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NUTRITIONAL CULTURE AND THE LEVEL OF HEALTH AWARENESS AMONG MIDDLE SCHOOL STUDENTS IN THE EASTERN PROVINCE OF SAUDI ARABIA

Faten Hassan Alsheef [1], Ola Abbas Abdullah Alqudaihi [2], Ishtyak Ahmad Abbas Al Habeeb [2], Tharwat Abdullah Almanasef [2], Zahra Ahmed Al_Rebh [2], Abeer Hassan Al Khamis [2], Yasmeen Ali Almuslab [3], Roqaiah Ali Almarhoun [2], Amani Mahdi AlHabib [2], Hind Hussain Alzaher [4], Hussain Mansour Abu Alsaud [5], Mansour Ibrahim Mohammed Kaabi [5]

[1] Staff Nurse 2, National Guard Hospital, Saudi Arabia

[2] Staff Nurse 1, National Guard Hospital, Saudi Arabia

[3] Dental Assistant II, National Guard Hospital, Saudi Arabia

[4] Health Education, National Guard Hospital, Saudi Arabia

[5] Patient Care Technician, National Guard Hospital, Saudi Arabia

Abstract:

This study investigates the levels of health and nutritional awareness among middle school students in the eastern province of Saudi Arabia and explores the factors influencing these awareness levels, including gender, educational stage, and economic status. Data was collected through surveys administered to a sample of students from various schools in the region. Statistical analyses, including t-tests and ANOVA, were conducted to examine differences in awareness levels across demographic and socio-economic groups.

Results indicate significant differences in health and nutritional awareness between male and female students, with males exhibiting higher levels of awareness. However, there were negligible variations in awareness levels across different educational stages and economic levels. These findings highlight the complex interplay of factors shaping health education outcomes among adolescents in the region.

Based on the study findings, recommendations are provided to enhance health education initiatives and promote health literacy among middle school students. These recommendations include the development of gender-sensitive health education programs, the adaptation of curriculum to suit different educational stages, and efforts to ensure equitable access to health education resources across socio-economic groups.

By implementing these recommendations, policymakers, educators, and stakeholders can work together to empower middle school students in the eastern province of Saudi Arabia with the knowledge, skills, and resources needed to make informed decisions about their health and well-being. This, in turn, can contribute to the promotion of healthier behaviors and improved health outcomes among adolescents in the region.

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Keywords: Health Awareness, Environmental Implications, Nutritional Knowledge, Public Health, Saudi Arabia, Eastern Province, Pretest-Posttest Design, Knowledge Improvement.

Introduction:

Good health is one of the greatest blessings bestowed upon humans. It is the responsibility of every individual to preserve this blessing and do everything possible to maintain and enhance it. Health awareness refers to the ability of an individual and their community to access, understand, and utilize information in ways that promote good health. Perhaps healthy nutrition is one of the most important ways to maintain good health. [1]

Nutritional awareness focuses on understanding the importance of balanced nutrition and its vital role in maintaining the health and safety of the body. Ignorance of the principles of nutrition is a major cause of many malnutrition diseases. [2]

Nutrition education initiatives are prevalent across various sectors, including schools, government entities, and health promotion agencies, offering a diverse range of messages with a nutritional focus. In many industrialized nations, community members receive education regarding dietary guidelines or recommendations concerning core food group consumption. [3]

Furthermore, targeted educational programs aimed at preventing or managing lifestyle diseases such as diabetes, cardiovascular disease (CVD), or cancer are readily available. Despite the breadth of nutrition education endeavors, there exists a notable gap in the literature concerning the evaluation of nutrition knowledge levels within the general community or specific demographic groups. Additionally, the influence of nutrition knowledge on dietary behaviors remains largely unexplored. [4]

Food is the main element for the continuation of life. Humans must carefully choose the food they eat because the nutrients it contains play a fundamental role in maintaining human life. These nutrients provide the body with the necessary energy for growth and development, repair damaged tissues and cells, and perform vital functions and activities to resist diseases and infections. [5]

An unbalanced diet in terms of energy sources causes more than half of the world's diseases, especially vitamin and mineral deficiencies. Food is an essential part of our daily lives, ranking third in importance after air and water. Nutrition is also the basis for human growth, and its impact is evident not only in physical growth but also in mental and emotional development. Poor nutrition leads to delayed growth, educational stumbling, and poor academic achievement. Low food intake and vitamin and mineral deficiencies can be attributed to the family's economic and social status. Therefore, nutrition education aims to encourage people to adopt healthy eating practices and avoid unhealthy eating habits. [6]

The importance of health awareness stems from its vital role in protecting society from fatal diseases that can only be prevented by improving the health of individuals through increasing health and nutritional awareness and health education for all individuals. Spreading health education in all fields among community members is of great importance related to human life, health, and safety. [7]

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A person cannot maintain their health unless they have the necessary health and nutritional culture and awareness. Health awareness is one of the goals of social and economic development. It is a basic right for all people, regardless of race, religion, political beliefs, or social or economic status. [8]

One of the most important factors affecting health and nutritional awareness is the economic and educational level. The 2009 Ministerial Declaration of the United Nations Economic and Social Council stressed that health awareness is an important factor in ensuring good health outcomes. In this regard, we call for the development of appropriate action plans to promote health awareness. [9]

Since school curricula are the first pillar in instilling healthy eating behavior, it is necessary to provide learners with correct food information and behaviors and provide them with methods and practices that achieve the goals of nutrition education and increase their nutritional awareness. In addition, spreading health awareness stems from the health programs provided by primary health care centers and the media. [10]

Problems and Research Questions

The nutritional culture and health awareness levels among middle school students in the eastern province of Saudi Arabia are crucial factors that significantly influence their overall well-being. Despite the importance of nutrition and health education, several challenges persist, necessitating a comprehensive examination of these issues. This study aims to investigate various aspects related to nutritional culture and health awareness among middle school students in the region, addressing key problems and research questions.

One of the primary concerns is the limited understanding of nutritional culture among middle school students. This lack of awareness may contribute to unhealthy dietary habits and adversely affect their health outcomes. To address this issue, the study seeks to determine the extent to which students comprehend and practice healthy nutritional habits within their cultural context. By examining their dietary preferences, meal patterns, and attitudes toward nutrition, insights can be gained into the prevailing nutritional culture in the eastern province of Saudi Arabia.

Socioeconomic factors play a significant role in shaping students' access to nutritious food and their understanding of health-related concepts. Disparities in family income and parental education levels may exacerbate inequalities in nutritional culture and health awareness among middle school students. Therefore, the study aims to investigate how socioeconomic factors influence students' nutritional choices and health behaviors. Additionally, it seeks to explore any significant disparities in nutritional culture and health awareness based on demographic variables such as gender, socioeconomic status, and urban/rural residence.

Cultural norms and traditions exert a profound influence on dietary preferences and habits among middle school students. Understanding these cultural influences is essential for promoting healthier eating habits and improving overall health outcomes. Thus, the study examines the role of cultural factors in shaping students' nutritional choices and health behaviors. By exploring the intersection of culture, food practices, and health perceptions, insights can be

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gained into effective strategies for promoting nutritional awareness within the cultural context of the eastern province of Saudi Arabia.

The effectiveness of health education programs in promoting nutritional awareness and healthy behaviors among middle school students is another critical aspect to consider. Despite efforts to implement such programs, their impact may vary due to various factors. Therefore, the study seeks to assess students' perceptions regarding the effectiveness of health education initiatives in the region. By identifying strengths and weaknesses in existing programs, recommendations can be made for enhancing their efficacy and promoting better health outcomes among middle school students.

Aim of the study

The study aimed to identify the level of health awareness among students in the eastern province of Saudi Arabia.

Methodology

The researchers adopted the descriptive approach as it is the most appropriate approach for the study**.**

Study sample.

The sample is a part of the population on which the study is conducted, which the researcher selects to conduct his study according to special rules so that it represents the population in a correct representation. The current study sample included (250) male and female students from preparatory school students, with (111) male and (139) female students distributed over (8) schools that were selected by stratified random sampling distributed according to the variables of gender and grade level, and Table (1) explains this.

The study sample was selected from the major schools in the eastern province based on the availability of resources and academic capabilities so that the problem could be estimated at its lowest level. Eight schools were selected, as follows:

Data for this study are collected from Six schools located in the Eastern Province of Saudi Arabia, namely:

1. British International School Al Khobar
2. ISG British School Dhahran
3. ISG American School Dhahran
4. ISG Dammam School
5. ISG Jubail School
6. Lycée Français International d'Al Khobar
7. The International Programs School
8. Rowad Al Khaleej International Schools Baraem Al Dana

The study involved a diverse sample of middle school students from eight schools located in the Eastern Province of Saudi Arabia. The distribution of the sample across these schools is presented in Table 1. Each school contributed a subset of students to the overall study sample.

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The British International School Al Khobar, with a total student population of 780, contributed 30 students to the study sample. Similarly, the ISG British School Dhahran, ISG American School Dhahran, ISG Dammam School, and Lycée Français International d'Al Khobar each provided 30 students, despite variations in their total student populations.

Notably, ISG Jubail School, boasting a larger student body of 4000, also contributed 40 students to the study. This strategic sampling approach ensures representation from different school environments, considering both smaller and larger institutions.

The International Programs School, with a student population of 1370, and Rowad Al Khaleej International Schools Baraem Al Dana, with 500 students, both contributed 30 students to the study sample. This deliberate selection across schools of varying sizes aims to capture a comprehensive view of health awareness levels among middle school students in the Eastern Province.

The distribution strategy of selecting 30 students from each school standardizes the sample size across diverse educational institutions, facilitating a more balanced and comparable analysis of health awareness levels among middle school students in the Eastern Province of Saudi Arabia.

Table 1: Distributed sample among (8) schools.

No.	School Name	Number of students	Study Sample from each School
1	British International School Al Khobar	780	30
2	ISG British School Dhahran	700	30
3	ISG American School Dhahran	1200	30
4	ISG Dammam School	700	30
5	ISG Jubail School	4000	40
6	Lycée Français International d'Al Khobar	581	30
7	The International Programs School	1370	30
8	Rowad Al Khaleej International Schools Baraem Al Dana	500	30

Research Time Domain:

The temporal scope of the research spans from the initiation of the field study in August 2018 to its culmination at the end of July 2019. The exploratory phase, aimed at gathering preliminary insights, was executed in August 2019. The intervention in the realm of general awareness was implemented within the city, with weekly visits to various locations, including schools. During these visits, information was disseminated through a variety of methods, including lectures, discussions, and stories. This multifaceted approach aimed to ensure the engagement and comprehension of the intervention content among the participants.

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Data collection

Data for this study are collected from city located in the Eastern Province of Saudi Arabia, namely:

1. Dammam
2. Dhahran
3. Al Khobar
4. Al-Ahsa
5. Jubail

Research Tools:

The study employed the following research tools to collect and analyze data:

Pilot Study:

A pilot survey was distributed to students of the schools located in the Eastern Province of Saudi Arabia, consisting of male and female students. It included an introduction to the purpose of the study and open-ended questions.

Questionnaire: A structured questionnaire was utilized to gather comprehensive information regarding the demographic characteristics of the individuals constituting the study sample. This questionnaire facilitated the acquisition of pertinent details necessary for understanding the profile of the participants.

The intervention implemented in this study was designed to enhance general awareness skills among the selected sample of participants residing in cities within the Eastern Province. The intervention unfolded over a specific period, spanning nine months, and involved a multi-faceted approach to knowledge dissemination.

Through the researchers' review of some previous studies and literature related to health and nutritional awareness, paragraphs were prepared, and new paragraphs were added from these studies. The number of paragraphs that included the health and nutritional awareness scale for students of the schools located in the Eastern Province of Saudi Arabia became 34 paragraphs.

Validity:

After preparing the paragraphs of the health and nutritional awareness scale for students of the schools located in the Eastern Province of Saudi Arabia, which consisted of 34 paragraphs, the researchers presented them to a group of experts specializing in the Home Economics Department to benefit from their opinions and guidance. They were asked to indicate the validity or invalidity of the paragraphs and to make appropriate modifications to the paragraphs that needed modification. After analyzing the experts' answers, the paragraphs that obtained a percentage of 80% or more of the experts' opinions were determined, and their number was 31 paragraphs.

Reliability of the scale:

The scale was applied to a random sample of 30 male and female students from schools located in the Eastern Province of Saudi Arabia, and then the scale was re-applied to the same sample after two weeks. The correlation coefficient between the two applications was calculated, and it was found to be 0.85, which indicates a high degree of reliability of the scale.

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Internal consistency and reliability:

Cronbach's alpha coefficient was calculated for the scale items, and it was found to be 0.80, which indicates a high degree of internal consistency of the scale.

Table 2: Discriminant validity of the items of the health and nutritional awareness scale

Variables	Upper Group		lower group		T. Value	Statistically significant
	Mean	SD	Mean	SD		
1	2.8	0.74	2.02	0.37	6.289	Sig.
2	2.8	0.39	2	0.17	7.8	Sig.
3	2.73	0.98	1.82	0.69	8.136	Sig.
4	2.49	0.29	1.86	0.36	4.023	Sig.
5	2.69	0.78	1.95	0.18	7.401	Sig.
6	2.69	0.68	1.83	0.43	6.432	Sig.
7	2.75	0.85	1.83	0.34	8.609	Sig.
8	2.54	0.35	1.75	0.28	5.565	Sig.
9	2.49	0.78	1.61	0.56	6.02	Sig.
10	2.32	0.42	1.68	0.44	4.352	Sig.
11	2.73	0.45	1.82	0.36	6.052	Sig.
12	5.51	0.2	1.65	0.53	5.468	Sig.
13	2.73	0.83	1.72	0.26	4.356	Sig.
14	2.58	0.72	1.86	0.56	7.008	Sig.
15	2.68	0.54	1.58	0.4	8.21	Sig.
16	2.78	0.6	1.62	0.81	6.82	Sig.
17	2.51	0.81	1.76	0.52	7.139	Sig.
18	2.56	0.62	1.74	0.78	6.015	Sig.
19	2.54	0.55	1.58	0.43	7.258	Sig.
20	2.51	0.52	1.44	0.56	7.782	Sig.
21	2.57	0.27	1.68	0.67	6.841	Sig.
22	2.74	0.27	1.89	0.32	6.851	Sig.
23	2.54	0.22	1.92	0.26	7.221	Sig.
24	2.39	0.4	2.129	0.37	1.422	N. S
25	2.39	0.38	1.88	0.52	3.681	Sig.
26	2.38	0.38	1.64	0.65	3.089	Sig.
27	2.45	0.55	1.89	0.57	3.291	Sig.
28	2.45	0.17	1.92	0.54	2.152	Sig.
29	2.57	0.56	1.96	0.67	4.018	Sig.
30	2.85	0.66	1.58	0.66	4.521	Sig.
31	2.62	0.18	1.89	0.2	6.069	Sig.

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Reliability of the scale: The reliability of the health and nutrition awareness scale was extracted using Cronbach's internal consistency coefficient. The reliability coefficient calculated in this way reached 0.73) which is a good reliability coefficient.

Table 3: Reliability of the scale and its relationship to the total score

No.	Correlation coefficient
1	0.522
2	0.512
3	0.552
4	0.413
5	0.495
6	0.478
7	0.502
8	0.468
9	0.536
10	0.442
11	0.513
12	0.425
13	0.568
14	0.475
15	0.462
16	0.446
17	0.459
18	0.511
19	0.589
20	0.546
21	0.563
22	0.541
23	0.572
25	0.268
26	0.278
27	0.311
28	0.178
29	0.362
30	0.345
31	0.482

Paragraph (24) was deleted from the relationship of the paragraph to the total score because it fell by discrimination.

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Final Application of the Health and Nutritional Awareness Scale

Statistical analysis

The results obtained by the researchers will be displayed and analyzed, Data were fed to the PC and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp). We will display the arithmetic means of the questionnaire responses obtained from the sample and present the standard deviations to identify the degree of variation in those responses by displaying the frequencies and their percentages to identify the level of responses about the variables.

Results and Discussion

The results obtained were interpreted as follows:

Objective 1: To identify the health and nutritional awareness among students of the College of Physical Education and Sports Sciences.

Hypothesis: There is no difference in the arithmetic mean of the sample from the hypothetical mean of the health awareness and nutritional awareness scales.

Based on the data presented in Table 4, which outlines the results of a t-test conducted to examine the discrepancy between the sample mean and the hypothesized mean concerning health and nutrition awareness among middle school students in the eastern province of Saudi Arabia, several key observations can be made.

Firstly, the sample size (n) involved in the study is substantial, comprising 250 middle school students. This sizable sample is advantageous for ensuring the reliability and generalizability of the findings.

The sample mean, representing the average level of health and nutrition awareness among the participants, is calculated to be 66.715. This figure provides a quantitative representation of the perceived level of awareness within the studied population.

The standard deviation (SD) of 10.112 indicates the extent of variability in health and nutrition awareness scores among middle school students. A higher standard deviation suggests greater diversity in responses, while a lower value implies greater consistency.

The calculated t-value of 8.241 is notably higher than the critical t-value of 1.96 at a significance level of 0.05, indicating a substantial difference between the sample mean and the hypothesized mean. This stark contrast suggests that the observed level of health and nutrition awareness among middle school students significantly deviates from what was initially anticipated or assumed.

Furthermore, the associated p-value of 0.05 provides additional insight into the significance of the findings. With a p-value below the predetermined significance threshold of 0.05, the null hypothesis – typically positing no difference or effect – is rejected. This rejection indicates that there is indeed a statistically significant distinction between the sample mean and the hypothesized mean in terms of health and nutrition awareness among middle school students in the eastern province of Saudi Arabia.

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Table 4: T-test for the difference between the sample mean and the hypothesized mean to measure health and nutrition awareness

Sample	Mean	SD	T. Value		Degrees of Freedom	P. Value
			Calculated	Tabular		
250	66.715	10.112	8.241	1.96	149	0.05

These results indicate that the sample of students enjoys health and nutritional awareness. This result can be explained by the fact that awareness, understanding, and comprehension are the most important aspects of knowledge for learners. They include psychological, social, and behavioral aspects (Leng et al, 2017). It is the path that individuals and communities follow when obtaining information related to their nutrition, health, physical and mental health, and safety for activity and movement. [11]

Low health awareness and dietary practices prevent people from benefiting from food properly. They can even lead to diseases, including malnutrition (Maphosa and Jideani, 2017). These results are consistent with the study of Macdiarmid et al, (2016). This is in contrast to the findings of Ohly et al. (2016), where the sample had a medium level of health awareness. [12-14]

Objective 2: To identify the significance of the differences in the level of health and nutritional awareness according to the following variables:

- To identify the significance of the statistical differences in health and nutritional awareness according to gender.

Hypothesis: There are no statistically significant differences in health and nutritional awareness between males and females.

Table 5 presents a comparative analysis of health and nutritional awareness among middle school students in the eastern province of Saudi Arabia, disaggregated by gender. The data highlights distinct patterns in awareness levels between male and female participants.

Among the male cohort, consisting of 111 individuals, the average score for health and nutritional awareness is notably higher at 69.524, with a relatively lower standard deviation of 7.428. Conversely, the female group, comprising 139 participants, exhibits a slightly lower mean awareness score of 64.721, accompanied by a higher standard deviation of 10.581. These figures indicate a greater variability in awareness levels among female students compared to their male counterparts.

Table 5: Differences in health and nutritional awareness according to gender

Sample	No.	Mean	SD	T. Value		P. Value
				Calculated	Tabular	
Male	111	69.524	7.428	2.872	1.97	0.05
Female	139	64.721	10.581			

The calculated t-value of 2.872 suggests a significant difference in health and nutritional awareness between male and female students. This discrepancy is further supported by the associated p-value, which falls below the conventional threshold of 0.05, signifying statistical

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significance. Consequently, the null hypothesis, which posits no difference in awareness levels between genders, is rejected. Therefore, the null hypothesis is rejected because there is a difference in health and nutritional awareness according to gender in favor of males. This is consistent with the study of Sanou et al. (2014), but it does not agree with the studies of Sogari et al. (2018). [15, 16]

The observed gender disparity in health and nutritional awareness underscores the need for gender-sensitive approaches in educational and public health initiatives targeting middle school students. Understanding and addressing the underlying factors contributing to these differences are paramount for the development of tailored interventions aimed at promoting holistic health and well-being among adolescents.

one-way ANOVA was used to analyze the variance between the stage variables. The arithmetic mean and standard deviation were found for each group within the total group, as shown in Table 6.

Table 6: Difference in health and nutritional awareness according to the stage of the study

Educational stage	No.	Mean	SD
First stage	95	67.233	10.052
Second stage	65	65.582	8.0016
Third stage	48	67.423	11.521
Fourth stage	42	66.2581	10.415

Table 6 provides a comprehensive breakdown of health and nutritional awareness levels among middle school students in the eastern province of Saudi Arabia, delineated by their respective educational stages. This analysis aims to discern any discernible trends or disparities in awareness levels across different stages of middle school education.

In the first stage, encompassing 95 participants embarking on their middle school journey, the average health and nutritional awareness score stands at 67.233, with a standard deviation of 10.052. This indicates a moderate level of awareness among students at the outset of their middle school education.

Moving to the second stage, which includes 65 participants, the mean awareness score slightly decreases to 65.582, accompanied by a narrower standard deviation of 8.0016. This suggests a marginal decline in awareness levels compared to the first stage, albeit with less variability among scores.

Transitioning to the third stage, comprising 48 participants, there is a slight uptick in the mean awareness score to 67.423. However, this increase is coupled with a higher standard deviation of 11.521, indicating greater variability in awareness levels among students at this stage.

In the fourth stage, the smallest group with 42 participants, the mean awareness score is recorded at 66.2581, with a standard deviation of 10.415. While the mean score aligns closely with that of the first stage, the standard deviation suggests a degree of variability comparable to the earlier stages.

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Upon closer examination, while there are fluctuations in mean awareness scores across the different educational stages, the differences appear relatively minor. Statistical methods, such as analysis of variance (ANOVA), could be employed to ascertain the significance of these disparities. Furthermore, exploring potential factors contributing to variations in awareness levels, such as curriculum content, teaching methodologies, and student demographics, may offer valuable insights for enhancing health education programs tailored to the specific needs of students at each stage of middle school education.

Table 7: Results of one-way ANOVA to detect the significance of the difference in health and nutritional awareness according to the stage of the study

Source of Variation	Sum of Squares	Degrees of Freedom	Mean of Squares	T. Value		P. Value
				Calculated	Tabular	
Between Groups	73.25	3	23.152	0.24	2.6	0.87
Within Groups	14866.25	146	102.12			

Table 7 presents the outcomes of a rigorous one-way analysis of variance (ANOVA) designed to discern any significant disparities in health and nutritional awareness among middle school students in the eastern province of Saudi Arabia across different educational stages. This statistical method allows for a comprehensive examination of variance between and within groups to determine whether the observed differences in mean awareness scores are statistically significant.

The analysis partitions the total variability in health and nutritional awareness scores into two main sources: between groups and within groups. The "Between Groups" variation accounts for differences in mean awareness scores across the various educational stages, while the "Within Groups" variation encapsulates variability within each stage group due to individual differences or measurement errors.

The results reveal that the sum of squares attributed to between-group variation is 73.25, with 3 degrees of freedom, resulting in a mean of squares of 23.152. In contrast, the sum of squares within groups is substantially larger at 14866.25, with 146 degrees of freedom, leading to a mean of squares of 102.12.

The calculated t-value for the between-groups variation is 0.24, which is notably smaller than the critical t-value of 2.6 at a significance level of 0.87. Furthermore, the associated p-value is much larger than the conventional threshold of 0.05. This indicates that there is no statistically significant difference in health and nutritional awareness scores among middle school students across the various educational stages in the eastern province of Saudi Arabia.

These findings suggest that factors other than the educational stage may exert a more substantial influence on health and nutritional awareness levels among middle school students in the region. Potential factors could include socioeconomic status, access to health education resources, cultural beliefs, and family dynamics. Therefore, while the educational stage may not be a significant determinant of awareness levels, a multifaceted approach addressing these broader contextual factors may be necessary to enhance health and nutritional literacy among

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middle school students in the eastern province of Saudi Arabia. Further research exploring these factors in greater depth could provide valuable insights for designing targeted interventions aimed at promoting holistic health education and fostering healthy behaviors among adolescents.

This accepts the null hypothesis, meaning that there are no statistically significant differences in health and nutritional awareness according to the stage of study. This does not agree with the study of Spronk et al. (2014), where there were significant differences in health and nutritional awareness according to the stage of the study, but it does agree with Truman et al. 2017. [17, 18]

Table 8: The difference in health and nutritional awareness according to the economic level

Educational stage	No.	Mean	SD
High	86	66.16	9.742
Average	112	66.582	9.852
Weak	52	67.621	10.896

Table 8 provides a comprehensive examination of health and nutritional awareness levels among middle school students in the eastern province of Saudi Arabia, categorized according to their economic status. This analysis aims to elucidate potential disparities in awareness levels across different economic strata, shedding light on the intersection between socioeconomic factors and health education outcomes.

Within the cohort of students from high economic backgrounds, comprising 86 participants, the mean health and nutritional awareness score stands at 66.16. Despite a moderate level of awareness, the standard deviation of 9.742 suggests some variability in awareness levels among students from affluent households.

Moving to students from average economic backgrounds, consisting of 112 participants, there is a marginal increase in the mean awareness score to 66.582. However, the standard deviation remains relatively consistent at 9.852, indicating similar variability in awareness levels compared to the high-economic group.

Conversely, students hailing from economically disadvantaged backgrounds, encompassing 52 participants, demonstrate the highest mean awareness score at 67.621. Despite this, the standard deviation of 10.896 suggests greater variability in awareness levels among students facing economic challenges.

While the differences in mean awareness scores across economic levels are subtle, further statistical analysis is required to determine their significance. Techniques such as analysis of variance (ANOVA) or regression analysis could ascertain whether these variations are statistically significant and explore potential confounding variables.

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Table 9: Results of one-way ANOVA to detect the significance of the differences in health and nutritional awareness according to the economic level

Source of Variation	Sum of Squares	Degrees of Freedom	Mean of Squares	T. Value		P. Value
				Calculated	Tabular	
Between Groups	32.182	2	16.158	0.16	3	0.81
Within Groups	14866.25	147	101.521			

Table 9 furnishes a comprehensive examination of health and nutritional awareness levels among middle school students in the eastern province of Saudi Arabia, scrutinized through the lens of economic status via a one-way analysis of variance (ANOVA). This statistical tool enables the assessment of any discernible disparities in awareness levels across different economic strata, providing insights into the interplay between socioeconomic factors and health education outcomes.

The analysis dissects the total variability in health and nutritional awareness scores into two primary sources: between groups and within groups. The "Between Groups" variation scrutinizes differences in mean awareness scores among students from distinct economic backgrounds, while the "Within Groups" variation encapsulates the variability in awareness levels within each economic stratum due to individual differences or measurement errors.

The outcomes reveal that the sum of squares attributed to between-group variation is 32.182, with 2 degrees of freedom, culminating in a mean of squares of 16.158. Conversely, the sum of squares within groups is substantially larger at 14866.25, with 147 degrees of freedom, yielding a mean of squares of 101.521.

The calculated t-value for the between-groups variation is 0.16, significantly smaller than the critical t-value of 3 at a significance level of 0.81. Additionally, the associated p-value is notably larger than the conventional threshold of 0.05, indicating a lack of statistical significance. These results collectively suggest that there is no substantial difference in health and nutritional awareness scores among middle school students across various economic levels in the eastern province of Saudi Arabia.

While the findings may seem surprising, they underscore the complex nature of factors influencing health education outcomes beyond economic status alone. Additional variables such as cultural influences, access to resources, and educational interventions may play significant roles in shaping awareness levels among students. Thus, further research delving into these multifaceted determinants is imperative to devise targeted interventions aimed at promoting equitable health education access and fostering healthier behaviors among adolescents in the region.

This agrees with the study of Velardo [19] (2015) but does not agree with the study of Anderson (2014). [20]

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Conclusions:

In conclusion, the findings from the analyses conducted on health and nutritional awareness among middle school students in the eastern province of Saudi Arabia provide valuable insights into the factors influencing awareness levels and underscore the importance of targeted interventions in promoting health literacy among adolescents. Here are the key conclusions drawn from the data:

Significant Gender Differences: The analysis revealed significant differences in health and nutritional awareness between male and female students. Specifically, male students demonstrated higher levels of awareness compared to their female counterparts. This highlights the need for gender-specific approaches in health education initiatives to address disparities and ensure equitable access to information and resources.

Limited Variability Across Educational Stages: While there were slight fluctuations in mean awareness scores across different educational stages, the differences were not statistically significant. This suggests that the educational stage alone may not be a significant determinant of health and nutritional awareness among middle school students in the region. Further exploration of additional factors influencing awareness levels is warranted to inform targeted interventions.

Negligible Impact of Economic Status: The analysis found no significant differences in health and nutritional awareness across various economic levels among middle school students. This challenges the notion that economic status is a primary determinant of awareness levels and underscores the need to explore other socio-economic and environmental factors that may influence health education outcomes.

Complex Interplay of Factors: The findings highlight the multifaceted nature of factors influencing health and nutritional awareness among adolescents. Beyond demographic characteristics such as gender, educational stage, and economic status, cultural influences, access to resources, and educational interventions also play significant roles. Addressing these complex determinants requires a holistic approach that considers the unique needs and contexts of middle school students in the eastern province of Saudi Arabia.

Implications for Interventions: To promote health literacy and foster healthier behaviors among adolescents, targeted interventions tailored to specific demographic and socio-economic groups are essential. Strategies may include gender-sensitive health education programs, curriculum adaptations to suit different educational stages, and initiatives aimed at addressing socio-economic disparities in access to health resources.

Recommendations:

Based on the conclusions drawn from the analyses conducted on health and nutritional awareness among middle school students in the eastern province of Saudi Arabia, several recommendations can be made to enhance health education initiatives and promote health literacy among adolescents:

Tailored Health Education Programs: Develop gender-sensitive health education programs that address the specific needs and preferences of male and female students.

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Incorporate interactive and culturally relevant learning materials to engage students effectively and promote retention of health information.

Diversified Curriculum: Implement a diversified health education curriculum that caters to the varying levels of awareness and understanding among students at different educational stages. Adapt teaching methods and content to align with the cognitive development and learning styles of middle school students, ensuring that the curriculum remains relevant and engaging.

Equitable Resource Allocation: Ensure equitable access to health education resources and support services across different economic levels. Implement targeted interventions to address socio-economic disparities in access to healthcare facilities, nutritious food options, and health education materials, thereby promoting equal opportunities for health literacy among all students.

Holistic Approach to Health Promotion: Take a holistic approach to health promotion by addressing the complex interplay of factors influencing health and nutritional awareness among adolescents. Collaborate with parents, educators, healthcare providers, and community leaders to create a supportive environment that fosters healthy behaviors and positive lifestyle choices among middle school students.

Research and Evaluation: Conduct further research to explore additional factors influencing health and nutritional awareness among middle school students in the eastern province of Saudi Arabia. Use evidence-based approaches to evaluate the effectiveness of health education interventions and identify areas for improvement, thereby informing future program development and implementation.

Community Engagement: Engage the local community in health promotion efforts by organizing workshops, seminars, and awareness campaigns on topics related to nutrition, physical activity, mental health, and disease prevention. Foster partnerships with community-based organizations, religious institutions, and government agencies to amplify the reach and impact of health education initiatives.

Empowerment and Advocacy: Empower students to take an active role in promoting health and well-being within their schools and communities. Encourage student-led initiatives, peer education programs, and advocacy campaigns that empower adolescents to advocate for health-promoting policies and practices, thereby fostering a sense of ownership and responsibility for their health outcomes.

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