 1564 adolescents in United States reported that the majority of the adolescents watched television (60.3%) and spent time on digital media (76.5%) for more than 2 hours a day (Fleming-Milici & Harris, 2020). Pearson et al. (2014) also reported that adolescents spent 2.24 hours watching television in a day during weekdays and 2.29 hours a day during weekends.

Table 4.3: Screen viewing activity among adolescents

Item	N (%)	Mean ± SD
Television viewing (hours/day)		3.79 ± 2.39
≤ 1 hour	13 (15.1)	
2 – 3 hours	32 (37.2)	
≥ 4 hours	41 (47.7)	
Computer/Internet viewing (hours/day)		8.09 ± 5.49
≤ 1 hour	5 (5.8)	
2 – 3 hours	17 (19.8)	
≥ 4 hours	64 (74.4)	

4.4 Snacking pattern of adolescents

4.4.1 Frequency of snacking

Most adolescents reported snacking once and twice a day (36% and 33.7%, respectively), followed by three times or more in a day (19.8%), and never take a snack (10.5%) (Table 4.4.1). About 89.5% of the adolescents snacked at least once a day. This finding was slightly lower than another study in Malaysia that reported 97.4% of adolescents consumed snacks at least once a day (Boon & Sedek, 2012). According to the NHMS (2017), 64.8% of Malaysian adolescents snacked 1 to 3 times a week, 23.8% snacked 4 to 6 times a week, 7.6% snacked seven times or more in a week, while only 3.8% reported no snacking (Institute for Public Health, 2017). A study among 884 British adolescents reported that the mean frequency of snacking was 2.6 times in a day (Llauradó et al., 2016). The study also suggested that eating meals more than three times a day with the consumption of low energy density snacks such as vegetables and fruits can improve the diet quality of adolescents.

Table 4.4.1: Frequency of snacking among adolescents

Characteristic	N (%)
Frequency of snacking (times/day)	
Never	9 (10.5)
Once	31 (36.0)
Twice	29 (33.7)
≥ 3 times	17 (19.8)

4.4.2 Energy intake from snacking

Table 4.4.2 shows the energy intake from snacking among adolescents. The mean and percentage of energy intake from snacking among adolescents during the weekend (428 ± 255 kcal and 25.61%, respectively) was higher than the mean and percentage energy intake from snacking during weekday (383 ± 266 kcal and 24.18%, respectively). Furthermore, the total mean energy intake from snacking for both weekday and weekend was 406 ± 242 kcal, while the total mean percentage energy of snacking from total energy intake was 25.09% (SD: 11.18).

These findings were consistent with a local study that found the total mean energy intake from snacking among adolescents was 403 kcal, and the total mean percentage energy of snacking from total energy intake was 24.4% (Boon & Sedek, 2012). According to the study, adolescents who were frequently snacking had a high carbohydrate than protein and fat intake, leading to high percentage energy of snacking. Likewise, NHANES 2013-2014 reported that snack intake of adolescents in the United States contributed to approximately 25% of the total energy intake (US Department of Agriculture, 2016).

However, present study contradicted other studies that found the snacking energy among adolescents in China was lower than 10% from total energy intake (Wang et al., 2018; Wang et al., 2012). The differences in these findings might be because of healthier and lower energy density options for snacking, such as fruits and vegetables, among adolescents in China.

Table 4.4.2: Energy intake from snacking among adolescents

Characteristic	Mean ± SD
Energy intake from snacking (weekday)	
Energy of snacking (kcal)	383 ± 266
Snacking energy as percentage of TEI (%) [d]	24.18 ± 12.92
Energy intake from snacking (weekend)	
Energy of snacking (kcal)	428 ± 255
Snacking energy as percentage of TEI (%) [d]	25.61 ± 12.68
Total energy intake from snacking (weekday+weekend)	
Energy of snacking (kcal)	406 ± 242
Snacking energy as percentage of TEI (%) [d]	25.09 ± 11.18

[d] TEI: Total energy intake

4.5 Factors associated with snacking among adolescents

4.5.1 Association between sociodemographic characteristics and frequency of snacking among adolescents

Table 4.5.1.1 shows the associations between sociodemographic characteristics and frequency of snacking among adolescents. There was no significant association between age and the frequency of snacking among adolescents (x^2=2.604; p=0.272). The finding was consistent with another study that found a significant association between age and the frequency of snacking among adolescents (Mithra et al., 2018; Sholeye et al., 2018). A possible explanation from the present study might be that there was a slight difference in the number of male and female adolescents who were snacking less than one time or more than two times a day.

Next, there was no significant association between sex and frequency of snacking among adolescents (x^2=0,000; p=0.927). The present study showed a consistent finding with another study among adolescents in Chile that reported no significant association between sex and frequency of snacking (p>0.05) (Jensen et al., 2019). Gage et al. (2021) also found no significant association between sex and frequency of snacking (p>0.05), with a slightly higher frequency of snacking among female than male adolescents. The study also suggested that a higher frequency of snacking among female adolescents could be due to the tendency for female adolescents to snack and be involved in unhealthy eating habits if they had easy access to convenience mart.

Apart from that, there was no significant association between ethnicity and frequency of snacking among adolescents (x^2=0.408; p=1.000). This finding was aligned to a study among adolescents in Kelantan that found no significant association of the frequency of snacking between Malay and Chinese adolescents (p>0.05) (Abdullah et al., 2016). The study also reported that

Chinese adolescents consumed a high healthy-based diet, while Malay adolescents preferred to eat local-based and Western-based diets. No significant association found in the present study could be because the type of food during snacking is more important in observing the association with ethnicity rather than the frequency of snacking.

The household income was not significantly associated with the frequency of snacking among adolescents (x^2=0.000; p=0.565). In the Project EAT-II (Eating Among Teens) study, there was no significant association between the household income and snacking pattern among the adolescents in United States (Cutler et al., 2011). In the present study, unequal distribution among low- and middle-income families might justify the non-significant association between household income and snacking frequency. However, a previous study by Mithra et al. (2018) reported that there was a significant association between household income and frequency of snacking (p<0.05). In the study, adolescents who went to private school, which indicated high household income, had a higher frequency of snacking than adolescents with low household income who went to government school. Likewise, another cross-sectional study among 1320 adolescents from 40 secondary schools in southeast Iran also reported a significant association between household income and frequency of snacking, especially among higher-middle and middle-income families (p<0.05) (Feyzabadi et al., 2017).

For parental education level and occupation, no significant associations were found with the frequency of snacking. The finding was similar to a study among adolescents in Nigeria that found no significant association between maternal education and employment status with snacking among adolescents (p>0.05) (Sholeye et al., 2018). No significant association reported in the present study might be because adolescents have their own preferences on eating habits and are not influenced by their parents' knowledge of healthy eating habits. In contrast, several studies

reported a significant association between parental education and employment status and snacks consumption among adolescents (Chen et al., 2019; Wang & Fielding-Singh, 2018). Additionally, parents with high education levels have a healthier eating environment, while low education level parents have poorer eating environments (Campbell et al., 2007; MacFarlane et al., 2007). Therefore, adolescents with a high parental education level were more likely to have a lower frequency of snacking.

Table 4.5.1.1 Association between sociodemographic characteristic and frequency of snacking among adolescents (n = 86)

Characteristic	≤ 1 time a day	≥ 2 times a day	X^2	*p*-value
	N (%)			
Age (year)			2.604	0.272
15	17 (42.5)	12 (26.0)		
16	11 (27.5)	17 (37.0)		
17	12 (30.0)	17 (37.0)		
Total	40 (100)	46 (100)		
Sex			0.000	0.927
Male	17 (42.5)	20 (43.5)		
Female	23 (57.5)	26 (56.5)		
Total	40 (100)	46 (100)		

Ethnicity			0.408	1.000[1]
Malay	27 (67.5)	32 (69.5)		
Chinese	5 (12.5)	5 (10.9)		
Indian	7 (17.5)	8 (17.4)		
Bumiputera Sabah	1 (2.5)	1 (2.2)		
Total	40 (100)	46 (100)		
Household income (monthly)			0.000	0.565
Low (<RM4850)	29 (72.5)	33 (71.7)		
Middle/High (>RM4850)	11 (27.5)	13 (28.3)		
Total	40 (100)	46 (100)		
Father's education level			0.470	0.889[1]
No formal education/Primary	2 (5.0)	4 (8.7)		
Secondary	21 (52.5)	23 (50.0)		
Tertiary	17 (42.5)	19 (41.3)		
Total	40 (100)	46 (100)		
Mother's education level			0.492	0.782
No formal education/Primary	6 (15.0)	5 (10.9)		
Secondary	20 (50.0)	26 (56.5)		
Tertiary	14 (35.0)	15 (32.6)		
Total	40 (100)	46 (100)		

Father's occupation			1.198	0.549
Private sector	12 (30.0)	19 (41.3)		
Government sector	11 (2.5)	11 (23.9)		
Other (Self-employed /Retiree/Unable to work)	17 (42.5)	16 (34.8)		
Total	40 (100)	46 (100)		
Mother's occupation			3.809	0.149
Private sector	7 (17.5)	3 (6.5)		
Government sector	15 (37.5)	14 (30.5)		
Other (Self-employed /Retiree/Unable to work)	18 (45.0)	29 (63.0)		
Total	40 (100)	46 (100)		

[1] Fisher's exact test

4.5.2 Association between sociodemographic characteristic and percentage energy of snacking among adolescents from total energy intake

Table 4.5.2.1 shows the association between sociodemographic characteristics and percentage energy of snacking among adolescents from total energy intake. Adolescents aged 15 years old reported the highest percentage energy of snacking from total energy intake (26.11%), followed by 16 years old (25.07%) and 17 years old (24.1%). However, no significant association was found between age and percentage energy of snacking from total energy intake (t=0.229; p=0.796). The slight differences in the percentage energy of snacking between the age in the present study might cause the result to be non-significant. According to Abdullah et al. (2016), older adolescents tend to consume healthy-based food while younger adolescents tend to snack on western-based food. In addition, older adolescents also were more independent in choosing their own food (Kral & Rauh, 2010). These findings indicated that older adolescents could have lower percentage energy from snacking due to consumption and healthier option food that are usually low energy density as snacks.

Next, there was no significant association between sex and percentage energy of snacking from total energy intake (t=1.290; p=0.200). Nevertheless, a study among adolescents in the United States found a significant association between sex and mean energy from snacking (p<0.01) (Tripicchio et al., 2019). From the present study, the percentage energy of snacking from total energy intake for male adolescents was higher than female adolescents (26.87% and 23.75%, respectively). This finding was probably because female adolescents tend to include fruits as their snack while male adolescents consumed more soft drinks and oily snacks (Mithra et al., 2018). Besides, male and female adolescents have different choices of snacks that can contribute to different mean and percentage energy from snack intake (Hampl et al., 2003).

There was no significant association between ethnicity and percentage energy of snacking from total energy intake (t=1.993; p=0.121). No previous study has been done on the association between ethnicity and percentage energy of snacking from total energy intake in Malaysia. However, a study among adolescents in Minnesota found no significant association between Asian-American and snack consumption patterns (Cutler et al., 2011). No significant association found in the present study might be because of the higher proportion of Malay adolescents than other ethnicities.

For household income, no significant association was found with percentage energy of snacking from total energy intake (t=0.575; p=0.567). The finding was consistent with a study that found no significant association between household income and percentage energy of snacking from total energy intake among adolescents (p>0.05) (Watts et al., 2018). Tripicchio et al. (2019) also reported that there was no significant association between household income and mean energy from snacking among adolescents (p>0.05). In the present study, adolescents from middle/high-income families have a higher percentage of snacking from total energy intake than adolescents from low-income families. A possible reason for the finding might be that middle- or high-income families have easy access and adequate money to buy more snacks than low-income families, which increased the percentage energy from snacks.

Father's education and parental occupation were not significantly associated with the percentage energy of snacking from total energy intake. As the proportion of father's occupation and parental occupation were not equally distributed, it explained the non-significant finding in the present study. In this study, adolescents with parents who work in the government sector reported a higher percentage of snacking from total energy intake. A possible explanation for the finding might be that the parents with better occupation and income would give their children pocket

money to buy snacks, increasing their consumption of snacks (Upreti et al., 2020). However, the present study also found an association between mother's education and percentage energy of snacking from total energy intake. This finding was aligned with a study among adolescents in British that reported an association between mother's education and percentage energy of snacking from total energy intake (p<0.05) (Watts et al., 2018). According to Wang and Fielding-Singh (2018), adolescents with parents who finished college degrees had healthier food rules at home. Therefore, mothers with higher education levels were more likely to restrict their children's snacking behaviour, resulting in lower percentage energy of snacking from total energy intake.

Table 4.5.2.1 Association between sociodemographic characteristic and percentage energy of snacking among adolescents from total energy intake (n = 86)

Characteristic	Total % energy of snacking (weekday + weekend)		
	Mean ± SD	*t*/F	*p*
Age (year) [1]		0.229	0.796
15	26.11 ± 13.05		
16	25.07 ± 9.23		
17	24.10 ± 11.19		
Sex		1.290	0.200
Male	26.87 ± 11.16		
Female	23.75 ± 11.12		

Ethnicity[1]		1.993	0.121
Malay	23.38 ± 10.79		
Chinese	28.67 ± 10.65		
Indian	30.09 ± 12.10		
Bumiputera Sabah	20.25 ± 9.19		
Household income (monthly)		0.575	0.567
Low (<RM4850)	24.66 ± 11.23		
Middle/High (>RM4850)	26.21 ± 11.23		
Father's education level		1.451	0.151
No formal education /Primary/Secondary	26.57 ± 11.42		
Tertiary	23.04 ± 10.67		

Mother's education level		2.167	0.033*
No formal education /Primary/Secondary	26.92 ± 10.87		
Tertiary	21.51 ± 11.11		
Father's occupation		0.975	0.333
Government sector	27.10 ± 14.62		
Non-government sector	24.40 ± 9.78		
Mother's occupation		1.478	0.143
Government sector	22.61 ± 10.55		
Non-government sector	26.36 ± 11.37		

[1] One-way ANOVA
* Significant at $p<0.05$

4.5.3 Association between snack availability at home and frequency of snacking among adolescents

Based on Table 4.5.3.1, there were no significant associations found between items in snack availability at home (fruits, vegetables, fruit juices, cakes or sweet biscuits, potato chips or salty snacks, chocolates or candies, soft drinks, and sport or energy drinks) and frequency of snacking among adolescents (p>0.05). The present study was consistent with a previous study by Martens et al. (2010) that found no associations between snack availability at home and frequency of snacking among adolescents. This finding might be due to the availability of snacks at home is insufficient to trigger snacking behaviour among adolescents, and other factors are needed to influence snack consumption. However, several previous studies found a significant association between snack availability at home, which contradicted the present study (p<0.05) (Feyzabadi et al., 2017; N. Larson et al., 2017; Niven et al., 2015). According to Feyzabadi et al. (2017), easy access to unhealthy snacks at home can increase adolescents' weekly consumption of snacks. In addition, snacking food items were usually sourced from home rather than relatives' or friends' homes and public spaces such as restaurants (Gage et al., 2021; Vatanparast et al., 2020).

Table 4.5.3.1 Association between snack availability at home and frequency of snacking among adolescents (n = 86)

Variables	≤ 1 time a day	≥ 2 times a day	X^2	*p*-value
	N (%)			
Fruits			1.072	0.301
Never/Seldom	6 (15.0)	11 (23.9)		
Sometimes/Always	34 (85.0)	35 (76.1)		
Total	40 (100)	46 (100)		
Vegetables			0.399	0.528
Never/Seldom	5 (12.5)	8 (17.4)		
Sometimes/Always	35 (87.5)	38 (82.6)		
Total	40 (100)	46 (100)		
Fruit juice			0.106	0.744
Never/Seldom	16 (40.0)	20 (43.5)		
Sometimes/Always	24 (60.0)	25 (56.5)		
Total	40 (100)	46 (100)		
Cakes or sweet biscuits			2.681	0.102
Never/Seldom	20 (50.0)	15 (32.6)		
Sometimes/Always	20 (50.0)	31 (67.4)		
Total	40 (100)	46 (100)		

Potato chips or salty snacks			2.740	0.098
Never/Seldom	21 (52.5)	16 (34.8)		
Sometimes/Always	19 (47.5)	30 (65.2)		
Total	40 (100)	46 (100)		
Chocolates or candies			3.586	0.058
Never/Seldom	23 (57.5)	16 (34.8)		
Sometimes/Always	17 (42.5)	30 (65.2)		
Total	40 (100)	46 (100)		
Soft drinks			0.002	0.965
Never/Seldom	28 (70.0)	32 (69.6)		
Sometimes/Always	12 (30.0)	14 (30.4)		
Total	40 (100)	46 (100)		
Sport or energy drinks			0.055	0.815
Never/Seldom	26 (65.0)	31 (67.4)		
Sometimes/Always	14 (35.0)	15 (32.6)		
Total	40 (100)	46 (100)		

4.5.4 Association between snack availability at home and percentage energy of snacking among adolescents from total energy intake

Table 4.5.4.1 shows the association between snack availability at home and percentage energy of snacking among adolescents from total energy intake. There were no significant associations between fruits item and vegetables item with the percentage energy of snacking among adolescents from total energy intake (p>0.05). However, the present study showed a lower percentage of snacking energy for the adolescents who responded 'sometimes' and 'always' for fruits and vegetables. It was possible because adolescents' likelihood to frequently snack was less when there was easy access to healthy snacks such as fruits and vegetables (N. Larson et al., 2017; Niven et al., 2015). There were also no associations between fruit juice, cakes or sweet biscuits, potato chips or salty snacks, soft drinks, and sport or energy drinks items with percentage energy of snacking among adolescents from total energy intake (p>0.05).

On the other hand, a significant association was found between chocolates and candies item with the percentage energy of snacking among adolescents from total energy intake (t=2.115, p=0.037). This finding indicated that the high availability of chocolates and candies at home could increase the percentage of snacking energy from total energy intake. Previous studies also supported that the availability of unhealthy and energy-dense snacks could increase the consumption of energy-dense snacks (Campbell et al., 2007; Cutler et al., 2011; Pearson et al., 2017), which can lead to a high percentage of energy from snacking.

Table 4.5.4.1 Association between snack availability at home and percentage energy of snacking among adolescents from total energy intake (n = 86)

Characteristic	Total % energy of snacking (weekday + weekend)		
	Mean ± SD	*t*/F	*p*
Fruits		0.153	0.879
Never/Seldom	24.72 ± 5.54		
Sometimes/Always	25.18 ± 12.21		
Vegetables		0.432	0.667
Never/Seldom	26.33 ± 7.87		
Sometimes/Always	24.87 ± 11.71		
Fruit juice		0.200	0.842
Never/Seldom	24.81 ± 12.77		
Sometimes/Always	25.30 ± 10.02		
Cakes or sweet biscuits		1.314	0.193
Never/Seldom	23.19 ± 12.59		
Sometimes/Always	26.40 ± 10.02		

Potato chips or salty snacks		1.689	0.095
Never/Seldom	22.77 ± 11.13		
Sometimes/Always	26.84 ± 11.02		
Chocolates or candies		2.115	0.037*
Never/Seldom	22.35 ± 11.03		
Sometimes/Always	27.37 ± 10.91		
Soft drinks		0.691	0.492
Never/Seldom	24.54 ± 12.20		
Sometimes/Always	26.36 ± 8.45		
Sport or energy drinks		0.154	0.878
Never/Seldom	24.96 ± 10.11		
Sometimes/Always	25.35 ± 13.23		

* Significant at $p<0.05$

4.5.5 Association between screen viewing activity and frequency of snacking among adolescents

Table 4.5.5.1 shows the association between screen viewing activity and the frequency of snacking among adolescents. There were no significant associations found between screen viewing activity and the frequency of snacking among adolescents (television: x^2=0.214, p=0.643; computer or internet: x^2=0.013, p=0.908). A slight difference in number between the proportion of adolescents who watched television for less than 3 hours and more than 4 hours, and a high proportion of adolescents who spent more than 4 hours on computer or internet might explain the reason for non-significant findings in this study. A study among adolescents in China found no significant association between television viewing and snacking behaviour (p>0.05) (Parvanta et al., 2010). The study also suggested that attention given to television advertisement was a better measure of predicting snacking behaviour instead of the number of hours spent on television

However, a study among adolescents in Canada showed a significant association between screen viewing and snacking frequency (p<0.01) (Thomson et al., 2008). This finding was also supported by other studies that also found a significant association between screen viewing and snacking frequency (p<0.005) (Pearson et al., 2014 & 2017). These associations found in previous studies could be because snack food commercials and advertisements shown during screen viewing activity could increase the appetite to consume food and drinks such as salty snacks and sweetened beverages (Borgogna et al., 2015; Robinson & Matheson, 2015). Hence, resulting in high consumption of snacks during screen viewing activity.

Table 4.5.5.1 Association between screen viewing activity and frequency of snacking among adolescents (n = 86)

Variables	≤ 1 time a day	≥ 2 times a day	X^2	*p*-value
	N (%)			
Television viewing			0.214	0.643
≤ 3 hours	22 (55.0)	23 (50.0)		
≥ 4 hours	18 (45.0)	23 (50.0)		
Total	40 (100)	46 (100)		
Computer/Internet viewing			0.013	0.908
≤ 3 hours	10 (25.0)	12 (26.1)		
≥ 4 hours	30 (75.0)	34 (73.9)		
Total	40 (100)	46 (100)		

4.5.6 Association between screen viewing and percentage energy of snacking among adolescents from total energy intake

Table 4.5.6.1 shows the association between screen viewing activity and percentage energy of snacking among adolescents from total energy intake. For television viewing, the mean total percentage energy of snacking from total energy intake was higher for adolescents who watched television for less than 3 hours. On the other hand, adolescents who spent 4 hours or more on computer or internet showed a higher mean total percentage energy of snacking from total energy intake than adolescents who spent less than 3 hours on computer or internet. In order to attend online learning classes due to the COVID-19 situation, there was an increase in screen time among adolescents (Carroll et al., 2020; Pietrobelli et al., 2020). Adolescents also spent more time on computer or internet usage for online learning than television, explaining the higher percentage energy of snacking for high computer or internet viewing and high percentage energy of snacking for low television viewing.

However, no significant association was found between screen viewing and percentage energy of snacking among adolescents from total energy intake (television: t=0.255, p=0.799; computer or internet: t=0.711, p=0.479). Previous studies found that higher screen viewing activities were linked to lower consumption of fruits and vegetables as snacks but higher consumption of energy-dense snacks (Hobbs et al., 2015; Pearson et al., 2014). Increased consumption of energy-dense snacks during screen viewing activities may explain the increased percentage energy of snacking from total energy intake. Furthermore, a study among adolescents in Brazil also suggested that consuming unhealthy and energy-dense snacks during screen viewing may contribute to the significant association between screen viewing and metabolic syndromes

(Schaan et al., 2019). The study also suggested that consumption of energy-dense snacks during screen viewing can encourage 'mindless eating' that leads to high energy intake from snacks.

Table 4.5.6.1 Association between screen viewing and percentage energy of snacking among adolescents from total energy intake (n = 86)

Characteristic	Total % energy of snacking (weekday + weekend)		
	Mean ± SD	*t*/F	*p*
Television viewing		0.255	0.799
≤ 3 hours	25.39 ± 11.81		
≥ 4 hours	24.77 ± 10.59		
Computer/Internet viewing		-0.711	0.479
≤ 3 hours	23.63 ± 10.75		
≥ 4 hours	25.60 ± 11.37		

CHAPTER 5
CONCLUSION, LIMITATION AND RECOMMENDATION

5.1 Conclusion

This cross-sectional study was conducted among 86 adolescents from two secondary schools in Kuala Selangor, Selangor. In the study, most adolescents reported consuming snacks at least once a day, while only 10.5% reported never taking a snack in a day. The total mean energy intake from snacking among adolescents for both weekdays and weekends was 406.08 kcal a day. The present study also reported that energy from snacking among adolescents contributed to 25% of total energy intake in a day. Adolescents in the study reported having a higher fruits and vegetables availability at home than other items such as fruit juice, cakes or sweet biscuits, potato chips or salty snacks, chocolates or candies, soft drinks, and sport or energy drinks. Other than that, this study found that adolescents, on average, spent 3.79 hours for television viewing and 8.09 hours for computer/internet.

There were no significant associations between sociodemographic characteristics, snack availability, screen viewing activity, and frequency of snacking among adolescents. Next, there were also no significant associations between sociodemographic characteristics and percentage energy of snacking from total energy intake except for mother's education level that showed a significant association with percentage energy of snacking from total energy intake. Out of all snack availability at home items, only chocolates or candies showed a significant association with percentage energy of snacking from total energy intake. This finding indicated that high chocolates and candies availability at home could increase the percentage energy of snacking from total energy intake. Apart from that, no significant association was found between screen viewing activity and percentage energy of snacking from total energy intake. Despite the lack of significant

associations between sociodemographic characteristics, snack availability at home, screen viewing activity, and snacking among adolescents reported in the study, further studies can be conducted to better understand the factors associated with snacking among adolescents.

5.2 Limitations of the study

There were several limitations of the study. First, this study had a small sample size which was insufficient to analyse the associations precisely. Second, the present study was only conducted in two secondary schools in Kuala Selangor. Thus, the findings from this study cannot be generalized to all secondary school adolescents. Third, the usage of an online self-reported questionnaire due to the COVID-19 situation might lead to over-reporting and under-reporting of the information due to the comprehension barrier of the questionnaire, especially for 24-hour dietary recall. Fourth, the present study also lacked other variables such as food type during snacking and food that reflected Malaysian snacking habits, which can be important in assessing snacking situation among adolescents in Malaysia.

5.3 Recommendation

There are several recommendations based on the findings of the present study. Maternal education level was found to associate with percentage energy from snacking among adolescents. Even though the education level of the mothers cannot be changed, the knowledge of the mothers regarding snacking of their children can be increased. Hence, the role of the nutritionist is essential to educate and increase awareness of the mothers on the healthy snacking habit that can be implemented at home. Next, the Ministry of Education can consider adding nutrition subjects in the curriculum, including snacking habits, to increase the awareness of healthy eating habits among adolescents. Intervention programs should also be done in school by providing healthier option of

snacks and low energy density snacks in the canteen to encourage healthy snacking habits among the adolescents.

For future studies, it is suggested to expand the sample size and location of the study with equal distribution so that it would be possible to have a meaningful result on the snacking situation among Malaysian adolescents and can be generalized to all Malaysian adolescent populations. Next, the Semi-Quantitative Food Frequency Questionnaire (FFQ) for snacks can be used to assess the frequency of snacking more precisely instead of a simple question asking the frequency of snacking in a day that can be potentially biased. On the other hand, adding more variables such as anthropometric measurements, biochemical parameters, and type of food consumed during snacking is also recommended to improve the study's findings.

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APPENDICES

APPENDIX A: SAMPLE SIZE

Table 3.1: Sample size calculation

Variables	Correlation coefficient, r	Sample size, n
Healthy snack availability at home and snacking of adolescents (Nepper, 2016)	0.40	$n = [\frac{(1.96 + 0.84)}{0.5 \times ln[\frac{(1 + 0.4)}{(1 - 0.4)}]}]^2 + 3$ n = 47
Energy-dense snack availability at home and snacking of adolescents (Nepper, 2016)	0.39	$n = [\frac{(1.96 + 0.84)}{0.5 \times ln[\frac{(1 + 0.39)}{(1 - 0.39)}]}]^2 + 3$ n = 49
Television viewing and snacking of adolescents (Thomson et al., 2008b)	0.56	$n = [\frac{(1.96 + 0.84)}{0.5 \times ln[\frac{(1 + 0.56)}{(1 - 0.56)}]}]^2 + 3$ n = 23

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

Research title	:	**Factors Associated with Snacking among Adolescents in Kuala Selangor, Selangor.**
Study Site	:	**Secondary schools in Kuala Selangor district.**
JKEUPM Ref No.	:	**JKEUPM-2021-044**
Researcher	:	**Aida Nursabrina Binti Baddri**
Supervisor	:	**Prof. Dr. Zalilah Binti Mohd Shariff**

Documents received and reviewed with reference to the above study:

1. Ethics Application Form, Version 1 dated 21/1/2021
2. Respondent Information Sheet & Consent (English), Version 2 dated 13/2/2021
3. Respondent Information Sheet & Consent (Malay), Version 2 dated 13/2/2021
4. Respondent Information Sheet & Guardian's/Parent's Consent (English), Version 2 dated 13/2/2021
5. Respondent Information Sheet & Guardian's/Parent's Consent (Malay), Version 2 dated 13/2/2021
6. Proposal (English), Version 1 dated 21/1/2021
7. Questionnaire/Interviews (English), Version 1 dated 21/1/2021
8. Questionnaire/Interviews (Malay), Version 1 dated 21/1/2021
9. Curriculum Vitae of:
    a. Prof. Dr. Zalilah Binti Mohd Shariff

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

[X] Approved

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

[ ] Disapproved

Please note that the approval is **VALID UNTIL 1 MARCH 2022**

Researchers should comply with the following:

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

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

III. Applicable for Clinical Trial Studies and Clinical interventional Studies only: Progress Report has to be submitted to JKEUPM at every 6 months from the date of approval (Form 3.1). Report

APPENDIX F: RESPONDENT'S INFORMATION SHEET

12/2/2021 VERSION 2

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

BORANG 2.4: PENERANGAN DAN PERSETUJUAN RESPONDEN

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

1. TAJUK KAJIAN

Faktor-faktor yang mempengaruhi pengambilan kudapan (snek) dalam kalangan remaja berumur 15-17 tahun di Kuala Selangor, Selangor.

2. PENGENALAN

Kudapan atau snek merupakan makanan atau minuman yang diambil antara selang masa sarapan, makan tengah hari dan makan malam. Pengambilan kudap-kudapan boleh menjadi sihat atau kurang sihat bergantung kepada jenis makanan dan minuman yang diambil. Sebagai contoh, buah-buahan dan sayur-sayuran yang tinggi dengan vitamin dan mineral boleh dijadikan sebagai pilihan kudap-kudap yang lebih sihat. Namun, pengambilan kudapan dalam kalangan remaja amat membimbangkan. Meskipun buah-buahan dan sayur-sayuran boleh dijadikan sebagai kudap-kudapan, remaja lebih memilih kudap-kudapan yang tinggi kalori seperti kerepek kentang, kuih muih dan coklat. Jika kudap-kudapan tinggi kalori ini diambil secara berlebihan, ia akan menyebabkan banyak masalah kesihatan dikemudian hari.

Kajian ini dilakukan untuk memenuhi keperluan graduasi bagi Ijazah Sarjana Muda (Pemakanan dan Kesihatan Komuniti) di Universiti Putra Malaysia. Kajian ini akan melibatkan 100 orang remaja berumur 15-17 tahun di Kuala Selangor, Selangor.

3. APAKAH YANG PERLU ANDA LAKUKAN?

Kajian ini bertujuan untuk mengetahui faktor-faktor yang mempengaruhi pengambilan kudapan dalam kalangan remaja berumur 15-17 tahun di Kuala Selangor, Selangor. Maka, remaja berumur 15-17 tahun dijemput untuk mengambil bahagian dalam kajian soal selidik ini. ***Penyertaan adalah secara sukarela dan tiada bayaran atau saguhati yang diberi jika menyertai kajian ini.*** Anda perlu membaca dan memahami borang penerangan ini. Jika anda bersetuju untuk menyertai kajian ini, anda diminta untuk menandatangani borang persetujuan di halaman 3.

Borang soal selidik akan mempunyai 3 bahagian;
Bahagian 1: Ciri demografik dan sosioekonomi
Bahagian 2: Pola kudapan dan borang ingatan 24-jam
Bahagian 3: Ketersediaan kudapan di rumah dan paparan skrin

Masa diambil untuk menyelesaikan borang soal selidik ini tidak lebih dari 20 minit.

4. SIAPA YANG TIDAK BOLEH MENYERTAI KAJIAN INI?

Remaja yang tidak menghadiri sekolah menengah di Kuala Selangor, cacat dan mempunyai penyakit kronik seperti penyakit jantung, darah tinggi dan kencing manis.

5. APAKAH FAEDAH MENYERTAI KAJIAN INI?

a) KEPADA ANDA SEBAGAI PESERTA?

Anda dapat mengetahui tentang faktor-faktor yang mempengaruhi pengambilan kudapan dalam kalangan remaja.

b) KEPADA PENYELIDIK?

Penyelidik dapat menentukan faktor-faktor yang mempengaruhi pengambilan kudapan dalam kalangan remaja dan pengetahuan daripada kajian ini boleh digunakan untuk merancang lebih banyak program promosi kesihatan dalam kalangan remaja di Malaysia.

6. ADAKAH IA BERISIKO?

Risiko kajian ini amat rendah kerana responden hanya perlu menjawab borang soal selidik sahaja.

7. ADAKAH MAKLUMAT DAN IDENTITI SAYA KEKAL RAHSIA?

Ya, maklumat diberikan semasa kajian ini akan kekal rahsia.

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

Jika ada sebarang pertanyaan, sila hubungi:

1) Penyelidik: Aida Nursabrina binti Baddri

011-11471659

192133@student.upm.edu.my

2) Penyelia: Professor. Dr. Zalilah Mohd Shariff

03-97692472

zalilahms@upm.edu.my

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

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

BORANG 2.5: PENERANGAN DAN PERSETUJUAN IBUBAPA/PENJAGA

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

1. TAJUK KAJIAN

Faktor-faktor yang mempengaruhi pengambilan kudapan (snek) dalam kalangan remaja berumur 15-17 tahun di Kuala Selangor, Selangor.

2. PENGENALAN

Kudapan atau snek merupakan makanan atau minuman yang diambil antara selang masa sarapan, makan tengah hari dan makan malam. Pengambilan kudap-kudapan boleh menjadi sihat atau kurang sihat bergantung kepada jenis makanan dan minuman yang diambil. Sebagai contoh, buah-buahan dan sayur-sayuran yang tinggi dengan vitamin dan mineral boleh dijadikan sebagai pilihan kudap-kudap yang lebih sihat. Namun, pengambilan kudapan dalam kalangan remaja amat membimbangkan. Meskipun buah-buahan dan sayur-sayuran boleh dijadikan sebagai kudap-kudapan, remaja lebih memilih kudap-kudapan yang tinggi kalori seperti kerepek kentang, kuih muih dan coklat. Jika kudap-kudapan tinggi kalori ini diambil secara berlebihan, ia akan menyebabkan banyak masalah kesihatan dikemudian hari.

Kajian ini dilakukan untuk memenuhi keperluan graduasi bagi Ijazah Sarjana Muda (Pemakanan dan Kesihatan Komuniti) di Universiti Putra Malaysia. Kajian ini akan melibatkan 100 orang remaja berumur 15-17 tahun di Kuala Selangor, Selangor.

3. APAKAH YANG PERLU ANDA LAKUKAN?

Kajian ini bertujuan untuk mengetahui faktor-faktor yang mempengaruhi pengambilan kudapan dalam kalangan remaja berumur 15-17 tahun di Kuala Selangor, Selangor. Maka, remaja berumur 15-17 tahun dijemput untuk mengambil bahagian dalam kajian soal selidik ini. ***Penyertaan adalah secara sukarela dan tiada bayaran atau saguhati yang diberi jika menyertai kajian ini.*** Anda perlu membaca dan memahami borang penerangan ini. Jika anda bersetuju anak/jagaan anda menyertai kajian ini, anda diminta untuk menandatangani borang persetujuan di halaman 3.

Borang soal selidik akan mempunyai 3 bahagian;
Bahagian 1: Ciri demografik dan sosioekonomi
Bahagian 2: Pola kudapan dan borang ingatan 24-jam
Bahagian 3: Ketersediaan kudapan di rumah dan paparan skrin

Masa diambil untuk menyelesaikan borang soal selidik ini tidak lebih dari 20 minit.

4. SIAPA YANG TIDAK BOLEH MENYERTAI KAJIAN INI?

Remaja yang tidak menghadiri sekolah menengah di Kuala Selangor, cacat dan mempunyai penyakit kronik seperti penyakit jantung, darah tinggi dan kencing manis.

5. APAKAH FAEDAH MENYERTAI KAJIAN INI?

a) KEPADA ANAK/JAGAAN SAYA SEBAGAI PESERTA?

Anak/jagaan anda dapat mengetahui tentang faktor-faktor yang mempengaruhi pengambilan kudapan dalam kalangan remaja.

b) KEPADA PENYELIDIK?

Penyelidik dapat menentukan faktor-faktor yang mempengaruhi pengambilan kudapan dalam kalangan remaja dan pengetahuan daripada kajian ini boleh digunakan untuk merancang lebih banyak program promosi kesiahtan dalam kalangan remaja di Malaysia.

6. ADAKAH IA BERISIKO?

Risiko kajian ini amat rendah kerana responden hanya perlu menjawab borang soal selidik sahaja.

7. ADAKAH MAKLUMAT DAN IDENTITI ANAK/JAGAAN SAYA KEKAL RAHSIA?

Ya, maklumat diberikan semasa kajian ini akan kekal rahsia.

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

Jika ada sebarang pertanyaan, sila hubungi:

1) Penyelidik: Aida Nursabrina binti Baddri

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192133@student.upm.edu.my

2) Penyelia: Professor. Dr. Zalilah Mohd Shariff

03-97692472

zalilahms@upm.edu.my

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

APPENDIX G: INFORMED CONSENT FORM

12/2/2021 VERSION 2

9. PERSETUJUAN

Saya…… No Kad Pengenalan. ……
beralamat……
……..dengan ini bersetuju untuk mengambil bahagian secara sukarela dalam penyelidikan yang tersebut di atas *(kajian klinikal/percubaan ubat-ubatan/rakaman video/kumpulan sasaran/temuduga/ soal selidik).

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

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

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

*potong yang tidak berkenaan

Tandatangan ……
(*Responden*)

Tarikh :……

Tandatangan ……
(*Saksi*)

Nama :……

No. K/P: ……

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

Tarikh ……

Tandatangan ……
(*Penyelidik*)

9. PERSETUJUAN

Saya…… No Kad Pengenalan. …… beralamat…… ……..dengan ini secara sukarela bersetuju membenarkan *anak / jagaan saya …… menyertai **penyelidikan tersebut di atas *(klinikal/percubaan ubat-ubatan/rakaman video/kumpulan sasaran/temuduga/ soal selidik).**

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

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

I setuju/tidak bersetuju untuk imej/gambar/rakaman video/ rakaman suara berkaitan dengan anak/ jagaan saya digunakan dalam apa jua bentuk penerbitan atau pembentangan. (sekiranya berkaitan).

*potong yang tidak berkenaan

Tandatangan …… Tandatangan ……
(*Ibubapa/ Penjaga*) (*Saksi*)

Tarikh :…… Nama :……..

No. K/P: ……..

Saya mengesahkan bahawa saya telah menerangkan kepada ibubapa/penjaga responden mengenai sifat dan tujuan penyelidikan tersebut di atas.

Tarikh …… Tandatangan …….
(*Penyelidik*)

APPENDIX H: QUESTIONNAIRE

Section 1: Demographic and socioeconomic characteristic

Bahagian 1: Ciri demografik dan sosioekonomi

Answer all questions. / *Jawab semua soalan.*

1. Birth date / *Tarikh lahir:*

_____ (ddmmyyyy / hhbbtttt)

2. Sex / *Jantina:*
   - Male / *Lelaki*
   - Female / *Perempuan*

3. Ethnicity / *Etnik*:
   - Malay / *Melayu*
   - Chinese / *Cina*
   - Indian / *India*
   - Others / *Lain-lain*. State / *Nyatakan*: .....

4. Household income (per month) / *Pendapatan isi rumah (sebulan)*:
   - < RM 2500
   - RM 2501 – RM 4500
   - RM 4501 – RM 1000
   - > RM 10000

5. Father's education level / *Tahap pendidikan bapa*
   - No formal education / *Tiada pendidikan formal*
   - Primary / *Sekolah rendah*
   - Secondary / *Sekolah menengah*
   - Tertiary / *Ijazah*
   - Others / *Lain-lain*. State / *Nyatakan*: .....

6. Mother's education level / *Tahap pendidikan ibu*
   - No formal education / *Tiada pendidikan formal*
   - Primary / *Sekolah rendah*
   - Secondary / *Sekolah menengah*
   - Tertiary / *Ijazah*
   - Others / *Lain-lain*. State / *Nyatakan*: .....

7. Father's occupation / *Pekerjaan bapa*
   - Self-employed / *Bekerja sendiri*
   - Government sector / *Sektor kerajaan*
   - Private sector / *Sektor swasta*
   - Retired / *Pesara*
   - Unable to work / *Tidak mampu bekerja*

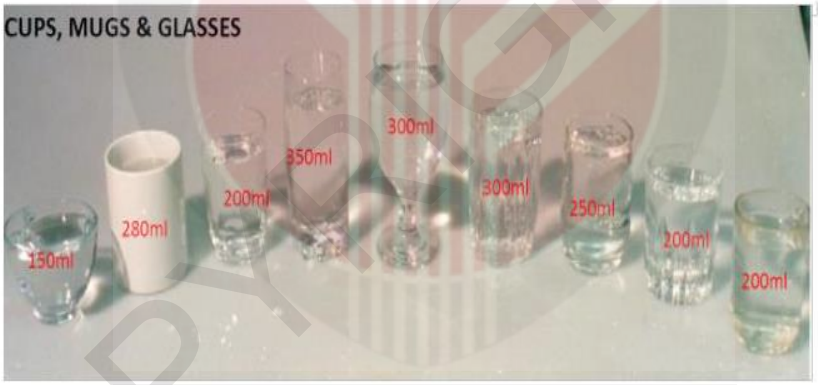
8. Father's occupation / *Pekerjaan bapa*
   - Self-employed / *Bekerja sendiri*
   - Government sector / *Sektor kerajaan*
   - Private sector / *Sektor swasta*
   - Retired / *Pesara*
   - Unable to work / *Tidak mampu bekerja*

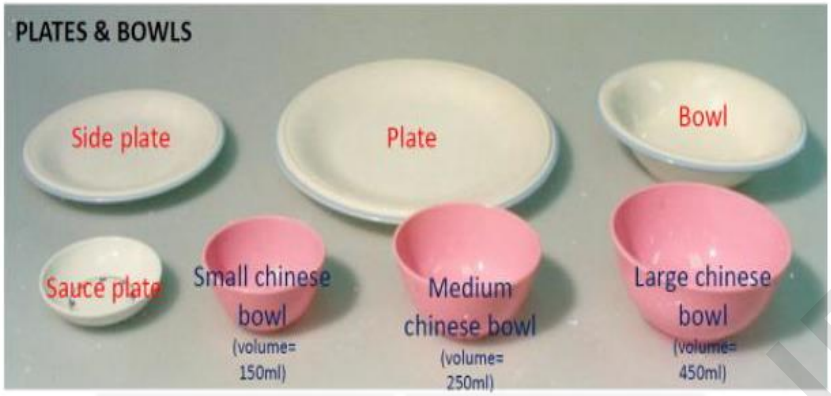
Section 2: Snacking pattern dan 24-hr diet recall

Bahagian 2: Pola kudapan dan borang ingatan diet 24 jam

1. How often do you take snack in a day? / *Berapa kerapkah anda mengambil kudap-kudapan dalam sehari?*
   - Never take a snack / *Tidak pernah mengambil kudap-kudapan*
   - Once / *Sekali*
   - Twice / *Dua kali*
   - 3 times or more / *3 kali atau lebih*

2. Respondents are required to recall the food intake from after waking up in the morning until before going to bed at night during **one** weekday (Monday – Friday) and **one** weekend (Saturday or Sunday). Please refer to the attached pictures to estimate the amount of food intake. / *Responden dikehendaki untuk mengingat semula makanan yang diambil daripada selepas bangun dari tidur pada waktu pagi sehingga sebelum masuk tidur pada waktu malam bagi **satu** hari minggu (Isnin – Jumaat) dan **satu** hujung minggu (Sabtu atau Ahad). Sila rujuk pada gambar yang disediakan untuk menganggar jumlah makanan yang diambil.*





Weekday

Recall day / *Hari ingatan*:	Monday / *Isnin*	Tuesday / *Selasa*	Wednesday / *Rabu*	Thursday / *Khamis*	Friday / *Jumaat*

Time / *Masa*	**Food and beverage / *Makanan dan minuman***	**Amount of intake (e.g.: 1 cup) / *Jumlah pengambilan (contoh: 1 cawan)***
Breakfast / *Sarapan*		
Morning snack / *Kudapan pagi*		
Lunch / *Makan tengah hari*		
Evening snack / *Kudapan petang*		
Dinner / *Makan malam*		
Night snack / *Kudapan malam*		

Weekend

Recall day / *Hari ingatan*:	Saturday / *Sabtu*	Sunday / *Ahad*

Time / *Masa*	**Food and beverage / *Makanan dan minuman***	**Amount of intake (e.g.: 1 cup) / *Jumlah pengambilan (contoh: 1 cawan)***
Breakfast / *Sarapan*		
Morning snack / *Kudapan pagi*		
Lunch / *Makan tengah hari*		
Evening snack / *Kudapan petang*		
Dinner / *Makan malam*		
Night snack / *Kudapan malam*		

2. How many hours do you spend on television viewing (including DVDs or videos) during weekdays (Monday – Friday)? / *Berapa lamakah, dalam jam, anda meluangkan masa menonton televisyen (termasuk DVDs atau video) sehari pada hari minggu (Isnin – Jumaat)?*
   ____ hours per day / *jam sehari*

3. How many hours do you spend on television viewing (including DVDs, or videos) daily during weekends (Saturday and Sunday)? / *Berapa lamakah, dalam jam, anda meluangkan masa menonton televisyen (termasuk DVDs dan video) sehari pada hujung minggu (Sabtu dan Ahad)?*
   ____ hours per day / *jam sehari*

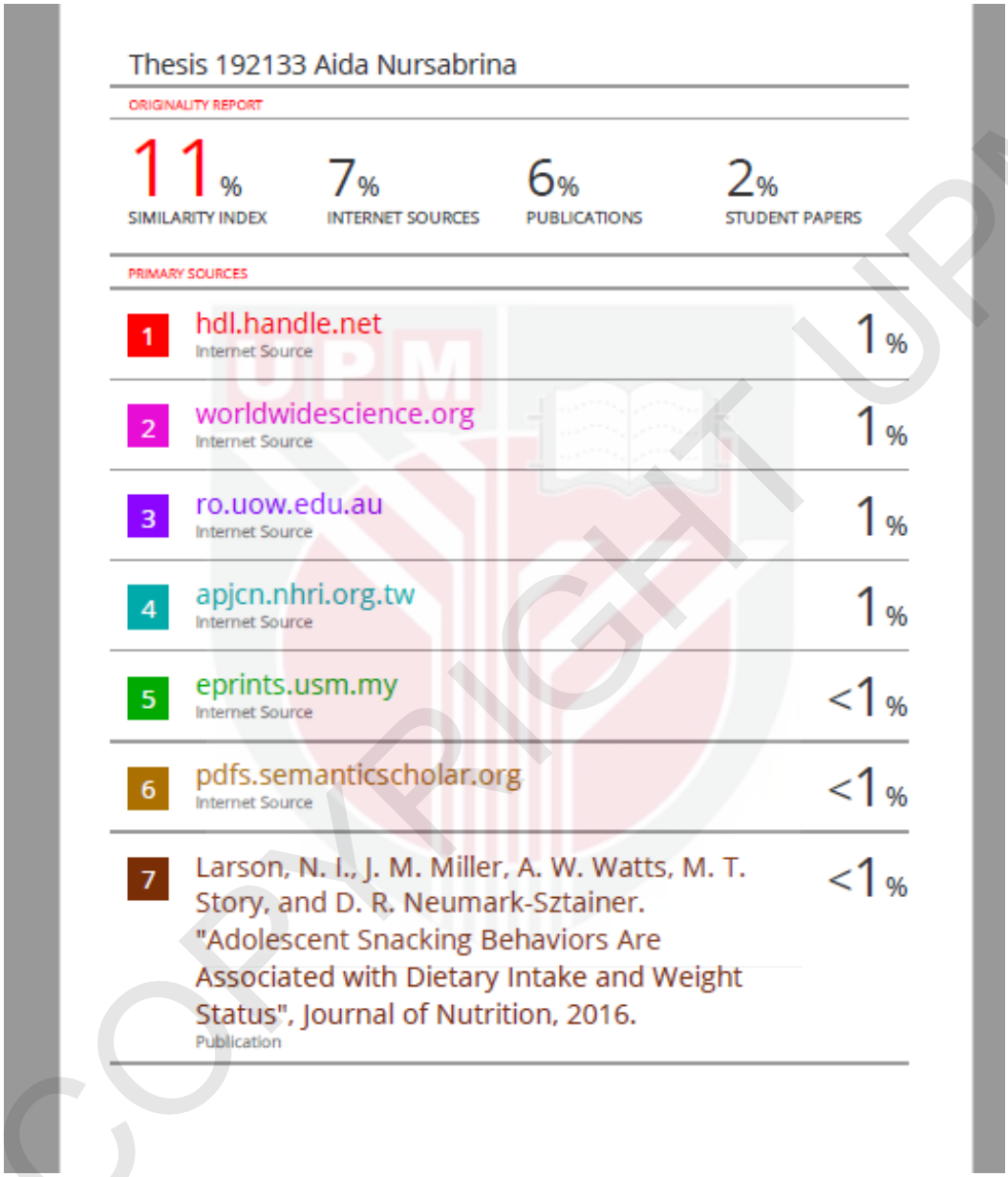
4. How many hours do you spend on computer viewing (including internet surfing) daily during weekdays (Monday – Friday)? / *Berapa lamakah, dalam jam, anda meluangkan masa menggunakan komputer (termasuk melayari internet) sehari pada hari minggu (Isnin – Jumaat)?*
   ____ hours per day / *jam sehari*

5. How many hours do you spend on computer viewing (including internet surfing) daily during weekends (Saturday and Sunday)? / *Berapa lamakah, dalam jam, anda meluangkan masa menggunakan komputer (termasuk melayari internet) sehari pada hari minggu (Sabtu dan Ahad)?*
   ____ hours per day / *jam sehari*

END OF QUESTIONNAIRE

Thank you for your commitment and cooperation!

APPENDIX I: ORIGINALITY (TURNITIN REPORT)



Thesis 192133 Aida Nursabrina

ORIGINALITY REPORT

11%	7%	6%	2%
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7	Larson, N. I., J. M. Miller, A. W. Watts, M. T. Story, and D. R. Neumark-Sztainer. "Adolescent Snacking Behaviors Are Associated with Dietary Intake and Weight Status", Journal of Nutrition, 2016. Publication	<1%