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Eating Habits, Nutrition Literacy, and Mathematics Performance of Junior High School Students

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Abstract

This study determined the students' level of eating habits, nutrition literacy, and mathematics performance and the relationship among them in a select school in Laguna, Philippines during the Academic Year 2021-2022. It also determined the difference in eating habits and nutrition literacy according to the profile. It used descriptive-correlational research design through a survey of 430 respondents selected using multi-stage random sampling. The adapted and validated instrument showed reliability analysis, internal consistency carried out using Cronbach's Alpha, with eating habits (α=0.70) and nutrition literacy (α=0.83) reached high reliability. Frequency, percentage, mean, standard deviation, independent samples z-test, one-way ANOVA, and chi-square test for association were used. The study found that most respondents have 85 to 89 mathematics performance while the level of eating habits and nutrition literacy was high and the mathematics performance was satisfactory. There was a significant difference in eating habits (F=2.47, p=0.04) and nutrition literacy (F=5.56, p=0.00) as to age, while no difference was found as to sex (p>0.05). There was also a significant difference in nutrition literacy according to grade level, while no significance was found in eating habits according to grade level. Respondents' eating habits were associated with nutrition literacy (x2=48.90, p=0.00), and mathematics performance (x2=18.28, p=0.03). It indicated that eating habits greatly affect the nutrition literacy and mathematics performance of the students. The study formulated recommendations for the teachers, school heads and administrators, parents and guardians, students, and future researchers.

Keywords: *Eating Habits, Nutrition Literacy, Mathematics Performance, Mathematics*

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1. Introduction

Mathematics performance in school is often perceived as a great challenge for students. It is also challenging for teachers to change their students' perspective of this subject. In a worldwide assessment conducted by the Trends in International Mathematics Science Study in 2019, the Philippines is the bottommost and consistently ranked behind in math. Problems related to mathematics are very evident in the Philippines and globally (Blomeke & Delaney, 2014). Although the country provides educational modules containing specific topics and instructional plans, Filipino students still have low understanding and thinking skills when it comes to learning Mathematics (Aksan, 2021). Even college students are still struggling in mastering the math subject itself (Dinglasan & Patena, 2013; Ganal & Guiab, 2014). Because of the various factors associated with the problems in teaching mathematics, efforts had been made by the researchers to find out the cause of the student's low performance in Mathematics. The Department of Education (DepEd) had taken it as a challenge to improve and enhance students' literacy and performance of the country's education. It employs concrete policies and actions in addressing the gaps and problems in teaching the subject (Mendoza, 2020).

Numerous determinants affect the intellectual and academic performance of students in school. These could be the school quality indicators, family characteristics, individual characteristics, and interestingly, dietary patterns (Kristo et al., 2020). According to Tucker (2010), the dietary patterns have a significant effect on the ability of the students, particularly the adolescent. The nutrients and composition of meals have a significant impact on students' behavior and thinking ability in school. An inadequate and unbalanced diet could reduce the attention, perception, struggle in erudition, encourage behavioral ailments and absence, worst, on the overall academic performance of an individual (Demirezen & Cosansus, 2005). It suggests schools to ensure students have access to healthy, nutrient-rich meals in order to maximize their ability to learn and grow (Tucker, 2010).

With the significant findings on the correlation of dietary patterns on academic performance, this study aimed to come up evaluate dietary plan appropriate for the needs of adolescent students. While there are studies of the same nature previously conducted, there were limited studies in the Philippine setting. Hence, the study is novel. Eating habits and nutrition literacy correlated with the students' mathematics performance has not been a

research subject. While a research has been conducted in the same locale (Munda & Tamban, 2019), it was only limited to Mathematics performance correlated with other variables like interpersonal, intrapersonal, and adaptability of students. Therefore, this study aimed to determine the students' level of eating habits, nutrition literacy, and mathematics performance in a select school in Laguna, Philippines during the Academic Year 2021-2022. It also aimed to test the difference in eating habits and nutrition literacy according to demographics and the relationship among eating habits, nutrition literacy, and mathematics performance.

2. Literature review

2.1. Eating Habits

There were several studies conducted on the eating patterns of students during the pandemic. For instance, Chen et al. (2022) found that 51.2% of the 426 students surveyed in Malaysia had increased eating, snacking (55.2%) and online food ordering (71.1%) during the lockdown. A similar eating pattern was established in the study of Arif et al. (2022) among Indonesian students but emphasized female students with significantly lower physical activity than male students. According to Olfert et al. (2022), students showed significant increase in eating and consumption of almost every food group where 32.6% had increased eating patters since the pandemic due to boredom. Meanwhile, 332 Portuguese university students healthier eating habits were adopted during the pandemic lockdowns due to decrease in meal delivery platforms used and increased consumption of vegetables, fruit and legumes (Monteiro & Ferreira-Pego, 2022). Similar patterns were recorded by Gaa et al. (2022) where 59% students who skipped meals before COVID-19 was down to 47.8% during lockdowns and consumption of homemade meals increased from 64.1% to 82.3%.

Although there was improvement on eating healthy during the pandemic, the concern increased as to obesity. According to Lowry and Shores (2022), there has been an accelerated trend in obesity due to changing patterns of eating habits, access to healthy food and decrease activity. In a study by Di Renzo et al. (2020), 48.6% of the total 3533 respondents have perception of weight gain. While Cantarero et al. (2023) reported a 17.9% improvement in sports habits, a total of 13.6% were dependent on mobile phone. Galali (2021) also reported that more than half of people surveyed had harmed lifestyle during lockdowns, which appeared to have detrimental effect on eating habits leading to strong perception of weight

gain. The study also found that participants appeared to moderately adhere to Mediterranean diet, particularly vegetables, fruits, and legumes. The post lockdown also shown similar pattern of eating habits with 8.63% drop in the consumption of homemade foods and 26.67% of students gained weight (Shaun et al., 2021).

2.2. Effects of Eating Habits on Academic Performance

In a study conducted by Teves and Narciso (2017) on the 348 secondary students of Negros Oriental in the Philippines, the eating behavior showed inclination to eating bread, pastries, junk foods, candies and soft drinks while the academic achievement was average. The study found strong significant positive correlation between students' eating behaviour and nutritional status but there was no significant relationship between nutritional status and academic performance. Similarly, Beredo and Aceron (2019) found a negligible negative correlation between weight and academic performance based on the computed r value of 0.349. However, Reuter et al. (2019) found that healthy eating habits benefit students' academic performance emphasizing that breakfast consumption was associated with an increase in self-reported GPA, whereas fast-food consumption was associated with a decrease. Kristo et al. (2020) also discovered a significant positive correlation between eating habits score, family affluence score, and student success through Scholastic Aptitude Standardized Examination (SASE) scores while Correa-Burrows et al. (2016) assert that higher-quality diet improved respondents' average scores in language, mathematics, and GPA.

Mora et al. (2019) found physical activity and eating recommended number of meals per day associated with improved academic performance. physical activity and proper nutrition are significant predictors of achievement scores (Asigbee et al., 2018). However, Pearce et al. (2018) discovered that academic performance was found to be negatively related to a nutrient-deficient, energy-dense diet, but not to a nutritious diet. Students' lack of basic nutritional knowledge is associated with low scores on assessments (Badrasawi et al., 2020).

2.2. Theoretical framework

This research is linked to the Planned Behavior Theory, which was developed to encompass all behaviors that humans can exert self-control. Behavioral intentions are influenced by one's attitude toward the likelihood that the behavior will produce the desired

result and one's subjective assessment of the associated risks and benefits. This theory has been used to explain and predict a variety of health behaviors and intentions, including smoking, drinking, seeking medical care, breastfeeding, and substance abuse. It claims that motivation and ability are required for behavioral success. It categorizes beliefs as behavioral, normative, or control (LaMorte, 2019a). It is also associated with Social Cognitive Theory of Albert Bandura, which suggests that knowledge takes place in a social context and is characterized by a dynamic and reciprocal relationship between the individual, their environment, and their behavior. It considers the unique ways in which people acquire and maintain behaviors, as well as the social context in which they occur (LaMorte, 2019b). These theories were linked to this study since the aim is to determine the students' level of eating habits, nutrition literacy, and mathematics performance. Improved math performance could be obtained if individuals have good eating habits and high literacy on food nutrition.

3. Methodology

Descriptive-correlational research design was used in this study. Of the 1,049 learners enrolled in the online and blended learning modalities, 430 Grade 7 to 10 students were chosen as respondents through multi-stage sampling. Stratified sampling was utilized in the first stage, while simple random sampling was applied in the second stage.

Table 1
Demographic Characteristics

Profile	Frequency	Percent
Sex		
Male	188	43.7
Female	242	56.3
Age		
12-13 years old	217	50.5
14-15 years old	124	28.8
16-17 years old	81	18.8
18-19 years old	6	1.4
20 years old and above	2	0.5
Grade level		
Seven	146	34.0
Eight	93	21.6
Nine	95	22.1
Ten	96	22.3
Total	**430**	**100.0**

The table shows the demographic characteristics of the student-respondents who are mostly female students (242 or 56.3%), between 12 and 13 years old (217 or 50.5%), and seventh grade (146 or 34.0%).

This study's instrument consists of three parts. The first section focuses on the demographic characteristics, while the second part solicits data on the respondents' self-reported Mathematics performance through their rating in the first quarter. The mathematics performance categories of the respondents were based on the DepEd Order No. 8, series of 2015. The third part is an adapted questionnaire from Naughton et al. (2015), Steptoe et al. (1995), Roininen et al. (1999), and Park (2011) to determine the respondents' level of eating habits and nutrition literacy. The instrument was adjusted to reflect the respondents' present scenario. Each statement is a 5-point Likert scale. The instrument was tested for content validity by four specialists and reliability analysis through internal consistency. Cronbach's alpha demonstrated that eating habits scale ($\propto = 0.70$, 10 items) and nutrition literacy scale ($\propto = 0.83$, 17 items) reached high reliability. The questionnaire was distributed to the respondents via Facebook Messenger group chat as Google Form Link.

In carrying out the data collection, permission was given by the division superintendent and the school heads, parents and respondents of the study. In compliance with research ethics, it was stressed that participation in the survey was voluntary. The data were kept confidential to the full extent of the law.

The study employed frequency and percentage to describe the demographic characteristics, and mean and standard deviation to assess the level of mathematics performance, eating habits, and nutrition literacy. Moreover, independent samples z-test and one-way ANOVA were applied to test the difference in the level of eating habits and nutrition literacy between two and three independent groups, respectively. Lastly, chi-square test for association was performed to examine the link among the categorical data on eating habits, nutrition literacy, and mathematics performance.

4. Findings and Discussion

Table 2 demonstrates the level of the eating habits of the respondents. The statement with the highest mean is "*I keep three regular meals a day*" (x=4.19, SD=1.03), interpreted as "high level." It indicates that most junior high school students strongly agreed that they

should continue eating three meals every day. The statement with the lowest mean is "*I do not eat cake, ice cream, and other sweets/desserts and soda between meals*" (x=2.87, SD=1.19), interpreted as "Average level." It suggests that majority of respondents had a moderate level of agreement that they do not consume sweets, desserts, and soda between meals. It shows that most respondents have healthy eating habits. On the other hand, it also shows that despite having healthy eating habits, most respondents love to eat unhealthy foods for their appetite.

Table 2

Eating Habits of the Students

Statement	Mean	Std Dev	Interpretation	Rank
1. I eat dairy products such as cheese, butter, cream, yogurt, and other milk-based products every day over one serving size.	3.53	1.11	High level	5.5
2. I eat meat, fish, egg, bean, or tofu every day over 1-2 serving sizes.	3.74	0.95	High level	4
3. I eat vegetables every day over 1-2 serving sizes.	3.85	1.05	High level	3
4. I eat one serving size of fruit or drink 2-3 servings of fresh fruit juice every day.	3.47	1.06	Average level	6
5. I do not eat fried or stir-fried food every day more than the recommended amount.	3.53	1.01	High level	5.5
6. I eat fatty meat (pork: *kasim, lomo, liempo, pata, pigue or* chicken: skin, drumstick, thigh, wing, neck) every three days over one serving size.	3.07	1.13	Average level	8
7. I do not add table salt or condiments like soy sauce, vinegar, catsup, patis, bagoong to food generally.	3.12	1.19	Average level	7
8. I do not eat cake, ice cream & other sweets/desserts and soda between meals.	2.87	1.19	Average level	9
9. I keep three regular meals a day.	4.19	1.03	High level	1
10. I eat a variety of foods.	4.03	0.98	High level	2

Legend: 4.50 – 5.00 Very High, 3.50 – 4.59 High, 2.50 – 3.49 Average, 1.50 – 2.49 Fair, 1.00 – 1.49 Poor Level

The results show similarity to Kristo et al. (2021) that 64.4% skip at least one meal every day, while 35.6% do not. Breakfast is the most frequently skipped meal, whilst dinner is the least frequently skipped meal. While skipping a meal is attributed to many factors and medical implications, the result show that the eating habits of the students are on the average

level signifying mostly adherence to good nutrition with some inclination to sweets and oily foods.

Table 3

Nutrition Literacy of the Students

Statement	Mean	Std Dev	Interpretation	Rank
1. I always follow a healthy and balanced diet.	3.83	1.00	Highly literate	13
2. The healthiness of food has an impact on my food choices.	3.99	0.94	Highly literate	9
3. I am very particular about the nutrient content of the food I eat.	3.97	0.88	Highly literate	10
4. It is important for me that my diet is low in fat.	3.66	1.01	Highly literate	14
5. I pay attention that I do not use too much sugar.	3.84	1.04	Highly literate	12
6. It is important for me that my diet contains a lot of vitamins and minerals.	4.09	0.90	Highly literate	7
7. I am prepared to eat a lot as healthy as possible.	3.94	0.99	Highly literate	11
8. I think it is important to know how to eat healthy food.	4.50	0.73	Very highly literate	1
9. It is important that the food I eat helps me control my weight.	4.33	0.82	Highly literate	2
10. I worry about the healthiness of food that I eat.	3.22	1.32	Moderately literate	16
11. I avoid foods if they may raise my cholesterol level.	3.28	1.22	Moderately literate	15
12. I ask myself all the time whether the things I eat are good for me.	3.18	1.26	Moderately literate	17
13. It is important that the food I eat are not only healthy but also keeps me awake and alert.	4.07	0.94	Highly literate	8
14. It is important that the food I eat helps me cope with life.	4.11	0.87	Highly literate	6
15. It is important that the food I eat helps me relax.	4.26	0.80	Highly literate	4
16. It is important that the food I eat cheers me up and makes me feel good.	4.32	0.86	Highly literate	3
17. It is important that the food I eat helps me cope with stress.	4.13	0.97	Highly literate	5

Legend: 4.50 – 5.00 Very Highly Literate, 3.50 – 4.49 Highly Literate, 2.50 – 3.49 Moderately Literate, 1.50 – 2.49 Fairly Literate, 1.00 – 1.49 Not Literate

Table 3 illustrates the level of nutrition literacy of the respondents. The statement with the highest mean is "*I believe it is necessary to know how to consume nutritious food"*

(x=4.50, SD=0.73), interpreted as "extremely literate." It indicates that most respondents strongly think that healthy eating is vital. The statement with the lowest mean is "*I ask myself all the time whether the things I eat are good for me*" (x=3.18, SD=1.26), interpreted as "moderately literate." It indicates that most respondents agreed with the statement that they constantly question whether the food they consume is healthy. It shows that most respondents have a high level of nutrition literacy. On the other hand, despite having knowledge of nutrition literacy, most respondents want to eat foods that are not good for their health.

This shows congruence with Demir (2020) showeing 96.3% of students with sufficient level of nutrition knowledge. Insufficient literacy was found in 50% of the academics whereas 17.2% demonstrated acceptable literacy. In the area where questions about food portion sizes were included, half of the academicians (50.0 %) were found to be illiterate, whereas just 17.2 % were found to be illiterate. Overall, the respondents' nutritional literacy levels were deemed to be high. Unfortunately, they still want to eat unhealthy food even they know it is not good for their health. In addition, with a mean score of 5.34 out of 7, Naughton et al. (2015) determined that the respondents in this study had a favorable attitude toward healthy eating. Meanwhile, Ashoori et al. (2021) found that the level of food and nutrition among senior high school students in Tehran was relatively low. Food and nutrition-related knowledge and skills should be prioritized in schools, according to these findings.

Table 4

Test of Difference in Eating Habits and Nutrition Literacy According to Sex

Variable	Mean	SD	Interpretation	z value	P-value	Interpretation
Eating Habits						
Male	3.56	0.61	High level	0.73	0.47	Not significant
Female	3.52	0.61	High level			
Nutrition Literacy						
Male	3.95	0.56	Highly literate	0.67	0.51	Not significant
Female	3.92	0.53	Highly literate			

Legend: 4.50 – 5.00 Very High/ Very Highly Literate, 3.50 – 4.49 High/ Highly Literate, 2.50 – 3.49 Average/ Moderately Literate, 1.50 – 2.49 Fair/ Fairly Literate, 1.00 – 1.49 Poor Level/ Not Literate

Concerning the respondents' eating habits, male participants (x=3.56, SD=0.61) had higher mean than females (x=3.52, SD=0.61). Male participants' mean score of nutrition literacy (x=3.95, SD=0.56) is also higher than females (x=3.92, SD=0.53). The results

indicate that the null hypotheses were retained since the probability values were greater that the level of significance. It signifies that there was no statistically significant difference between the sexes in terms of eating habits (z=0.73, p=0.47) and nutrition literacy (z=0.67, 0.51) of the respondents. In other words, male and female respondents have the same level of eating habits and nutrition literacy.

This study disputed the study of Demir (2020) that women had greater nutritional literacy ratings than males, Valladares et al. (2016) that women scored considerably higher than males in the category of emotional eating and Miller et al. (2021) that there are statistically significant gender differences for eating the appropriate foods to avoid illness and disease, eating the appropriate foods to stay active, and reducing food waste.

Table 5

Test of Difference in Eating Habits and Nutrition Literacy According to Age

Age	Mean	SD	Interpretation	F value	P-value	Interpretation
Eating Habits						
12-13years old	3.60	0.60	High level	2.47	0.04	Significant
14-15 years old	3.56	0.59	High level			
16-17 years old	3.38	0.64	Average level			
18-19 years old	3.22	0.70	Average level			
20 years old and above	3.75	0.21	High level			
Nutrition Literacy						
12-13years old	4.05	0.53	Highly literate	5.56	0.00	Significant
14-15 years old	3.83	0.56	Highly literate			
16-17 years old	3.79	0.48	Highly literate			
18-19 years old	3.69	0.72	Highly literate			
20 years old and above	4.01	0.42	Highly literate			

Legend: (Eating Habits) 4.50 – 5.00 Very High, 3.50 – 4.49 High, 2.50 – 3.49 Average, 1.50 – 2.49 Fair, 1.00 – 1.49 Poor Level;
(Nutrition Literacy) 4.50 – 5.00 Very Highly Literate, 3.50 – 4.49 Highly Literate, 2.50 – 3.49 Moderately Literate, 1.50 – 2.49
Fairly Literate, 1.00 – 1.49 Not Literate; Significant if p-value is < 0.05

When respondents were categorized by age, there were substantial differences in their eating habits and nutrition literacy. Regarding eating habits, students aged 20 and older had the highest mean (x=3.75, SD=0.21), whereas students aged 18-19 had the lowest mean (x=3.22, SD=0.70). In terms of nutrition literacy, students aged 12 to 13 years had the highest

mean (x=4.05, SD=0.53), while those aged 18 to 19 years had the lowest mean (x=3.69, SD=0.55). In addition, the results indicate that there is a statistically significant difference in the eating habits as to age groups (F(4,425)=2.47, p=0.04). Post hoc through Scheffe's test revealed that there was statistically significant difference between 12-13 years old and 16-17 years old (p = 0.04). Respondents who are 12-13 years old (x=3.60, SD=0.60) got higher mean score on eating habits than 16–17-year-old (x=3.38, SD=0.64) respondents. Also, there is a statistically significant age-based difference in the nutrition literacy of the respondents (F (4,425) =5.56, p=0.00). There were statistically significant differences between 12-13 years old and 14-15 years old (p = 0.01) and between 12-13 years old and 16-17 years old (p = 0.01), as determined by Scheffe's post hoc test. Respondents who are 12-13 years old (x=4.05, SD=0.53) obtained higher mean score on nutrition literacy than 16–17-year-old (3.79, SD=0.48) respondents. It indicates that there is difference in eating habits and nutrition literacy of respondents according to age. It shows that mostly younger students have more knowledge about nutrition literacy and aware of their eating habits than older students. They were aware what food is healthy and what is not. This explains the findings of Demir (2020) that nutritional literacy scores decline with age.

Table 6

Test of Difference in Eating Habits and Nutrition Literacy According to Grade Level

Grade Level	Mean	SD	Interpretation	F value	P-value	Interpretation
Eating Habits						
Seven	3.58	0.64	High level			
Eight	3.59	0.58	High level	2.54	0.06	Not significant
Nine	3.58	0.58	High level			
Ten	3.39	0.61	Average level			
Nutrition Literacy						
Seven	4.06	0.53	Highly literate			
Eight	4.04	0.54	Highly literate	8.57	0.00	Significant
Nine	3.81	0.55	Highly literate			
Ten	3.77	0.51	Highly literate			

Legend: (Eating Habits) 4.50 – 5.00 Very High, 3.50 – 4.49 High, 2.50 – 3.49 Average, 1.50 – 2.49 Fair, 1.00 – 1.49 Poor Level;
(Nutrition Literacy) 4.50 – 5.00 Very Highly Literate, 3.50 – 4.49 Highly Literate, 2.50 – 3.49 Moderately Literate, 1.50 – 2.49 Fairly Literate, 1.00 – 1.49 Not Literate; Significant if p-value is < 0.05

Concerning eating habits, Grade 8 students obtained the highest mean (x=3.59, SD=58) compared to other grade levels. In terms of nutrition literacy, Grade 7 students had the highest mean (x=4.06, SD=0.53) compared to other levels. According to the results, there is no significant difference in students' eating habits categorized by grade level (F(3,426)=2.54, p=0.06). Meanwhile, there was a significant difference in the nutrition literacy of respondents by grade level (F(3,426)=8.57, p=0.00). There were significant differences in nutrition literacy between Grades 7 and 9 (p = 0.01), Grades 7 and 10 (p = 0.00), Grades 8 and 9 (p = 0.03), and Grades 8 and 10 (p = 0.01), according to Scheffe's post hoc test. Grade 7 students (x=4.06, SD=0.53) got higher mean scores on nutrition literacy than the Grade 9 (x=3.81, SD=0.55) and Grade 10 (x=3.77, SD=0.51) students. Meanwhile, Grade 8 students (x=4.04, SD=0.54) got higher mean scores on nutrition literacy than the Grade 9 (x=3.81, SD=0.55) and Grade 10 (x=3.77, SD=0.51) students. These indicate that lower grade levels have more knowledge about nutrition literacy than higher grade levels. This is similar to the study of Kristo et al. (2020) that grouping respondents by grade level did not reveal any statistically significant differences in eating habits, or meal skipping.

Table 7

Students' Mathematics Performance

Grade Scale	Frequency	Percent	Mean	Std Dev	Interpretation
75 – 79	102	23.7			
80 – 84	120	27.9			
85 – 89	129	30.0	3.28	1.02	Satisfactory level
90 – 100	79	18.4			
Total	**430**	**100.0**			

Legend: 4.50 – 5.00 Outstanding level; 3.50 – 4.49 Very satisfactory level; 2.50 – 3.49 Satisfactory level, 1.50 – 2.49 Fairly satisfactory level; 1.00 – 1.49 Poor level of Math Performance

According to the results in table 7, majority of respondents earned grades between 85 to 89 (129 or 30.0%), while the least obtained grades between 90 to 100 (79 or 18.4%). Further, students' level of mathematics performance falls to the "satisfactory level" (x=3.28, SD=1.02). This is similar to the study of Munda and Tamban (2019) where they utilized a mathematics assessment to describe their respondents' mathematics performance. Accordingly, the mathematics performance of their respondents reached satisfactory level.

Table 8

Test of Relationship among Nutrition Literacy, Eating Habits, and Mathematics Performance

Variables	x^2	p-value	Decision	Interpretation
● Nutrition Literacy and Eating Habits	48.90	0.00	Reject the Null hypothesis	Significant
● Eating Habits and Mathematics Performance	18.28	0.03	Reject the Null hypothesis	Significant
● Nutrition Literacy and Mathematics Performance	14.47	0.27	Failed to reject the Null hypothesis	Not significant

Legend: Significant if p<0.05

According to the results presented in table 8, there is a significant link between nutrition literacy and eating habits (x^2=48.90, p=0.00). There is also a significant connection between eating habits and mathematics achievement among junior high school pupils (x^2=18.28, p=0.03). These imply that nutrition literacy and eating habits, as well as eating habits and mathematics performance, are significantly associated. It indicates that nutrition literacy affects eating habits. If students are highly literate, they are likely to have good eating habits. On the other hand, eating habits of the students affects their mathematics performance. However, the result demonstrated no correlation between nutrition literacy and mathematics performance (p>0.05).

The findings refute the study of Taleb and Itani (2021) that there was no correlation between nutrition literacy and eating patterns and affirm Kristo et al. (2021) on the correlation between a family's socioeconomic status and a student's performance through SASE scores. With the significant correlation between eating habits and mathematics achievement, this study asserts the findings of Reuter et al. (2020) that healthy eating habits boost students' academic performance, Burrows et al. (2017) that moderate relationships exist between dietary intakes and academic performance results, Mora et al. (2019) that eating the necessary number of meals per day relate to increased academic performance, and Asigbee et al. (2018) that good nutrition was important performance score predictors. The findings were contradicting Pearce et al. (2018) that academic performance was negatively correlated with a nutrient-deficient, energy-dense diet, but not with a nutrient-dense diet.

5. Conclusion

This study discovered significant difference in nutrition literacy of the students in terms of age and grade level signifying decreased nutrition literacy as student progressed by age and grade level. On the other hand, there is an association between nutrition literacy and eating habits, and eating habits and mathematics performance. With the positive association of eating habits and mathematics performance, this study concludes that the eating nutritious foods have significant impact on students' academic performance.

With the vital findings on the value of nutrition, this study suggests teachers to teach adolescent students the significance of eating healthy food by explaining the details of dietary plan and its benefits to increase students' awareness. Similarly, school heads and other superiors in DepEd may consider developing an effective dietary plan to help the learners improve their health, thereby improving academic skills. They may include the dietary plan in the schools' feeding program and in the discussions in Health or Technology and Livelihood Education subjects.

As the study was limited to three variables and grade levels of respondents, further studies can increase the sample to different grade levels and include other variables to further strengthen the findings that nutrition literacy and mathematics performance are correlated.

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