Anthropometric Status and Eating Behavior as Predictors of University Students' Academic Achievement

Asia Pacific Journal of Multidisciplinary Research
Vol. 7 No.2, 32-42
May2019
P-ISSN 2350-7756
E-ISSN 2350-8442
www.apjmr.com
CHED Recognized Journal
ASEAN Citation Index

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Date Received: August 2, 2018; Date Revised: April 3, 2019

Abstract-*Nutrition, Health, and Education are fundamental pillars of human resource development index. University students are the future nation-builders hence investment in their health and education will actually lead to a strong and developed nation. The study generally investigated the interplay of anthropometric status, academic performance and eating behavior of university students. It specifically investigated the students' anthropometric status, their academic performance and their eating behavior on healthy eating habits, emotional and personal eating styles, and consciousness in food safety. The descriptive correlational research design was utilized in the study with sixty randomly sampled participants. Results revealed that majority of the respondents were in normal weight, have good academic standing, and have neutral eating behavior. Test of difference showed that males have higher weight than females, students with higher weekly allowance, and whose parents have higher level of educational attainment and family income have higher BMI. Likewise, in terms of eating behaviors, those who have high academic performance, mothers are professionals, and from teacher education department have the highest assessment on their healthy eating habits while no significant difference was found on the academic performance of the respondents. Test of relationship revealed that academic achievement is correlated to the students' healthy eating habits. Moreover, regression analysis showed that nutritional status and healthy eating habits predict the academic performance of the university students at 16.5 percent strength of association. Results of the study will serve as a basis for educational health intervention and promotion.*

Keywords *– Nutritional Status, Academic Performance, BMI, Eating Behavior, University Students*

INTRODUCTION

One important quality indicators of Human Resources is the Human Development Index (HDI). It emphasizes that people and their capabilities should be the primary criterion to assess the development of a country. The basis for any true development must commence with the development of human resources. Among the determinants of HDI were education, health, and economy. When there are well educated human resources, the healthier they will be and the better economy of a nation is expected. Hence, these factors were closely related to the people's nutritional status. An understanding of the nature of the relationship between health and education is necessary for policy planners, implementers, as well as curriculum makers and implementers.

Social and economic developments of all nations largely depend on the quality of higher education. For universities around the world, promoting the health and well-being of students means a way of promoting quality education. The problem on the nutritional status of university students is considered a global issue in which every educational institution should consider as a priority.

According to Gan, Mohd, Zalilah, &Hazizi [1] the presence of unhealthy eating behaviors among university students is a serious concern. It is therefore imperative to encourage university students to observe proper eating behavior with the ultimate goal of developing a culture of health-conscious individuals and promote better academic achievement. They further emphasized that college students are manifesting unhealthy eating habits leading to gain in body weight and make their self-regulating food choices. Additionally, a study carried out by Adolphus, Lawton, and Dye [2] found out that insufficient and unbalanced diet observed among university students encounter difficulties in learning

which caused them to become dropped outs and low achievement as well as the physiological imbalance.

Higher education institutions should advocate an effective school environment in which its main goal is to promote health programs and services to students as an educational standard. In fact, the Centers for Disease Control and Prevention (CDC) in 2012, confirmed that health has the essential role among people to become active particularly the college students which is predisposed by habitual actions, beliefs, psychological constructs, and other external and internal stimuli.

According to Cavalli [3] and Drewnowski& Popkin [4] eating habits have been the primordial reason behind global weight and obesity. These constitute an increased consumption of fatty foods and sugar negatively correlated with the low intake of organic and nutritious foods. Hence, healthy food habits are important in keeping away a huge variety of chronic diseases such as obesity, heart problems, hypertension, diabetes, arthritis, cancer and many more.

Investigating the factors influencing the eating behavior of college students is important in tailoring interventions to increase their awareness of healthy food consumption and food safety consciousness. Reorientation on the psychographic characteristics of the students particularly on healthy eating habits will eventually lead to a normal body mass index and improve academic performance. This study explored the link between nutritional status, academic performance and eating behavior of college students of Cagayan State University at Lasam, Philippines. To achieve the optimal nutritional status of students, eating behavior and food intake need to be determined. With the proper calculation of height and weight of the students, it yields a reliable indicator of their body fitness while food selection and eating habits are important variables which have long-term consequences to their health, longevity and academic performance.

In the present locale of this study, it has been observed that most of the students do not have proper dietary habits and intake due to personal, financial, social and environmental factors which can have direct effect on the academic performance of the students with this, there is a need to deal with obesity and overweight in students through an increase of preventive educational activities in order to prevent the impending epidemic of non-communicable diseases. Likewise, it will also provide caring and support for young highly educated people.

This study is hinged on Abraham Maslow's theory of needs. The needs of people are based on a hierarchical model moving from the bottom to the higher needs. This explains that basic needs such as physiological must be satisfied first before moving up to higher needs. Among the important basic needs identified by Maslow are food and nutrition. As an implication to the educational setting, it is well accepted that when students do not have the proper food intake and nourishment this will eventually lead to the physical and cognitive incapacity of students to learn.

This study also captures the personal characteristics of the respondents particularly their parents' occupation and educational attainment will provide better educational intervention program for the students. A few studies published internationally have investigated the influences of parents' occupation and education on their children's nutrition and physical development. Aslam and Kingdon [29] found that only the mother's education was a significant predictor of child height and weight. Similarly, Glewwe [30] developed a conceptual model to describe pathways through which parental education may affect child health. Parental education leads to changes in child health through two interrelated channels. Higher education causes changes in parental values, affecting household income and allocation of resources towards children's health as well as parents' health knowledge. Second, more years of schooling lead to changes in cognitive skills that also affect parents' health knowledge, household income, and thus health and nutritional inputs.

The scarcity of literature in the Philippine setting prompted the researchers to pursue the study in a public higher education institution. The study hopes to contribute to the existing body of literature on how the interplay of nutritional status, academic performance, and eating behavior is observed among Filipino college students specifically the students with the end goal of proposing initiatives focusing on the establishment of a whole school approach to food and nutrition policy having a long-term impact to the students. To create an effective educational intervention addressing the good eating habits and food safety of students, this study was conducted.

PURPOSES OF THE STUDY

The study generally investigated the relationship between Body Mass Index, Academic Performance and eating behaviors of Filipino college students. Specifically, it aimed to 1) describe the personal characteristics of the respondents; 2) determine the body mass index; 3) find out the level of academic performance, 4) assess the eating behaviors of the respondents along healthy eating habits, emotional and personal eating habits, and consciousness on food safety. 5) Test the significant differences on the BMI, academic performance and eating behaviors of the respondents when grouped along with their personal characteristics; ascertain the significant relationship between the eating attitudes of the academic performance and body mass index of the respondents; 6) determine the factors which predict the academic performance of the students. Moreover, the study addressed issues recently identified as research gaps in need of further investigation that will generate empirical evidence on which aspects necessitate improvement and intervention. In essence, the results of this study may specifically guide higher education institutions in the Philippines in their initiatives in promoting healthy and competitive human resource of the country.

METHODS

Research Design

Employing a descriptive correlational design, the study covered the description of the existing relationship between BMI, academic performance, and personal food consumption behavior of the university students. Bold [5] noted that the purpose of a correlational study is to define the relationships among variables. As well, Creswell [6] confirmed that a correlational design utilized a statistical test to construct arrangements for variables.

Participants

There were sixty respondents randomly sampled from the total of eighty-three population of third year college students from the three college departments of Cagayan State University at Lasam, namely College of Teacher Education, College of Technology, and College of Information and Computing Sciences. Before the conduct of the study, permission was requested from the university authorities. To ensure the research ethics protocol, informed consent was observed particularly by orienting the respondents regarding the aim and motivation of conducting the study.

Instruments and Procedures

A two-part questionnaire was used in the study. The questionnaire elicited the personal characteristics of the respondents. It also looked at the anthropometric characteristics of the respondents as to their weight, height, and body mass index. Lastly, to assess the eating behavior of the students a standardized instrument on was lifted from the eating behavior questionnaire of Nmor, Nwaka, &Nmor [7]. Meanwhile, to obtain the data on the academic performance of the respondents, their mean grade during the first semester was considered.

To measure the academic performance of the respondents, their mean grade was obtained from their permanent record in the Campus Registrar's office of Cagayan State University at Lasam with written permission. The research instrument used was pre-tested by the respondents to the group of students who were not part of the population sampled to make necessary adjustment on its face and content validity.

Along with the anthropometric assessment of the respondents, a calibrated scale was utilized to determine their weight. During the weighing process, the respondents were requested to undergo the process and their participation was voluntary. Prior to their weighing process, they were asked to wear light clothing while they were instructed to stand straight. Their height measurement was also recorded.

Data Analysis

To analyze the gathered data, descriptive statistics were utilized to describe the personal characteristics of the participants. Likewise, inferential statistics particularly independent sample t-test and one-way ANOVA were used to test the hypotheses of the study. The Shapiro-Wilks test for normality is one of three general normality tests designed to detect all departures from normality.

Correspondingly, Post Hoc Tukey HSD test was also used to analyze the significant difference on the specific groups of variables differed. Pearson r was used to identify the significant relationship between the identified variables. Finally, multiple regression analysis was used to identify the variables that predict the academic performance of the students.

To interpret the eating behavior of the respondents, the following scale was adopted: 4.20-5.00- Very High (VH)/ Always; 3.40-4.19- High- (H)/ Very Often; 2.60-3.39- Moderate (M)/ Sometimes; 1.80-2.59- Low (L)/ Rarely, 1.00-1.79- Very Low (VL)/

Never.

In the same way, BMI was utilized to measure participants' anthropometric status. Weight status was categorized and interpreted into four: underweight (BMI ≤18.5), normal weight (BMI between 18.5 and 24.9), overweight (BMI between 25.0 and 29.9) and obese (BMI ≥30).

The following percentage bracket and classification was adopted to interpret the academic performance of the respondents: 97-100- Excellent; 94096- Very Outstanding, 91-93- Outstanding; 88-90- Very Good; 85-87- Good, 83-84- Very Satisfactory, 79-81- Satisfactory, 76-78 – Fair; 75- Passing, below 75- Failing.

RESULTS AND DISCUSSION

As shown in Table 1, most of the respondents were female. This suggests that in terms of enrolment trend of Cagayan State University at Lasam, female students outnumbered male students in the university. The table likewise reveals that when grouped according to a weekly allowance, most of the students have Php 201-500 weekly allowance. Likewise, parents' educational attainment showed that most of the fathers were elementary undergraduate while mothers' education showed that most of them were elementary graduates. Finally, the parents' occupation revealed that most of the fathers were farmers and mothers were housekeepers.

Table 1. Personal Characteristics of the Respondents

Profile Variables	Categories	Frequency (N=60)	Percentage
SEX	Male	22	37
	Female	38	63
WEEKLY ALLOWANCE	Below 200	9	15
	201-500	44	73
	501-1000	6	10
	1001-1500	1	2
FAMILY MONTHLY INCOME	Less than Php.5,000	35	58
	Php 5,000-8,000	11	18
	Php 8,000-10,000	6	10
	Php 10.000-12,000	4	7
	Php 12,000-14,000	0	0
	Php 14,000-16,000	2	3
	More than 16,000	2	3
FATHER EDUCATIONAL ATTAINMENT	Elem. Undergrad	14	23
	Elem. Graduate	12	20
	HS Undergrad	9	15
	HS Graduate	12	20
	TechVoc Diploma	2	3
	College Undergrad	7	12
	College Graduate	4	7
FATHERS' OCCUPATION	Farmer	36	60
	Laborer/ Service worker/ Technical worker	22	37
	Professional	2	3
MOTHERS' EDUCATIONAL ATTAINMENT	Elem. Undergrad	8	13
	Elem. Graduate	15	25
	HS Undergrad	7	12
	HS Graduate	24	40
	TechVoc Diploma	0	0
	College Undergrad	3	5
	College Graduate	3	5
MOTHERS' OCCUPATION	Housekeeper	46	77
	Laborer/ Service worker/ Technical worker	10	17
	Professional	4	7

Anthropometric Status of the Students

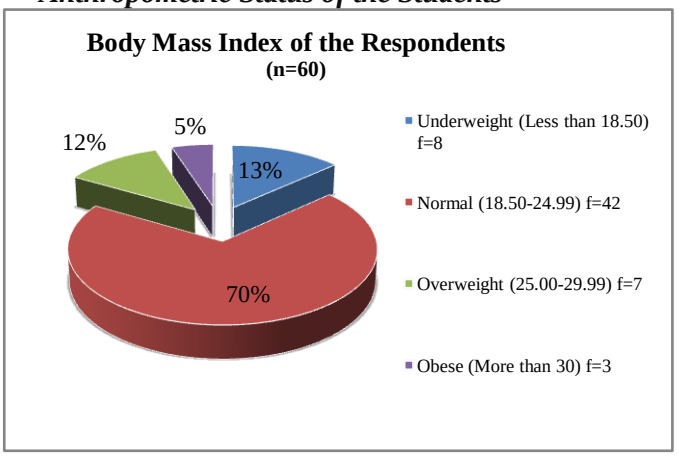

Figure 1. Percentage Distribution of the Nutritional Status of the Respondents when taken as a whole

Figure 1 shows the percentage distribution of the BMI of the respondents. The revealed that majority of them have normal BMI (18.50-24.99) with the frequency of 42 (70 percent). In like manner, there were only 8 (13 percent) underweight respondents while, 7 (12 percent) of them were overweight, and the least contributors were obese with a frequency of 3 (5 percent).

This finding shows that most of the sampled respondents of Cagayan State University at Lasam had a normal weight body mass index. The finding is consistent with Hemati, Moghadasi& Azizi [8] who stated that the overall prevalence of normal weight represents the majority of the students, and two-fifths of them were overweight and underweight while the fewer percentage of them was obese. The finding clearly implies that majority of the students were of normal weight but there is a reasonable high occurrence of overweight and least occurrence of obese in the university.

Table 2. The difference on the Body Mass Index of the Respondents when group According to Profile Variables

Profile Variables	Nutritional Status P value
Sex	0.004 *
Weekly Allowance	0.023 *
Fathers' Occupation	0.545 ns
Mothers' Occupation	0.608 ns
Mothers' Education	0.016 *
Fathers' Education	0.033 *
Family Monthly Income	0.570 ns
College Department	0.067 ns

*= significant at 0.05 levelns= not significant at 0.05 level

As seen in Table 2., the results of the test of differences showed that there exist significant differences on the BMI of the respondents when grouped according to their profile variables. Therefore, the null hypothesis of the study was rejected at the 0.05 alpha level. The table further reveals that differences are shown along sex (p-value = 0.004), weekly allowance (p-value = 0.023), mother's education (p value= 0.016), and fathers' education (p value= 0.033).

A significant difference between the BMI of students when grouped according to their sex showed that male students have higher BMI over the female students. The finding would mean that male students have higher weight and height compared to their female counterpart. This finding is consistent with Salameeh et. al [9] reported that female university students had lesser BMI than male university students based on their body weight and height measurement. This is in contrast with Santamaria et. al [10] illustrated that no differences exist on university students' BMI between both sexes.

Consequently, a weekly allowance of the respondents spelled difference on their BMI, the finding shows that student with a high amount of weekly allowance has high BMI compared to the students who have a low weekly allowance. The finding may be interpreted that the higher the students have an amount of weekly allowance, the higher purchasing behavior they manifest, hence the higher BMI they have. This finding may be attributed that economic status is a factor that explains students' boy mass index. Alves et.al [11] noted that that social class is considered an associated factor in the BMI.

Perusing the table, it also reveals that parents' education spelled difference on the BMI of the respondents. This shows that students whose both parents were college undergraduate and college graduates have high BMI. The finding confirms the study of Shrewsbury & Wardle, [12] that there exists a relationship between mother's education and the BMI of their children. Further, Thomas, Strauss & Henriques [13] concluded that parents' level of education is correlated to the health of their children.

Subsequently, studies concluded that women's education is significantly associated with children's health. It has been widely accepted that when parents are more educated, their awareness of the intake of their children with healthy and nutritious food also increases. In like manner, UNICEF [14] also noted that stable family income, lodging, and adequate level

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of education are important to be considered to eliminate malnutrition.

Table 3. Academic Performance of the Respondents when taken as a whole

Point Bracket	Description	f	%
91-93	Outstanding	2	3
88-90	Very Good	16	27
85-87	Good	31	52
82-84	Very Satisfactory	8	13
79-81	Satisfactory	3	5
Total Mean Grade = 87.00		**Std. Dev.= 2.233**	
Highest Grade= 91.86		Lowest Grade= 80.84	

Table 3. shows the academic performance of the respondents when taken as a whole. It shows that all the students have a total mean grade of 87 with the standard deviation of 2.233. The table generally shows that students have good academic standing. The data also reveals that the maximum grade of the respondents is 91.86 while the lowest grade is 80.84.

The table also reveals that 31 (52%) of the respondents belonged to a good level of academic performance, 27 (16 %) to the very good level, 8 (13%) belonged to very satisfactory level, while 3 (5%) to a satisfactory level and only 2 (3%) have an outstanding level of academic performance. The data also reveals that no student obtained an excellent level of academic performance.

Table 4. Test of Difference on the Academic Performance of the Respondents When Group According to Profile Variables

Profile Variables	Academic Performance P value
Sex	0.251 ns
Weekly Allowance	0.946 ns
Fathers' Occupation	0.517 ns
Mothers' Occupation	0.973 ns
Mothers' Education	0.138 ns
Fathers' Education	0.175 ns
Family Monthly Income	0.301 ns
College Department	0.247 ns

*= significant at 0.05 level
ns= not significant at 0.05 level

Test of difference on the academic performance, when grouped to selected profile variables, showed that no significant differences existed. Hence, then null hypothesis stating that there is no significant difference on the academic performance when grouped according to their profile variables is rejected at the 0.05 alpha level. This means that regardless of students' sex, weekly allowance, birth order, parents' education, parents' occupation, family monthly income, residence, and college department of the students they have the same level of academic performance. The study confirms Okafor [15] that no gender difference on the academic performance of undergraduate students. In like manner.

Table 5. Assessment of the Eating Behavior of the respondents

	Mean	Interpretation	Std.Dev.
Healthy Eating Habits	3.77	Very Often/ High	0.62
Emotional and Personal Eating Style	2.99	Sometimes/ moderate	0.69
Consciousness in Food Safety	3.12	Sometimes/ moderate	0.95
Grand Mean	**3.29**	**Sometimes/ Neutral**	

Legend: 4.20-5.00-Always/ Very High; 3.40-4.19- Very Often/ High; 2.60-3.39-Sometimes/ Neutral; 1.80-2.59-Rarely/ Low, 1.00-1.79- Never/ Very Low .

With regards to the eating behavior of the students of Cagayan State University at Lasam, Table 3 presents that the respondents have a "neutral" level of eating behavior as evidenced with the grand mean of 3.29. It can also be seen in the table that the three dimensions of students' eating behavior, healthy eating habits obtained the category mean of 3.77 (very often/ high) and standard deviation of 0.62, consciousness in food safety registered with the mean of 3.12 (sometimes/ neutral), and emotional and personal eating style with the category mean of 2.99 (very often/ high).

The highest assessment of the respondents on their eating behavior is shown on their healthy eating habits (3.77- Very Often/High). The finding indicates that most of the students consider the practice of healthy food consumption habit as part of their daily activities. They tend to manifest eating activity is a way for them to become healthy. Similarly, they also believe that consuming the variety of foods with different vitamins and minerals will make them healthy while most of them also confirmed that their eating habits are normal as they chew their foods slowly and well. Additionally, for them, knowing more about the food nutrients they can get from what they eat will make them become healthier. Though manifesting a high level of healthy eating habits, drinking vitamins were the least observe activity of the students in this

dimension. Hence, there is still a need for vitamin supplements for the students to become healthier. Sanlier [16] noted that most university students did not meet the recommended intakes for most of the micronutrient and macronutrient.

Perusing the table, it also shows that the respondents assessed themselves to have a moderate level of consciousness in food safety (3.12- sometimes/ moderate). The finding indicates that most of the students have a neutral level of food safety knowledge and practices. The respondents consider eating natural foods and organic vegetables as a way of observing food safety. They also believed that proper handling and preparation of foods will prevent poisoning and occurrence of foodborne diseases. They also believed that emphasis on improving personal hygiene, proper cooking of foods, avoiding food contamination, storage foods properly at safe temperatures are important ways to observe food safety. The moderate level of food safety awareness of the students needs to be enhanced with proper education and awareness. Sanlier [16] affirmed that food healthy knowledge, awareness and practices of emerging adults are at the low level. In the same way, Rimal [17] noted that to have proper food safety education it requires basic practices of proper food handling and preparation. Furthermore, emotional and personal eating style of the respondents was also assessed with moderate level (2.99- sometimes/ moderate). This finding reveals that personal and emotional styles of the respondents have an effect on their food choices and consumption. It was found out that most of the students admitted that eating foods is a way for their recreation and social activity. They also manifest the behavior of eating much when they are not in a good emotional condition. Accordingly, eating their favorite food will eventually make them eat more than usual. The finding also affirms that the palatability of food is a factor which makes the students consume more foods. This affirms Steptoe, Pollard & Wardle [18] that food choices are affected by an individual's psychological construct.

Table 6 presents the eating behaviors of students differ when grouped according to their personal characteristics. Hence, the null hypothesis of the study was rejected at the 0.05 alpha level. Significant differences are seen along healthy eating habits when grouped according to academic achievement (p-value =0.035), mothers' occupation (p-value = 0.029), and college department (p value= 0.021). In like manner, along with emotional and personal eating styles of the respondents, weekly allowance (p-value- 0.044), mother's occupation (p value= 0.004), father's education (p value=0.016), family monthly income (p-value = 0.040), and college department (p value= 0.024). Additionally, consciousness on food safety spelled differences in the mother's occupation (0.035) and father's education (0.002) of the respondents.

Table 6. Differences on the Eating Behaviors of the Respondents when grouped according to their Profile Variables

Profile Variables	Healthy Eating Habits	Emotional eating Habits	Consciousness in Food Safety
Sex	0.744 ns	0.882 ns	0.236 ns
Body Mass Index	0.263 ns	0.576 ns	0.137 ns
Academic Achievement	0.035 *	0.743 ns	0.196 ns
Weekly Allowance	0.223 ns	0.044 *	0.540 ns
Birth order	0.227 ns	0.502 ns	0.147 ns
Fathers' Occupation	0.996 ns	0.222 ns	0.878 ns
Mothers' Occupation	0.029 *	0.004 *	0.035 *
Mothers' Education	0.058 ns	0.074 ns	0.061 ns
Fathers' Education	0.060 ns	0.016 *	0.002 *
Family Monthly Income	0.409 ns	0.040*	0.358 ns
College Department	0.021 *	0.024 *	0.085 ns

*= significant at 0.05 level
ns= not significant at 0.05 level

Based on the Post hoc Tukey HSD Test, the respondents who have high academic performance, mothers are professionals, and from the college of teacher education department have the highest assessment on their healthy eating habits. This study reveals that the factors defining differences in the eating habits of students were academic performance, mother's education and college department. Hence, when mothers are more educated the exhibit higher awareness on food safety and proper eating habits. Vaida [19] confirmed that even mother's occupation is a determinant of child feeding practices affecting the well-being of their children.

On the aspect of high academic performance and high healthy eating habits, it was affirmed in this

study that students who have healthy eating habits tend to show better performance in their academic. While students from the education department showed high assessment of their eating habits revealed that they are more aware of the nutrition of their food intake compared to their counterparts in the other college department.

Additionally, emotional eating habits of the respondents significantly differed on the weekly allowance, mother's occupation, and father's education. Post Hoc HSD Test revealed that students who have the highest assessment on their emotional and personal eating styles have a high weekly allowance of Php 500-1,000, mothers are working as service and technical workers, and fathers are college undergraduates and college graduates. The finding implies that weekly allowance, mothers occupation, and fathers level of education defined differences in the personal and behavioral eating styles of students. The high amount of weekly allowance of the respondents constitute to their purchasing power to foods they would like to eat hence they higher decision making they established among themselves. In like manner, mothers' occupation and fathers' education would mean that parent-related factors have the strong influence on the food consumption behaviors of the students. Furthermore, students from the college of teacher education showed a higher assessment of their emotional and personal eating habits since the college are female-dominated and evidence on the behavioral eating styles between male and female students are observable.

Consequently, the table also reveals that consciousness of the respondents on food safety spelled differences on their mother's occupation and educational background of fathers. Results would mean that food safety awareness of students is associated with parental variables. This implies that when parents have a higher level of education and good occupation, the higher awareness of food handling practices and preparation is observed. This clearly explains that access of their children to safe and nutritious food intake is expected of them. Food hygiene's knowledge, attitudes, and practices of adolescents found out that parental influences increased food safety awareness. In like manner, Roseman &Kurzynske [20] concluded that education and income levels are influencing factors for food safety and knowledge. Correspondingly, Norazmir et al [21] noted socio-economic profile and academic achievement are associated with proper eating habits and food safety consciousness.

Generally, this study found out that most of the significant variables defining differences in the eating behavior of the students are influenced by parental-related variables. This finding construes with Golan &Crow [22] that parents are influential factors to developing proper eating behavior of their children. Further, Wilke et al [23] noted that socio-economic variables are factors affecting the healthy eating behavior of students.

This study also revealed that sex, birth order, and body mass index do not spell differences in the eating habits of the students.

Table 8. Test of the relationship between the eating behaviors of the respondents and selected variables

		Healthy Eating Habits	Emotional eating Habits	Consciousness in Food Safety
Body Mass	r-value	.0012	.0926	-.0020
Index	p-value	p=.993	p=.482	p=.988
Academic	r-value	.2873	-.0179	.1461
Achievement	p-value	p=.026*	p=.892	p=.265

**= significant at 0.05 level; ns= not significant at 0.05 level*

Table 8 shows the correlation between eating behaviors of the respondents and their BMI and academic achievement. It was found out in the study that there is a significant relationship between the academic achievement (p value= 0.26) and healthy eating habits of the respondents. The positive relationship generally suggests that the higher the healthy eating habits of the students, they tend to exhibit a higher level of academic achievement. This implies that there is a positive association between proper and adequate food consumption and scholastic standing. This finding has been confirmed by earlier studies conducted by [24] who showed that nutrition has a role and effects on the cognitive functioning of students. In like manner, McIsaac, Kirk, &Kuhle, [25] found out a significant relationship between health behaviors and academic performance of students.

The table also shows that no significant relationship was found between BMI and eating behavior of the respondents. This also confirms the finding of Mahmoud and Taha [26], that no statistical correlation between eating habits and Body mass index of the students. These results are due to the increasing number of young adults who do not meet recommended diets and physical activities.

Table 9. Regression Analysis of the eating behavior and nutritional status in relation to the academic performance of the respondents

Factors	β*	Un Std. Error of β	β	Standardized Coefficient β	t	p-value
Healthy Eating Habits	0.396	0.184	0.243	0.113	2.155	0.036*
Emotional Eating Habits	0.241	0.169	0.133	0.093	1.423	0.160
Consciousness in Food Safety	0.002	0.214	0.001	0.086	0.010	0.992
Body Mass Index	0.609	0.233	0.056	0.021	2.610	0.012*

*N=60 R= 0.485 R^2= 0.165 F value= 3.338**

**- significant at 0.5 level*

Table 9. presents that academic achievement of the students is accounted by healthy eating habits and nutritional status. Among the predictor variables identified, healthy eating habits obtained the p-value of 0.035, and BMI obtained the p-value of 0.036 which are lesser than 0.05 alpha level. This means to say that the two variables namely eating habits and BMI significantly predicting the academic achievement of the college students. Likewise, in general, the table also presents that adjusted R^2 of 0.165, when converted into percentage, is 16.5 percent. This suggests that 16.5 percent of the variance in the scholastic standing of the students is accounted for the four variables.

Body Mass Index (BMI) is found out to predict academic performance of students. This indicates that when students have a normal body status, they manifest good academic performance. With good nutritional status, expected learning achievement of students will increase. The finding further confirms Alatupa et al [27] and London &Castrechini [28] BMI is used to predict the academic performance of students. Correspondingly, the healthy eating habits of the students predict their academic performance. This indicates that when students have good eating consumption, they can perform academically.

CONCLUSION AND RECOMMENDATION

The study generally investigated the interplay of anthropometric status, academic performance and eating behavior of university students. It specifically investigated the students' anthropometric status, their academic performance and their eating behavior on healthy eating habits, emotional and personal eating styles, and consciousness in food safety. The study revealed the majority of the respondents were female, have Php 201-500 weekly allowance, parents' educational attainment showed that majority of them were elementary undergraduates and elementary graduates, parents' occupation revealed that most of them were farmers and housekeepers. Majority of the respondents have normal BMI as an anthropometric measurement. Test of difference showed that sex, weekly allowance, and parents' education spelled differences on the respondents' BMI. Meanwhile, the students have good academic standing while no significant differences found along with their selected profile variables as to the eating behavior of the respondents, they have a high level of healthy eating habits, moderate food safety awareness and a moderate level of emotional and Personal eating style. Test of relationship showed that academic achievement and healthy eating habits are correlated. Finally, the result of regression analysis revealed that healthy eating habits and BMI significantly predicts the academic achievement of the college students. Results of the study will serve as the basis for educational health intervention and promotion.

Implications for Campus-Based Health Education Program

The urgent need for campus-based health education program should be initiated to help increase the awareness of students on proper eating habits and healthy lifestyles. This study supports the need for a compulsory health education activity which should be initiated since a major finding of the study revealed that there is a significant interplay of students' anthropometric measurement, academic achievement, and eating behavior. Hence, development of educational interventions focusing on students' awareness on healthy food intake will encourage them to have a better practice of healthy eating habits and a better academic performance. Further, implementation of campus-based campaigns to raise awareness on healthy lifestyles through posters and pamphlets, slogan and poster making contest will be an effective medium of communication to students. In like manner, ensuring healthy meals for the students with food supplements available to students at affordable prices in the school canteen should be initiated. Also, a health awareness campaign for parents should be carried out since most of the variables found in the

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study were parent-related factors. A regular monitoring of students BMI should be carried out by the Campus Clinic and the Office of Students' Services Development and Welfare (OSDW). The Campus Student Government (CSG) may design a health awareness plan for all students to participate.

Limitations and Future Research Directions

The present study is only limited to the selected profile variables of the respondents which are correlated with their academic performance, eating behavior and BMI. There is still a need to conduct a similar study to a wider group of respondents to have a clearer picture of the effects of nutritional status to the academic achievement of college students since the sampling size of the present study was only based in one campus of a public higher education institution in Region 02, Philippines. As to future research directions, there is still a need to conduct a similar research study using true experimental research design to come up with a more conclusive result. Finally, another study should be conducted using new variables and by identifying the patterns of food consumption and preferred food intake of students.

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