



IS WHEAT GRASS JUICE A GOOD COST EFFECTIVE ALTERNATIVE TREATMENT FOR ANEMIA OF THE RURAL AREA?

SHISHIR VIND SHARMA, PRADEEP KUMAR MANHARE,
RUPESH THAKUR and SHUBHRA SHARMA

School of Life and Allied Sciences
ITM University, Atal Nagar
Chhattisgarh, 492001, India

Department of Mathematics
Santosh Rungta Groups of Institution Bhilai
Chhattisgarh, 490001, India
E-mail: shubhrasharma13@gmail.com

Abstract

Unhealthy diets, malnutrition and regular menstrual cycle in womens affect normal metabolisms of iron which promotes anemia in human population. Occurrence of high cost treatments is not affordable by rural public. Hence, the grass of “Triticum aestivum” has been used as an alternative solution enriched with amino acids, minerals and vitamins. Hence the study has been designed to judge the prevalence of anemia and its low cost remedies for adult girls belonging from rural area. The experiment was initiated with Sahli’s method for hemoglobin estimation. Afterward, 52 girls were elected with decreased hemoglobin level and then administrated with 10 grams of wheat grass for chewing per day up to 45 days. Meanwhile the hemoglobin levels were checked after every 15 days with Sahli’s meter. The results revealed that, out of all 52 girls 50% were showing increased levels of hemoglobin within 30 days. Thus it would be a good alternative treatment for anemia.

Introduction

Hemoglobin (Hb) is an iron-containing protein found in red blood cells. The level of the protein in the blood gives an important information about the status of anemia in an individual [5]. Moreover, lower hemoglobin level generates serious global health problem in both rural and urban area [2]. It is

2020 Mathematics Subject Classification: 62Bxx.

Keywords: Hemoglobin, Wheat grass, Anemia, Herbal medicine.

Received February 15, 2022; Accepted May 23, 2022

a condition where Iron deficiency are the most common reason found for anemia [4], [15]. Comparison with male, womens are more suffering from anemia due to regular menstrual cycle [3]. Another comparison with rural population, the peoples more suffer from anemia than urban area as well as the medicine is not be affordable in the area [6].

In addition, it has been estimated that out of 24.8% of the global population, 50% of women and 26% of male are affected from anemia at reproductive age [5]. On the other side it has been also recorded that the number of patients is being significantly increased but doctor's numbers are not being increased hence, the ratio of patient and doctors is being changed badly upto 1700:1 [7]. Therefore, in this present study, a survey has been done among college students between the age of 19-22 from rural areas which is focused on following objectives. Firstly, to calculate and correlate the BMI of anemic women and boys with a level of hemoglobin, secondly, to determine the doses and administration of wheat grass that would be beneficial for anemic subjects and finally to inform the rural population for self-care from iron deficiency. In addition, hypothetically, it was expected that various doses of wheat grass with longer period of administration could increase the level of hemoglobin.

Material and Methods

The study was designed into two different experimental parts, wherein the first part of the work was to estimate the hemoglobin level among 265 students of ITM University, Uparwara village, Atal Nagar, Chhattisgarh coming from rural area (Uparwara village). And the second one was focused on good administration of wheat grass to the anemic students in order that a cost effective solution could be found for anemia treatment with respect of rural population. First of all the students were dived into three different age group of 19-20, 20-21 and 21-22, in which common symptoms of anemia were observed through counseling regarding nutrition, life style and menstrual cycles. Having taken the history, the students were selected for hemoglobin estimation with sahli's method. Meanwhile, the BMI was also calculated by Quelet formula [11].

Quelet formula:-

$$\text{BMI} = \text{Weight (kg)}/\text{Height (m}^2\text{)}$$

Cultivation and administration of wheat grass

For wheat grasses germination, the seeds of *Triticum aestivum*'s with an appropriate amount were taken for sowing as well as harvested it every 7th day when the grasses were germinated upto 5 to 6 inches. Having harvested, sufficient amount of wheat grass were collected daily to feed the anemic students. Simultaneously hemoglobin level was estimated with Sahli's meter, wherewithal graduated hemoglobin tube was filled with N/10 hydrochloric acid up to the marking of 2 grams, furthermore blood sample was collected with capillary tube and poured into hemoglobin tube. The blood sample and N/10 HCL were mixed with a little finger vortex. Further the mixture tube of Sahli's meter was kept for 10 to 15 min to be completed the reaction. Later on, the acid hematin was diluted by addition of appropriate amount of distilled water gradually with the dropper until it is matched with the standard colour plates of the comparator. Results were read as gram/dl. Having observed the result of hemoglobin, the students with decreased levels were chosen for wheat grass administration. Hence, the different doses of wheat grass about 10, 12, 14 and 16 grams were decided to be gently administered to the anemic students. Each dose was administered per day for 45 days. Meanwhile, the hemoglobin was estimated three time with Sahli's meter every after 15 days.

As per the planning of the study the anemic students were classified according to the normal range of hemoglobin (Male:- 13-17 gram/dl and Female:-11-15gram/dl) recommended by WHO.

Data Analysis

The present study was analysed with Analysis of Variance (ANOVA) to observe the difference between means of variance wherein, one way ANOVA was performed by MS excel.

Result

The present study, the prevalence of anemia among college going students of ITM University coming from rural area were considered for the study as well as tested for hemoglobin level for anemia shown in Table 01.

Table 01. Showing status of anemia among the students.

S.No	Age Group	No of Students	Male Students						Female Students							
			Normal	Anemic	Total	HB level of anemic Students	BMI of Anemic Male			Normal	Anemic	Total	HB level of anemic Students	BMI of Anemic female		
							Under BMI	Normal BMI	Over BMI					Under BMI	Normal BMI	Over BMI
01	19-20	130	65	06	71	09-11	05	01	00	48	23	59	07-10	15	05	03
02	20-21	110	54	04	58	8-9	04	00	00	34	18	52	07-10	12	04	02
03	21-22	45	23	03	25	8-9	03	00	00	09	11	20	07-10	08	03	00

Table 02. Demonstration of the positive result after the wheat grass administration.

S.No.	Age group	Male-13				Female-52			
		No of students	Positive results			No of students	Positive results		
			Under BMI	Normal. BMI	Over BMI		Under BMI	Normal. BMI	Over BMI
01	9-20	06	03	01	00	23	09	02	00
02	20-21	04	03	00	00	18	07	02	00
03	21-22	03	02	00	00	11	05	01	00

Status of anemia

In this study, out of 265 students, 120 (45.28%) students were girls and 145 (54.71%) were boys. Wherein 24.52% of students (65 in number) were found anemic Table 01. Thereupon, male female ratio was recorded as 19.62% (52 in numbers) of female and 4.90% (13 in numbers) of male subjects (Figure 1.1). Having correlated BMI with anemia, in females it was recorded that 11.69% of subjects were under, 2.26% of subjects were over and 5.67% of subjects were normal BMI. Whereas in case of male, out of 4.90%, 1.50% of subjects were under, 0.37% was over and 3.03% were normal weight. All over

the result indicates that adult females are more anemic than male subjects, and it has also been found that the most of anemic females are under weight as compare to males.

Wheat Grass Administration

Having administrated the various doses of wheat grass to both male and female subjects. Of which, only dose of 10 gram wheat grass per day was showing good (50%) results where 26 females were showing increased level of hemoglobin between 1 to 1.5 gram within 30 days and male subjects were showing 76% of increased level of hemoglobin around 1 gram/dl. With correlation of male subjects were showing 26% more result than females subjects. In further result administration of 8 grams was showing lower result where 39% of female subject were showing increased hemoglobin level between 0.5 to 0.8 and male subjects where showing 65% of increased level of hemoglobin between 0.8 to 1 gram/dl. The increased administrated doses showed no significant increased result were observed up to 14 gram of wheat grasses doses.

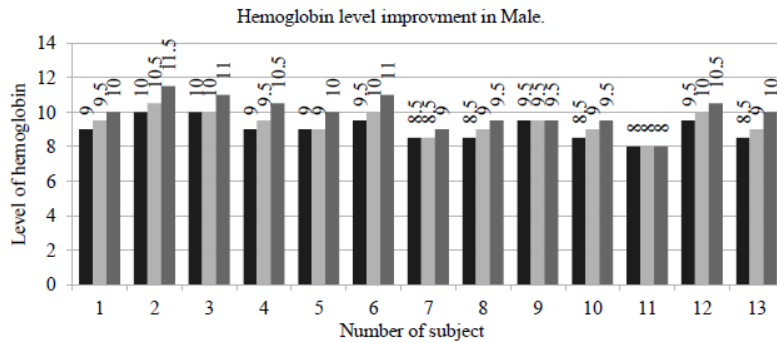


Figure 1. Series 1 is showing hemoglobin level before investigation, Series 2 is showing hemoglobin level after 15th day of investigation and Series 3 is showing hemoglobin level of day 30th.

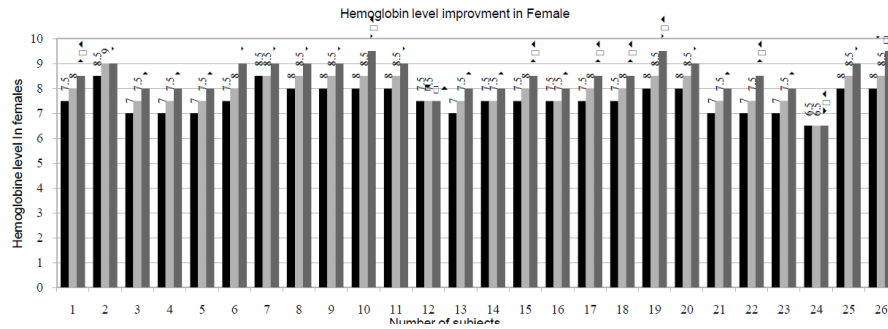


Figure 2. Series 1 is showing hemoglobin levels before investigation, Series 2 is showing hemoglobin levels after 15th day of investigation and Series 3 is showing hemoglobin levels after day 30th.

Correlation with BMI

With biological correlation of BMI, the present study has revealed that, the maximum students who has improved their hemoglobin were found with lower BMI. Further correlation with age has revealed that total number of registered girls students between 21-22 age group that was 20 and out of this figure 11 students were anemic and 09 student were found normal. In this age group, the number of anemic girls were higher than other age groups as well as wheat grass administration results shows 54% of positive result, although at the college level usually lower numbers of students are found between the ages of 21-22 and higher number is found below 20.

Analysis of Data

In this study, data of hemoglobin level of both male and female were analyzed with Analysis of Variance (ANOVA) separately. Resulting, It has been found that the F value (5.39 for male and 16.36 for female) were greater than critical value within the table (3.25 for male and 3.11 for female). It indicates that there is a significant difference between mean of groups thus, the alternative hypothesis has been accepted for the work.

Discussion

The nutritional values of wheat grass is comprised with 860 mg protein, 15 mg calcium, 38 mg lysine, 18.5 mg chlorophyll, 7.5 mg vitamin C and B

complex vitamins [12]. Therefore, it has been used for treatment of various diseases such as ulcerative colitis, excessive bleeding, Rheumatoid arthritis, Thalassemia even squamous cell carcinoma also [1], [12],[13], [14].

Presently, it has been revealed that 0.5 to 1.5 grams/dl of hemoglobin can be easily improved within 30 days of administration of wheat grass. Where the doses of wheat grass and time period could be varied. Comparison with other studies, Marwaha et al., observed 50% of positive cases. And instead of fresh grass all the subjects were treated with 100 ml of wheat grass juice, in this study among 16 patients, 8 patients were respond [8]. One an another study where tablets of the grass with various doses were given to the patients of various age. The result was observed as the per-treatment status of Hb was 8.54 and after the treatment Hb was found increased up to 9.13 [14]. Comparison with present study, fresh wheat grass administration improves the hemoglobin level up to 0.5 to 1.5 gram/dl. Consequently, it has been proved that the fresh wheat grass without any processing would be more applicable for treatment of anemia.

Conclusion

In previous study, wheat grass was used as a juice or tablets, over there it was a mixture of many processing that could reduce the nutritional values and medical properties of the grass. Whenever, the fresh wheat grass is taken for chewing with fiber that could contain complete nutritional and medical values as compare with juice and tablets as well as it is affordable in rural area easily. Which would be more applicable in anemia. Hence in present study fresh wheat grass is used without any processing, and it is concluded that fresh wheat grass would be good alternative to treat the anemia which is caused by unhealthy diet, malnutrition and regular menstrual cycle in both rural and urban population.

Acknowledgment

The present work was done with following contributions of the professors of ITM University Dr. Rupesh Thakur in designing of the work and writing of manuscript was done by Dr. Shishir Vind Sharma. The experimental portion was done by the student of the University Predeep Manhare and the statistical analysis was done by Dr. Shubra Sharma Assistant professor Santosh Rungta group of institution Bhilai Chhattisgrah.

References

- [1] A. E. Ben et al., Wheat grass juice in the treatment of active distal ulcerative colitis: A randomized double-blind placebo-controlled trial, *Scandinavian Journal of Gastroenterology* 37(4) (2002), 444-449.
- [2] A. C. Guyton Red blood cells, anemia and polycythemia, *Textbook of physiology*, Philadelphia, Elsevier, 2006.
- [3] S. Gautam, M. Haju and H. Kim, Determining factors for the prevalence of anemia in women of reproductive age in Nepal: Evidence from recent national survey data, *Journal* 14(6) (2019), Available online at <https://doi.org/10.1371/journal.pone.0218288>.
- [4] J. L. Harper, E. C. Marcel and C. B. Emmanuel, *Iron deficiency anemia: Practice essentials, Pathophysiology and Etiology*, Medscape, 2015.
- [5] K. Kaur, Anemia 'a silent killer' among women in India: Present scenario, *European Journal of Zoological Research* 3(1) (2014), 32-36. Available online at www.scholarsresearchlibrary.com.
- [6] L. Matthew et al. Burden and determinants of anemia in a rural population in south India: A cross-sectional Study, *Hindawi Anemia*, Pages 9 (2018). Available online at <https://doi.org/10.1155/2018/7123976>
- [7] K. L. Mukherjee, S. Ghosh *Medical laboratory technology procedure manual for routine diagnostic tests*, Noida McGraw Hill Education 2(11) (2012), 263-266.
- [8] R. K. Marwaha, D. Bansal, S. Kaur and A. Trehan, Wheat grass juice reduces transfusion requirement in patients with thalassemia major: a pilot study, *Indian Pediatrics* 41(5) (2004), 716-720.
- [11] S. R. S. Pasricha et al., Diagnosis and management of iron deficiency anaemia: Clinical Update, *Med J.* 193(9) (2010), 525-532. Available online at https://www.mja.com.au/system/files/issues/193_09_011110/pas10224_fm.pdf
- [12] N. Soundarya and P. Suganthi, A review on anaemia types causes symptoms and their treatments, *Journal of Science and Technology Investigation* (2016), 10-7. Available online at <http://pubeese.com/journal/index.php/josti/article/view/5>.
- [13] A. A. Shirude, Phytochemical and pharmacological screening of Wheat grass (*Triticum Aestivum* L), *International Journal of Pharmaceutical Sciences Review and Research* 9 (2011), 159-164. Available online at www.globalresearchonline.net.
- [14] K. Singh, M. S. Pannu, P. Singh, J. Singh, Effect of wheat grass tablets on the frequency of blood transfusions in Thalassemia Major, *Indian J. Pediatr* 77 (2010), 90-101, Available online at <https://doi.org/10.1007/s12098-010-0002-8>.
- [15] M. R. Turner and K. Talbot, Functional vitamin B12 deficiency, *Pract Neurol* 9 (2009), 37-41.