Assessment of the Dietary Behavior of Selected Public High School Students in San Jose, Camarines Sur, Philippines

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ABSTRACT

This study aimed to assess the dietary behavior among high school students in 5 secondary public schools in San Jose, Camarines Sur, Philippines. A cross-sectional study design was used. 178 students were interviewed 44% of the respondents are male and 56% are female. Most students in this study eat breakfast and bring lunch at school but school seldom gives them food for breakfast and lunch. Their pack lunch unusually contained vegetables and less food with high fat content. Students drink water 2-3 times daily, 1 time eat fruit or drink fruit juice but sometimes they don't drink milk or eat food containing milk. Majority of the students eat food with less salt. However, it is advised that teachers should still encourage their students to drink more water every day. Furthermore, Teachers should make an effort to encourage the students to drink fruit juice and eat vegetables and eat low-salt food and more fresh vegetables to reduce sodium intake for healthier blood pressure. The students should also be encouraged to plant vegetables at home to minimize expenses in buying.

KEYWORDS – assessment Dietary behavior, High School Students

1. INTRODUCTION

Non-communicable diseases (NCDs) are the leading cause of death globally, killing more people each year than all other causes of death combined (WHO 2010a) [1]. Available data demonstrates that nearly 80% of NCD deaths occur in low and middle-income countries (WHO 2010a; Abegunde et al 2007) [2], of which Philippines is not an exception as a result of economic development that transitioned from traditional foods to affordable ultra-processed food (UPF) products (Monteiro & Cannon, 2012) [3] and decreased physical activity and sedentary lifestyles (WHO 2010; Hancock et al. 2011) [4,5]. The number of Ultra Processed Food products has been dominating the global food systems and have contributed significantly to the present dietary changes and food consumption habits of young children (Monteiro et al., 2011; Arcan et al., 2013) [6,7]. The drivers for the proliferation of UPF in LMICs include: globalization, urbanization, income growth, trade liberalization, and foreign direct investments (GLOPAN 2016) [8].

These foods are supplied by the food industry and highly accessible and affordable in the market and even abundant which often makes it difficult to plan a nutrition diet. 80% of our population consumes only a few servings of vegetables and fruits each day. And when people choose to eat high fiber foods such as vegetables, they most often choose potatoes, usually prepared as French fries. People live on those choices and prefer to eat foods that offer various constituents to the eater, making development of chronic diseases more likely. There is evidence to suggest that, though much has been done in managing communicable diseases in the Philippines, little has been done to address the issue of the escalating non-communicable diseases in the country. Majority of NCD occurrences are preventable (WHO 2010a)[9]. In 2008, WHO reported that of the 57 million deaths that occurred globally, 36 million, approximately 63%, were due to cardiovascular diseases, cancers, diabetes, and chronic lung diseases, all of which are classified as non-communicable diseases (WHO 2010a). Almost half of all deaths in Asia are now attributable to NCDs, accounting for 47% of the global burden of disease. Projections by WHO 2010a demonstrate that by 2030 NCD related deaths in Asia will be greater than those of communicable diseases, maternal, perinatal, and nutritional diseases combined. The prevalence of overweight and obese children aged 10–19 years old in the Philippines has increased by 3.4% after a decade. It is now 8.3% (DOST–FNRI 2013) [10] from 4.9% (DOST–FNRI 2003) [11].

The Philippines is experiencing rapid nutrition transition found to be associated with increased rates of non-communicable diseases (NCDs) attributed to risk behaviours such as tobacco use, unhealthy diet, insufficient physical activity and the harmful use of alcohol. NCDs have not spared the young people, not only urban but as well as rural residents. Consumption of unhealthy diet that are rich in sugar, fats, and sodium from UPF products and inadequate consumption of leafy vegetable and whole grain cereals coupled with sedentary lifestyle have led to an upward surge in overweight and obesity among school children and studies have documented these as risk factors for NCDs (Popkin et al. 2012, DOST–FNRI 2013) [12,10].

Partido areas in Camarines Sur is formed by a cluster of 10 municipalities-including San Jose and Lagonoy - all covered by the 4th Congressional District of the Province. The area is rich in natural resources, however, most of its about 100,000 households fall within the economic bracket called low-income earners. Aside from Food Security concerns, another challenge that the District is still facing is in terms of health equity and to address the problem of high Poverty Incidence not only in Partido areas but as well as the whole provinces of Camarines Sur. According to the Philippines Statistics Authority (PSA), Camarines Sur was classified as the 2nd among Bicol Provinces with the highest rate of Poverty next to Masbate. In this connection, it is also important to understand the dietary behaviors, physical activity patterns as to health outcomes among secondary school children in lower income settings such as San Jose and Lagonoy, which could also be a basis for future economic problems of the municipalities.

2. METHODOLOGY

2.1 Study Area. High School students aged 13-19 yrs. old in Public Secondary Schools in the Municipality of San Jose, Camarines Sur. There are 5 Secondary public schools from San Jose.

2.2 The Respondent – The respondents is coming from the different Public Secondary Schools in the Municipality of San Jose, Camarines Sur. These are: Rangas National High School (RHNHS), San jose national High School (SJNHS), Vivencion Obias National Hisgh School (VONHS), Salogon High School (SHS) and Villafuerte Peña High School (VPHS) with number respondents of 36, 37, 35, 34 and 36 respectively and with a total of 178 respondents participated in survey and interview.

2.3 Process. A descriptive, cross sectional design was used for this study and a quantitative data collection technique. The ideal sample size for this study is 180 and was divided equally among the 5 schools. Therefore at least 36 students were interviewed in each Public Secondary School. 182/5=36. Random sampling was used in consideration of different grades, classes and gender. The students that were sampled from each school (36) were divided equally b/w different grades in that school then equally again b/w the numbers of classes given in a grade. The number of participants was also initially being divided equally b/w boys and girls as the equal representation of both sexes which is also essential for successful completion of this study, however, numbers of participants per grade, class, gender were affected by the unavailability of some students that represents the different grades and gender. Because of the short time available for completion of data collection and the study, all students who were available at the moment were randomly enrolled into the study. The survey was administered to High School students aged 13-19 yrs. old in 11 Public Secondary Schools in the Municipality of San Jose, Camarines Sur, Philippines. This study will involve collection of information through mass/group interviews by a use of questionnaire. Students were asked for consent to choose or not to participate in the study.

2.4. Statistics. The statistical tool that was used in the analysis and interpretation of data is descriptive statistics such as frequency distribution, percentage, mean, and mode weighted mean. Frequency count for Demographic characteristics was used to see differences that occur in gender, grade, age group as well as school. This was analysed against dietary behavior, physical activity and health status variables to see the possible differences and association in behaviors (diet and physical activity) as well as in the health status of high school students. Weighted mean was being used to assess the Knowledge, Attitude and Practice and interpreted on the same categorical scale.

2.5 Sources of Data. The target population of this study are High School students aged 13-19 yrs. old in Public Secondary Schools in the Municipality of San Jose, Camarines Sur. There are 5 Secondary public schools from San Jose.

2.6. Informed Consent. Letter of cooperation was being provided to secondary schools and students involved in the study. Written consent forms also needed for obtaining approval of students together with distributing the survey material. The written consent includes the purpose of the study, participant requirement, benefits and contact information for questions. They were also being informed that it would not be used for any purpose

other than this study. They have the right to choose whether they will participate in the study or not because participation should be voluntary. Personal information of the participants was kept confidential. Using a self-selected Identification number can be used for anonymity of the study.

3. RESULTS AND FINDINGS

3.1 Demographic Characteristics

This part presents the findings and analysis of the demographic characteristics of the respondents as shown in the study.

Table 1. Demographic Characteristics of Respondents in San Jose

Respondents	Frequency	Percent (%)
A. Gender		
Male	79	44
Female	99	56
Total	178	100
B. Grade	Frequency	Percent (%)
7	24	13.4
8	36	20.2
9	34	19
10	34	19
11	29	16.3
12	21	12
Total	178	100

Gender. As shown in Tables 1, 44% of the respondents are male and 56% are female. This results shows that there are more female population who were more accessible during the actual gathering of data.

3.2 Dietary Behaviors Eating Breakfast and Lunch

Table 1a. Dietary Behavior of Eating Breakfast and Lunch Prevalent Among High School Students from the Public Secondary Schools in San Jose and Lagonoy, Camarines Sur

	RHNHS		SJNHS		VOKNHS		FHS		VPHS		OWM	
Dietary behavior	WM	D	WM	D	WM	D	WM	D	WM	D	WM	D
How often do you eat breakfast?	4.08	MOT	4.12	MOT	4.51	A	4.00	MOT	4.53	A	4.25	MOT
How often is breakfast offered to you at school?	3.6	MOT	3.6	MOT	2.7	S	3.4	S	2.9	S	3.1	S
How often do you bring your lunch to school?	4.1	MOT	4.1	MOT	2.4	R	3.7	MOT	3.5	S	3.6	MOT
How often is lunch offered to you at school?	3.6	MOT	3.6	MOT	2.4	R	3.1	S	2.9	S	3	S

Legend: WM- Weighted Mean, D- Description OWM- Overall Weighted Mean, MOT-Most of the Time, S- Sometimes, R- Rarely, A- Always

High school students are considered as youth. The youth, defined by the United Nations as those between 15–24 yr of age, is at a critical stage characterized by a shift from adolescence to adulthood and from financial dependence to financial independence (Cordeiro et al. 2015) [12].

Johnson RK, (2000) and St-Onge MP, Keller KL, Heymsfield SB (2003) [13,14] Stated that dietary behaviors and practices observed in children and adolescents may have detrimental consequences on their health. The adverse health consequences that may result from excessive intake of soda and sweetened beverages; fast-food consumption; inadequate intakes of fresh fruits, vegetables, fiber rich foods, and dairy and other calcium-rich foods; reduced levels of physical activity; and increasing obesity rates indicate a need to revisit the diet and lifestyle characteristics of this age group. The consumption of breakfast is often recommended [15,16]. In this study high school students were asked about their behavior particular in eating breakfast and lunch Table 1 shows the findings. As shown in Table 1 The high school student most of the time eats breakfast and brings

lunch in the school with an overall weighted mean of 4.25 and 3.6 respectively. However, schools sometimes or seldom offer breakfast and lunch to the students. According to Tabunda et al (2016) [17] Since 1997, the government, through the Department of Education (DepED), Philippines has been conducting a School-Based Feeding Program (SBFP) since 1997 however this program is intended only for kindergarten to grade six pupils which high school students were not included. The Filipino youth, 15–24 yr old, are at a critical period characterized by a shift from adolescence to adulthood. While the youth make up about one-fifth of the population, they are often not a priority in program development such as in food, health, and nutrition (Javier, H.A., 2021) [18]. The youth was projected to be about 19.5% of the population in 2015. Thus, it is recommended to look into the nutritional status of high school students so that the government could allocate a budget for the improvement of the youth food health and nutrition.

Table 1b. Dietary Behavior of Eating Breakfast and Lunch Prevalent to Grade Level of High School Students from the Public Secondary Schools in San Jose and Lagonoy, Camarines Sur

Dietary behavior	G7		G8		G9		G10		G11		G12	
	WM	D	WM	D	WM	D	WM	D	WM	D	WM	D
How often do you eat breakfast?	4.5	A	4.4	MOT	4.2	A	4.2	MOT	4.4	MOT	3.5	MOT
How often is breakfast offered to you at school?	2.8	S	3.1	S	2.3	R	3.4	S	2.9	S	3.1	S
How often do you bring your lunch to school?	3.0	S	2.7	S	2.9	S	2.3	R	3.0	S	2.7	S
How often is lunch offered to you at school?	3.0	S	2.7	S	2.9	S	2.3	R	3.0	S	2.7	S

Legend: G- Grade Level, WM- Weighted Mean, D- Description OWM- Overall Weighted Mean, MOT-Most of the Time, S- Sometimes, R- Rarely, A- Always

Table 1b. Shows the dietary behavior of eating breakfast and lunch by high school students according to Grade level. As shown in Table 1b, all grade levels eat breakfast most of the time and sometimes bring lunch at school. Based on the interview, those home far away from the school usually bring lunch and students bring lunch during mid and final term examinations. On the other hand, schools seldom offered food to the students. Hence, student's food is at their own expense.

Table 1c. Dietary Behavior of Eating Breakfast and Lunch Prevalent to Male and Female of High School Students from the Public Secondary Schools in San Jose and Lagonoy, Camarines Sur

Dietary Behavior	MALE		FEMALE		OWM	
	WM	D	WM	D	WM	D
How often do you eat breakfast?	4.3	MOT	4.2	MOT	4.1	MOT
How often is breakfast offered to you at school?	3.1	S	3.2	S	3.1	S
How often do you bring your lunch to school?	3.4	S	3.7	S	3.5	S
How often is lunch offered to you at school?	2.8	S	3.2	S	3.0	S

Legend: WM- Weighted Mean, D- Description OWM- Overall Weighted Mean MOT-Most of the Time, S- Sometime

As shown in Table 1c both male and female often eat breakfast but sometimes brought lunch in school. They usually eat their lunch at home. Since high school students were not the priority of DepED in their feeding program, schools seldom offered food to the students.

3.3 Dietary Behaviors on the Reason of not Eating Breakfast and Lunch

Breakfast is the most important meal throughout the day. Some studies stated that breakfast consumption before going to school improves cognitive function which increases the memory retention of the students.
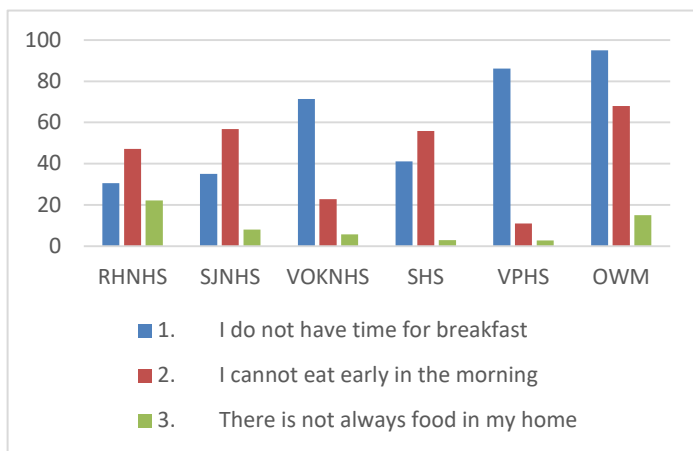
Figure 1. Reason of Not Eating Breakfast among High School Students by school
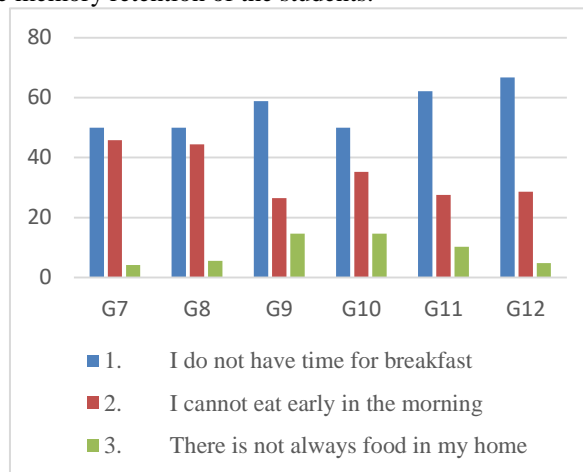

**Figure 2. Reason of Not Eating Breakfast among High School Students by Grade Level**

As shown in Figure 1 and 2. The common reason for high school students particularly in and RHNHS, SJNHS and SHS was they cannot eat early in the morning while VOKNHS and VPHS had no time for breakfast. As compared to grade level not having breakfast, no time for breakfast and cannot eat early in the morning for other reasons. Not having time for breakfast may be due to the fact that their residence is far from the school where they need to go to school early in the morning. This dietary behavior of the students may affect their health conditions. Several studies have shown that irregular dietary intake was associated with unfavorable cardiometabolic health markers, including obesity, type 2 DM, and dyslipidemia. [19,20] Meal habits are highly dependent on social, cultural, and psychological determinants, as people integrate meals with their everyday life routines. [21,22] Meal habits are a factor that influences body weight and metabolic status. [21,20]

Several National Health and Nutrition Examination Survey (NHANES) studies have shown that eating breakfast was associated with a lower body mass index (BMI) compared with skipping breakfast, among both adults and young children.[23,24] Several cross-sectional studies have reported that breakfast consumers tended to have a lower BMI than breakfast skippers, and that obese individuals were more likely to skip breakfast or to consume less food at breakfast.[22] Furthermore, breakfast consumption was inversely associated with the risk of a 5-kg weight gain among males in the United States.[23,25]

3.4 Dietary Behaviors on the of Lunch Pack
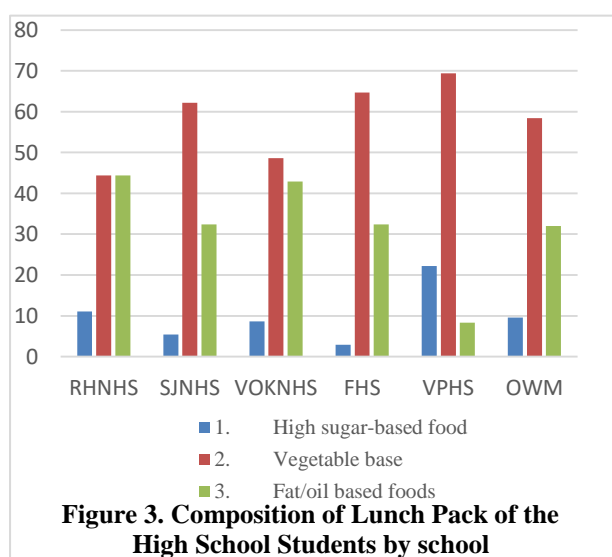
Figure 3. Composition of Lunch Pack of the High School Students by school
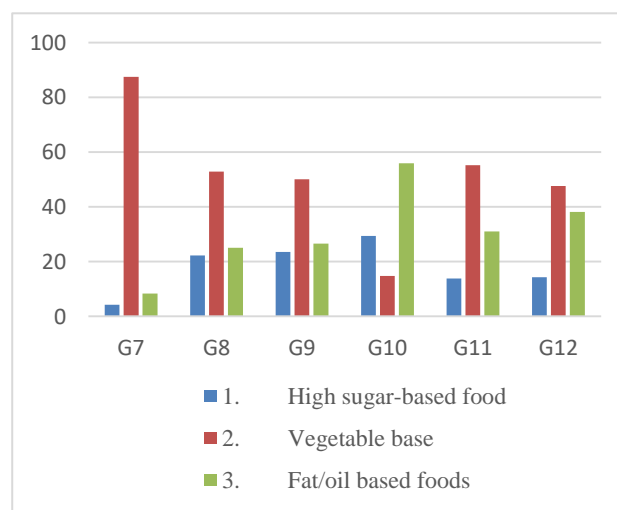

Figure 4. Composition of Lunch Pack of the High School Students by Grade Level

Fig. 3 and 4 shows the composition of lunch pack of the high school students by school and grade level respectively. Interestingly that majority of the pack lunch of the high school students containing vegetable base and fat based food and less high sugar- based food. Diet is central to health, and what children eat is an important influence on their health now and in the future. [26] Adequate nutrition is paramount for optimal growth and development as well as in reducing risks associated with both immediate and long-term health problems in school children. Nutritional and health status have influences on a child's learning ability and school performance. Access to a nutritious mid-day meal is crucial in maintaining good nutritional status as well as the overall wellbeing and cognitive development of a school child [27]. According to UNICEF [28], hungry children may have difficulty in concentrating or performing academic activities even when healthy and well-nourished.

3.5 Dietary Behaviors Drinking Water, Milk, Juice and Eating Fruits and Vegetables

The major way to survive on land is water. Our adult body consists of 75% of water and 55% in the infant stage; a human can only survive a few days without water [29]. It prevents dehydration. [29] Shifting food intake patterns mainly occurs in adolescents, many teenagers who use drinks intake like dangerous drinks like liquor and supplemented drinks, as well drinking less water, so the trend in the intake pattern causes kidney failure at a young age [30]. In this present study drinking behavior among high school students was identified.
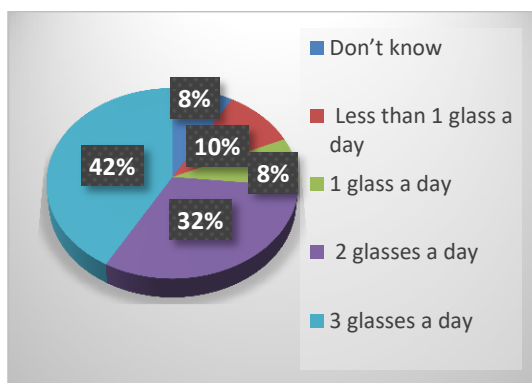

Figure 5. Number of glass of water drink daily by the High School Student
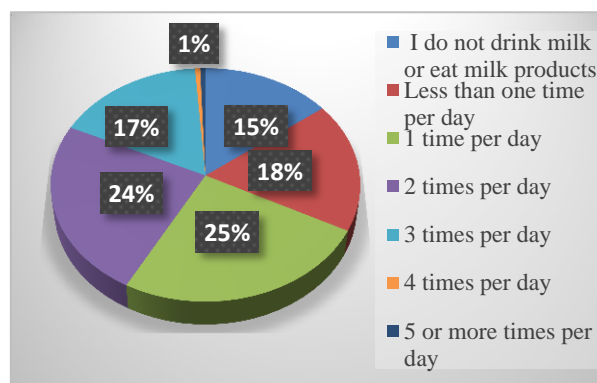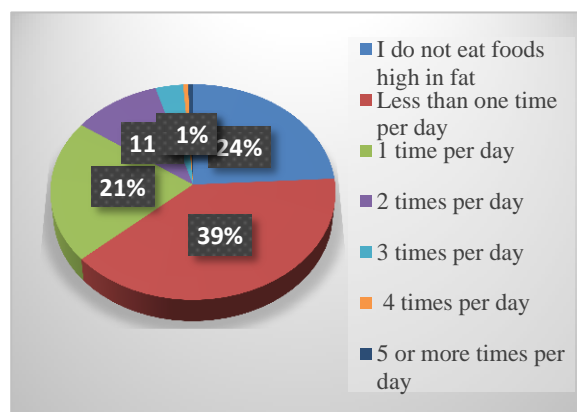

Figure 6. Number times per day that High School Student drink milk/eat milk products

As shown in Fig.5 there were 42% who responded that they drink 3 glasses a day per day how many times they water per day and 32% said that they drink water 2 times daily. This implies that students are aware of drinking more water as a rule of thumb a person should drink at least a glass of water per day. Hence, it is advised that teachers should still encourage their students to drink more water every day. The habit of drinking water is very important to maintain the physiological functions in terms of blood pressure, basal temperature, and pH because water is a supply machine of oxygen, glucose, sodium, and also potassium to the body [31,32]. On other hand, one time or less than one-time drink milk per day. This finding may be due to the price increase on milk. Previous studies indicated the importance of daily milk supplementation in improving the nutrients and dietary intake of children. [33-34] Another similar finding by Rose et al., 2018) [35] stated that dairy milk consumption among college students continues to decrease. Tipton (2016) [36] suggested that this circumstance is due to numerous beverage choices competing with milk. We believe that health and nutrition education outreach could be used to increase dairy milk consumption among college students. We hypothesize that promoting the health benefits of milk to college students could increase consumption.

Fruit and vegetables are rich sources of several biologically active components that contribute to general health and decrease the risk of chronic diseases such as cardiovascular disease [37]. They are the most ubiquitous source of phenolic compounds [38]. Polyphenols exert a variety of physiological effects in vitro including anti-oxidative, immunomodulatory and antimicrobial activities [39]. In this present study high school students were surveyed about of daily intake of fruit juice and vegetable as shown in Fig 5.
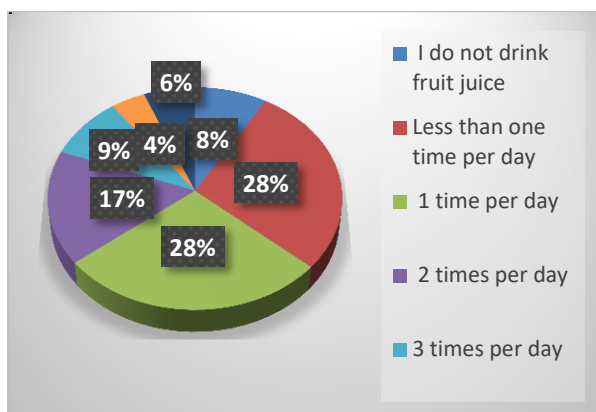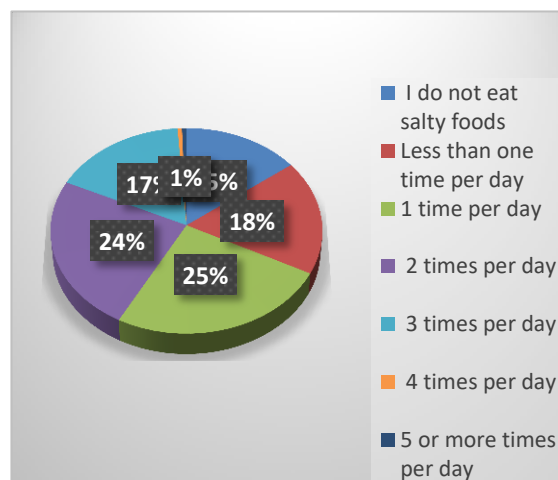
Figure 5. Number times per day that High School Student drink juice/eat fruit & vegetable

Figure 6. Number times per day that High School Student eat high fat food such as KFC

As shown in Fig. 5 that majority of the respondent only 1 time or less than one time per day they drink fruit juice. This result implies that students were not aware of the benefit of eating vegetables and drinking fruit juice. Teachers should make an effort to encourage the students to drink fruit juice and eat vegetables. The students should be encouraged to plant vegetables at home to minimize expenses in buying vegetables. On the other hand, that the respondent less than one time eating the food with high fats and 24% of the respondents do not eat foods high in fat (Fig. 6). Coelho, D.F. (2011) [40] stated that Dietary fat composition can interfere in the development of obesity due to the specific roles of some fatty acids that have different metabolic activities, which can alter both fat oxidation and deposition rates, resulting in changes in body weight and/or composition. Interestingly this study shows that students do not eat more food with high content of fat.

Sodium or salt is rarely depleted in the body pool but excess sodium intake could raise blood pressure for those who are salt-sensitive. [41,42] Some studies showed that the combination of environmental factors and genetic factors accounts for the pathology of hypertension [43], salt intake has been reported as the most important environmental factor of blood pressure [44]. Excessive salt intake and accumulation in the kidney can increase plasma volume and lead to high blood pressure. Recent intervention studies reported that lower dietary sodium intake decreased cardiovascular problems [45]. In this study it shows that the majority do not eat salty food. 24% to 25% among high school students eat 1- 2 times salty food per day respectively. As to this result, it is recommended eating low-salt food and more fresh vegetables to reduce sodium intake for healthier blood pressure.

Figure 7. Number times per day that High School Student eat salty food

4. CONCLUSION

In this study 44% of the respondents are male and 56% are female. Most students in this study eat breakfast and bring lunch at school but school seldom give them food for breakfast and lunch. Their pack lunch unusually containing vegetables and less food with high fat content. Students drink water 2-3 times daily, 1 time eat fruit or drink fruit juice but sometime they don't drink milk or eat food containing milk. Majority of the students eat food with less salt. However, it is advised that teachers should still encourage their students to drink more water every day. Furthermore, Teachers should make an effort to encourage the students to drink fruit juice and eat vegetables and eating low-salt food and more fresh vegetables to reduce sodium intake for healthier blood pressure. The students should also be encouraged to plant vegetables at home to minimize expenses in buying

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