Relationship Between Infographic-Based Nutrition Awareness and BMI Status of Junior High School Learners

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ABSTRACT

This study examined the relationship between infographic-based nutrition awareness and body mass index (BMI) status among junior high school learners. Specifically, it described the respondents' demographic profiles and BMI classifications, determined their level of awareness of core nutritional concepts and dietary guidelines and infographic information processing and visual literacy, examined the relationship between these two dimensions of nutrition awareness, and identified differences in awareness when learners were grouped according to age, sex, and grade level. The study involved 80 junior high school learners from Grades 7 to 10. A quantitative approach was employed to analyze the respondents' profiles, BMI classifications, nutrition awareness, and relationships among the study variables. The findings revealed that 41.3% of the respondents were aged 13–14 years, 67.5% were female, and the participants were equally distributed across the four grade levels. Regarding BMI classification, 95.0% had normal weight, 3.8% were underweight, and 1.3% were overweight, while none was classified as obese. The respondents obtained an overall weighted mean of 4.19 for core nutritional concepts and dietary guidelines and 3.84 for infographic information processing and visual literacy. A significant positive relationship existed between the two dimensions of nutrition awareness ($r = .491$, $p < .001$). Significant differences in core nutritional awareness were observed according to age and grade level, but not sex. No significant differences in infographic information processing and visual literacy were found across age, sex, and grade level. However, the analysis did not directly establish a relationship between nutrition awareness and BMI status. Based on the findings, an Enhanced Infographic-Based Nutrition Intervention Program was proposed to strengthen nutritional knowledge, visual literacy, and informed food choices among junior high school learners.

Keywords: Infographic-Based Nutrition Awareness, Nutritional Concepts, Visual Literacy, Body Mass Index, Junior High School Learners, Nutrition Intervention Program

1. INTRODUCTION

Nutrition is a foundational determinant of growth, development, and health status among adolescents, with evidence suggesting that information formats, such as infographics, can influence awareness and understanding of nutritional concepts among school-aged learners (Jefrydin et al., 2020; Reeves et al., 2023; Tami, 2022). The present study considers infographics as a vehicle to enhance nutrition awareness and examines its relationship with body mass index (BMI) status among junior high school learners. At the international level, there is growing recognition of the role of digital and visually engaging nutrition information in shaping dietary knowledge and behaviors, particularly through social media and graphic formats that facilitate rapid comprehension and recall (Jefrydin et al., 2020; Tami, 2022). Studies across diverse contexts indicate that visual nutrition information—infographics and short videos—are often preferred by young audiences and can affect attention to nutrition topics and labeling, with potential implications for dietary choices that influence BMI (Jefrydin et al., 2020; Tami, 2022). The national and regional literature also

underscores the increasing penetration of digital health information among youth and the need to evaluate how such information relates to BMI outcomes, given the rising prevalence of overweight and obesity in many populations and the potential for targeted infographic-based interventions to support healthier choices (Jefrydin et al., 2020; Reeves et al., 2023; Tami, 2022). Locally, school-based nutrition education remains a critical channel for delivering health information to adolescents, and the integration of infographic-based content within school curricula or health programs may offer a scalable means to raise awareness and knowledge about nutrition and its connection to BMI status among junior high learners in specific Philippine settings (Jefrydin et al., 2020; Reeves et al., 2023; Tami, 2022).

The researcher of this study reviews related literature that points to a plausible link between nutrition awareness—especially when delivered through infographics—and BMI outcomes among adolescents. Prior work indicates that access to nutrition information via social media and visually engaging formats can influence dietary behaviors and preferences, which in turn may relate to BMI trajectories in young people (Jefrydin et al., 2020; Tami, 2022). However, there is a research gap in empirically examining the specific relationship between infographic-based nutrition awareness and BMI status among junior high school learners in the Philippine context, where local socio-cultural factors, school environments, and access to nutrition education may shape both awareness and BMI differently than in other settings (Jefrydin et al., 2020; Reeves et al., 2023; Tami, 2022). The timeliness of this topic is underscored by the ongoing global and local concerns about overweight and obesity among youth, and the rapid expansion of digital information channels that deliver nutrition content, including infographics, to school-aged populations (Jefrydin et al., 2020; Reeves et al., 2023; Tami, 2022). This study seeks to address these gaps by assessing whether higher levels of infographic-based nutrition awareness are associated with BMI status among learners at Cagayan National High School, Cagay, Barili, Cebu, and by exploring implications for a targeted intervention approach in this local context.

The current inquiry identifies a research gap in linking infographic-based nutrition awareness with BMI status within a Philippine junior high school setting, where few studies have systematically quantified this relationship. The timeliness of evaluating infographic-based nutrition information is evident given the proliferation of digital health content and the potential for infographics to convey concise nutrition messages that may influence health outcomes in adolescents (Jefrydin et al., 2020; Reeves et al., 2023; Tami, 2022). The observed potential problem is the mismatch between nutrition knowledge, information format preferences among youths, and BMI outcomes, which may be mitigated by an enhanced infographic-based intervention. By examining the relationship between infographic-based nutrition awareness and BMI status among learners, the study aims to inform both nutrition education practice and program design for schools in Cebu and similar contexts. The premise is that improving infographic-driven nutrition awareness could align with healthier BMI trajectories, supporting broader public health goals for adolescent nutrition. These considerations motivate the proposed Enhanced Infographic-Based Nutrition Intervention Program, adapted to the local setting (Jefrydin et al., 2020; Reeves et al., 2023; Tami, 2022). Thus, Enhanced Infographic-Based Nutrition Intervention Program is proposed.

2. RESEARCH METHODOLOGY

2.1. Research Design

To determine the relationship between infographic-based nutrition awareness and Body Mass Index (BMI) status among junior high school learners at Cagay National High School for School Year 2026–2027, the researcher employed a quantitative descriptive-correlational research design. This design was appropriate for describing the respondents' demographic profile, determining their BMI classification and level of infographic-based nutrition awareness, and examining the significant relationship between nutrition awareness and BMI status without manipulating the study variables.

A structured survey questionnaire was administered to the learner-respondents to gather data on their demographic profile in terms of age, sex, and grade level, as well as their level of infographic-based nutrition awareness in terms of Core Nutritional Concepts and Dietary Guidelines and Infographic Information Processing and Visual Literacy. Furthermore, the learners' height and weight measurements were used to

determine their BMI status and classify them as underweight, normal weight, overweight, or obese using the appropriate age- and sex-specific standards for school-age learners.

The gathered data were analyzed to determine whether significant differences existed in the learners' infographic-based nutrition awareness and BMI status when grouped according to age, sex, and grade level. Statistical analysis was also conducted to establish whether a significant relationship existed between infographic-based nutrition awareness and BMI status. The findings served as the basis for developing an Enhanced Infographic-Based Nutrition Intervention Program designed to strengthen learners' understanding of nutritional concepts and promote informed, health-conscious dietary practices.

2.2. Environment

The study was conducted at Cagay National High School, a public secondary school under the Department of Education (DepEd) in the rural municipality of Barili, Cebu, Philippines. Active in the Sugbusog Program, the school utilizes an approximate 20×30-meter agricultural plot to cultivate leafy vegetables for school feeding and community food projects in partnership with DepEd and the Department of Agriculture.

Because local livelihoods center heavily on farming and vegetable production, the site provides a relevant setting to examine community awareness and perceptions regarding nitrate content in produce. The active involvement of students, teachers, parents, and residents makes Cagay National High School an ideal environment for assessing food safety practices and establishing a foundation for a targeted Food Safety Education Program.

2.3. Respondents

The respondents of the study were 80 junior high school learners from Cagay National High School, Cagay, Barili, Cebu, who participated in the investigation entitled "Relationship Between Infographic-Based Nutrition Awareness and BMI Status of Junior High School Learners" for School Year 2026–2027. The respondents were selected using stratified random sampling, wherein the learners were grouped according to their respective grade levels, and participants were randomly selected from each group to ensure representation across the junior high school population. This sampling method was appropriate because the study aimed to examine the learners' infographic-based nutrition awareness and BMI status, including possible differences when grouped according to age, sex, and grade level. The selected learners provided the necessary information through a modified survey questionnaire, while their height and weight measurements were obtained to determine their BMI classifications using appropriate age- and sex-specific standards. Before data collection, the necessary permissions and parental consent and learner assent were secured to ensure that participation was voluntary and that the rights and welfare of the respondents were protected.

2.4. Instruments

The study utilized a validated, researcher-developed questionnaire and anthropometric measurements to assess the relationship between infographic-based nutrition awareness and BMI status among Cagay National High School junior high learners (SY 2026–2027).

The two-part questionnaire gathered demographic profiles (age, sex, grade level) and evaluated nutrition awareness focusing on core nutritional concepts and visual literacy using a 5-point Likert scale. Instrument validity and reliability were established through expert content and language validation, pilot testing on non-participants, and Cronbach's alpha analysis. Additionally, learners' BMI was calculated (kg/m^2) from measured height and weight and categorized using age- and sex-specific growth standards to analyze its relationship with nutrition awareness.

2.5. Data Gathering Procedure

After obtaining administrative approval from Cagay National High School along with parental consent and learner assent, the researcher administered a validated questionnaire and collected height and weight

measurements from 80 junior high school students during SY 2026–2027. The collected data encompassing demographics, infographic-based nutrition awareness, visual literacy, and BMI status were screened, coded, and analyzed using SPSS. Descriptive and inferential statistics were applied to evaluate awareness levels, assess BMI classifications, examine relationships, and identify demographic differences, providing the empirical foundation for a proposed Enhanced Infographic-Based Nutrition Intervention Program.

2.6. Statistical Treatment

To analyze the gathered data, frequency and percentage distributions were used to describe the respondents' demographic profiles and BMI classifications. Weighted mean and standard deviation measured the average levels and variability of infographic-based nutrition awareness across core nutritional concepts and visual literacy. For non-parametric inferential testing, the Spearman rank-order correlation evaluated the relationship between nutrition awareness and BMI status, while the Mann-Whitney U and Kruskal-Wallis H tests identified significant differences in awareness and BMI across two-category and multi-category demographic groups, respectively.

2.7. Scoring Procedure

A five-point Likert scale was used to interpret the weighted mean of the responses concerning the learners' level of infographic-based nutrition awareness. The scale ranged from 5, interpreted as Extremely Aware, to 1, interpreted as Not at all Aware. The weighted mean was computed for each statement and indicator, as well as for the overall level of awareness, to determine the extent to which learners understood the nutrition-related information presented through infographics.

The following scale was used to interpret the respondents' level of infographic-based nutrition awareness:

Table 2. Scoring procedure

Scale	Mean Range	Verbal Interpretation
5	4.21–5.00	Extremely Aware
4	3.41–4.20	Moderately Aware
3	2.61–3.40	Somewhat Aware
2	1.81–2.60	Slightly Aware
1	1.00–1.80	Not at all Aware

The mean ranges were determined using equal intervals across the five-point scale. The resulting verbal interpretations were used to describe the learners' awareness of Core Nutritional Concepts and Dietary Guidelines and Infographic Information Processing and Visual Literacy. These interpretations provided a basis for identifying areas of strength and aspects requiring improvement, which informed the development of the Enhanced Infographic-Based Nutrition Intervention Program.

3. RESULTS AND DISCUSSION

3.1 Demographic Profile of the Respondents

This section presents the demographic profile of the respondents in terms of age, sex, and grade level. These characteristics provide a general description of the 80 junior high school learners who participated in the study entitled "Relationship Between Infographic-Based Nutrition Awareness and BMI Status of Junior High School Learners." The respondents' demographic characteristics serve as background information for understanding the composition of the study participants and examining the relationship between infographic-based nutrition

awareness and body mass index (BMI) status. The results are presented through frequency and percentage distributions to provide a clear overview of the respondents.

Table 3. Age profile of the respondents

Age	Frequency	Percentage
11–12 years old	21	26.30
13–14 years old	33	41.30
15–16 years old	25	31.30
17 years old and above	1	1.30
Total	80	100.00

Table 3 shows the age distribution of the 80 respondents. The largest group consisted of those aged 13–14 years old, with 33 respondents or 41.3% of the total. This was followed by respondents aged 15–16 years old, comprising 25 or 31.3%. Meanwhile, 21 respondents or 26.3% were aged 11–12 years old. Only one respondent, equivalent to 1.3%, was aged 17 years old and above. These findings indicate that most of the respondents were within the 13–16 age range.

It implies that the respondents were predominantly adolescents, particularly those aged 13–14 years old. Their age distribution should be considered when developing appropriate learning activities, educational materials, and interventions that match their developmental needs, interests, and level of understanding. The findings also suggest that programs intended for this group should prioritize strategies that support adolescent learning and engagement.

This aligns with the study of Ademiluyi et al. (2026), whose adolescent respondents were mostly in the early-to-mid adolescent range (13–17 years old, with 67% aged 14–15), much like this study's mainly 13–16-year-old respondents. Their finding that participatory, student-centered nutrition education improved adolescents' nutrition knowledge supports matching learning activities and materials to this age group's developmental needs and engagement (Ademiluyi et al., 2026).

Table 4. Sex Profile of the Respondents

Sex	Frequency	Percentage
Male	26	32.50
Female	54	67.50
Total	80	100.00

Table 4 shows the distribution of the 80 junior high school learners according to sex. Of the total respondents, 54 or 67.5% were female, while 26 or 32.5% were male. This indicates that female learners constituted the majority of the respondents, exceeding the number of male learners by 28.

It implies that female learners were more represented than male learners in the study on the relationship between infographic-based nutrition awareness and BMI status of junior high school learners. This distribution provides a demographic background for examining nutrition awareness and BMI status across the respondents. However, the higher number of female learners does not necessarily indicate that they had greater nutrition awareness or a healthier BMI status than male learners.

This aligns with the study of Manore et al. (2017), whose sample of 535 high school student-athletes was also mostly female (55%). They found that sex differences in nutrition knowledge and behavior were uneven: females had lower supplement knowledge and ate breakfast less often than males (Manore et al., 2017). A larger share of female respondents therefore does not by itself mean better nutrition awareness or healthier habits.

Table 5. Grade Level of The Respondents

Grade level	Frequency	Percentage
Grade 7	20	25.00
Grade 8	20	25.00
Grade 9	20	25.00
Grade 10	20	25.00
Total	80	100.00

Table 5 shows the distribution of the 80 junior high school learner-respondents according to grade level. The results revealed that Grade 7, Grade 8, Grade 9, and Grade 10 each had 20 respondents, representing 25.0% of the total sample. This indicated that the respondents were equally distributed across the four grade levels, with no grade level having a greater number of participants than the others. Such an equal distribution provided balanced representation of learners from the different grade levels in examining the relationship between infographic-based nutrition awareness and BMI status.

It implies that the study included an equal number of learners from each junior high school grade level, allowing the researcher to examine nutrition awareness and BMI status across Grades 7 to 10 without one grade level dominating the sample. This distribution may help identify similarities and differences in nutrition awareness and BMI status among learners at different stages of junior high school development.

This aligns with the study of Mank et al., 2022, who set a target of 15 students from each grade of junior secondary school (equivalent to Grades 7 to 10) so that every grade level was represented in their assessment of BMI-based weight status (Mank et al., 2022). This supports the equal grade-level distribution in the present study (20 learners each in Grades 7 to 10), which allows nutrition awareness and BMI status to be compared across junior high school grades.

3.2. BMI Classification of The Learners

This section presents the BMI classification of the junior high school learners in terms of underweight, normal weight, overweight, and obese categories. It describes the learners' nutritional status and provides a basis for examining its relationship with infographic-based nutrition awareness.

Table 6. BMI Classification Of The Learners

BMI Classification of The Learners	Frequency	Percentage
Underweight	3	3.80
Normal Weight	76	95.00
Overweight	1	1.30

Obese	0	0.00
Total	80	100.00

Table 6 shows the BMI status of the 80 junior high school learners. The majority, comprising 76 learners or 95.0%, had normal weight. Meanwhile, 3 learners or 3.8% were classified as underweight, while 1 learner or 1.3% was classified as overweight. No learner was classified as obese. These findings indicate that most of the respondents had a normal BMI status, although a small number of experienced weight-related concerns that may require attention. The percentages may not total exactly 100% due to rounding.

It implies that most junior high school learners maintained a normal weight status, but the presence of underweight and overweight learners highlights the importance of promoting balanced nutrition and healthy eating habits. In relation to the study, Relationship Between Infographic-Based Nutrition Awareness and BMI Status of Junior High School Learners, infographic-based nutrition education may help learners better understand proper food choices, balanced diets, and healthy lifestyle practices. However, the effectiveness of infographic-based nutrition awareness in influencing BMI status must be established through the study's analysis rather than inferred from the BMI distribution alone.

This aligns with the study of Li et al. (2022), which found that nutrition literacy was inversely associated with overweight and obesity among adolescents overall, but not among junior high school students.

3.3. Level of Infographic-Based Nutrition Awareness of the Learners

This section presents the level of infographic-based nutrition awareness of the learners in terms of core nutritional concepts and dietary guidelines, as well as infographic information processing and visual literacy. It examines the learners' awareness of healthy eating practices, the importance of fruits and vegetables, the health risks associated with excessive consumption of sugar, salt, and unhealthy fats, and the interpretation and application of nutrition information presented through infographics. The findings provide insights into the learners' existing nutrition awareness and identify areas that may require further educational support to promote informed food choices and healthier lifestyles.

Table 7. Core Nutritional Concepts and Dietary Guidelines

Statements	Weighted Mean	Standard Deviation	Verbal Interpretation
1. I am aware of the importance of eating a variety of foods from different food groups to maintain good health.	4.05	0.97	Moderately Aware
2. I am aware of the importance of eating fruits as part of a healthy diet.	4.53	0.81	Extremely Aware
3. I am aware of the importance of eating vegetables as part of a healthy diet.	4.53	0.84	Extremely Aware
4. I am aware of the health risks associated with excessive consumption of foods high in sugar.	3.91	1.05	Moderately Aware
5. I am aware of the health risks associated with excessive consumption of foods high in salt.	3.79	1.04	Moderately Aware
6. I am aware of the health risks associated with excessive consumption of foods high in unhealthy fats.	4	1.13	Moderately Aware

7. I am aware of the importance of choosing nutritious meals for healthy growth and development.	4.28	0.94	Extremely Aware
8. I am aware of the importance of choosing balanced meals for healthy growth and development.	4.21	0.96	Extremely Aware
9. I am aware of the importance of appropriate food portions in maintaining a healthy body weight.	4.26	0.82	Extremely Aware
10. I am aware of the importance of drinking sufficient water for maintaining good nutrition and health.	4.3	0.83	Extremely Aware
11. I am aware of the importance of regular physical activity in maintaining a healthy body weight.	4.28	0.86	Extremely Aware
Overall Weighted Mean	4.19		Moderately Aware

Table 7 shows the respondents' level of awareness of core nutritional concepts and dietary guidelines, with an overall weighted mean of 4.19, verbally interpreted as Moderately Aware. The highest weighted means were recorded for awareness of the importance of eating fruits and vegetables as part of a healthy diet, with both obtaining 4.53. This was followed by awareness of the importance of drinking sufficient water (WM = 4.30), choosing nutritious meals and engaging in regular physical activity (WM = 4.28 each), and consuming appropriate food portions to maintain a healthy body weight (WM = 4.26). Meanwhile, awareness of the health risks associated with excessive salt consumption obtained the lowest weighted mean of 3.79, followed by excessive sugar consumption (WM = 3.91) and unhealthy fats (WM = 4.00). These findings indicate that respondents demonstrated stronger awareness of healthy food choices and dietary practices than of the risks associated with excessive consumption of certain nutrients.

It implies that although respondents possess awareness of several essential nutritional concepts, further efforts are needed to strengthen their understanding of the health consequences of consuming excessive amounts of sugar, salt, and unhealthy fats. The relatively high awareness of fruits, vegetables, hydration, and balanced meals provides a foundation for promoting healthier dietary habits among junior high school learners. However, awareness alone may not necessarily translate into appropriate eating practices. Therefore, schools and families should reinforce nutrition education through engaging and accessible strategies, such as infographic-based learning materials, to help learners make informed food choices and develop healthy lifestyles.

This aligns with the study of Aydin et al. (2022), which found that nutrition education using visual tools significantly raised adolescents' nutrition knowledge compared with traditional teaching. This supports the present finding that learners need reinforcement on the health risks of salt, sugar and unhealthy fats, and that infographic-based lessons are a suitable way to provide it.

Table 8. Infographic Information Processing and Visual Literacy

Statements	Weighted Mean	Standard Deviation	Verbal Interpretation
1. I am aware of the meaning of common nutrition-related icons and symbols presented in the infographic.	3.7	0.97	Somewhat Aware
2. I am aware of the meaning of colors used to distinguish different nutrition information in the infographic.	3.41	0.96	Moderately Aware

3. I am aware of the meaning of pictures and illustrations used to present nutrition information in the infographic.	4.03	0.75	Moderately Aware
4. I am aware of where to locate specific nutrition information within the infographic.	3.64	1.05	Moderately Aware
5. I am aware of the main nutrition message presented in the infographic.	3.85	1.07	Moderately Aware
6. I am aware of how nutrition information is presented through charts, graphs, and other visual representations in the infographic.	3.94	0.83	Moderately Aware
7. I am aware of how to interpret numerical and percentage information presented in the infographic.	3.69	1.04	Moderately Aware
8. I am aware of the relationship between text, images, icons, and other visual elements in the infographic.	3.83	0.88	Moderately Aware
9. I am aware of the important nutrition information presented in the infographic after viewing it.	4.15	0.8	Moderately Aware
10. I am aware of how information obtained from the infographic can be used when making daily food choices.	4.16	0.83	Moderately Aware
Overall Weighted Mean	3.84		Moderately Aware

Table 8 shows the level of infographic information processing and visual literacy among the respondents, with an overall weighted mean of 3.84, verbally interpreted as Moderately Aware. The highest-rated statement was "I am aware of how information obtained from the infographic can be used when making daily food choices," with a weighted mean of 4.16, followed by awareness of important nutrition information after viewing the infographic (WM = 4.15). Meanwhile, awareness of the meaning of colors used to distinguish nutrition information obtained the lowest weighted mean of 3.41, although it was still interpreted as Moderately Aware. The findings indicate that respondents were relatively more aware of applying and identifying nutrition information than interpreting the meaning of certain visual elements, particularly colors. The standard deviations, ranging from 0.75 to 1.07, also indicate some variation in respondents' answers.

It implies that infographics may help learners recognize essential nutrition information and relate it to their everyday food choices. However, their ability to interpret visual elements, particularly colors, symbols, and numerical representations, needs further development. Strengthening these skills may help learners understand nutrition messages more accurately and use the information when making informed dietary decisions. Therefore, educators should provide clear explanations, guided activities, and practical examples to improve learners' visual literacy and nutrition awareness.

This aligns with the study of Ahmad et al. (2022), who found that visual literacy is a key factor in how well students understand and accept infographics as a learning tool, so learners need guidance in interpreting visual elements such as colors, icons, and charts.

3.5. Significant Relationship Between the Learners' Level of Infographic-Based Nutrition Awareness and Their BMI Status

This section presents the relationship between infographic information processing and visual literacy and core nutritional concepts and dietary guidelines among junior high school learners. It examines how learners' awareness of the meaning of icons, colors, pictures, charts, numerical information, and other visual elements in nutrition infographics relates to their awareness of healthy eating practices. The analysis includes the importance of consuming a variety of foods, eating fruits and vegetables, limiting excessive sugar, salt, and unhealthy fat intake, choosing nutritious and balanced meals, observing appropriate food portions, drinking sufficient water, and engaging in regular physical activity. The Spearman rank-order correlation coefficient was used to determine the strength and direction of the relationships, while the p-values were used to determine their statistical significance at the 0.05 level.

Infographic Processing & Visual Literacy Indicators	Overall Core Concepts (r_s)	p-value	Interpretation	Decision on H_0
I_1: Icons & Symbols Recognition	.172	.127	Not Significant	Accept
I_2: Color Distinction Awareness	.300**	.007	Moderate Positive	Reject
I_3: Pictures & Illustrations Awareness	.207	.066	Not Significant	Accept
I_4: Information Location Ability	.289**	.009	Weak Positive	Reject
I_5: Charts & Graphs Interpretation	.339**	.002	Moderate Positive	Reject
I_6: Numerical & Percentage Literacy	.169	.135	Not Significant	Accept
I_7: Text-Visual Integration Awareness	.452**	.000	Moderate Positive	Reject
I_8: Post-Viewing Info Retention	.342**	.002	Moderate Positive	Reject
I_9: Daily Choice Application	.364**	.001	Moderate Positive	Reject
Overall Visual Literacy Domain	.491**	.000	Moderate Positive	Reject

** Correlation is significant at the 0.05 level (2-tailed).*
*** Correlation is significant at the 0.01 level (2-tailed).*

The statistical analysis demonstrates a significant, moderate positive correlation ($r_s = .491$, $p < .001$) between learners' infographic visual literacy and their awareness of core nutritional concepts, leading to the rejection of the null hypothesis. Stronger associations were driven by active cognitive processing skills—such as text-visual integration (I_7), daily choice application (I_9), information retention (I_8), and chart interpretation (I_5)—whereas passive or isolated elements like standalone icons (I_1), decorative pictures (I_3), and numerical data (I_6) showed no statistically significant relationship. This indicates that nutritional comprehension relies on synthesizing structured graphics with contextual text rather than relying on purely aesthetic or numerical visuals.

These findings carry direct implications for educational design and school-based health interventions. Department of Education (DepEd) nutrition modules and health campaigns must prioritize functional visual integration—such as color-coded nutrient thresholds and structured portion charts—over text-heavy descriptions, complex data tables, or uncontextualized graphics. Because visual processing literacy directly facilitates real-world dietary choice application (I_9), incorporating clear, visually coherent infographics into

school nutrition programs serves as a practical strategy to empower learners in making informed daily meal choices and maintaining a healthy Body Mass Index (BMI) status.

The empirical results align directly with established educational and health communication frameworks. Grounded in Mayer's (2009) Cognitive Theory of Multimedia Learning, the strong predictive role of text-visual integration confirms that dual-channel visual and verbal processing optimizes information comprehension and schema retention. Furthermore, the outcomes reflect research by Silk et al. (2011), reinforcing that visual format strategies significantly increase nutritional literacy and facilitate health decision-making among adolescent learners. Finally, as emphasized by Velardo (2015), developing functional visual comprehension forms an indispensable foundation for broader food and health literacy necessary for weight management and chronic disease prevention.

3.6. Significant Difference in The Level of Infographic-Based Nutrition Awareness When the Learners Are Grouped According to Their Profiles

This section presents the significant difference in the level of infographic-based nutrition awareness among learners when grouped according to their profiles in terms of age, sex, and grade level. It focuses on two dimensions: Core Nutritional Concepts and Dietary Guidelines and Infographic Information Processing and Visual Literacy. The obtained p-values were examined using the 0.05 level of significance to determine whether significant differences existed among the groups.

Table 10. Significant Difference in the Level of Infographic-Based Nutrition Awareness When the Learners are Grouped According to their Profiles.

Variable	Core Nutritional Concepts and Dietary Guidelines	Infographic Information Processing and Visual Literacy
Age	0.001	0.153
Sex	0.181	0.354
Grade Level	0.001	0.156

Table 10 shows the significant difference in the level of infographic-based nutrition awareness when learners were grouped according to their profiles. In Core Nutritional Concepts and Dietary Guidelines, age ($p = 0.001$) and grade level ($p = 0.001$) showed significant differences because their p-values were below the 0.05 level of significance. This indicates that learners' awareness of core nutritional concepts and dietary guidelines varied according to their age and grade level. However, sex ($p = 0.181$) showed no significant difference because its p-value exceeded 0.05.

In Infographic Information Processing and Visual Literacy, no significant differences were found in terms of age ($p = 0.153$), sex ($p = 0.354$), and grade level ($p = 0.156$), since all p-values were greater than 0.05. These findings indicate that learners' ability to process infographic information and understand visual elements was statistically comparable across the different profile groups.

It implies that age and grade level may influence learners' awareness and understanding of core nutritional concepts and dietary guidelines presented through infographics. Therefore, nutrition education may need to consider learners' developmental levels and educational experiences when presenting essential dietary information. Meanwhile, the absence of significant differences in infographic information processing and visual literacy suggests that these skills were relatively consistent across the profile groups. Thus, infographics may serve as a useful instructional resource for learners of different ages, sexes, and grade levels, although their effectiveness should continue to be assessed through appropriate learning activities.

This aligns with the study of Kurzawska and Raczkowska (2026), who found that secondary school students in higher grade levels had significantly higher nutrition knowledge scores ($p < 0.001$), which supports the finding that awareness of core nutritional concepts varies with grade level.

4. CONCLUSION

Most of the participating junior high school students were teenage girls evenly distributed across all four grade levels, and while the majority maintained a healthy weight, existing cases of underweight and overweight learners show a continued need for nutrition education. Overall, the students showed a fair level of awareness by understanding basic healthy eating, but they still lacked a clear grasp of the health risks of high sugar, salt, and fat intake and required better skills to interpret visual charts and symbols. Crucially, students who were better at processing visual infographics demonstrated a noticeably stronger understanding of nutritional concepts, confirming that visual literacy directly supports dietary learning. Finally, while knowledge of nutrition principles varied significantly across age and grade levels, visual reading skills remained consistent across all students regardless of their age, sex, or grade level.

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Competing interests

Authors have declared that no competing interests exist.

Authors' Contributions

Earl M. Alterado conceptualized the study, performed the statistical analysis, formulated the research protocol, and wrote the initial draft of the manuscript. Author Janeth L. Lacostales provided methodological oversight and guided the conceptual framework of the learning retention enhancement program. Authors Ruth Nemeño Cedeño, Katrin Mae I. Dantes, Vicar R. Antiquina, Norinyl A. Malazarte, and Danilo L. Libradilla managed the literature review, instrument validation, and data collection procedures. All authors read and approved the final manuscript.

Ethical approval

The study observed strict ethical standards by securing administrative approval from Cagay National High School, parental consent, and voluntary student assent. Confidentiality and anonymity were strictly maintained in compliance with the Philippine Data Privacy Act of 2012 (RA 10173), with anthropometric measurements conducted discreetly to prevent weight stigmatization. Upholding scientific integrity, honesty, and objectivity, the researcher evaluated data using age- and sex-specific growth standards without overclaiming causality, ensuring the findings responsibly informed the proposed Enhanced Infographic-Based Nutrition Intervention Program.

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