IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Impact Of Multimodal Intervention Programme On Anaemia Among Adolescent Girls At Selected BCM Hostels Of Vijayapura

1Ms Kaveri H, 2Dr Jayashree Pujari

1Student , 2Associate Professor

1BLDEA,s Shri B.M.Patil Institute of Nursing Sciences Vijayapura ,

2BLDEA,s Shri B.M.Patil Institute of Nursing Sciences Vijayapura

Abstract

Anaemia is a significant public health concern among adolescent girls, primarily due to increased iron requirements during growth, menstrual blood loss, and inadequate dietary intake.

This study aimed to assess the impact of a multimodal intervention programme on haemoglobin levels and knowledge regarding anaemia among adolescent girls residing in selected BCM Hostels of Vijayapura, Karnataka. A quasi-experimental one-group pre-test post-test design was adopted. A total of 250 adolescent girls were screened, and 80 girls identified with anaemia participated in the intervention. Data were collected using a digital haemoglobinometer and a structured knowledge questionnaire. The multimodal intervention comprised nutritional education delivered through audio-visual aids and daily supplementation with jaggery balls and raisins for 8 weeks. Pre-test results indicated that 32% of participants were anaemic, with 62.5% having moderate anaemia. Post-intervention findings demonstrated a significant improvement in haemoglobin levels (from 9.37±1.12 to 10.87±1.13 g/dL) and knowledge scores (from 12.51±2.58 to 19.67±3.12) ($p<0.001$). Severe anaemia was completely eliminated, and the majority of participants shifted to mild anaemia. The study concludes that a structured multimodal intervention effectively enhances haemoglobin levels and knowledge regarding anaemia, emphasizing the importance of integrating nutritional supplementation and health education programs to prevent and manage anaemia among adolescent girls.

Introduction and need for study

Adolescence age is a critical period of growth, reproductive maturation, and developmental transitions. which demands increased nutritional intake and therefore makes adolescents more vulnerable to nutritional deficiencies Adolescents as described by the United Nations as those between the ages of 10 and 19, are 1.2 billion in number in world today, constituting 18 percent of the world's population. More than half of all adolescents live in Asia. Nearly 90% of adolescents live in low- and middle-income countries (LMICs) where under nutrition, including anaemia and micronutrient deficiencies is a public health problem. In absolute numbers, India is home to more adolescents- around 243 million-than any other country. Adolescents are the future generation of any country and their nutritional needs are critical for the wellbeing of society. Globally, anaemia is considered one of the major health concerns among adolescent girls, due to the increased iron requirements during growth and the onset of menstrual cycle. In India, for instance, about 50% of adolescent girls are reported to suffer from iron deficiency anemia. Anaemia among adolescent girls can lead to fatigue, weakness, reduced cognitive skills and physical activity. This impacts their academic performance and physical growth Adolescent age is the perfect period to correct the nutritional status. If intervention is done correctly during this period, then future consequences of nutritional deficiencies can be prevented to a large extent. Recent study in India had shown that decreased intake of jaggery is one among the major factors contributing to IDA. India is one of the largest producers of sugarcane. Of total sugarcane produced in India, 53% is processed into white sugar, 36% into jaggery and khandsari, 3% for chewing as cane juice, and 8% as seed cane. Jaggery is very rich in important minerals, vitamins, and proteins The purpose of this study is to assess the prevalence of anemia and provide multimodal intervention to enhance the Hemoglobin level of adolescent girls.

Title of Research Proposal

Impact of Multimodal intervention programme on anaemia among adolescent girls at selected BCM Hostels of Vijayapura

Objectives

1. To assess and compare the pre-test and post -test level of haemoglobin among adolescent girls

2. To assess the level of knowledge regarding anaemia among adolescent girls at selected BCM Hostel of Vijayapura

3. To plan and implement Multimodal intervention programme among adolescent girls at selected BCM Hostel of Vijayapura

4. To evaluate the effectiveness Multimodal intervention on Knowledge and Haemoglobin percentage among adolescent girls at selected BCM Hostel of Vijayapura.

5. To find out association between anaemia with their selected demographical variables

Operation Definition:

1.KNOWLEDGE: In this study knowledge refers to understanding of the adolescent girls regarding anaemia and its prevention

2.Adolescent Girls: In this study, adolescent girls are those between the age of 10 to 19 years.

3.Anemia: In this it refers to adolescent girls having Haemoglobin levels below 12.0 g/dL

4. Multimodal Intervention: In this study, the multimodal intervention program is the intervention designed to provide nutritional education and nutritional supplementation [jaggery balls & raisins] for 8weeks to the identified case of anaemia among adolescent girls of selected BCM Hostel

Hypothesis

H_0: There is no significant difference in the level of knowledge on anaemia among adolescent girls at selected BCM Hostel of Vijayapura.

$H0_1$: There is a significant difference in the level of knowledge on anaemia among adolescent girls at selected BCM Hostel of Vijayapura

H02: There is no significant difference in the haemoglobin percentage after implementation of Multimodal intervention

H2: There is a significant difference in the haemoglobin percentage after implementation of Multimodal intervention.

Research Design:

Quasi experimental Research Design

Research Approach:

Quantitative Research Approach:

Study Area:

The study will be conducted in a selected BCM Hostels of Vijayapura, Karnataka**.**

Study Population:

The study will focus on Adolescent girls (aged 18-45 years) from selected BCM Hostels of Vijayapura, Karnataka. A sample of 250 adolescent girls will be included in the study.

Sampling Technique:

A simple random sampling method will be used to select participants

SAMPLE SIZE ESTIMATION

Sample for the study has been estimated by using GPower software 3.1.9.4. The sample size for final study will be calculated by power analysis using the results of pilot study.'Tentatively the sample size was calculated by using G-Power software

Intervention (mean and SD of difference) = 5.26 + 0.24

The following parameters were used to calculate the sample size

Level of significance 0.05

Power of the test: 0.80

Effect size: 0.52

The calculated sample size is 210

Considering the possibility of dropouts/ response/non response errors the researchers has contemplated 20% attrition rate. Hence the final sample size will be 250.

Therefore the final sample size is 250 adolescent girls.

ASSUMPTIONS

• Adolescent girls are prone to develop anaemia due to menstruation, insufficient iron in the diet and poor absorption of iron in the body.

• Dietary intake of iron supplement in form of nutrition ball will improve the haemoglobin level among adolescent girls

Inclusion criteria

• Adolescent girls residing in BCM Hostel

• Adolescent girls who are willing to participate in study

• Adolescent girls who understand either English or Kannada

Exclusion criteria

• Adolescent girls suffering from diabetes, hypertension, heart disease, thyroid disorder, tuberculosis or cancer

• Adolescent girls who are not willing to participate in study

• Adolescent girls who do not understand either English or Kannada

Variables under Study

Independent Variables: Multimodal intervention programme

Dependent Variables: Haemoglobin levels among adolescent girls and knowledge on preventive measures

. Demographic Variables: Age, education, family income, education of parents, religion, pallor, age at menarche and diet pattern.

Description of the tool: The tool consisted of three parts

Section A – Demographic Variables

This section dealt with demographic variables such as age, education, family income, education of the parents, religion, pallor, age at menarche and diet pattern.

Section B – Digital Haemoglobin Meter This instrument was used to estimate the haemoglobin levels in adolescent girls**.**

The level of anaemia was classified as follows:

10-11gm/dL - Mild anaemia.

7-10gm/dL - Moderate anaemia.

Below 7gm/Dl-Severe anaemia

Section C: Structured Knowledge questionaries:this instrument was to assess the pretest and post-test knowledge on anaemia among adolescent girls

DATA COLLECTION METHOD:

• Ethical clearance was be obtained from institutional ethical committee. Shri BM Patil Institute of Nursing Science Vijayapura.

• Permission obtained from concerned authority,

• Purpose of conducting the study explained to the subjects.

• Informed consent obtained from the subject

• Pre-test Haemoglobin percentage checked by using digital Haemoglobinometer

• Pre-test knowledge assessment carried out by using structured knowledge questionnaires

• Multimodal intervention programme implemented

Phase 1: Selection of samples suffering with moderate and severe anaemia

Phase 2: implementation of nutritional education for 30 minutes using audio and video AV aids

Phase 3: implementation of 5gm of jaggery ball and 5gm of raisins for 8weeks

Phase 4: post-test evaluation of Knowledge and haemoglobin percentage after 8weeks

• Data analysed by using Descriptive and Inferential statistics.

Results

SECTION-I

Table no 1: Frequency and percentage distribution of adolescent girls according to their age

SI No	Age in years	Frequency (n)	Percentage (%)
1	10–12 years	62	24.8
2	13–15 years	100	40.0
3	16–18 years	88	35.2
	Total	250	100.0

The table shows the distribution of adolescent girls according to their age. Among the total 250 participants, the majority of girls (100, 40.0%) belonged to the age group of 13–15 years. This was followed by 88 girls (35.2%) in the 16–18 years age group. The least number of participants, 62 (24.8%), were in the 10–12 years age group.

Table no 2: Frequency and percentage distribution of adolescent girls according to their class

SI No	Class	Frequency (n)	Percentage (%)
1	6th–7th standard	62	24.8
2	8th–9th standard	100	40.0
3	10th–12th standard	88	35.2
	Total	250	100.0

The table presents the distribution of adolescent girls according to their class. Out of 250 participants, the majority of girls (100, 40.0%) were studying in 8th–9th standard. This was followed by 88 girls (35.2%) in 10th–12th standard. While the least numb, 62 (24.8%), were in 6th–7th standard.

Table no 3: Frequency and percentage distribution of adolescent girls according to their religion

SI No	Religion	Frequency (n)	Percentage (%)
1	Hindu	138	55.2
2	Muslim	63	25.2
3	Others	49	19.6
	Total	250	100.0

The table depicts the distribution of adolescent girls according to their religion. Out of 250 participants, the majority (138, 55.2%) belonged to the Hindu religion. This was followed by 63 girls (25.2%) who were Muslims, while 49 participants (19.6%) belonged to other religions

Table no 4: Frequency and percentage distribution of adolescent girls according to their types of family

SI No	**types of family**	Frequency (n)	Percentage (%)
1	Nuclear	125	50.0
2	Joint	88	35.2
3	Extended	37	14.8
	Total	250	100.0

The table shows the distribution of adolescent girls according to their type of family. Among the 250 participants, half of them (125, 50.0%) belonged to nuclear families. This was followed by 88 girls (35.2%) from joint families, while 37 participants (14.8%) were from extended families

Table no 5: Frequency and percentage distribution of adolescent girls according to their duration of stay in hostel

SI No	**Duration of stay**	Frequency (n)	Percentage (%)
1	< 1 Year	75	30.0
2	1-2 Year	87	34.8
3	> 2 Years	88	35.2
	Total	250	100.0

The table presents the distribution of adolescent girls according to their duration of stay in the hostel. Among the 250 participants, the highest number of girls (88, 35.2%) had stayed in the hostel for more than 2

years. This was closely followed by 87 girls (34.8%) who had stayed for 1–2 years, while 75 participants (30.0%) had a stay of less than 1 year

Table no 6: Frequency and percentage distribution of adolescent girls according to their dietary pattern

SI No	**Dietary pattern**	Frequency (n)	Percentage (%)
1	Vegetarian	62	24.8
2	Mixed	125	50.0
3	Non-Vegetarian	63	25.2
	Total	250	100.0

The table no 6 shows the distribution of adolescent girls according to their dietary pattern. Out of 250 participants, half of them (125, 50.0%) followed a mixed diet. This was followed by 63 girls (25.2%) who were non-vegetarian, while 62 participants (24.8%) were vegetarian

Table no 7: Frequency and percentage distribution of adolescent girls according to their Frequency of intake of green leafy vegetables

SI No	Frequency of intake of green leafy vegetables	Frequency (n)	Percentage (%)
1	Daily	99	39.6
2	2-3 times/week	63	25.2
3	Occasionally	88	35.2
	Total	250	100.0

The table no 7 illustrates the distribution of adolescent girls according to their frequency of intake of green leafy vegetables. Among the 250 participants, the highest proportion (99, 39.6%) consumed green leafy vegetables daily. This was followed by 88 girls (35.2%) who consumed them occasionally, while 63 participants (25.2%) reported intake 2–3 times per week

Table no 8: Frequency and percentage distribution of adolescent girls according to their menstrual status

SI No	Menstrual status	Frequency (n)	Percentage (%)
1	Attained Menarche	188	75.2
2	Not Attained Menarche	62	24.8
	Total	250	100.0

The table no 8 depicts the distribution of adolescent girls according to their menstrual status. Out of 250 participants, the majority of girls (188, 75.2%) had attained menarche, while 62 participants (24.8%) had not yet attained menarche

Table no 9: Frequency and percentage distribution of adolescent girls according to their duration of menstrual flow

SI No	**Duration of menstrual flow**	Frequency (n)	Percentage (%)
1	NA	62	24.8
2	3-5 days	100	40.0
3	> 5 days	88	35.2
	Total	250	100.0

The table no 9 presents the distribution of adolescent girls according to their duration of menstrual flow. Out of 250 participants, 100 girls (40.0%) reported a menstrual flow of 3–5 days, which was the most common duration. This was followed by 88 girls (35.2%) who experienced menstrual flow for more than 5 days. Additionally, 62 participants (24.8%) were categorized as not applicable (NA), as they had not yet attained menarche

Table no 10: Frequency and percentage distribution of adolescent girls according to their amount menstrual flow

SI No	**Amount menstrual flow**	Frequency (n)	Percentage (%)
1	NA	62	24.8
2	Mild	37	14.8
3	Moderate	63	25.2
4	Heavy	88	35.2
	Total	250	100.0

In the present study, the distribution of adolescent girls according to the amount of menstrual flow is presented in Table 10. Out of the total 250 girls, 62 (24.8%) had not yet attained menarche, and therefore menstrual flow was not applicable to them. Among those who had started menstruating, 37 girls (14.8%) reported experiencing mild menstrual flow, 63 girls (25.2%) had moderate flow, and 88 girls (35.2%) reported heavy menstrual flow. This indicates that while a quarter of the adolescents are yet to experience menstruation, the majority of those who have attained menarche experience moderate to heavy menstrual flow, with heavy flow being the most common. These findings suggest that variations in menstrual flow are prevalent among adolescent girls, and a significant proportion may require guidance or health interventions to manage heavier menstrual bleeding effectively

Table no 11: Frequency and percentage distribution of adolescent girls according to their History of worm infestation

SI No	History of worm infestation	Frequency (n)	Percentage (%)
1	Yes	88	35.2
2	No	162	64.8
	Total	250	100.0

In the present study, the distribution of adolescent girls according to their history of worm infestation is shown in Table 11. Out of the total 250 participants, 88 girls (35.2%) reported having a history of worm infestation, whereas 162 girls (64.8%) did not have any such history. This indicates that while the majority of adolescents were free from worm infestation, more than one-third of the girls had experienced it at some point, highlighting the need for health education and preventive measures such as deworming programs and proper hygiene practices among this population.

Table no 12: Frequency and percentage distribution of adolescent girls according to their History of deworming tablet intake

SI No	History of deworming tablet intake	Frequency (n)	Percentage (%)
1	Yes	162	64.8
2	No	88	35.2
	Total	250	100.0

Table 12 presents the distribution of adolescent girls according to their history of deworming tablet intake. Out of the total 250 participants, 162 girls (64.8%) reported that they had taken deworming tablets, while 88 girls (35.2%) had not received any deworming medication. This indicates that a majority of the adolescents had participated in deworming programs or had taken preventive medication, which is important for controlling worm infestation and promoting overall health. However, more than one-third of the girls had not taken deworming tablets, suggesting a need to increase awareness and accessibility of deworming interventions in this population

Table no 13: Frequency and percentage distribution of adolescent girls according to their History of iron and folic acid tablet intake

SI No	History of iron and folic acid tablet intake	Frequency (n)	Percentage (%)
1	Yes	149	59.6
2	No	101	40.4
	Total	250	100.0

Table no 13 shows the distribution of adolescent girls according to their history of iron and folic acid (IFA) tablet intake. Out of the total 250 participants, 149 girls (59.6%) reported that they had taken IFA tablets, whereas 101 girls (40.4%) had not consumed them. This indicates that while a majority of the adolescents are receiving iron and folic acid supplementation, a substantial proportion of girls have not taken these tablets, highlighting the need to enhance awareness and ensure adherence to IFA supplementation programs for the prevention of anemia and promotion of overall health among adolescent girls.

Table no 14: Frequency and percentage distribution of adolescent girls according to their previous history of anemia

SI No	**Previous history of anemia**	Frequency (n)	Percentage (%)
1	Yes	88	35.2
2	No	162	64.8
	Total	250	100.0

Table no 14 presents the distribution of adolescent girls according to their previous history of anemia. Out of the total 250 participants, 88 girls (35.2%) reported having a previous history of anemia, whereas 162 girls (64.8%) did not have any such history. This indicates that more than one-third of the adolescents had experienced anemia in the past, emphasizing the need for regular monitoring, nutritional interventions, and health education to prevent recurrence and promote optimal haematological health among adolescent girls

SECTION-II

Table no 15: Frequency and percentage distribution of adolescent girls according to their prevalence of anemia

SI No	**Anemia**	Frequency (n)	Percentage (%)
1	Absent	170	68.0
2	Present	80	32.0
	Total	250	100.0

Table no 15 presents the distribution of adolescent girls according to the prevalence of anemia. Out of the total 250 participants, 80 girls (32.0%) were found to have anemia, while 170 girls (68.0%) were not anaemic. This indicates that nearly one-third of the adolescents are currently affected by anemia, highlighting it as a significant health concern in this population. The findings underscore the importance of preventive measures such as iron and folic acid supplementation, dietary interventions, and regular health monitoring to reduce the prevalence of anemia among adolescent girls

Table no 16: Frequency and percentage distribution of pretest test anemia level of adolescent girls

SI No	**Anemia**	Frequency (n)	Percentage (%)
1	Mild Anemia	26	32.5
2	Moderate anemia	50	62.5
3	Severe Anemia	04	5.0
	Total	80	100.0

Graph no 16: Frequency and percentage distribution of pretest test anemia level of adolescent girls

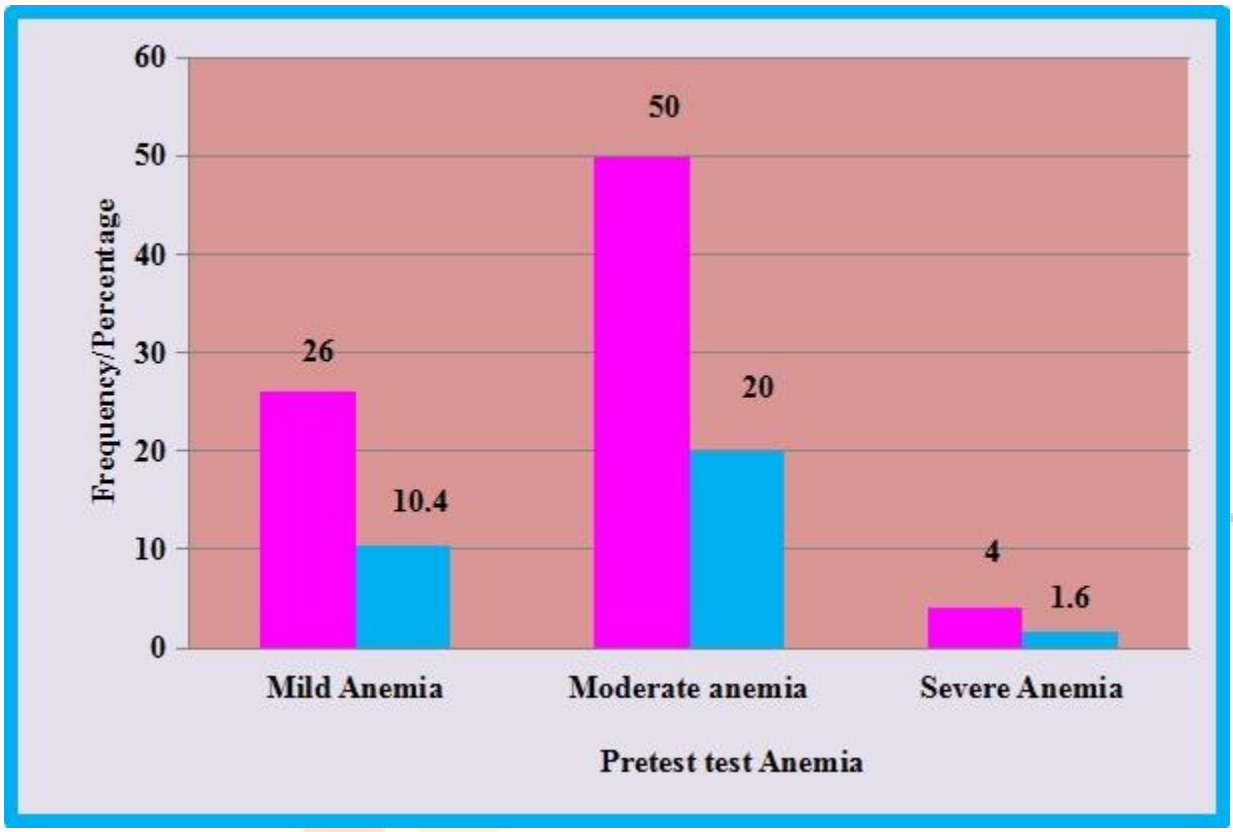


Table 16 shows the frequency and percentage distribution of pretest anemia levels among adolescent girls who were found to be anemic (n = 80). Of these girls, 26 (32.5%) had mild anemia, 50 (62.5%) had moderate anemia, and 4 (5.0%) had severe anemia. This indicates that the majority of anemic adolescents were experiencing moderate anemia, while fewer girls had mild or severe anemia.

Conclusion:

These findings suggest a need for appropriate interventions such as iron supplementation, dietary modifications, and health education to prevent the worsening of anemia and promote better haematological health among adolescent girls

Table no 17: Frequency and percentage distribution of post-test test anemia level of adolescent girls

SI No	**Anemia**	Frequency (n)	Percentage (%)
1	Normal	14	17.5
	Mild anemia	49	61.3
2	Moderate anemia	17	21.3
3	Severe anemia	00	0.0
	Total	80	100.0

Graph no 17: Frequency and percentage distribution of post-test test anemia level of adolescent girls

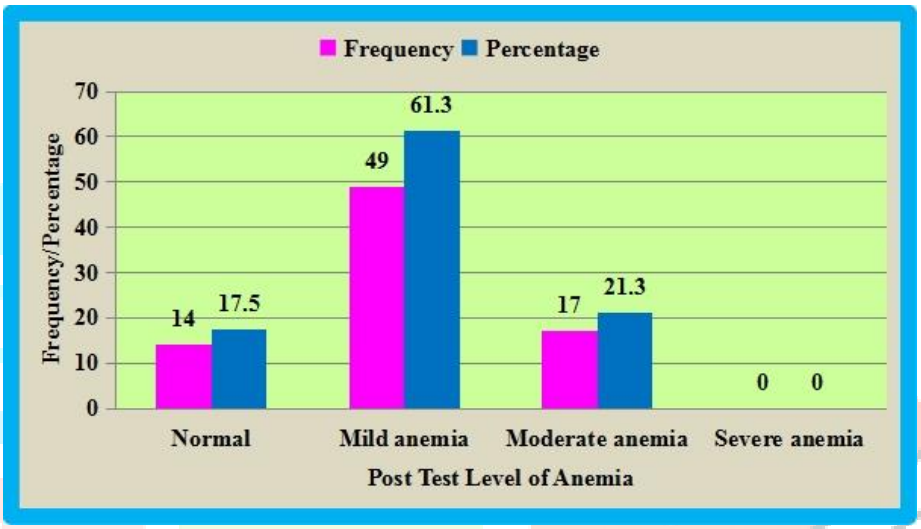


Table no 17 presents the frequency and percentage distribution of post-test anemia levels among adolescent girls (n = 80). Out of the total participants, 14 girls (17.5%) had normal haemoglobin levels after the intervention. Among those who remained anaemic, 49 girls (61.3%) had mild anemia, 17 girls (21.3%) had moderate anemia, and none of the participants had severe anemia.

Conclusion:

This indicates a noticeable improvement in anemia status following the intervention, with some girls achieving normal haemoglobin levels and the complete elimination of severe anemia. The majority of the participants shifted to the mild anemia category, suggesting the effectiveness of the intervention in reducing the severity of anemia among adolescent girls

Table no 18: Effectiveness Multimodal intervention on Haemoglobin percentage among adolescent girls at selected BCM Hostel of Vijayapur.

HB	Mean	N	SD	t-value	p-value
Pre-Test	9.37	80	1.12	152.8	<0.0001 (HS)
Post-Test	10.87	80	1.13		

Table no 18 presents the effectiveness of the multimodal intervention on haemoglobin levels among adolescent girls at the selected BCM Hostel of Vijayapur (n = 80). The mean haemoglobin level increased from 9.37 g/dL in the pre-test to 10.87 g/dL in the post-test. The standard deviation was 1.12 in the pre-test and 1.13 in the post-test. The calculated t-value was 152.8 with a p-value of less than 0.0001, indicating a highly significant improvement (HS) in haemoglobin levels following the intervention.

Conclusion:

These findings suggest that the multimodal intervention was highly effective in improving the haemoglobin status of adolescent girls

Table no 19: Assessment of the Pre-Test level of knowledge regarding anaemia among adolescent girls at selected BCM Hostel of Vijayapur

SI No	**level of knowledge**	Frequency (n)	Percentage (%)
1	Inadequate	54	67.5
2	Moderately Adequate	22	27.5
3	Adequate	04	5.0
	Total	80	100.0

Graph no 19: Aassessment of the Pre-Test level of knowledge regarding anaemia among adolescent girls at selected BCM Hostel of Vijayapur

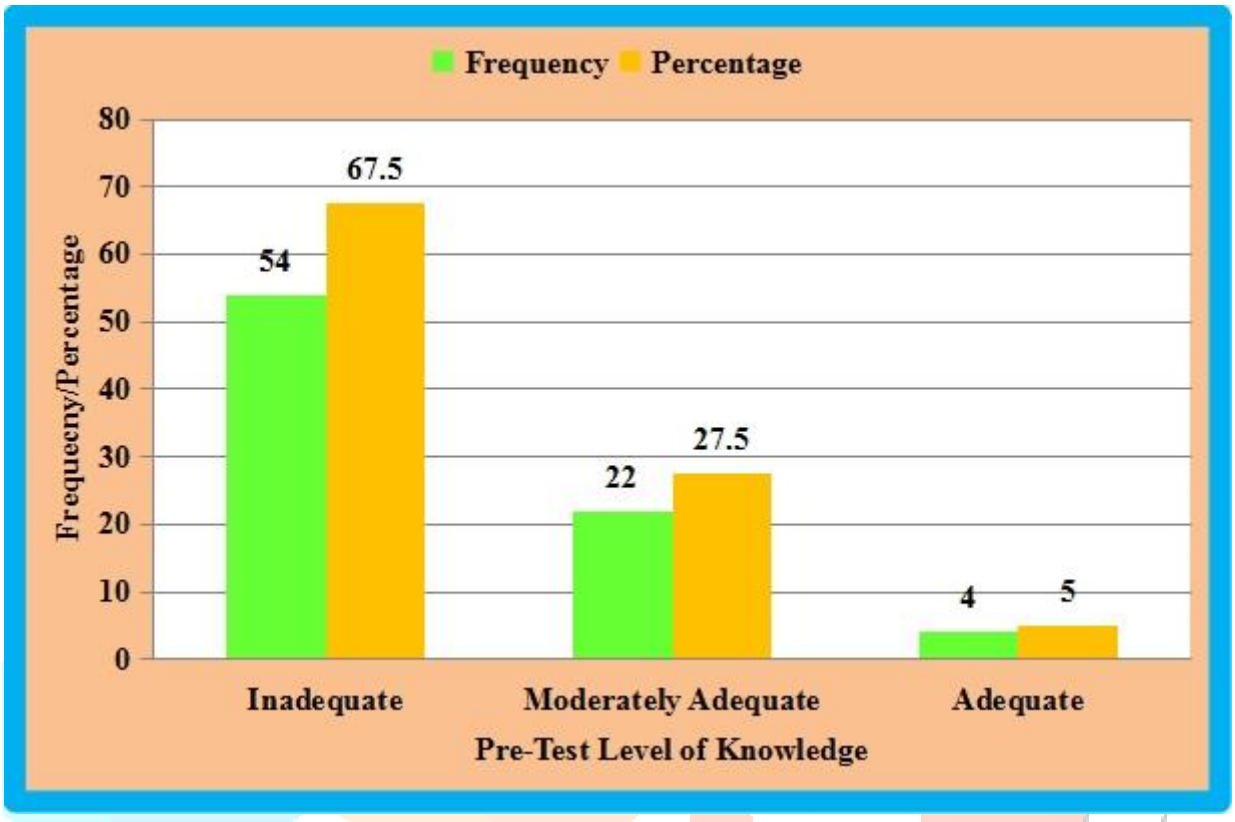


Table no 19 presents the assessment of the level of knowledge regarding anemia among adolescent girls at the selected BCM Hostel of Vijayapur (n = 80). Out of these participants, 54 girls (67.5%) had inadequate knowledge, 22 girls (27.5%) had moderately adequate knowledge, and only 4 girls (5.0%) demonstrated adequate knowledge about anemia.

Conclusion:

This indicates that the majority of the adolescent girls had insufficient awareness regarding anemia, its causes, prevention, and management. The findings highlight the need for targeted health education programs to improve knowledge and promote healthy practices among adolescents

Table no 20: Assessment of the Post-Test level of knowledge regarding anaemia among adolescent girls at selected BCM Hostel of Vijayapur

SI No	**level of knowledge**	Frequency (n)	Percentage (%)
1	Inadequate	01	1.3
2	Moderately Adequate	25	31.3
3	Adequate	54	67.5
	Total	80	100.0

Graph no 20: Aassessment of the Post-Test level of knowledge regarding anaemia among adolescent girls at selected BCM Hostel of Vijayapur

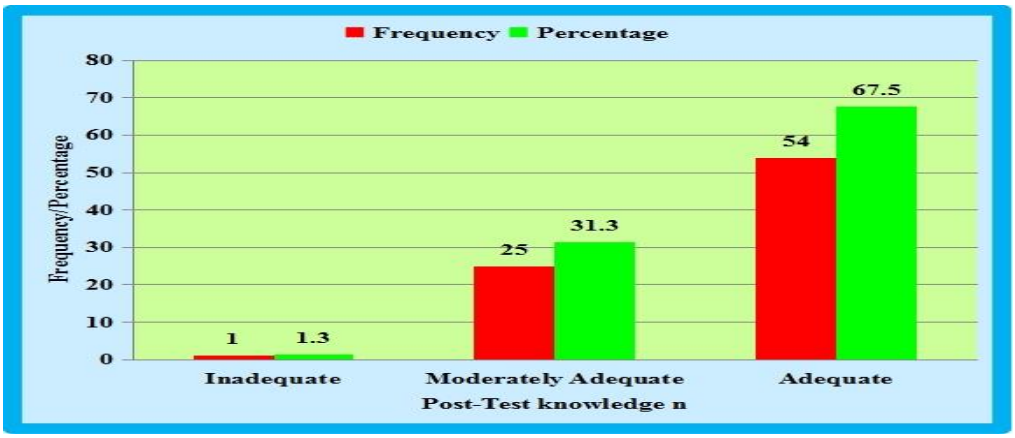


Table no 20 presents the assessment of the post-test level of knowledge regarding anemia among adolescent girls at the selected BCM Hostel of Vijayapur (n = 80). After the intervention, 1 girl (1.3%) had inadequate knowledge, 25 girls (31.3%) had moderately adequate knowledge, and 54 girls (67.5%) demonstrated adequate knowledge about anemia.

Conclusion: This indicates a significant improvement in the level of knowledge among the participants compared to the pre-test, suggesting that the educational intervention was effective in increasing awareness and understanding of anemia and its prevention.

Table no 21: Item wise comparison of knowledge score among adolescent girls at selected BCM Hostel of Vijayapur.

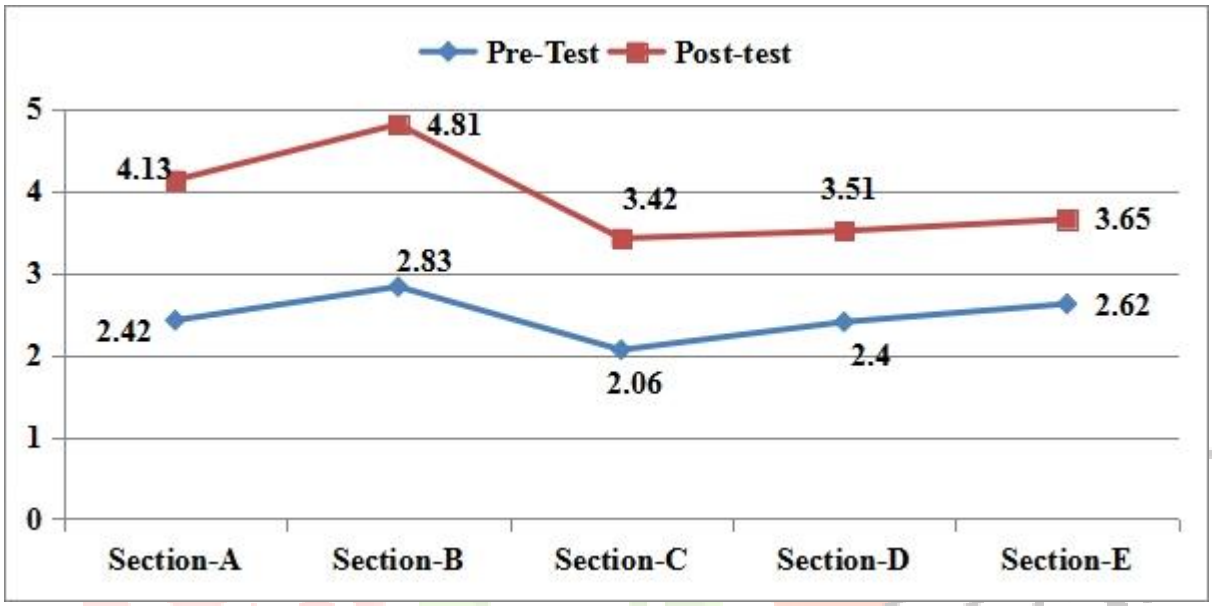
ITEM	Pre-Test	Post-test	t-value	P-value
Section A: General Knowledge on Anaemia	2.42±0.91	4.13±1.13	13.3	<0.0001(S)
Section B: Causes and Risk Factors	2.83±0.58	4.81±0.62	22.6	<0.0001(S)
Section C: Signs and Symptoms	2.06±0.72	3.42±0.88	13.4	<0.0001(S)
Section D: Prevention and Management	2.40±0.49	3.51±1.17	8.59	<0.0001(S)
Section E: Complications and Health Education	2.62±0.89	3.65±1.29	8.95	<0.0001(S)

Table No. 21 shows the item-wise comparison of pre-test and post-test knowledge scores among adolescent girls regarding anaemia. The findings indicate that the post-test mean scores were higher than the pre-test scores in all sections, demonstrating improvement in knowledge after the intervention. The mean score in Section A (General Knowledge on Anaemia) increased from 2.42±0.91 to 4.13±1.13 (t=13.3, p<0.0001), in

Section B (Causes and Risk Factors) from 2.83±0.58 to 4.81±0.62 (t=22.6, p<0.0001), in Section C (Signs and Symptoms) from 2.06±0.72 to 3.42±0.88 (t=13.4, p<0.0001), in Section D (Prevention and Management) from 2.40±0.49 to 3.51±1.17 (t=8.59, p<0.0001), and in Section E (Complications and Health Education) from 2.62±0.89 to 3.65±1.29 (t=8.95, p<0.0001).

Conclusion: All the calculated t-values were statistically highly significant, indicating that the intervention was effective in improving knowledge regarding anaemia among adolescent girls.

Graph no 21: Mean knowledge comparison of among adolescent girls at selected BCM Hostel of Vijayapur regarding anemia



The above graph no 21 illustrates the item-wise comparison of pre-test and post-test mean knowledge scores among adolescent girls regarding anaemia. It clearly shows that the post-test scores are higher than the pre-test scores across all sections, indicating a consistent improvement in knowledge following the intervention. The highest post-test mean score was observed in Section B (Causes and Risk Factors) at 4.81 compared to the pre-test score of 2.83. Similarly, notable improvements are seen in Section A (4.13 vs 2.42), Section C (3.42 vs 2.06), Section D (3.51 vs 2.40), and Section E (3.65 vs 2.62).

Conclusion:

Overall, the upward trend in all sections demonstrates the effectiveness of the educational intervention in enhancing knowledge about anaemia among adolescent girls.

Table no 22: Effectiveness Multimodal intervention on Knowledge among adolescent girls at selected BCM Hostel of Vijayapur.

Knowledge	Mean	N	SD	Mean % Knowledge	t-value	p-value
Pre-Test	12.51	80	2.58	50.0%	19.6	<0.001 (HS)
Post-Test	19.67	80	3.12	78.7%		

Table no 22 presents the effectiveness of the multimodal intervention on knowledge regarding anemia among adolescent girls at the selected BCM Hostel of Vijayapur (n = 80). The mean knowledge score increased from 12.51 in the pre-test, representing 50.0% of the maximum possible score, to 19.67 in the post-test, representing 78.7%. The standard deviation was 2.58 for the pre-test and 3.12 for the post-test. The calculated t-value was 19.6 with a p-value of less than 0.001, indicating a highly significant improvement (HS) in knowledge after the intervention. **Conclusion:**These results suggest that the multimodal intervention was effective in significantly enhancing the knowledge of adolescent girls regarding anemia

Table no 23: Association between levels of anaemia with their selected demographical variables

Demographic Variable	levels of anemia			Chi-square	df	p-value
	Mild Anemia	Moderate anemia	Severe Anemia			
Age						
10–12 years	1	13	1	6.791	4	0.147(NS)
13–15 years	12	13	1			
16–18 years	13	24	2			
Class						
6th–7th standard	1	13	1	6.791	4	0.147(NS)
8th–9th standard	12	13	1			
10th–12th standard	13	24	2			
Religion						
Hindu	2	48	3	68.075	4	< **0.0001(HS)**
Muslim	24	0	1			
Others	0	2	0			

Types of family						
Nuclear	13	26	1	10.56	4	**0.032(S)**
Joint	13	12	2			
Extended	0	12	1			
Duration of stay						
< 1 Year	13	2	0	32.63	4	< **0.0001(HS)**
1-2 Year	0	24	2			
> 2 Years	13	24	2			
Dietary pattern						
Vegetarian	1	13	1	68.09	4	< **0.0001(HS)**
Mixed	1	37	2			
Non-Vegetarian	24	0	1			
Greenleaf Vegetables						
Daily	1	14	1	7.79	4	0.099(NS)
2-3 times/week	12	12	1			
Occasionally	13	24	2			
Menstrual status						
Attained Menarche	25	37	3	5.62	2	0.060(NS)
Not Attained Menarche	1	13	1			
Duration MC Flow						
NA	1	13	1	6.79	4	0.147(NS)
3-5 days	12	13	1			
> 5 days	13	24	2			
Amount of MC Bleeding						
NA	1	13	1	7.920[a]	6	0.244(NS)
Mild	0	1	0			
Moderate	12	12	1			
Heavy	13	24	2			
History Of Worm Infestation						
Yes	13	24	2			
No	13	26	2	0.030	2	0.98(NS)
History Deworming						

Yes	13	26	2	0.030	2	0.985(NS)
No	13	24	2			
History of IFA						
Yes	12	26	2	0.23	2	0.89(NS)
No	14	24	2			
Previous History of Anemia						
Yes	13	24	2	0.03	2	0.99(NS)
No	13	26	2			

Table No. 23 presents the association between levels of anaemia and selected demographic variables among adolescent girls. The analysis reveals that there is a statistically significant association between levels of anaemia and variables such as religion (χ^2=68.075, p<0.0001), type of family (χ^2=10.56, p=0.032), duration of stay (χ^2=32.63, p<0.0001), and dietary pattern (χ^2=68.09, p<0.0001). However, no significant association was found between levels of anaemia and variables including age (χ^2=6.791, p=0.147), class (χ^2=6.791, p=0.147), green leafy vegetable consumption (χ^2=7.79, p=0.099), menstrual status (χ^2=5.62, p=0.060), duration of menstrual flow (χ^2=6.79, p=0.147), amount of menstrual bleeding (χ^2=7.920, p=0.244), history of worm infestation (χ^2=0.030, p=0.98), history of deworming (χ^2=0.030, p=0.985), history of IFA supplementation (χ^2=0.23, p=0.89), and previous history of anaemia (χ^2=0.03, p=0.99). Hence, it can be concluded that selected demographic variables such as religion, type of family, duration of stay, and dietary pattern have a significant influence on the levels of anaemia among adolescent girls, while the remaining variables do not show any significant association

Implications Nursing Implication:

Nursing Practice:

• Jaggery balls and Raisins is a safe and better modality which bring a higher level of satisfaction for adolescent girls.

• This intervention could bring benefits to both adolescent girls who are on pharmacological therapy and not on the same.

• It also brings a long-term effect and higher level of improvement of haemoglobin level, thus the samples feels better and can avoid complication.

Nursing Education:

• This study can motivate student nurse to explore new strategies for effective improvement of hemoglobin level in blood.

• This research report can be kept in library for reference of nursing personnel and other health care professionals.

• The nurse educator can take independent decision based on principles of health care.

• Nurse educator can train and encourage the student nurses to implement Jaggery balls and Raisins as a non-pharmacological management.

Nursing Research:

• The nursing implication of the study lies in the scope for expanding the quality of nursing service.

• In this area of evidence-based practice, publication of these studies will take nursing to a new horizon.

• Nurse researcher can do various studies related to effectiveness of Jaggery balls and Raisins for improving haemoglobin level among antenatal mother.

• A comparative study can be done to determine the effectiveness of Jaggery balls and Raisins with other intervention.

• Similar study can be conducted on a large sample so it could be generalized.

Nursing Administration:

• The result of the study encourages the nurse administrator to conduct In service education programs on various types of non-pharmacological treatment to increasing the haemoglobin level.

• This helps the nurse administrator to develop and provide an effective non-pharmacological measure for improving haemoglobin level.

• Nurse administrators can create awareness among nurses that Jaggery balls and Raisins is a very good cost-effective nursing intervention to increasing haemoglobin level in blood.

References

1] M Limna, Effect of Rice Flakes and Jaggery Mixture Consumption on Haemoglobin Level among Adolescent Girls International Journal of Science and Research (IJSR) jun,2018,8,(6).1124-28.

2] Sakthibalan M, Sarumathi E, Mangaiarkkarasi A, Bikash Ranjan Meher. Evaluation of efficacy of jaggery and raisins as supplements in iron deficiency anemia among medical undergraduate students in South India. National Journal of Physiology, Pharmacy and Pharmacology. 2018; 8:10:1432-6.

3] Achouri I, Aboussaleh Y, Sbaibi R, Ahami A, El Hioui M. Prevalence of iron deficiency anaemia among school children in Kenitra, Northwest of Morocco. Pakistan Journal of Biological Sciences. 2015 Feb 15;18(4):191

4] Anusuya V. Effectiveness of amla juice with elemental iron among adolescent girls on iron deficiency anaemia in govt. Manohara school at Sellur, Madurai (Doctoral dissertation, College of Nursing, Madurai Medical College, Madurai).

5] Chellamani A. A Study to evaluate the Effectiveness of nutrition ball onhaemoglobin level among adolescent girls with iron deficiency anaemia at selected industry Hostel in Madurai (Doctoral dissertation, College of Nursing, Madurai Medical College, Madurai).

6] Rathi R. A Study to assess the effectiveness of nutrition ball to increase haemoglobin level among adolescent girls with anaemia in selected villages at Kanyakumari District (Doctoral dissertation, Global College of Nursing, Marthandam)