Research Article

Assessment of Dietary Diversity and Nutritional Status among Adolescents

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Abstract

Aim: The study's objectives were to assess adolescents' nutritional status and dietary diversity as well as examine the relationships between these variables and a few chosen sociodemographic characteristics. Introduction: To provide the nutrients needed for adolescent physical and cognitive development, dietary diversification is essential. A varied diet during this time promotes healthy growth, lowers the risk of obesity and malnutrition, cultivates wholesome eating habits for the rest of one's life, and improves general wellbeing.

Materials and Methods: 150 teenagers from two Bangalore schools participated in a descriptive cross-sectional study. The number of food groups ingested during the preceding 24 h, according to the nine food groups listed by the food and agriculture organization, was used to calculate dietary variety. A calibrated digital scale and a non-stretchable tape were used to take anthropometric measurements, such as height and weight. The Statistical Packages for the Social Sciences version 2.0 was used to analyze the data.

Results: The findings showed that whereas 29.3% of teenagers had low dietary diversity, just 11.3% had great dietary diversity. In addition, 24.7% were overweight, 9.3% were obese, 8% were underweight, and 7.3% were stunted. The nutritional status of adolescents was found to be significantly correlated with the food types and jobs of their moms.

Conclusion: The results highlight the need for nutritional interventions to improve the quality of adolescents' diets, as they show a significant prevalence of malnutrition and insufficient dietary diversity.

Keywords: Adolescents, dietary diversity, nutritional status

Introduction

The variety of foods taken during a certain time period is known as dietary diversity, and it is crucial for getting the nutrients required for growth and well-being. As a qualitative indicator of dietary consumption, it shows how diverse a household's food supply is and how nutrient-sufficient a person's diet is.[1] A diverse diet promotes overall health and helps prevent many non-communicable diseases.[2] Additionally, dietary patterns and nutritional status, including both overweight and underweight, are linked to the early onset of non-communicable diseases and contribute to increased years lived with disability.[3]

According to the 2011 census, early adolescents (ages 10–14) constitute 11% of India's adolescent population. Adequate nutrition during this stage is vital for sustainable development and well-being, but food habits can be influenced by peers, availability, and cultural preferences. Analyzing dietary intake is crucial for identifying potential risks of nutrition-related diseases and ensuring a balanced intake of macronutrients and micronutrients.

The Global Nutrition Report 2020 indicates that one in nine individuals suffers from undernourishment, while one in three is obese or overweight. Globally, 21% of teenagers enrolled in school eat fewer than one serving of vegetables per day, 34% eat <1 serving of fruit per day, 42% drink soft drinks every-

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day, and 46% eat fast food at least once per week.[4] In India, 29% of girls and 23% of boys between the ages of 10 and 14 are shorter than average for their age, 5% of adolescents in this age group are overweight, and 32% of boys and 23% of girls are underweight. Remarkably, just 11% of teenagers eat a diet that is sufficiently varied.[5]

To improve the nutritional status of children and teenagers, the Indian government has implemented a variety of initiatives. However, data from the NFHS-5 (2019–2020) indicates very modest advances when compared to NFHS-4.

Little is known regarding the nutritional status and dietary diversity of early adolescents in urban settings, particularly in Karnataka, despite the fact that the undernutrition status of children and adolescents in rural areas has been extensively studied in the literature to date. By evaluating the nutritional status and dietary diversity of teens in a few Bangalore schools, this study aims to close this knowledge gap by providing information on their eating habits and nutritional needs. The findings can be utilized to inform policymakers and enhance dietary programs for adolescents.

Objectives

- To assess dietary diversity and nutritional status among adolescents.
- To determine the association between dietary diversity and nutritional status.
- To determine the association between dietary diversity and nutritional status with selected socio-demographic variables among adolescents.

Hypotheses

H_1: Dietary diversity and nutritional status are significantly correlated.

H_2: Dietary diversity and nutritional status are significantly correlated with a few chosen sociodemographic factors.

Materials and Methods

Research approach

To assess the nutritional status and dietary diversity of teenagers, a quantitative research methodology was applied.

Research design

To investigate dietary diversity and nutritional status among teenagers in two chosen schools in Mathikere, Bangalore, a cross-sectional descriptive approach was used.

Settings

The research was conducted in two schools located in Mathikere, Bangalore.

Population: The target population for the study comprised early adolescents aged 10–14 years.

Sample

The sample consisted of early adolescents aged 10–14 years attending the selected schools in Bangalore.

Sample size

150 students.

Sampling technique

A non-probability convenient sampling method was used to select 150 students who met the inclusion criteria.

Inclusion criteria

- Adolescents aged between 10 and 14 years.

Exclusion criteria

- Adolescents taking part in other trials targeted at enhancing their nutritional health are excluded
- Teenagers with long-term conditions that call for special diets
- Teenagers whose daily food intake deviated from their typical diet.

Description of tool

The tool was divided into three sections:

Section A: Socio-demographic profile

Age, gender, education, religion, dietary preferences, frequency of eating or snacking outside the home, place of residence, family type, size, monthly family income, parental education and occupation, and parent marital status were all gathered in this section.

Section B: Dietary diversity questionnaire

The Food and Agriculture Organization's standard methods for assessing dietary diversity in individuals and households were used to estimate dietary diversity. The questionnaire addressed nine food groups: Cereals, dark green leafy vegetables, vitamin A-rich fruits and vegetables, other fruits and vegetables, organ meat, meat and fish, and eggs.

In-person interviews were used to complete a 24-h dietary recall. Teenagers were asked to openly recollect every food and drink they had the day before. The interviewer recorded the responses, and scoring was done based on food groups consumed:

- 1 point was given for each food group consumed
- 0 points were given if a food group was not consumed.

Scores were totaled and interpreted as follows:

- <3 points for the low dietary diversity
- 4–5 points for medium dietary diversity
- And >6 points were for high dietary diversity.

Section C: Nutritional assessment

A non-stretchable measuring tape was used to determine height. Adolescents were asked to remove footwear and any head ornaments. Measurements were taken with the buttocks, shoulders, and back of the head aligned against a wall, and a long scale was used to record height accurately.

A digital scale that had been calibrated was used to measure body weight. Before the measurement, adolescents were told to take off any bulky clothing, shoes, or objects in their

pockets. They stood upright, looking straight ahead, while their weight was recorded. Nutritional status was assessed using World Health Organization growth charts. Stunting was identified using height-for-age z-scores (HAZ), whilst thinness, overweight, and obesity were evaluated using body mass index (BMI)-for-age z-scores.

Data collection procedure

Official approval from the school administration was obtained. Participants were informed of the study's goal, and their written consent was acquired. Each participant needed 15–20 min on average to finish the data gathering process.

Results

Data from 150 participants were analyzed using Statistical Packages for the Social Sciences software (version 20.0). Descriptive statistics like frequency and percentage were employed to summarize the study variables. Inferential statistics such as the Chi-square test and Fisher's exact test were used to assess the connections between dietary diversity, nutritional status, and certain sociodemographic characteristics. 26.7% of the 150 teenagers were twelve, 25.3% were eleven, 18% were thirteen or fourteen, and 11.3% were ten. Of those enrolled in upper primary classes, 56.7% were female, and 52.3% were female. 84% of individuals said they were Hindu.

50.7% of respondents said their household made between ₹9,232 and ₹27,648/month. 48% of respondents said they ate meals or snacks outside of their homes at least once a week, while the majority (81.3%) ate a mixed diet. 71.3% of participants were in nuclear households, and nearly all (96.7%) lived at home.

Regarding parental education and employment, 55.3% of fathers were in the private sector, and 39.3% of fathers had a doctorate degree or above. However, 65.3% of mothers were homemakers, and 52% had finished secondary school. It's significant to note that 97.3% of parents said they were married.

Table 1 shows that 59.3% of individuals had a medium level of dietary diversification. Only 11.3% had significant dietary diversity, while 29.3% exhibited low dietary diversity. According to Table 2, teenagers' low dietary diversity is caused by their over-reliance on cereals, inadequate intake of fruits and vegetables, and restricted consumption of a variety of food groups, including organ meats, milk, and eggs.

A thorough summary of the dietary variability among adolescents may be seen in Table 2. According to the table, cereals and fruits and vegetables are among the most often consumed food groups. The respondents' poor dietary diversity is reflected in the lower consumption rates of other categories, such as organ meats, milk, and eggs.

According to Table 3, 7.3% of teenagers were classified as stunted, whereas 90.7% of them were of normal height for their age. In terms of BMI for age, 57.3% of teenagers were in the normal range, 24.7% were overweight, 9.3% were obese, and 8% were thin.

The relationship between nutritional status (height for age) and dietary diversity scores is displayed in Table 4. The correlation is not statistically significant, according to the $P = 0.235$ obtained from the use of the Fisher's exact test.

The relationship between nutritional status, specifically BMI for Age, and dietary diversity scores is shown in Table 5. This correlation was assessed using the Chi-square test; the $P = 0.413$ indicates that the result is not statistically significant.

The relationship between a few chosen sociodemographic factors and nutritional status (height for age) is shown in Table 6. For the analysis, Fisher's exact test and the Chi-square test were used. With a $P = 0.021$, the results show a strong correlation between the kind of diet and adolescents' nutritional status.

The relationship between a few chosen sociodemographic factors and nutritional status (BMI for age) is shown in Table 7. This association was evaluated using the Chi-square test, which showed a significant correlation

Table 1: Frequency and percentage distribution of dietary diversity score *n*=150

S. No.	Dietary diversity	Frequency	Percentage
1	Low dietary diversity	44	29.3
2	Medium dietary diversity	89	59.3
3	High dietary diversity	17	11.3

Table 2: Percentage and frequency distribution of food group intake *n*=150

S. No	Food groups	Frequency	Percentage
1	Cereals	150	100
2	Green leafy vegetables	22	14.7
3	Vitamin A rich food	48	32
4	Fruits and vegetables	149	99.3
5	Organ meat	9	6
6	Meat and fish	33	22
7	Eggs	24	16
8	Legumes, nuts and seeds	109	72.7
9	Milk and milk product.	80	53.3

Table 3: Frequency and percentage distribution according to nutritional status *n*=150

S. No	Category	Frequency	Percentage
1	Height for age		
	Normal	136	90.7
	Stunted	11	7.3
	Severely stunted	3	2.0
2	BMI for age		
	Normal	86	57.3
	Overweight	37	24.7
	Obese	14	9.3
	Thinness	13	8.7
	Severe thinness	0	0

BMI: Body mass index

Table 4: Association between dietary diversity and nutritional status (height for age) *n*=150

S. No	Dietary diversity score	Nutritional status			Fisher exact test	Result
		Normal	Stunted	Severely stunted		
1	≤3	42	2	0	0.235	NS
2	4–5	79	8	2		
3	≥6	15	1	1		

NS: Not significant

Table 5: Association between dietary diversity and nutritional status (BMI for age) *n*=150

S. No	Dietary diversity score	Nutritional status					Chi-square value	*P*-value
		Normal	Overweight	Obese	Thinness	Severe thinness		
1	≤3	27	7	7	3	0	0.413	0.520
2	4–5	52	24	6	7	0	df=1	NS
3	≥6	7	6	1	3	0		

NS: Not significant, df: Degree of freedom

Table 6: Association between nutritional status (height for age) and selected sociodemographic variable, *n*=150

S. No.	Socio-demographic variables	Height for age Z score			Fisher exact test value
		Normal	stunted	Severely stunted	
1.	Type of diet				0.021
	Mixed diet	115	5	3	
	Vegetarian	21	6	0	

Table 7: Association between nutritional status (BMI for Age) and selected sociodemographic variable *n*=150

S. No	Socio-demographic variables	BMI for age Z-score				Result
		Normal	overweight	obese	Thin-ness	
1.	Type of diet					
	Mixed diet	66	32	14	11	χ^2 value-3.772 (df=1) *P* value-0.052
	Vegetarian	20	5	0	2	
2	Occupation of the mother					
	Government sector	1	0	0	0	χ^2=9.053 (df=3) *P*=0.029
	Private sector	22	9	2	0	
	Self employed	12	7	0	1	
	Homemaker	51	21	12	12	

BMI: Body mass index, NS: Not significant, S-significant, df: Degree of freedom

between the mother's work and the kind of diet consumed by teenagers.

Discussion

The findings revealed that, in contrast to medium dietary diversity (59.3%) and low dietary diversity (29.3%), only 11.3% of participants exhibited high dietary diversity. Teenagers' nutritional condition showed that 7.3% were stunted and 90.7% were of normal height for their age. Furthermore, 24.7% were overweight, 9.3% were obese, and 8% were thin for their age, while 57.3% had a normal BMI for their age. A Pan-India study that evaluated the eating habits and diet variety of 3046 undergraduate students revealed that 34.7% of them had low dietary diversity scores, supporting similar findings.[7] Additionally, a cross-sectional study conducted in Bagalkot found that 59.2% of adolescents were underweight, 6.7% were overweight, and 26.7% were stunted.

A study of adolescent girls in Dhaka that revealed that only 8.7% of them consumed a wide range of foods supports this conclusion. The findings showed that 6.7% of the teenage girls were overweight, 3.3% were very thin, and 10% were moderately thin. Furthermore, 24% of the females had mild to moderate stunting, and 10% had severe stunting.[8]

The study's findings showed no correlation between the nutritional status (height for age and BMI for age) and the dietary diversity score. This correlation was found using the Fisher exact test and Chi-square, which produced $P = 0.235$ and 0.413, respectively, suggesting that the outcome is not statistically significant. Interestingly, a study from Maharashtra and Odisha supports the findings, stating that adults and adolescents' food intake did not accurately reflect their nutritional status because they derived a large portion of their energy from cereal consumption.[9] Contrary to this conclusion, comparable research conducted in 2018 on teenage females in Dhaka to assess dietary diversity and nutritional status reveals a positive relationship between dietary diversity and

teenage nutritional status.[10] Furthermore, Ethiopian data demonstrated a high and statistically significant correlation between children's HAZ and food diversity assessments based on either a 24-h or 7-day recall.[11]

The results of the study indicate that several sociodemographic traits do not significantly correlate with dietary diversity. However, the research found a strong correlation between the mother's occupation (P = 0.029), nutritional status (height for weight) and diet choice (P = 0.021), and nutritional status (BMI for age) and diet type (P = 0.054).

Conclusion

The study shows high malnutrition and poor diet diversity among adolescents, highlighting the need for better dietary practices. Community Health Nurses can help by promoting diverse, adequate nutrition for sustainable health.

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Ethical Clearance

Ethical clearance was obtained from University Ethics Committee for Human trials of M S Ramaiah University of Applied sciences. (Reference no: EC-23/39-PG-RINER). Registry name- Baby Vanlalhruaii.

Conflict of Interest

There is no conflict of interest.

Criteria for Inclusion in Author's/Contributor's List

Manuscript has been read and approved by all the author.

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