EFFECTIVENESS OF BEETROOT JUICE ON THE PREVENTION AND MANAGEMENT OF ANAEMIA

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ABSTRACT

Objective: To revealed the effect of beetroot juice onan expansionof Hb levelon adolescent girls andto evaluate the association between Hb levelwith a selected demographic variable.

Method:It is a true experimental study withanevaluative approach that was adopted and the study was based on the conceptual framework of J. W. Kenny's Open System Model. The sample of 46 GNM students was divided into 23 in each experimental and control group. Data collected by using socio-demographic variable and nutritional status of them. The tool was validated by verifying it with a different expert from professionals of medical science, nursing science, and statistician.

Result:In the present study among the total sample of both experimental and control group majority of girls that are 41 (89.13%) wasthe age of 17-19 years, 29 girls (63.04%) were from the Hindu religion. Majority of the girls that was 27 (58.69%) had family income between 1-2.5 lakh, 29 girls (63.05%) had BMI between 18.5-24.9, most of the girls, 27 came from a joint family that is 58.70%, among them, 23(50%) had regular Menstrual cycle of 28-30 days. Most of the girls, 22(47.82%) of the duration of Menstruation is 3-5 days/month. Among them, 19 girls (41.31%) had normal menstrual bleeding Parten and 30 girls (65.22%) were non-vegetarian. In the pre-test it shows that girls ofthe Experimental group were 13(56.53%) normal, 7(30.43%) mild anemia, 3 (13.04%) of them are in moderate anemia. In the control group, 10(43.48%) were normal, 7(30.43%) were in mild anemia, 6 (26.09%) of them were in moderate anemia. After the intervention in the Post-test level of hemoglobin in young ladies of the Interventional group was 17(73.92%) were in normal, 4(17.39%) were in mild anemia, 2(8.69%) were in moderate anemia. In control group 10(43.48%) girls were in normal, 8(34.79%) were in mild anemia, 5(21.73%) were in moderate anemia. In the pre-test, the degree of hemoglobin among girls in the Interventional group was Mean 9.68 and

SD 2.54 and in post-test mean score was 11.20 and SD 0.56. the mean difference among preand post-test was 1.97. The paired "t" value was 9.67 which was high than the tabulated value. There was an association between the level of Hb with BMI, Menstrual cycle, duration of bleeding, and type of diet as the tabulated value which is 5.991 at P value less than 0.05. Thus, there was no noteworthy relationship among the level of hemoglobin with the socio-demographic variables such as Religion, family income, and amount of bleeding at P<0.05.

Conclusion: The researcher concluded that Beetroot juice can help to increase the Hb level effectively.

Keywords: Beetroot juice,Anaemia, Haemoglobin level

Introduction

The world is home of 1.2 billion people matured 10-19 years. India has the biggest populace of youths (243 million) trailed by China (207 million) and United States (44 million). Among young people, Adolescence ladies comprise a bigger part. In a family with constrained asset the female kid is bound to be dismissed. She is denied of acceptable food and instruction and is used as an additional working hand to do the family unit works. The additional weight of menstrual blood misfortune, typical or unusual hastens the frailty time and again. (1) Anaemia due to Iron deficiency is a condition described by a diminished number of red platelets and has genuine ramifications for the wellbeing, intellectual turn of events, and efficiency of grown-ups and youngsters around the world.(2) Youth is a transitional time of physical and mental human improvement for the most part among adolescence and legitimate adulthood. Roughly 20% of the total populace is teenagers and dominant part of them live in creating nations. In India the predominance of sickliness among young adult young ladies is 90%.(3) Iron deficiency causes unfavourable results as the infection progress. It influences the development of juvenile young ladies as well as influence their mindfulness, memory and school execution and maintenance in school and participation. It additionally causes delay in beginning of menarche, influences resistant framework prompting diseases. In the event that the pallid young adult young lady gets pregnant, it might increment fetal horribleness and mortality, increment the perinatal hazard, increment the rate of Low Birth Weight (LBW), and by and large increment in Infant Mortality Rate (IMR) and Maternal Mortality Rate (MMR). As developing pregnant young people contend with the developing embryo for supplements pallor in pregnancy will be more

terrible than in more established ladies.(4) In India the pervasiveness of frailty among juvenile young ladies is 90%. Varieties in commonness pace of weakness are seen inside the nation with the least predominance of 33% being accounted for from Andhra Pradesh to most elevated of 98 % in Rajasthan. Another comparable examination by **Toteja GS** et.al revealed 90.1% of iron deficiency among juvenile young ladies in 16 areas of India.(3) Hb focus is the most dependable marker of pallor at the populace level, instead of clinical estimates which are emotional and in this way have more space for blunder. Estimating Hb fixation is moderately simple and cheap, and this estimation is much of the time utilized as an intermediary pointer of iron insufficiency.(5) In an assessment report on the nutritional status of adolescent of both sexes suggest that they consume inadequate iron and proteins in the diet. The National family health survey (NFHS) reveals the prevalence of anemia to be 70-80% in India. Among them children 70%, in pregnant women 80%, and adults 24%. The most important and common cause of the high prevalence of anemia in India is due to low dietary intake and poor availability of iron, hookworm infestation andmalaria(6)**Kumar A** et al. conducted a study in the year of 2018 among adolescent girls (10-19) years of age at school of Jorhat, Maharashtra. He took 340 samples in school going adolescent girls and to assess the hemoglobin estimation by using of cyanmethemoglobin method. As per her views (27.9%) having mild anemia, (47.5%) having moderate anemia and (15.5%)havingsevereanemia, anemiaassociatedwithexcessivemenstrualbleeding, vegetarian diet, age group at menarche, low socio-economic status of the family, and also Body Mass Index (BMI).(7)**Yuthika Agrawal** et al. in the year of 2017 investigated on nutritional deficiencies in anemia in adolescents of Northern Indian". She has collected 200 samples, 100 samples having adolescent boys, and 100 having adolescent girls in (10-19) years of age group. She found the results in boys 56(5.5%) have mild anemia, 27(28.3%) having moderate anemia and 16(16.2) having severe anemia and in girls 45(44.6%) having mild anemia, 31(30.7%) having moderate anemia and 25(24.7%) having severe anemia. She concluded that girls are more suffering from anemia than boys due to the nutritional pattern, menstrual cycle, less education of parents, and low socioeconomicstatus.(8)Kanodia p, et al. in the year 2016 conducted a study in which they have collected 433 samples of girls in Govt. school of Dhahran, Nepal, and checked the Hb by using cyanmethemoglobin method. They found that the results total (51.3%) having anemic, out of this (28.5%) having mild anemia and (23.9%) having severe anemia. The prevalence of anemia due to the worm infestation, parental

education, socioeconomic status including housing, drinking water, menstrual bleeding, and diet pattern of adolescent girls in Nepal.(9)

Adolescents are constituting nearly about half of the total population. It is a period of transition from childhood to adulthood.So, from the above studies it is concluded that the adolescence period is the most vulnerable time for a female child. As the GNM students are staying away from home so it is important to observe their health status by preventing them from anemia.So, the researcher felt necessary to conduct a study on it, to identify anemia among students and provide them the beetroot juice to improve their health status.

Material and method:

In this investigation, the Quantitative Evaluative methodology is utilized. The Quasi-experimental pre-test, post-test controlgroup research design was utilized. The investigation has satisfied the measures of control and manipulation. In current study, the Independent variable was Beetroot juice and the Dependent variable was the level ofhemoglobin. The socio-demographic variables were Age, religion, annual income, BMI, type of family,type of diet, menstrual cycle. The study population was GNM students of a selected nursing college of Bhubaneswar, Odisha. The sample was the GNM 1st year students of 46 in number. They are divided into two groups of 23 students in each group as an experimental and control group. Data were collected by a simple random sampling technique.The inclusion criteria werethose that had thehemoglobin level between 7.1-10.9mg/dl. The exclusion criteria were who have a history of bleeding disorder like hemophilia or other major illness like leukemia and renalfailure and who have allergic to beetrootjuice and had Hb level less than 7.1 mg/dl. Data were collected by a self-structuredquestionnairewhich has divided into two parts as section A includes demographic variables and section B which includes information regarding the general health condition and dietary Parten of students. Content validity of the tool prepared on expert's opinions. Two experts were medical Doctor and three experts were community health nursing personnel. The reliability of the instrument is tried by the test re-test strategy and it was discovered solid by utilizing it in the pilot study. The data collection for hemoglobin level the instrument used for this study was sahilshemoglobin meter. A total of 10 students was selected by probability, random sampling technique to conduct the pilot study. Data was collected using the data collection proforma and assessment sheet. There was no difficulty occurred during the pilot study period and the study was found to be feasible as per the results of the pilot study.

The tools for the study were also found to be appropriate as per the pilot study. Those students were in the experimental group after the pre-test 100 ml of beet juice was provided to them for one month along with breakfast. After one again their Hb level was recorded. The data were analyzed and interpreted by using descriptive & inferential statistics.

Result:

Finding related to the sociodemographic variable of the total sample under study (Table No.1)

In the present study among the total sample of both experimental and control group majority of girls that are 41 (89.13%) were from 17-19 years, 29 girls (63.04%) were from the Hindu religion. Majority of the girls that was 27 (58.69%) had family income between 1-2.5 lakh, 29 girls (63.05%) had BMI between 18.5-24.9, most of the girls, 27 came from a joint family that is 58.70%, girls 23(50%) of them had regular Menstrual cycle of 28-30 days. Most of the girls, 22(47.82%) of the duration of Menstruation is 3-5 days/month. Among them, 19 girls (41.31%) had normal menstrual bleeding Parten and 30 girls (65.22%) were non-vegetarian.

Finding related to hemoglobin level in boththe experimental and control group. (Table no-02)

In the pre-test, it shows girls in the Experimental groupwere 13(56.53%) normal, 7(30.43%) mild anemia, 3 (13.04%) of them are in moderate anemia. In the control group, 10(43.48%) were normal, 7(30.43%) were in mild anemia, 6 (26.09%) were in moderate anemia. After the intervention level of hemoglobin of Post-test in girls of the Interventionalgroup was 17(73.92%) were in normal, 4(17.39%) were in mild anemia, 2(8.69%) were in moderate anemia. In the control group, 10(43.48%) girls were in normal, 8(34.79%) were in mild anemia, 5(21.73%) were in moderate anemia. Thus, in the wake of giving beetroot juice there was some expansion in Hb level of girlsexperimental group.

Finding related to the comparison of the hemoglobin level in the experimental group after and before the intervention. (Table no-03)

This examination shows that in pre-test the hemoglobin level among young ladies in the trial bunch was Mean 9.68 and SD 2.54 and in the post-test mean score was 11.20 and SD 0.56. the mean distinction among pre-test and post-test was 1.97. The paired "t" value was 9.67 which

was high than the tabulated value. In this way, it shows that there was a huge relationship (at P<0.05 level) between pre-test and post-test scores on hemoglobin levels among young ladies in the trial and control gathering. It shows that beetroot juice on Hemoglobin levels among young ladies in the trial bunch was powerful. As there was no intervention to control group so t value was no needto calculate.

Finding related to the association between hemoglobin level with a selected demographic variable. (Table no-04)

It reveals that there was a significant association between the level of hemoglobin with demographic variables of BMI, Menstrual cycle, duration of bleeding, and type of diet as the tabulated value which is 5.991 at P<0.05. While there was no critical association was found betweenthe level of hemoglobin with the demographic variables such as Religion, family income, and amount of bleeding at P<0.05. It seems that there was some association between the effectiveness of beetroot juice on hemoglobin some demographic variables like BMI, Menstrual cycle, duration of bleeding, and type of diet.

Discussion

The current examination was supported by one investigation which was led by Vanitha S. (2019) to evaluate the impact of Beet Juice for college students. The discoveries of the investigation show that the general pretest mean score of hemoglobin was 10.04 with SD of 0.58 and the general posttest mean score of hemoglobin was 12.67 with SD of 0.99. It demonstrated that after the intervention of beetroot juice, there was a high critical improvement in the hemoglobin level of adolescent girls with a "t"value of 17.787 at p=0.001(10) The organization of beetroot juice was successful to expand the Hb level and there was a relationship between Hemoglobin level with some segment factors like BMI, Menstrual cycle, duration of bleeding, and dietary habit. The discoveries of the current investigation can be executed in an enormous populace for speculation of the outcome. The outcome can be actualized in young girls those are having mild to moderate anemia with the absence of any other serious blood disorders. Medical caretakers ought to have sufficient information with respect to the utilization and advantages of beetroot juice.

Conclusion:

To conclude, this study has educated us that, beetroot juice is thevery cheapest food which can

easily available in the market. by the use of it, we can prevent diseases like anemia. As the nursing profession, our role is to identify the vulnerable group for anemia and provide them health education regarding uses, benefits of beetroot juice and those are critical cases refer them to appropriate medical treatments. As a nursing researcher, we have to do a further review regarding study related to beetroot juice in the prevention of anemia for generalizing the result in a large group of population.

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Ethical statement: The ethical committee of the organization has approved the study for research and the prior consent of the parents of children was taken before the collection of the samples.

Conflict of interest: The author declares that there is no conflict of interest.

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Table no. 01: Description of a socio-demographic variable by frequency (f) and percentage (%)

N=46

Socio-demographic variables		Frequency (f)	Percentage (%)
Age	17 – 19 years	41	89.13
	19 – 23 years	05	10.87
Religion	Hindu	29	63.04
	Muslim	13	28.26
	Christians	04	8.70
Annual income of family	Less than 1 lakh	11	23.92
	1-2.5 lakh	27	58.69
	More than 2.5 lakh	08	17.39
BMI	< 18.5	08	17.39
	18.5 – 24.9	29	63.05
	25 – 29.9	05	10.87
	>30	04	8.69
Types of family	Nuclear	19	41.30
	Joint	27	58.70
Personal hygiene	Hygienic	39	84.78
	Unhygienic	7	15.22
Menstrual cycle	<28 days	11	23.92
	28 – 30 days	23	50.00
	>30 days	12	26.08
Duration of bleeding	3- 5 days	22	47.82
	5- 7 days	11	23.92
	>7days	13	28.26
Amount of bleeding	Normal	19	41.31
	Heavy	15	32.61
	Scanty	12	26.08
Dietary Parten	Vegetarian	16	34.78
	Non-vegetarian	30	65.22

Table 02: Comparison of frequency and percentage of hemoglobin level of bothgroups.

(N1=23, N2=23)

Level of anemia (gm/dl)	Before intervention				After intervention			
	Experimental group		Control group		Experimental group		Control group	
	(f)	(%)	(f)	(%)	(f)	(%)	(f)	(%)
Normal (11-13)	13	56.53	10	43.48	17	73.92	10	43.48
Mild anemia (10-10.9)	7	30.43	7	30.43	4	17.39	8	34.79
Moderate anemia (8-10)	3	13.04	6	26.09	2	8.69	5	21.73

Table 3: Result of t-test value in experimental group

(N1 = 23)

In the experimental group	Mean	SD	MD	t- value	Interference
Pre-test	9.68	2.54			
Post-test	11.20	0.56	1.97	9.67	Statistically significant

P<0.05

Table 4: Association between hemoglobin levels with selected demographic variable.   **(N = 46)**

P<0.05

Demographic variable	calculated Chi-square value	df	Interference
Religion	1.763	2	Statistically not significant
BMI	8.621	2	**Statistically significant**
Family income	3.224	2	Statistically not significant
Menstrual cycle	7.789	2	**Statistically significant**
Duration of bleeding	9.494	2	**Statistically Significant**
Amount of bleeding	3.104	2	Statistically not Significant
Type of diet	6.698	2	**Statistically significant**