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AN EXPERIMENTAL STUDY TO DETERMINE THE EFFECTIVENESS OF BEETROOT JUICE ON HEMOGLOBIN AMONG GIRLS OF SELECTED HOSTEL GIRLS, BIDAR, KARNATAKA

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ABSTRACT

Anemia is a condition in which a person lacks sufficient healthy hemoglobin, the substance carrying oxygen in red blood cells. Poor nutrient status was associated with common menstrual problems among adolescent girls from rural area. **Objectives** of the study were 1) To assess the hemoglobin level among girls in selected college hostel, 2) To determine the effectiveness of beetroot juice to raise hemoglobin level among girls in selected college hostel and 3) To associate the relationship between hemoglobin and selected demographic variables among girls in selected college hostel. Hypotheses were 1) There will be a significant difference between the pre and post hemoglobin value among the girls with anemia among girls in selected college hostel and 2) There will be an association between the hemoglobin and selected demographic variables among girls with anemia. One group pretest post test design selected for the study with a purposive sampling technique. Thirty samples of hostellers were included. Reliability was found to be reliable with the reliability coefficient of 0.92 by test retest method. The freshly prepared beetroot juice was administered to the samples for 20 days in mid morning. Pre and post assessment was done by using cyanmethemoglobin method for checking hemoglobin level. The data analysis was done by using descriptive and inferential statistics. Results proved that after beet-root juice intake it was noted to achieve t value of 15.76 which was significant improvement in overall hemoglobin levels at ($P < 0.05$**).** **Conclusion**: Study concluded that the juice of beetroot is an excellent source of iron and vitamin C, which is considered good for anemia for adolescents' girls.

KEYWORDS: Anemia, Effectiveness, Beetroot juice, Hemoglobin, Cyamethemoglobin, Hostel girls.

INTRODUCTION

Anemia is a condition in which a person lacks sufficient healthy hemoglobin, the substance carrying oxygen in red blood cells. This disease is very common, and can result in the person feeling tired, weak, dizzy, and short of breath. Global Data's epidemiological analysis of anemia found that the disease burden varies significantly by country and is quite common even in developed countries. Global Data epidemiologists obtained data from studies that collected blood samples from the general populations and tested them for hemoglobin levels. Anemia is defined as having a hemoglobin levels below the thresholds set for specific age groups by the World Health Organization (WHO). The figure below presents the total prevalence of anemia in the 16MM. India has the highest total prevalence of anemia at 39.86%, while Canada has the lowest at 3%. The US and 5EU (France, Germany, Italy, Spain, and the UK) have total prevalence levels ranging between 5.6–10.74%, making the disease a common occurrence in these markets.[1]

A study was to determine prevalence and contributing factors to anaemia among the study population. Haemoglobin concentration was assayed using cyanomethaemoglobin method. According to this research, over two-thirds of the anaemic students (68.83%) suffer from mild anaemia. A research conducted at the Vadodara nursing school in India, among female students within the age limit of 17–21 years, it was revealed that the prevalence of mild and moderate anaemia was almost equal (mild = 42.5%, moderate = 43.11%). Also it revealed that a higher percentage of female students were anaemic (86.6%). Yet nearly one in every four female undergraduates was found to be anaemic and these results warrant serious

attention to be paid regarding anemia among this population because, among other things, their academic performance may be adversely affected due to anaemia.[2]

The another study was designed to assess the prevalence of anemia among college going girls of Raipur city, Methodology: cross-sectional, descriptive study was carried out on 178 college going girls between the age group of 18-25years, residing in college hostels. Results revealed the overall prevalence of anemia was 63.48%. Out of 178 Adolescents College going girl, 113 (63.48%) had varying severity of anemia, while anemia was absent in 65(36.52%) girls. Out of the 113 girls, 30 (16.86%) were mild anemic, 70 (39.32%) were moderately anemic and 13(7.30%) were severely anemic. The present study revealed that anemia is major health problem among the college going girls in government hostels. Continuous follow-up programme and nutrition education can improve the nutritional status of college going girls.[3]

The prevalence is even higher among Indian women, with around 50% of women having low hemoglobin levels. Numerous studies conducted in India found that poor eating habits (not eating enough fruits, vitamin C, and legumes such as and beans and peas) and lack of access to healthcare are the main causes for such a high prevalence of anemia among women. Iron supplementation programs have not been successful in decreasing anemia in India. One reason for anemia being so common in both developed and developing countries could be that anemia is difficult to diagnose, as the symptoms are non-specific in the mild early stages. Another reason could be due to the high prevalence of conditions that can cause anemia, such as CKD. In people with CKD, anemia arises due to kidney damage lowering the production of hormones that direct hemoglobin production.[1]

Hemoglobin, an iron-rich protein, is an essential component for living a healthy life. When the body lacks enough healthy red blood cells or hemoglobin, it leads to a health condition known as anemia. Anemia is associated with shortness of breath, fatigue, headaches, poor appetite, rapid heartbeat and dizziness. In order to deal with such a health condition, it is imperative to improve the levels of hemoglobin in the body. The juice of beetroot is an excellent source of iron and vitamin C, which is considered good for anemia. Whereas, beetroot leaves are useful for spleen and liver diseases. It is understood to have cleansing and diuretic action."

Beetroot helps in repairing and reactivating the red blood cells in the body, which further increases the supply of oxygen to all parts of the body. One of the best ways to consume beetroot for anemia is to have it in the form of juice. Beetroot juice is a healthy potion that can do wonders for your overall health. Beetroots and carrots make a lovely pair and this combo is quite beneficial for those suffering from anemia as it helps in increasing the iron levels naturally with tangy oranges it will help to get a double dose of vitamin C.[4]

The low iron status among adolescent hostel girls from the rural zone determines that this is a high risk group to anemia and FeD and they require prevention, control and supplementation strategies. To achieve the optimal hemoglobin a dietary intake rich in iron, vitamin B6 and B12 and other specific nutrient is key to improvement. Inadequate iron intake may have a permissive role for iron deficiency in females. Hence the investigator have decided to test the effectiveness of beetroot juice on hemoglobin among hostellers.

MATERIALS AND METHODS

Objectives of the study were 1) To assess the hemoglobin level among girls in selected college hostel, 2) To determine the effectiveness of beetroot juice to raise hemoglobin level among girls in selected college hostel and 3) To associate the relationship between hemoglobin and selected demographic variables among girls in selected college hostel. **Hypotheses** were 1) There will be a significant difference between the pre and post hemoglobin value among the girls with anemia among girls in selected college hostel and 2) There will be association between the hemoglobin and selected demographic variables among girls with anemia. **One group pretest post test design** selected for the study with a purposive sampling technique. **Thirty samples** of hostellers were included. The conceptual framework adopted for the study based on Imogene King's goal attainment was selected. **Validity** of the tool was ensured by a team of experts. **Reliability** was found to be reliable with the reliability coefficient of 0.92 by test retest method. The girls with pathological condition and bleeding disorders, the girls who were taking pharmacological treatment of anemia and the who were consuming iron rich dietary supplements were excluded from the study. The freshly prepared beetroot juice was administered to the samples for 20 days in mid morning. Pre and post assessment was done by using cyanmethemoglobin method for checking hemoglobin level. The girls who were willing to participate in the study were included. The girls with pathological condition and bleeding disorders, on pharmacological treatment of anemia and consuming rich iron supplements also excluded. Data was collected during Dec 2018.The **data analysis** was done by using descriptive and inferential statistics. **Results** were done by using descriptive and inferential statistics. The beetroot juice was prepared by cutting 100gm of fresh beetroot into small pieces and grind; the beetroot extract prepared for this was mixed with 50 ml of water. 100 ml of beetroot juice was given to each adolescent girl for 20 days in morning in empty stomach.

Ethical clearance: Ethical clearance was taken from Institutional Ethical Committee Board of Vasantha college of Nursing, Bidar, Karnataka. Written consent of

each subject was obtained before the study. Confidentiality was maintained throughout the study.

RESULTS AND DISCUSSION

Table 1: Frquency and percentage distribution of pre and post test haemoglobin level according to grade among hostel girls N=30.

Hb% Level	< 7		7and above		10 and above	
	F	%	F	%	F	%
Pretest Level	2	6.6	14	46.66	14	46.66
Post test Level	0	0	8	26.66	22	73.66

It is observed that in table 1 during the pre test it is found that 6.6% had severe anemia 46.66% had moderate anemia and 46.66% had mild anemia. Findings strongly suggest that nutrition can influence of improving the hemoglobin as hostellers don't find balanced and nutritious food.

It is monitored that post mean score was higher in progressing the Hemoglobin value .The post-test can be a valuable diagnostic tool for more effective in demonstrating the interventional effect and anemia significantly decreased after the intervention in post test by 73.66% from 46.66%, attractively results noted that none were in < 7 hemoglobin% level and 26.66% had gained 7 and above category.

Table 2: Effectiveness of Beetroot juice on hemoglobin value among hostel girls N= 30.

Test of Hb	Mean	SD	t value	P value
Pre Test	8.8	1.639	15.76	P< 0.05*
Post Test	11.17	1.681		

*****Significant P <0.05

The above table 2 value of post mean score of hemoglobin value indicated that great improvement in hemoglobin value 11.17 with the SD 1.681 than the pre mean hemoglobin value 8.8 and SD 1.639. Results proved that after beet-root juice intake it was noted to achieve t value of 15.76 which was significant improvement in overall hemoglobin levels at ($P < 0.05$). Results provide establishment that consuming beet root juice is highly beneficial in treating anemia.so Hypothesis I has accepted. It has been proved that beets build red corpuscles and add tones to blood so that it increases hemoglobin level in blood. This represents that there was a significant difference between pre and post test hemoglobin level among hostellers.

Study findings is consistent with the present study aimed to investigate the effects of consuming 6 weeks of beetroot juice (Beta vulgaris L.) on hematological parameters in female soccer players. Twenty female soccer players were selected randomly and assigned into two groups: Experimental (beetroot juice, n = 10) and control (placebo, n = 10). Subjects trained for six weeks (three 90-min sessions per week) by consuming 200 mL of juice 2 hours prior to training. Blood samples were collected and investigated (Hb, Hct, RBC, Iron, MCV, Ferritin and TIBC) in pre- and posttest. Paired Sample t-test and Independent Sample t-test were used for comparision within and between groups, respectively. Statistical significance was $P<0.05$. Results showed that the experimental group had significant increases in the Hb, Hct, RBC, iron, and ferritin levels ($P < 0.05$). No significant difference was detected in MCV levels ($t = -1.10$, $P = 0.29$) and there was a significant decrease in the TIBC ($t = 4.99$, $P = 0.001$). In the control group, there were significant differences in (Hct, iron, ferritin and TIBC) ($P < 0.05$). In addition, there were significant differences in (Hb, Hct, RBC, iron, ferritin and TIBC) levels between experimental and control subjects ($P < 0.05$), but there was no significant difference in MCV ($t = 1.11$, $P = 0.28$). Study concluded since beetroot juice consumption has significant effects on the levels of some hematological parameters in female soccer players, it can be used to prevent and improve anemia among these athletes.[5]

Table 3: Association between pre test hemoglobin values with demographic variables of hosteller girls.

Demographic variables		Below 7	7 and above	10 and above	Chi square
Religion	**Hindu**	4	9	7	X^2 2.3229
	Muslim	2	1	4	$P= 0.05^{Ns}$
	Christian	1	1	1	(0.676603)
Menstural flow	Regular	3	7	13	X^2 4.685
	Irregular	3	3	1	$P= 0.05^{Ns}$ (0.096087)
Previous disorders	Yes	1	1	4	X^2 1.7102
	No	6	9	9	$P= 0.05^{Ns}$ (0.425248)

Diet	Veg	4	6	10	X^2 0.525 P= 0.05^{Ns} (0.769126)
	Non veg	1	3	6	
Socio Economic Status	Below 2000	2	2	3	X^2 1.4719 P= 0.05^{Ns} (0.831614)
	2000 and above	2	4	5	
	3000 and above	1	4	7	
Previous treatment of Iron taken	Nil	3	8	13	X^2 1.6667 P= 0.05^{Ns} (0.796763)
	Iron tonic	1	1	1	
	Iron tablet	1	1	1	

Non significant P= 0.05^{Ns}

In regards to chi-square table 3 results represented that there was no significant difference between hemoglobin with all the demographic variables at P=0.05 level. Hence results support the effectiveness of beetroot juice in improving hemoglobin values among adolescents.

CONCLUSION

Prevention of anemia is effective when the strategy is focused right from adolescents for their future reproductive life. Poor nutrient status were associated with common menstrual problems among adolescent girls from rural area. The results showed a significant increase in Hb levels in girls after beetroot juice consumption. This shows that there is significant (at $p<0.05$ level) relationship between pre-test and post-test scores of Haemoglobin level among adolescent girls.

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