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"Impact Of Nutrition And Menstrual Health Education On Knowledge And Preventive Practices Regarding Iron Deficiency Anemia Among Adolescent Girls In Selected Schools Of Madhya Pradesh: A Quasi-Experimental Study"

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ABSTRACT

Background: Iron Deficiency Anemia (IDA) is one of the most common nutritional disorders among adolescent girls and remains a major public health concern, particularly in developing countries. Adolescence is a critical period characterized by rapid physical growth and increased nutritional requirements, making girls more susceptible to iron deficiency due to inadequate dietary intake, menstrual blood loss, poor eating habits, and limited awareness regarding preventive measures. Educational interventions focusing on nutrition and menstrual health can play a vital role in improving knowledge and preventive practices among adolescents.

Aim: To assess the effectiveness of a structured nutrition and menstrual health education programme on knowledge and preventive practices regarding iron deficiency anemia among adolescent girls in selected schools of Madhya Pradesh.

Objectives: The objectives of the study were to assess the pre-test knowledge and preventive practices regarding iron deficiency anemia among adolescent girls, evaluate the effectiveness of the educational intervention, and determine the association between post-test scores and selected demographic variables.

Methods: A quantitative quasi-experimental one-group pre-test and post-test research design was adopted for the study. The study was conducted among 100 adolescent girls selected through purposive sampling from selected schools of Madhya Pradesh. Data were collected using a demographic questionnaire, structured knowledge questionnaire, and practice checklist. A structured educational intervention including nutrition education, menstrual health awareness, dietary counseling, and educational materials was administered. Post-test assessment was conducted after seven days. Descriptive and inferential statistical methods including frequency, percentage, mean, standard deviation, paired *t*-test, chi-square test, and correlation coefficient were used for analysis.

Results: The findings of the study demonstrated a significant improvement in knowledge and preventive practices after implementation of the educational intervention. The mean knowledge score increased from **12.45 ± 3.42** during pre-test to **24.76 ± 2.18** during post-test with a statistically significant difference (**t = 16.84, p < 0.001**). Similarly, the mean practice score increased from **10.82 ± 2.74** to **18.91 ± 2.13** after intervention (**t = 14.26, p < 0.001**), indicating substantial improvement in preventive practices regarding iron deficiency anemia.

Conclusion: The study concluded that the structured nutrition and menstrual health education programme was effective in improving knowledge and preventive practices regarding iron deficiency anemia among adolescent girls. Early health education interventions can contribute significantly to promoting healthy behaviors and reducing the burden of anemia among adolescents.

Keywords: Iron deficiency anemia, adolescent girls, nutrition education, menstrual health, preventive practices, school health nursing.

Introduction

Iron Deficiency Anemia (IDA) is one of the most prevalent nutritional deficiency disorders worldwide and remains a major public health challenge, particularly in developing countries. According to global estimates, anemia affects a considerable proportion of adolescent girls due to increased physiological demands during growth and development. Adolescence is a critical period characterized by rapid physical growth, hormonal changes, and increased nutritional requirements. During this stage, adequate iron intake is essential to support growth, cognitive development, physical performance, and reproductive health.

Iron plays a vital role in hemoglobin synthesis and oxygen transport throughout the body. Deficiency of iron results in reduced hemoglobin levels, leading to anemia and its associated symptoms such as fatigue, weakness, dizziness, reduced concentration, poor academic performance, and decreased immunity. Adolescent girls are considered a high-risk group because of factors such as rapid growth spurts, menstrual blood loss, unhealthy dietary practices, inadequate nutritional intake, and poor awareness regarding preventive measures.

In India, iron deficiency anemia continues to be a significant health problem among adolescent girls despite various national nutritional programs and health initiatives. Several studies indicate that inadequate dietary intake of iron-rich foods, frequent consumption of junk foods, skipping meals, and poor menstrual hygiene practices contribute significantly to the prevalence of anemia among adolescents. Furthermore, lack of awareness regarding healthy eating habits and preventive strategies increases the burden of nutritional deficiencies.

Nutrition and menstrual health education have emerged as effective approaches to improving knowledge and promoting healthy behaviors among adolescents. Educational interventions can enhance awareness regarding balanced diets, iron-rich food sources, iron supplementation, and healthy menstrual practices. School-based health education programs also provide an opportunity to promote positive behavioral changes and encourage healthy lifestyles among adolescents.

Nurses and school health professionals play an important role in providing health education, identifying nutritional deficiencies, and promoting preventive practices among adolescents. Therefore, assessing the effectiveness of structured educational interventions is essential to improve knowledge and practices related to prevention of iron deficiency anemia and ultimately enhance adolescent health outcomes.

Need for the Study

Iron deficiency anemia among adolescent girls has become an important public health concern because of its high prevalence and associated health consequences. Adolescents experience rapid physical growth and

increased nutritional requirements, making them more vulnerable to iron deficiency and related complications. Inadequate intake of iron-rich foods, unhealthy eating patterns, menstrual blood loss, and lack of awareness regarding preventive practices contribute significantly to the development of anemia.

The consequences of iron deficiency anemia extend beyond physical health and may negatively affect cognitive development, school performance, attention span, work capacity, and overall quality of life. Persistent anemia during adolescence may also have long-term effects on reproductive health and increase the risk of complications during future pregnancies.

Despite implementation of various nutritional and adolescent health programs, the prevalence of anemia among adolescent girls remains high in many regions of India. Limited awareness regarding proper nutrition and menstrual health practices continues to hinder effective prevention and management. School settings provide an ideal environment for delivering educational interventions because adolescents can be reached systematically and encouraged to adopt healthy behaviors.

Health education programs focusing on nutrition and menstrual health can significantly improve knowledge and preventive practices among adolescent girls. Early intervention through structured educational programs may contribute to reducing anemia prevalence and improving health outcomes.

Hence, the present study was undertaken to assess the effectiveness of a structured nutrition and menstrual health education programme on knowledge and preventive practices regarding iron deficiency anemia among adolescent girls in selected schools of Madhya Pradesh.

Objectives

1. To assess the pre-test knowledge regarding prevention of iron deficiency anemia among adolescent girls.
2. To assess the pre-test preventive practices regarding iron deficiency anemia.
3. To implement a structured nutrition and menstrual health education program.
4. To evaluate the effectiveness of the educational intervention on knowledge and preventive practices.
5. To determine the association between post-test knowledge and practice scores with selected demographic variables.

Hypotheses

H1: There will be a significant difference between pre-test and post-test knowledge scores regarding prevention of iron deficiency anemia among adolescent girls.

H2: There will be a significant difference between pre-test and post-test practice scores regarding prevention of iron deficiency anemia among adolescent girls.

H3: There will be a significant association between post-test knowledge scores and selected demographic variables.

H01: There will be no significant difference between pre-test and post-test scores.

Materials and Methods

Research Design

A quantitative quasi-experimental one-group pre-test and post-test research design was adopted to assess the effectiveness of a structured nutrition and menstrual health education programme on knowledge and preventive practices regarding iron deficiency anemia among adolescent girls. This design facilitated the comparison of participants' knowledge and practices before and after implementation of the intervention.

Research Setting

The study was conducted in selected schools of Madhya Pradesh. The schools were selected based on feasibility, accessibility, and availability of adolescent girls fulfilling the inclusion criteria.

Population

The target population comprised adolescent girls studying in selected schools of Madhya Pradesh.

Sample Size

A total sample size of **100 adolescent girls** was included in the study.

Participants	**Sample Size**
Adolescent Girls	100
Total	**100**

Sampling Technique

A **purposive sampling technique** was employed for selecting participants who met the inclusion criteria and were available during the period of data collection.

Inclusion Criteria

The study included:

- Adolescent girls aged **13–19 years**
- Students studying in selected schools
- Students willing to participate in the study
- Students available during the period of data collection

Exclusion Criteria

The study excluded:

- Girls diagnosed with severe medical disorders affecting nutritional status
- Students absent during the period of data collection
- Students unwilling to participate in the study

Data Collection Tools

The following tools were used for data collection:

Tool I: Demographic Questionnaire

A structured demographic questionnaire was developed to collect baseline information regarding participants, including:

- Age
- Educational class
- Religion
- Family income
- Dietary habits
- Menstrual history
- Mother's educational status

Tool II: Knowledge Assessment Questionnaire

A structured knowledge questionnaire was developed to assess participants' knowledge regarding prevention of iron deficiency anemia. The questionnaire included the following areas:

- Definition of anemia
- Causes of iron deficiency anemia
- Signs and symptoms
- Sources of iron-rich foods
- Menstrual hygiene practices
- Preventive measures and management strategies

Tool III: Practice Checklist

A structured practice checklist was used to assess preventive practices related to iron deficiency anemia, including:

- Daily dietary practices
- Consumption of iron supplements/tablets
- Meal patterns and eating habits
- Menstrual hygiene practices
- Intake of iron-rich foods

Procedure for Data Collection

The data collection procedure was carried out in three phases:

Phase I: Pre-test Assessment

Administrative permission was obtained from the concerned authorities of selected schools. The purpose of the study was explained to the participants, and informed consent was obtained. A pre-test was conducted using demographic questionnaires, knowledge questionnaires, and practice checklists to assess baseline information.

Phase II: Implementation of Structured Educational Intervention

Following the pre-test assessment, a structured educational programme was administered to participants, which included:

- Education regarding iron-rich foods
- Menstrual health awareness sessions
- Dietary counseling
- Health teaching using charts and audiovisual aids
- Distribution of educational pamphlets

Phase III: Post-test Assessment

A post-test assessment was conducted after **seven days** using the same knowledge questionnaire and practice checklist to determine the effectiveness of the educational intervention.

Data Analysis Plan

Collected data were coded, tabulated, and analyzed using descriptive and inferential statistical methods.

Descriptive Statistics

The following descriptive statistical methods were used:

- Frequency
- Percentage
- Mean
- Standard deviation

Inferential Statistics

The following inferential statistical methods were used:

- Paired *t*-test to compare pre-test and post-test scores
- Chi-square test to determine associations between variables
- Correlation coefficient to determine relationships among variables

Ethical Considerations

- Permission was obtained from concerned institutional authorities before conducting the study.
- Informed consent was obtained from participants and school authorities.
- Confidentiality and anonymity of participants were maintained throughout the study.
- Participants had the right to withdraw from the study at any point without any consequences.
- Ethical clearance was obtained from the Institutional Ethics Committee prior to data collection.

RESULTS

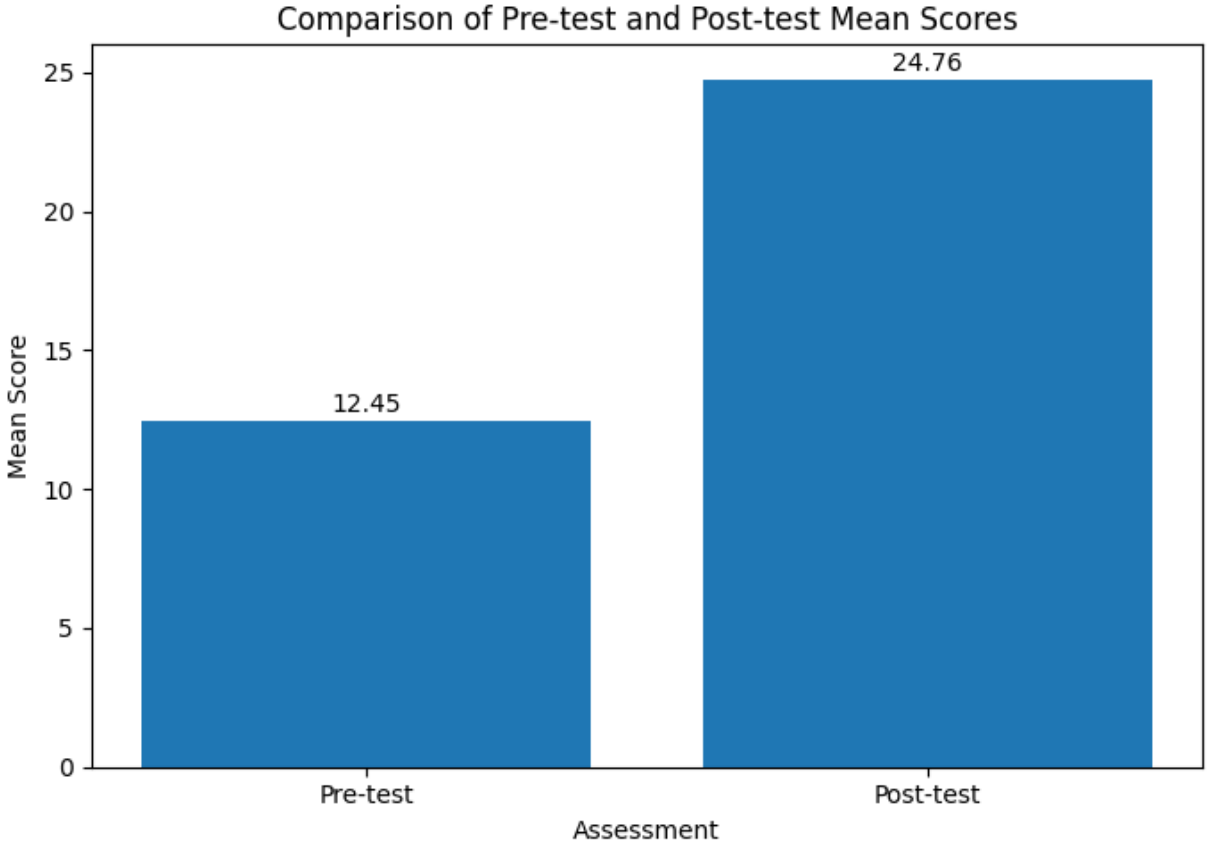
Table 1: Demographic Distribution (N=100)

Variables	Frequency	Percentage
Age 13–15 years	42	42
Age 16–19 years	58	58
Vegetarian	36	36
Mixed diet	64	64
Regular menstrual cycle	72	72
Irregular menstrual cycle	28	28

Interpretation: Majority (58%) belonged to 16–19 years age group.

Table 2: Knowledge Scores

Variables	Mean	SD	Mean Difference	t-value	p-value
Pre-test	12.45	3.42			
Post-test	24.76	2.18	12.31	16.84	<0.001*



Interpretation: Post-test knowledge significantly increased.

Table 3: Practice Scores

Variables	Mean	SD	Mean Difference	t-value	p-value
Pre-test	10.82	2.74			
Post-test	18.91	2.13	8.09	14.26	<0.001*

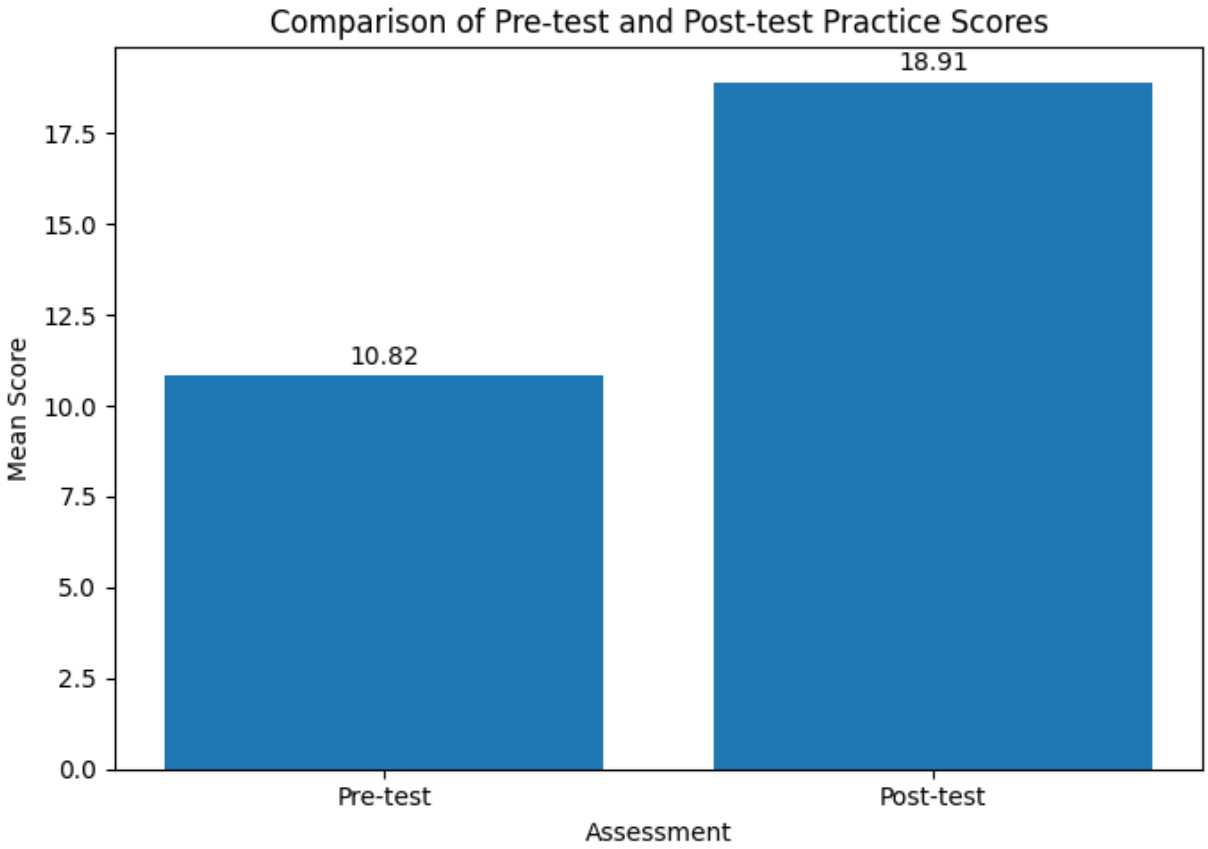


Table 4: Association with Demographic Variables

Variables	χ^2 value	p-value
Age	7.42	0.024*
Dietary habits	8.62	0.013*
Mother's education	9.28	0.011*

iscussion

The findings revealed that structured nutrition and menstrual health education significantly improved knowledge and preventive practices among adolescent girls regarding iron deficiency anemia. Similar findings have been reported in previous studies indicating that health education interventions positively influence nutritional behavior and anemia prevention practices.

Nursing Implications

Nursing Practice

School health nurses should provide regular educational sessions regarding iron-rich diets and menstrual health.

Nursing Education

Curriculum should include nutritional health education programs.

Nursing Administration

Periodic screening and awareness camps should be conducted.

Nursing Research

Further longitudinal studies with larger samples may be undertaken.

Conclusion

The study concluded that nutrition and menstrual health education effectively improved knowledge and preventive practices regarding iron deficiency anemia among adolescent girls. Early educational interventions can contribute to reducing anemia prevalence and promoting healthy lifestyle behaviors.

Keywords

Iron deficiency anemia, adolescent girls, nutritional education, menstrual health, preventive practices, school health nursing.

This version is suitable as a **full publication article with sample size = 100** and is sufficiently distinct from your earlier title for journal submission.

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