

# Effect of Supplementation of *Lepidium sativum* (Garden Cress Seed) Incorporated Chikkies on Tribal Anaemic Adolescent Girls (12-18 years) in Nilgiris District

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## Abstract

India has the highest prevalence of Iron Deficiency Anaemia (IDA), and 60-70 per cent of adolescent girls are being anaemic. Adolescence is considered as nutritionally critical period of life. The health of adolescent girls need special attention. To overcome this problem, food based approaches have been considered as the most acceptable, safe and sustainable approach. Keeping all these views in mind the present study was carried out. Ethical Approval for the study was obtained from the Universal Ethics Committee. Screening for Anaemia was done by assessing haemoglobin levels of 500 adolescent girls. From that 100 moderately anaemic adolescent girls (each 50 in experimental and control groups) were chosen for further study. The chikkies incorporated with *Lepidium Sativum* (Garden cress seeds) with other ingredients was supplemented to experimental group daily for a period of 3 months. Haematological parameters like HB, RBC, PCV, MCV, MCH was assessed both prior and after supplementation. Control group was given only plain chikkies without any incorporation. There was a significant improvement in haematological parameters like Hb, RBC, PCV, MCV, MCH in experimental group and there was no significant change in control group. It shows that incorporation of *Lepidium Sativum* seeds in foods has goodhealth impact.

**Keywords:** Adolescents, Chikkies, Incorporation, Iron Deficiency Anaemia, Haematology, *Lepidium sativum* Seeds

## 1. Introduction

Iron Deficiency Anaemia (IDA) is an alarming health challenge in developing countries. Adolescent girls are highly vulnerable to anaemia and anaemia at this stage is likely to compromise pubertal growth spurt. Additionally it may reduce physical work capacity and cognitive function which may adversely affect learning and scholastic performance of the school girls entering adolescence<sup>1</sup>. Inadequate nutrition during adolescence can have serious consequences throughout the reproductive years of life. It attributes high maternal mortality rate<sup>2</sup>. Anaemia in adolescent girls contributes to maternal and foetal mortality and morbidity in future<sup>3</sup>.

Adolescent, particularly girls are vulnerable to iron deficiency. The highest prevalence is between age of 12-15 years when requirements are at peak. More than 50% girls in this age group have been reported to be anaemic<sup>4</sup>.

Garden cress seeds are very high in iron and folic acid content. These seeds are used as herbal medicine to treat iron deficiency anaemia, because 100g of garden cress seeds provided 100mg of iron. Iron is important for growth, brain development and the immune system. Iron content in the seed often helps to cure anaemia in children and in anaemic adolescent girls<sup>5</sup>. Iron deficiency is mostly seen in adolescent period which adversely affect their health and development. Among the adolescent girls in Tamilnadu, majority (49.1%) of the girls were

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moderately anaemic<sup>6</sup>. Hence in the present study an attempt has been made by the investigator to assess the impact of supplementing iron rich Garden Cress Seeds (*Lepidium Sativum*) incorporated chikkies to combat anaemia among adolescent girls.

## 2. Methodology

### 2.1 Area and Subjects

The study was conducted in tribal areas of Gudalur Taluk of Nilgiris District. Ten nearby tribal areas were selected, after getting prior official permission from the authorities. A total of 500 tribal adolescent girls of 12-18 years of age were selected for screening anaemia. The purpose and procedure involved in the study were clearly explained. A good rapport was maintained through proper counselling. They were motivated to extend their full cooperation and support for successful conduct of the study. As the data's regarding general information, socio economic status, dietary habits and food consumption pattern, clinical examination, initial nutritional knowledge, anthropometric measurements were recorded using a questionnaire cum interview method. Ethical approval for the study was obtained from Universal Ethical Clearance Committee of Chennai, Tamilnadu. Written consent was obtained from samples selected.

Out of 500 subjects, 220 subjects were identified as anemic with Hb<12g/dl. Among these subjects, 67 subjects were mildly anemic (Hb 10-12 g/dl), 124 subjects were moderately anemic (Hb 8-10 g/dl) and 29 subjects were severely anemic (Hb<8g/dl). As the majority of the subjects were moderately anemic this group was selected. Based on the willingness, 100 were selected from 124 moderately anaemic subjects with haemoglobin level 8-10 gm/dl, were selected for the study. The subjects were divided into two groups with fifty in control group and fifty in experimental group for supplementation process. Consumption of Garden Cress Seed with high iron intake can be an ideal solution to overcome the Iron Deficiency Anaemia (IDA)<sup>7</sup>.

### 2.2 Deworming and Supplementation

All the 100 subjects both in control and experimental group were dewormed by giving a tablet of albendazole (400 mg) before starting supplementation process. After deworming the subjects in the control group were supplemented daily with chikkies of twenty grams containing roasted groundnut and jaggery. Based on

the animal dosage, human equivalent dosage level of *Lepidium sativum* (Garden cress seeds) to be used for daily supplementation was calculated and it was incorporated in chikkies for subjects in the experimental group. They were supplemented daily with a chikki of 20 gm incorporated with 3 g of *Lepidium Sativum* Seeds (Garden cress seeds) along with other ingredients like roasted groundnut and jaggery. It was supplemented for a period of 3 months (90 days). 5 g of fresh amla was given for better absorption after consumption of chikki. The effect was assessed through haematological parameters namely Hb, RBC, PCV, MCV and MCH before and after supplementation to both groups.

### 2.3 Statistical Analysis

Control subjects supplemented with plain chikkies and experimental subject supplemented with garden cress seeds incorporated chikkies were compared and the values were expressed as mean  $\pm$  SEM. The data were analyzed by using paired 't' test and P values < 0.05 were considered as significant.

## 3. Result and Discussion

The clinical symptoms associated with iron deficiency showed that before supplementation to experimental group with *Lepidium Sativum* seeds incorporated chikkies more clinical symptoms were seen. But after supplementation for a period of 3 months more improvement was seen in clinical signs and symptoms of the experimental group and the control group remained the same without any improvement after the supplementation with plain chikkies. The results of the study as given in Table 1 and 2 below revealed that the mean Haemoglobin (Figure 1), RBC (Figure 2), PCV (Figure 3), MCV (Figure 4), MCH (Figure 5) level has significantly increased among the subjects of the experimental group than the control group after supplementation of the garden cress seeds incorporated chikkies for a period of three months. The mean Haemoglobin level increased from 9.624 g/dl to 12.140 g/dl, RBC level 3.207 million cells/mm<sup>3</sup> to 4.0 million cells/mm<sup>3</sup>, PCV level 28.872% to 36.420%, MCV level 90.075fl to 90.196fl, MCH level 30.036mcg to 30.194mcg in the experimental group. On an average there was 2.516 g/dl increase in haemoglobin, 0.837 million cells/mm<sup>3</sup> of RBC, 7.548% of PCV, 0.121fl of MCV, 0.158mcg of MCH over a period of 3 months. The increase might be attributed to the iron content in the chikkies.

**Table 1.** Effect of supplementation of *Lepidium Sativum* seeds incorporated chikkies to experimental group subjects (N = 50)

Haematological parameters	Initial Value	t'ratio	Final value	t'ratio
Haemoglobin(g/dl)	9.624±0.058	23.63	12.140±0.061***	35.22
RBC million cells/mm <sup>3</sup>	3.207±0.019	23.32	4.044±0.215***	34.89
Packedcellvolume(PCV)%	28.872±0.176	23.27	36.420±0.184***	35.21
Mean corpuscular volume(MCV)fl	90.075±0.009	7.62	90.196±0.007***	16.39
Mean corpuscular haemoglobin(MCH)mcg	30.036±0.0035	12.79	30.194±0.0090***	21.17

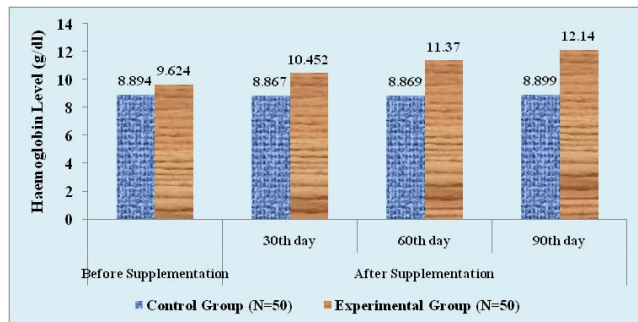
Values are in mean ± SEM (n=50) \*P<0.05, \*\*P<0.01 and \*\*\*P<0.001 Vs Initial Treatment

**Table 2.** Effect of supplementation of Plain chikkies to control group subjects (N = 50)

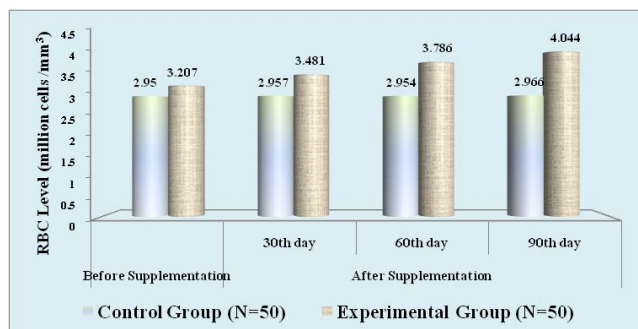
Haematological parameters	Initial value	t'ratio	Final value	t'ratio
Haemoglobin(g/dl)	8.894±0.087	1.30	8.899±0.084ns	0.18
RBC million cells/mm <sup>3</sup>	2.955±0.029	0.38	2.966±0.021ns	1.29
Packedcellvolume(PCV)%	26.636±0.25	1.71	26.737±0.26ns	1.45
Mean corpuscular volume(MCV)fl	90.023±0.00	1.15	90.063±0.00ns	1.55
Mean corpuscular haemoglobin(MCH)mcg	30.009±0.00	0.37	30.015±0.00ns	1.04

Values are in mean ± SEM (n=50) \*P<0.05, \*\*P<0.01 and \*\*\*P<0.001 Vs Initial Treatment ns- non-significant

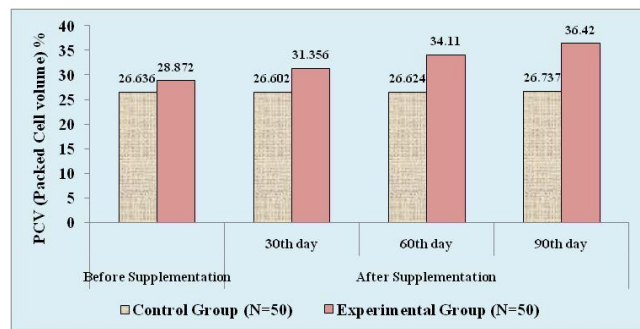
### 3.1 Haematological Parameters



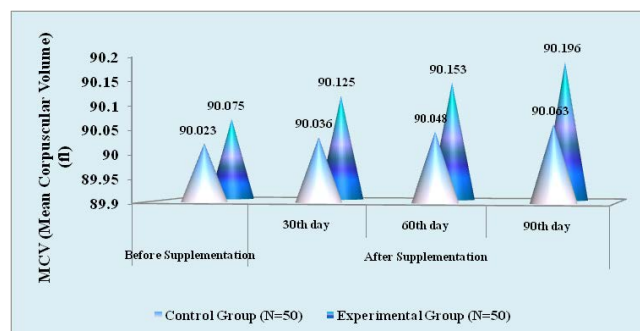
**Figure 1.** Mean haemoglobin of the selected anaemic sub samples before and after supplementation (N=100).



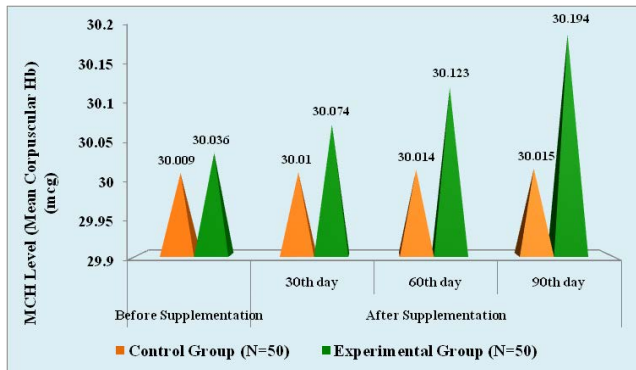
**Figure 2.** Mean red blood cell of the selected anaemic sub samples before and after supplementation (N=100)



**Figure 3.** Mean packed cell volume of the selected anaemic sub samples before and after supplementation (N=100).



**Figure 4.** Mean corpuscular volume of the selected anaemic sub samples before and after supplementation (N=100).



**Figure 5.** Mean corpuscular haemoglobin of the selected anaemic sub samples before and after supplementation (N=100).

## 4. Conclusion

One of the best strategy to alleviate anaemia among adolescent girls is through food based strategy. The results of the study proved that the supplementation of *Lepidium Sativum* (Garden Cress Seeds) incorporated chikkies is cost effective and had a significant effect on the haematological parameters such as Hb, RBC, PCV, MCV, MCH of the anaemic subjects.

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