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Research Article

Bridging The Knowledge Gap: Effectiveness of Structured Teaching Program on Anaemia Prevalance and Prevention Among B.Sc. Nursing Students

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I N F O

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A B S T R A C T

Introduction: Anemia is a major public health problem in India, particularly among adolescents and nursing students. Inadequate knowledge about its prevalence and prevention can negatively affect both personal health and future nursing practice.

Method: A pre-experimental one-group pre-test and post-test design was conducted among B.Sc. Nursing students selected through purposive sampling at a selected nursing college in Kashmir. Data were collected using a structured knowledge questionnaire. A structured teaching programme was administered after the pre-test, followed by a post-test to assesseffectiveness.

Result: The findings showed an increase in knowledge scores, with the mean post-test score (23.12) higher than the mean pre-test score (21.81), indicating improvement. A significant association was also found between pre-test knowledge scores and selected demographic variables.

Discussion: The study concludes that structured teaching programmes are effective in improving knowledge regarding anemia among nursing students. Enhanced knowledge can promote better preventive practices and strengthen their role in health education.

Keywords: Anemia, Structured Teaching Programme, Knowledge, B.Sc. Nursing Students, Pre-Experimental Study

Introduction

The most prevalent hematological condition is anemia. The World Health Organization defines anemia as a condition in which the blood's hemoglobin (Hb) level is below normal because one or more essential elements are lacking.[1]When there is not enough hemoglobin to carry oxygen to the tissue, anemia occurs physiologically. It is a reflection of a disease condition or changed bodily functions rather than a disease itself.[2]

When erythrocyte hemoglobin (Hb), hematocrit, and the concentration of red blood cells per unit of volume are unusually low in comparison to the peripheral blood parameters of a reference population, the condition is referred to as anemia. Hematocrit and hemoglobin levels in healthy persons vary according to the individual's developmental stage, hormonal stimulation, environmental oxygen pressure, age, and gender.[3]

A lower-than-normal quantity of hemoglobin or red blood cells is known as anemia. Anemia is a major public health problem that is disregarded in both developed and developing countries. Anemia reduces the blood's ability to absorb oxygen. Patients with anemia may have palpitations, shortness of breath, weariness, and a pale complexion. Children who suffer from chronic anemia are more vulnerable to illnesses and academic difficulties.[4] Anemia is a serious nutritional issue that affects almost 30% of the world's population, or 1500 million people, according to WHO and UNICEF.[5] Iron deficiency is the main factor that causes anemia to develop. Heavy blood loss, parasite infections, acute and chronic infections, vitamin deficiencies, and hemoglobinopathies are additional causes of anemia. Anemia is a global nutrition issue that is more common in underdeveloped nations than in industrialized ones. With an estimated global prevalence of 43% and 5%, respectively, young children and pregnant women are particularly affected (WHO, 2001). The prevalence of anemia is 37.70% in school-age children, 35% in non-pregnant women, and 18% in adult males. Anemia is often three to four times more common in developing nations than in industrialized ones.[6]

Lack of iron Inadequate reserves at birth, hookworm infestations, eating rice with high phytate content, drinking coffee and tea with food that contains tannin, a powerful inhibitor of iron absorption, menstruation, malaria, and other infections are the main causes of anemia in India (WHO 1997). Iron deficiency is the primary cause of anemia in two million people, or more than 30% of the global population.[2]

The National Family Health Survey (NFHS)-IV (2015–16) reports that 53% of women between the ages of 15 and 49 had anemia. The National Family Health Survey (NFHS)-IV (2015–16) found that 54% of teenage girls between the ages of 15 and 19 have anemia. A number of initiatives have been started throughout the nation to address this issue, with the goal of reaching a hemoglobin level of 12% by adolescence by 2018. The key initiatives include adequate immunization, periodic deworming, and health and nutrition education.[4]

India's national consultation on the management of nutritional anemia (1998). Hemoglobin levels between 7 and 9.9 g/dl were considered mild anemia, whereas hemoglobin levels below 7 g/dl were considered severe anemia in females. Information from the National Nutrition Monitoring Bureau (NNMB 2002).[1]

Adolescents' and young adults' cognitive development and performance may suffer as a result of anemia. Anemia is thought to be the most prevalent nutritional issue during adolescence (ages 10 to 24).[7]

Children and adolescents with anemia experience intellectual impairment, poor academic performance, and stunted growth, all of which can have long-term effects on economic output and educational attainment.[8]

Iron deficiency anemia caused about 18,628 fatalities in low socio-demographic index regions (including India) in 2021, with a mortality rate of 1.77 per 100,000 people, according to the Global Burden of Disease 2021 estimates. Because poverty, illiteracy, and ignorance increase the likelihood of anemia and its consequences, the burden was greatest in lower-income areas.[9]

Anemia affects 33% to 89% of pregnant women and over 60% of teenage girls in India.[10]

With a mortality rate of 1.77 per 100,000 people, iron deficiency anemia is estimated to have caused 18,628 deaths in low socio-demographic index regions, including India, according to the Global Burden of Disease 2021 estimates.[11]

Menstrual blood loss and inadequate food intake are major risk factors for anemia, which is particularly common among female college students in India. Anemia prevalence was found to be roughly 55.8% in those aged 15–19 and 56.1% in those aged 20–29, according to a comprehensive analysis that was carried out between January 2000 and December 2021. Medical and nursing students had particularly high rates, with some as high as 94.4% among nursing students in Punjab. This concerning burden among aspiring medical professionals highlights the urgent need for education and awareness campaigns in academic settings.[12]

Aim

The purpose of this study was to determine the baseline knowledge of B.Sc. Nursing students about the prevalence and prevention of anemia as well as the efficacy of a structured training program in raising their knowledge levels at a selected nursing college of Kashmir, thereby determining the impact of planned educational intervention on students' awareness and understanding of anemia.

Research Methodology

Research Approach and Design

The study used a quantitative research approach. The efficacy of a structured training program on knowledge regarding the prevalence and prevention of anemia

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among B.Sc. Nursing students was evaluated using a pre-experimental one-group pretest–post-test research design.

Setting of the Study

The study was carried out at a selected Nursing College of Kashmir.

Population and Sample

The target population comprised all B.Sc. Nursing 4th and 7th semester students of the selected Nursing College. The sample comprised of 60 B.Sc. Nursing students who met the inclusion criteria.

Sampling Technique

The method of non-probability purposive sampling was applied to select the participants for the study.

Inclusion and Exclusion Criteria

Inclusion criteria

- B.Sc. nursing students who were present when the data was being collected.
- Students who provided informed consent and were open to participating.

Exclusion criteria:

- Students who had previously attended similar educational programmes on anaemia.

Tool for Data Collection

A structured knowledge questionnaire created by the researcher was used to gather data.

The tool consisted of two sections:

- **Section A**: Demographic variables (such as Age, Occupational status of Parents, Type of Family, Monthly Income of family, Type of Residence, Number of Siblings.
- **Section B**: Structured knowledge questionnaire related to prevalence and prevention of anaemia.

The tool was validated by experts in nursing and community health, and reliability was established using appropriate statistical methods.

Description of the Intervention

With the help of experts and a review of the literature, the structured teaching program was created. It included topics related to definition, prevalence, causes, signs and symptoms, risk factors, prevention strategies, dietary measures, and the role of nurses in prevention of anaemia. The teaching programme was delivered using lecture and audiovisual aids and lasted for approximately 30 minutes.

Data Collection Procedure

A pretest employing the structured knowledge questionnaire was carried out following formal authorization from the relevant authorities and informed consent from the subjects. The students were given the organized instruction program after the pretest. The same questionnaire was used in a post-test five days later to gauge the amount of knowledge gained.

Scoring pattern/ criteria measure for knowledge assessment.

Section II consists of 30 items. Correct answer of each item was awarded a score of one (1) and incorrect answer was awarded zero (0). The maximum knowledge score was 30 and minimum score was zero. Knowledge scores were arbitrarily scored as adequate (24-30), moderate (16-23) and inadequate (0-15) in Table 1.

Table 1.Shows Scoring Pattern for Knowledge Assessment

Knowledge score	Score percentage (% age)	Knowledge level
0-15	<50	Inadequate
16-23	50-80	Moderate
24-30	>80	Adequate

Ethical Considerations

The Institutional Ethics Committee granted ethical approval. Every participant provided written informed permission. Participants identity and confidentiality were protected throughout the study, and their involvement was entirely voluntary.

Findings

Section A

Demographic characteristics of the participants showed that

- All participants (100%) fall into a single age category (20-24 years) with a frequency of 60.
- Most of the participants (45%) had parents with govt. jobs (27 individuals); 40% (24 individuals) were others, 10% (6 individuals) were labor, and 5% (3 individuals) had private jobs.
- A majority (80%) reside in rural areas (48 individuals), while 20% live in urban areas (12 individuals).
- 78.33% live in a nuclear family (47 individuals), 20% in a joint family (12 individuals), and and1.67% in an extended family (1 individual).
- >30000 per month (highest) includes 31.67% (19 individuals), followed by 21000 to 30000 per month, which includes 28.33% (17 individuals); individuals),10000 to 20000 per month includes 23.33% (14 individuals); and 10000 per month includes 16.67% (10 individuals).

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- All participants (100%) belong to residence type 1 (60 individuals).
- 30% have 3 siblings (18 individuals), 28.33% have 2 siblings (17 individuals), 25% have 4 siblings (15 individuals), and 16.67% have 1 sibling (10 individuals).

Table 2.Shows the frequency and percentage distribution of the sample according to their various demographic profile

n=60

Variable	Category	Frequency	Percentage (%)
Age	20–24 years	60.0	100.0
Parents Occupation	Govt. Job	27.0	45.0
	Private Job	3.0	5.0
	Labour	6.0	10.0
	Others	24.0	40.0
Residence	Rural area	48.0	80.0
	Urban	12.0	20.0
Type of Family	Nuclear family	47.0	78.33
	Joint family	12.0	20.0
	Extended family	1.0	1.67
Monthly Income	Rs. 10000 per month	10.0	16.67
	Rs. 11000–20000 per month	14.0	23.33
	Rs. 21000–30000 per month	17.0	28.33
	Rs. >30000 per month	19.0	31.67
Type of Residence	Own	60.0	100.0
Number of Siblings	1	10.0	16.67
	2	17.0	28.33
	3	18.0	30.0
	Above	15.0	25.0

Section-B

This section describes the assessment of pre-test and post-test scores of BSc nursing 4th and 7th semester students regarding anemia in selected nursing college of Anantnag.

Table No. 3 presents a summary of the pre-test knowledge scores of participants.

- The mean score was 21.81, indicating the average performance of the group. The standard deviation was 2.29, suggesting a moderate spread of scores around the mean.
- The minimum score observed was 17.0, while the maximum score reached 27.0, showing a score range of 10 points. The interquartile range—from the 1st quartile (20.0) to the 3rd quartile (24.0)—shows that the middle 50% of scores were concentrated within this interval.
- The median score was 21.0, which is slightly lower than the mean, indicating a slight right skewness in the distribution of scores.

Table 3.Shows Descriptive Statistics of Pre-test Knowledge Scores of B.Sc. Nursing Students on Anaemia (Mean, Standard Deviation, Minimum, Median, and Maximum)

n=60

Statistic	Mean	Standard deviation	Minimum (lowest score obtained by students)	Median	Maximum (Highest score obtained by students)
Pre-test	21.81	2.29	17.0	21.0	27.0

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Table No. 4 presents a summary of the post-test knowledge scores of participants.

- The post-test scores exhibit a mean of 23.12, indicating the average performance of the participants. The standard deviation is 2.59, suggesting a moderate spread of scores around the mean. The minimum score recorded was 18.0, while the maximum was 28.0, showing the range of scores achieved.
- Regarding the distribution, the 1st quartile (Q1) is 21.0, the median (Q2) is 23.0, and the 3rd quartile (Q3) is 25.0. This suggests that 50% of the participants scored between 21.0 and 25.0, with half of them scoring above 23.0.

Table 4.Shows Descriptive Statistics of Post-test Knowledge Scores of B.Sc. Nursing Students on Anaemia (Mean, Standard Deviation, Minimum, Median, and Maximum)

n=60

Statistic	Mean	Standard deviation	Minimum (lowest score obtained by students)	Median	Maximum (Highest score obtained by students)
Post-test	23.12	2.59	18.0	23.0	28.0

Section -C

Comparison table between pre-test and post-test knowledge scores

Table No. 5.0 and bar-graph present the comparison between the pre-test and post-test scores to assess the effectiveness of the intervention. The mean score increased from 21.81 (pre-test) to 23.12 (post-test), indicating an average mean difference of 1.31. The standard deviation of the difference was 2.16.

A paired t-test was conducted, yielding a t-value of 4.64 with 58 degrees of freedom. The corresponding p-value was 0.00002, which is significantly lower than the conventional threshold of 0.05. This suggests that the observed improvement in scores is statistically significant and not due to chance.

The participants performance significantly improved as a result of the intervention, as seen by the rise in post-test scores over pre-test scores.

Table 5.Shows the comparison between pre-test and post-test knowledge scores

n=60

Comparison	Mean(pre-test)	Mean(post-test)	Mean Difference	Standard Deviation of Difference	t-value	p-value	significance
Pre-test vs post-test	21.81	23.12	1.31	2.16	4.64	0.00002	Significant

Significant (p≤0.05)

Section-D

Table no. 6 showed the association between pre-test knowledge score and demographic variables like age, occupation status of parents, residence, type of family, total monthly family income, type of residence, and number of siblings.

- Age had a correlation coefficient of 0.047, which is statistically significant. This suggests that age has a slight but meaningful relationship with pre-test scores.
- Parents' occupation showed a correlation coefficient of 0.112, which is not significant. This indicates that the occupation of the parents did not significantly influence the pre-test performance.
- Residence had a correlation of 0.072, which is non-significant. This means that whether the participant lived in an urban or rural area did not have a meaningful effect on pre-test scores.
- Type of family showed a correlation of 0.040, which is significant. This implies that the type of family (joint or nuclear) was significantly associated with the pre-test scores.
- Total Monthly Family Income had a correlation of 0.089, which was non-significant, indicating that income level did not show a meaningful relationship with pre-test performance.
- Type of Residence showed a correlation coefficient of 0.049, which is significant. This means the kind of living arrangement (own house or rented) had a significant association with pre-test scores.
- Number of Siblings had a correlation of 0.100, which is non-significant, suggesting that the number of siblings did not affect the pre-test score meaningfully.
- Total Pre-Test Score had a higher correlation of 0.323, but it was still non-significant, indicating that despite

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the higher value, it was not statistically proven to have a strong relationship (possibly due to sample variation).

- Total Post-Test Score had a correlation of 0.047, which is significant, showing a meaningful and expected association between pre- and post-test performance.
- **Significant Association**: Age, Type of family and Type of Residence have a st atistically significant Association with pre-test knowledge scores. Hence Research Hypothesis H1 was accepted.

Table 6.Shows Association between pre-test knowledge scores with selected demographic variables by T test and one Way Anova

n=60

Demographic Variable	Correlation Coefficient	Interpretation
Age	0.047	Significant *
Parents' Occupation	0.112	Non-significant
Residence	0.072	Non-significant
Type of Family	0.040	Significant *
Total Monthly family Income	0.090	Non-significant
Type of Residence	0.049	Significant *
Number of Siblings	0.100	Non-significant
Total Pre-Test Score	0.323	Non-significant
Total Post-Test Score	0.047	Significant *

Significant (p≤0.05)
NOT Significant(p≥0.05)

Discussion

The study's results showed a mean difference of 1.31 between the pre-test and post-test knowledge scores, which were 21.81 and 23.12, respectively. Following the implementation of the structured instruction program, the post-test scores significantly improved (t=4.64, p=0.00002), according to the statistical analysis utilizing the paired t-test. This illustrates unequivocally how well the educational intervention improved the students' comprehension of anemia.

The study is supported by the findings of earlier research. The purpose of Mrs. Jasmi Manu et al.'s study[13] was to evaluate teenage girls' understanding of iron deficiency anemia. A pre-experimental one-group pretest-posttest design was used in this study. Purposive sampling was used to pick the 40-person sample. Overall pretest knowledge scores averaged 13.6, whereas posttest knowledge scores averaged 19.9. This study clearly showed that following an organized educational program, teenage girls' understanding of iron deficiency anemia considerably improved.

Priyalatha M. conducted an additional inquiry that supports this study.[14] This study found that 89.5% had intermediate knowledge, 9.8% had low information, and 0.8% had strong knowledge of anemia during the pretest. However, there was an improvement in knowledge at the post-test, with 29.3% having average knowledge and 70.7% having strong knowledge. The paired t-test revealed a substantial improvement in knowledge about anemia, with a pre-test knowledge mean of 5.94 (S.D.-2.47) and a post-test mean of 9.66 (S.D.-10.65) (p=0.001).

Another study conducted by Dr. Priyanka Chaudhary, MS. Deepti, MS. Raman Preet Kaur, and Ms. P. Chitra[7] further supports the same findings. The majority of the teenage females (58%) had insufficient knowledge, 40% had moderate knowledge, and 2% had acceptable knowledge in the pre-test prior to the implementation of a structured education program, according to the study's findings. Following a structured education program, 15% of teenage girls reported having moderate knowledge, and 85% reported having adequate information about how to prevent anemia in teenage females.

Mrs. Monika Devi NR conducted a different study whose results are consistent with ours.[15] This survey found that 76% of teenage females knew very little about anemia, whereas 6% had insufficient information and 18% had good understanding. Statistics showed that about 70% of teenagers had sufficient knowledge after completing the training program, while about 30% still lacked it.

The results of another study, conducted by Rajesh Singh et al. [16], corroborate this one. They showed that the majority of the samples were Hindu (90%), the majority were unmarried (80%), and the majority belonged to mixed families (73.3%). The proposed teaching program was successful, as evidenced by the fact that most people had improved their knowledge and had average knowledge (60%) on the post-test. 73% of the participants had low knowledge on the pretest. On the pre-test, 73% of the

sample had poor knowledge. On the post-test, the majority of respondents (60%) had average knowledge.

Limitations

- The research was restricted to one selected Nursing College of Kashmir, limiting generalization of the findings.

Recommendations

- Similar studies can be conducted using a true experimental or quasi-experimental design with a control group for better comparison.
- A bigger sample size can be used to duplicate the study and in different nursing colleges to improve generalizability of the findings.
- Future studies may include assessment of attitude and practices along with knowledge to evaluate overall behavioral change regarding anaemia prevention.

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