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Food Preferences and Dietary Intakes of Filipino Adolescents in Metro Manila, The Philippines

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ABSTRACT

Introduction: This study examined differences in food preferences and dietary intake among male and female Filipino adolescents of different nutritional status as measured by body mass index (BMI). **Methods:** One hundred and twenty 13-17-year olds from various schools and communities in Metro Manila, The Philippines were selected through quota sampling with BMI, sex and age as criteria. Data on mean dietary intake and food preference were collected using pretested instruments - a 3-day food record and a food preference questionnaire, respectively. Resulting values were analysed using one-way ANOVA, Bonferroni test and Pearson's product-moment and Spearman's correlation using SAS Enterprise Guide version 2. **Results:** Preference for cereals prepared with added sugar or fat (ρ=0.21, p= .0240), and low fat meat (ρ=0.18, p=0.420) were found to be positively correlated with BMI, while preference for fruits that are high in vitamin A (ρ= -0.18, p=0.430) was negatively correlated with the said variable. Overweight respondents gave lower and significantly different preference scores to donut (p=.02780), banana cue (p=.0489) and mayonnaise (p=.0291). Respondents of different nutritional status also had statistically different intakes of fibre, calcium and phosphorus, corresponding with the positive correlation of fibre (ρ=0.25231, p=0.0054), calcium (ρ=0.2529, p=0.0134) and phosphorus (ρ=0.25887, p=0.0043) intake with BMI. With respect to sex, male respondents gave statistically higher preference for French fries (p=.0370), tofu (p=.0005), garlic (p=.0190) and mussels (p=.0023). Also, males have significantly higher intakes of energy and carbohydrate than female respondents. **Conclusion:** Results suggest that food preferences should be considered in the nutritional care management of malnourished adolescents.

Keywords: Adolescents, dietary intake, food preferences, The Philippines

INTRODUCTION

Adolescence is a period in one's life where physical and mental maturation takes place allowing one to gradually move from being a child to an adult as described by Spear (2004). These changes bring about a high demand for energy and nutrients as pointed out by Iglesias-Gutierrez *et al.* (2008) and Washi & Ageib (2010). In fact, according to the WHO (2005), it is in adolescence when one's requirement for nutrients is at its highest due to the rapid growth that is taking place; thus improper nutrition at this point may lead to present and future consequences on growth and health.

Neumark-Sztainer *et al.* (2003) explained that an adolescent is in search of identity

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and independence and this is expressed through exerting more control on what is eaten, and on where and when food is consumed, an observation consistent with the outcomes of investigations undertaken by da Veiga & Sichieri (2006) and Washi and Ageib (2010).

According to the National Statistics Coordination Board (2000), adolescents constitute almost a quarter of the Philippine population and as a group they are considered to hold the "key to the 21st century" as per WHO (2005), as the development of poorer countries depends on "increasing proportions of future adults who are educated, healthy and economically productive." Given this understanding, focusing on the health and nutritional status of the life stage dubbed as "last window of opportunity" is important in a developing country such as The Philippines.

The Food and Nutrition Research Institute (FNRI) survey in 2008 showed that malnutrition exists among Filipino adolescents. The said survey revealed that there are more underweight than overweight adolescents and trends show that the prevalence of overweight among adolescents has decreased from 4.8% in 2005 to 4.6% in 2008 according to the FNRI (2008). On the other hand, the FNRI also reported that prevalence of underweight among adolescents has increased significantly from 16% in 2005 to 17% in 2008. Overnutrition and undernutrition can have negative consequences for both the short and the long terms. For instance, the WHO (2005) stated that obesity can lead to conditions such as psycho-social problems and increased risk for lifestyle diseases while undernutrition may pose risks to adolescent pregnancy and may reduce work capacity.

Understanding the cause of malnutrition in adolescence is essential to help ensure the health of the future prime movers of the population. Dietary intake is known to be one of the factors which may explain nutritional status as discussed by Gibson (2005). Dietary intake, in turn, may be influenced by food preference as evidenced by the outcome of studies conducted by Neumark-Sztainer *et al.* (2003), and Weber Cullen, Watson, & Konarik (2009).

There appears to be limited published investigations on food preferences and dietary intake of adolescents conducted in the local setting in recent times. Thus, with the use of data collected from a larger study of Filipino adolescents and their PROP (6-n-propyl–2-*thiouracil)* taster status, food preference and consumption, this study aimed to determine whether Filipino adolescents of varying nutritional status as measured by BMI and sex differ in terms of food preference and dietary intake. In addition, we also looked into whether preference for different foods and dietary intake is correlated with BMI, and determined whether food preference is related to dietary intake.

METHODS

Participant selection and study setting

In this investigation held from July 2008 to June 2009, adolescents aged 13-17 years from various secondary schools and communities in the Greater Manila Area (Quezon City, Antipolo and Marikina) were screened using Body Mass Index (BMI), sex and age as the only selection criteria. A formal letter was initially sent to school principals, district supervisors and community leaders to allow the investigators to perform the screening in the areas mentioned.

For the purpose of screening, the BMI of potential respondents was calculated using the Quetelet's Index formula. The potential respondents were classified as normal, underweight or overweight utilising the BMI-for-age classification for male and female adolescents published by the Food and Nutrition Research Institute-Department of Sciene and Technology (FNRI-DOST) (2002), as reference standard. Height was measured using a microtoise (*Inter16*

CMS Weighing Equipment Ltd., UK), while weight was measured using a spring balance scale (*American Heritage Philippines).* Methods of measuring height and weight were patterned after procedures described by Gibson (2005).

The investigation employed a non-probabilistic sampling method, specifically quota sampling. Thus, after anthropometric measurements of adolescents had been taken, potential respondents who had passed the criteria were asked to submit signed assent and consent forms from their parent or guardian. Only those who were able to submit the forms were considered in the final selection of 40 underweight, 40 normal weight and 40 overweight adolescents, from whom data on dietary intake and food preference were obtained. The methodology employed in the study was reviewed and approved by the University of the Philippines-Diliman, Office of the Vice-Chancellor for Research and Development (UP-OVCRD).

Dietary intake

The usual energy and nutrient intake of the respondents were measured using a pre-tested food record accomplished on two weekdays and one weekend. Participants were asked to record when and where they ate, the description of the food or beverage, the brand names for processed foods and measure of the food consumed estimated through the use of measuring spoons and cups, a 6-inch ruler and graduated shapes.

The energy and nutrient content of the 3-day recorded diet were determined by first converting measures to edible portions using the Food Exchange List published by the FNRI-DOST (1994) and the USDA SR21 published by the U.S. Department of Agriculture, Agricultural Research Service (2009); followed by the computation of energy and nutrient content of the foods consumed using the Philippine Food Composition Table issued by the FNRI-DOST (1997) and the USDA SR 21, or in the case of processed foods, the Nutrition labels. Usual energy and nutrient intake were reported as the mean of the three-day consumption.

Food preference

Food preference of the respondents was measured using a Food Preference Checklist developed in an earlier study undertaken by Villarino *et al* (2009) and pre-tested on a separate group of adolescents for this investigation. The checklist included eighty-eight (88) food items that are representative of the different food groups found in the Philippine Food Composition Table and different taste modalities. The checklist had a 9-point hedonic scale to rate the respondents' like or dislike for each item. The scale was anchored at extreme ends where 1 is equivalent to dislike extremely and 9= like extremely. Additionally, a '0' category was incorporated to represent food items that had not been tasted yet by the respondents. The questionnaire also included basic demographic information such as age, sex, and contact details. Mean preference score for a food group was computed by taking the average food preference given to the different foods within a group.

Data analysis

Food preference and dietary intake data were grouped according to BMI classification and sex. In evaluating food preference, the 88-food items listed in the food preference questionnaire were further classified into main groups (Cereals, Vegetables, Fruits, Milk and Dairy Products, Meat, Fish and Poultry, Fats and Oils, Sugar and Confectionery, Condiments and Beverages) and sub-groups using primarily the Food Exchange List as a guide to differentiate between foods of different nutritional value. Specifically, the food items were grouped as follows: (1) Group 1 Cereals: Cooked with additional sugar or fat (cake, corn chips, donuts, French fries, potato chips, instant noodles); (2) Group 2 Cereals: Plain (white milled rice, rice cakes, corn, oatmeal, pan de sal and white loaf bread); (3) Group 1 Vegetables: Dark green and leafy ,yellow or orange colored vegetables (bitter gourd, swamp cabbage, squash, carrot, pechay, cabbage); (4) Group 2 Vegetables (garlic, cauliflower, tomatoes, mushroom, eggplant, bean sprouts); (5) Group 1 Fruits: High in Vitamin C (local orange, Philippine lemon, green mango, ripe mango, ripe papaya); (6) Group 2 Fruits: High in Vitamin A (ripe mango, ripe papaya); (7) Group 3 Fruits: Others (green apple, Fuji apple, red apples, pineapples, lacatan banana, latundan banana, banana, saba banana, tamarind); (8) Group 4: Prepared with fat and sugar (fried banana saba with sugar); (9) Milk and Dairy Products (cheese, ice cream, condensed milk, evaporated milk, powdered milk, fresh milk, yogurt); (10) Group 1 Meat, Fish and Poultry: Low fat (crab, dried fish, mussel); (11) Group 2 Meat, Fish and Poultry: Medium Fat (boiled egg, egg, fried egg, salted duck egg, canned sardines, tofu, canned tuna in oil); (12) Group 3 Meat, Fish and Poultry: High Fat (bacon, hotdog); (13) Meat ,cut unspecified, cooked using moist heat (simmered pork, simmered beef, simmered shrimp, simmered fish, simmered chicken); (14) Meat, cut unspecified, cooked using fat (fried pork, beef steak, fried fish, fried chicken); (15) Fats and Oils (butter, coconut milk, margarine, mayonnaise, peanut butter); (16) Sugar and Confectionery (brown sugar, refined sugar, fruit jam, honey, candy); (17) Condiments (shrimp paste, fish paste, fish sauce, vinegar, tomato catsup, soy sauce); (18) Group 1 Beverages: Alcoholic beverages (wine, beer); (19) Group 2 Beverages: Non-alcoholic beverages without sugar (coffee without sugar, tea without sugar); and (20) Group 3 Beverages: Non-alcoholic beverages with added sugar (fruit juice, soft drinks).

One-way analysis of variance (ANOVA) followed by Bonferroni test were used to explore differences in food preference and dietary intake of adolescents of different BMI classifications and sex. In terms of food preference, analyses were done on several levels - per food item, per sub-group and per main food group. Pearson's product-moment and Spearman's correlation were also computed to analyse possible associations between food preference and BMI classification. All statistical analyses were performed in SAS Enterprise Guide version 2.

RESULTS

The study enlisted 40 underweight, 40 normal and 40 overweight adolescents; 50% of the 120 respondents males (n=60) and 50% were females (n=60). The respondents had a mean BMI of 21.18± 5.97 and mean age of 14.95±1.44. All age values, except for the 15-year-old age group, were represented across BMI categories. Other demographic information cannot be provided as these were not collected.

Preferences for most foods were not correlated with BMI, except for the following sub-groups: Group 1 Cereals (ρ=0.21, p= .0240), Group 2 Fruits (ρ= -0.18, p=0.430) and Group 1 Meat (ρ=0.18, p=0.420) (Table 1). ANOVA analysis per food item revealed that respondents of different BMI classifications varied significantly in their preference for donut (p=.02780), fried saba banana with sugar (p=.0489), bacon (p=.0313) and mayonnaise (p=.0291). Specifically, overweight respondents gave the lowest preference scores for donut, fried saba with sugar (locally known as banana cue) and mayonnaise, while underweight respondents gave the lowest preference score for bacon.

The respondents' dietary intake classified by BMI is summarised in Table 2. Overweight participants consumed higher amounts of all nutrients, except for vitamins B_1 and B_2. In contrast, underweight respondents' dietary intake was lowest for all nutrients, with the exception of vitamins B_1 and B_2. Despite the trends observed, the intakes of the respondents did not vary significantly (p>0.05) except for fibre, calcium, and phosphorus. Protein

Table 1. Mean preference scores of respondents according to food groups by BMI

FOOD GROUP (Main groups and subgroups)	*Underweight*	*Normal Weight*	*Overweight*	ρ
Cereals	6.6 ± 0.8	6.4 ± 1.0	6.3 ± 0.9	-0.04
Cereals subgroups:				
Group 1 Cereals: Cooked with additional fat or sugar	6.8 ± 1.0	6.5 ± 1.2	6.4 ± 0.8	**0.21**
Group 2 Cereals: Plain	6.3 ± 1.0	6.4 ± 1.2	6.1 ±1.2	-0.06
Vegetables	5.1 ± 1.7	5.2 ± 1.5	5.0 ± 1.9	0.07
Vegetables subgroups:				
Group 1 Vegetable: High in Vitamin A (dark green & leafy & yellow or orange)	5.8 ± 1.8	5.8 ± 1.5	5.4 ± 2.0	-.04
Group 2 Vegetable: Other vegetables	4.5 ± 2.0	4.5 ± 2.0	4.6 ± 2.2	0.04
Fruits	6.5 ± 1.0	6.5 ± 1.1	6.2 ± 1.1	-0.11
Fruits subgroups:				
Group 1 Fruits: High in vitamin C	6.3 ± 1.2	6.3 ± 1.1	5.8 ± 1.3	-0.17
Group 2 Fruits: High in vitamin A	7.1 ± 1.6	7.1 ± 1.3	6.5 ±1.9	**-0.18**
Group 3 Fruits: Other fruits	6.3 ± 1.3	6.5 ± 1.4	6.6 ± 1.3	0.06
Group 4 Fruits: Cooked with additional sugar & fat	6.3 ± 1.2	6.4 ± 1.1	7.1 ± 1.5	-0.25

ρ in bold figures indicate statistical significance (p<0.05)

Table 1. Mean preference scores of respondents according to food groups by BMI (Continued)

FOOD GROUP (Main groups and subgroups)	*Underweight*	*Normal Weight*	*Overweight*	ρ
Milk and dairy products	6.3 ± 1.8	6.6 ± 1.6	6.7 ± 1.1	0.14
Meat, fish and poultry	6.4 ± 1.1	6.8 ± 1.2	6.8 ± 1.2	0.17
Meat, Fish and Poultry sub-groups:				
Group 1 Meat, Fish & Poultry: Low fat	5.5 ± 1.9	6.0 ± 1.9	6.3 ± 1.8	**0.18**
Group 2 Meat, Fish & Poultry: Medium fat	5.9 ± 1.4	6.3 ± 1.6	6.5 ± 2.3	0.13
Group 3 Meat, Fish & Poultry: High fat	6.5 ± 1.7	7.1 ± 1.5	6.9 ± 1.5	0.26
Group 4 Meat, Fish & Poultry: Cooked using moist heat	6.8 ± 1.2	7.2 ± 1.2	7.0 ± 1.2	0.83
Group 5 Meat, Fish & Poultry: Cooked using fat	7.2 ± 1.0	7.3 ± 1.3	7.4 ± 1.0	0.05
Fats and oils	5.8 ± 1.7	6.2 ± 1.8	5.6 ± 1.6	-0.08
Sugar and confectionery	6.4 ± 1.1	6.5 ± 1.5	6.2 ± 1.2	-0.04
Condiments	4.9 ± 1.8	5.5 ± 1.4	5.5 ± 1.3	0.15
Beverages	4.0 ± 1.4	4.2 ± 1.4	4.1 ± 1.2	0.13
Beverages sub-groups:				
Group 1 Beverages: Alcoholic	1.9+ 2.2	2.6+ 2.7	2.2+ 2.6	0.04
Group 2 Beverages: Non-alcoholic without added sugar	3.0+ 2.3	2.8+ 2.4	2.7+ 1.9	0.04
Group 3 Beverages: Non-alcoholic with added sugar	7.2+ 1.2	7.1+ 1.5	7.3+ 1.0	-0.05

ρ in bold figures indicate statistical significance (p<0.05)

Table 2. Mean energy and nutrient intake of the respondents by BMI

Intake	*Underweight*	*Normal weight*	*Overweight*	*ρ*
Energy (kcal)	1752 ± 451	1872 ± 733	2062 ± 702	0.17
Protein (g)	55.4 ± 25.6	56.3 ± 31.1	69.2 ± 29.0	**0.22**
Fat (g)	48.0 ± 23.5	58.2 ± 34.3	63.5 ± 31.9	**0.23**
Carbohydrates (g)	289.4 ± 89.5	302.6 ± 122.3	328.7 ± 136.5	0.08
Fibre (g)	12.2 ± 18.8[b]	8.4 ± 4.2[b]	27.4 ± 35.8[a]	**0.47**
Calcium (mg)	383 ± 171[b]	512 ± 331[ab]	538 ± 298[a]	**0.18**
Phosphorus (mg)	672 ± 238[b]	692 ± 305[b]	867 ± 347[a]	**0.27**
Iron (mg)	13.7 ± 9.9	14.7 ± 11.2	14.8 ± 9.4	0.09
Vitamin A (μg RE)	351 ± 532	391 ± 607	477 ± 453	0.14
Vitamin B_1 (mg)	2.65 ± 8.30	0.94 ± 1.0	1.28 ± 1.46	-0.07
Vitamin B_2 (mg)	2.56 ± 4.40	2.23 ± 3.80	1.50 ± 1.55	-0.13
Vitamin B_3 (mg)	17.0 ± 8.3	14.7 ± 8.8	17.7 ± 7.7	0.08
Vitamin C (mg)	50 ± 103	28 ± 37	60 ± 71	0.08

[a, b] Means with the same letter are not significantly different
ρ in bold figures indicate statistical significance (p<0.05)

(ρ=0.19381, p=0.0339), fat (ρ=0.20743, p=0.0230), fibre (ρ=0.25231, p=0.0054), calcium (ρ=0.2529, p=0.0134), and phosphorus (ρ=0.25887, p=0.0043) intakes were found to be positively correlated (p<0.05) with BMI, as increasing intake of these nutrients were observed with increasing BMI.

Table 3 presents the mean preference scores given by the participants to different food, as classified by sex. Generally, the male respondents gave higher preference scores for more food groups than the female respondents but most of these were not statistically significant, except for the mean preference for French fries(p=.0370), garlic (p=.0190), tofu (p=.0005) and mussels (p=.0023). The mean energy and nutrient intakes, classified by sex are described in Table 4. Male respondents had higher intakes for most of the dietary components, except for fibre, vitamin B_1 and B_2. Statistical results signify that the mean nutrient intake of the respondents vary significantly (p<0.05) only for energy and carbohydrates.

The data were further analysed to determine whether preference scores for different foods were correlated with dietary intake. Results which were found to be statistically significant at $p < 0.05$ and positively correlated are the following: preference for vegetables and intake of energy, protein, fat, carbohydrates, calcium and phosphorus; preference for milk and dairy and intake of fat, calcium and phosphorus; preference for fats and oils and carbohydrate intake; and lastly, preference for beverages and fibre intake.

DISCUSSION

Adolescents of different nutritional status differed in terms of their preference for cereals cooked with additional sugar and fat, fruits high in vitamin C and low fat meat, but did not differ in terms of energy-yielding nutrients intake. Specifically, the overweight respondents gave the lowest preference scores for donut, banana cue and mayonnaise, food items which are relatively richer in fat. However, analyses of dietary data revealed that the overweight respondents had the highest intake of fat and intake of fat was positively correlated with

Table 3. Mean preference scores of respondents according to food groups by sex

FOOD GROUP (Main groups and subgroups)	*Male*	*Female*
Cereals	6.4 ± 0.9	6.4 ± 0.8
Cereals subgroups:		
Group 1 Cereals: Cooked with additional fat or sugar	6.5 ± 1.1	6.7 ± 0.9
Group 2 Cereals: Plain	6.4 ± 1.1	6.2 ± 1.1
Vegetables	5.3 ± 1.8	4.9 ± 1.7
Vegetables subgroups:		
Group 1 Vegetable: High in Vitamin A (dark green, & leafy & yellow or orange)	5.7 ± 1.7	5.5 ± 1.8
Group 2 Vegetable: Other vegetables	4.9 ± 2.1	4.2 ± 1.9
Fruits	6.5 ± 1.0	6.4 ± 1.1
Fruits subgroups:		
Group 1 Fruits: High in vitamin C	6.2 ± 1.2	6.1 ± 1.3
Group 2 Fruits: High in vitamin A	7.0 ± 1.4	6.8 ± 1.8
Group 3 Fruits: Other fruits	6.5 ± 1.2	6.4 ± 1.5
Group 4 Fruits: Cooked with additional fat or sugar	6.5 ± 1.2	6.4 ± 1.1
Milk and dairy products	6.4 ± 1.7	6.7 ± 1.4
Meat, fish and poultry	7.2 ± 1.2	7.5 ± 1.0
Meat, Fish and Poultry sub-groups:		
Group 1 Meat, Fish & Poultry: Low fat	6.7 ± 1.3	6.6 ± 1.0
Group 2 Meat, Fish & Poultry: Medium fat	6.1 ± 1.8	5.7 ± 2.0
Group 3 Meat, Fish & Poultry: High fat	6.5 ± 2.1	6.0 ± 1.3
Group 4 Meat, Fish & Poultry: Cooked using moist heat	6.7 ± 1.7	7.0 ±1.4
Group 5 Meat, Fish & Poultry: Cooked using fat	7.0 ± 1.2	7.0 ± 1.1
Fats and oils	6.2 ± 1.8	5.6 ± 1.6
Sugar and confectionery	6.4 ± 1.3	6.4 ± 1.3
Condiments	5.2 ± 1.6	5.4 ± 1.4
Beverages	4.0 ± 1.4.	4.1 ± 1.2
Beverages sub-groups		
Group 1 Beverages: Alcoholic	2.0 ± 2.4	2.4 ± 2.6
Group 2 Beverages: Non-alcoholic without added sugar	3.0 ± 2.4	2.7 ± 2.1
Group 3 Beverages: Non-alcoholic with added sugar	7.1 ± 1.2	7.4 ± 1.3

BMI. Probably, the overweight respondents preferred and consumed other fat-rich foods that did not turn out to be statistically significant or they may have also tailored their answers in the food preference questionnaire to reflect socially-desirable behaviour as what was reported in Craeynest *et al* (2007), who investigated the association between food preference and obesity among adolescents. In fact, studies by Johansson *et al.* (2000) and Garaulet *et al.* (2000) even suggest that BMI is a main predictor of under-reporting of food intake.

Although not statistically significant, overweight respondents gave higher preference scores for milk and dairy products and had the highest intake of nutrients, namely calcium and phosphorus, associated with the said food group. Hence, it may be possible that food preference of mal-nourished adolescents may be used to predict food consumption and dietary intake.

Table 4. Mean energy and nutrient intake of the respondents by sex

Intake	*Male (n=60)*	*Female (n=60)*
Energy (kcal)[a]	2107 ± 700	1684 ± 518
Protein (g)	63.4 ± 26.3	57.2 ± 31.7
Fat (g)	57.7 ± 31.4	55.5 ± 30.3
Carbohydrates (g) [a]	348.4 ± 118.1	265.4 ± 102.9
Fibre (g)	12.0 ± 10.5	20.0 ± 33.0
Ca (mg)	483 ± 254	473 ± 309
P (mg)	797 ± 273	690 ± 337
Fe (mg)	14.6 ± 9.5	14.0 ± 10.8
Vit A (μg RE)	420 ± 578	393 ± 487
Vit B_1(mg)	1.32 ± 2.25	1.93 ± 6.60
Vit B_2 (mg)	1.76 ± 2.82	2.43 ± 4.02
Vit B_3 (mg)	17.7 ± 8.3	15.3 ± 8.2
Vit C (mg)	43 ± 64	49 ± 87

[a] Significantly different at $p<0.05$

It is interesting to note that underweight respondents rated starchy and bakery products more highly than the others. However, they consumed the lowest amount of carbohydrates, a nutrient that is dense in starch and bakery products. It is possible that they have under-reported, over-reported or have omitted some of the food items they consumed for want of social desirability. Another explanation for the observed negative correlation of BMI with preference to some food groups is that, our underweight respondents are in fact reducing their food intake despite their preference to control weight, as was noted in Neumark-Sztainer *et al* (2004).

The male respondents gave higher preference scores for more food groups than female respondents. It is difficult to relate the observation that male respondents gave higher preference scores to French fries, garlic, tofu and mussels to other study outcomes and to what is available in the literature. Results of investigations undertaken by Wansink, Cheney & Chan (2003), and Kiefer, Rathmanner & Kunze (2005) suggest that the difference in preference among males and females may have been due to physiological and psycho-social factors. In our case, however, that cannot be established since such variables were not measured in our study.

The observed higher dietary intake of male respondents relative to female respondents may be explained by their difference in body size and body composition. During the adolescent growth spurt, boys tend to gain more lean tissue and this creates higher demand for energy, prompting the boys to eat more than girls (Kiefer *et al.* 2005). More so, social desirability and social approval bias may have affected the data.

Not all food preferences were translated to actual intake and this may be due to factors that were not measured in this investigation. Interestingly, preference for milk and dairy products correlated with intake of fat, calcium and phosphorus, nutrients that are known to be dense in the aforementioned food items. Thus, for the milk and dairy food group among the respondents, preference may be used to predict intake.

CONCLUSION

Adolescents of different nutritional status, sex and BMI varied in terms of food preferences and dietary intake, but not all observations have been supported by the statistical tests performed. Males showed higher preference for more food groups and had higher intakes of more nutrients than the female respondents.

Increasing intake of some nutrients was observed with increasing BMI. The fact that the respondents' preference for some food groups were translated into dietary intake suggests that investigating food preference in relation to adolescent malnutrition may be a promising endeavour. However, matters such as the sample selection and size, study setting, the use of estimation in determining quantities of food intake and the non-inclusion and control of other factors which may determine food preference and nutrient intake, limits the application of our findings.

This study may provide inputs to nutritionist-dietitians involved in the nutritional care management of malnutrition among adolescents. As preference may be used to predict consumption, nutritionist-dietitians may consider making an inventory of the food preferences of their adolescent clients and finding alternatives that are lower in energy yielding nutrients.

Future studies focusing on the same problem may enlist more adolescent respondents from areas within and outside Metro Manila and include or control for social, cultural and economic variables which may affect the food preference and intake of this age group. In addition, studying adolescents in terms of their specific development stage may provide more insights.

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