

Original Research Article

Impact of dietary habit on the mental wellbeing of adolescents: a Bangladeshi perspective

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ABSTRACT

Background: Adolescent mental health is a critical public health issue, significantly influenced by dietary habits. This study aims to explore the relationship between dietary patterns and mental well-being among adolescents in Dhaka, Bangladesh.

Methods: This cross-sectional observational study was conducted with 600 students from Grades 9 and 10 across multiple schools in Dhaka. Data were collected using a structured questionnaire covering demographic information, dietary habits, and mental health assessed using the generalized anxiety disorder 7-item (GAD-7) scale.

Result: The majority of participants were aged 15 years (37.83%) and 16 years (28.33%), with 61.33% being female. BMI classification revealed that 28.83% were underweight, 54.67% had a normal BMI, and 16.50% were overweight or obese. Dietary analysis showed that 56.17% had a mixed diet, 48.33% consumed fruits weekly, and 59.83% consumed vegetables regularly. Significant correlations were found between dietary habits and anxiety levels, with positive correlations between fruit and vegetable intake ($r=0.143$, $p<0.001$) and negative correlations between skipping breakfast and fruit intake ($r=-0.172$, $p<0.001$).

Conclusion: This study highlights the significant impact of dietary habits on the mental well-being of adolescents in Dhaka. Regular consumption of fruits and vegetables is associated with lower anxiety levels, while poor dietary practices, such as skipping breakfast and high fast-food intake, are linked to higher anxiety. These findings underscore the need for targeted nutritional education and mental health interventions to improve adolescent health outcomes.

Keywords: Adolescent mental health, Dietary habits, Anxiety levels, Generalized anxiety disorder

INTRODUCTION

Adolescence is a critical period of human development, marked by rapid physical, psychological, and emotional changes. This stage of life is crucial as it lays the foundation for future health and well-being. Mental health during adolescence is particularly significant, as it influences educational achievement, social relationships, and overall quality of life.¹ Globally, mental health issues such as depression, anxiety, and stress are prevalent among adolescents, affecting a substantial proportion of this population.² According to the World Health Organization, up to 20% of children and adolescents worldwide suffer from a disabling mental illness, with suicide being the third leading cause of death among adolescents.³ In Bangladesh, the situation is similarly concerning, with rising rates of mental health disorders reported among adolescents.⁴

Dietary habits have been increasingly recognized as a key factor influencing mental health. Nutritional intake during adolescence not only supports physical growth but also plays a crucial role in cognitive and emotional development.⁵ Various studies have highlighted the association between specific nutrients and mental well-being. For instance, Omega-3 fatty acids, commonly found in fish, have been linked to reduced symptoms of depression and anxiety.⁶ Similarly, dietary patterns such as the Mediterranean diet, which is rich in fruits, vegetables, whole grains, and lean proteins, have been associated with lower rates of mental health disorders.⁷ In contrast, diets high in processed foods, sugars, and unhealthy fats are often correlated with poorer mental health outcomes.⁸ In Bangladesh, adolescents constitute a significant portion of the population, with unique dietary habits influenced by socio-economic and cultural factors.

Common dietary practices among Bangladeshi adolescents often include high consumption of rice, vegetables, and fish, but may lack diversity and essential nutrients.⁹ Despite the global recognition of the diet-mental health link, there is a paucity of research focusing specifically on Bangladeshi adolescents.

This study aims to fill this gap by exploring the impact of dietary habits on the mental well-being of adolescents in Bangladesh. Several studies underscore the importance of investigating this relationship within the Bangladeshi context. For instance, Kurshed et al, conducted a study on the dietary intake and nutritional status of adolescent girls in Dhaka, revealing significant deficiencies in micronutrient intake, particularly calcium and iron.¹⁰

Similarly, Razzak et al, highlighted widespread nutritional and hygiene problems among adolescent girls in Sunamganj District, emphasizing the need for targeted health education interventions.¹¹ Another study by Islam et al, explored dietary diversity among rural adolescents, finding significant associations between socio-economic status and dietary diversity, with poorer households

exhibiting less diverse diets.¹² These findings are critical as they point to underlying socio-economic and cultural factors that influence dietary habits and, consequently, mental health. The role of socio-economic status in shaping dietary habits is further evidenced by the study conducted by Hossain, which compared the nutritional knowledge and practices between garment worker adolescents and school-going girls.¹³ The study found significant gaps in nutritional awareness, highlighting the need for education and intervention programs. Moreover, the impact of dietary habits on mental health has been observed in various contexts.

For instance, a study by Ahmed et al, investigated the prevalence of anaemia and vitamin A deficiency among adolescent boys in Dhaka, linking these deficiencies to poor dietary habits.¹⁴ Similarly, a study by Sunny et al,

examined the lifestyle and dietary habits of high school students during the COVID-19 pandemic, underscoring the importance of healthy dietary practices for maintaining mental well-being during stressful times.¹⁵ The existing literature clearly indicates a significant gap in research focused on the dietary habits and mental well-being of Bangladeshi adolescents. This study seeks to address this gap by providing a comprehensive analysis of the relationship between dietary habits and mental health in this demographic.

METHODS

Study type

This cross-sectional observational study was conducted among 600 students, both male and female, selected from various schools in Dhaka city.

Study duration

The study duration was from January 2021 to December 2024.

Sampling technique

Randomized sampling technique was used for data collection. The study population included students from Grades 9 and 10, ensuring a representative sample of the urban adolescent population in Dhaka.

Sample size

The sample size was determined to provide adequate statistical power and representativeness.

Data collection

Data collection was carried out using a structured questionnaire, which was designed to gather detailed information on demographic characteristics, dietary habits, and mental health status. The mental health of the

respondents was assessed using the generalized anxiety disorder 7-Item (GAD-7) scale. The questionnaire also included sections on screen time, distinguishing between leisure and educational activities.

Inclusion criteria

Inclusion criteria were limited to students in Grades 9 and 10 to maintain consistency and focus on a specific age group.

Exclusion criteria

Exclusion criteria included students with pre-diagnosed mental disabilities to avoid confounding effects from pre-existing conditions. Additionally, students outside the specified grade levels were excluded from the study. Informed consent was obtained from the legal guardians of all participants. The consent form was incorporated into the questionnaire, and guardians provided their approval through a signature, ensuring ethical compliance and the protection of minors involved in the study.

Statistical analysis

The collected data were entered and analyzed using SPSS version 25. Statistical analyses included Chi-square tests for categorical variables and ANOVA tests for continuous variables to assess the significance of associations between dietary habits, screen time, and mental health outcomes. Statistical significance was set at a *p* value of less than 0.05.

RESULTS

The age distribution showed that the majority of participants were aged 15 years (37.83%), followed by 16 years (28.33%), 14 years (24.67%), 13 years (6.33%), and 17 years (2.83%).

Table 1: Distribution of baseline characteristics among the participants (n=600).

Variables	Frequency	%
Age (years)		
13	38	6.33
14	148	24.67
15	227	37.83
16	170	28.33
17	17	2.83
Gender		
Male	232	38.67
Female	368	61.33
BMI		
Underweight	173	28.83
Normal	328	54.67
Overweight	91	15.17
Obesity I	8	1.33

Gender distribution revealed that 38.67% of the participants were male (n=232) and 61.33% were female (n=368).

Regarding the Body Mass Index (BMI) classification, 28.83% of the participants were underweight (n=173), 54.67% had a normal BMI (n=328), 15.17% were overweight (n=91), and 1.33% fell into the obesity I category (n=8) Table 1.

Table 2: Distribution of participants by dietary habits (n=600).

Dietary habits	Frequency	%
Fruits intake		
Regular	204	34.00
Weekly	290	48.33
Rarely	97	16.17
Never	9	1.50
Vegetables intake		
Regular	359	59.83
Weekly	173	28.83
Rarely	52	8.67
Never	16	2.67
Fast food intake		
Regular	138	23.00
Weekly	246	41.00
Rarely	177	29.50
Never	39	6.50
Sweet and sugary food intake		
Regular	198	33.00
Weekly	240	40.00
Rarely	158	26.33
Never	4	0.67
Habit of skipping breakfast		
Often	93	15.50
Sometimes	269	44.83
Rarely	54	9.00
Never	184	30.67

The distribution showed that a majority of the participants, 56.17% (n=337), followed a mixed diet. This was followed by 38.33% (n=230) who adhered to a non-vegetarian diet, and a smaller proportion, 5.50% (n=33), who were vegetarians' figure 1. Among the 600 adolescent participants, the majority, 81.50% (n=489), reported having no known food allergies. For those with known food allergies, 9.50% (n=57) were allergic to prawns and fish.

Other specific food allergies included spinach and eggplant, each affecting 1.33% (n=8) of the participants. Additionally, 6.33% (n=38) reported having common food allergies. Among the 600 adolescent participants, the majority, 81.50% (n=489), reported having no known food allergies. For those with known food allergies, 9.50% (n=57) were allergic to prawns and fish. Other specific food allergies included spinach and eggplant,

each affecting 1.33% (n=8) of the participants. Additionally, 6.33% (n=38) reported having common food allergies figure 2. Regarding fruit intake, 34.00% (n=204) of the participants reported consuming fruits regularly, 48.33% (n=290) consumed fruits weekly, 16.17% (n=97) rarely ate fruits, and 1.50% (n=9) never consumed fruits. For vegetable intake, a majority, 59.83% (n=359), reported eating vegetables regularly, 28.83% (n=173) consumed vegetables weekly, 8.67% (n=52) rarely ate vegetables, and 2.67% (n=16) never consumed vegetables. Fast food consumption was also significant among the participants, with 23.00% (n=138) eating fast food regularly, 41.00% (n=246) weekly, 29.50% (n=177) rarely, and 6.50% (n=39) never consuming fast food.

Sweet and sugary food intake was reported as regular by 33.00% (n=198) of the participants, weekly by 40.00% (n=240), rarely by 26.33% (n=158), and never by 0.67% (n=4). When it comes to the habit of skipping breakfast, 15.50% (n=93) of the participants reported often skipping breakfast, 44.83% (n=269) sometimes skipped breakfast, 9.00% (n=54) rarely skipped breakfast, and 30.67% (n=184) never skipped breakfast table 2. For the item "Feeling nervous, anxious, or on edge," 48.8% (n=293) reported not experiencing this at all, 39.8% (n=239) felt this way several days, 7.0% (n=42) experienced it more than half the days, and 4.3% (n=26) nearly every day.

Regarding "Not being able to stop or control worrying," 55.3% (n=332) did not experience this at all, 31.7% (n=190) felt this way several days, 9.0% (n=54) more than half the days, and 4.0% (n=24) nearly every day. For the item "Worrying too much about different things," 44.5% (n=267) reported not at all, 30.8% (n=185) several days, 10.7% (n=64) more than half the days, and 14.0% (n=84) nearly every day. In terms of "Trouble relaxing," 41.3% (n=248) reported not at all, 30.2% (n=181) several days, 15.0% (n=90) more than half the days, and 13.5% (n=81) nearly every day. For "Being so restless that it is hard to sit still," 73.0% (n=438) did not experience this at all, 13.7% (n=82) felt this way several days, 8.3% (n=50) more than half the days, and 5.0% (n=30) nearly every day.

Regarding "Becoming easily annoyed or irritable," 47.2% (n=283) reported not at all, 28.5% (n=171) several days, 14.0% (n=84) more than half the days, and 10.3% (n=62) nearly every day. Finally, for the item "Feeling afraid as if something awful might happen," 74.5% (n=447) did not experience this at all, 19.7% (n=118) felt this way several days, 3.8% (n=23) more than half the days, and 2.0% (n=12) nearly every day table 3. The majority of participants, 52.83% (n=317), experienced minimal anxiety. Mild anxiety was reported by 36.17% (n=217) of the participants. Moderate anxiety levels were observed in 8.00% (n=48) of the adolescents, while 3.00% (n=18) experienced severe anxiety figure 3.

The bivariate correlation analysis between GAD-7 scores and various dietary habits among the 600 adolescent participants revealed several significant associations. Fruits intake showed a positive correlation with vegetables intake ($r=0.143$, $p<0.001$) and a weak positive correlation with fast food intake ($r=0.090$, $p=0.027$). However, it was negatively correlated with the habit of skipping breakfast ($r=-0.172$, $p<0.001$). Vegetables intake was negatively correlated with fast food intake ($r=-0.186$, $p<0.001$) and diet type ($r=-0.239$, $p<0.001$), indicating that higher vegetable intake was associated with lower fast-food consumption and a preference for a healthier diet. It was also negatively correlated with the habit of skipping breakfast ($r=-0.192$, $p<0.001$).

Fast food intake showed positive correlations with sweets and sugary food intake ($r=0.177$, $p<0.001$), diet type ($r=0.218$, $p<0.001$), and the habit of skipping breakfast ($r=0.345$, $p<0.001$), suggesting that higher fast-food consumption was associated with increased intake of sweets and sugary foods, and a tendency to skip breakfast. Sweets and sugary food intake had positive correlations with diet type ($r=0.188$, $p<0.001$) and a weak positive correlation with fast food intake ($r=0.177$, $p<0.001$). Diet type showed positive correlations with fast food intake ($r=0.218$, $p<0.001$) and sweets and sugary food intake ($r=0.188$, $p<0.001$), while it was negatively correlated with vegetables intake ($r=-0.239$, $p<0.001$).

The habit of skipping breakfast had a strong positive correlation with fast food intake ($r=0.345$, $p<0.001$) and a negative correlation with both fruits' intake ($r=-0.172$, $p<0.001$) and vegetables intake ($r=-0.192$, $p<0.001$). The GAD-7 scores categorized showed weak negative correlations with fruits intake ($r=-0.076$, $p=0.062$), vegetables intake ($r=-0.043$, $p=0.298$), and fast-food intake ($r=-0.024$, $p=0.553$), none of which were statistically significant.

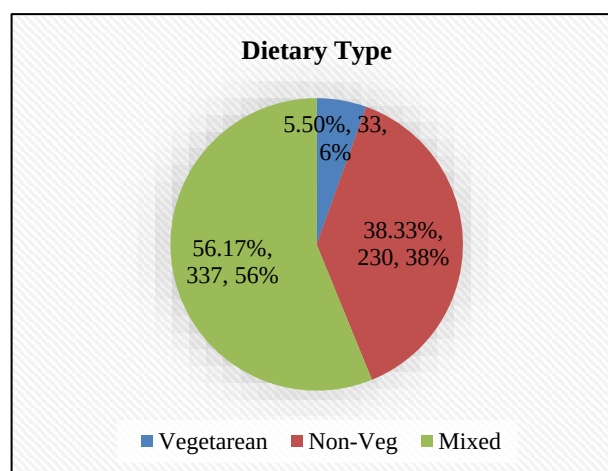


Figure 1: Distribution of dietary type among the participants (n=600).

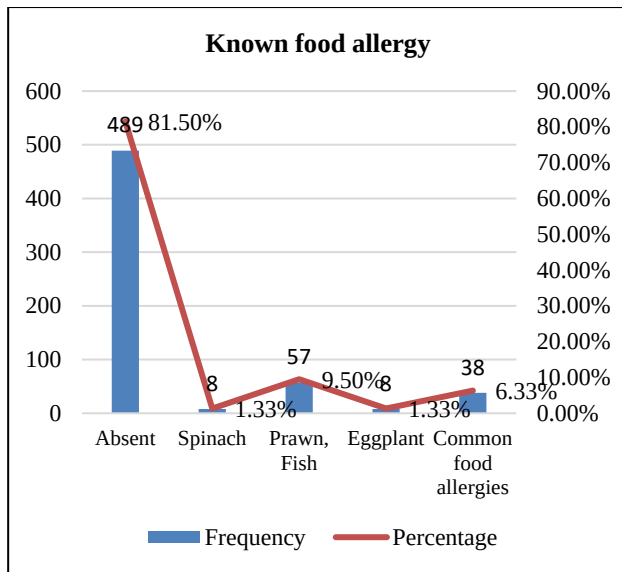


Figure 2: Distribution of known food allergens among the participants (n=600).

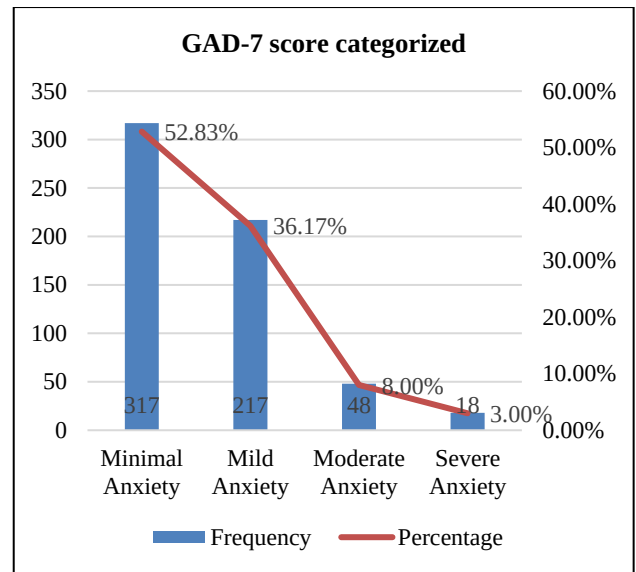


Figure 3: Distribution of participants my GAD-7 measured anxiety levels.

Table 3: Distribution of generalized anxiety disorder 7-item (GAD-7) score representations among the participants (n=600).

GAD-7 Category	Not at all, N (%)	Several days, N (%)	More than half the days, N (%)	Nearly every day, N (%)
Feeling nervous, anxious or on edge	293 (48.8)	239 (39.8)	42 (7.0)	26 (4.3)
Not being able to stop or control worrying	332 (55.3)	190 (31.7)	54 (9.0)	24 (4.0)
Worrying too much about different things	267 (44.5)	185 (30.8)	64 (10.7)	84 (14.0)
Trouble relaxing	248 (41.3)	181 (30.2)	90 (15.0)	81 (13.5)
Being so restless that it is hard to sit still	438 (73.0)	82 (13.7)	50 (8.3)	30 (5.0)
Becoming easily annoyed or irritable	283 (47.2)	171 (28.5)	84 (14.0)	62 (10.3)
Feeling afraid as if something awful might happen	447 (74.5)	118 (19.7)	23 (3.8)	12 (2.0)

Table 4: Bivariate correlation of GAD-7 scores and dietary habit of participants (n=600).

Correlations		Fruits intake	Vegetables intake	Fast food intake	Sweets and sugary food intake	Diet type	Habit of skipping breakfast	GAD7 score categorized
Fruits intake	Pearson correlation	1	0.143**	0.090*	0.061	0.023	-0.172**	-0.076
	Sig. (2-tailed)		<0.001	0.027	0.133	0.573	<0.001	0.062
Vegetables intake	Pearson correlation	0.143**	1	-0.186**	0.001	-0.239**	-0.192**	-0.043
	Sig. (2-tailed)	<0.001		<0.001	0.982	<0.001	<0.001	0.298
Fast food intake	Pearson correlation	0.090*	-0.186**	1	0.177**	0.218**	0.345**	-0.024
	Sig. (2-tailed)	0.027	<0.001		<0.001	<0.001	<0.001	0.553
Sweets and sugary food	Pearson correlation	0.061	0.001	0.177**	1	.188**	0.040	0.021

Continued.

Correlations		Fruits intake	Vegetables intake	Fast food intake	Sweets and sugary food intake	Diet type	Habit of skipping breakfast	GAD7 score categorized
intake	Sig. (2-tailed)	0.133	0.982	<0.001		<0.001	0.325	0.605
Diet type	Pearson correlation	0.023	-0.239**	0.218**	0.188**	1	-0.017	-0.051
	Sig. (2-tailed)	0.573	<0.001	<0.001	<0.001		0.674	0.212
Habit of skipping breakfast	Pearson correlation	-	-0.192**	0.345**	0.04	-0.017	1	0.072
	Sig. (2-tailed)	<0.001	<0.001	<0.001	0.325	0.674		0.076
GAD7 score categorized	Pearson correlation	-0.076	-0.043	-0.024	0.021	-0.051	0.072	1
	Sig. (2-tailed)	0.062	0.298	0.553	0.605	0.212	0.076	

It also had weak positive correlations with sweets and sugary food intake ($r=0.021$, $p=0.605$) and the habit of skipping breakfast ($r=0.072$, $p=0.076$), though these were also not statistically significant Table 4.

DISCUSSION

The findings of this study highlight important aspects of dietary habits and their correlation with mental well-being among adolescents in Dhaka, Bangladesh. The age distribution of our participants, with the majority being 15 years old (37.83%) and 16 years old (28.33%), aligns with other studies that focused on similar age groups to capture a representative sample of adolescent dietary and mental health patterns.^{16,17} The gender distribution in our study, where 38.67% of the participants were male and 61.33% were female, reflects similar trends observed in other adolescent health studies, indicating a higher participation or prevalence of issues among female adolescents.¹⁷ This gender disparity may be influenced by sociocultural factors that warrant further investigation.

Our BMI classification revealed that 28.83% of the participants were underweight, 54.67% had a normal BMI, 15.17% were overweight, and 1.33% were classified as obesity I. These findings are consistent with a study conducted in Tehran, which reported comparable percentages of underweight and overweight adolescents, highlighting the universal nature of adolescent nutritional challenges.¹⁸ The high prevalence of normal BMI is encouraging, yet the significant proportion of underweight and overweight individuals indicates the need for targeted nutritional interventions. The dietary types in our study showed that 5.50% of participants were vegetarian, 38.33% were non-vegetarian, and 56.17% had a mixed diet. This distribution mirrors findings from urban adolescents in Nigeria, where dietary patterns were similarly diverse, underscoring the impact of cultural dietary practices on adolescent nutrition.¹⁹ A substantial

majority of our participants, 81.50%, reported no known food allergies, while 9.50% were allergic to prawns and fish. These figures align with global data on food allergies, though the specific allergens may vary by region.^{20,21} Regarding fruit and vegetable intake, 34.00% of participants consumed fruits regularly, while 48.33% did so weekly, and 59.83% consumed vegetables regularly, with 28.83% doing so weekly. These figures are comparable to findings from project EAT, which emphasized the role of home availability and taste preferences in increasing fruit and vegetable consumption among adolescents.²² The positive correlation between fruit and vegetable intake in our study ($r=0.143$, $p<0.001$) supports the assertion that these dietary components are often consumed together.²³

Interestingly, our study found a negative correlation between fruit intake and the habit of skipping breakfast ($r=-0.172$, $p<0.001$). This finding is consistent with research showing that breakfast-skipping adolescents are less likely to consume fruits and other healthy foods throughout the day.²⁴ Additionally, the negative correlation between vegetable intake and fast food consumption ($r=-0.186$, $p<0.001$) aligns with studies indicating that higher fast food consumption is associated with lower intake of healthier food options.²⁴ The mental health assessment using the GAD-7 scale revealed that 52.83% of participants had minimal anxiety, 36.17% had mild anxiety, 8.00% had moderate anxiety, and 3.00% had severe anxiety. These levels are comparable to findings from a large-scale study in Finland, which validated the use of GAD-7 among adolescents and reported similar distributions of anxiety levels.²⁵

Furthermore, our findings on specific anxiety symptoms such as feeling nervous or anxious (48.8% not at all, 39.8% several days) and uncontrollable worrying (55.3% not at all, 31.7% several days) reflect patterns observed in other adolescent populations.^{25,26} Overall, our study

underscores the complex interplay between dietary habits and mental health among Bangladeshi adolescents. The correlations identified, such as the positive relationship between fruit and vegetable intake and the negative impact of fast-food consumption on mental health, highlight the need for comprehensive nutritional and mental health interventions. Comparative analysis with studies from other regions provides valuable context and reinforces the universal relevance of these findings. Addressing these issues through targeted policies and educational programs could significantly improve the health outcomes of adolescents in Bangladesh. The sample size in this study was relatively small compared to other research efforts, largely due to the brevity of this study. Additionally, potential biases stemming from self-reporting and limitations on generalizability may influence the results.

CONCLUSION

This study provides a comprehensive and detailed analysis of the intricate relationship between dietary habits and mental well-being among adolescents in Dhaka, Bangladesh. The findings underscore the critical role of nutrition in influencing anxiety levels among this demographic. Specifically, the data reveal that regular consumption of fruits and vegetables is significantly associated with lower anxiety levels, highlighting their importance in promoting mental health. Conversely, frequent intake of fast food is linked to increased anxiety, indicating the adverse effects of unhealthy dietary practices. Furthermore, the negative correlation between skipping breakfast and overall dietary quality emphasizes the necessity for consistent and balanced eating patterns.

These results not only align with global research but also emphasize the urgent need for targeted nutritional education and public health interventions tailored to the needs of Bangladeshi adolescents. By addressing these dietary issues, we can make significant strides in improving both the physical and mental health of this vulnerable population. Future research should expand on these findings across diverse populations to develop and implement effective strategies that support the holistic well-being of adolescents worldwide.

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