

Original Research Article

Assessment of Adolescent Girls regarding Nutrition Education Program conducted in Government Senior Secondary School (up to the age of 10 to 15 year) through Anthropometric Measurements

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Abstract

Nutrition plays a critical role in the adolescence phase. This study focuses on assessing the nutritional knowledge and status of 40 school- going girls from two schools at Bhilwara. The research aimed to evaluate knowledge on key concepts such as body mass index (BMI), the importance of vitamins etc. Data collection was done using structured questionnaire. The findings revealed that 80% of the students at Gulmandi were aware of the nutrition education program, while only 30% of the students were aware at Bapu Nagar School. The students' knowledge of BMI was notably higher at Bapu Nagar School (90%) compared to Gulmandi School (25%). The majority of students at both schools expressed strong support for the continuation of nutrition education programs. However, the overall knowledge regarding nutrition was found to be average, with significant gaps in understanding specific nutritional concepts, especially in the areas of weight and height measurement and the role of vitamins. In terms of nutritional status, Gulmandi School had a higher prevalence of underweight students (70%), while Bapu Nagar School showed a more balanced distribution. Based on the findings, a nutrition education booklet was developed to address the existing knowledge gaps. The study emphasizes the importance of continued nutrition education in schools to improve adolescent girls' nutritional knowledge and health outcomes, fostering their overall well-being and promoting healthier lifestyles.

Keywords: Nutrition education, adolescent girls, anthropometric measurement, height and weight

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Introduction

Food is essential for sustaining life, providing the nutrients necessary for growth, maintenance and energy. Throughout history, humans have cultivated a wide variety of grains, fruits, vegetables, nuts, and oilseeds, alongside rearing animals for food. A balanced intake of nutrients derived from these food groups supports metabolism, immune function, and cognitive development. Since the body cannot synthesize essential nutrients on its own, they must be obtained through food.

Food and Nutritional Education

Nutrition education plays a key role in guiding individuals to make healthier food choices and adopt behaviors that support overall well-being. It combines educational activities with environmental changes to encourage voluntary adoption of healthy dietary habits. Such education can take place at individual, community and policy levels. ^[1]

School-Based Food and Nutrition Education (SFNE)

SFNE involves delivering knowledge and skills related to food and nutrition through diverse activities and materials. It goes beyond traditional nutrition education by incorporating food literacy, which includes informed decision-making and self-efficacy in food choices. SFNE equips students with the tools needed to adopt long-term health-promoting dietary practices. ^[2]

School nutrition education (often referred to as School -based Food and Nutrition Education or SFNE) is a multi- faceted concept that can be delivered through a wide range of activities, materials and tools depending on the objectives and context. While traditionally focused on nutrition, SFNE is increasingly incorporating broader themes such as food literacy, which encompasses knowledge, skills, decision-making and self-efficacy related to food and nutrition. SFNE aims to equip students with the tools to make

informed, health-promoting food choices, fostering long-term positive outcomes. In Rajasthan, several nutrition programs are actively addressing malnutrition and improving health outcomes of children, pregnant women, and lactating mothers.

Nutrition Programs in Rajasthan

Several initiatives in Rajasthan address malnutrition and improve health outcomes for children, pregnant women and lactating mothers. Key programs include -

1. **Integrated Child Development Services (ICDS):** This flagship program provides nutrition education, supplementary nutrition and immunization services to children <6 years, pregnant women and adolescent girls through Anganwadi centers.
2. **Indira Gandhi Matritva Poshan Yojana (IGMPY)**
3. **POSHAN Abhiyaan (National Nutrition Mission):** A national initiative aimed at reducing malnutrition by addressing stunting, undernutrition, anemia and low birth weight. It emphasizes behavior change communication and health service implementation.
4. **Cargill-UN World Food Program Initiative:** In partnership with the Rajasthan government, this program promotes early childhood nutrition by producing fortified Take-Home Rations (THRs) and raising awareness about nutrition through behavior change campaigns. [3]
5. **National Food Security Act (NFSA):** Enacted in 2013, this act guarantees food security for about two-third of Indian population. It provides subsidized food grains and fortified grains through the Public Distribution System (PDS).
6. **Food Nutri-Pathshala Program:** Focused on combating micronutrient deficiencies in school children in Punjab and Haryana, this initiative incorporates biofortified grains, such as iron- rich pearl millet and zinc- rich wheat into meals. Tools like Nutri-Diary and Nutri-Dabba help monitor and ensure balanced diets.

These comprehensive, multi-pronged initiatives aim to enhance nutritional outcomes across diverse age groups and regions in India.

Justification

Relevance of Nutrition education is well proven as food and nutrition is connected to both individual and societal well-being. Nutrition education is a set of strategies designed to help individuals make healthy food choices and adopt behaviors that support overall health. Many educational activities are conducted to inculcate positive dietary habits. Education for nutrition occurs at various levels, from individual and community efforts to policy-driven initiatives.

The present study was proposed to study following objectives:

1. To assess knowledge of nutrition education program among 10 to 15 years school going girls
2. To assess height and weight of 10 to 15 years school going girls
3. To develop an awareness program according to the knowledge gap of students

Research Methodology

Locale of the study and sampling procedure: The jurisdiction of the university is spread over six divisions in the state of Rajasthan i.e. Ajmer, Jaipur, Udaipur, Kota, Jodhpur and Bikaner. Out of this, Ajmer division was selected. In Ajmer division, Bhilwara district was selected because the area was well known to the researcher.

Selection of Government School: In Bhilwara district, 40 Government schools were situated, out of them two schools namely Gulmandi and Bapu Nagar Govt Senior Secondary School were selected purposively.

Selection of samples: A list of 40 school going girls in the age group of 10-15 years was prepared from selected schools with the help of school staff.

Development of research tool: To assess, knowledge of adolescent girls about the nutrition education programs of the government, the interview technique was used to collect data from respondents. In the interview questionnaire, student's general information such as age, education, marital status, nutrition education, weight, height, family type and size, as well as their sources of information were recorded. Questions related to the knowledge of dietary habits, awareness of physical changes, family size &

type were included. The same interview schedule was used to measure their knowledge after the training to see the impact of the Nutrition education program.

Assessment of height and weight of school going girls: Height measurement was done using heightometer. Weight was recorded in (kg) using digital weighing balance.

BMI Calculation: BMI was calculated using the formula

$$\text{BMI} = \text{Weight (kg)} / \text{Height(m)}^2$$

To develop teaching aid on nutrition education programs: This section develops teaching aid with posters and a knowledge test consisting of close-ended questions to assess the nutritional awareness and dietary habits of school-going girls.

Procedure of data collection: Data were collected from school-going girls in both rural and urban areas using interviews based on a structured questionnaire. Nutritional status, including height and weight, was assessed with the help of a structured schedule. Educational materials, such as posters, were used as teaching aids.

Analysis of data

1. **Education:** Respondents were categorized as secondary school and senior secondary school on the basis of education
2. **Occupation:** On the basis of their family members' source of livelihood, students were divided as non-wage earners and wage earners.
3. **Cast:** Students were categorized into three categories on the basis of caste - a. SC/ST, b. OBC and c. GEN
4. **Family Size and Type:** Depending upon the composition of family, respondents were bifurcated into -
a. Nuclear & b. Joint family
Three categories were made on the basis of family size - small (upto 4 members), medium (5 - 8 members) and large (> 9 members).
5. **Media ownership:** The respondents were categorized into different groups based on their media ownership such as smart phone, Newspaper / Magazines, Transistor and Television.

6. **Socio-Economic Status (SES):** To measure this variable SES scale developed by AICRP. Home Science Extension Education (1997) with slight modification was used. Categorization of socio-economic status was done on the basis of standard deviation and mean. Three categories were made to present SES as shown in table 1.

S. No.	Categories	Scores
1.	Low (0-6)	Below 30
2.	Medium (7-13)	30-50
3.	High (14-20)	Above 50

Table 1: Categories of socio-economic status (SES)

Measurement of dependent variables

Measurement of knowledge of rural women regarding carbon footprint:

The knowledge test consisted of 10 close-ended questions with maximum scores of 10, where each correct response was assigned as score 1 and incorrect was denoted as 0. Respondents were divided into three categories on the basis of knowledge as shown in table 2:

S. No.	Categories	Scores
1.	Poor (< 3)	< 33 %
2.	Average (4 - 6)	33- 66 %
3.	Good (> 6)	> 66%

Table 2: Category of the respondents on the basis of knowledge

Statistical Analysis

Frequency and percentage were used for statistical analysis of the data.

Results and Discussion

- 1. Background information of the respondents:** This section deals with the general information of the respondents like age, marital status, education, family occupation, caste, family size and type, media ownership, socio-economic status, sources of information used and training attended.

Age: Data in Table 3 reveals that all the respondents (100%) belonged to the age group of 9-10 years.

Marital status: Data in Table 3 indicates that all of the respondents (100%) were unmarried. None of the respondents were married.

- 2. Caste:** Data in Table 3 reveals that in Gulmandi school more than half of the respondents (55%) were in OBC category whereas, 35 % were from General category and 10 % belonged to ST/SC caste.

In Babu Nagar School 65% respondents were in OBC category whereas 20% were from General category and 15% were from SC/ST category.

S. No.	Particulars	Gulmandi School		Babu Nagar School	
		f	%	f	%
1.	Age (in year)				
	5-8	0	0	0	0
	9 -10	20	100	20	100
2.	Marital status				
	Unmarried	20	100	20	100
	Married	0	0	0	0
3.	Caste				
	Sc/St	2	10	3	15
	OBC	11	55	13	65
	GEN	7	35	4	20
4.	Occupation				
	Non–Wage earner	0	0	0	0

S. No.	Particulars	Gulmandi School		Babu Nagar School	
		f	%	f	%
1.	Age (in year)				
	5-8	0	0	0	0
	Wage earner	20	100	20	100
5.	Education				
	Secondary school	0	0	0	0
	Senior secondary school	20	100	20	100

Table 3: Distribution of the respondents by age, marital status, caste, occupation and education (n = 40)

Occupation/ source of livelihood of respondents' family): With regards to occupational status of the respondents. Table 3 reveals that all of the respondents (100%) were wage earners.

Education of respondents: Regarding educational level of the respondents, Table 3 indicates that all of the respondents (100%) were from senior secondary education.

1. Distribution of the respondents on the basis of their family structure: The table 4 provides a distribution of respondents based on their family structure in Gulmandi School and Babu Nagar School. In terms of family type, 35% of respondents in Gulmandi School belong to nuclear families, while 65% were from joint families. Similarly, in Babu Nagar School, only 10% were from nuclear families and a significant (90%) number belonged to joint families. Regarding family size, 35% of respondents in Gulmandi School have small families (up to 4 members), while 65% have large families (9 or more members), with no representation of medium-sized families (5–8members). In Babu Nagar School, 10% of respondents were from small families, and the remaining 90% had large families, with no medium-sized families represented in this group either.

Particulars		Gulmandi school		Bapu Nagar school	
		f	%	f	%
Family Structure	Nuclear	7	35	2	10
	Joint	13	65	18	90
Family size	Small	7	35	2	10
	Medium	0	0	0	0
	Large	13	65	18	90

Table 4: Family structure of the respondents (n = 40)

2. Distribution of the respondents on the basis of media ownership of the

respondents: Table 5 The table illustrates media ownership among students of Gulmandi School and Bapu Nagar School. Both schools showed identical ownership levels of smartphones and televisions, with 100% in each school owning these devices. However, there was a notable difference in newspaper or magazine ownership, with 75% in Gulmandi School owning them compared to only 50% in Bapu Nagar School. Neither school reported any ownership of radios or transistors, indicating a shift away from traditional audio media. Overall, the data highlights the dominance of digital and visual media in both schools, with some variation in access to print media.

Particulars	Gulmandi school		Bapu Nagar school	
Media Ownership	f	%	f	%
Smart phone	20	100	20	100
Newspaper/Magazine	15	75	10	50
Radio/Transistor	0	0	0	0
Television	20	100	20	100

Table 5: Distribution of the respondents on the basis of their media ownership, household assets, distinctive features and source of information used by the respondents

3. Categorization of respondents according to their socio- economic status

(n=40): Table 6 is revealing the socio economic status of the respondents. It was seen that none of them belonged to the high income group in either of the schools. In Gulmandi school, 40% students were from lower SES, while 60% belonged to the middle class. While on other hand, majority of the students were from lower SES at Bapu Nagar school. Remaining were from middle income group.

S. No.	Category	Gulmandi school		Bapu Nagar school	
		f	%	f	%
1.	Low	8	40	18	90
2.	Middle	12	60	2	10
3.	High	0	0	0	0

Table 6: Socio economic status of the respondents

4. Knowledge of Gulmandi school and Bapu Nager school going girls regarding nutrition.

With regard to the sources of information used by the respondents, data in Table 7 reveals knowledge of students about nutrition education programs. It showed that a majority of students from Gulmandi School (80%) were aware of the nutrition education program, while only 30% of Bapu Nagar School students were familiar with it. Additionally, 100% of both schools were aware of common methods used to deliver nutrition education in schools. Knowledge of BMI was higher among Bapu Nagar School students (90%), compared to 25% in Gulmandi School. A significant number of students in both schools (100%) supported the continuation of nutrition education programs by the Government. There was also a noticeable difference in knowledge about the focus of these programs, with more Bapu Nagar students (90%) being aware of the target groups compared to 50% from Gulmandi School. Overall data suggests that while some students were knowledgeable about nutrition education, still there was a scope for greater awareness and understanding, especially in areas like weight and height measurement and the importance of vitamins.

S. No.	Particulars	Gulmandi school				Bapu Nagar school			
		Yes		No		Yes		No	
		f	%	f	%	f	%	f	%
1.	Knowledge of nutrition education program	16	80	4	20	6	30	14	70
2.	Knowledge about weight and height measurement	5	25	15	75	13	65	7	35
3.	Knowledge of vitamins	2	10	18	90	1	5	19	95
4.	Knowledge about common method of giving nutrition education in school	20	100	0	0	20	100	0	0
5.	Knowledge about BMI full form	5	25	15	75	18	90	2	10
6.	Knowledge of groups which is typically a focus in nutrition education program	10	50	10	50	18	90	2	10
7.	Knowledge of nutrition education program aim to prevent malnutrition	3	15	17	85	13	65	7	35
8.	Knowledge about various nutrition education program conducted in your school	5	25	15	75	5	25	15	75
9.	Measurement tool is often used to assess the growth of children in nutrition programs	0	0	20	100	0	0	20	100
10.	Nutrition education program contented by government of Rajasthan in school	20	100	0	0	20	100	0	0

Table 7: Categorization of respondents according to their knowledge (n=40)

5. Overall knowledge of the respondents regarding nutrition education program: On the basis of the overall knowledge level of the respondents regarding nutrition education program, they were grouped into three categories of knowledge namely poor, average and good as depicted in Table 8.

S. No.	Category	Gulmandi school		Bapu Nagar school	
		F	%	f	%

1.	Poor (< 3)	4	20	8	40
2.	Average (4-6)	15	75	12	60
3.	Good (> 6)	1	5	0	0

Table 8: Categorization of respondents as per their knowledge about nutrition education program (n=40)

Table 8 categorizes respondents from Gulmandi School and Bapu Nagar School based on their performance levels. In the "Poor" category, 20% (4 respondents) from Gulmandi School and 40% from Bapu Nagar School were included. In the "Average" category, 75% from Gulmandi School and 60% students from Bapu Nagar School fell under this group. In the "Good" category, only 1 student was found from Gulmandi School, while there were no respondents from Bapu Nagar School in this category. This indicates that Gulmandi School has a higher percentage of average performers, while Bapu Nagar School has a larger proportion of respondents in the poor category.

6. Categorization of respondents according to their anthropometric measurement (n=40): The table 9 shows the distribution of respondents from Gulmandi School and Bapu Nagar School based on their weight categories. In the "Underweight" category, 70% students from Gulmandi School and 50% from Bapu Nagar School were noted. The "Normal" weight category comprised 20% respondents from Gulmandi School and 35% respondents were from Bapu Nagar School. In the "Overweight" category, only 5% respondents were from Gulmandi school and 15% were from Bapu Nagar School. This indicates a higher prevalence of underweight individuals in Gulmandi School, while Bapu Nagar School showed a more balanced distribution across the three categories.

S. No.	Category	Gulmandi school		Bapu Nagar school	
		F	%	F	%
1.	Underweight	14	70	10	50

2.	Normal	4	20	7	35
3.	Overweight	1	5	3	15

Table 9: Categorization of respondents according to their anthropometric measurement (n=40)

7. Development of booklet on nutrition education: A booklet was created based on existing knowledge scores of respondents. It focuses on key areas for learning that were identified by the researcher after obtaining the existing knowledge level of respondents.

Conclusion

The study provides valuable insights into the nutritional knowledge and status of school-going girls aged 10-15 years in Gulmandi and Bapu Nagar schools. While the majority of students were aware of nutrition education programs, there is a significant gap in knowledge, especially regarding topics such as body mass index (BMI) and the importance of specific nutrients like vitamin A. The findings indicate that most students have an average understanding of nutrition, with some gaps in critical areas. The nutritional status assessment revealed a higher prevalence of underweight students at Gulmandi School, whereas Bapu Nagar School had a more balanced distribution across different weight categories. This suggests the need for targeted interventions to address nutritional deficiencies, particularly at Gulmandi School. To address these knowledge gaps and improve the nutritional status of the students, the study led to the development of a nutrition education booklet. The booklet focused on areas where the students' knowledge was lacking, aiming to enhance their understanding of nutrition and promote healthier lifestyle choices. The continuation and expansion of nutrition education programs in schools are crucial to fostering better health outcomes among adolescent girls and ensuring their overall well-being.

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