

Dietary Intake and Physical Lifestyle of Residential College Students in Universiti Kebangsaan Malaysia

(Pengambilan Dietari dan Gaya Hidup Fizikal Pelajar Kolej Kediaman di Universiti Kebangsaan Malaysia)

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ABSTRACT

A survey regarding dietary intake and physical lifestyle among Residential College Students was conducted in Universiti Kebangsaan Malaysia (UKM). The objectives of study were to determine and evaluate student's dietary intake and physical lifestyle in the campus which focus to Ungku Omar Residential College, one of the 12 Residential Colleges in UKM. This study was used experimental research design where 100 students (10 percent of population) have been selected randomly through their quotas of race and gender. The results show that the dietary intake of macronutrient carbohydrate, fat and protein taken by the majority of the students ($\geq 50\%$) have been met the satisfied level as suggested by The Malaysian Food Pyramid Guideline. However, 35-57 percents of student were consuming high calories and high fat food diet. Based on the data obtained, there are relationship between the pattern of students' dietary intake and quality of services and food inside the campus. According to the students' perception, the food outlets (cafeteria) in campus were providing balanced diet, but the quality and safety of food and services were still unsatisfied. The result also found that the students were practicing an active lifestyle with moderate outdoor exercise during their campus life. We concluded that the students in Ungku Omar's Residential College are practicing healthy campus lifestyle with a satisfied level of balanced dietary intake and physical lifestyle. However, further improvements and attention on students' dietary intake, especially vegetables, fruits, calories and fat intake are necessary. Therefore, the cafeteria and Residential College administration need to monitor and improve the status of dietary and physical lifestyle among students periodically through a constant survey.

Keywords: Dietary intake, physical lifestyle, food service provider, balanced energy lifestyle.

ABSTRAK

Satu kajian soal selidik mengenai pengambilan dietary dan gaya hidup fizikal pelajar kolej telah dijalankan di Universiti Kebangsaan Malaysia (UKM). Objektif kajian adalah untuk menentukan dan menilai pengambilan dietary serta gaya hidup fizikal pelajar di kampus kediaman dengan tumpuan khusus kepada pelajar di Kolej Kediaman Ungku Omar, UKM. Kajian ini telah menggunakan reka bentuk eksperimen bebas dengan metod persampelan rawak mudah berdasarkan kuota bangsa dan jantina. Sejumlah 100 pelajar terlibat dalam kajian iaitu mewakili 10 peratus saiz populasi. Hasil kaji selidik menunjukkan pengambilan diet makronutrisi karbohidrat, protein dan lemak oleh majority pelajar ($\geq 50\%$) mencapai tahap memuaskan berpandukan garis panduan piramid makanan Malaysia. Namun, 35-57 peratus didapati mengamalkan pengambilan makanan tinggi kalori dan tinggi lemak. Data yang diperolehi juga menunjukkan terdapat perkaitan antara corak pengambilan dietari pelajar dengan kualiti perkhidmatan dan makanan yang disediakan di dalam kampus. Berdasarkan persepsi pelajar, kafeteria di dalam kampus dianggap mampu menyediakan makanan yang seimbang dari segi nutrisi, namun dari segi kualiti, keselamatan makanan dan perkhidmatan masih tidak mencapai tahap memuaskan. Kajian juga mendapati pelajar mengamalkan gaya hidup aktif dengan senaman luaran yang sederhana. Dirumuskan bahawa para pelajar di kolej kediaman yang diselidik mengamalkan cara hidup kampus yang sihat dengan pengambilan diet dan aktiviti fizikal yang seimbang. Walau pun begitu, dicadangkan supaya pengambilan dietari terutamanya sayur-sayuran, buah-buahan, lemak dan kalori dipertingkatkan bagi kesihatan diri pelajar. Pihak kafeteria dan pengurusan kolej disaran memberi perhatian terhadap penambahbaikan amalan pemakanan dan gaya hidup fizikal pelajar demi memastikan generasi kampus yang sihat.

Kata kunci: Pengambilan dietari, gaya hidup fizikal, penyedia perkhidmatan makanan, gaya hidup tenaga seimbang.

INTRODUCTION

Balanced dietary intake which contains all the seven classes of food is essential in maintaining good health. It is highly important to have adequate dietary intake to complement daily physical activities (Cook et al. 2013). University students with the age range (19 - 23) are those at the transition age period from adolescence to adulthood, where their growth and maturity would complete at such age range. At this transition period, the interactions of various biological, intellectual, psychological and social factors contribute towards the formation of personal identity. Their diet, nutrient and health patterns implicates the beginnings of various diseases not manifested until much later in life (Khor et al. 2002; Racette et al. 2005; Soriano et al. 2000). Therefore, the maintenance of physical activity and the prevention of excessive weight gain must be complemented with balanced dietary intake (Zulaikha et al. 2011).

The dietary habits of university students are greatly influenced by various factors, including accommodations, eating out practices, time management, convenience, weight control practices, financial issues, family influences and misperceptions (Horacek & Betts 1998). According to Huang et al. (2003), university students often failed to meet the recommended intake of fruits and vegetables. The prevalence of meal skipping, especially breakfast, among university students is a common practice. Most of the students having snacking habits which is consider as unhealthy as it rich in high fat and calorie-dense food. This unhealthy dietary habit might be due to the high cost of healthy food, convenience, lack of awareness and availability of fast food (Huang et al. 2003; Moy et al. 2009).

In terms of physical lifestyle, university has suitable and convenient environment for exercise and training as they are usually equipped with facilities and infrastructures for various outdoor and indoor activities such as jogging track, games courts and gymnasium. Thus students could practice healthy lifestyle on an ongoing basis (Zulaikha et al. 2011). However, university students' lifestyle is greatly influenced by surrounding factors which may cause some of them to be overweight and obese at the young adult age (Racette et al. 2005). They are constantly facing stress and pressures from various aspects, including academic performance, personal and/or family problems, social interaction and financial status. The above stated aspects affect the students' eating habit and healthy life style (Khor et al. 2002). In relation to this scenario, we assessed student dietary intake and physical lifestyle in

one of the Residential College in Universiti Kebangsaan Malaysia, namely Ungku Omar Residential College. The objectives of this study were to determine and evaluate the dietary intake and physical lifestyle of the Residential College Students. We are also interested to explain student preferences and perceptions toward food outlets services in the university and college, thus suggest intervention for improvement.

METHODOLOGY

We used an open experimental research design in this study. Due to large numbers of student population and residential colleges, we choose Ungku Omar Residential College as sampling location. Simple Random Sampling that based on background of ethnic and gender was used to select the sample. In the UKM Bangi Campus, Ungku Omar Residential College is ranked third after College Pendeta Za'aba and College Keris Mas in term of student population size. Based on the demographic data provided by the Ungku Omar Administrative Office at the period of study (January-April 2014), the college was accommodated with 914 local students whereby 322 are males (35.23%) and 592 females (64.77%). In term of ethnic, 82.17 percent are Malays, 14.55 percent Chinese, 1.42 percent Indians and 1.86 percent others. Through this experimental design, about 10 percent of the student population was selected randomly according to groups of gender and ethnic. As result, there are 46 male students and 54 female students were involved in this survey. Among these, 80 of them are Malay, 11 are Chinese, 5 are Indian and 4 from East Malaysia (Sabah and Sarawak).

Questionnaire

We developed a set of questionnaire consisting of two sections with references to questionnaire template of dietary and lifestyle assessment designed by British Heart Foundation. ¹In Section A (lifestyle screening), a total of 18-items were included for assessing dietary habits and physical lifestyle among respondents. Meanwhile, in Section B, a total of 9-items of perception was designed to evaluate the respondents' food source, diet preferences and perceptions on current food service provides by cafeterias in both college and campus. A test of reliability for both section of questionnaires show Alpha Cronbach = 0.724 and 0.782 simultaneously which consider strong and reliable. Subjects' diet preferences was evaluated through rank test while subjects' perceptions was recorded using 5-point Likert scale (1=very unsatisfied, 5=very satisfied).

¹ Please refer <http://www.devonhealthandwellbeing.org.uk/wp-content/uploads/2012/10/BHF-How-healthy-is-your-diet-questionnaire1.pdf>. See also questionnaires from Nutra Therapeutic (online: http://www.renaissance.com/Nutr_Status_Lifestyle_Q.pdf). Accessed 14 July 2015.

Data Analysis

Data obtained through survey was keyed into spreadsheet using of Microsoft Office EXCEL software, version 2007 (Microsoft Corporation, Washington, USA). Data was presented descriptively using bar and pie charts.

RESULTS AND DISCUSSION

Figure 1 shows the percentages of the dietary intake of various food categories. As shown, rice is the main carbohydrate source and is consumed daily by majority of college students. This finding supported the fact that rice is the staple food for nearly half of the world's seven billion people, especially in Asian (Pingali 2006). In comparison with other protein sources such as red meat, egg, fish and seafood, the students prefer poultry especially chicken. About 42.0 percent of the students consumed poultry in their daily diet. However, approximately 30.0 percent of the students were known to consume red meat, processed meat products, eggs, fish and seafood for 1-2 times per week in their diet. This finding indicates that protein intake among students are from variety of sources. Pingali (2006) also reported that there was a rise in protein intake in Asian diet which is similar to the result of this current study of students' daily diet.

Based on students' opinion in this survey, 64 would prefer to choose poultry or fish rather than red meat or processed meat. Meat is an important component of a healthy and balanced diet due to its nutritional richness. It is the valuable source of high biological value protein, iron, vitamin B12 as well as other vitamin B complex, zinc, selenium and phosphorus. However, its nutritional composition is strictly depending on its source and animal parts. Red meat was found contained higher saturated fat and lower protein than poultry such as chicken (Pereira et al. 2013). Excessive saturated fat consumption could promote the expansion of white adipose tissues and hypertrophy leading to apoptosis. Consequently, these phenomena promote the release of inflammatory protein such as cytokines and chemokines that inducing inflammation and insulin resistance, and thus increasing the risk of cardiovascular disease and metabolic syndrome (Kennedy et al. 2009; Haffner 2006; Willerson & Ridker 2004).

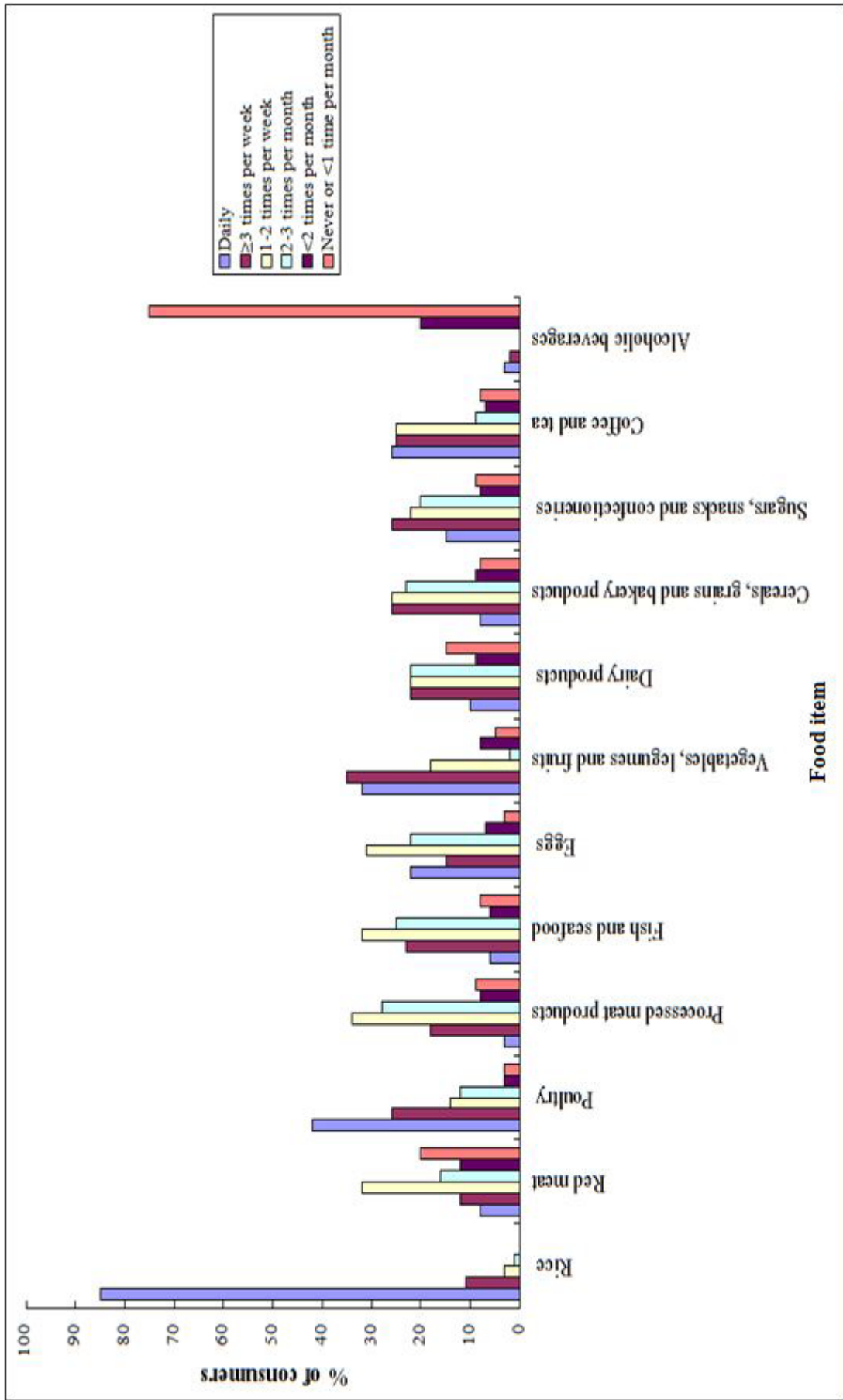
Therefore, moderate consumption of red meat and variation in protein source intake is important in maintaining healthy and balanced diet of the students. This study proved that Ungku Omar Residential college's students were practicing a balanced and healthy protein intake.

Further, vegetables, legumes and fruits consumption among students were at satisfactory level according to the Malaysian Dietary Guidelines (National Coordinating Committee on Food and Nutrition (NCCFN), 2010). In this study, about 32 percent were consuming vegetables, legumes and fruits daily while about 35 percent were consuming them for more than 3 times per week. Vegetables, fruits and legumes intake by the students is similar with statistical report by Food and Agriculture Organization of the United Nations (FAO), where consumption of these food categories by Asian has been increasing since 1979 until 2001 (Pingali 2006). Adequate consumption of fruits and vegetables in diet is well-known in preventing numerous diseases such as cancer, diabetes, cardiovascular diseases, neurodegenerative disease etc. Protective properties from fruits and vegetables are resulted from the presence of low molecular weight antioxidants and their synergistic effect, which protect the cells and their structures against oxidative damage (Harasym & Oledzki, 2014).

Legumes played an integral part in Asian cuisine for many centuries. Health benefit of legumes is always linked with there is of flavonoid content (Lee et al. 2011). Dairy products consumption among these students had achieved satisfied level with the total of 44 percent of students consuming them at least 1-2 times per week. Dairy products are the major source of dietary calcium. An adequate calcium intake during growth period may be critical in maximizing the peak bone mass, which is a determinant of future risk of osteoporosis (Sandra et al. 1999). Students' diet with moderate dairy products intake indicates reduced risk of osteoporosis among these students. Besides, coffee and tea consumption was also found to be high among these students, where about 76 percent of students consumed it at least 1-2 times per week. Moderate coffee and tea in diet was found exerted health benefit to the consumers. Both coffee and tea are proven to contain caffeine and various polyphenols, which played significant role in human body immune modulation, cardio protection, and hepato protection (Liang 2012; Mark 2007). Even moderate alcohol intake in healthy diet had been proposed (Takahiro et al. 2007), but alcoholic beverages consumption was the least consumed drink. About 75 percent of the students seldom or never drink alcoholic beverages. This finding was expected as majority of the involved students are Muslim, where alcoholic beverages is prohibited by Islam. According to study Michalak et al. (2007), religion is the most important variable for manipulating alcohol drinking patterns of most populations.

The diet information discussed above is able

FIGURE 1. Food consumption frequency of students in Ungku Omar’s Residential College, based on food (Total subjects =100).

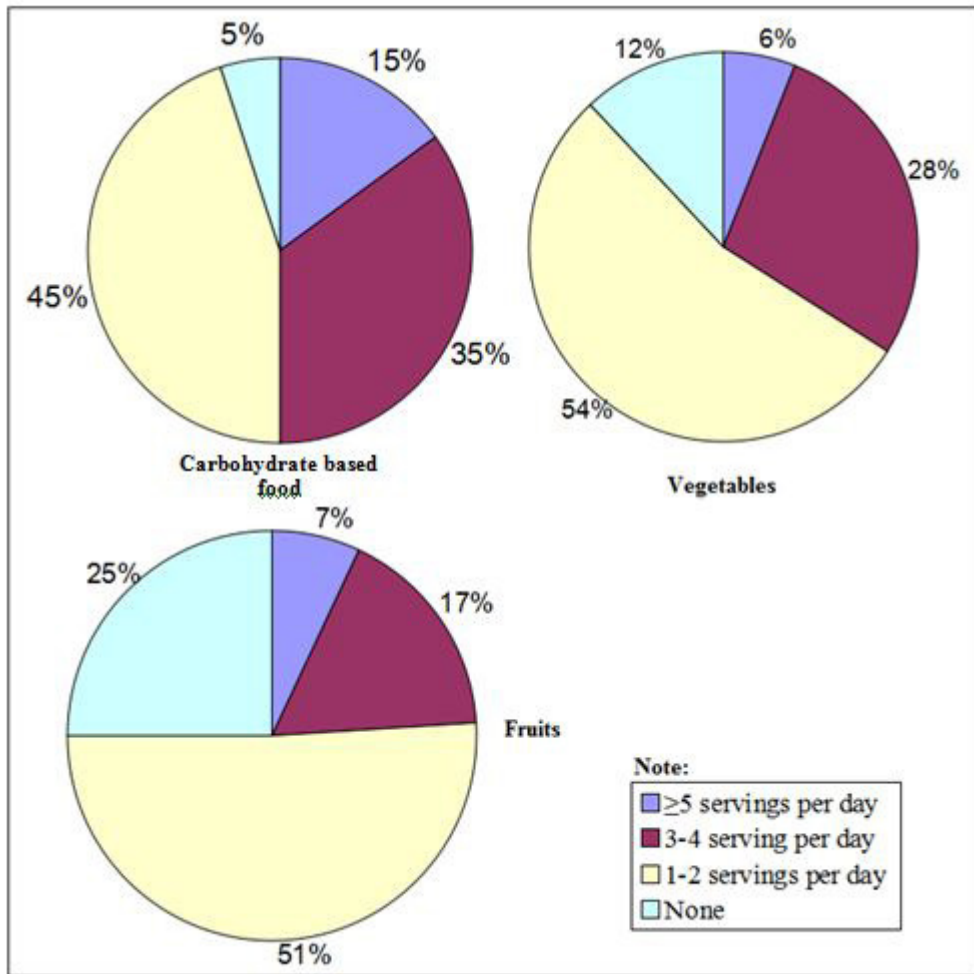


to show that the pattern of daily food intake among students are with correct food varieties based on the Malaysian Food Pyramid. However, healthy dietary practice must be fulfilled with recommended serving size of each category of food. Detailed survey on serving size of carbohydrate based food, vegetables and fruits intake by students shown in Figure 2.

By referring to Malaysian Dietary Guidelines (National Coordinating Committee on Food and Nutrition (NCCFN), 2010), Malaysians are urged to consume these three groups of food in large amount.

Based on the data obtained, it was shown that majority of the students consumed at least 1-2 serving of these food in each and every intake. In comparison with vegetables and carbohydrate based food intake, it was found that many students do not take fruits as part of their daily diet. According to the dietary guidelines, Malaysians were encouraged to consume adequate amount of rice and at least 5 servings of fruits and vegetables daily. Only 6-7 percent of the students meet the requirements stated above. Thus, little effort on the improvement of students' diet is still necessary.

FIGURE 2. Carbohydrate-based food, vegetables and fruits consumption frequency of students in Ungku Omar's Residential College, based on serving size (Total subjects = 100).



Although the students' diet intake is at satisfactory level, over consumption of high calories and high fat food is the major drawback of their eating practices. Approximately 87 percent of them consumed fried food at least 2-4 times per week (with 17% of them consumed fried foods daily); while 57 percent of them consumed high fat food routinely (>4 times per week). Such finding is consistent with the current Asian diet trend transition, where food preparation

time becomes factors that influence consumers in food choice selection (Pingali 2006). Tendency of the students in choosing high fat and fried food may be due to the wide availabilities of local traditional cuisine and snacks such as nasi lemak, curry, roti canai and keropok lekor at food outlets/cafeterias in campus. In addition, 86 percent of them were also found consumed fast foods such as KFC, McDonald and Pizza Hut for at least 1-2 times per week in the past one month from

this survey. Emergence of fast food outlets around the campus area and the convenience of transportation system are believed to be the contributing factors. Fast food consumption had always associated with poor dietary intake and weight gain over time. Modifications on social-environmental factors are found particularly important in reducing fast food consumption among the adolescences (Bauer et al. 2009).

From the aspect of eating habits of these students, we had found that majority of them tend to skip their meals. Only 28 percent of them have their breakfast daily while about 75 percent of them tend to skip their meals, either lunch or dinner, at least 1-2 times per week. Breakfast has been reported to be a proxy-variable for a healthy lifestyle. Skipping breakfast is always linked with lower levels of physical productivity and weight gain (Reeves et al. 2013). Regular and balanced dietary habits in daily life must be practiced to ensure the good health of an individual. However, imbalanced dietary habits among university students were commonly reported due to the factors especially changes in living arrangements, financial resource, food budget, availability of fast food outlets, psychological traits and preferences. Habit was recognized as the most powerful predictors of eating behavior. By nurturing healthy eating habit among university students, this could develop a healthy community in campus (Riet et al. 2011; Papadaki et al. 2007). Balanced and regular dietary intake is important among these students as more than half of them (69%) do not take any additional supplements. Malaysian dietary guidelines stated that following Malaysian Food Pyramid is able to provide sufficient nutrients needed by human without any supplement intake. On the other hand, regular excessive supplement intake might be harmful (National Coordinating Committee on Food and Nutrition (NCCFN), 2010).

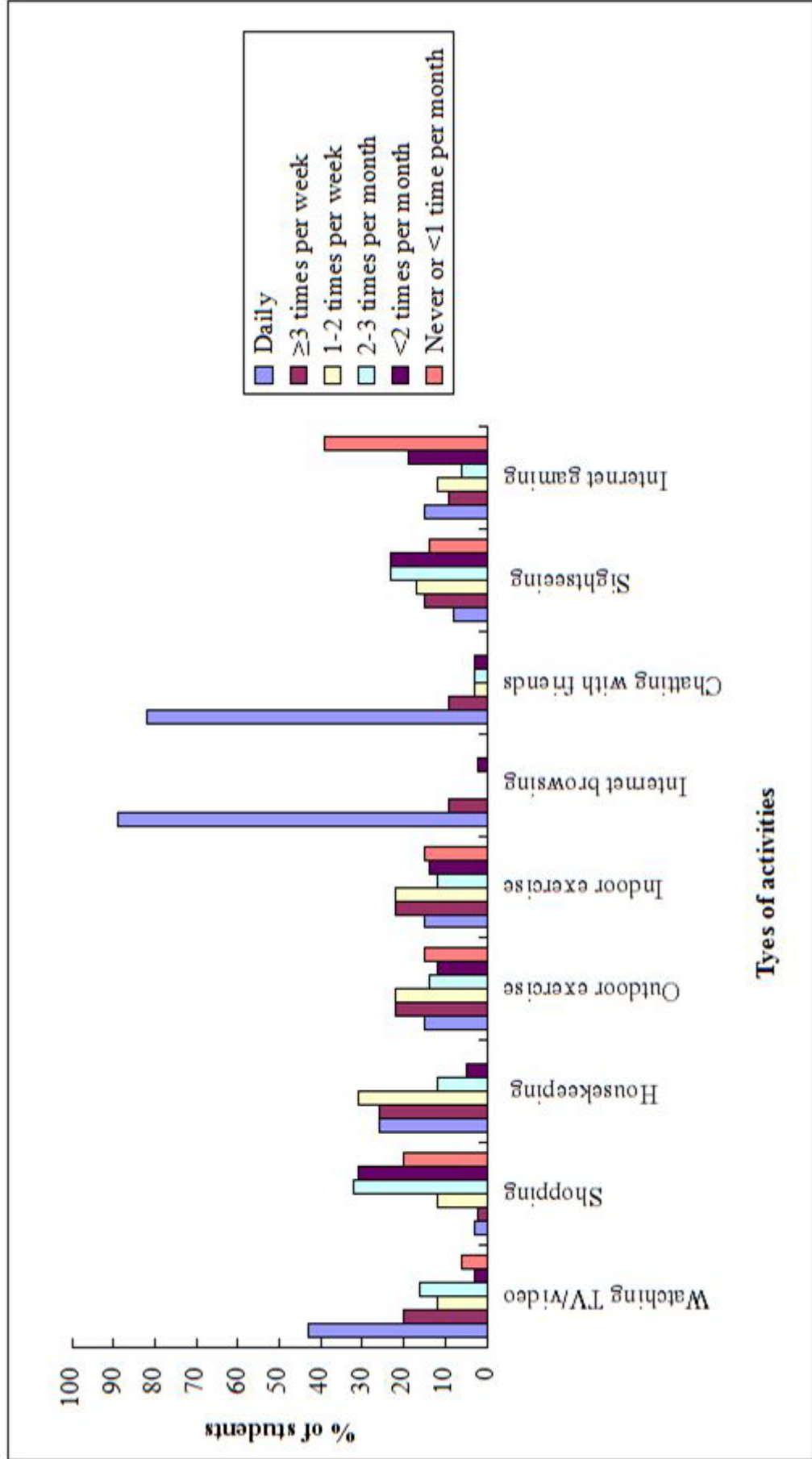
Students' Physical Activities Level

Healthy lifestyle is a lifestyle where energy balance is approximately kept constant. Energy intake (food consumption) is mandatory to be kept balanced with energy expenditure (physical activities). Figure 3 shows that the main daily activities of students are watching TV/video (42%), internet browsing (89%) and chatting with friends (82%). Meanwhile, 55 percent of them were practicing either indoor or outdoor exercise at least 1-2 times per week. Students practicing daily exercise were only about 15 percent. Types of outdoor exercise that are preferred by students are shown in Figure 4. Majority of students prefer jogging and brisk walking. This is because jogging and brisk walking are easy and can be

carried out at any time and at any place in campus. In addition, the results of this study indicate that about 77 percent of students spend at least 1-2 hours per week for outdoor exercise, with 20 percent of them spend more than 5 hours per week. Lifestyle with extraneous and extreme physical activity may place an individual at a reduced risk of non-communicable diseases. In addition, strong dose-response relationship was found between cardiorespiratory fitness and physical activity of an individual. Individual with moderate/vigorously active physical stamina possesses high cardiorespiratory fitness (Cook et al. 2013; Eriksen et al. 2013).

According to Teh et al. (2014), approximately 65 percent of Malaysian adults were physically active (Figure 4). Malaysians are encouraged to practice as frequent as 2-3 times a week in physical activities that could increase flexibility, strength and endurance of the muscle. Besides, Malaysians are also urged to carry out moderate physical activity for at least 30 minutes continuously for 5-6 days per week (National Coordinating Committee on Food and Nutrition (NCCFN), 2010). Even though most of the students are practice a lot of sedentary activities (watching TV/video, internet browsing and chatting with friends), but their interest and awareness on the necessity of exercise enable them to stay healthy and active in campus. These students performed walking exercise when they go for their lectures and vice versa. A total of 45 percent of the students attend lectures by walking, and 31 percent of them taking campus bus as their main transportation. Even though walking is not frequently recognized as a form of exercise, but it was regarded as a simple and free activity that do not requires any particular skills. However, regular walking will bring benefit to the body physical health, especially among the elderly (Lee et al. 2007). Nevertheless, walking had been found as a form of exercise for patient suffers from chronic obstructive pulmonary diseases (Dreher et al. 2008). Thus, for those individual that do not have habitual exercise, regular walking will prevent them from practicing extreme sedentary lifestyle. Besides that, geographical factor such as presence of small hills around campus and structure of buildings in the campus are among the factors that prevent students in campus from undergoing extreme sedentary lifestyle. According to the statistical data from this study, 79 percent of them climb at least 5-9 times flights of stairs (at approximately 10 steps each time) each day. In comparison with walking, stairs climbing is regarded as a physically strenuous activity, where it requires about 8.6 times more energy expenditure than the resting state. In order to promote the level of physical activity in daily lifestyle, interventions to increased stair climbing at the expense

FIGURE 3. Frequency of activities that students of Ungku Omar's Residential College carried out, based on types of activities (Total subjects =100)

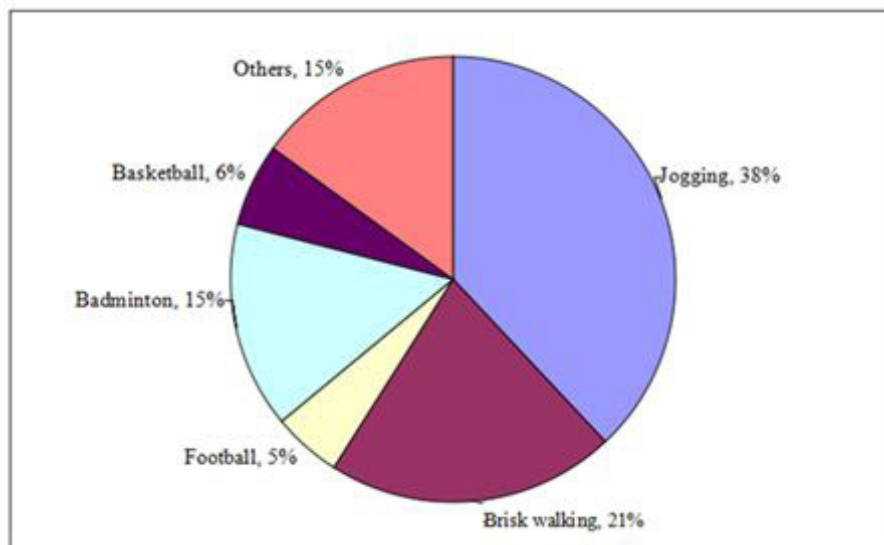


of the use of escalator have proved popular (Eves & Webb 2006).

This study indicates that, students in the Ungku Omar residential college had been practicing a healthy lifestyle with a satisfied level of diet intake and physical active level. The only aspect that needs to be improved in their healthy lifestyle is reducing overconsumption of high calories and fat food and increasing the serving

portion of fruits and vegetables in daily diet. We strongly believed that there is a correlation between these students' food intake with quality of food and services that provided by food outlets (cafeteria) especially in residential college. Therefore, further study on students' perceptions on food service by food outlets (cafeteria) in college and campus was conducted.

FIGURE 4. Outdoor physical exercises that frequently done by the students of Ungku Omar's residential college (Total subjects =100).



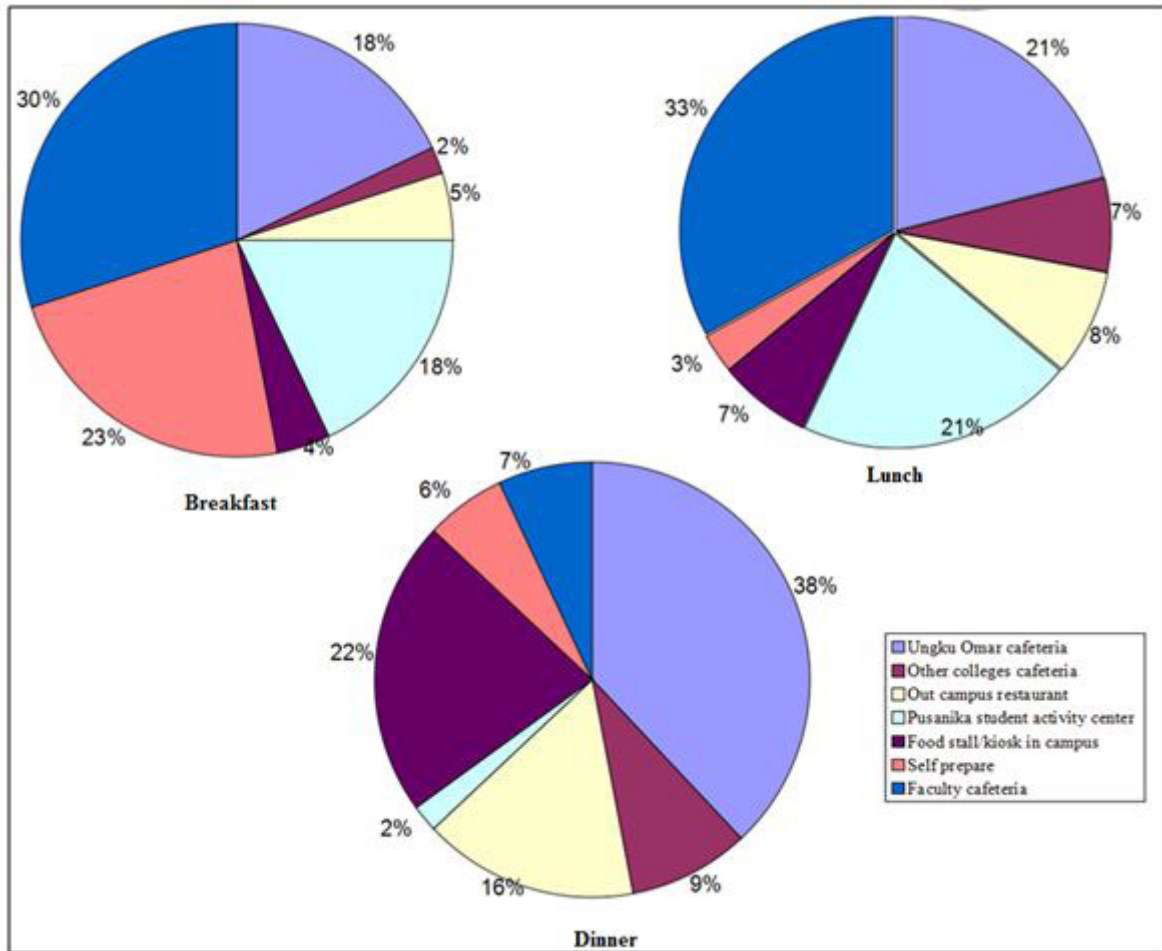
Students' Preferences and Their Perceptions on Food Service Providers

Figure 5 shows that the main food sources of these students are within campus zone. Cafeteria in faculty is the main food source for their breakfast and lunch, while Ungku Omar cafeteria is their main source for dinner. This finding is expected due to the ease of food accessibility in faculty during day time while most of the students will stay in their own faculty for attending lectures and group studies. Based on the opinions of 72 percent of the students, cafeterias in campus were providing balanced diet for the university students, but the quality and safety of food and services were still at unsatisfied level. About 57 percent of the students stated that they are satisfied with the quality and safety of current food and service but the overall score obtained from the evaluation was only 2.9 out of 5. Thus, more efforts should be taken to improve the safety and quality

of food and service provided presently.

According to opinions by students, food quality and variety are the two main factors that affect their selection of food and food sources. The diet preference ranking test, indicated that students' preferences descending from: Malay traditional cuisines, western foods, Chinese traditional cuisines, Indian traditional cuisines, organic/health food, fast food, Arabic food, Korean food and lastly Japanese food. These finding proved that the students' food preferences vary depending on their ethnic, where each race of students will have preference on their own ethnic's cuisine which is very much similar to the findings published by Boek et al. (2012). In that study, the authors found that race/ethnicity is a factor that played significant role in students' food choices. In addition, Boek et al. (2012) also suggested that nutrition consultant should address taste and convenience when attempting to influence the students' food choice.

FIGURE 5. Percentage of students in consuming their breakfast, lunch and dinner according to food service providers in campus and meal time



As for the diet ranking according to food categories, the students' preferences were found descending from: rice/grain/cereal products, meat products, fruits, dairy product, fish, seafood, vegetables, bakery products and lastly confectioneries. This outcome supports the findings in diet survey above (section 3.1). Thus, diet intake strongly influence the students' preferences on food selection. Therefore, appropriate efforts are needed in improving food quality and variety based on students' preference and nutritional value in order to encourage healthy diet intake among the students.

Ungku Omar Residential College's cafeteria is the main food source for the students' dinner, but the degree of satisfaction on food and service did not achieve the preferred satisfactory level yet. Among 12 criteria tested, the average scores of all criteria given by the students were below satisfied level (average score less than 4 out of 5). The 12 tested criteria include

food serving manner (3.6/5.0), cafeteria's staff attitude (3.5/5.0), food quality (3.0/5.0), food's appearance (3.0/5.0), food taste/aroma/smell (3.0/5.0), cafeteria's comfort (3.0/5.0), food price (3.0/5.0), food safety (2.9/5.0), cafeteria's cleanliness (2.9/5.0), food variety (2.7/5.0) and eating utensil's cleanliness (2.7/5.0). The students also expressed their opinions on their criteria priority during food selection. The priority given by the students on food selection is descending as below: food safety, food taste and aroma, cleanliness, food price, food variety, food appearance, nutritional value, ease of accessibility and last but not least food premise's comfort. As a suggestion, efforts on the improvement of service and quality of food provided by Ungku Omar Residential College's cafeteria can be carried out according to the student preferences as discussed above, and in balanced with the students' current diet status. By this, promoting a healthy community in campus will become a reality in no time.

CONCLUSION AND SUGGESTION

As a conclusion, the students of Ungku Omar's Residential College, Universiti Kebangsaan Malaysia lies within the category of healthy campus lifestyle, with a satisfied level of balanced diet intake and physical active level. In this survey, rice was found to be their main source of carbohydrate and together with a vast variety of protein. Serving size of vegetables and fruits intake needs to be increased. Calories and fat intake did not achieved the healthy level. Even though most of the students do practice sedentary activities, moderate weekly indoor and outdoor exercise kept them at a satisfied energy balanced campus lifestyle.

There are some limitations in this study. Therefore, further improvements and attention on students' dietary intake, especially vegetable, fruits, calories and fat intake is absolutely necessary. This can be achieved by improving the quality of food and service provided by the food outlets (cafeteria) in campus. The conducted study on students' diet preferences, their perceptions and suggestions on current food service by food outlets (cafeteria) in college and campus provided us a set of data collection which will be useful in future research in food quality and service improvement in college and campus.

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