IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

EFFECTIVENESS OF FRESH GOOSEBERRY JUICE ON HEMOGLOBIN LEVEL AMONG ADOLESCENT GIRLS WITH ANAEMIA

Salic Rahuman N*

[1] **Associate Professor, Sandipany Academy, Durg, Chhattisgarh**

ABSTRACT

The study assessed the prevalence of anaemia and compared the effectiveness of fresh gooseberry juice and elemental iron supplementation Vs elemental iron supplementation on haemoglobin level among adolescent girls with anaemia. A total of 60 samples (30+30) were selected by probability simple random sampling technique. The study instrument used was as follows: demographic and clinical data, prevalence scale of anaemia and assessment of haemoglobin level. The tools were administered after obtaining the administrative and informed consent. The collected data were analyzed using descriptive and inferential statistics. It was inferred that the administration of fresh gooseberry juice and elemental iron supplementation for anaemia, 80% of the adolescent girls were highly satisfied and 20% of them were satisfied and none of them were dissatisfied.

Key words:

Effectiveness, Gooseberry, Elemental iron, Supplementation, Adolescent

MAIN TEXT

1. INTRODUCTION

Adolescence is the period when the individual can be shaped and moulded into great adults psychologically. Global database by WHO [2007] on child growth and malnutrition and national family health survey -2 [2007] in India, had suggested that adolescent girls of urban, semi urban and rural schools in India are found to be anaemic and the prevalence rate to be between 61.9 to 82.1 %, being highest among rural girls of higher order as compared to urban poor girls irrespective of their age and menarche status. This could be due to differences in dietary habits, worm infestations, poor hygiene and poor environmental sanitation. Anaemia prevalence was more among girls of low weight, height and BMI as compared to those who were heavier, tall and having higher BMI.

1.1. NEED FOR THE STUDY

Anaemia is the most common form of malnutrition among adolescents today. It is of public health significance in our country. Adolescents [10-19 years] constitute >20% of our population in India & 50% suffer from iron deficiency anaemia. Both urban & rural, suffer from anaemia & being more in girls than boys. Poor economic status, faulty dietary pattern, lack of awareness & education, urbanization prevalence of malaria, hookworm & other infestations, repeated bacterial infections also influence the incidence & nature of anaemia among children and adolescents. Iron deficiency anaemia reduces the work capacity of individuals and entire population brings serious economic consequences and it may be obstacle to national development. Also iron deficiency anaemia is one of the leading causes for morbidity. Iron deficiency has effect on all systems in the human bodies. Long standing severe anaemia may lead to congestive cardiac failure.

1.2. STATEMENT OF THE PROBLEM

A study to assess the prevalence and to evaluate the effectiveness of fresh gooseberry juice on haemoglobin level among adolescent girls with anaemia in a selected school at Malur in Kolar district, Karnataka

1.3. OBJECTIVES OF THE STUDY

1. To assess the prevalence of anaemia among adolescent girls
2. To assess the effectiveness of fresh goose berry juice on haemoglobin level among adolescent girls in Group I and II
3. To find out the association between the demographic variables and the level of haemoglobin before and after administration of fresh goose berry juice on haemoglobin level among adolescent girls in Group I and II

4. To determine the association between the clinical variables and the level of haemoglobin before and after administration of fresh goose berry juice on haemoglobin level among adolescent girls in Group I and II

1.4. HYPOTHESES

- **H_1** - There will be significant difference between the level of haemoglobin before and after administration of fresh goose berry juice on haemoglobin level among adolescent girls in Group I and II at $p<0.05$
- **H_2** - There will be significant association between the selected demographic variables and the level of haemoglobin before and after administration of fresh goose berry juice on haemoglobin level among adolescent girls in Group I and II at $p<0.05$
- **H_3** - There will be significant association between the selected clinical variables and the level of haemoglobin before and after administration of fresh goose berry juice on haemoglobin level among adolescent girls in Group I and II at $p<0.05$

2. RESEARCH METHODOLOGY

Research approach	Quantitative approach
Research design	True experimental design
Research setting	Government girls junior college, Malur
Population	Adolescent girls
Sample and sample size	60 adolescent girls (30 experimental group +30 control group)
Sampling technique	Simple random sampling technique
Study Instruments used	Tool-1: Demographic and clinical data Tool-2: Assessment of haemoglobin level after administration of gooseberry juice
Procedure for data collection	After obtaining the permission from concerned authorities and informed consent from the samples, the investigator collected the baseline demographic and clinical data.
Plan for data analysis	Descriptive and inferential statistics with the help of SPSS version 20.0 was used for analysis of data

3. RESULTS

3.1. Demographic data of adolescent girls

Frequency and percentage distribution of demographic variables of adolescents girls with anaemia in the Group I and Group II of the adolescent girls (age, education family income, dietary pattern type of family and number of children).

N=60 (30+30)

Demographic variables	Group I		Group II	
	Frequency	Percentage	Frequency	Percentage
Age in years				
13-15 years	15	50	13	43.3
16-18 years	15	50	17	56.7
Family income per month in rupees.				
<2000	21	70	24	80.0
2001- 4000	6	20.0	6	20.0
4001-6000	1	3.3	-	-
6001-8000	-	-	-	-
8000-10000	2	6.6	-	-
>10000	-	-	-	-
Dietary pattern				
Vegetarian	8	26.6	7	23.3
Non vegetarian	22	73.3	23	76.7
Type of family				
Nuclear	21	70.0	22	73.3
Joint	9	30.0	8	26.7

- The data above revealed that most of the participants Group I and Group II [50.0, 56.7%] were in the age Group of 16-18 years and most of them [70%, 80%] had monthly income of Rs<2000 per month. Majority of the participants [73.3%, 76.6%] were consuming non-vegetarian [70%, 73.3%] nuclear family respectively.

3.2.Clinical data of adolescent girls

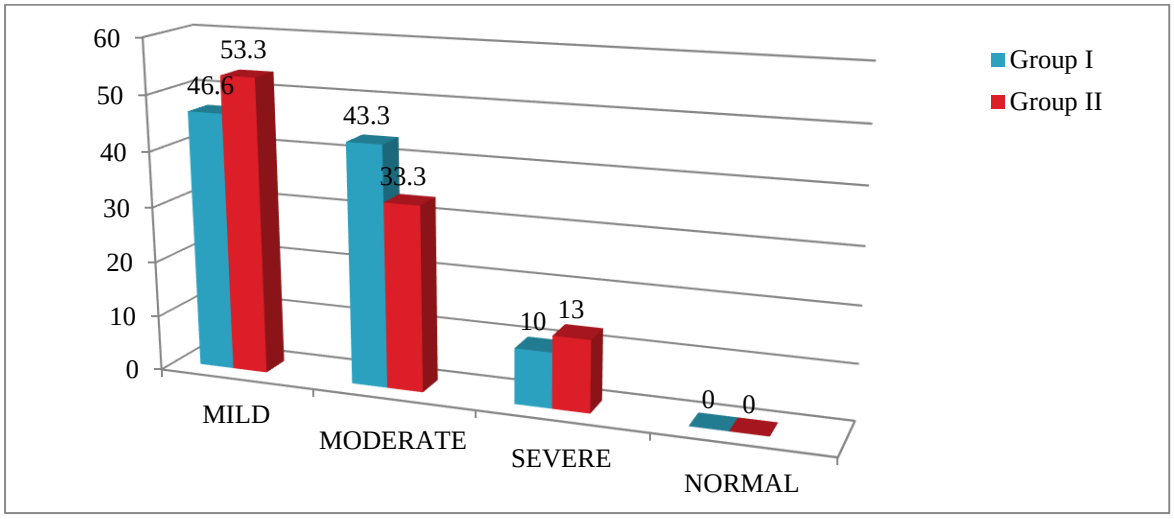
Frequency and percentage distribution of clinical variables in the Group I and Group II of the adolescent girls

N=60 (30+30)

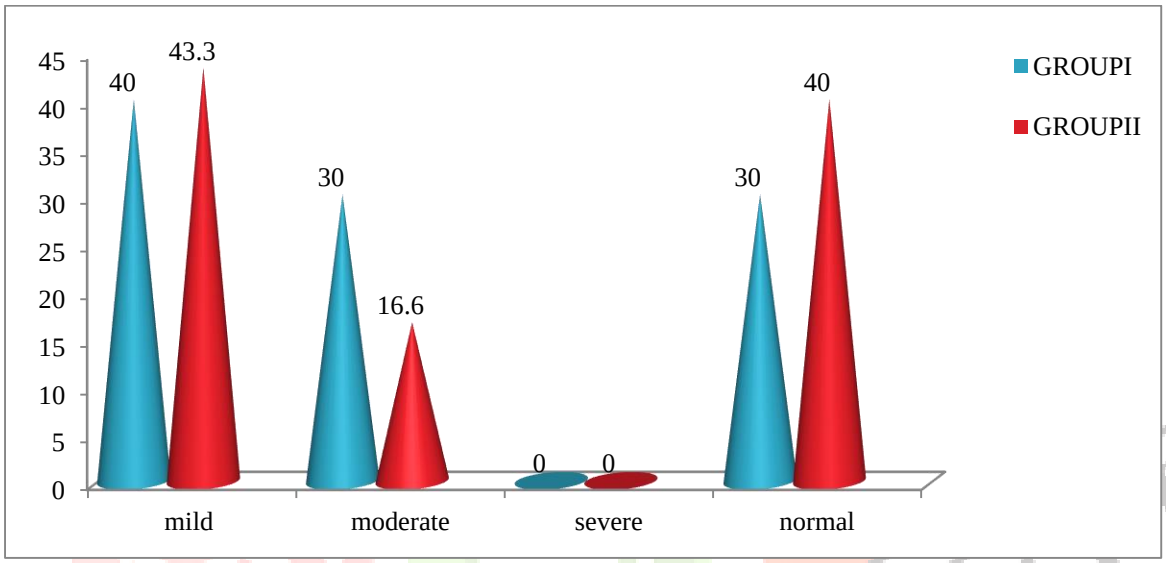
Clinical characteristics	Group I		Group II	
	Frequency	Percentage	Frequency	Percentage
Weight in kg				
25 - 35	5	16.6	3	10
36 - 45	17	56.6	17	56.6
46 – 55	6	20	10	33.3
56 – 65	2	6.6	-	-
Height in cm.				
130 – 140	3	10	-	-
141 – 150	15	50	10	33.3
151 – 160	12	40	20	66.6
Body mass index				
<16.0	4	13.3	5	16.7
16.1 – 17.0	2	6.7	7	23.3
17.1 – 18.5	8	26.7	4	13.3
18.6 – 20.0	7	23.3	6	20.0
20.1 – 25.0	9	30.0	8	26.7
Age at menarche				
13 – 15 years	11	36.6	9	30
16 – 18 years	19	63.3	21	70
Frequency of your menstrual cycle				
<21days	5	16.6	4	13.3
21-28days	10	33.3	16	53.3
>28days	15	50	10	33.3
Number of days of menstrual flow				
<3days	6	20.0	13	43.3
3 – 5 days	16	53.3	14	46.7
>5 days	8	26.7	3	10.0
Amount of menstrual flow				
Normal flow	14	46.7	13	43.3
Minimal flow	10	33.3	13	43.3
Excessive flow	6	20.0	4	13.3
Did you receive any blood and blood products?				
Yes	-	-	-	-
No	30	100	30	100
Do you take coffee or tea?				
Yes	17	56.7	19	63.3
No	13	43.3	11	36.7

The data above revealed that most of the study participants in the Group I and Group II (56.6%, 56.6%) were weight between 36-45 kg with the height of (50%, 66.6%) had the BMI range (30%, 26.7%) from 20.1 to 25.0. Most of the adolescent girls (63.3%,70%) attained menarche at the age of 16-18 years had frequency of menstrual cycle (50%, 53.3%) between 21-28 days, (53.3%, 46.7%) had menstrual flow 3-5 days, the amount of menstrual flow were (46.7%, 43.3%). None of the adolescent girls (100%) had received blood and blood products in both the Groups with the habit of (56.7%, 63.3%) taking coffee or tea respectively.

3.3.Assessment of Pre-test and Post-test haemoglobin level among adolescent girls



Percentage Distribution of Pretest haemoglobin level among adolescent girls in Group I and II



Percentage Distribution of Posttest haemoglobin level among adolescent girls in Group I and II

3.4.Comparison of mean and standard deviation of level of haemoglobin before and after administration of fresh gooseberry juice and elemental iron supplementation in the Group I and Group II of adolescent girls.

N =60 (30+30)

Group	Mean	Standard deviation	't' value
Group I			
Before administration	9.79	1.36	-
After administration	9.22	1.44	21.17
Improvement score	0.57	-	-
Group II			
Before administration	9.84	1.53	-
After administration	11.32	1.47	30.92***
Improvement score	1.5	-	-

***p<0.001

It was inferred that the level of haemoglobin before the administration of fresh gooseberry juice and elemental iron supplementation among adolescent girls were low (M= 9.79, SD= 1.36) (M=9.84, 1.53). Whereas after the administration of fresh gooseberry juice and elemental iron supplementation the level of haemoglobin got increased in the Group II (M= 11.32, SD=1.47) (M=9.22, SD=1.44) than in the Group I respectively. The difference was found to be statistically significant at p<0.001 level of confidence.

3.5.**Association between the selected demographic variables and level of haemoglobin before and after the administration of elemental iron supplementation in the Group I of adolescent girls.**

N =60 (30+30)

Demographic variables	**Before administration**				**After administration**			
	Mild	**Moderate**	**Severe**	**x^2**	**Mild**	**Moderate**	**Normal**	**x^2**
Age in years								
13-15 years	9	6	-	0.165	6	4	5	0.2977
16-18 years	6	6	3	[df=2]	10	3	2	[df=2]
Educational standard								
8thstd	3	3	1		2	2	3	
9thstd	3	3		0.507	2	3	1	0.265
10thstd	4	1		[df=8]	4		1	[df=8]
11thstd	2	2	2		4	2		
12thstd								
Family income								
<2000	8	9	2		11	4	4	
2001-4000	5	1		0.427	3	1	2	0.857
4001-8000	-	-	-	[df=4]	2	2		[df=4]
8001-10000	-	-	-	-	-	-	-	
>10000	2	2	1		-	-	1	
Dietary pattern								
Vegetarian	3	4	1	0.711	5	2	1	0.693
Non – vegetarian	12	8	2	[df=2]	11	5	6	[df=2]
Type of family								
Nuclear	11	8	2	0.924	11	4	6	0.500
Joint	4	4	1	[df=2]	5	3	1	[df=2]
Number of children								
One	2	1	-	0.475	3	-	-	0.297
Two	2	4	1	[df=6]	1	3	3	[df=6]
Three	7	7	1		9	3	3	
More than three	4	-	1		3	1	1	

It was inferred from that there was no significant association between the selected demographic variables and level of haemoglobin before and after the administration of elemental iron supplementation in the Group I.

3.6.Association between the selected demographic variables and level of haemoglobin before and after the administration of elemental iron supplementation in the Group II of adolescent girls.

N=60 (30+30)

Demographic variables	**Before administration**				**After administration**			
	Mild	**Moderate**	**Severe**	**x^2**	**Mild**	**Moderate**	**Normal**	**x^2**
Age in years								
13-15 years	9	2	2	0.185	3	3	7	0.127
16-18 years	7	8	2	[df=2]	10	3	4	[df=2]
Educational status in standard								
8^{th}std	3	1	1	0.680	1	1	3	0.804
9^{th}std	6	1	1	[df=8]	3	1	4	[df=8]
10^{th}std	3	3	-		3	1	2	
11^{th}std	1	1	1		1	1	1	
12^{th}std	3	4	1		5	2	1	
Family income								
<2000	-	-	-		-	-	-	
2001-4000	13	8	3	0.962	11	4	9	0.650
4001-8000	3	2	1	[df=2]	2	2	2	[df=2]
8001-10000	-	-	-		-	-	-	
>10000	-	-	-		-	-		
Dietary pattern								
Vegetarian	2	3	2	0.236	2	3	2	0.222
Non – vegetarian	14	7	2	[df=2]	11	3	9	[df=2]
Type of family								
Nuclear	12	9	1	0.045	10	3	9	0.339
Joint	4	1	3	[df=2]	3	3	2	[df=2]
Number of children								
One	-	2	1	0.125	2	1	-	0.184
Two	7	5	-	[df=6]	5	2	7	[df=6]
Three	6	3	1		7	1	2	
More than three	3	-	2		1	2	2	

It was inferred that there was no significant association between the selected demographic variables and level of haemoglobin before and after the administration of fresh gooseberry juice and elemental iron supplementation in the Group II.

3.7.Association between the selected clinical variables and level of haemoglobin before and after the administration of elemental iron supplementation in the Group I of adolescent girls

N=60 (30+30)

Clinical variables	Before administration				After administration			
	Mild	Moderate	Severe	x^2	Mild	Moderate	Normal	x^2
Weight in kg								
25-35	3	2	-	0.123	2	1	2	0.886
36-45	10	4	3	[df=4]	10	4	3	[df=4]
46-55	2	6	-		4	2	2	
56-65	-	-	-		-	-	-	
Height in cm								
130-140	1	4	1	0.504	2	2	2	0.816
141-150	7	4	1	[df=4]	7	3	2	[df=4]
151-160	7	4	1		7	2	3	
161-170	-	-	-		-	-	-	
Body mass index								
<16.0	3	1	-	0.531	2	-	2	0.406
16.1-17.0	1	1	-	[df=8]	1	-	1	[df=8]
17.1-18.5	4	2	2		5	3	-	
18.6-20.0	4	2	1		5	1	1	
20.1-25.0	3	6	-		3	3	3	
Age at menarche								
13-15years	9	9	1	0.380	12	3	4	0.314
16-18 years	6	3	2	[df=2]	4	4	3	[df=8]
Frequency of menstrual cycle								
<21 days	1	4	-	0.249	3	1	1	0.974
21-28 days	7	2	1	[df=4]	5	3	2	[df=4]
>28 days	7	6	2		8	3	4	
Menstrual flow days								
<3 days	2	3	1	0.684	4	2	-	0.645
3-5 days	10	5	1	[df=4]	8	3	5	[df=4]
>5 days	3	4	1		4	2	2	
Amount of menstrual flow								
Normal flow	8	6	-	0.052	8	2	4	0.610
Minimal flow	3	6	1	[df=4]	6	3	1	[df=4]
Excessive flow	4	-	2		2	2	2	

It was inferred that there was no significant association between the selected clinical variables and level of haemoglobin before and after the administration of elemental iron supplementation in the Group I.

3.8.Association between the selected clinical variables and level of haemoglobin before and after the administration of elemental iron supplementation in the Group II of adolescent girls

N=60 (30+30)

Clinical variables	Before administration				After administration			
	Mild	Moderate	Severe	x^2	Mild	Moderate	Normal	x^2
Weight in kg								
25-35	1	1	1	0.559	2	1	-	0.587
36-45	9	5	3	[df=4]	6	4	7	[df=4]
46-55	6	4	-		5	1	4	
56-65	-	-	-		-	-	-	
Height in cm								
130-140	-	-	-	0.837	-	-	-	0.114
141-150	5	4	1	[df=2]	7	1	2	[df=2]
151-160	11	6	3		6	5	9	
161-170	-	-	-		-	-	-	
Body mass index								
<16.0	3	1	1	0.762	2	1	2	0.994
16.1-17.0	3	3	3	[df=8]	3	1	3	[df=8]
17.1-18.5	3	-	1		2	1	1	
18.6-20.0	4	2	-		2	1	3	
20.1-25.0	3	4	1		4	2	2	
Age at menarche								
13-15years	12	7	2	0.621	9	4	8	0.963
16-18 years	4	3	2	[df=2]	4	2	3	[df=8]
Frequency of menstrual cycle								
<21 days	3	-	1	0.457	-	1	3	0.252
21-28 days	8	7	1	[df=4]	8	2	6	[df=4]
>28 days	5	3	2		5	3	2	
Number of days of menstrual flow								
<3 days	5	6	2	0.020	7	3	3	0.077
3-5 days	10	4	-	[df=4]	5	1	8	[df=4]
>5 days	1	-	2		1	2	-	
Amount of menstrual flow								
Normal flow	9	4	-	0.062	5	1	7	0.248
Minimal flow	5	6	2	[df=4]	7	3	3	[df=4]
Excessive flow	2	-	2		1	2	1	

It was inferred that there was no significant association between the selected clinical variables and level of haemoglobin before and after the administration of elemental iron supplementation in the Group II.

4. CONCLUSION

Adequate haemoglobin level is very essential for every healthy person. Administration of fresh gooseberry juice and elemental iron supplementation is simple and easy to implement and most acceptable method for anaemic clients. The finding of the study supports this intervention for girls with anaemia which is the best intervention to promote haemoglobin level.

4.1.RECOMMENDATIONS

1. The same study could be conducted on a large sample to generalize the results
2. The study could be replicated in different settings with similar facilities
3. A similar study could be conducted by using Solomon four Group design
4. A study could be conducted to find out the other factors affecting adolescent girls along with anaemia during the adolescent period

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