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Evaluating The Effectiveness of School-Based Nutritional Education on Dietary Habits and Healthoutcomes in Adolescents of Bijnor City

Prerna Verma1 and Professor (Dr.) Preeti Sharma

[1]*Research Scholar, Nirwan University Jaipur*
[2]*Dean & Professor, School of Basic and Applied Sciences, Nirwan University Jaipur*

Abstract—*Adolescence is a critical period for reinforcing healthy dietary behaviors. Nutrition education perform a significant role in facilitating dietary and behavioral changes, thereby enhancing the nutritional status of individuals. The objective of this study is to inquire at how nutrition education affects the knowledge and consumption patterns of 200 rural adolescents in Bijnor district of Uttar Pradesh. Data were collected both before and after the nutrition education intervention to determine its influence on the responders. Adolescence is a crucial period of life for development when optimal nutrition to maximize growth and establish healthy dietary habits is essential for transition into adulthood. It is nearly impossible to sustain excellent health without sufficient nourishment. Nutrition and health interventions are essential in changing dietary habits and eating patterns within populations, serving as powerful tools for promoting healthy eating practices and ensuring long-term improvements among individuals. Nutritional education interventions complement earlier reviews' results that multi-strategy nutrition interventions can have considerable effects on anthropometric measurements, dietary consumption, and lifestyle modification.*

Keywords: *Nutrition, consumption pattern, malnutrition, dietary habits, nutritional status, nutrition education.*

1. INTRODUCTION

Adolescence is one of the most important stages in an individual's wellness and development. The physiological need for nutrients grows at this age, making it particularly crucial to consume a high-nutritional-quality diet. Evidence suggests that the lifestyle, behaviour patterns, and dietary habits developed at this age persist throughout adulthood and can have an immense effect on health and well-being in later life (1). Both undernutrition and overnutrition have reached epidemic levels in developing nations such as India, where children and adolescents are particularly vulnerable. In these nations, wellness risks, particularly those connected to malnutrition, are linked to inadequate and imbalanced nutrition, which are important causes of serious health difficulties. These can also contribute to slowed cognitive and nervous system development (2). In recent years, it has been noticed that adolescent's eating habits are initially influenced by family settings, with the majority of changes coming when they attend school, when they spend a lot of time away from home (3). As a result, school-based health education is critical for promoting adolescent health. Schools can help the adolescents filter out misleading data by disseminating and utilizing credible internet information sources, as well as teaching critical thinking (4).

Obesity is a preventable disease, but due to the influence of a Western lifestyle (defined by idleness and a high consumption of processed meals, high-sugar beverages, confections, fried foods, and high-fructose food items), its prevalence in the population is rapidly increasing. According to surveys undertaken in Indian cities, the frequency of overnutrition among adolescents exceeds 10%. Improved knowledge and behavior in health and nutrition are strongly correlated with broad-level healthcare and dietetics programs, particularly in Indian educational institutions (5). Food and nutrition education initiatives for adolescents are one of the readily accessible approaches. The school is an ideal setting for the development of this sort of intervention, with the ultimate objective of preventing overweight and obesity among teenagers, because it is where they spend the majority of their time and are active in the process of learning and altering their behaviors (6), (7).

School food and nutrition intervention strategies have witnessed a gradual change from knowledge orientation to behavioural orientation (8) and from a focus on the individual to the food environment. Research evidence has shown that adequate nutrition knowledge and positive attitudes towards nutrition do not necessarily translate to good dietary practices. Similarly, research has shown that the food environment plays a far bigger role in behaviour than originally believed (9), (10).

2. MATERIALS AND METHOD

Study Location: The research was carried out in the Bijnor district of Uttar Pradesh, chosen for its distinctive nutritional and demographic features.

Study Type: Observational study.

Sample Size: A carefully curated sample of 200 adolescent girls was selected from both government and private schools in the district. To ensure balance, 100 participants were purposively selected from each school based on convenience. A quantitative research approach with a descriptive design was adopted for the study. Using purposive sampling, adolescent girls aged 12 to 18 years were selected from a government and a private school.

(A) DDPS School, Bijnor. **(B)** KPS Inter College, Bijnor.

Intervention Period: 22nd September 2022 to 20th November 2022

Participants were subjected to a comprehensive evaluation, which included a detailed medical history, sociodemographic assessment, and physical examination to determine their baseline clinical status. Data collection relied on primary sources, with informed consent obtained from all participants and approval from school authorities. The questionnaire employed in the study was organized into four distinct sections.

Section I: The proforma used for gathering background information collected details such as name, age, religion, family structure, birth order, number of siblings, socio-economic status, annual income, and food habits of the participants.

Section II: The nutritional assessment proforma included the collection of anthropometric data, with height and weight measurements taken, followed by the calculation of BMI for each participant.

Section III: The investigator developed a knowledge-based questionnaire to assess participants' understanding of nutritional concepts, including general health and diet, recommended dietary practices, food-related knowledge, and nutritional deficiency disorders.

Section IV: The investigator created a dietary pattern questionnaire to identify dietary habits, analyze nutrient deficiencies or excesses, and evaluate overall nutritional intake.

Data collection method: Data for this study were collected using primary sources. An offline questionnaire survey method was deemed suitable to obtain responses from a large number of participants. The detailed questionnaire, divided into four sections, thoroughly addressed each study objective. To enhance usability and efficiency, the questionnaire featured closed-ended questions, with four possible answers for each knowledge-based item. To ensure accessibility, the questionnaire was bilingual, allowing respondents to choose their preferred language for better comprehension. Before official data collection, all survey instruments were initially written in English, translated into Hindi, back-translated, and pretested on fifty participants.

Statistical Analysis: The data analysis strategy was thorough and effective, employing various statistical techniques. These included percentage and frequency calculations, descriptive analysis to evaluate key variables, paired t-tests to assess changes over time, and cross-tabulation to investigate relationships between variables.

3. RESULTS

This study primarily focuses on the impact of dietary patterns on the BMI of adolescent girls before and after an intervention. The intervention aims to reduce the frequent consumption of junk food and promote healthier eating habits, which could potentially lead to improvements in overall health.

Table 1: Distribution of Respondents by frequency of eating fast foods

Particular	Pre	Post	Diff	Pre	Post	Diff
	Government School			Private School		
Never or almost never	8	30	22	7	25	18
1-2 Times per week	49	54	5	30	42	12
3-4 Times per week	27	12	15	41	22	19
5-6 Times per week	11	3	8	15	9	6
7-8 Times per week	5	1	4	7	2	5
Total	100	100	0	100	100	0

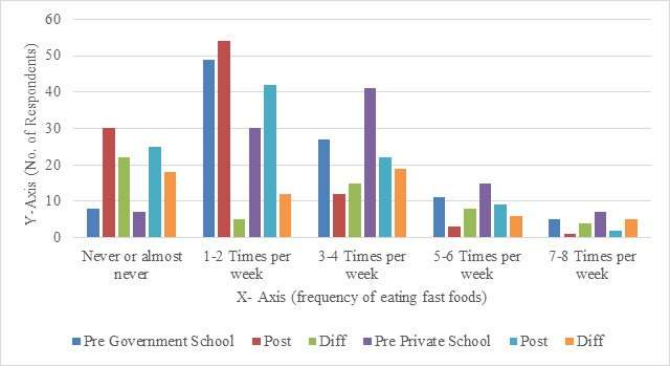

Figure 1: Distribution of Respondents by frequency of eating fast foods

This table outlines the distribution of respondents by the frequency of eating fast foods before (Pre) and after (Post) an intervention in government and private schools:

Government School: Post-intervention, there was a significant increase in students reporting "Never or almost never" eating fast food (+22), along with slight increases in those eating fast food 1-2 times per week (+5). However, there were notable decreases in students eating fast food 3-4 times per week (-15), 5-6 times per week (-8), and 7 or more times per week (-4).

Private School: Similar trends were observed, with a substantial increase in students reporting "Never or almost never" eating fast food (+18). Additionally, there were increases in those eating fast food 1-2 times per week (+12). Conversely, there were decreases in students eating fast food 3-4 times per week (-19), 5-6 times per week (-6), and 7 or more times per week (-5).

Overall, the intervention led to significant reductions in the frequency of fast food consumption across all categories in both government and private schools, with more students opting to eat fast food less frequently or not at all after the intervention.

Table 2 : Distribution of Respondents by ability to read a nutrition label

Particular	Pre	Post	Diff	Pre	Post	Diff
	Government School			Private School		
Not at all comfortable	56	5	56	38	4	34
Slightly comfortable	24	26	2	29	22	7
Moderately comfortable	16	45	29	27	49	22
Very comfortable	4	24	20	6	25	19
Total	100	100	0	100	100	0

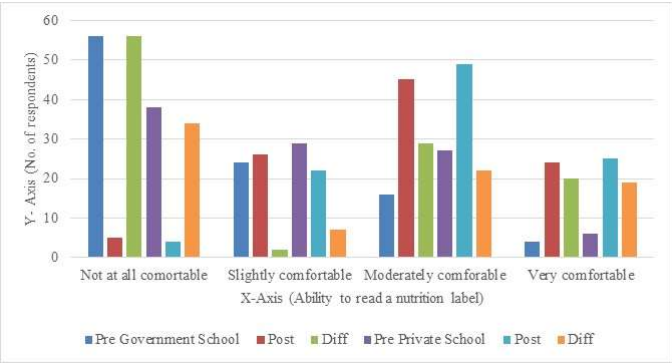

Figure 2 : Distribution of Respondent by ability to read a nutrition label

This table presents the distribution of respondents based on their ability to read a nutrition label before and after an intervention, categorized by government and private schools:

Not at all Comfortable: There was a significant decrease in the number of individuals who felt not at all comfortable reading a nutrition label post-intervention, with a notable decrease in both government and private schools.

Slightly Comfortable: The number of individuals feeling slightly comfortable remained relatively stable in government schools but decreased in private schools post-intervention.

Moderately Comfortable: Both types of schools saw an increase in the number of individuals feeling moderately comfortable post-intervention, with a larger increase in government schools.

Very Comfortable: There was a substantial increase in the number of individuals feeling very comfortable reading a nutrition label post-intervention in both types of schools.

Overall, the intervention seems to have had a positive impact, with more individuals feeling comfortable or very comfortable reading nutrition labels, particularly in government schools where the increase was more pronounced across all comfort levels.

Table 3: Distribution of Respondent by nutritional knowledge scores

Particular	Pre	Post	Diff	Pre	Post	Diff
	Government School			Private School		
1-4 (Very Poor)	12	6	6	9	3	6
5-8 (Poor)	44	33	11	46	37	9
9-12 (Fair)	38	41	3	27	30	3
13-16 (Good)	6	17	11	17	25	8
Above 16 (Very Good)	0	3	3	1	3	2
Total	100	100	0	100	100	0

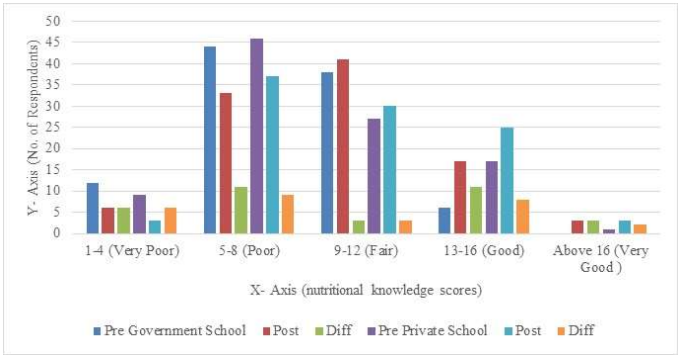

Figure 3: Distribution of Respondent by nutritional knowledge scores

This table displays the distribution of respondents by their nutritional knowledge scores before (Pre) and after (Post) an intervention in government and private schools:

Government School: Post-intervention, there were decreases in the number of students with very poor (-6) and poor (-11) nutritional knowledge scores. However, there were increases in those with fair (+3), good (+11), and very good (+5) nutritional knowledge scores.

Private School: Similarly, there were decreases in the number of students with very poor (-6) and poor (-9) nutritional knowledge scores post-intervention. However, there were

increases in those with fair (+3), good (+8), and very good (+2) nutritional knowledge scores.

Overall, the intervention led to improvements in nutritional knowledge scores in both government and private schools, with fewer students scoring in the lower categories and more students scoring in the higher categories.

4. DISCUSSION

In this study, we successfully assessed the effectiveness of school-based nutrition interventions aimed at promoting healthy dietary practices, lifestyle modification, dietary preferences, diet-related behavior, and nutritional knowledge among adolescents. Our findings indicate that nutrition education has a significant impact on adolescents' dietary behaviors. Educational interventions focused on nutrition not only influence dietary choices but also play a pivotal role in enhancing the nutritional knowledge of young individuals. This is in line with previous research, which has demonstrated that health and nutrition intervention programs have a substantial influence on adolescents' health, knowledge, lifestyle, and behavior, particularly regarding eating habits (11). Raising awareness about the benefits of whole foods was a key part of our intervention. Whole foods contribute significantly to overall health, and incorporating them into adolescents' diets is essential for long-term well-being. The importance of this aspect cannot be overstated, as educating adolescents about the advantages of whole foods helps instill lifelong healthy eating habits (12).

Our study found that dietary intake and physical activity are closely linked, jointly impacting adolescents' physical health, mental well-being, and academic performance.This supports the growing body of evidence showing that healthy dietary choices, when combined with regular physical activity, lead to improved overall health during adolescence (13). The studies reviewed were categorized by their focus on nutrition education. The most successful interventions featured structured programs with interactive discussions, hands-on nutrition lessons, dietary modifications, and anthropometric assessments. The success of these interventions is primarily justified by their ability to foster meaningful changes in food habits and nutritional knowledge among adolescents (14).

Overall, the findings from our study support the notion that nutrition education, when effectively implemented in school settings, can significantly improve dietary behavior and knowledge among adolescents. This reinforces the need for continued investment in school-based nutrition programs to promote long-term health benefits for young people (15).

5. CONCLUTION

This study highlights the effectiveness of behavioural interventions in improving adolescents' dietary practices and overall health. It recommends developing cost-effective, multi-strategy approaches that promote a healthy lifestyle, integrating nutrition education and physical activity. Additionally, it calls for long-term assessments of intervention outcomes and suggests exploring their impact on factors like body mass. Further research is advised to enhance adolescent health, recognizing their importance as a key demographic.

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