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Impact of Supplementation of *Lepidium Sativum* (Garden Cress Seeds) Incorporated Chikkies on Heamoglobin and RBC status of Selected Tribal Adolescent Girls

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Abstract

Iron deficiency anaemia (IDA) is an alarming health challenge in developing countries. Adolescent girls are highly vulnerable to aneamia 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 (Sen and Kanani, 2006). To overcome this problem, food based approaches have been considered as the most acceptable, safe & sustainable approach. So the present study was carried out to assess the effect of Lepidium Sativum (Garden Cress Seeds) incorporated chikkies on selected anaemic adolescent girls of the age group (12-18 years). Ethical approval for the study was obtained from the Universal Ethics Clearance Committee. Screening for anaemia was conducted by assessing haemoglobin levels of 500 adolescent girls. From that 100 moderately anaemic adolescent girls (each 50 in the experimental and control group) were chosen for further study. Haemoglobin status and RBC level (biochemical assessment) of the selected subject was assessed both prior and after supplementation. Clinical examination was carried out. A chikkie of twenty grams containing Lepidium Sativum Seeds - 3 gm (garden cress seeds), groundnut - 10 gm, jaggery - 7 gm was supplemented to fifty selected moderately anaemic adolescent girls in the experimental group daily for a period of 3 months. The chikkies contained 3.5 mg of iron. Deworming was done prior supplementation to both groups. Control groups were given only plain chikkies without incorporation of Lepidium Sativum Seeds. The haematological parameter namely Hb and RBC level gradually increased from 9.624 g/dl to 12.140 g/dl and 3.207 million cells/mm^3 to 4.044 million cells/mm^3 respectively. There was a significant improvement in parameters of experimental group and there was no specific change in control group. It shows that incorporation of Lepidium Sativum Seeds in foods has better & good effect.

Keywords: Anaemia, Adolescent, *Lepidium Sativum* Seeds, incorporation, chikkies, haematology.

Introduction

Adolescent girls constitute one fifth of the female population in the world. Nutritional anaemia is one of India's major, public health problems. Adolescence is a vulnerable period in the human life cycle for the development of nutritional anaemia. Anaemia in adolescent girls contributes to maternal and foetal mortality and morbidity in future (Kulkarni *et al.*, 2012**)**. Adolescent girls are at high risk of developing iron deficiency anaemia because of increased iron demands during puberty, menstrual losses and limited dietary intake (Namrata *et al.,* 2011). Iron deficiency anaemia is a prevalent problem among the reproductive women in India (Balasubramanian, 2010) particularly adolescent girls. Anaemia defined as decreased concentration of blood haemoglobin is one of the most common nutritional deficiency disease observed globally and affects more than a quarter of the world's population (Kefyalew and Dohe, 2014).

Garden Cress Seeds (*Lepidium Sativum*) are very high in iron and folic acid content. These seeds are used as herbal medicine to treat iron deficiency anaemia because 100 g of Garden Cress Seed provide 100 mg of iron. Iron is important for growth brain development and immune system. Iron deficiency is mostly seen in adolescent period which adversely impact their health and development. Among the adolescent girls in Tamilnadu, majority (49.1%) of the girls were moderately anaemic (Saravana Kumar *et al.,* 2014)**.** During adolescence anaemia is more prevalent in both sexes due to growth spurt especially in girls where they are exposed to risk of onset of menarche (Premalatha *et al.,* 2012). 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 anemia among adolescent girls in the age group of (12-18 yrs).

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Methodology

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. The investigator selected a total of 500 tribal adolescent girls of the age group 12-18 years for screening anaemia. The purpose and procedure involved in the study were clearly explained. A good rapport was maintained through proper counseling. 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 Clearance

Ethical approval for the study was obtained from Universal Ethical Clearance Committee of Chennai, TamilNadu. Written informed consent was availed from the subject of the study.

Screening for Anaemia

Haemoglobin estimation was carried out by using cyanmeth Hb Method. Anaemia was classified by World Health Organization (WHO, 2011) based on severity grading criteria as normal non anaemic (>11 gm/dl), mild degree (9-10.9 gm/dl), moderate (7-8.9 gm/dl), severe (<7 gm/dl) and very severe (4 gm/dl). Based on the Willingness and the subjects with haemoglobin level 8-10 gm/dl, hundred moderately anaemic subjects were selected for further study. All the selected 100 subjects falls between 13-15 years age group.The subjects were divided into two groups as fifty control group subjects and fifty experimental group subjects for supplementation process. Sirimavo *et al*, 2014, revealed that supplementation of 5 mg of Garden Cress Seeds for two months have raised the haemoglobin level from 8.50 gm / dl to 9.83 gm / dl**.** Consumption of Garden Cress Seed with high iron intake can be a ideal solution to overcome the Iron Deficiency Anemia (IDA) (Srilakshmi, 2010).

Deworming and Supplementation

All the 100 subjects both in control & experimental group subjects 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 a chikki of twenty grams containing (roasted groundnut 10 gm) and jaggery (10 gm) and subject in the experimental group were supplemented daily with a chikki of 20 gm incorporated with 3 g of *Lepidium Sativum* Seeds (garden cress seed), roasted groundnut - 10 gm, jaggery - 7 gm. The incorporated chikki contained 3.5 mg of iron. 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 biochemical assessment (i.e.) haematological parameters (Bhai Ismail and Jumval Manju, 2014; Rajan, 2012)**.** The values of haemtological parameters namely Hb and RBC before (initial value) and after (final value) of supplementation to both groups control subject supplemented with plain chikkies and experimental subject supplemented with garden cress seeds incorporated chikkies were compared and analysed through statistical analysis.

Statistical Analysis

Supplemented with plain chikkies and experimental subject supplemented with garden cress seeds incorporated chikkies were compared and the values were expressed as mean ± SEM. The data's were analyzed by paired *'t'* test using graph Pad. P values < 0.05 were considered as significant.

Result and Discussion

The effect of Garden Cress Seeds (*Lepidium Sativum*) incorporated chikkies on the iron status of the anaemic adolescent girls is discussed below. The results of the study revealed that the mean haemoglobin level and RBC 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 and RBC level 3.207 million cells/mm^3 to 4.044 million cells/mm^3 in the experimental group. On a average there was an increase in 2.516 g/dl of haemoglobin and 0.837 million cells/mm^3 of RBC over a period of 3 months. The increase might be attributed to the iron content in the chikkies.

Haematological Parameters

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

Haemoglobin (g/dl)				RBC million cells/mm^3			
Initial	't' ratio	Final	't' ratio	Initial	't' ratio	Final	't' ratio
9.624±0.058	23.63	12.140±0.061***	35.22	3.207±0.019	23.32	4.044±0.215***	34.89

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

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

Haemoglobin (g/dl)				RBC million cells/mm^3			
Initial	't' ratio	Final	't' ratio	Initial	't' ratio	Final	't' ratio
.894±0.087	1.30	8.899±0.084 ^{ns}	0.18	2.955±0.029	0.38	2.966±0.021 ^{ns}	1.29

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

Conclusion

The results of the study have well proved that the supplementation of *Lepidium Sativum* (Garden Cress Seeds) incorporated chikkies had a significant effect on the haematological parameters such as Hb and RBC of the anaemic subjects. One of the best strategy to alleviate anaemia among adolescent girls is through food based strategy. As it is locally available and cheaper at cost, it works well to control anaemia. This has been proved through this study.

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