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Effectiveness of a Structured Teaching Program on Knowledge of Healthy Food Habits Among Class 10th Students in a Selected Vadodara School: A Pre-Experimental Study

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ABSTRACT

Introduction: Healthy food habits during adolescence are essential for growth, development, and preventing chronic diseases. Many adolescents lack proper nutrition due to limited awareness and socio-economic factors. Structured teaching programs are effective in improving nutrition knowledge and behaviors, particularly in India where undernutrition remains common among teens.

Aim: The aim of this study is to assess the effectiveness of a structured teaching program on knowledge regarding healthy food habits among class 10th students in a selected school of Vadodara.

Methodology: This pre-experimental study used a one-group pre-test and post-test design to evaluate the effectiveness of a structured teaching program on healthy food habits among 60 systematically randomly selected 10th-grade students in a Vadodara school. Data collection occurred in three phases: a pre-test to assess baseline knowledge, the teaching intervention delivered via slides and explanations on the same day, and a post-test conducted seven days later using the same questionnaire with additional items. Formal permission was obtained from school authorities, and informed consent was secured from participants, who cooperated fully. Data were analyzed using descriptive statistics and inferential tests (Chi-square, paired t-test) via SPSS 27. Ethical approval was granted by the Institutional Ethics Committee of Parul Institute of Nursing.

Results: The study involved 60 class 10 students, predominantly aged 15–16 years (70%) with a slightly higher proportion of females (56.7%). Most attended private schools (60%) and lived in joint families (66.7%). Pre-test results showed that 66.7% had average knowledge of healthy food habits, while only 1.7% had excellent knowledge. After the structured teaching program, knowledge significantly improved: 33.3% achieved excellent scores and 56.7% good scores, with no student scoring poorly. The mean knowledge score increased from 13.45 (SD = 4.49) pre-test to 20.8 (SD = 3.84) post-test ($t = 9.371$, $p < 0.001$). Chi-square analysis revealed a significant association between receiving health education at school and baseline knowledge ($p = 0.048$), while other socio-demographic variables showed no significant association.

Conclusion:The structured teaching program significantly improved healthy food habits knowledge among students, highlighting the importance of school-based nutrition education to promote healthy behaviors and reduce future health risks

Keywords: *Structured Teaching Program, Knowledge, Healthy Food Habits, Nutrition Education and Adolescents*

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1. INTRODUCTION

Maintaining healthy food habits is essential for providing the body with necessary nutrients that support overall health and

development. The World Health Organization (WHO) highlights the role of balanced nutrition in preventing malnutrition and non-communicable diseases (NCDs) such as diabetes, cardiovascular diseases, stroke, and certain cancers.[1] Proper nutrition during adolescence is especially critical, as this period involves rapid physical growth and cognitive development.[2,3] Unfortunately, many adolescents suffer from inadequate dietary intake due to lack of awareness, socio-economic factors, and changing lifestyles.[4,5] Poor eating habits in this group can lead to long-term health complications including obesity, anemia, and micronutrient deficiencies.[6,7]

Analyzing adolescent eating patterns reveals disparities in food availability and consumption across regions and socio-economic strata, underscoring the importance of targeted nutrition education.[8] Structured teaching programs have been shown to effectively improve nutritional knowledge and promote healthier food choices among teenagers by addressing specific educational needs.[9,10] These interventions can positively influence attitudes and behaviors related to food, thereby reducing risks of diet-related diseases later in life.[11]

In India, the adolescent population constitutes a significant demographic, and many face nutritional challenges such as underweight and anemia, particularly girls.[12,13] The National Family Health Survey (NFHS-5) reports persistent nutritional gaps among adolescents, further

highlighting the need for school-based nutrition education.[14] A pre-experimental design measuring knowledge before and after an educational program provides an effective method to assess immediate learning outcomes.[15]

The aim of this study is to evaluate the effectiveness of a structured teaching program on knowledge regarding healthy food habits among class 10th students in a selected school of Vadodara, thereby promoting improved nutritional awareness and healthier eating behaviors.

2. METHODOLOGY

The study employed a pre-experimental research approach using a one-group pre-test and post- test design to assess the effectiveness of a structured teaching program on knowledge regarding healthy food habits among 10th-grade students in a selected school in Vadodara. The research design focused on how the participants were selected and engaged within the study framework. A total of 60 students from class 10 were systematically randomly selected based on inclusion and exclusion criteria to participate in the study.

Data collection was carried out in three phases. In the first phase, a pre-test was conducted using a self-structured questionnaire to assess the students' baseline knowledge regarding healthy food habits. This took approximately 45 minutes for completion. In the second phase, the structured teaching program was delivered on the same day, which included slide presentations with food item illustrations to enhance understanding, accompanied by adequate explanations as required. The third phase involved administering a post-test on the seventh day after the teaching session, using the same OMR questionnaire with an additional 25 questions to evaluate knowledge improvement.

Formal written permission was obtained from the school authorities before conducting the study. The participants were gathered, informed about the study's purpose, and their consent was obtained. Throughout the data collection, the students were cooperative, and no difficulties were encountered. Data processing was completed within one day, during which any missing data were identified and rectified promptly.

For data analysis, both descriptive and inferential statistics were utilized. Frequency and percentage distributions were used to interpret socio-demographic variables, while mean, mean percentage, and standard deviation were calculated to assess the knowledge levels of the students regarding healthy food habits. Inferential analysis included the Chi-square test to determine associations between pre-test knowledge and selected socio-demographic variables, and the paired t-test was applied to compare pre-test and post-test knowledge scores, therebyevaluating the effectiveness of the structured teaching program. Data analysis was conducted using SPSS 27.0 software.

Ethical approval for the study was secured from the Institutional Ethics Committee of the Parul Institute of Nursing. Participants were thoroughly informed about the purpose of the study and assured that their confidentiality and anonymity would be strictly maintained. Emphasis was placed on voluntary participation, with all ethical principles—autonomy, beneficence, non- maleficence, and justice—being upheld throughout the research process.

3. RESULTS:

Section I

Findings Related to Frequency and Percentage Distribution of Socio-Demographic Variables of the Participants

Table 4.1: Frequency and Percentage Distribution of Socio-Demographic Variables of the Participants

n=60

Sl. No.	Demographic Variables		Frequency (F)	Percentage (%)
1	**Age**	13–14	18	30.00%
		15–16	42	70.00%
2	**Gender**	Male	26	43.30%
		Female	34	56.70%
3	**Class**	10:00 AM	23	38.30%
		10 B	37	61.70%
4	**Type of School**	Government School	24	40.00%
		Private School	36	60.00%
5	**Residence**	Urban	30	50.00%
		Rural	30	50.00%
6		Farmer	12	20.00%
	Father's Occupation	Teacher	22	36.70%
		Business	12	20.00%
		Government Employee	14	23.30%
7	**Mother's Occupation**	Homemaker	26	43.30%
		Teacher	16	26.70%
		Business	8	13.30%
		Government Employee	10	16.70%
8	**Family Monthly Income**	₹10,000–₹20,000	54	90.00%
		₹20,001–₹40,000	2	3.30%
		₹40,001–₹60,000	2	3.30%

		More than ₹60,000	2	3.30%
9	**Education of Father**	Primary School	20	33.30%
		Secondary School	22	36.70%
		Graduate	8	13.30%
		Post Graduate	10	16.70%
10	**Education of Mother**	Illiterate	4	6.70%
		Primary School	20	33.30%
		Secondary School	12	20.00%
		Graduate	12	20.00%
		Post Graduate	12	20.00%
11	**Number of Family Members**	2–3	20	33.30%
		4–5	24	40.00%
		6–7	8	13.30%
		More than 7	8	13.30%
12	**Family Type**	Nuclear Family	20	33.30%
		Joint Family	40	66.70%
13	**Access to Kitchen**	Yes	22	36.70%
		No	38	63.30%
14	**Meals with Family**	Yes	44	73.30%
		No	16	26.70%
15	**Type of Meals Preferred**	Home-cooked meals	14	23.30%
		Fast food	22	36.70%
		Street food	12	20.00%

		Snacks	12	20.00%
16	**Frequency of Fruits and Veg**	Daily	16	26.70%
		3–4 times a week	16	26.70%
		Once a week	9	15.00%
		Rarely	11	18.30%
		Never	8	13.30%
17	**Water Intake**	Less than 1 litre	2	3.30%
		1–2 litres	29	48.30%
		2–3 litres	17	28.30%
		More than 3 litres	12	20.00%
18	**Food Habits Important**	Yes	43	71.70%
		No	17	28.30%
19	**Health Education at School**	Yes	46	76.70%
		No	14	23.30%
20		Yes	26	43.30%
	Know Healthy Food Habits	No	34	56.70%

Table 4.1 provides an overview of the socio-demographic characteristics of 60 class 10th students. The majority (70%) were aged 15–16 years, with females (56.7%) slightly outnumbering males. Most students (61.7%) belonged to class 10 B, and 60% attended private schools. Half resided in urban and half in rural areas. Fathers were primarily teachers (36.7%), and most mothers were homemakers (43.3%). A large majority (90%) of families had a monthly income between ₹10,000–₹20,000. Most fathers (36.7%) had secondary education, while mothers mostly had primary education (33.3%). Regarding family structure, 66.7% belonged to joint families, and 40% had 4–5 members. Only 36.7% had access to a kitchen, though 73.3% usually had meals with their families. Meal preferences leaned toward fast food (36.7%), and fruit/vegetable intake was low, with only 26.7% consuming them daily. Water intake was mostly 1–2 litres (48.3%). While 71.7% considered food habits important, only 43.3% knew what healthy food habits were, and 76.7% reported receiving health education at school. This data highlights the need for structured nutrition education among teenagers.

Section II

Findings Related to Knowledge Regarding Healthy Food Habits Among Teenage Students of Class 10th

Table 4.2: Frequency and Percentage Distribution of Knowledge Regarding Healthy Food Habits Among Teenage Students of Class 10th

n=60

Knowledge Score	Pre-Test		Post-test	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Poor Score (≤7)	3	5.0%	0	0.0%
Average Score (8- 15)	40	66.70%	6	10.0%
Good Score (16 – 22)	16	26.70%	34	56.7%
Excellent Score (23 – 30)	1	1.70%	20	33.3%

Table 4.2 shows the pre-test and post-test knowledge levels of students on healthy food habits. In the pre-test, most students (66.7%) had average knowledge, 26.7% had good knowledge, only 1.7% had excellent knowledge, and 5% had poor knowledge. After the structured teaching programme, there was a significant improvement: no students remained in the poor category, average knowledge dropped to 10%, good knowledge increased to 56.7%, and excellent knowledge rose to 33.3%. This highlights the effectiveness of the teaching programme in improving students' knowledge of healthy food habits.

Table 4.3: Descriptive statistics of Knowledge Regarding Healthy Food Habits Among Teenage Students of Class 10th

n=60

Score	Test	Mean Score	Standard Deviation
Knowledge Score	**Post-test**	20.8	3.844
	Pre-test	13.45	4.493

Table 4.3 shows that the mean pre-test knowledge score was 13.45 with a standard deviation of 4.49, indicating moderate knowledge and variability among students. After the structured teaching programme, the mean post-test score increased to 20.8 with a standard deviation of 3.84, showing improved knowledge and reduced variability. This reflects the effectiveness of the intervention.

Section III

Findings Related to the Effectiveness of a Structured Teaching Programme on Knowledge Regarding Healthy Food Habits Among Teenage Students

Table 4.4: Paired t-test Analysis Showing the Effectiveness of a Structured Teaching Programme on Knowledge Regarding Healthy Food Habits Among Teenage Students

n=60

Knowledge Score	Mean Score	Standard Deviation	Degree of Freedom	Calculated 't' Value	Tabulated 't' Value	p- value
Post-test	20.8	3.844				

Pre-test	13.45	4.493	59	9.371	1.671	0.001*

Table 4.4 shows a significant increase in knowledge scores after the structured teaching programme. The mean pre-test score was 13.45 (SD = 4.49), which rose to 20.8 (SD = 3.84) in the post-test. The calculated t-value (9.371) was greater than the tabulated value (1.671) at 0.05 significance level with 59 degrees of freedom, and the p-value (0.001) was statistically significant. This indicates the teaching programme was effective in improving students' knowledge about healthy food habits.

Section IV

Findings Related to the Association Between Pre-Test Knowledge Regarding Healthy Food Habits and Selected Socio-Demographic Variables

Table 4.5: Chi- square association Between Pre-Test Knowledge Regarding Healthy Food Habits and Selected Socio-Demographic Variables

n=60

Sl. No.	**Demographic Variables**		**F**	**Knowledge Score**				**df**	**χ^2 Value**	**p- value**
				Poor	**Average**	**Good**	**Excellent**			
1	**Age**	13–14	18	0	13	5	0	3	1.845	0.605
		15–16	42	3	27	11	1			
2	**Gender**	Male	26	2	17	7	0	3	1.442	0.696
		Female	34	1	23	9	1			
3	**Class**	10:00 AM	23	1	15	7	0	3	0.864	0.834
		10 B	37	2	25	9	1			
4	**Type of School**	Government School	24	0	15	9	0	3	4.531	0.21
		Private School	36	3	25	7	1			
5	**Residence**	Urban	30	2	19	9	0	3	1.683	0.641
		Rural	30	1	21	7	1			
6		Farmer	12	1	10	1	0	9	11.646	0.234
		Teacher	22	0	15	7	0			

	Father's Occupation	Business	12	0	8	3	1			
		Government Employee	14	2	7	5	0			
7	**Mother's Occupation**	Homemaker	26	1	18	7	0	9	12.769	0.173
		Teacher	16	2	11	3	0			
		Business	8	0	3	4	1			
		Government Employee	10	0	8	2	0			
8	**Family Monthly Income**	₹10,000–₹20,000	54	3	34	16	1	9	3.333	0.95
		₹20,001–₹40,000	2	0	2	0	0			
		₹40,001–₹60,000	2	0	2	0	0			
		More than ₹60,000	2	0	2	0	0			
9	**Education of Father**	Primary School	20	1	14	5	0	9	8.311	0.503
		Secondary School	22	2	14	6	0			
		Graduate	8	0	5	2	1			
		Post Graduate	10	0	7	3	0			
10	**Education of Mother**	Illiterate	4	0	3	1	0	12	6.658	0.879
		Primary School	20	1	14	5	0			
		Secondary School	12	1	7	4	0			
		Graduate	12	1	9	2	0			
		Post Graduate	12	0	7	4	1			
11		2–3	20	1	14	5	0	9	4.69	0.86

	Number of Family Members	4–5	24	2	14	7	1			
		6–7	8	0	7	1	0			
		More than 7	8	0	5	3	0			
12	**Family Type**	Nuclear Family	20	1	14	5	0	3	0.581	0.901
		Joint Family	40	2	26	11	1			
13	**Access to Kitchen**	Yes	22	1	14	6	1	3	1.794	0.616
		No	38	2	26	10	0			
14	**Meals with Family**	Yes	44	2	31	11	0	3	3.345	0.341
		No	16	1	9	5	1			
15	**Type of Meals Preferred**	Home-cooked meals	14	1	7	6	0	9	7.801	0.554
		Fast food	22	1	16	5	0			
		Street food	12	0	9	2	1			
		Snacks	12	1	8	3	0			
16	**Frequency of Fruits and Veg**	Daily	16	1	10	5	0	12	6.786	0.871
		3–4 times a week	16	1	11	3	1			
		Once a week	9	1	7	1	0			
		Rarely	11	0	7	4	0			
		Never	8	0	5	3	0			
17	**Water Intake**	Less than 1 litre	2	1	1	0	0	9	2.148	0.205
		1–2 litres	29	1	19	8	1			
		2–3 litres	17	1	10	6	0			
		More than 3 litres	12	0	10	2	0			

18	**Food Habits Important**	Yes	43	2	28	12	1	3	0.575	0.902
		No	17	1	12	4	0			
19	**Health Education at School**	Yes	46	3	33	10	0	3	6.755	0.048*
		No	14	0	7	6	1			
20	**Know Healthy Food Habits**	Yes	26	1	16	8	1	3	1.9	0.593
		No	34	2	24	8	0			

Table 4.5 shows the chi-square test results examining the association between pre-test knowledge of healthy food habits and socio-demographic variables among 60 students. Most variables, including age, gender, class, parents' occupation, and family income, showed no significant association with knowledge scores. However, receiving health education at school was significantly associated with better pre-test knowledge ($p = 0.048$). This emphasizes the role of school health education in improving students' nutrition awareness before the intervention.

4. CONCLUSION

This study demonstrates that the structured teaching programme significantly improved knowledge about healthy food habits among class 10th students in a Vadodara school. Initially, most students had only average knowledge, highlighting the need for such interventions. After the programme, knowledge levels increased significantly, confirming its effectiveness. The analysis showed that most socio-demographic factors did not influence baseline knowledge, except that students who received health education at school had better pre-test knowledge. This emphasizes the importance of school-based health education in promoting nutrition awareness. Overall, the study highlights the value of structured teaching and strengthened health education to encourage healthy eating habits among adolescents.

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Conflict of Interest

The authors declare that there are no actual or potential conflicts of interest related to this research study.

Ethical Consideration

Ethical approval for the study was obtained from the Institutional Ethics Committee of Parul Institute of Nursing (PIEC), Vadodara, Gujarat. All participants were clearly informed about the purpose and nature of the study, and written informed consent was secured from each participant prior to data collection. Confidentiality and anonymity were strictly maintained throughout the study..

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