Original Research Article

Effectiveness of Herbal Extract in Enhancing the Level of HB among Adolescent Girls with Iron Deficiency Anemia at Selected Higher Secondary Schools at Bangalore

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ABSTRACT

Background Information: Anemia develops when there are not enough healthy red blood cells in the body. Adolescent are particularly susceptible to iron deficiency anemia in view of the increased need for dietary iron. Anemia can result from decreased erythrocyte production which occurs due to decreased Hemoglobin synthesis. The heme in hemoglobin accounts for 2/3 of the body's iron. Iron is lost by chromic bleeding & excessive menstruation. When the stored iron is not replaced, hemoglobin production Is reduced leads to deficiency anemia.

Aim & objectives: evaluate the effectiveness of herbal extract in enhancing the level of HB of adolescent girls with iron deficiency anemia.

Materials and Methods: The data was collected using structured interview schedule, check list, sahlis method for the confirmatory diagnostic evaluation and blood test to assess the accurate level of HB. The study was conducted on 20 adolescent girls with iron deficiency anemia and herbal extract given for a period of 1month. Pre-test administered before starting the intervention and post-test at the end of the month. The study was conducted at Gangothri public school in Bangalore district.

Result: The study showed that in the experimental group mean score and SD in the Pre-test was 9.7 ± 1.218 and post test was 11.03 ± 1.685. The difference in the pretest & post-test mean values was statistically significant at $p<0.05$ level, t=2.9759, df =18) there was a significant improvement in the level of HB & proved that the intervention of herbal mixture was effective in enhancing the level of the HB.

Conclusion: present study reflected that herbal extract have been playing a key role to cope with iron deficiency anemia as demonstrated by improved HB and micro-nutrients level in the blood.

Keywords: effectiveness, adolescent girls, herbal mixture, iron deficiency anemia.

INTRODUCTION

Adolescence has been defined by the World Health Organization as the period of life spanning the ages between 10 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. The added burden of

menstrual blood loss, normal or abnormal, precipitates the crises too often. [1]

Adolescent girls are particularly prone to iron deficiency anaemia because of the increased demands of iron by the body. During this period, iron requirement increases dramatically and the overall iron requirement increase from a pre-adolescent level of approximately 0.7-0.9mg fe/d to as much as 2.2mg fe/d or perhaps more in heavily menstruating young women. [2]

Anemia is a major public health problem in the world today. Studies have revealed that 65 per cent to 75 per cent of the adolescent girls in India are anaemic. Adolescent girls are an important section of our society as they are our potential mothers and future homemakers. Iron is one of the micronutrient, it is used for formation of hemoglobin, when the iron is decreased in human body, and it is called as iron deficiency. According to world Health Organization (WHO) the hemoglobin level should be 12 g/dl for adolescent girls. When the hemoglobin level less than 12gms/dl it is considered as anemia. [3]

The anemic adolescent girls grow into adult women with compromised growth, both physical and mental. These women have low pre-pregnancy weight, and are more likely to die during childbirth and deliver low birth weight babies (UNICEF, 2012). [4]

National rural health mission (2013) states that 69.7% adolescent girls between the age 15 -17 years suffering with anemia and its prevalence in India is high in rural community areas. India has the world's highest prevalence of Iron deficiency anemia among women, with a 60-70% of the adolescence girl being anemic. The government of Karnataka directorate of public health and preventive medicine [2002] conducted a study on prevalence of anemia among adolescent girls in the urban and rural communities. The report stated that 34.4 % of school adolescents of Karnataka state (both Urban & Rural) are anemic. [1]

Amla rich with Vitamin C which helps to increase the Iron absorption and to prevent anemia. It is also called as Vitamin C power house. *Jaggery* is an excellent source of Iron and regular consumption of jaggery can help to improve the hemoglobin level. Various studies have shown that *pumpkin leaves* extract is effective to increases the regeneration of HB. It is rich with vitamin-c and iron. [5]

Vitamin C along with foods rich in iron will increases Iron level in the blood. The office of dietary supplements explains that "iron is not well absorbed-adult normally absorbed between 10 to 15% of Iron they eat". Heme iron obtained from meat, is better absorbed than non-heme iron from plants and its absorption it's influenced by other dietary intake such as Vitamin C. [6]

Investigator felt that administering the herbal extract which is rich in iron & Vitamin C enhances the level of hemoglobin and in adolescent girls. This study is based on community resources. Since jaggery, amla and pumpkin leaves are locally available, cost effective, can be easily stored and utilized by subject.

MATERIALS AND METHODS

The study was conducted at Gangothri International Public School, Bangalore District. Ethical clearance was obtained and the study population comprised of 20 adolescent girls between the age group of 14-17 years with iron deficiency anemia. Inclusion Criteria included girls in the age group of 14-17 years, hemoglobin less than 12 gm/dl, attained menarche and willing to participate in the study. Exclusive criteria include adolescent girls with any systemic disease /associate illness, with history of metorrhagia/menorrhagia associated with reproductive disorders, severe anemia with HB less than 6gm/dl and already taken treatment for anemia. The researcher collected the data through the following procedure.

Data Collection Procedure
*Pre-test:* was carried out with the help of

experienced lab technician to assess the level of hemoglobin.

Administration of intervention: Herbal Extract: The herbal extract was prepared from amla, jaggery & pumpkin leaves (For 1kg jaggery, ½ kg amla & 2-3 dark pumpkin leaves) It was administered to the adolescent girls in a quantity of 30 ml per day prior to the lunch for a duration of one month with the help of an ounce glass.

The standardization of amla and jaggery mixture supplemented with pumpkin leave was done at "Bangalore Test house at Rajajinagar". The result of the test is as follows.

Sl. No.	Parameters	Result
1	Acidity	7.45
2	Alcohol Content	Nil
3	Vitamin-c	.7%
4	Iron as fe	101.27mg/kg

Post test carried out using the same technique at the end of the month to assess the level of hemoglobin.

Flow diagram showing the procedure used in the study
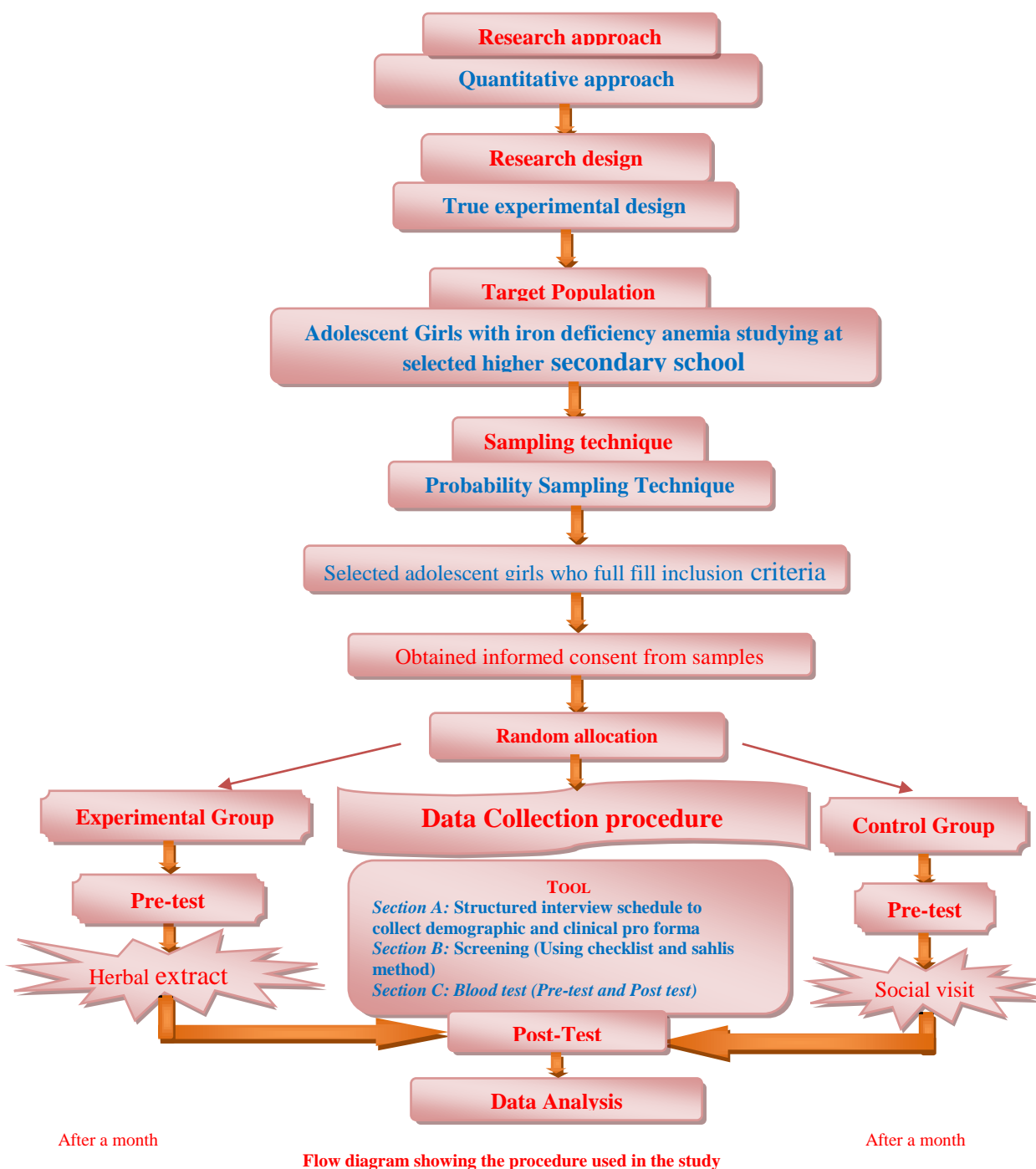
RESULTS

A total of 20 adolescent girls studying in GIPS were selected for study. Frequency and percentage distribution of demographic variables of adolescent girls with iron deficiency anemia revealed that out of 20, 60% were in the age group of 14 years and 70% girls from 9[th]std. According to this study 80% from nuclear family and 60% had monthly income of 10,000 to 15,000. The data reveals the 50% had No. of children in the family ≤ 2 & all (100%) are belong to Hindu religion. The dietary pattern shows that only 20% are pure vegetarian.

Table 1: Frequency and Percentage distribution of clinical variables of adolescent girls with anemia. N=20

Weight	Frequency (f)	Percent (%)
36-45 kg	14	70.0
46-55 Kg	6	30.0
Total	**20**	**100.0**
Height		
141-150 CM	8	40.0
151-160 CM	12	60.0
Total	**20**	**100.0**
Body Mass Index		
<18.5	10	50.0
18.5- 25	10	50.0
Total	**20**	**100.0**
Age at Menarche		
10-13 Yrs	20	100.0
Total	**20**	**100.0**
Frequency of menstrual cycle		
<21	4	40.0
21-28 Days	10	60.0
>28 days	6	100.0
Total	**20**	
No of days of menstrual flow		
<3 days	4	20.0
3- 5 Days	8	40.0
>5 Days	8	40.0
Total	20	
Amount		
High	8	40.0
Normal	8	40.0
Mimimal	4	20.0
Total	**20**	
Regularity		
Regular	6	30.0
Irregular	14	70.0
Total	**20**	**100.0**
Intake of Tea/ Coffee		
yes	18	90.0
No	2	10.0
Total	**20**	**100.0**

Table 2: Mean S.D &'t' value of pre-test & post-test findings of iron deficiency anemia in experimental group

Group	Mean	S.D	SEM	Mean Difference	Standard Error Difference	't' Value	P Value
Pre-Test	9.7	1.218	.38517	1.93	.649	2.9759	.0087
Post-Test	11.65	1.65	.52178			S	

The result of intervention shows mean score and SD in the Pre-test was 9.7±1.218 and post test was 11.65±1.65. It was observed that difference in the pre-test & post test mean values was statistically very significant at p=<0.05. (t=2.9759, df=18), there was a significant improvement in the level of HB & this proved that the intervention of herbal mixture was effective in enhancing the level of the HB.

Table 3: Mean, S.D &'t' Value of pre-test & post-test design of iron deficiency anemia in the control group

Group	Mean	S.D	SEM	Standard Error Difference	't' Value	P-Value
Pre-Test	9.8	3.09	.9771	1.329	.5792	.5696
Post-Test	9.03	2.85	.9012		NS	

The data shows that mean score in the pre-test was 9.8±3.3.09 and post-test was 11.2±3.0366. It was observed that the calculated 't' value was less than table value. So it was not statistically significant at P<0.05 level. (t=.5792, df=18).

The result shows that experimental Post-test score was 11.63±3.67 & Control group was 9.03±2.8. The calculated 't' value was greater than the table value. Hence it was statistically significant at P<0.05 level. (t=2.529, df=18).

Table 4: Comparison of mean values, S.D &'t' values of adolescent girls in the experimental & control group

	M	S.D	SEM	Mean difference	Standard Error Difference	't 'Value	P Value
Experimental	11.63	3.67	.5218	2.6	1.028	2.5298	0.0210
Control	9.03	2.8	.8854			S	

DISCUSSION

A total of 20 adolescent girls studying in GIPS were selected for study. Out of 20, 60% were in the age group of 14 years and 70% girls from 9th std. According to this study 80% from nuclear family and 60% had monthly income of 10,000 to 15,000. The data reveals the 50% had No. of children in the family <2 & all (100%) are belong to Hindu religion. The dietary pattern shows that only 20% are pure vegetarian. The clinical pro forma shows that 70% had the weight of 36 to 45kg & height of 151 to 160 cm. 50% samples had the B.M.I <18.5 & 50% had 18.5-25. But age at menarche for all samples 10-13 years & frequency of menstrual cycle 21-28 days for 60% samples. The number of days of menstrual flow, 40% had 3-5 days & 40% had > 5 days. The data revealed that of 40% had high & 40% normal amount of menstrual flow and 70% had irregular menstrual cycle. It shows that 90% had the habit of taking tea. The present study was in accordance with study conducted by Jagadeesh (2011) found that demographic variables like age religion type of family income & clinical variables like weight, height, BMI age menarche, frequency of menstrual cycle etc. Effect on level of hemoglobin. [7] Suchitra A. Rati, Shashikumar Jawadagi (2014) conducted a study on prevalence of anemia and revealed that the prevalence of anemia more among girls who were more than 14 years of age, regular periods, menstrual bleeding for more than 5 days, girls from low socio economic conditions and belongs to vegetarian diet. [8]

The mean S.D &'t' value of the pre=test and post-test findings of iron deficiency anemia in experimental group of found that mean pre-test score was 9.7 with the SD 1.218. Mean post-test score was increased to 11.65 with SD of 1.65. Change in the score was statistically tested. The calculated 't' value 2.9759 was highly significant at p<0.05 which shows that herbal extract was effective for enhancing the level of hemoglobin (t=2.9759, df=18), Hence Hypothesis H1"There will be significant effect of herbal mixture on iron deficiency anemia among adolescent girls" is accepted. These findings are in tune with a study that was conducted by Fransisco.P. et.al (2009) to assess the effectiveness of regular consumption of jaggery as a natural sweetener in fruit juice (mixed with ascorbic acid) to treat iron deficiency anaemia. The study reveals that there was improved mean Hemoglobin level from 11.1±1.09g/dl to 12.6±2.1g/dl after intervention. [9] These findings are consistent with the study conducted by Sindhu menon H. et al (2011) to assess effectiveness of gooseberry supplementation in prevention of anaemia. From these study findings it was evident that intervention was effective in improving the level of hemoglobin. [10]

Comparison of mean values, S.D & 't' values of adolescent girls in the experimental & control group revealed that experimental Post-test score was 11.63±3.67 & Control group was 9.03±2.8. The calculated 't' value was greater than the table value. Hence it was statistically significant at P<0.05 level, (t=2.529, df=18). This study was in accordance with

the study conducted by Salic Rahuman (2012) found that the difference in the post-test level of hemoglobin between the experimental and control group was statically significant at p<0.001 level. [11]

CONCLUSION

From the findings of the study it can be concluded that majority of the adolescent girls especially in rural areas had iron deficiency anemia. This herbal mixture was effective for enhancing the level of hemoglobin among the adolescent girls with iron deficiency anemia.

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REFERENCES

1. Siddharam. S.M, Venkatesh. G.M, Thejeshwari H.L. A study of anemia among adolescent girls in rural area of Hassan district, Karnataka, South India. International journal of Biological and medical research, 2001; 2(4):922-924.
2. WHO/UNICEF/UNO. Iron deficiency anaemia: assessment, prevention and control. Geneva: World Health Organization 2001.
3. Shilp. S. Biradar, somasekhar. P. Biradar, Altagi. A.S prevalence of anemia among adolescent girls. Journal of clinical and diagnostic research.2012; 5(1) 6(3): 372-377.
4. United Nations Children's Fund, 1984: analysis of the situations of Children in India, Newdelhi: UNICEF.
5. Amla herb benefits. [online]. 2006 Nov 24, Available from: URLhttp://www.articlesbase.com/altern ative-medicine-articles/amla-herb-benefits-75191.htm1#axzz1PjQbSKaD
6. Cinju John, (2012) a study on effectiveness of jiggery and amla on Hb level improvement in Iron deficiency anemia among adolescent girls in selected nursing institution of Udupi District, Karnataka, unpublished dissertation Rajiv Gandhi University of Health Sciences.
7. Jagadeesh .V {2012} A Study to evaluate the effectiveness of beetroot etract on iron deficiency anemia among adolescent girls at selected school in mysore. Unpublished dissertation Rajiv Gandhi University of Health Sciences.
8. Suchitra A. Rati, Shashikumar Jawadagi (2014). Prevalence of anemia among doles Cent girls studying in selelcted schools, International Journal of Science and Research. 2014;3(8):358
9. Fransisco.P. arcanjo, Pinto.P.V, maria. . Aranjo Marcia. R. Amici, olga.M.Amancio. Effect of beverage fortified with evaporated sugarcane juice on hemoglobin levels in preschool children [online]. 2009 26(4).
10. Sindhu menon. K, et Al effectiveness of gooseberry supplementation in prevention of anemia among antenatal mothers, ayurveda health tourism. 2011; 8(6):11-13.
11. Salic Rahuman. N, (2013), unpublished Doctrol dissertation Rajiv Gandhi University of Health Sciences.

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