



**AgEcon** SEARCH

RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

*No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.*

Marie Faye R. Nguyen  
Anna Teresa O. Orillo  
Rose Ann F. Hagos  
Celina Ann Z. Javier  
Richelle M. Alcantara  
Maria Theresa M. Talavera

# Association of Adolescents' Knowledge, Attitude, and Practices (KAP) on Nutrition Labels and their Nutritional Status

## ABSTRACT

*Nutrition labels play an important role in promoting proper nutrition. The purpose of the study was to establish the association of knowledge, attitude, and practices (KAP) on nutrition labels in relation to the nutritional status of adolescents. Three hundred and ninety-three (390) high school students, aged 12 to 17 years old, were the respondents for the study.*

*Two sets of questionnaires were administered to determine the respondents' (1) demographic characteristics; (2) dietary habits; and (3) knowledge, attitudes, and practices (KAP) on nutrition labels.*

*Through descriptive statistics and Pearson correlations analyses, it was found that the respondents had high KAP ratings on nutrition labels, indicating the respondents' high knowledge on nutrition labels, positive attitude towards nutrition labels, and practice on nutrition labels. Despite high KAP ratings, the study found that KAP and nutritional status has weak ( $r=0.023$ ,  $p=0.645$ ) relations.*

*It can be inferred that nutrition labeling alone is insufficient to improve the nutritional status of the group. Other contributing factors such as food habits, social influence, and accessibility to source of food with nutrition labels; information dissemination mechanisms; and presence of diseases are to be determined in order to further elucidate the association between nutrition labels and nutritional status.*

## INTRODUCTION

Adolescence is a life stage marked by dynamic physiological and psychosocial changes related to substantial growth and development. It is characterized by an increased desire for independence, which drives adolescents to make their own lifestyle choices including food preferences and food habits. Adolescents tend to snack on calorie-dense food eaten outside their homes since they spend most of their time in school. Moreover, an increasing number of children and adolescents are becoming consumers at a younger age by which there are many external factors shaping their consumer habits. These factors include peer influence, culture, school environment, and commercialism (Kraak and Pelletier, 1998). Commercialism is characterized by the exposure to mass media as adolescents are proven to be major consumers of such (Cruz, et al., 2001).

Twenty-two percent (22%) of the Philippine population is composed of adolescents aged 10 to 19 years old (UNICEF, 2010). In addition, the prevalence of underweight adolescents is 17% (FNRI, 2008). The same survey revealed that the prevalence of underweight and overweight among Filipinos were higher among male than female adolescents. With these findings come increasing demands to focus on the nutritional needs of adolescents as this life stage sets the foundation for good health in adulthood. The changing food habits and lifestyle and the prevailing malnutrition among adolescents magnify the need for proper nutrition education among adolescents to promote awareness on healthy food choices.

Nutrition education is an intervention that aims to alleviate malnutrition through the communication of nutrition-related information aiming to bring about change in behavior. It is considered to be an interdisciplinary and integrative strategy that focuses on sustainability and the achievement of long-term nutritional goals. Nutrition education encompasses both knowledge acquisition and behavioral changes in the field of food consumption and other nutrition-related practices.

One of the most accessible means to communicate nutrition information is through the use of nutrition labels. Nutrition labeling is a population-based approach that helps make the food selection environment more conducive to healthy choices through providing relevant information to consumers about the nutrient content of food (Cowburn and Stockley, 2004). The World Health Organization (WHO) reiterates the effectiveness of nutrition labeling in terms of conveying information regarding the nutritional content of food, the use of sound nutrition principles in the formulation of food, the opportunity to include supplementary nutrition information on the label, and in providing scientifically proven nutrition claims (Hawkes, 2004).

International guidelines, such as the Codex General Standard, have been developed to help consumers become more responsible in terms of their food purchase decisions. Nutrition labels provide a number of information regarding the food content, most essentially energy and the macronutrient content, such as carbohydrates, protein, and fat. These macronutrients significantly contribute to the current nutritional status of adolescents and they are the major requisites in alleviating malnutrition. Still, there are debates regarding the relevance and use of nutrition labels in promoting good nutritional status.

Knowledge is essential in developing food habits, as it is also relevant in shaping attitude towards food. A number of studies have been conducted with attempts to associate dietary patterns with the consumers' use of nutrition labels. Drichoutis, Lazaridis, and Nayga in 2006, explored the antecedents and consequences of nutrition label use based on literature. Results showed that some empirical research support the claim that nutrition label information can influence dietary patterns. Furthermore, there were even a number of studies, according to Drichoutis, et al. (2006), stating that the use of nutrition labels also contributes to healthier food choices.

Despite the information presented in nutrition labels, malnutrition is still to be regarded as a result of the interplay of different factors. Malnutrition, being a multifaceted concern, cannot be attributed directly to just one factor.

By recognizing nutrition labels as one of the most practical means of acquiring nutrition information about food and giving due attention to adolescents who are exposed to various external influences, the study generally aimed to determine the association of knowledge, attitude, and practices on nutrition labeling to nutritional status of adolescents. The specific objectives of the study were to (1) describe the socio-economic and nutritional status of adolescents and (2) to determine the association between knowledge, attitude, and practices of adolescents with regard to the use of nutrition labels.

## MATERIALS AND METHODS

In order to determine the association between knowledge, attitudes, and practices (KAP) of adolescents with regard to the use of nutrition labels and possibly, to associate them with nutritional status; a cross-sectional study was conducted.

Individual differences such gender, year levels, and socio-economic status were taken into account as they may affect the knowledge, attitude, and practices of adolescents with regard to the use of nutrition labels. The individual differences were found to have an influence on the interest of students in acquiring nutrition information. Also, the food preferences of adolescents, that may affect their practices and attitudes toward nutrition labels, were determined using a food frequency questionnaire. Aside from inherent individual differences, various sources of information were also identified as they can contribute to knowledge on nutrition labels.

Despite nutrition labeling's goal of informing and promoting responsible food choices, the direct impact of knowledge, attitudes, and practices on nutrition labels to nutritional status is yet to be established. The framework (Figure 1) of the study was designed to illustrate how each of the factors interrelates with one another. The study focused on respondents undergoing adolescence, the stage where the nutritional, psychological, and physiological transitions are very much evident.

Also, high school students are perceived to be more exposed and open to various means of knowledge acquisition. Adolescence is marked by an intense quest for independence and adventure predisposing them to a number of risks associated to poor nutritional status. If it can be proven that there is really an association between nutritional status and KAP on nutrition labels, then mandatory implementation of nutrition labeling accompanied with sufficient nutrition education in the Philippines can actually be a remarkable breakthrough in nutrition advocacy and intervention.

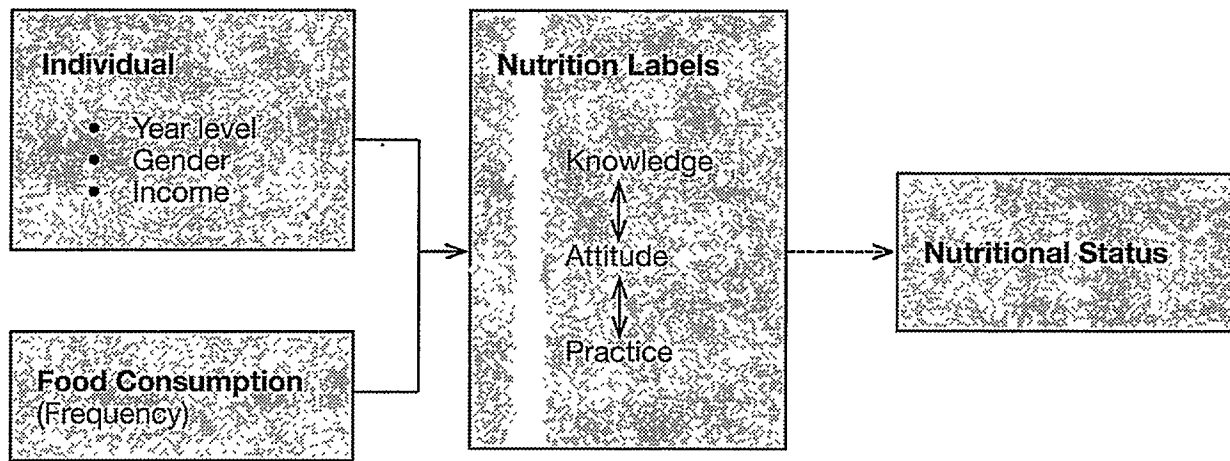


Figure 1. Conceptual framework

The study was conducted at the Los Baños National High School (LBNHS), one of the largest public high schools in Laguna, with 4,939 student enrollees during the survey period. Complete enumeration was done within the pilot sections, from first year to fourth year, resulting to a total of 411 students. From the 411 respondents, 393 students participated in the survey yielding a response rate of 95.6%. Those who did not participate were attending to extracurricular activities while some were absent during the time of survey.

A survey was conducted using two sets of questionnaires to determine the (1) socio-economic status, (2) use of nutrition labels, and (3) food preferences of the adolescents. Questions to determine the socio-economic status aim to identify the age, gender, year level, income of parents, and part time job of each respondent as these factors may have an influence on the knowledge, attitude, and practices of adolescents in terms of label use.

The questionnaire for nutrition labels measured three constructs such as knowledge, attitude, and practices. The knowledge section involved multiple-choice questions that would test the knowledge of students on basic concepts for the utilization of nutrition labels. Also, this section included sample pictures of nutrition labels to

test the ability of the students to comprehend the information presented in nutrition labels. In assessing their attitudes towards nutrition labels, questions with regard to their standard for buying, reasons for reading, value for nutritional label, importance of reading nutrition labels, and considerations for food preference with nutritional labels were queried. Lastly, practices were measured according to their level of interest, frequency of reading, and buying habits as depicted in some questions.

The food frequency questionnaire contained 66 items that aimed to measure the number of times food is consumed on a weekly basis. The categories of the food items are as follows: dairy products, fats and oils, mayonnaise and sandwich spreads, peanut butter, pork and pork products, beef and beef products, poultry and poultry products, fish and fish products, egg, fresh fruits, vegetables, cereals, cakes and pastries, sugar and sweets, salty snacks, fast foods, carbonated beverages, drinks and juices, beer, wine, coffee, tea, vitamins and food supplements.

## RESULTS AND DISCUSSION

To assess the nutritional status of the students, anthropometric measurements were conducted. The weight and height of the students were obtained using a platform scale and microtoise, respectively. The body mass index (BMI) was computed to determine the nutritional status using the formula  $BMI = \text{Weight (kg)}/\text{Height (m}^2\text{)}$ . The nutritional status was classified using the WHO BMI cutoff points (<18.0 is underweight, within 18.5 and 24.99 is normal,  $\geq 25$  is overweight, and  $\geq 30$  is obese).

The survey was conducted on September 13 and 15 in 2010, utilizing the respondents' one-hour class schedule for the Technology and Livelihood Education (TLE) subject as approved by the school administrator. Instructions on answering the nutrition labeling questionnaire were carefully given to the students and each question was read to the students to assist them in answering the questionnaire. For the food frequency questionnaire part, pictures of the different food items were shown to the students to help them recall. Anthropometric measurements were taken immediately after the questionnaires were submitted.

After the data collection, the questionnaires were encoded and the KAP items were rated. To measure knowledge, the highest possible score was ten (10) points, four (4) points for attitude, and eight (8) points for practice. In summary, the total score for KAP questions was 22 points. Basic descriptive characteristics were obtained from the variables measured. Pearson correlation was used to determine the association between knowledge, attitude and practices on nutrition labels in relation to nutritional status. Data analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 17 software.

### Respondents' profile

The demographic analyses results shown in Table 1 revealed that majority of the total 393 students were female (62.8%). Furthermore, populations per year level are distributed with the following percentages: 26.72%, 25.19%, 24.17%, and 23.92% for the first year, second year, third year, and fourth year levels, respectively.

The socio-economic status of students was determined by the monthly household income. Income was then translated to poverty threshold. The data of poverty threshold was based from the 2009 Poverty Statistics done by the National Statistical Coordination Board reported that a family of five needs PhP 7, 017 monthly income to stay out of poverty. Greater part of the population (82.19%) is above the poverty line while only 17.81% did not meet the minimum monthly income to stay out of poverty. The prevalence of underweight was 51.2% while overweight was 10.2%. Lastly, 38.7% of the students were within normal BMI.

Table 1. Characteristics of the sample population

Characteristics	Freq (N=393)	Percentage
Gender		
Male	146	37.20
Female	247	62.80
Year Level		
First Year	105	26.70
Second Year	99	25.20
Third Year	95	24.20
Fourth Year	94	23.90
Socio-economic Status		
Below Poverty Line	70	17.81
Above Poverty Line	323	82.19
Nutritional Status		
Underweight	201	51.20
Normal	152	38.70
Overweight	40	10.20

### Frequency of food consumption

The food frequency questionnaire included 66 food items. Summary of the frequencies for food consumed by the students are presented in Table 2. It is expected that most of the students have never consumed beer or wine because of their young age. While only 0.76% of the population never consumed egg. Dairy products such as fresh milk, powdered milk, skimmed milk, cultured milk, yogurt, cheese, cheese spread, cream and ice cream were mostly consumed once to twice a week (38.1%).

The food consumed by one third of the respondents (0.33%) once or twice a week belonged to fats and oils (butter, margarine, and oils). Majority of the population consumed meats, such as pork, beef, and chicken at once or twice a week. Only a small proportion of students regularly consumed fruits (6.7%) and vegetables (11.8%). Cereals, that include breads, rice, pasta and noodles, were consumed frequently for once or twice a week (33.5%) and three to four times a week (21.2%).

The population mainly eats cakes and pastries, sugar and sweets, salty snacks, fast foods, carbonated beverages and other drinks, and juices for about once or twice a week. To have a broader idea of the nutrient intake, it is essential to assess the dietary pattern of a population (Ahmad, et al., 2009). This study in particular showed the lack of balance in the dietary pattern of adolescents. Generally, the consumption of food items for once or twice a week reflects the variability of the diet on a weekly basis. If the frequency of food eaten more than five to six times a week were summed up, the top ranked food item would be vitamins (46.8%) and followed by eggs (44.5%). This suggests that eggs were their main source of protein.

For meats, pork was most frequently consumed by 38.4% of the students. On the other hand, frequency of consumption for more than five to six times a week of cereals (39.8%) and vegetables (49.6%) are also high. Almost half of the population (40.9%) consumes sugar and sweets such as candies, jams, and chocolates

on a regular basis. Also, salty snacks (28.6%), fast food items (23.9%), and carbonated beverages (25.9%) are highly consumed by the students. A study conducted by Savige, et al. (2007) showed that non-essential food such as fast food and energy-dense snacks. Sugar sweetened drinks were consumed by 89.8% of adolescents on a daily basis, having just one in five adolescents consumed fast foods every day.

This consumption pattern suggests a possible occurrence of nutritional problems including micronutrient deficiencies, undernutrition, and obesity later in life hence, close monitoring and nutrition education on proper food choices, a balanced diet, and timing of meals are important in promoting proper nutrition.

Despite having a majority of adolescents identify calorie-dense snacks and soft drinks as low value and harmful, nutritional value remains to be of low priority as they think it is still too early for them to worry about the nutritional implication of frequent consumption of calorie-dense snacks. The most common factors influencing food choices were identified to be taste, peer pressure, parental influence, easy access to unhealthy snacks, limited availability of healthy snacks, high price of healthy snacks, and media and advertisements (Karimi-Shahanjarini, et al., 2009).

The availability and accessibility of healthy and unhealthy food greatly affect adolescent food consumption patterns. Campbell, et al. (2007) reported that the availability of unhealthy foods at home was the strongest correlate of sweet snack consumption. For this reason, foods available at home have a strong influence on food choices of adolescents. However, adolescents spend a considerable amount of time in school, which makes foods available in school canteens and nearby food establishments play a vital role in their food consumption patterns. Aside from giving nutrition education, it is very important that schools provide a healthy food selection at canteens and cafeterias (Ahmad, 2009).

Table 2. Percentage distribution of responses according to frequency of consumption

Food Items	Percentage (%)							
	N=393							
	Never	1x- 2x a wk	3x-4x a wk	5x-6x a wk	Once a day	2x-3x a day	4x-5x a day	≥6x a day
Dairy products	20.20	38.00	18.30	9.30	7.20	5.00	0.90	0.90
Fats and oils	25.40	34.50	14.80	6.90	8.50	6.00	2.30	1.70
Mayonnaise and sandwich spread	11.70	39.20	24.20	12.50	7.40	3.70	0.80	0.60
Peanut Butter	11.70	41.70	22.90	8.70	7.40	4.80	0.50	2.00
Pork and pork products	5.20	28.70	27.70	14.80	9.70	10.80	1.80	1.30
Beef and beef products	9.80	47.80	24.00	8.30	4.70	4.20	0.90	0.30
Poultry and poultry products	28.40	31.90	20.30	8.40	5.70	4.20	0.70	0.50
Fish and fish products	8.10	38.50	28.20	11.90	7.30	4.70	0.50	0.80
Egg	0.70	21.40	33.30	18.30	16.50	5.30	2.00	2.30
Fresh Fruits	15.20	43.90	16.40	10.40	6.70	5.00	1.40	0.90
Vegetables	7.90	26.80	24.70	15.30	11.80	9.80	2.40	1.30
Cereals	5.50	33.40	21.20	10.20	10.70	12.10	3.80	3.10
Cakes and pastries	9.00	58.20	19.00	5.90	4.20	2.50	0.70	0.40
Sugar and sweets	11.50	29.60	18.00	11.90	10.70	9.40	5.10	3.80
Salty snacks	9.20	38.10	24.20	11.50	10.60	5.00	1.00	0.40
Fast foods	6.90	44.10	25.10	10.60	8.80	3.00	0.90	0.60
Carbonated beverages	18.20	38.00	17.80	10.80	8.60	4.90	1.00	0.50
Drinks and Juices	7.50	36.30	25.30	15.10	9.40	4.20	1.20	0.90
Beer	92.60	7.10	-	-	0.20	-	-	-
Wine	81.80	16.50	1.50	-	0.20	-	-	-
Coffee	27.90	35.40	15.50	5.60	10.90	3.30	-	1.30
Tea	56.50	31.80	7.60	1.80	1.30	0.50	0.50	-
Vitamins	24.20	20.60	8.40	4.30	29.50	10.20	1.30	1.50
Food Supplements	58.50	18.80	4.30	4.60	9.90	3.00	0.50	0.20

### Knowledge, attitude, and practices on nutrition labels

The study on nutrition labels encompasses three major categories namely, knowledge, attitude, and practices and the interrelationship among these. The level of knowledge regarding nutrition labels may vary based on a number of factors as attitude is influenced by values and other external factors, such as culture and upbringing. Practice, on the other hand, is a form of overt behavior that reflects a specific preference or level of competency. The understanding of nutrition labels begins with being able to translate its content. The scores of

knowledge, attitude, and practices on nutrition labels were combined (KAP) to provide an index for this interrelationship.

Table 3 presents the mean scores and standard deviation of knowledge, attitude, practices and KAP across the sample characteristics such as gender, year level, and household income. Analysis of variance (ANOVA) was conducted in order to test the significant differences between means.



For gender, significant difference ( $p=0.01$ ) among males and females were seen in the practice of using nutrition labels, i.e., females had higher scores than males. This suggests that boys were less likely to perceive nutrition as important in food shopping than that of girls; and males were typically less interested in diet and health issues than are females (Nayga, 1996). Drichoutis, et al. (2006) reported that consumers with high income have added advantage of being able to choose a wider variety of foods that can be of higher quality or higher nutritional value. This may raise the concern of those included in the lower income brackets, as they are more likely to choose food based on the cost and not on the nutritional content.

Nonetheless, mean scores of KAP and its constructs does not significantly differ from those included below the poverty line and those that belong above the poverty line (Table 3). Hence, it is not substantial to deduce that those with lower income brackets were less likely to have high knowledge, positive attitude, and favorable practice towards nutrition labels.

On the other hand, significant differences of mean scores were seen in knowledge, attitude, practices, and combined KAP scores, with respect to year level. Fourth year students had the highest mean score (mean= $8.50 \pm 1.31$ ) for knowledge. The results indicate that higher education level would lead to higher knowledge on nutrition label.

As supported by the study done by Rasberry (2007) points out that the subject that is most likely to use the information on food labels are those with tertiary education. This is because higher education level would place the consumer at an advantage of being more informed about nutrition and therefore being more able to interpret the nutrition information on the label. Second year students had the highest mean scores for attitudes, practices, and total KAP.

It can be noted that the presence of nutrition labels only means that the nutritional content was made available to the consumer but it does not equate to good nutritional value of food. The study

recognizes the possibility that consumption of food with nutrition labels is coincidental rather than a well thought out choice based on its nutritional value.

Furthermore, there is a possibility that the respondents were aware of the importance and use of the nutrition labels but they would not take time to read them. If this is the case, if they could not spare a few minutes to read the labels, the likelihood that they would compare nutrition labels of similar products would be even less. Such behavior can be brought about by various factors such as time, peer pressure, and mood.

#### **Association of KAP and nutritional status**

To explore the association of KAP with nutritional status, mean scores for knowledge, attitude, and practices were determined and noted against nutritional status. As shown in Table 4, mean scores for each nutritional status category does not considerably differ from each other. Results showed that students had high knowledge, positive attitude, and favorable practices in terms of the use of nutrition labels. However, prevalence of underweight among this population is still high at 51.1%. This denotes that several factors must be involved in the nutritional status of adolescents such as household food security, eating practices, and physical activity (Delisle, et al., 2000).

Moreover, adolescent malnutrition may be attributed to socio-cultural factors. A study done by Radu and Ciotaru (2007) stated that a high prevalence of undernutrition among adolescents may be due to their receptivity to fashion trends, in which beauty is equated to extreme thinness. As adolescents are frequently exposed to these stimuli, they tend to resort to fad diets without considering its implications to health in general.

With dietary pattern as a factor affecting nutritional status, a gap was found in this age group. As shown in other studies, being aware or informed about proper nutrition does not necessarily translate to food behavior. Similarly, not all adolescents who are aware of nutrition labels are persuaded to use them or were able to utilize the information effectively. They feel that there are many barriers to changing their dietary habits such as lack of time, lack of discipline, and lack of sense of urgency (Story and Resnick, 1986).

Table 3. Mean scores of KAP with respect to gender, household income, and year level

Characteristics	Mean Score $\pm$ Standard Deviation			
	Knowledge	Attitude	Practice	KAP
Sex	8.04 $\pm$ 2.03	3.16 $\pm$ 0.77	5.25 $\pm$ 1.28	16.45 $\pm$ 2.95
Male (37.15%)	7.94 $\pm$ 1.49	3.11 $\pm$ 0.79	5.55 $\pm$ 1.12	16.60 $\pm$ 2.23
Female (62.84%)	0.33	0.52	6.09	0.30
F score	0.57	0.47	0.01*	0.59
p-value				
Socio-Economic Status				
Below Poverty Line (17.81%)	7.96 $\pm$ 1.52	3.17 $\pm$ 0.76	5.47 $\pm$ 1.20	16.60 $\pm$ 2.35
Above Poverty Line (82.19%)	7.98 $\pm$ 1.75	3.12 $\pm$ 0.79	5.43 $\pm$ 1.19	16.53 $\pm$ 2.55
F score	0.01	0.27	0.07	0.05
p-value	0.91	0.60	0.79	0.83
Year Level				
First Year (26.72%)	7.45 $\pm$ 1.79	3.20 $\pm$ 0.80	5.28 $\pm$ 1.19	15.92 $\pm$ 2.74
Second Year (25.19%)	7.98 $\pm$ 1.66	3.32 $\pm$ 0.79	5.79 $\pm$ 1.14	17.09 $\pm$ 2.54
Third Year (24.17%)	8.04 $\pm$ 1.86	2.95 $\pm$ 0.82	5.54 $\pm$ 1.21	16.53 $\pm$ 2.46
Fourth Year (23.92%)	8.50 $\pm$ 1.31	3.02 $\pm$ 0.67	5.15 $\pm$ 1.13	16.67 $\pm$ 2.15
F score	6.62	4.72	5.80	3.84
p-value	0.00*	0.00*	0.00*	0.01*

\*significant at  $p < 0.05$

Table 4. Mean Scores of KAP in relation to nutritional status of the population

	Underweight	Normal	Overweight/ Obese	F score	p-value
	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD		
Knowledge	7.93 $\pm$ 1.74	8.01 $\pm$ 1.65	8.10 $\pm$ 1.78	0.201	.818
Attitude	3.18 $\pm$ 0.77	3.06 $\pm$ 0.81	3.10 $\pm$ 0.78	1.122	.327
Practices	5.39 $\pm$ 1.21	5.43 $\pm$ 1.13	5.70 $\pm$ 1.30	1.124	.326
KAP	16.51 $\pm$ 2.59	16.49 $\pm$ 2.34	16.90 $\pm$ 2.81	0.450	.638

The Pearson product moment correlations revealed the association between knowledge, attitude, and practices on nutrition labels and nutritional status (Table 5). The knowledge, attitude, and practices on nutrition labels were taken as a whole and referred to as the KAP index. The nutritional status was represented by the BMI of the respondents. The results showed that all correlations were positive except for that of attitude towards knowledge and attitude towards BMI.

A significant difference noted in more favorable practice would indicate a higher knowledge and a more favorable attitude towards nutrition labels.

On the other hand, a significantly high overall KAP implicates a higher knowledge and a more favorable attitude and practices in terms of the use of nutrition labels. The negative association of attitude and knowledge suggests that higher knowledge entailed less favorable attitude towards nutrition labels. This trend could not be established because it is statistically insignificant; however, it may show that knowledge on nutrition labels may be high but it does not guarantee its use. Thus, nutrition education may increase the knowledge on nutrition labels but may not immediately persuade a consumer to buy food with nutrition labels.

With regard to nutritional status, there is a positive correlation among constructs except for that of attitude. As mentioned earlier, this stage is characterized by drastic physiological and psychological changes that can cause indecisiveness and instability among adolescents. This state, in effect, makes attitude extremely variable. Several factors influencing attitude is to be considered such as peers, parents, teachers, and the mass media.

Some of the respondents held misconceptions that a healthy diet and the use of nutrition labels were only for those who wanted to lose weight. It is very important to highlight the relevance of having good nutrition for a better quality of life, of which weight management is just a component. Also, it must be added that the presence of nutrition labels does not necessarily mean good nutritional value for food. It only communicates the nutrient content of food, but as to how it would translate to providing the recommended daily nutrient requirement would vary among individuals.

Knowledge, having positively correlated to nutritional status ( $r=0.015$ ), indicates that students having high knowledge on nutrition labels are less likely to be malnourished. In addition, the strongest correlation was found between knowledge and KAP ( $r=0.773$ ) signifying that taking advantage of KAP on nutrition labels is through nutrition education. With this result at hand, nutrition education would possibly be a powerful tool and an effective intervention to improve the nutritional status of adolescents. Integration of nutrition courses in the school curriculum could lead to healthy food choices.

Also, educating parents regarding nutrition and decision-making could be expected to result to a long-term healthy eating pattern. The association of KAP and nutritional status ( $r=0.023$ ,  $p=0.645$ ), though not statistically significant, is still positive, suggesting that a higher KAP score would have a higher chance of having a normal nutritional status.

Table 5. Pearson Correlation between knowledge, attitude, and practices on nutrition labels in relation to nutritional status

	Knowledge	Attitude	Practices	KAP	BMI
Knowledge	1.00	-0.023 (0.656)	0.216* (0.000)	0.773* (0.000)	0.015 (0.768)
Attitude		1.000	0.312* (0.000)	0.716* (0.000)	-0.067 (0.184)
Practices			1.000	0.444* (0.000)	0.072 (0.152)
KAP				1.000	0.023 (0.645)
BMI					1.000

\*significant at  $p<0.05$

## CONCLUSIONS AND RECOMMENDATIONS

Research results showed that the students had a high score on knowledge, attitude, and practices. Despite the high individual scores, it was established through Pearson correlation that KAP had weak positive association with nutritional status.

Knowledge, attitude, and practices on nutrition labels could not solely improve the nutritional status of adolescents. Consistent with the study done by Cowburn and Stokley (2000), nutrition labeling alone was likely to give limited success as a strategy to improve the nutritional health of a population. Other factors such as social influence, availability and accessibility to source of food with nutrition labels, information dissemination, and presence of disease must be considered and measured. The results from the food frequency questionnaire showed that the population consumed food items without taking into consideration if these contain the nutrients they need or not. It was also found that the family has been identified as one of the most influential factors that affect food and nutrition-related decisions, just as concluded by Kraak and Pelletier in 1998. Thus, the parent-child interaction of adolescents may also be considered for future studies.

Nutrition labels indicate the available nutrients in the product that can lead to informed choices thus, helping consumers make purchasing decisions. Adolescence is an important stage for developing food habits and preferences, hence it is vital that adolescents learn to read and use the nutrition labels.

However, having nutrition information on food packages assumes consumers have the motivation and ability to use this but because its format is not easily understood that even educated consumers often do not use them (Maubach, et al., 2009). For this reason, it is proposed that formats of nutrition label be carefully studied to meet the needs of consumers, making it easily accessible and easier to understand. Also, nutrition education in schools and through media practitioners in radio and television are also urged to promote information regarding the use of nutrition labels. Their aim must not only be to inform but also to persuade the consumers to be informed about the nutrition content of food items.

The limitations of the study opened windows for further studies. It is recommended that a 24-hour food recall be done to assess the actual food intake of the sample population. Through this 24-hour food recall, a more detailed list of food items actually consumed can be derived, as this can be the basis if the sample population eats food with nutrition labels.

The school canteen can also be an important component of the study. The foods sold in the canteen can be evaluated based on the types of food they sell, its nutritional value or whether they have nutrition labels or not. Nonetheless, this can also provide data on the nutrient profile of food sold at the canteen bearing nutrition labels. The food items being sold the most can be related with the consumption of food items with nutrition labels, and once again, be associated with the students' nutritional status.

## REFERENCES

- Ahmad, H., P. Liaqat, P. I. Paracha, A. Qayyum, and M. Arshad Uppal.** 2009. Assessment of Nutritional Status of Adolescents versus Eating Practices in Islamabad City. *Pakistan Journal of Nutrition* 8 (8): 1304-1308.
- Campbell, K.J., D. A. Crawford, J. Samson, A. Carver, S. P. Garnett, and L. A. Baur.** 2007. Associations between the Home Food Environment and Obesity-promoting Eating Behaviors in Adolescence. *Obesity*. 15:719-730.
- Cowburn, G. and L. Stokley.** 2000. Consumer understanding and use of nutrition labeling: a systematic review. *Public Health Nutrition*. 8: 21-28.
- Cruz, G.T., E. P. Laguna, and C. M. Raymundo.** 2001. Family influences on the lifestyle of Filipino youth. *East-West Center Working Papers*. 108 (8): 1-4.
- Delisle H., M. D. Chandra-Mouli, and B. de Benoist.** 2000. Should adolescents be specifically targeted for nutrition in developing countries: To address which problems and how? Retrieved from [http://www.who.int/child-adolescenthealth/New\\_Publications/NUTRITION/Adolescent\\_paper.pdf](http://www.who.int/child-adolescenthealth/New_Publications/NUTRITION/Adolescent_paper.pdf)
- Deutsche Gesellschaft for Technische Zusammenarbeit (GTZ).** Practitioner's Guide: Nutrition Education. Germany: Deutsche Gesellschaft for Technische Zusammenarbeit.
- Drichoutis, A.C., P. Lazaridis, and R. M. Nayga.** 2006. Nutritional food label use: A Theoretical and Empirical Perspective. Paper prepared for presentation at the 98th EAAE Seminar 'Marketing Dynamics within the Global Trading System: New Perspectives', Chania, Crete, Greece in June 29 - July 2, 2006.
- Food and Nutrition Research Institute-Department of Science and Technology (FNRI-DOST).** 2008. 7th National Nutrition Survey: Philippines.
- Karimi-Shahanjarini A., N. Omidvar, M. Bazargan, A. Rashidian, R. Majdzadeh, and D. Shojaeizadeh.** 2010. Iranian Female Adolescent's Views on Unhealthy Snacks Consumption: A Qualitative Study. *Iranian Journal of Public Health*. 39(3): 92-101
- Kraak, V. and D. L. Pelletier.** 1998. The Influence of Commercialism on the Food Purchasing Behavior of Children and Teenage Youth. *Family Economics and Nutrition Review*. 11:15-24.
- Leones, C. V. S.** 2006. Effective Preventive Measures for Youth at Risk in the Philippines. Resource Material Series No. 68 prepared for the 129th International Senior Seminar 'Visiting Experts' Papers' United Nations Asia and Far East Institute (UNAFEI) Newsletter.
- Maubach, N., J. Hoek, B. Healey, P. Gendall, and D. Hedderley.** 2009. Motivation, Ability and the Influence of Nutrition Information Formats. In D. Tojib (Ed.), *Proceedings of the Australian and New Zealand Marketing Academy Conference: Sustainable Management and Marketing*. ANZMAC.
- Nayga, R.M.** 1996. Determinants of Consumers' Use of Nutritional Information on Food Packages. *Journal of Agricultural and Applied Economics*, 28: 303-312.
- National Statistical Coordination Board (NSCB).** 2011. 2009 Official Poverty Statistics: Philippines.
- Radu, E. and O. Ciotaru.** 2007. Adolescent Malnutrition in Anthropological Perspective, *Proceedings of the Romanian Academy, Series B - Chemistry, Life Sciences and Geosciences*, Vol. 10.
- Rasberry, C. N.** 2007. Determinants of Nutrition Label Use among College Students. *American Journal of Health Education*. 38: 76-82.
- Savidge, G.S., K. Ball, A. Worsley, and D. Crawford.** 2007. Food Intake Patterns Among Australian Adolescents. *Asia Pacific Journal of Clinical Nutrition*. 16(4):738-47.
- Story, M. and M. D. Resnick.** 1986. Adolescents' View on Food and Nutrition. *Journal of Nutrition Education*. 18(4):188-192.

## ACKNOWLEDGEMENTS

*The researchers would like to extend their heartfelt gratitude to Dr. Corazon Barba; Prof. Angelina Bustos; Prof. Nancy Tandang; and the faculty, staff, and students of Los Baños National High School (LBNHS) in Brgy. Batong Malake, Los Baños, Laguna.*

## RESEARCHERS

*Marie Faye R. Nguyen is a food technologist and corresponding author. Nguyen is a Product Development Officer at Mister Donut Philippines in Quezon City (email: mariefaye.nguyen@gmail.com).*

*Anna Teresa O. Orillo is an Instructor at the Institute of Human Nutrition and Food at the College of Human Ecology at the University of the Philippines Los Baños (email: orillornd@gmail.com).*

*Rose Ann F. Hagos is a Food Technologist at the Institute of Human Nutrition and Food at the College of Human Ecology at the University of the Philippines Los Baños (email: rosehagos@gmail.com).*

*Celina Ann Z. Javier is Science Research Specialist I at the Food and Nutrition Research Institute of the Department of Science and Technology (email: celinaannjavier@yahoo.com).*

*Richelle M. Alcantara was a Research Assistant at the Institute of Human Nutrition and Food at the College of Human Ecology at the University of the Philippines Los Baños (email: richelle.alcantara@yahoo.com).*

*MTM Talavera is an Assistant Professor at the Institute of Human Nutrition and Food at the College of Human Ecology at the University of the Philippines Los Baños (email: theresa2968@yahoo.com).*