

COMPARATIVE STUDY ON EFFECT OF GARDEN CRESS SEEDS HEALTH DRINK AND “MIKRONUTRIENT SUPPLEMENTATION” ON MNC SCHOOL CHILDREN IN ANEMIA

Abstract

Anemia is one of the major public health problems that affect the world total population widely. Anemia is a condition characterised by reduction in the volume of red blood cells and a decrease in the haemoglobin concentration in blood. Garden cress seeds being the richest source of non-heme iron, helps to increase the haemoglobin levels. The objective of study is to study of effect of garden cress seeds to improve the status of iron in children of MNC school Aurangabad. The study was conducted on school going children group of 40 respondents (8-11years). The total 40 respondents were selected and divided into two groups such as 20 children in GPA (experimental group) and 20 children in GPB (placebo group), pre and post blood haemoglobin level was observed.

The health drink which is developed with garden cress seeds was given to the GPA and Mikronutrient supplementation syrup given to GPB. The haemoglobin level of experimental group was compared with placebo group which are 12.18g/dl and 10.71g/dl respectively. Post experimental values were found more than pre experimental value. There was significantly increased haemoglobin level. The garden cress seeds health drink was found more effective in increasing the haemoglobin than Mikronutrient supplementation syrup in school going children. Garden cress seeds health drink help to increase the haemoglobin level, when taken regularly it help to reduce the risk of anemia in school going children.

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Key words: Anemia, Garden cress seeds,
School going children, Mikronutrient
supplementation syrup.

I. INTRODUCTION

Micronutrient deficiencies play a significant role in the overall health and welfare of our population. Among the various essential micronutrient deficiencies that have profound detrimental effects on physical, cognitive, and socio-economic well-being, anemia, particularly resulting from iron deficiency, stands out as the most prevalent.

Anemia is a medical condition characterized by a decrease in the volume of red blood cells and a reduction in the concentration of hemoglobin in the blood. This decrease in red blood cells diminishes the amount of oxygen delivered to the body's tissues and organs, leading to a range of adverse symptoms. Anemic individuals often exhibit paleness, weakness, and may experience breathlessness or fainting episodes. They may also report a racing heartbeat, insomnia, decreased appetite, or a general sense of malaise. In developing countries, nearly half of all women and children suffer from anemia, with the highest prevalence rates found in Southern and Central Asia, as well as specific regions of Africa. The causes of anemia include inadequate intake of iron, folate, vitamin B12, or other essential nutrients.

Anemia is a major public health issue that affects a significant portion of the global population (Dutta, DC, 2004). It impacts individuals of all age groups, with a particular emphasis on women of childbearing age and children. According to the World Health Organization (WHO), anemia is defined as a hemoglobin level of <11g/dl for children aged 6 months to 5 years, and <11.5 g/dl for children aged 5–11 years (WHO, 2011).

India's experience with decades of iron supplementation programs has been less than satisfactory. Therefore, the challenge ahead is to enhance iron intake, bioavailability, and absorption within the system (Gopalan, 2014). The time has come to prevent and control anemia through supplementation in combination with nutrition education.

Nidhi Agarwal and Sheel Sharma (2013) have indicated that garden cress seeds are a rich source of protein, fat, iron, calcium, and phosphorus. They are particularly abundant in iron, containing 100 mg iron/100g of garden cress seeds. Additionally, vitamin C significantly enhances iron absorption (Gupta, Chhavi, and Singhal, Surbhi, 2011).

Snehal Doke and Manisha Guha (2014) have discovered that *Lepidium sativum*, commonly known as garden cress, is a rapidly growing annual herb native to Egypt and West Asia. It has various health benefits, including its role as an emmenagogue, galactagogue, and aphrodisiac. It also contributes positively to gastrointestinal and respiratory health, aids in managing anemia, diabetes, and potentially even cancer.

For women's health: Emmenagogue, **Galactagogue**, **Aphrodisiac**, For the gastrointestinal tract, For the respiratory tract, For anaemia, For diabetes, For cancer and For various other things.

Hurrell R and Egli (2010) have highlighted that ascorbic acid acts as an enhancer of non-heme iron absorption. Muscle tissue can also reduce ferric iron to ferrous iron and bind it in soluble complexes, making it more readily available for absorption.

These reviews may serve as inspiration for researchers to further explore the application of garden cress seeds as both a nutritional food source and a therapeutic agent.

II. METHODOLOGY

The research involved a cohort of 40 school-going children aged between 8 to 11 years, specifically chosen from Nutan Middle School in Aurangabad, with the school's consent. Initially, interviews were conducted with a total of 60 children, from which 40 were systematically selected. The process of random sampling was employed for participant selection.

The 40 selected respondents were further segregated into two distinct groups:

One group consisted of 20 children designated as the experimental group.

The other group also included 20 children, classified as the placebo group.

- **Experimental Group:** This group will contain children to which health rich drink will be given.
- **Placebo Group:** This group will have children who will receive the Mikronutrient supplementation given by the school.

1. Tools of Data Collection: For the present study, survey method was used for data collection, in which a self prepared questionnaire was given to respondents, containing the detailed information about their name, age, sex, health status, percentage of hemoglobin, clinical finding etc.



Lemon juice

Garden cress seeds

Sugar

Recipe/ Preparation Of Health Drink

Ingredient:

Amount for 1 cup



Devloped drink

Table1: Ingredient and amount of Health drink

Garden cress seed	5g (aprox.)
Sugar	5g(aprox)
Lime juice	5g (aprox.)
Water	100ml

2. **Placebo Group:** Placebo group was given their regular Mikronutreint liquid supplementation in school given by government of Maharashtra under MDM scheme 1 tea spoon two times a week.



Plate : Mikronutrient supplement syrup

Table 2: Nutritiv e value of the product as per 15 gm of Mikronutrient liquid:

Vitamin A	Niacinamide	Vitamin D3	Elemental iron	Folic acid	Calcium gluconate	Malt extract
4500IU	45mg	600IU	20mg	1.5mg	360mg	4.52gm

3. **Hematologic Assessments:** Sahli’s method was used for hematologic assessment.
4. **Anthropometric Assessment:** Anthropometry involves obtaining physical measurements of an individual and relating them to standards that reflect the growth and development of the individual.
 - **Height**
 - **Weight**
5. **Medical History:** To find out any diseased condition or to know any food allergy or use of any food supplementation medical history was asked to children. Following history was taken. Any food supplementation, Any medication, Any food allergy, Goiter / Thyroid complaint, G.I complaint, Any respiratory complaint, Any other complaint.
6. **Clinical Findings:** Various clinical finding were observed for the feeding purpose. As anemia, if it is present, have its sign and symptoms. And it may reveal many other diseased conditions too. So following clinical findings were observed. Pallor, Nails, Skin, Hairs, PEM.
7. **Nutritional Education Programme:** Nutritional education program was conducted for children of school in which importance of good nutrition and hazards of junk food along with personal hygiene was explained. Animated poems showing importance and effects of milk, green and other vegetables were presented.
8. **Statistical Analysis:** Different data were analysis with the help of suitable statistical method the mean and standard deviation were calculated to find out the prevalence of iron deficiency anemia. T test was calculated to find out difference between ICMR values to compare the effect of garden cress seeds and Mikronutrient supplementation in children.

Schematic Representation

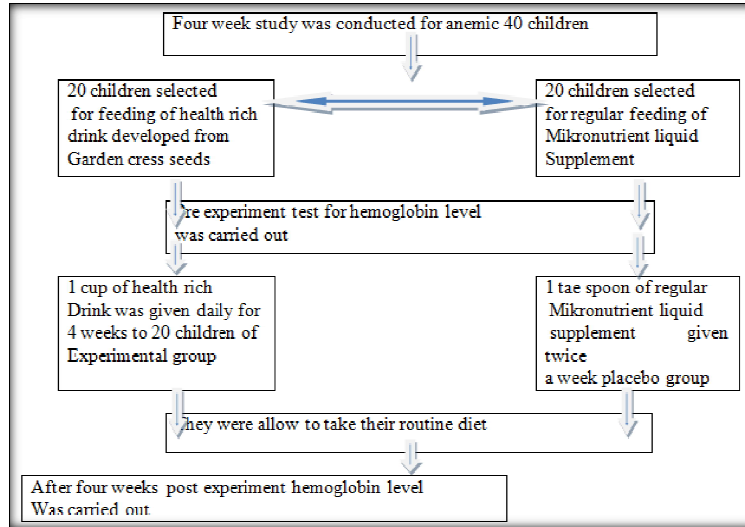


Figure 1: Protocol of the Present Study

III. RESULT AND DISCUSSION

Table 3: Nutritive value of the product as per 100 ml

Energy	Protein	Carbohydrate	Fat	Iron	Calcium	Phosphorus
45.45kcal	1.32g	6.905g	1.27g	5.020mg	22.95mg	36.7mg

- 1. Prevalence of Anemia:** To find prevalence in Nutan middle school 61 students were examined.
- 2. Prevalence of Anemia in Males:** 30 males were assessed for anthropometric and hemoglobin and following data were obtained.

Table 4: Prevalence of anemia in males

MALE			
Anthropometric	Male subject (n= 30) Mean±SD	ICMR/WHO Mean±SD	t- test
Height	122.75±12.27	137.37±6.39	2.325
Weight	24.86±5.32	29.525±3.811	1.645
Biochemical			
Hemoglobin	9.62±1.50	12±0.5	3.121

That is the male subjects of MCN's Nutan middle School are having less than normal height and hemoglobin. Pasricha SR et al, (2010) emphasized on the high prevalence of anaemia among all the age groups of children.

Nimmathota Arlappa et al,(2014) stated the Prevalence of anaemia among different physiological groups in the rural areas of Maharashtra observed that The overall prevalence of anaemia was 59% among pre-school children. The male subjects of MCN's Nutan middle School are having mostly near normal weight.

- 3. Prevalence of Anemia in Females:** 31 females were assessed for the anthropometric and hemoglobin and following values were obtained

Table 5: Prevalence of anemia in females

FEMALE			
Anthropometric	Female subject n=31 Mean±SD	ICMR/WHO Mean±SD	t-test
Height	121.04±8.75	137.3±6.76	6.713
Weight	24.93±6.17	29.65±4.27	2.779
Biochemical			
Hemoglobin	9.45±1.79	12±0.5	5.278

Prevalence of anemia in females- Priyanka Wankhade and colleagues conducted research in 2011 focusing on iron deficiency, a condition that significantly affects female adolescents and adults. Within this population group, the study reported an overall anemia prevalence of 13.6%. Notably, anemia was more prevalent in girls compared to boys, with a rate of 15.3%.

This study aligns with the findings of Kalaivani in 2009, who similarly observed that anemia's prevalence in India ranks among the highest globally. Specifically, anemia rates are notably elevated among pregnant women and preschool-aged children.

Similarly the present study also found that the female subjects of MCN's Nutan middle School are having less than normal height, weight and hemoglobin.

- 4. Effect on Hemoglobin Level:** 20 Experimental subjects were feed with garden cress seeds health drink and their pre experimental and post experimental values of anthropometric and hemoglobin data were compared. 20 subjects of placebo group were given their regular supplementation of Mikronutrient syrup and before and after feeding experiment their anthropometric and hemoglobin values were compared. Post experimental hemoglobin value of placebo and experimental group is compared here.

Table 6: Effect on Hemoglobin level

	Experimental Male(n=8) mean±sd	Placebo Male(n=9) mean±sd	Experimental Female(n=12) mean±sd	Placebo Female(n=11) mean±sd
Hb Value	12.18±1.47	10.71±1.48	12.85±1.32	10.37±1.63
t- value	1.515=2.731		2.272=2.080	

That mean it can be said that health drink developed with garden cress seeds is more effective in females than that in males.

IV. CONCLUSION

Health drink which is developed with garden cress seeds, sugar, lemon juice and water. Different data were analysis with the help of suitable statistical method the mean and standard deviation were calculated to find out the prevalence of iron deficiency anemia. T test was calculated to find out difference between ICMR values to compare the effect of garden cress seeds and Mikronutrient supplementation in children. Prevalence of anthropometric measurement, hemoglobin level, medical history, clinical finding was carried out by survey method in N.M. School. Thirty males and thirty-one females' forms were filled; mean and standard deviation were calculated. But there was significant difference in the level of hemoglobin in placebo group also. So hemoglobin level of experimental group was compared with placebo group And post experimental values were found more than pre experimental value. There was significant increase in hemoglobin level. The pre experimental values of height, weight and hemoglobin levels of 11 female subjects of placebo group And garden cress seed health drink was found more effective in increasing hemoglobin than Mikronutrient supplementation of school.

REFERENCES

- [1] Dutta DC. Anaemia in pregnancy. Text book of Obstetrics including Perinatology & Contraception, 6th edition ISBN:81-7381-142-3; 2004. Published by New Central Book Agency (P) Ltd, Calcutta, India; 262-267.
- [2] World Health Organization. Vitamin and Mineral Nutritional anaemia. Geneva: WHO, 2011
- [3] Gopalan.C, Rama Sastri B.V. and Balasubramanian, S.C., (2010), Nutritive Value of Indian Foods, National Institute of Nutrition, ICMR, Hyderabad.
- [4] Nidhi Agarwal and Sheel Sharma. APPRAISAL OF GARDEN CRESS (*Lepidium sativum* L.) AND PRODUCT DEVELOPMENT AS AN ALL PERVASIVE AND NUTRITION WORTHY FOOD STUFF. . Indian Journal of Traditional Knowledge . 2013 , 12(4), 699-706.
- [5] Gupta, Chhavi and Singhal, Surbhi (2011). Effect of garden cress seeds and amla intervention on the haemoglobin status of non pregnant women (18-25 years). *Asian J. HomeSci.*, 6 (2) : 216-219.
- [6] Snehal Doke and Manisha Guha. Garden cress (*Lepidium sativum* L.) Seed - An Important Medicinal Source: A Review. *J. Nat. Prod. Plant Resour.*, 2014, 4 (1):69-80
- [7] Hurrell R, Egli I. iron bioavailability and dietary reference values. *Am J Clin Nutr.* 2010;91:1461-7s. [Pub med]
- [8] Pasricha SR, Black J, Muthayya S, Shet A, Bhat V, Nagaraj S, Shet AS ; Determinants of Anemia Among Young Children in Rural India. *American Academy of Pediatrics*, 2010; 126(1):140-149.

- [9] Nimmathota Arlappa, Indrapal I Meshram, Nagalla Balakrishna, Rachkula Harikumar, Kodavanti Mallikharjuna Rao, Avula Laxmaiah⁽²⁰¹⁴⁾ Prevalence of anaemia among different physiological groups in the rural areas of Maharashtra. INDIAN JOURNAL OF COMMUNITY HEALTH / VOL 26 / ISSUE NO 03 / JUL – SEP 2014
- [10] To study the status of anaemia in young female population of aurangabad region
- [11] Author (s): Priyanka Wankhade¹, Prafulla Mane¹, Kavita Atre^{1*}, Rahul Mayee¹ ISRM Clinical Research Services Pvt. Ltd. Aurangabad (MS)
- [12] Kalaivani K.(2009). Prevalence & consequences of anaemia in pregnancy. Indian Journal Med Res, 130(5), 627-33.