

EXAMINING NUTRITIONAL STATUS AND EMOTIONAL WELL BEING IN ADOLESCENT GIRLS THROUGH DIET QUALITY AND DEPRESSIVE SYMPTOMS

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ABSTRACT

Adolescence is a critical developmental stage marked by heightened nutritional demands and emotional sensitivity, particularly among girls. The present study was conducted in the year 2024 with an objective to assess the diet quality and emotional functioning of 100 adolescent girls aged 11–18 years in Guntur district of Andhra Pradesh- using the Diet Quality Index–International (DQI-I) and the Depression, Anxiety, and Stress Scale–Youth Version (DASS-Y). Dietary Information was gathered via 24-hour recall and evaluated using Indian Food Composition Table IFCT (2017), with DQI-I scoring based on ICMR–NIN (2020) guidelines. Emotional functioning was evaluated using DASS-Y, categorizing severity across depression, anxiety and stress. Data on DQI-I scoring showed that 15 percent of the girls had excellent diet quality, 85 percent were under the “Good but Needs Improvement” category (>60–80) and none had poor diet quality (<60). Results of DASS-Y showed high emotional distress 86percent had moderate to extremely severe anxiety, 79 percent had moderate to severe stress, and 72 percent showed depressive symptoms. Older adolescents (15–18 years) exhibited significantly higher levels of stress and anxiety compared to younger ones, as confirmed by t-tests and chi-square analyses. A strong negative correlation ($r = -0.6798$, $p < 0.001$) was observed between DQI-I and DASS-Y scores, with 46.21 percent of the emotional variation explained by diet quality. These findings underscore the critical role of nutrition in mental health and highlight the need for integrated dietary and psychological interventions to promote holistic well-being among adolescent girls.

Keywords: Adolescent girls, Anxiety, Depression, DASS-Y, Emotional functioning, Mental health, Nutritional status, Diet Quality Index–International (DQI-I), Stress,

INTRODUCTION

Adolescence, typically defined as the age between 11 and 18 years, is a period of rapid growth and profound physiological, psychological and emotional changes. In this crucial period of growth, adolescents go through increased nutritional demands to

support their accelerated physical and cognitive development. Adolescent girls are especially at risk because of the onset of menstruation, hormonal shifts and socio-cultural pressures, which often result in poor dietary practices and heightened emotional sensitivity. A sufficient and well-balanced diet

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is necessary for maintaining psychological well-being in addition to physical health. Inadequate intake of essential nutrients can compromise growth, immunity, and cognitive performance, while also increasing the risk of emotional disturbances such as depression, anxiety, and stress.

In order to evaluate adolescents overall dietary quality, the Diet Quality Index–International (DQI-I) is a widely used tool. The current study findings DQI-I developed by Mediratta and Pulkit (2023), which is based on ICMR–NIN (2020) recommendations, was employed. This tool evaluates four key components of diet—variety, adequacy, moderation, and overall balance—and provides a composite score that reflects the nutritional quality of the individual's dietary intake. Low DQI-I scores are indicative of inadequate consumption of nutrient-rich foods such as vegetables, fruits, dairy products, and micronutrients, which may be linked to poor mental health outcomes. Emotional functioning, particularly the presence of depressive symptoms, is another critical aspect of adolescent health. Depression, anxiety and stress are common among adolescents and are impacted by a number of things, such as inadequate diet, academic pressure, family environment and social relationships.

In this study, the Depression, Anxiety and Stress Scale–Youth Version (DASS-Y) was used to measure emotional functioning, a reliable and validated instrument designed specifically to evaluate emotional states in adolescents. The scale categorizes severity levels and helps identify adolescents at risk of psychological distress. While both nutrition and emotional well-being play vital roles in adolescent development, there is a lack of research exploring the relationship between these aspects among adolescent girls in India. Hence, this study aimed to evaluate the

nutritional status of girls aged 11–18 years using the Diet Quality Index–International (DQI-I) and to examine their emotional functioning by detecting depressive symptoms through the DASS-Y scale. This study aims to generate evidence on the interrelationship between dietary quality and emotional well-being, and to inform upcoming initiatives that support adolescent girls' emotional and nutritional well-being.

MATERIAL AND METHODS

A cross-sectional assessment was conducted during the year 2024, to assess adolescent girls' emotional functioning and nutritional status by examining their diet quality and the existence of symptoms of depression. The research was conducted among a total of 100 adolescent girls aged 11–18 years, who were split into two age groups: 11–14 years ($n = 50$) and 15–18 years ($n = 50$). The participants were selected using a purposeful random sampling from schools and colleges in Guntur district, Andhra Pradesh. Prior to gathering data, official consent was acquired from the respective school and college authorities, and Informed consent was obtained from the parents or guardians of the participants.

The research study was presented before the Institutional Human Ethics Committee (IHEC) of the university before taking up the study at the field level.

The nutritional intake of the participants was evaluated using the 24-hour dietary recall method. Each adolescent girl was interviewed to recall all foods and beverages consumed during the previous day, including the time of consumption, type of food and portion sizes. Standard measuring tools such as measuring cups, were used to ensure accurate estimation of quantities consumed. Intake of nutrients was calculated using the Indian Food Composition Tables (IFCT, 2017), covering energy,

macronutrients, and key micronutrients such as iron, calcium, and vitamin C. To evaluate overall diet quality, the Diet Quality Index–International (DQI-I) method developed by Mediratta and Pulkit (2023) was adopted, with modifications made based on the most recent ICMR-NIN Recommended Dietary Allowances (RDA), 2020, specific to the Indian adolescent population. The DQI-I assesses diet across four major components: variety (20 points), adequacy (40 points), moderation (30 points), and balance (10 points), summing to a total score of 100. The variety component measures diversity across food groups and within protein sources, the adequacy component evaluates sufficient intake of essential nutrients, moderation captures the consumption of nutrients to be limited, such as saturated fats and sodium and then balance assesses the proportion of energy derived from macronutrients. The total diet quality score for each participant had been calculated using these components.

The Depression, Anxiety and Stress Scale – Youth Version (DASS-Y) was used to measure emotional functioning, a validated instrument designed to measure emotional distress in adolescents (Szabó and Lovibond, 2022). The DASS-Y has 21 items total, including seven measures evaluating stress, anxiety, and depression. Participants

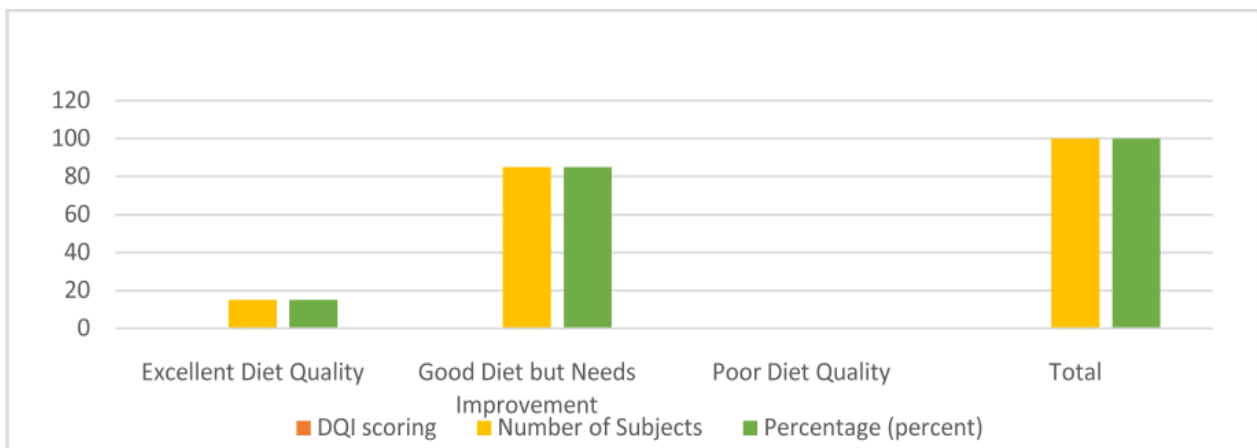
responded to each item based on their experiences over the past week using a 4-point Likert scale starts from 0 (“Did not apply to me at all”) to 3 (“Applied to me very much or most of the time”). Scores for each emotional domain were calculated and interpreted according to severity levels- normal, mild, moderate, severe, and extremely severe. This tool helped identify adolescents experiencing psychological distress and in need of emotional support.

By integrating dietary quality assessment through DQI-I and emotional assessment through DASS-Y, this study aims to explore the interrelationship between nutrition and emotional well-being among adolescent girls in Guntur District.

RESULTS AND DISCUSSION

Diet Quality Index (DQI-I)

The distribution of adolescent girls by overall DQI-I score categories, only 15 percent had excellent diets, marked by high ranking and nutrient adequacy, while 85 percent fell into the “Good but Needs Improvement” group, reflecting adequate but imbalanced diets needing better moderation and nutrient density (Acharya and Singh, 2014). None of the girls had a poor diet quality, indicating overall acceptable intake but highlighting the



Graph 1. Distribution of adolescent girls by overall DQI-I score categories

Table 2. Distribution of Adolescent Girls by Severity Categories of Depression, Anxiety and Stress (DASS-Y) (n=100)

Severity Category	Stress		Anxiety		Depression	
	No.	(%)	No.	(%)	No.	(%)
Normal	13	13	4	4	28	28
Mild	5	5	7	7	15	15
Moderate	32	32	32	32	30	30
Severe	47	47	18	18	21	21
Extremely Severe	3	3	39	39	6	6
Total	100	100	100	100	100	100

necessity of focused interventions to enhance diet quality in the majority.

The results related to Dietary assessment of the subjects based on DQI-I scores are represented in graph 1.

The assessment of emotional functioning indicated a high occurrence of stress, anxiety, and depression among adolescent girls, with anxiety and stress being particularly severe. Nearly 47 percent of participants experienced severe stress, and 32 percent reported moderate stress, indicating that 79 percent were under significant emotional strain. Only 13 percent had normal stress levels, while mild 5 percent and extremely severe 3 percent stress were less common.

Anxiety levels were the most severe, with 39 percent reporting extremely severe anxiety followed by 18 percent severe and 32 percent

moderate, meaning that 86 percent of girls showed anxiety symptoms above normal. Mild and normal anxiety levels were seen in just 7 percent and 4 percent of participants, respectively.

Depression was also widespread, with 30 percent experiencing moderate symptoms, 21 percent severe, and 15 percent mild. Although 28 percent reported normal levels, a total of 72 percent had depressive symptoms above the normal range, though generally less intense than anxiety or stress.

These results demonstrate a significant impact on mental health, with majority of girls facing moderate to extreme emotional challenges. The results support earlier findings by Szabó and Lovibond (2022) and Sharma and Malik (2022), emphasizing the urgent requirement for focused adolescent mental health support.

Table 3. Mean (DASS-Y) scores among Adolescent Girls

Emotional Function	Mean scores of the subjects			t-value	Significance ($p < 0.05$)
	11-14Years (n=50)	15-18 years (n=50)	Total subjects (N=100)		
Depression	13.28 ± 7.61	16.6 ± 9.82	14.68 ± 8.55	-1.89	Not significant
Anxiety	22 ± 5.31	25 ± 5.05	23.26 ± 5.62	-2.90	Significant
Stress	21 ± 6.65	28 ± 5.12	24.64 ± 6.66	-5.90	Highly significant

Table 4. Chi-square Test Results for Emotional Function Components

Emotional Function	Chi-square Value (χ^2)	Degrees of Freedom (df)	p-value	Significance
Stress	14.05	4	0.0071	Significant ($p < 0.01$)
Anxiety	4.86	4	0.302	Not Significant
Depression	16.80	4	0.0021	Significant ($p < 0.01$)

The emotional functioning assessment revealed age-related differences among adolescent girls. While older adolescents (15–18 years) had a greater mean depression score (16.6 ± 9.82) than younger ones (13.28 ± 7.61), There was no statistically significant difference ($t = -1.89$, $p > 0.05$), though a rising trend was noted. Anxiety levels showed a significant increase with age ($t = -2.90$, $p < 0.05$), with older girls scoring higher (25 ± 5.05) than younger ones (22 ± 5.31), likely due to academic and social pressures. The most significant difference was in stress scores, with older adolescents reporting much higher levels (28 ± 5.12) than younger peers (21 ± 6.65), supported by a highly significant t-value of -5.90 ($p < 0.01$). These results imply that anxiety and stress intensify with age, emphasizing the necessity of focused mental health interventions during late adolescence, consistent with findings by Szabó and Lovibond (2022) and Sharma and Malik (2022).

The relationship between age group (11–14 years and 15–18 years) and severity levels

of emotional functioning components-stress, anxiety, and depression-among adolescent girls was assessed. A strong correlation was observed between age and stress severity ($\chi^2 = 14.05$, $p = 0.0071$), with older adolescents exhibiting higher levels of stress. This may lead to increased academic, social, and emotional pressures during late adolescence.

Similarly, a significant relationship was found for depression ($\chi^2 = 16.80$, $p = 0.0021$), where more older adolescents were classified under moderate to extremely severe categories, indicating a rise in depressive symptoms with age. In contrast, the association between age and anxiety was not significant ($\chi^2 = 4.86$, $p = 0.302$), indicating that levels of anxiety were fairly distributed across both age groups.

Overall, the findings highlight that emotional disturbances-particularly stress and depression-intensify with age, underscoring the need for age-specific psychological support

Table 5. Pearson Correlation Coefficient Between Diet Quality Index–International (DQI-I) Scores and Depression, Anxiety, and Stress Scores Among Adolescent Girls

Parameter	Depression	Anxiety	Stress
Pearson correlation coefficient (r)	-0.2316	-0.6160	-0.7255
Coefficient of determination (r^2)	0.05365	0.3795	0.5264
p-value	0.02041	8.979×10^{-12}	1.372×10^{-17}
Covariance	-7.3980	-12.9273	-18.0525
Sample size (n)	100	100	100
t-statistic	-2.3571	-7.7419	-10.4361

and early intervention strategies for adolescent girls.

Correlation between DQI-I and DASS-Y Scores

Statistical analysis of the data on DQI and DASS-Y scores indicates a strong negative relationship between quality of diet (DQI-I scores) and emotional distress (DASS-Y scores) among adolescent girls. This suggests that better diet quality is significantly p -value (7.429×10^{-15}) associated with lower levels of depression, anxiety, and stress. The r^2 value of 0.4621 implies that 46.21 percent of the variation in emotional functioning can be explained by diet quality.

The observed negative covariance (-38.3778) and the notably high t -value (-9.1761) suggest a strong inverse association between the variables. These outcomes are consistent with existing literature that emphasizes the influence of dietary patterns on mental health, especially during adolescence. In conclusion, the findings highlight the essential role of nutritious and well-balanced diets in fostering emotional health among adolescent girls.

CONCLUSION

The study assessed the diet quality and emotional functioning of 100 adolescent girls (11–18 years) using the DQI-I and DASS-Y scales. Findings revealed high emotional distress, among adolescents' depressive symptoms. Older adolescents exhibited significantly higher stress and anxiety, with age-related differences. Poor diet quality, marked by inadequate intake of key nutrients,

was common. The results highlight a clear link between poor nutrition and emotional distress, emphasizing the necessity for integrated dietary and mental health interventions to support adolescent well-being.

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