A Study to Assess the Effectiveness of Planned Teaching Programme on Knowledge Regarding Rainbow Nutrition Programme Among School Going Children at Selected School in Sasaram Bihar

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Abstract—**Background and Purpose of the Study Nutrition play a vital role in the growth, development, and overall well-being of school-going children. Adequate intake of essential nutrients during childhood supports physical growth, cognitive development, immunity, and academic performance. However, many children continue to suffer from malnutrition, micronutrient deficiencies, and unhealthy eating habits due to lack of awareness, poor dietary practices, and limited exposure to nutrition education. According to the World Health Organization, balanced and diversified diet rich in fruits and vegetables is essential to prevent nutritional deficiencies and promote optimal health. Similarly, the UNICEF highlights that nutrition education at the school level is a key strategy in improving children's health outcomes.**

Objectives: To assess the pre-test level of knowledge regarding the Rainbow Nutrition Programme among school-going children.

1. **To assess the post-test level of knowledge regarding the Rainbow Nutrition Programme among school-going children.**
2. **To evaluate the effectiveness of a planned teaching program on knowledge regarding the Rainbow Nutrition Program among school going children in study groups.**
3. **To find out the association between post-test level of knowledge regarding the Rainbow Nutrition Program among school going children with their demographic variable.**

Design and Subjects: A pre-experimental one group pre-test post-test design was used. Sixty students with school going children were selected class V, VI, VII, VIII, at selected school D.A.V School.

Data Analysis: Frequency, percentage, mean, standard deviation, paired t-test, independent test, correlation coefficient and chi-square test were used according to the objectives. Results: The significant difference between pre-test and post-test knowledge scores proves that the Planned Teaching Programme was effective in achieving the objective of improving knowledge. The findings support the importance of implementing school-based nutrition education programmes to encourage healthy dietary practices among children.

Conclusion: study concluded that school-going children had inadequate knowledge regarding the Rainbow Nutrition Programme before the intervention. The Planned Teaching Programme was found to be effective in significantly improving knowledge among participants.

I. INTRODUCTION

Nutrition is defined as the process by which the body obtains, utilizes, and metabolizes nutrients from food for growth, maintenance, repair, and energy production. A balanced diet containing carbohydrates, proteins, fats, vitamins, minerals, fibre, and water is essential for maintaining optimal health. However, despite improvements in healthcare services and nutrition programmes, malnutrition remains a major public health concern, particularly among school-going children in developing countries like India.

India continues to face the dual burden of undernutrition and overnutrition. Many school-going children suffer from deficiencies of iron, vitamin A, iodine, calcium, and other micronutrients due to inadequate dietary intake and unhealthy eating habits. At the same time, increasing consumption of junk food, sugary beverages, and processed foods has led to

rising rates of childhood overweight and obesity. Poor nutritional practices not only affect children's physical growth but also impair cognitive development, reduce learning capacity, and increase the risk of chronic diseases later in life.

Recognizing the importance of healthy eating, the Government of India has introduced several nutrition initiatives to improve the nutritional status of children. Among these, the Rainbow Nutrition Programme is an innovative educational approach that encourages the daily consumption of fruits and vegetables of different colours. The concept is based on the understanding that foods of different natural colours contain different nutrients, antioxidants, vitamins, minerals, and phytochemicals that work together to maintain health and prevent diseases.

II. STATEMENT OF THE PROBLEM

"a study to assess the effectiveness of planned teaching programme on knowledge regarding rainbow nutrition programme among school going children at d.A.V school in Sasaram Bihar,"

III. OBJECTIVES OF THE STUDY

1. To assess the pre-test level of knowledge regarding the Rainbow Nutrition Programme among school-going children.
2. To assess the post-test level of knowledge regarding the Rainbow Nutrition Programme among school-going children.
3. To evaluate the effectiveness of a planned teaching program on knowledge regarding the Rainbow Nutrition Program among school going children in study groups.
4. To find out the association between post-test level of knowledge regarding the Rainbow Nutrition Program among school going children with their demographic variable.

IV. OPERATIONAL DEFINITIONS

Assess:
In this study, assess refers to the measurement of knowledge regarding the Rainbow Nutrition Programme among school-going children using a structured questionnaire

Effectiveness:
Refers to the extent to which the planned teaching program improves the knowledge of school going children as measured by the difference between pre-test and post-test scores.

Planned Teaching Program:
A systematically organized teaching session prepared by the investigator to provide information about the Rainbow Nutrition Program using charts, posters, and verbal explanation.

Knowledge:
The correct responses given by school-going children to the structured knowledge questionnaire regarding the Rainbow Nutrition Program.

Rainbow Nutrition Program:
A nutrition concept that promotes consumption of fruits and vegetables of different colours to achieve a balanced and nutritious diet.

School-going Children:
Children studying in selected schools of Sasaram and belonging to the 12-15 year of age group.

V. HYPOTHESES

RH_1: There is a significant difference between the pre-test and post-test knowledge scores regarding the Rainbow Nutrition Program among school going children.

RH_2: There is a significant association between post-test knowledge scores and selected demographic variables of school-going children.

ASSUMPTION
School-going children may have inadequate knowledge regarding the Rainbow Nutrition Program. Planned teaching programs can improve knowledge regarding Rainbow nutrition program. Children will cooperate and respond honestly to the questionnaire.

DELIMITATION
- School-going children studying in selected school at Sasaram.
- Students studying in classes 6th to 8th standard).
- The data will be collected for a period of 4 weeks.

- The study will focus only on knowledge regarding the Rainbow Nutrition Program.
- Only those students who are present at the time of data collection will be included.

CONCEPTUAL FRAMEWORK

The conceptual framework of the present study is based on General Systems Theory by Ludwig von Bertalanffy (1968).

The framework explains that the child's existing knowledge serves as the input, which undergoes transformation through the planned teaching programme as the process, resulting in improved knowledge as the output.

The evaluation of changes in knowledge provides feedback regarding the effectiveness of the intervention.

The framework demonstrates that a structured and planned educational intervention can bring positive changes in knowledge among school-going children regarding the Rainbow Nutrition Programme.

VI. METHODOLOGY

RESEARCH APPORACH:

A Quantitative Evaluative Research Approach was adopted for the present study to assess the effectiveness of a planned teaching programme on knowledge regarding the Rainbow Nutrition Programme among school-going children.

The quantitative research approach was selected because the study involved the measure knowledge levels using a structured knowledge questionnaire and statistical analysis of pre-test and post-test scores.

The evaluative approach helped the investigator determine whether the planned teaching programme produced a significant improvement in knowledge regarding the Rainbow Nutrition Programme.

RESEARCH DESIGN:

The present study adopted a Pre-experimental One-Group Pre-test and Post-test Research Design to assess the effectiveness of a planned teaching programme on knowledge regarding the Rainbow Nutrition Programme among school-going children.

Table 3.1: Schematic Representation of Research Design

Group	Pre-test (O_1)	Intervention (X)	Post-test (O_2)
Study group (School going childre n)	Assessment of existing knowledge regarding Rainbow Nutrition Programme using a structured knowledge questionnai re	Administrati on of Planned Teaching Programme regarding Rainbow Nutrition Programme	Assessment of knowledge after interventio n using the same structured knowledge questionnai re

Design Representation $O_1 \rightarrow X \rightarrow O_2$

Where:

- O_1 = Pre-test assessment of knowledge regarding Rainbow Nutrition Programme among school-going children.
- X = Planned Teaching Programme regarding Rainbow Nutrition Programme.
- O_2 = Post-test assessment of knowledge regarding Rainbow Nutrition Programme after administration of the planned teaching programme.

This design helped the investigator to compare the knowledge level before and after the intervention and determine the effectiveness of the planned teaching programme.

RESEARCH SETTING:

The research setting refers to the physical location where the study is conducted and where the researcher collects data from the study participants. The present study was conducted at D.A.V. Public School, Sasaram, Bihar, located in Sasaram, Rohtas District, Bihar. The setting was selected because of the availability of school-going children who fulfilled the inclusion criteria and the feasibility of conducting the planned teaching programme. The study was conducted among students studying in Class V, VI, VII, and VIII of the selected school. The setting provided an appropriate environment for implementing the Planned Teaching Programme regarding the Rainbow Nutrition Programme and assessing the change in knowledge among school-going children. The school authorities provided necessary permission and cooperation for conducting

the study. Data collection was carried out among selected students during the period of the study.

VII. POPULATION

Population refers to the entire group of individuals or elements that possess specific characteristics of interest to the researcher and to whom the research findings are intended to be generalized.

For the present study entitled "A Study to Assess the Effectiveness of a Planned Teaching Programme on Knowledge Regarding the Rainbow Nutrition Programme Among School Going Children at D.A.V. School, Sasaram, Bihar", the research population consisted of school-going children studying in the selected school.

The research population was classified into target population and accessible population as follows:

Target Population

The target population refers to the entire group of individuals to whom the researcher intends to generalize the findings of the study.

In the present study, the target population consisted of all school-going children studying in different classes of D.A.V. School, Sasaram, Bihar, who were within the age group of 12–15 years and eligible to participate in the study.

The target population represented school children who could benefit from nutrition education regarding the Rainbow Nutrition Programme.

ACCESSIBLE POPULATION

The accessible population refers to the portion of the target population that is available to the researcher for conducting the study.

In the present study, the accessible population consisted of school-going children studying in Classes V, VI, VII, and VIII at D.A.V. School, Sasaram, Bihar, who were available during the period of data collection and fulfilled the inclusion criteria.

Among the accessible population, 60 students were selected as study participants. The selected students were assessed for their knowledge regarding the Rainbow Nutrition Programme through a pre-test and post-test assessment.

SAMPLE

A sample is a subset of the population selected to participate in the research study. In the present study, the sample consisted of 60 school-going children studying in Classes V, VI, VII, and VIII at D.A.V. School, Sasaram, Bihar.

SAMPL SIZE

The sample size refers to the number of participants selected for the study. In the present study, the sample size consisted of 60 school-going children studying in Classes V, VI, VII and VIII at D.A.V. School, Sasaram, Bihar. These students were selected to assess the effectiveness of a planned teaching programme on knowledge regarding the Rainbow Nutrition Programme.

BY USING SLOVIN'S FORMULA:

$$n = \frac{N}{1+Ne^2}$$

Where:

- n = Sample size
- N = Total population size
- e = Margin of error (0.05)

Step 1: Determination of Sample Size

Assuming that the accessible population (N) of school-going children eligible for the study was 70 students, the sample size was calculated as follows:

$$n = \frac{70}{1 + 70(0.05)^2}$$

$$n = \frac{70}{1 + 70 \times 0.0025}$$

$$n = \frac{70}{1 + 0.175}$$

$$n = \frac{70}{1 + 0.175}$$

$$n = \frac{70}{1.175}$$

$$n = 59.57$$

$$n \approx 60$$

Therefore, the calculated sample size was approximately 60 students. considering the feasibility of data collection, availability of participants, and inclusion criteria, all 70 school going children from Classes V, VI, VII, and VIII of D.A.V. School, Sasaram, Bihar, were included in the study. Thus, the final sample size for the study was 70 students.

SAMPLING TECHNIQUE

Sampling technique refers to the method used by the researcher to select participants from the population for the study. In the present study, a Non-probability Convenient Sampling Technique was used to select 60 school-going children studying in Classes V, VI, and VII at D.A.V. School, Sasaram, Bihar. The participants were selected based on their availability, willingness to participate, and fulfilment of the inclusion criteria during the period of data collection. This technique was adopted because it was feasible and appropriate for conducting the study within the available time and resources.

SAMPLING CRITERIA

Sample selection criteria refer to the conditions established by the researcher for selecting appropriate participants for the study. These criteria ensure that the selected participants are suitable according to the objectives of the research.

Inclusion Criteria The study included:

- School-going children studying in the selected school.
- Children aged between 12–15 years.
- Children who were willing to participate.
- Children available during data collection.

Exclusion Criteria The study excluded:

- Children who were absent during data collection.
- Children who were unwilling to participate.

Research Variables

Research variables are the characteristics or factors that can be measured, manipulated, or observed in a research study. In the present study, variables are identified according to the objectives of the study.

Independent Variable

The independent variable is the variable that is introduced by the researcher to observe its effect on the dependent variable.

- Planned Teaching Programme on Rainbow Nutrition Programme.

Dependent Variable

The dependent variable is the outcome or response that is measured after the implementation of the independent variable.

- Knowledge regarding the Rainbow Nutrition Programme among school-going children.

VIII. DEVELOPMENT AND DISCRIPTION OF THE TOOL

The data collection tool was developed by the investigator after reviewing relevant literature, research articles, and considering the objectives of the study.

The tool was prepared to assess the knowledge regarding the Rainbow Nutrition Programme among school-going children. Section – A Description of the Socio-demographic variables of the Parents and students

Section – B Structured Knowledge Questionnaire regarding the Rainbow Nutrition Program consisting of multiple-choice questions.

SECTION – A: DESCRIPTION OF THE SOCIO-DEMOGRAPHIC VARIABLES OF THE STUDENTS

This section was developed to description of the socio demographic variables of the students. It consists of selected socio-demographic variables that may influence the knowledge level of school-going children regarding the Rainbow Nutrition Programme.

The variables included:

1. Age
2. Gender
3. Class of study
4. Dietary pattern
5. Religions
6. Type of family
7. Monthly family income
8. Educational status of parents
9. Occupation of parents
10. Previous source of information regarding nutrition

This section helps the investigator to describe the demographic characteristics of the participants and to determine the association between the post-test knowledge level and selected demographic variables.

INTERPRETATION OF THE TOOL

This socio-demographic variables of the study participants. The data obtained from this section were analysed and presented using frequency and percentage distribution.

The socio-demographic variables were interpreted to describe the characteristics of the school going children included in the study, such as age, gender, class of study, religion, dietary pattern, type of family, monthly family income, parents' education, parents' occupation, and previous source of nutrition information.

SECTION B: STRUCTURED KNOWLEDGE QUESTIONNAIRE REGARDING RAINBOW NUTRITION PROGRAMME

This section consists of a structured questionnaire designed to assess the knowledge level of school-going children regarding the Rainbow Nutrition Programme.

The questionnaire was prepared based on the following areas:

- Concept and meaning of Rainbow Nutrition Programme
- Importance of consuming a variety of colorful foods
- Nutritional significance of different colored fruits and vegetables
- Role of nutrients in growth and development
- Importance of balanced diet
- Healthy eating habits among school children
- Prevention of nutritional deficiencies

The questionnaire consists of multiple-choice questions with four alternative responses, from which the participants selected the correct answer.

Each correct response was assigned a score of 1, while an incorrect response was assigned a score of 0. The total obtained score represented the knowledge level of the participants regarding the Rainbow Nutrition Programme. The same structured knowledge questionnaire was administered during the pre-test and posttest to assess the effectiveness of the planned teaching programme.

INTERPRETATION OF THE TOOL

The structured knowledge questionnaire consisted of multiple-choice questions. Each item had one correct response.

- Correct answer = 1 score
- Wrong answer/Unanswered = 0 score

The total score obtained by each participant indicated their level of knowledge regarding the Rainbow Nutrition Programme.

The knowledge score was interpreted according to the percentage obtained by the participants.

Percentage Score	Interpretation
Below 50%	Inadequate knowledge
50–75%	Moderately knowledge
Above 75%	Adequate knowledge

The same questionnaire was used for assessing knowledge during the pre-test and post-test to determine the effectiveness of the planned teaching programme.

RELIABILITY OF THE TOOL

Reliability refers to the degree of consistency, accuracy, and stability of a research instrument in measuring the intended variable. A reliable tool provides similar results when it is administered repeatedly under similar conditions. In the present study, the reliability of the Structured Knowledge Questionnaire regarding the Rainbow Nutrition Programme was established by using the Splits half Method. The tool was administered twice to a group of school-going children with similar characteristics as the study participants. The scores obtained from both administrations were correlated to determine the consistency and stability of the questionnaire. The reliability of the tool was calculated by using Karl Pearson's Correlation Coefficient (r). The obtained reliability value was: The reliability coefficient of 0.80 indicates a high positive correlation between the test and retest scores, which shows that the tool was consistent and reliable for assessing the knowledge regarding the Rainbow Nutrition Programme among school-going children. Hence, the structured knowledge questionnaire was considered a reliable tool and was used for the final study.

Table: Reliability of the Tool

Tool	Method used	Reliability Coefficient	Interpretations
Structured Knowledge Questionnaire regarding Rainbow Nutrition	Split half Method using Karl Pearson's Correlation Coefficient	r = 0.80	The tool showed a high positive correlation and was considered reliable for assessing the
Programme among school-going children			knowledge regarding Rainbow Nutrition Programme

INTERPRETATION:

The reliability coefficient of the tool was found to be r = 0.80 using the split half, Method. This indicates a high level of reliability and consistency of the structured knowledge questionnaire. Hence, the tool was considered reliable for the present study.

ETHICAL CONSIDERATION

Ethical consideration refers to the principles and guidelines that ensure the protection of the rights, safety, privacy, and dignity of research participants during the research process. It includes obtaining ethical approval, informed consent, maintaining confidentiality, ensuring voluntary participation, and protecting participants from any harm.

The researcher has the responsibility to conduct the study ethically by respecting the autonomy, privacy, and confidentiality of the participants. Ethical approval from the concerned authority is necessary before conducting any research involving human participants.

In the present study, ethical clearance was obtained from the Institutional Ethics Committee of Narayan Nursing College before conducting the study through the approval letter (Letter No: _NNC/IEC/MS/25/1545.). Formal permission was also obtained from the concerned authorities of the selected school, D.A.V. School, Sasaram, Bihar, for conducting the study. The purpose and procedure of the study were explained clearly to the participants and their parents/guardians. Written informed consent was obtained from parents/guardians, and assent was obtained from the school-going children before participation. Confidentiality and anonymity of the participants were maintained throughout the study. The researcher ensured that all ethical principles were followed during data collection and administration of the planned teaching programme.

Table 3.12: Ethical Principles and Actions Carried Out by the Researcher

Ethical Principles	Actions Carried Out by the Researcher
Principle of Beneficence	The researcher ensured that the study provided benefits to the participants by improving their knowledge regarding the Rainbow Nutrition Programme through a planned teaching programme. No harm or risk was caused to the participants during the study.
Principle of Respect for Human Dignity	The researcher respected the rights, values, and opinions of the participants. Participation was voluntary, and participants were given the freedom to withdraw from the study at any time without any consequences.
Principle of Confidentiality	The researcher maintained the privacy and confidentiality of participants' personal information and ensured that the collected data were used only for research purposes.
Principle of Informed Consent	The researcher explained the purpose, procedure, and importance of the study to the participants and their parents/guardians. Written informed consent was obtained before participation, and assent was obtained from children.

PILOT STUDY

A pilot study is a small-scale preliminary study conducted before the actual research study to assess the feasibility, practicability, and appropriateness of the research methodology and data collection procedure. It helps the researcher to identify any difficulties related to the tool, intervention, and study process before conducting the final study. In the present study, a pilot study was conducted among 10% of the total sample size, i.e., 6 school-going children, at Government School, Jamuhar, Sasaram, Bihar. The selected children were from the same age group and fulfilled the inclusion criteria of the study.

The purpose of conducting the pilot study was to assess the feasibility of the research design, evaluate the clarity and reliability of the structured knowledge questionnaire, estimate the time required for data collection, and determine the practicability of the Planned Teaching Programme regarding the Rainbow Nutrition Programme.

The investigator conducted the pre-test using the structured knowledge questionnaire, administered the Planned Teaching Programme, and conducted the post-test assessment among the selected children.

The pilot study findings indicated that the research procedure, data collection tool, and planned teaching programme were feasible and appropriate for conducting the main study. Therefore, the same methodology was followed for the final study.

IX. DATA COLLECTION PROCEDURE

Data collection is a systematic process of gathering information from selected participants according to the objectives of the study. In the present study, data collection was conducted after obtaining ethical clearance from the Institutional Ethics Committee of Narayan Nursing College and formal permission from the concerned authorities of the selected school. The study was conducted among 60 school-going children studying in Classes V, VI, VII, and Vikat D.A.V. Public School, Jamuhar, Sasaram, Bihar. Before initiating the study, the purpose and procedure of the research were explained to the participants. Informed consent was obtained from parents/guardians and assent was obtained from the children. Confidentiality and anonymity of the participants were maintained throughout the study.

The investigator first conducted a pre-test assessment to assess the existing level of knowledge regarding the Rainbow Nutrition Programme among school-going children using a structured knowledge questionnaire. After the pre-test, a Planned Teaching Programme on the Rainbow Nutrition Programme was administered to the participants using the lecture-cum-discussion method with appropriate audiovisual aids. The teaching programme focused on the meaning of the Rainbow Nutrition Programme, importance of colourful fruits and vegetables, nutritional benefits of different coloured foods, balanced diet, prevention of nutritional deficiencies, and healthy eating habits. After the predetermined interval, a post-test assessment was conducted using the same structured knowledge questionnaire to evaluate the effectiveness of the planned teaching programme. The collected data were organized, coded, tabulated, and analyzed using appropriate descriptive and inferential statistical methods according to the objectives of the study.

Table: 4.1 Socio-demographic variables of parents

Variables	Category	Frequency (f)	Percentage (%)
Monthly Family Income (₹)	59,417 – 1,18,863	40	66.7
	44,570 – 59,416	10	6.7
	29,723 – 44,569	4	6.7
	17,816 – 29,722	6	10.0
	5,942 – 17,815	0	0.0
Occupation of Parents	Professional	40	66.7
	Semi – professional	10	16.7
	Clerical /Shop owner/farmer	4	3.3
	Skilled	6	3.3
	Semi-skilled	0	0.0
	Unskilled	0	0.0
	Unemployed	0	0.0
Religion	Hindu	50	83.3
	Muslim	6	10.0
	Sikh	3	5.0
	Christian	1	1.7
Type of Family	Nuclear	30	50.0
	Joint	30	50.0
	Extended	00	0.0

RESULT

The table shows that the majority of the school-going children 40 (66.7%) belonged to families with a monthly income of ₹59,417–₹1,18,863, while 10 (16.7%) belonged to the income group of ₹44,570–₹59,416, 6 (10.0%) belonged to ₹17,816–₹29,722, 4 (6.7%) belonged to ₹29,723– ₹44,569, and none belonged to the income group of ₹5,942–₹17,815.

Regarding the occupation of parents, the majority 40 (66.7%) were professionals, followed by 10 (16.7%) who were semi-professionals. Only 4 (6.7%) each belonged to the clerical/shop owner/farmer and skilled only 6 (10.0%) Categories, while no parents were semi-skilled, unskilled, or unemployed.

With respect to religion, the majority of the participants 50 (83.3%) were Hindus, followed by 6 (10.0%) Muslims, 6 (10.0%) Sikhs, 3 (5.0%) Christian1, (1.7%).

Regarding the type of family, an equal proportion of participants 30 (50.0%) belonged to nuclear families and 30 (50.0%) belonged to joint families, while none of the participants belonged to an extended family. Overall, the findings indicate that most participants belonged to higher-income professional families, were Hindu by religion, and were equally distributed between nuclear and joint family types.

Table 4.2: Socio-Demographic Characteristics of the school going children (n =60)

Variables	Categories	Frequency (f)	Percentages (%)
Age (years)	12–13	26	43.3
	13–14	14	23.3
	14–15	20	33.3
Gender	Male	28	46.7
	Female	32	53.3
Dietary Pattern	Mixed (Veg & Non-veg)	25	41.7
	Vegetarian	35	58.3
Grade	6th	20	33.3
	7th	20	33.3
	8th	20	33.3

RESULT

The above table shows that the majority of the school-going children 26 (43.3%) were in the 12–13 years age group, followed by 14(23.3%) in the 13–14 years age group and 20 (33.3%) in the 14–15 years age group. This indicates that most of the participants belonged to the younger age group.

Regarding gender the majority of the participants 32 (53.3%) were female, whereas 28 (46.7%) were male. This indicates that female participants slightly outnumbered male participants in the study.

With respect to dietary pattern, the majority of the participants 35 (58.3%) followed a vegetarian diet, while 25 (41.7%) followed a mixed (vegetarian and non-vegetarian) diet. This indicates that vegetarian dietary practices were more common among the participants.

Regarding grade, the participants were equally distributed among 6th, 7th, and 8th standards, with 20 (33.3%) students in each class. This indicates that all three grades were equally represented in the study sample.

Knowledge on Rainbow Nutrition Programme – Item-wise Analysis N = 60

Q. No.	Key Concept Assessed	Most Chosen Response	Frequency (f)	Percentage (%)
1	Main aim of the Rainbow Nutrition Programme	To promote balanced and colourful eating habits	48	80.0
2	Rainbow Nutrition encourages eating	Same colours every day	30	50.0
3	Benefit of eating different coloured foods	Different nutrients and vitamins	40	66.7
4	Vitamin A foods	Orange and yellow foods	30	50.0
5	Benefit of red-coloured foods	Hair growth	40	66.7
6	Nutrients in green-coloured vegetables	Iron and calcium	30	50.0
7	Effect of purple/blue foods	Increase cholesterol	40	66.7
8	Meaning of eating a rainbow plate	Mixing many sweets	30	50.0
9	Importance of colourful fruits and vegetables	Provide different nutrients	40	66.7
10	Importance of colourful fruits and vegetables	Make meals attractive only	20	33.3
11	Benefits of papaya and orange	Teeth and bones only	35	58.3
12	Food group not part of Rainbow Nutrition	Milk and dairy	30	50.0
13	Beneficiaries of Rainbow Nutrition	School-going children	25	41.7
14	Meaning of “Eat a rainbow every day”	Eat colourful healthy food daily	30	50.0
15	Main health benefits of yellow foods like banana and corn	Reduce energy	29	48.3
16	Main purpose of the Rainbow Nutrition Programme	Avoid vegetables	30	50.0
17	Meaning of “Eat a rainbow every day” for healthy eating	Eat colourful healthy foods daily	30	50.0
18	What each colour of fruits and vegetables represents	Different nutrients and health benefits	20	33.3
19	Red foods	Heart health	20	33.3

20	Orange/yellow vitamins	Vitamin A	20	33.3
21	Nutrients provided by green vegetables like spinach and broccoli	Sugar and salt	30	50.0
22	Benefits provided by blue/purple foods	Increase sugar level	28	46.7
23	Benefits of white foods like onion and garlic	Fight infection	30	50.0
24	Colour group best for eye health	Red	30	50.0
25	Colour group that helps with heart protection	Red	30	50.0
26	Not a benefit of eating rainbow-coloured foods	Causes disease	40	66.7
27	Why many colours are included in the diet	Each colour gives nutrients	40	66.7
28	Primary aim of the Rainbow Nutrition Programme	Balanced and colourful diet	30	50.0
29	Yellow foods contain	Energy and carbohydrates	60	100.0
30	Main source of Vitamin C	Citrus fruits	25	41.7
31	Green leafy vegetables are helpful for	Causing stomach pain	30	50.0
32	Benefits of purple foods	Reduce cancer risk	59	98.3
33	Meaning of eating a rainbow plate	Natural different colours	50	83.3
34	Effect of eating only one type of coloured food every day	Lack of some nutrients	30	50.0
35	Programme helps children	Eat junk food	40	66.7

RESULT

The majority of the school-going children 48 (80.0%) reported that the main aim of the Rainbow Nutrition Programme is to promote balanced and colourful eating habits, indicating good awareness regarding the objective of the programme.

The majority of the school-going children 30 (50.0%) reported that Rainbow Nutrition encourages eating the same colours every day, indicating limited knowledge regarding the concept of rainbow nutrition.

The majority of the school-going children 40 (66.7%) reported that eating different coloured foods provides different nutrients and vitamins, indicating adequate knowledge regarding the nutritional benefits of colourful foods.

The majority of the school-going children 30 (50.0%) identified orange and yellow foods as sources of Vitamin A, indicating moderate knowledge regarding Vitamin Arich foods.

The majority of the school-going children 40 (66.7%) selected hair growth as the benefit of red-coloured foods, indicating varying levels of knowledge regarding the health benefits of red foods.

The majority of the school-going children 30 (50.0%) reported that green coloured vegetables contain iron and calcium, indicating moderate knowledge regarding nutrients present in green vegetables.

The majority of the school-going children 40 (66.7%) reported that purple/blue foods increase cholesterol, indicating inadequate knowledge regarding the benefits of purple and blue foods.

The majority of the school-going children 30 (50.0%) reported that eating a rainbow plate means mixing many sweets, indicating poor understanding of the concept of a rainbow plate.

The majority of the school-going children 40 (66.7%) reported that colourful fruits and vegetables provide different nutrients, indicating adequate knowledge regarding their nutritional importance.

The majority of the school-going children 20 (33.3%) reported that colourful fruits and vegetables make meals attractive only, indicating inadequate knowledge regarding their actual nutritional benefits.

The majority of the school-going children 35 (58.3%) reported that papaya and orange are beneficial for teeth and bones only, indicating partial knowledge regarding their health benefits.

The majority of the school-going children 30 (50.0%) reported that milk and dairy are not part of the Rainbow Nutrition Programme, indicating moderate understanding of the food groups included in the programme.

The majority of the school-going children 25 (41.7%) identified school-going children as the beneficiaries of

the Rainbow Nutrition Programme, indicating limited knowledge regarding the target beneficiaries.

The majority of the school-going children 30 (50.0%) reported that eating a rainbow every day means eating colourful healthy foods daily, indicating moderate knowledge regarding healthy eating practices.

The majority of the school-going children 29 (48.3%) reported that yellow foods reduce energy, indicating inadequate knowledge regarding the benefits of yellow foods. The majority of the school-going children 30 (50.0%) reported that the main purpose of the Rainbow Nutrition Programme is to avoid vegetables, indicating poor understanding of the programme objectives.

The majority of the school-going children 30 (50.0%) reported that eating a rainbow every day suggests eating colourful healthy foods daily, indicating moderate awareness regarding healthy dietary practices.

The majority of the school-going children 20 (33.3%) reported that each colour of fruits and vegetables represents different nutrients and health benefits, indicating inadequate knowledge regarding colour-specific nutrition.

The majority of the school-going children 20 (33.3%) reported that red foods are beneficial for heart health, indicating limited knowledge regarding the benefits of recoloured foods.

The majority of the school-going children 20 (33.3%) identified Vitamin A as the vitamin present in orange and yellow foods, indicating inadequate knowledge regarding vitamin-rich foods.

The majority of the school-going children 30 (50.0%) reported that green vegetables provide sugar and salt, indicating poor knowledge regarding the nutritional value of green vegetables.

The majority of the school-going children 28 (46.7%) reported that blue and purple foods increase sugar levels, indicating inadequate knowledge regarding their health benefits.

The majority of the school-going children 30 (50.0%) reported that white foods such as onion and garlic help fight infection, indicating moderate knowledge regarding the health benefits of white foods.

The majority of the school-going children 30 (50.0%) reported that red foods are best for eye health, indicating inadequate knowledge regarding foods beneficial for eye health.

The majority of the school-going children 30 (50.0%) reported that red foods help in heart protection, indicating moderate knowledge regarding heart-protective foods.

The majority of the school-going children 40 (66.7%) reported that causing disease is not a benefit of eating rainbow-coloured foods, indicating adequate awareness regarding the advantages of consuming colourful foods.

The majority of the school-going children 40 (66.7%) reported that each colour provides different nutrients, indicating good knowledge regarding the importance of dietary diversity.

The majority of the school-going children 30 (50.0%) reported that the primary aim of the Rainbow Nutrition Programme is to promote a balanced and colourful diet, indicating moderate knowledge regarding the programme.

All the school-going children 60 (100%) reported that yellow foods contain energy and carbohydrates, indicating excellent knowledge regarding the nutritional value of yellow foods.

The majority of the school-going children 25 (41.7%) identified citrus fruits as the main source of Vitamin C, indicating limited knowledge regarding Vitamin C-rich foods. The majority of the school-going children 30 (50.0%) reported that green leafy vegetables cause stomach pain, indicating inadequate knowledge regarding the benefits of green leafy vegetables.

The majority of the school-going children 59 (98.3%) reported that purple foods reduce the risk of cancer, indicating excellent knowledge regarding the health benefits of purple foods.

The majority of the school-going children 50 (83.3%) reported that eating a rainbow plate means consuming naturally different coloured foods, indicating good understanding of the concept of a rainbow plate.

The majority of the school-going children 30 (50.0%) reported that eating only one type of coloured food every day may lead to a lack of some nutrients, indicating moderate awareness regarding the importance of dietary diversity. The majority of the school going children 40 (66.7%) reported that the Rainbow Nutrition Programme helps children eat junk food, indicating inadequate knowledge regarding the actual purpose

Calculate by chi-square of x2, df, p-value, level of significance of Selected Sociodemographic Variables among School-going Children and parents. (N = 60)

Sociodemographic Variables	Inadequate F (%)	Moderate F (%)	Adequate F (%)	χ^2 / df / p-value
Age (years)				1.876 / 4 / 0.759 NS
12–13	3 (5.0)	4 (6.7)	12 (20.0)	
13–14	3 (5.0)	10 (16.7)	10 (16.7)	
14–15	2 (3.3)	6 (10.0)	10 (16.7)	
Sex				0.327 / 2 / 0.849 NS
Male	2 (3.3)	5 (23.8)	15 (25.0)	
Female	2 (3.3)	16 (76.2)	20 (33.3)	
Dietary Pattern				0.042 / 2 / 0.979 NS
Mixed	5 (8.3)	8 (13.3)	14 (23.3)	
Vegetarian	6 (10.0)	10 (16.7)	17 (28.3)	
Grade				1.215 / 4 / 0.876 NS
6th	3 (5.0)	11 (18.3)	12 (20.0)	
7th	2 (3.3)	3 (5.0)	8 (13.3)	
8th	1 (1.67)	8 (13.3)	12 (20.0)	
Monthly Family Income (₹)				3.964 / 8 / 0.861 NS
₹59,417–₹1,18,863	4 (6.7)	4 (6.7)	6 (10.0)	
₹44,570–₹59,416	3 (5.0)	3 (5.0)	4 (6.7)	
₹29,723–₹44,569	2 (3.3)	4 (6.7)	2 (3.3)	
₹17,816–₹29,722	2 (3.3)	6 (10.0)	6 (10.0)	
₹5,942–₹17,815	4 (6.7)	3 (5.0)	7 (11.7)	
Occupation of Parents				12.584 / 10 / 0.247 NS
Professional	0 (0.0)	1 (1.7)	10 (16.7)	
Semi-professional	2 (3.3)	6 (10.0)	5 (23.8)	
Clerical/Shop owner	2 (3.3)	7 (11.7)	4 (6.7)	
Skilled	1 (1.7)	4 (6.7)	6 (10.0)	
Semi-skilled	0 (0.0)	5 (8.3)	6 (10.0)	
Unemployed	0 (0.0)	0 (0.0)	1 (1.67)	
Religion				8.746 / 4 / 0.068 NS
Hindu	6 (10.0)	10 (16.7)	12 (2.0)	
Muslim	5 (8.3)	3 (5.0)	8 (13.3)	
Christian	0 (0.0)	5 (8.3)	11 (18.3)	
Type of Family				0.584 / 4 / 0.965 NS
Nuclear	3 (15.8)	5 (23.8)	18 (30.0)	
Joint	3 (15.8)	9 (15.0)	18 (30.0)	
Extended	0 (0.0)	2 (3.3)	2 (3.3)	

X. MAJOR FINDING

The association between the post-test level of knowledge regarding the Rainbow Nutrition Programme and selected socio-demographic variables among school-going children using the Chi-square test. The findings revealed that age was not significantly associated with the post-test knowledge level ($\chi^2 = 1.876$, df = 4, p = 0.759), indicating that knowledge improvement was similar among different age groups.

Regarding sex, no significant association was found between gender and post-test knowledge level ($\chi^2 = 0.327$, df = 2, p = 0.849), suggesting that both male and female students gained similar knowledge after the planned teaching programme.

With respect to dietary pattern, the association between dietary habits and post-test knowledge was not statistically significant ($\chi^2 = 0.042$, df = 2, p = 0.979). This indicates that knowledge regarding the Rainbow Nutrition Programme was not influenced by whether students followed a vegetarian or mixed diet.

Regarding grade/class level, no significant association was observed between the educational grade of students and their post-test knowledge scores ($\chi^2 = 1.215$, df = 4, p = 0.876). This indicates that students from 6th, 7th, and 8th standards had comparable improvement in knowledge.

The association between monthly family income and post-test knowledge level was also found to be statistically non-significant ($\chi^2 = 3.964$, df = 8, p = 0.861), showing that family economic status did not have an influence on the knowledge gained after the programme.

Regarding occupation of parents, no significant association was found with post-test knowledge level ($\chi^2 = 12.584$, df = 10, p = 0.247). This indicates that

parental occupation did not affect the effectiveness of the planned teaching programme.

The association between religion and post-test knowledge level was not statistically significant (χ^2 = 8.746, df = 4, p = 0.068). This indicates that knowledge improvement was similar among students belonging to different religious groups.

Regarding type of family, no significant association was observed between family type and post-test knowledge level (χ^2 = 0.584, df = 4, p = 0.965), indicating that students from nuclear, joint, and extended families showed similar levels of knowledge improvement.

Overall, the findings indicate that none of the selected socio-demographic variables had a significant association with the post-test knowledge level regarding the Rainbow Nutrition Programme (p > 0.05). Therefore, the research hypothesis (RH2), which stated that there would be a significant association between post-test knowledge scores and selected sociodemographic variables, was not supported. The planned teaching programme was effective in improving knowledge among school-going children irrespective of their socio-demographic characteristics.

XI. SUMMARIES OF FINDINGS

The findings of the study were summarized according to the objectives. The sociodemographic characteristics of the participants revealed that the study sample consisted of school-going children belonging to different demographic backgrounds. The distribution of participants according to and previous nutrition information provided a clear understanding of the study population.

The pre-test assessment revealed that the majority of school-going children had inadequate knowledge regarding the Rainbow Nutrition Programme before receiving the Planned Teaching Programme. The participants had limited awareness regarding the importance of consuming fruits and vegetables of different colours, nutritional benefits of colourful foods, balanced diet, role of nutrients in growth and development, and prevention of nutritional deficiencies.

After administration of the Planned Teaching Programme, the post-test findings showed a considerable improvement in knowledge among the participants. The majority of students demonstrated improved knowledge regarding rainbow nutrition concepts. This indicates that the educational intervention successfully increased awareness and understanding among school-going children.

The comparison between pre-test and post-test knowledge scores showed a statistically significant improvement after administration of the Planned Teaching Programme. The paired t-test analysis confirmed that the improvement in knowledge was due to the intervention provided by the investigator.

The association between post-test knowledge scores and selected demographic variables showed that some variables had significant association with knowledge, whereas others did not show significant association. These findings indicate that certain demographic characteristics may influence nutritional knowledge among school-going children.

XII. DISCUSSION OF FINDINGS

The findings of the present study demonstrated that school-going children had limited knowledge regarding the Rainbow Nutrition Programme before the intervention. This finding indicates the need for structured nutrition education programmes in schools. Children often consume food according to taste and availability rather than nutritional value, highlighting the importance of creating awareness regarding healthy food choices.

The improvement observed in post-test knowledge after administration of the Planned Teaching Programme indicates that structured health education is an effective method for increasing nutrition-related awareness among children. The use of simple language, visual aids, charts, posters, and interactive discussion helped students understand the concept of rainbow nutrition more effectively.

The significant difference between pre-test and post-test knowledge scores proves that the Planned Teaching Programme was effective in achieving the objective of improving knowledge. The findings support the importance of implementing school-based nutrition education programmes to encourage healthy dietary practices among children.

The association between demographic variables and post-test knowledge suggests that factors such as parental education, previous exposure to nutrition information, and socio-economic background may

influence children's understanding of nutrition. However, the overall improvement among participants demonstrates that planned teaching can benefit children from different backgrounds.

XIII. STRENGTHS OF THE STUDY

The present study had several strengths. The study addressed an important area of child health related to nutrition awareness. A systematic research design was used to evaluate the effectiveness of the educational intervention. The structured knowledge questionnaire was reliable and appropriate for assessing the knowledge level of school going children.

The Planned Teaching Programme was developed according to the educational needs of the participants and included appropriate teaching methods and audiovisual aids. The pre-test and post-test design allowed direct comparison of knowledge before and after intervention. Ethical principles were maintained throughout the study process.

XIV. LIMITATIONS OF THE STUDY

The study had certain limitations. The sample size was limited to 60 school-going children from one selected school, which may restrict generalization of the findings to a larger population. The study used a pre-experimental design without a control group, which limits comparison with other groups.

The study assessed only knowledge regarding the Rainbow Nutrition Programme and did not evaluate actual changes in dietary practices or long-term behavioural modifications. The duration of the study was limited, and convenient sampling technique was used for participant selection.

XV. NURSING IMPLICATIONS

The findings of the study have important implications for nursing practice, nursing education, nursing administration, and nursing research.

In nursing practice, nurses can play an important role in promoting nutrition education among school-going children. School health nurses and community health nurses can organize regular health education sessions, nutrition awareness campaigns, and counselling programmes to improve children's understanding of healthy eating habits.

In nursing education, nursing students should be encouraged to conduct health education programmes related to nutrition during community health postings. Nutrition education and school health nursing should be emphasized as important components of nursing curriculum.

In nursing administration, nursing administrators can support and organize school-based health promotion activities. Collaboration between healthcare institutions and educational institutions should be strengthened to improve child health services.

In nursing research, further studies can be conducted using larger samples, different educational settings, and experimental designs to evaluate the effectiveness of various nutrition education strategies.

XVI. RECOMMENDATIONS

Based on the findings of the present study, the following recommendations are suggested. Similar studies can be conducted among larger groups of school-going children in different geographical areas. Experimental studies with control groups can be carried out to establish stronger evidence regarding effectiveness.

Regular nutrition education programmes should be incorporated into school health activities. Parents and teachers should be involved in nutrition awareness programmes because they play an important role in shaping children's food habits. Further studies can evaluate the effect of nutrition education on dietary practices, nutritional status, and lifestyle behaviours of children.

XVII. CONCLUSION

The present study concluded that school-going children had inadequate knowledge regarding the Rainbow Nutrition Programme before the intervention. The Planned Teaching Programme was found to be effective in significantly improving knowledge among participants.

The findings emphasize the importance of structured nutrition education programmes in schools to promote healthy eating habits among children. Nurses, teachers, parents, and healthcare professionals should work together to improve nutrition awareness and prevent nutritional deficiencies among school-going children.

The study highlights that planned health education is an effective approach for improving knowledge and encouraging children to adopt healthier dietary practices, thereby contributing to better growth, development, and overall well-being.

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