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Fat Consumption among School Teachers in Selected Private Schools of Barangay Don Jose, Santa Rosa, Laguna, Philippines

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Abstract

The prevalence of non-communicable diseases (NCD) has been rampant on a world stage. Southeast Asia is among the top regions in the world affected by NCDs. Low- to middle-income countries in the region have been undergoing a nutrition transition due to rapid urbanization which affects the prevalence of NCDs and among the countries affected is the Philippines. Santa Rosa, Laguna is a city known for its fast-growing economy and it has also been an area affected by the increasing rate of mortality due to NCDs. Dietary habits is one modifiable risk factor in developing NCDs and can be affected by the adequacy of dietary fat consumed. This study aimed to identify sources of dietary fat among school teachers in Santa Rosa, Laguna through the use of food frequency questionnaires. The dietary fat consumed by the respondents was evaluated based on the World Health Organization (WHO) and Department of Health (DOH) recommendations of consumption of dietary fat. 39% of the respondents had an adequate dietary fat intake alongside a normal nutritional status while 16% of the respondents were overweight with an over-adequate dietary fat consumption. The identified commonly consumed food items overall were chicken eggs, chicken meat, lean fishes, and baked goods. These results were consistent with the results of the food consumption survey in 2013 conducted by the Food and Nutrition Research Institute of the Department of Science and Technology (FNRI-DOST).

Keywords: *Fat Consumption; Dietary Fat; Fat Evaluation*

Introduction

Non-communicable diseases (NCDs) have consistently been the leading cause of death worldwide. In the Global Burden of Disease Report of 2004 prepared by the World Health Organization (WHO) [1], NCDs constituted 57.9% of the total deaths of males and 61.5% of deaths of females worldwide. Among the top causes of death under NCDs are cardiovascular diseases (CVDs) and chronic obstructive pulmonary diseases (COPDs). In the same report, CVDs came out to be the leading cause of death worldwide accounting for 31.5% of deaths of females and 26.8% of deaths of males worldwide. At the very top of the leading causes of deaths in 2004 is Ischemic Heart Disease, which is a specific type of CVD falling under Coronary Artery Disease (CAD). This specific disease claimed 7.2 million lives that year.

In the 2016 report of top 10 global causes of deaths by WHO, Ischemic Heart Disease continued to rank first with an increased casualty of 9.2 million. The leading causes of death in 2030 is projected to be ischemic heart disease, stroke, and COPD.

Southeast Asia is among the top affected areas by NCDs, ranking third after Europe and Africa. Though reports in 2004 showed that leading causes of death in low to middle income countries that constitute southeast Asia tend to be more on lower respiratory diseases,

the absolute total of NCDs in the region outweigh the leading cause. However, trends in recent years show that mortality rates NCDs like CVDs and Diabetes Mellitus have since surpassed that of lower respiratory diseases in lieu of factors such as development. In more recent reports, NCDs in the southeast Asian region claim an estimated 8.5 million lives each year. One third of which affect people within the age range of 15 - 59 years old which greatly affect the economic productivity of the area.

These trends seem to reflect in a country such as the Philippine Republic which is a developing country in itself [2]. Its Department of Health has stated that there are six leading causes of death in the Philippines. Of these six, all are NCDs and four are classified as major NCDs, namely: diseases of the heart and vascular system, diseases of the respiratory system such as COPD, malignant neoplasms and cancers, and Diabetes Mellitus. In 2016 records of the Philippine Statistics Authority (PSA), the highest percent distribution of death occurred in Region IV-A (CALABARZON) with 14.2% followed by the National Capital Region (NCR) with 13.2%.

Santa Rosa City is a first-class city proper located in the province of Laguna, a part of Region IV-A [3]. It is approximately 40 kilometers south of Manila, the country's capital and is referred to as the "Lion City of the South" which symbolically likens its vibrant and booming economy to the aggressiveness of a lion. Santa Rosa has undergone continuous development in the past few decades and is known for having one of the fastest growing economies in the Philippines. In just seven years, it has managed to evolve from a fourth-class municipality (1986) to a first-class town (1993) and was officially converted and recognized as a city in 2004.

The development of industries and infrastructure of Santa Rosa City brought in a tenfold of increase in its population. According to a 2015 Philippine census, Santa Rosa City is home to 353,767 people with a land area of 54.13 square kilometers. The surge of development and influx of population is reflective of characteristics that an area undergoing a "nutrition transition" possesses. This rapid transition stage due to development places Santa Rosa on a main stage for a burden of NCDs. CVDs, Diabetes, and COPD have been a consistent part of the ten leading causes of mortality in the city in the years 2012 - 2014. The occurrence of these cases in the health, nutrition, and sanitation profile of the city has also been increasing through the years.

The Philippines is a developing country currently undergoing a phenomenon called a 'nutrition transition' where in dietary practices and lifestyle behavior are affected by urbanization. In this transition, there is an increased consumption of refined sugars, dietary fat, and high calorie non-nutrient dense food items. This is accompanied by sedentary lifestyle behavior due to market demands of convenient and readily-available food from the growing middle- and working-class citizen. There is a need to study the fat consumption among adults in to provide additional knowledge for the formulation of interventions by characterizing the fat consumptions of individuals in the area. This is due to the prevalence of NCDs being linked to development and modifiable behavioral risks such as poor diet quality. Aside from that, trends in food consumption indicate an increase in fat and oil intake of Filipinos through the years. Additionally, data shows that the highest number of deaths occur in region IV-A (CALABARZON) and that 1/3 of deaths due to NCDs in southeast Asia occur prematurely within the age range of 15 - 59 years. There have been little to no studies that have characterized the fat consumption of Filipinos. This study would allow for additional information on the subject. The study aimed to assess the nutritional status and consumption of dietary fat among school teachers in selected private schools of Barangay Don Jose, Santa Rosa, Laguna.

Materials and Methods

Sampling procedure

Purposive sampling among school teachers in selected private schools of Barangay Don Jose, Santa Rosa, Laguna was conducted. Teachers whose age ranged from 20 to 59 years were selected as participants in the study. A total of 80 school teachers participated out of the 88 eligible participants.

A formal letter of invitation to participate in the study was addressed to the principals and directors of the schools. Schools who responded positively were included in the study. Participants were still made to sign an informed consent form to formally participate in the study.

Survey form

The survey form was divided into five parts, namely: consent form, profile of respondent, anthropometric information, general survey on fat consumption practices, and the food frequency questionnaire.

The first part of the survey which detailed the respondent's profile comprised of the respondent's name (optional), sex, age, date of birth, highest educational attainment, income, marital status, and religion. The anthropometric section included areas to provide height, weight, waist, and hip measurements to assess the nutritional status of the participant. The general survey on fat consumption comprised of questions pertaining to the behavior of fat consumption that may help validate the formulated FFQ. The FFQ listed food items with fat as one of the main constituents in the Food Exchange Lists (FEL). It was designed to be semi-qualitative to better quantify the intake of fat of the participant. It was also formulated to reflect the dietary fat consumption of an individual within a one-month consumption range. The formulated FFQ listed 154 food items.

Anthropometric assessment

Anthropometric measurements such as height, weight, waist circumference, and hip circumference were obtained through existing physical records of the participants. When no records were available, the researcher made use of existing clinic facilities in the school to obtain anthropometric measurement. When inadequate facilities with non-standard equipment were the only resources available, the researcher made use of a microtoise to obtain the height, a beam balance to obtain the weight, and measuring tape to obtain the waist and hip circumference.

The nutritional status of individuals will be based on the individual's computed Body Mass Index (BMI) computed for through the standard formula below. WHO cut-off points indicated in table 1 was used to assess the nutritional status of the respondents. Aside from that, the waist-to-hip ratio of the respondents were also assessed to evaluate risk of CVDs due to body fat distribution.

$$BMI = \frac{weight(kg)}{height(m^2)}$$

Waist-to-hip ratio was also assessed among the individuals to evaluate their risk for comorbidity and the distribution of visceral fat in the body which may be used as an indicator to determine the risk for CVDs.

BMI Cut-off	Classification
< 18.5	Underweight
18.5 - 24.9	Normal
25.0 - 29.9	Overweight
30.0 - 34.9	Obese Class I
35.0 - 39.9	Obese Class II
> 40.0	Obese Class III

Table 1: *BMI Classifications according to WHO cut-off points.*

Food frequency questionnaire

The Food Exchange Lists for Meal Planning (FEL) was used in order to formulate the FFQ. All food and beverages with a substantial amount of dietary fat was included in the FFQ. Exchange lists included in the FFQ were milk, meat, fat, and combination food. Alcoholic beverages were not included in the formulation of the FFQ as a separate FFQ would need to be provided to assess fat from alcohol consumption (Gibson, 1990). The formulation of the FFQ was design to reflect the typical intake of the respondent in a period of a month

however the evaluation of dietary fat was computed for on a daily basis with the use of the FEL as a basis. One limitation in formulating the FFQ was that the food items listed were taken from the FEL which only provides a limited number of food items to select from. The formulated FFQ included 152 food items.

Assessment of dietary intake

The 2015 Philippine Dietary Reference Index (PDRI) formulated by FNRI-DOST was used as the basis of the Total Energy Requirement (TER) of the respondents depending on their age under the assumption that they were all healthy individuals [4]. The evaluation of the grams of dietary fat per day was based on the 15 - 30% Acceptable Macronutrient Distribution Range of adults in the PDRI as well as the dietary recommendations adopted by DOH from WHO on consuming not more than 30% energy-adjusted fat on a daily basis.

Results and Discussions

Respondents profile

Of the 80 respondents, majority (61%) were female. The respondents ages ranged from 20 to 59 years. Majority of the respondents (63%) were under the age bracket of 20 to 29 years followed by those aged 30 to 39 years (23%). The age range of 50 to 59 years had the least number of participants amounting to only 5% of the respondents. With regards to educational attainment, majority of the respondents were college graduates (64%), followed by individuals who finished certificate courses (21%), and then by those who completed their Masteral studies (15%). Majority of the respondents (63%) earn a monthly income within the range of Php 20,000 to 30,000. This can be seen in table 2 below.

Respondent Profile		Frequency n = 80	Distribution %
Sex	Male	31	39
	Female	49	61
Age	20 - 29	50	63
	30 - 39	18	23
	40 - 49	8	10
	50 - 59	4	5
Religion	Aglipay	1	1
	Baptist	1	1
	Born Again	3	4
	Christian	5	6
	None	9	11
	Roman Catholic	56	70
	SDA	5	6
Educational Attainment	Certificate Course	17	21
	College Graduate	51	64
	Masteral Studies	12	15
Income (n = 79)	(Php)		
	< 20,000	25	32
	20,000 - 30,000	50	63
	> 30,000	4	5

Table 2: *Summary of respondent's profile.*

Table 3 below depicts the distribution of nutritional status of the respondents. Majority of the respondents (55%) of the study had a normal nutritional status. The second highest prevalence were overweight individuals (26%), followed by underweight individuals (11%). Obese class I and obese class II was at 3% each.

Nutritional Status	Frequency n = 80	Distribution %
Underweight	9	11
Normal	44	55
Overweight	23	29
Obese Class I	2	3
Obese Class II	2	3
Total	80	100

Table 3: *Nutritional status of the respondents based on body mass index.*

Upon assessment of waist-to-hip ratio (WHR), majority of the respondents (55%) had a WHR above the recommended cut-off point (0.8 for females and 1.0 to males) which indicated that the respondents the distribution of central adiposity presented an increased risk for CVD.

Waist-to-Hip Ratio	Frequency (n = 80)	Distribution
Below Cut-Off	35	44
Above Cut-Off	45	56
Total	80	100

Table 4: *Distribution of risk to CVDs as indicated by WHR.*

Interestingly, observed overweight individuals in the respondents were almost equal from males and females. 15% of the total respondents were overweight females which was not far from the observed overweight male respondents which comprised 14% of the study population.

Sex	Female		Male	
	Frequency	%	Frequency	%
Nutritional Status				
Normal	28	35	16	20
Obese I	0	0	2	3
Obese II	2	3	0	0
Overweight	12	15	11	14
Underweight	7	9	2	3
Total	49	61	31	39

Table 5: *Distribution of nutritional status among male and female participants.*

However, female respondents had a higher percentage of WHR above the recommended cut-off point. 45% of the respondents were female with an increased risk to CVDs due to their central adiposity while 10% of male participants have an increased risk to CVDs from central adiposity. This data can be seen in table 6 below.

Waist-to-Hip Ratio	Below Cut-Off		Above Cut-Off	
	Frequency	%	Frequency	%
Sex				
Female	13	16	36	45
Male	23	29	8	10
Total	36	45	44	55

Table 6: *Distribution of risk to CVDs indicated by WHR among male and female participants.*

Body fat percentage is a contributing factor to high prevalence of macrovascular disorders. Studies show that women are have higher risk at developing CVDs. Aside from that, studies also support that women are more susceptible to being overweight and obese as opposed to men. The body fat distribution of women is genetically engineered to concentrate in the hips and lower abdomen due to their ability to bear children. Women tend to carry more body fat and have a higher percentage of required essential body fat than men for this reason. This explains a lower recommended cut-off regarding their waist-to-hip ratio. However, this puts them innately at higher risk of developing CVDs and other NCDs [5].

Using BMI as an indicator to risk of CVDs has been repeatedly cited in references as a valid tool to use. However, other indicators can be used such as waist-to-hip ratios. In a study conducted by Czernichow., *et. al.* [6], the validity between different indicators of body fat percentage in relation to risk of CVDs was examined. It was found that all indicators such as BMI, waist circumference, and waist-to-hip ratio were all valid. However, there was no established discrimination against the capabilities of these models to indicate risk better. Each indicator carried the same weight in evaluating risk. The difference being WHR and waist circumference had the additional ability to determine abnormal body fat adiposity. Nonetheless, BMI still has an advantage compared to the rest of the other methods due to its ability to characterize fat distribution in reference to an individual's height frame.

Waist-to-hip ratio in addition to BMI is a useful tool in assessing risk to CVDs because of the established relationship between abdominal obesity and CVDs. Central obesity has not only been linked to CVD risk but also to hyperinsulinemia, insulin resistance, diabetic dyslipidemia, hypertension, and other disorders and adverse symptoms. Age related trends were found regarding overweight and obese individuals. The prevalence of overweight individuals is high in an age group of 20 - 39 years in both men and women. The prevalence of obesity is high in an age group of 49 - 50 years [7].

Majority of overweight and obese individuals were located within the age range of 20 to 39 years. If only individuals aged 40 - 59 years old are considered, the prevalence of obesity within that range would be at 11%.

Nutritional Status	Normal		Obese I		Obese II		Overweight		Underweight	
(n=80)	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Age										
20-29	27	**34**	2	**3**			12	**15**	9	**11**
30-39	10	**13**			1	**1**	7	**9**		
40-49	6	**8**			1	**1**	1	**1**		
50-59	1	**1**					3	**4**		
TOTAL	44	**55**	2	**3**	2	**3**	23	**29**	9	**11**

Table 7: *Distribution of nutritional status among age groups.*

A cross-sectional study conducted Anniyappan, Kalidhas, and Aruna [7] examined the prevalence of overweight and obesity among age and genders. It was found in the study that there are trends among age groups when assessing their BMI. The prevalence of overweight individuals is high in an age group of 20-39 years in while a higher prevalence of obesity is present in an age group of 49 - 59 years.

Studies suggest that the prevalence of obesity in old age is increasing in trend due to the carry-over of overweight and obesity in younger days and established habits. Obesity in old age can be associated with a reduced quality of life [8].

Fat adequacy evaluation

Majority of the respondents (54%) consumed an adequate amount of fat within the acceptable macronutrient distribution range stated in the PDRI and was in compliance of the recommended dietary fat intake by WHO and DOH. Respondents who consumed more than the recommended grams of fat per day comprised 26% of the respondents and the remaining 20% were individuals who consumed an inadequate amount of fat per day. This data can be seen in table 8 below.

Fat Evaluation	Frequency (n = 80)	Distribution %
Inadequate	16	20
Adequate	43	54
Over adequate	21	26
Total	80	100

Table 8: *Fat adequacy evaluation of the respondents.*

Majority of the respondents (39%) with a normal nutritional status consumed an adequate amount of fat. 9% of respondents consumed an inadequate amount of fat yet still exhibited a normal nutritional status while 8% consumed an inadequate amount of fat and exhibited an underweight nutritional status. 16% of the respondents were both overweight with an over-adequate fat consumption per day.

Fat Evaluation	Adequate		Inadequate		Over adequate	
	Frequency	%	Frequency	%	Frequency	%
Normal	31	39	7	9	6	8
Obese I	1	1	1	1	0	0
Obese II	0	0	0	0	2	3
Overweight	8	10	2	3	13	16
Underweight	3	4	6	8	0	0
Total	43	54	16	20	21	26

Table 9: *Distribution of nutritional status of respondents against fat adequacy evaluation.*

A study conducted in 2011 showed a prevalence of CVDs such as hypertension, dyslipidemia, impaired glucose, insulin resistance, and increase blood lipid profiles among individuals with increased BMI and WHR. There is a noted rise in biochemical risk factors among individuals with increased BMI over the normal values [7]. Dietary habits established such as regularly over-eating fat-rich food affect increased risk for CVDs in terms of lipid profile. Dietary fat has been proved to have an effect on an individual's blood lipid profile in terms of cholesterol and triglycerides. The effect of dietary fat varies according to the type and amount consumed. More adverse effects on heart health are evident among individuals with increased consumption (DiNicolantonio and O'Keefe, 2018).

Out of 80 respondents, 41 of them (51%) reported to consume fried food items 1 - 2 times in a day and 31 (39%) consumed fried food items 3 - 4 times in a day. The preferred oil for cooking is Canola oil (preferred by 48% of respondents), followed by Palm oil (preferred by 33% of respondents). This can be seen in table 11. In terms of the method of cooking of snacks and viands, majority of the respondents reported to use frying (70% of respondents).

No.	Freq	%
1 - 2	41	51
3 - 4	31	39
5	4	5
6	4	5
Total	80	100

Table 10: *Frequency of fried food items consumed in a day.*

Oil type	Frequency	%
Canola	38	48
Palm	26	33
Olive	11	14
Corn	5	6
Total	80.00	100.00

Table 11: *Commonly used oil among the respondents.*

	Viand	Snack
Method of Cooking	Frequency	Frequency
Fried	63	56
Boiled	13	30
Baked	28	6
Steamed	5	8

Table 12: *Most frequent method of cooking viands and snacks.*

Canola oil is a specific form of vegetable oil. It has a high amount of monounsaturated fatty acid amounting to about 63%, polyunsaturated fatty acid (PUFA) of 28%, and saturated fatty acid (SFA) of about 7%. Since it has a high amount of monounsaturated fatty acid (MUFA), it is a generally good type of oil for people to use in terms of heart health. MUFAs are well know for their low risk of cardiovascular disease and is a common source of dietary fat in Mediterranean diets which are known for having good effects on heart heal and for minimizing the risk for CVDs (DiNicolantonio and O'Keefe, 2018).

Palm oil is composed of 50% SFA, 10% PFA, and 40% of MUFA. Its major constituent is SFA which has been an established culprit in the development of heart diseases due to its ability to raise the levels of lol-density lipoprotein cholesterol (LDL-C) in the body. LDL-C has been established and graded by various studies as an important risk factor for developing heart disease (DiNicolantonio and O'Keefe, 2018).

Through the use of an FFQ, the top five commonly consumed food items with dietary fat per exchange list was identified. The exchange lists identified in the study included Milk, Meat, Fat, and Combination exchange lists derived from the FEL. The combination exchange list consisted of food items that tended to have more than one major constituent of macronutrients in the food item.

Overall commonly consumed fat food items

According to the 2013 Food Consumption Survey (FCS) conducted by the Food and Nutrition Research Institute of the Department of Scient and Technology (FNRI-DOST), residents of urban areas are generally the top consumers in the market. Urban residents tend to have a higher intake of fat, oil, meat, poultry, eggs, and fruit than rural residents. A list of 20 commonly consumed food items in Filipino households was released. Among these top 20 consumed food are cooking oil, chicken eggs, pork meat, chicken, biscuits, and powdered milk.

The data in table 13 through table 16 summarizes the frequently consumed food items among all of the respondents according to their exchange lists. These tended to reflect the frequently consumed food items in the list provided by FNRI-DOST.

The top consumed food by the respondents on the milk exchange list showed that the respondents frequently consumed whole milk items such as evaporated milk, powdered milk, and fresh cow's milk. Aside from that, the second most consumed food item in the milk exchange list is powdered milk which reflected the data gathered by FNRI-DOST.

Milk Exchange List			
Type	**Food Item**	**Frequency**	**Ave. Consumption Pattern**
Whole	Evaporated Milk	52	Weekly
Whole	Powdered Milk	34	Weekly
Skim	Yoghurt	26	Weekly
Whole	Fresh Cow's Milk	18	Weekly
Skim	Buttermilk	18	Monthly

Table 13: *Top 5 consumed food items from the milk exchange list.*

The respondents of the study tended to commonly consume low fat meat exchanges. Chicken eggs and chicken meat are also among the top 20 most consumed food item in a Filipino household according to the FCS by FNRI. Aside from this, respondents tended to consume low fat meat exchanged like lean fish.

Meat exchange list			
Type	**Food Item**	**Frequency**	**Ave. Consumption Pattern**
Medium Fat	Chicken Egg	74	Daily
Low Fat	Chicken Breast	69	Weekly
Low Fat	Bangus	69	Weekly
Low Fat	Tilapia	64	Weekly
Low Fat	Galunggong	63	Weekly

Table 14: *Top 5 consumed food items from the meat exchange list.*

The most commonly consumed food item among all of the respondents is coconut cream. Respondents tended to use different cooking oils which explains a lower ranking of cooking oil on this list. Mayonnaise is the second most commonly consumed fat item followed by canola oil which is the typically used oil by the respondents. Butter and peanut butter are also part of the top commonly consumed food items on the fat exchange list.

Among the top consumed combination food items of the respondents reflected in the FCS are biscuits and instant noodles. The top consumed food by the respondents on the combination food exchange list are cookies. Among the food items on the list are also banana cue and cake. 55 out of 80 respondents commonly consume baked goods such as cookies and cake tend to be high sources of SFAs.

Fat Exchange List		
Food Item	**Frequency**	**Ave. Consumption Pattern**
Coconut Cream	36	Monthly
Mayonnaise	35	Weekly
Canola Oil	34	Daily
Butter	32	Weekly
Peanut Butter	32	Weekly

Table 15: *Top 5 consumed food items from the fat exchange list.*

Combination List		
Food Item	**Frequency**	**Ave. Consumption Pattern**
Cookies	55	Daily
Crackers/Biscuits	52	Weekly
Instant Noodles	50	Weekly
Banana Cue	49	Weekly
Cake	49	Monthly

Table 16: *Top 5 consumed food items from the combination exchange list.*

Female respondents of the study commonly consumed more whole milk food items as compared to men. Only 28 out of 39 female respondents reported to commonly consume milk.

Milk Exchange List			
Type	**Food Item**	**Frequency**	**Ave. Consumption Pattern**
Whole	Evaporated Milk	28	Daily
Whole	Powdered Milk	20	Weekly
Skim	Yoghurt	15	Monthly
Whole	Fresh Cow's Milk	9	Weekly
Whole	Carabao	7	Monthly

Table 17: *Top 5 consumed food items of female respondents from the milk exchange list.*

Women in the study tended to consume more low-fat meat items than. The only difference between their commonly consumed products wads than women in the study commonly consume lean chicken meat as compared to the men.

Meat Exchange List			
Type	**Food Item**	**Frequency**	**Ave. Consumption Pattern**
Medium Fat	Chicken Egg	43	Daily
Low Fat	Bangus	42	Weekly
Low Fat	Tilapia	38	Weekly
Low Fat	Galunggong	37	Weekly
Low Fat	Chicken Breast	33	Weekly

Table 18: *Top 5 consumed food items of female respondents from the meat exchange list.*

Female respondents of the studies tended to consume healthier fat exchange options as compared to male respondents. A higher percentage of women reported to use canola oil as their preferred fat for cooking which is more beneficial due to its components of fat as discussed earlier.

Fat Exchange List		
Food Item	**Frequency**	**Ave. Consumption Pattern**
Coconut Cream	22	Monthly
Canola Oil	21	Daily
Butter	21	Weekly
Peanut Butter	20	Weekly
Vegetable Oil	20	Weekly

Table 19: *Top 5 consumed food items of female respondents from the fat exchange list.*

The most commonly consumed food item for female respondents in the combination exchange list are banana cue with a frequency of 22 out of 39 women. This is followed by cookies, crackers and biscuits, cake, and instant noodles.

Combination List		
Food Item	**Frequency**	**Ave. Consumption Pattern**
Banana Cue	22	Weekly
Cookies	21	Daily
Cracker/Biscuit	20	Weekly
Cake	19	Monthly
Instant Noodles	19	Weekly

Table 20: *Top 5 consumed food items of female respondents from the combination exchange list.*

The average patter of consumption of milk observed among male respondents tended to be more frequent than that of female respondents. Aside from that, male respondents of the study tend to commonly consume more low-fat milk compared to the female respondents. They essentially have the same top commonly consumed food for the milk exchange list except for the 5th food item which is low-fat milk.

Milk Exchange List			
Type	**Food Item**	**Frequency**	**Ave. Consumption Pattern**
Whole	Evaporated Milk	24	Weekly
Whole	Powdered Milk	14	Weekly
Skim	Yoghurt	10	Weekly
Whole	Fresh Cow's Milk	9	Weekly
Low Fat	Low Fat Milk	7	Monthly

Table 21: *Top 5 consumed food items of male respondents from the milk exchange list.*

Medium-fat meat is more commonly consumed among male respondents. The top 5 commonly consumed food among male respondents are similar to that of females except for chicken meat. The males in the study tended to consume chicken wings more than chicken breast which is a medium-fat type of meat as opposed to that of a low-fat type of meat commonly consumed by the females.

Meat Exchange List			
Type	**Food Item**	**Frequency**	**Ave. Consumption Pattern**
Medium Fat	Chicken Egg	31	Daily
Low Fat	Bangus	27	Weekly
Low Fat	Tilapia	26	Weekly
Low Fat	Galunggong	26	Weekly
Medium Fat	Chicken Wings	22	Weekly

Table 22: *Top 5 consumed food items of male respondents from the meat exchange list.*

Male respondents tended to consume fat exchanges higher in SFAs such as coconut cream. They also tended to consume a higher amount of TFAs than female respondents. WHO's dietary recommendations on consuming TFAs are as close to minimal as possible if it is not an option to eliminate it from the diet. Commonly consumed food item from the fat exchange list in males are mayonnaise. The cooking oil that they tend to use is either canola or palm oil which differs from that of women who tend to use canola and vegetable oil.

Fat Exchange List		
Food Item	**Frequency**	**Ave. Consumption Pattern**
Mayonnaise	16	Monthly
Coconut Cream	14	Monthly
Canola Oil	13	Daily
Palm Oil	13	Daily
Margarine	12	Weekly

Table 23: *Top 5 consumed food items of male respondents from the fat exchange list.*

Among the top commonly consumed combination food for men is Pork Liempo which is a combination of two fat exchanges and one high fat exchange. This is reflective of the FCS results of pork being in the top consumed food items of Filipino Households.

Combination List		
Food Item	**Frequency**	**Ave. Consumption Pattern**
Cookies	22	Daily
Instant Noodles	21	Weekly
Cracker/Biscuit	20	Weekly
Cake	19	Monthly
Pork Liempo	19	Weekly

Table 24: *Top 5 consumed food items of male respondents from the fat exchange list.*

Outliers of grams of fat intake per day

By using box-and-whiskers plot, outliers were determined beyond the interquartile range (IQR). Four outliers were found and 3 out of 4 of them are overweight. The female outlier is of normal nutritional status and tends to consume over 300 grams of fat per day. This exceeds the computed total energy requirement (TER) computed for the respondent. This indicated that her caloric requirement is already met by her grams of fat alone. A possible explanation would be that this certain respondent may be following a special diet regimen

such as a ketogenic diet. This cannot be concluded to with certainty as the researcher failed to have respondents indicate whether they were following a certain type of diet. The other respondents whose grams of fat fell outside the IQR more likely tend to consume an over-adequate amount of fat unintentionally as no pattern was found in their daily consumption.

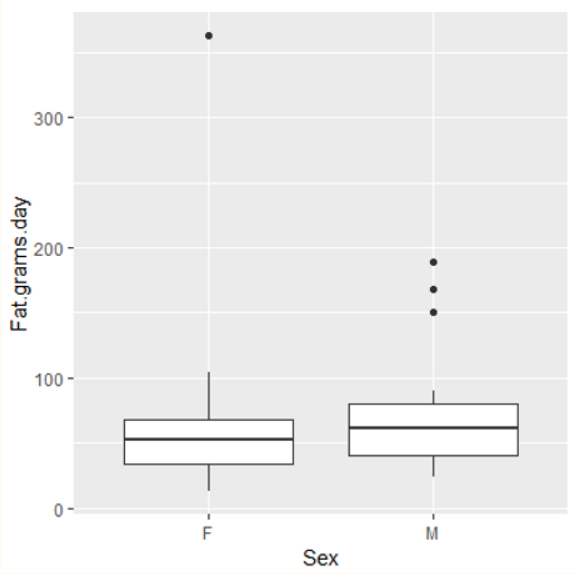

Figure 1: *Outliers of grams of fat per day.*

There have been no long-term studies to identify the health risks of the adherence to a non-medically prescribed diet of high fat consumption. However, it is ill-advised to do so as possible risks blood lipid disorders may factor in [9-36].

Summary and Conclusions

Among the 80 respondents, 55% had a normal nutritional status while 29% of the respondents were overweight, followed by 11% that were underweight and 3% were both obese class I and obese class II. Majority of the overweight, obese class II, and underweight respondents were female. Upon assessment of the WHR, 45% of females in the study have increased risk to CVDs due to the distribution of fat as central adiposity. The highest prevalence of overweight individuals falls under the age range of 20 - 39 years old.

54% of the respondents had adequate dietary fat intake upon assessment while 26% had over adequate dietary fat consumption and 20% had inadequate dietary fat consumption. 39% of the respondents had a normal nutritional status with adequate dietary intake. Majority (16%) of over adequate fat consumption occurred among individuals with an overweight nutritional status.

Majority of the respondents of the study (51%) reported to consume about only 1 - 2 fried food items per day. The commonly used cooking oil among the respondents is canola oil which is largely constituted of MUFAs and have a relationship with good heart health. however, the second most reported use of cooking oil is palm oil which is majorly constituted by SFAs and are known to have negative impacts on an individual's blood lipid profile. The most frequently reported method of cooking viands and snacks are through frying.

Through the use of an FFQ, commonly consumed food items with dietary fat by the respondents was identified. Among the top are chicken eggs, chicken meat, lean fish like Bangus, tilapia, and Galunggong and combination food such as cookies and biscuits. The source of dietary fat commonly tends to be in whole food rather than in concentrated fats and oils. Some of the identified commonly consumed fast food items reflect the results of FNRI-DOST's FCS of 2013.

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