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A comparative study to evaluate the effectiveness of gooseberry juice versus iron supplementation on the level of haemoglobin among adolescent girls in selected villages at Nellore

Nirmal Divya Ariga, Vanaja Kumari Madam, Mary Vineela Pathri

Assistant Professor, Community Health Nursing, Narayana College of Nursing, Chinthareddypalem, Nellore, Andhra Pradesh, India

Abstract

Adolescence has been defined by the World Health Organization as the period of life span between 13 to 19 years. This is the formative period of life when the maximum amount of physical, psychological, and behavioral changes take place. This is a vulnerable period in the human life cycle for the development of nutritional anemia, which has been constantly neglected by public health programs. Girls are more likely to be a victim due to various reasons. In a family with limited resources, the female child is more likely to be neglected. She is deprived of good food and education, and is utilized as an extra working hand to carry out the household chores.

Objectives

1. 1 To assess the level of haemoglobin among the adolescent girls.
2. To evaluate the effectiveness of gooseberry juice on haemoglobin levels among adolescent girls.
3. To evaluate the effectiveness of iron supplementation on the level of haemoglobin among adolescent girls.
4. To compare the effectiveness of goose berry juice versus iron supplementation on the level of haemoglobin among adolescent girls.
5. To associate the effectiveness of gooseberry juice on the level of haemoglobin with selected socio-demographic variables among adolescent girls.
6. To associate the effectiveness of iron supplementation on the level of haemoglobin with selected socio-demographic variables among adolescent girls.

Material and Methods: The research design adopted for the study is factorial research design and simple random sampling technique (lottery method) was used to select the samples. A total of 100adolescent girls were included for the study and written consent was obtained. The purpose of the study was explained. Among 100 samples 50 adolescent girls are randomly selected to group I (gooseberry juice) and other 50 adolescent girls to group II (iron supplementation) from Kakuturu at Nellore based on the inclusion criteria. Data collection was carried for a period of 6 weeks from 4-2-15 to 20-03- 15. The pretest was done on 1st day to determine the haemoglobin level by using hemometer and observational check list to assess the signs of anemia. Intervention was given with gooseberry juice for experimental group in group I and iron supplementation for the experimental group II for 21 days. The post test was conducted on 30th day to find out the effectiveness of gooseberry juice or iron supplementation among adolescent groups, by assessing the hemoglobin level and the observation checklist, data was analyzed by using the descriptive and inferential statistics and presented according to the objectives and hypothesis tested. Data was analyzed and interpreted by using descriptive (i.e. frequency, percentage, mean, standard deviation) and inferential statistical method (paired 't' – test, independent 't' test and chi – square).

Results: The above result indicates that goose berry juice is more effective in increasing the haemoglobin levels among adolescent girls than compared to iron supplementation. Hence the calculated value of independent 't' test is 5.45 and tabulated value is 2.49.the calculated value is greater than tabulated value so research hypothesis (H_3) is accepted and null hypothesis is rejected (H_{03}).

The results reveals that comparison of effectiveness of goose berry juice versus iron supplementation on haemoglobin levels among adolescent girls in both experimental group. In experimental group I the mean score is 10.56gm/dl and with SD of 3.13 and in experimental group II the mean score is 9.20 gm/dl with SD of 2.80. The calculated value is 3.54 and the table value is 2.49 at the level of $P<0.01$.

The above result indicates that goose berry juice is more effective in increasing the haemoglobin levels among adolescent girls than compared to iron supplementation. The calculated value of independent 't' test is 8.50 and tabulated value is 2.49.The calculated value is greater than tabulated value so research hypothesis (H_3) is accepted and null hypothesis is rejected (H_{03}).

Keywords: gooseberry juice, iron supplementation, haemoglobin, adolescent girls, public health programs

Introduction

Background of the study

The health problem which is affecting adolescent girls is anemia, it is a familiar nutritional problem to be concentrated more to improve their quality of life. Anemia is still a public health problem in India, where the vulnerable groups for Anemia are adolescent girls. Among adolescent girls anemia decreases the capacity to do physical work, affects growth and does not prepare them adequately for mother hood.

The recent report suggested that anemia is a major nutritional

problem in India and in developing countries 30-60 % of natural deaths are due to anemia during the adolescent period. Some of the alternative therapy that can be given for reducing anemia is vitamin c supplementation and iron supplementation. These two supplementation helps to prevent the problems of anemia.

Need for the study

WHO (2010) report that anemia affects more than 95% people worldwide. One third of the world's population is under prevalence of anemia among adolescents more than 50%. Anemia contributes to 20% of all adolescent deaths [7].

National Family Survey II in India has suggested that adolescent girls of urban, semi-urban and rural, schools in India are found to have decreased hemoglobin and prevalence rate of anemia is 61.9%-88%. The prevalence is highest among rural girls of higher order as compared to urban poor girls irrespective of their age. This could be due to a difference in dietary habits, worm infestation and poor hygiene. Anemia prevalence is more among girls of low weight and height [8].

WHO (2012) reports, Iron deficiency anemia is one of the top ten risk factors in developing countries for last years of healthy life. The conservative estimate suggests that it is the direct cause of 3% to 7% of adolescent deaths worldwide. In industrialized countries and non-industrialized countries, the prevalence of anemia among adolescents above 15 years are 10.3% to 42.3% respectively.

Material and Methods

Research Approach: The Quantitative Research Approach is adopted for the present study.

Research design: Factorial research design to assess the effectiveness of gooseberry juice, iron supplementation on haemoglobin levels.

Table 1

Groups		Pre test	Intervention	Post test
Goose berry juice (group I)	Experimental group	O_1	X	O_2
	Control group	O_1		O_2
Iron supplementation (group II)	Experimental group	O_1	X	O_2
	Control group	O_1		O_2

O_1- Pretest

X – group I (goose berry juice) and group II (iron supplementation)

O_2 – post test

Settings: The study was conducted among adolescent girls in selected villages like Kakuturu at Nellore District it is located 10km away from Narayana Medical College of nursing Nellore. Kakuturu consists of 2218 population. Among them, the adolescent girls are 529 population. There is one CHC, one PHC, church primary and secondary high schools, and ICDS center, and post office.

Population

Target population: Adolescent girls of 13-18 years of age.

Accessible Population: The adolescent girls, with 7-11gms/dl of Haemoglobin level, residing at kakuturu.

Sample: Samples of the study are adolescent girls between 13-18years of age, residing in selected villages at Nellore district and who fulfill the inclusion criteria.

Sampling Techniques: Simple random sampling technique adopted to select the subjects by lottery method.

Sample Size: The sample size of the study is 100 adolescent girls. The 100 adolescent girls are randomly assigned to two groups that is group I and group II. Group I consists of 50 adolescent girls among them 25 adolescent girls are randomly assigned to group I (gooseberry juice group) as experimental group and 25 adolescent girls are randomly assigned to control group and group II consists of 50 adolescent among them 25 adolescent girls are randomly assigned to (iron supplementation group) experimental group and 25 adolescent girls are randomly assigned for control group.

Sampling criteria

Inclusion criteria

The study includes adolescent girls,

- with Hb level 7- 11gm/dl
- willing to participate in the study
- available during the period of data collection

Exclusion criteria

The study excludes adolescent girls who have

- less than Hb7gm/dl
- thalassemia and sickle cell anemia disorders
- treatment of quinolones therapy
- bleeding disorders
- Gastrointestinal tract disorders like gastritis, gastric ulcer.
- Iron supplements.

Description of the Tool

It consists of two section i.e. section A and section B

Part A

Section A

It deals with socio demographic variables like Age, Education, Religion, Family income, Type of family, Marital status, Age at menarche, Duration of menstrual cycle, Flow of menstruation, Dietary pattern, weight of adolescent girls, BMI classification and,

Section B

Deals with the checklist on physical examination.

Part B

The assessment of hemoglobin is done with Hemometer by using sahli's method. Pretest and posttest of hemoglobin was done.

Scoring Interpretation (according to WHO)

Score	Interpretation
Hb 10 to 11.9gm/dl	Mild Anemia
Hb 7 to 9.9gm/dl	Moderate Anemia

Content validity

Content validity of the tool was obtained from 3 nursing experts for their opinion and suggestions and one from community health nursing HOD. The suggestions of the experts were included and the tool was modified before conducting the main.

Reliability

The reliability of the tool established by the split half method. This was done by splitting the samples into two groups. The reliability score obtained by the tool (r =0.9).

Ethical Clearance

Ethical clearance was obtained from the Institutional Ethics committee of Narayana Medical College Hospital.

Pilot study

After getting formal permission from the Principal, Narayana College of Nursing, concerned authorities, written consent was obtained from adolescent girls. The pilot study was conducted at kakuturu village for 1 week from 19-1-15 to 25-1-15. 12 adolescent girls were selected by using simple random sampling technique by means of lottery method, among which 6 adolescent girls were assigned to group I and 6 to group II. Pre-test was done by using hemometer to measure the haemoglobin levels and observation checklist to assess anemia. Intervention gooseberry juice was given at early morning 8am with empty stomach for experimental group I and iron supplementation for the experimental group II at after noon 1pm for 21 days. Post-test was conducted on 30th day with the same tool. Data analysis of the pilot study was done to ensure the effectiveness of main study.

Data collection procedure

Data collection was carried for a period of 6 weeks from 4-2-15 to 20-03-15.The researcher obtained formal permission from the ethical committee, Medical Officer of PHC, and village sarpanch. The written consent was taken from the adolescent girls. After explaining the purpose of the study, total 100 adolescent girls were selected by simple random sampling technique by using lottery method that full fill the inclusion criteria. Among them 25 adolescent girls are randomly selected for group I (goose berry juice) as experimental group and 25 control group whereas Group II (iron supplementation) consists of 25 experimental group and 25 control group. The pretest was done on 1st day to determine the haemoglobin level by using hemometer and observation check list to assess the signs of anemia. Intervention gooseberry juice was given at early morning 8am with empty stomach for experimental group I and iron supplementation for the experimental group II at after noon 1pm for 21 days. The post test was conducted on 30th day to find out the effectiveness of gooseberry juice or iron supplementation among adolescent groups, by assessing the haemoglobin level and the observation checklist, data was analyzed by using the descriptive and inferential statistics and presented according to the objectives and hypothesis tested.

Results and discussion

The data was organized, tabulated, analyzed and interpreted by using descriptive and inferential statistics based on the objectives of the study. The findings were presented in the following sections.

Section II

Table 13 Frequency and percentage distribution of haemoglobin levels among adolescent girls in group I (goose berry juice) (N=50)

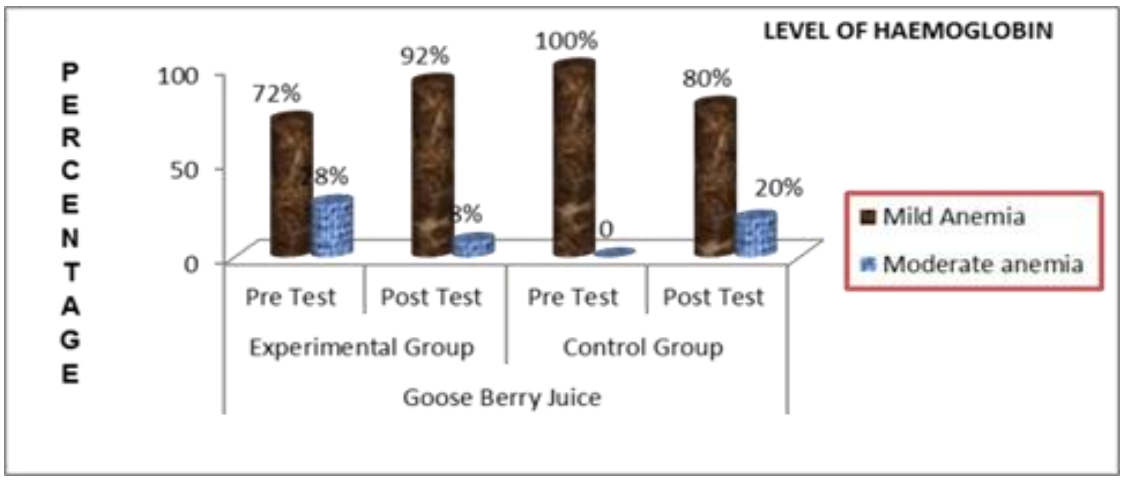

Fig 1

Table 2

S. No	Levels of hemoglobin n	Group I(Goose berry juice)							
		Experimental group (n=25)				Control group (n=25)			
		Pre test		Post test		Pre test		Post test	
		F	%	f	%	f	%	f	%
1	Mild anemia (10-11.9gm/dl)	18	72	23	92	25	100	20	80
2	Moderate anemia (7-9.9gm/dl)	7	28	2	8	-	-	5	20

Table 14 Frequency and percentage distribution of haemoglobin level among adolescent girls in group II (iron supplementation) (N=50)

Table 3

S. No	Levels of haemoglobin	Group II (Iron supplementation)							
		Experimental group (n=25)				Control group (n=25)			
		Pre test		Post test		Pre test		Post test	
		F	%	f	%	f	%	f	%
1	Mild anemia (10-11.9gm/dl)	20	80	18	72	25	100	19	76
2	Moderate anemia (7-9.9gm/dl)	5	20	7	28	-	-	6	24

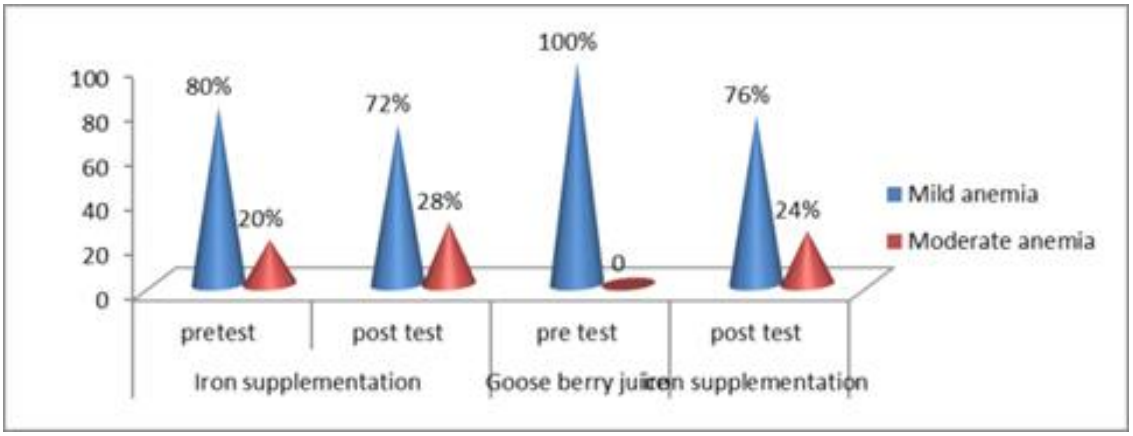

Fig 2

Section III

Table 17 Effectiveness of goose berry juice in pretest and posttest scores of haemoglobin levels among adolescent girls. (N=50)

Table 4

S. No	Levels of hemoglobin	Group I(Goose berry juice)				Paired 't' test
		Pre test		Post test		
		Mean	SD	Mean	SD	
1.	Experimental group (n=25)	8.17gm/dl	1.16	9.79gm/dl	3.25	C = 4.44 t = 2.49 df = 24 **S****
2.	Control group (n=25)	7.04gm/dl	0.32	7.05gm/**dl**	0.44	C = 2.18 t = 2.49 df = 24 NS

Effectiveness of iron supplementation in pretest and posttest scores of haemoglobin levels among adolescent girls. (N=50)

Table 5

S. No	Level of haemoglobin	Group II (iron supplementation)				Paired 't' test
		Pre test		Post test		
		Mean	SD	Mean	SD	
1.	Experimental group I (n=25)	9.11gm/dl	2.16	9.35gm/dl	2.27	C = 3.49 t = 2.49 df = 24 S**
2.	Control group I (n=25)	7.26gm/dl	0.23	7.29gm/dl	0.34	C = 1.72 t = 2.49 df = 24 NS

**p<0.01 is highly significant df=(n-1)=24

Discussion

Findings related to Effectiveness of goose berry juice versus iron supplementation on observation check list among adolescent girls between group I and group II

Table 22 results reveals that comparison of effectiveness of goose berry juice versus iron supplementation on haemoglobin levels among adolescent girls in both experimental group. In experimental group I the mean score

is 10.56 gm/dl and with SD of 3.13 and in experimental group II the mean score is 9.20 gm/dl with SD of 2.80. The calculated value is 3.54 and the table value is 2.49 at the level of $P<0.01$.

The above result indicates that goose berry juice is more effective in increasing the haemoglobin levels among adolescent girls than compared to iron supplementation. The calculated value of independent 't' test is 8.50 and tabulated value is 2.49.The calculated value is greater than tabulated value so research hypothesis (H_3) is accepted and null hypothesis is rejected (H_{03}).

Conclusion

Investigator found that the goose berry juice is more effective in increasing the haemoglobin levels when comparing to iron supplementation among adolescent girls.

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