VOLUME - 14, ISSUE - 02, FEBRUARY - 2025 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Nursing

A STUDY TO ASSESS EFFECTIVENESS OF BEETROOT JUICE ON CBC AMONG NURSING STUDENTS WITH IRON DEFICIENCY ANEMIA IN SELECTED COLLEGE OF JALANDHAR CANTT

Priya Sharma*	Professor, Community Health Nursing, ACN, Jalandhar Cantt *Corresponding Author
Aprsa Kalsi	Clinical Instructor, ACN, Jalandhar Cantt
Laxmi	BSC Nursing IV year students ACN Jalandhar Cantt
Nancy Chahal	BSC Nursing IV year students ACN Jalandhar Cantt

ABSTRACT Iron deficiency anemia (IDA) is a significant nutritional issue worldwide and affects 1.6 billion people worldwide with women of reproductive age and children being disproportionately affected. Consequences of untreated IDA include impaired cognitive function, decreased immune function, poor pregnancy outcomes, and increased risk of cardiovascular disease. Beetroot juice supplementation has a positive impact on the hematological parameters particularly hemoglobin and hematocrit level in a healthy individual. This study aimed to evaluate the efficacy of beetroot juice in improving Complete Blood Count (CBC) levels among nursing students with IDA in Jalandhar Cantt. Utilizing a quasi-experimental pre-test post-test design, 46 nursing students with hemoglobin levels below 11.9 g/dl were randomly selected. Participants in the experimental group consumed 100 ml of beetroot juice daily for 60 days, while the control group received no intervention. Pretest and post-test data were collected to measure the outcomes. Results indicated a significant difference in CBC levels between the groups, showcasing notable improvements in the experimental group. The study concludes that beetroot juice effectively elevate Complete Blood Count (CBC) level of iron deficiency anemia in nursing students.

KEYWORDS : Effectiveness, Iron Deficiency Anemia, Complete Blood Count.

INTRODUCTION

As per WHO Global Database on Anemia in Geneva (2013), anemia affects 1.62 billion in the general population which corresponds to 24.8% of the pediatric population. The highest prevalence is 47.4% in adolescent age group (95%, 9 CI: 45.7-49.1). The World Health Organization estimated that about 30% of the world's population suffers from anemia.7 India has the highest prevalence of iron-deficiency anemia among women, including adolescents, worldwide.7

70% of Indian nursing students are anemic (Hemoglobin (Hb) < 12. Studies have revealed that 65 % to 75 % of the nursing students in India are anemic.8 Adolescents, defined as individuals aged 10-19, experience rapid development and are notably vulnerable to nutritional deficiencies, mainly anemia.

A complete blood count (CBC) is a common blood test used to evaluate overall health and detect variety of condition, including anemia. In India, it is estimated that 70% of nursing students suffer from anemia, with hemoglobin levels below the recommended threshold of 11.9 gm/dl, a reflection of widespread iron deficiency primarily driven by inadequate nutritional intake and high menstrual blood loss.

Adolescence is characterized by a period of transition from childhood to adulthood, typically occurring between the ages of 10 and 19. It is a time of significant physical, cognitive and social- emotional changes. Nutritional demands increase during this phase due to physical growth and the onset of menstruation, reinforcing the need for intake of iron-rich foods and a balanced diet.

Globally, anemia affects approximately 1.62 billion individuals, with an alarming 47.4% prevalence in adolescents. India presents the highest rates of iron deficiency anemia among women and adolescents worldwide. Iron deficiency anemia, the most prevalent type among nursing students, poses serious health threats due to chronic blood loss and heightened iron requirements during rapid growth periods.

Summarizing, addressing the high rates of anemia in Indian nursing students is critical for safeguarding their health and ensuring better maternal and neonatal outcomes in the future.

Anemia Database Among Reproductive Age Group

Table – 1 General Details

Indicators	Urban	Rural	Total
Non pregnant women age 15 - 49 years who are anemic (<12.0 g/dl) (%)	72.1	86.1	80.1
Pregnant women age 15-49 years who are anemic (<11.0 g/dl) (%)	-	-	-
All women age 15 -49 years who are anemic (%)	70.6	86.6	79.5

Objectives Of The Study

The objectives of the study were to:

- Assess the pretest and posttest level of CBC among nursing students among control and experimental group.
- Assess effectiveness of beetroot juice on CBC among nursing students between control and experimental group.

HYPOTHESES

H: There will be significant difference between the level of CBC before and after the administration of beetroot juice among nursing students in Experimental group.

Methodology

Research Approach

A this study, quantitative approach is used to determine the effectiveness of beetroot juice. Upon CBC level among nursing students with iron deficiency anemia.

Research Design

A Quasi-experimental pretest posttest design is adopted for conducting the study.

Symbolic Presentation Of Quasi-experimental Research Design

Experimental Group:

Pretest	treatment	posttest
O1	X	O2

Control Group:

Pretest	treatment	posttest
O1	-	O2

Key:

O1-Pretest assessment of CBC in experimental group
O1- Pretest assessment of CBC in control group
O2- Posttest assessment of CBC in experimental group
O2- Posttest assessment of CBC in control group
X – Nursing Intervention - Administration of beetroot juice for the experimental group.

Research Setting:

The final study was conducted in Jalandhar Cantt and the control and experimental groups were selected from Army College of Nursing, Jalandhar Cantt.

Population

In the final study, the accessible population is nursing students with iron deficiency anemia residing in Army College of Nursing, Jalandhar.

Sample

Sample is the number of individuals from whom the required information is obtained. In the present study the sample was 46 nursing students having iron deficiency anemia divided into two groups as in 23 control group and in 23 experimental group residing in Army College of Nursing.

Description Of Tool

Tool 1: Demographic Characteristics
It consists of demographic variables.
Tool 2: Blood Investigations
It consists of patient value of blood reports.

Data Collection Process

The study was conducted at Army College of Nursing Jalandhar. Written permission and consent were obtained. The selection of sample was done by lottery method and the students whose Hb level was less than 11.9GM/DL were selected for the study. Sample size was 46 nursing students and their pre and posttest CBC levels were assessed. The beetroot juice was by 100gm of beetroot powder mixed with 1000ml of water, 100gm of sugar, 100ml of lemon juice and 10ml of ginger juice. Each participant in experimental group was given 10ml of beetroot juice for 60 days and no intervention Was given to control group. The pretest data was collected for both group one day prior to the study and posttest conducted in 61st day of pretest.

RESULT

This section deals with the description of elevation of CBC in experimental group and is explained in frequency and percentage distribution.

Table1: Frequencies And Percentage Distribution Of Sample Characteristics Based On Demographic Variables Sample Characteristics Based On Demographic Variables N= (23+23=46)

S.NO.	CHARACTERISTICS	EXPERIMENTAL GROUP		CONTROL GROUP	
		F	%	F	%
1	Age(in years)				
	18 – 19	3	13.04	4	17.39
	20 – 22	15	65.22	12	52.18
	22 – 24	5	21.74	5	21.74
	24 – 26	0	0	2	8.69
2	Educational class				
3.	2nd Semester	00	00	10	43.48
	4th Semester	09	39.13	05	21.74
	6th Semester	14	60.87	00	00
	4th Year	00	00	08	34.78
	Have you attained menarche				
	Yes	23	100	23	100
	No	00	00	00	00
4	Age at menarche				
	12	03	13.04	04	17.39
	13	10	43.48	09	39.13
	14	10	43.48	07	30.44
	15	00	00	03	13.04
5	Menstrual regularity				
	Regular	17	73.91	21	91.31
	Irregular	06	26.09	02	8.69
6	Monthly family income				
	<5001	00	00	00	00
	5001-10000	00	00	01	4.35
	10001-15000	05	21.74	01	4.35
	>15000	18	78.26	21	91.30
7	Type of family				
	Joint family	08	34.72	04	17.39
	Nuclear family	15	65.28	19	82.61
8.	Religion				
	Hindu	22	95.65	20	86.96
	Muslim	00	00	01	4.35
	Others	01	4.35	02	8.69
9	Diet				
	Vegetarian	18	78.25	17	73.92
	Non vegetarian	05	21.75	06	26.08

Table2: Frequencies And Percentage Distribution Of Prevalence Of Iron Deficiency Anemia Among Nursing Students

SR.NO.	PARAMETER	DEGREE OF IRON DEFICIENCY ANEMIA	FREQUENCY(f)	PREVALENCE (%)
1.	Hemoglobin			
		>11.9 gm/dl	192	80.68
		11.0 to 11.9gm/dl	18	7.56
		10.9to 8gm/dl	28	11.76

Table3 Frequency And Percentage Distribution Of Pretest CBC Of Nursing Students With Iron Deficiency Anemia. N= (23+23=46)

LEVEL OF PARAMETER	Below Normal	EXPERIMENT AL GROUP		Total (%)	Below Normal	CONTROL GROUP		Total (%)
		Normal	Above Normal			Normal	Above Normal	
Hemoglobin	23 (100%)	-	-	100	23 (100%)	-	-	100
MCH	6 (26.08%)	17 (73.92%)	-	100	2 (8.69%)	20 (86.95%)	1 (4.36%)	100
MCV	7 (30.44%)	16 (69.56%)	-	100	5 (21.73%)	17 (73.9%)	1 (4.37%)	100
MCHC	4 (17.39%)	19 (82.61%)	-	100	10 (43.47%)	13 (56.53%)	-	100

Table4: Frequency And Percentage Distribution Of Posttest CBC Of Nursing Students With Iron Deficiency Anemia

LEVEL OF PARAMETER	Below Normal		EXPERIMENT AL GROUP				Below Normal		CONTROL GROUP			
			Normal		Above Normal				Normal		Above Normal	
	f	%	f	%	f	%	f	%	f	%	f	%
Hemoglobin	6 (26.09%)		17 (73.91%)		-		17 (73.91%)		6 (26.09%)		-	
MCH	6 (26.08%)		16 (69.57%)		1 (4.35%)		17 (73.91%)		5 (21.74%)		1 (4.35%)	
MCV	8 (34.78%)		12 (52.18%)		3 (13.04%)		15 (65.22%)		7 (30.43%)		1 (4.35%)	
MCHC	1 (4.35%)		22 (95.65%)		-		6 (26.09%)		17 (73.91%)		-	

P<0.05significant and**-P<0.01&***-P<0.001, highly significant

Table 5: Mean , Mean Difference , SD And Unpaired "t" Test Of Posttest Of Control And Experimental Group For CBC Among Nursing Students With Iron Deficiency Anemia

CLINICAL PARAMETER	EXPERIMENTAL POST TEST		CONTROL POSTTEST		MEAN DIFFERENCE	"T" VALUE	P-VALUE
	Mean	SD	Mean	SD			
Hemoglobin	12.16	1.09	10.54	2.47	1.62	3.45	0.0023
Mean corpuscular Volume (MCV)	85.72	10.25	78.86	14.72	6.85	1.86	0.0754
Mean corpuscular Hemoglobin (MCH)	27.61	3.25	24.39	4.03	3.22	2.71	0.0126
Mean Corpuscular hemoglobin Concentration (MCHC)	32.24	1.342	31.04	1.71	1.2	2.70	0.0130

CONCLUSIONS

The following findings can be concluded from the present study:

- The Complete Blood Count (CBC) among nursing students who received beetroot. Juice was significantly improved than those who did not received beetroot juice.
- The beetroot juice has significant effect on elevation of Complete Blood Count among Nursing students
- Thus, it can be concluded that beetroot juice can be used to improve the CBC level in iron deficiency anemia.

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