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Effect of drumstick leaves supplementation for treating iron deficiency anemia in adolescence girls

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Abstract

The present study was carried out on iron deficiency anemia in adolescence girls through supplementation of drumstick leaves powder. Anemia is one of the most common causes of malnutrition and it has a great public health significance affecting children, adolescents and women of reproductive age worldwide. Iron deficiency anemia (IDA) is highly prevalent among the adolescence girls and women mainly from lower socio economic status. Nearly 80% of the women with anemia suffer from Iron deficiency anemia (IDA). This study was done with the intention of finding an efficient substitute in the form of non heam iron of vegetable origin, dry drumstick leaves powder by administering as supplementation to treat anemia. At present it is being 20 anemic adolescence girls was selected belonging to lower socio-economic status, aged between 13-15 years were target population. Using convenient sampling technique of 20 girls suffering from Iron deficiency anemia was selected. Based on the signs and symptoms, anemia was diagnosed using cyanmethemoglobin method. As intervention 25gm of dry drumstick leaves powder was given every day for three months. After three months the hematological levels were analyzed and recorded. The result revealed that significant improvement in average Hb level from 9.6.mg/ dl before intervention to 11.mg/dl after intervention. This simple and low cost technology can be promoted in the community to prevent the occurrence of iron deficiency anemia.

Keywords: Drumstick leaves, adolescence girls, iron deficiency anemia, malnutrition

Introduction

Adolescence is the transition period between child and adulthood. Adolescence is characterized by the growth spurt, a period in which growth is very fast. The haemoglobin level of adolescence is 11-14gm/dl. World health organization (WHO) explained adolescence both in term of age (spanning the age between 10-19 years) and in terms of phase of life marked by special attributes. Adolescent girls are at high risk of micronutrient malnutrition especially iron deficiency anemia. Globally the most important cause of anemia is believed to be iron deficiency due to inadequate dietary intake physiologic demands for rapid growth and iron losses during menstruation cycle. Other prevalent causes of anemia include, malaria, chronic infection, and nutritional deficiencies of vitamin A, folate, vitamin B₁₂ and vitamin C is a well-known enhancer of iron bioavailability. According to Kaviyarasi and Abirami (2017) [6] iron deficiency is the most common micronutrient deficiency found in the industrialized countries it is particularly common among all age groups. Adolescent girls are at risk because of number of factors including puberty and low dietary intake. It is the most common widespread specific nutritional deficiency in the world which affects approximately two billion people and 80 percent in the developing countries. The dry drumstick leaves powder possess remarkable nutritional and medicinal qualities. Leaves of drumstick could serve as a valuable source of nutrient for all age groups and known as nutrition dynamite. The leaves are known as great source of vitamins and minerals being served raw, cooked or dried (Mishra *et al.*, 2012) [7]. Fuglie (2005) [2] reported that *Moringa oleifera* dried leaf powder of serving will satisfy a child with 14% of the protein, 40% of the calcium, 23% of iron and nearly all the vitamin A that a child needs in a day. Every 100gm portion of leaves could provide women with over a third of her daily need of calcium and give her important quantities of iron, protein, copper and sulphur and B-vitamins. Keep above points in view, the present study was undertaken to assessment of iron deficiency anemia in adolescence girls through supplementation of drumstick leaves powder to achieving attainable malnutrition in Chhattisgarh.

Materials and Method

The study was carried out on iron deficiency anemia in adolescence girls to investigate the supplementation limiting through drumstick leaves powder during 2018 in adopted village-Loing, block- Raigarh (C.G.). The on farm trial was laid out on one group pre and post-test pre

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experimental design with convenient sampling technique 20 adolescence girls between 13-15 years with their haemoglobin levels between 9-10gm/dl. Anthropometric assessment, biochemical assessment, clinical assessment and nutritional assessment were conducted during October to December, 2018 with identified anemic adolescent girls. The purpose of action and consent was obtained and pre and post intervention haemoglobin level was recorded from them. Intervention was started with 25gm of dry drumstick leaves powder supplementation once a day for three months. Inhibitors of iron absorption the study was explained to every respondent so as to get their full cooperation such as tea and coffee were withheld along with the dietary supplementation.

Socio economic survey: Socio economic data such as age, class studying, type of family, family composition and monthly income were collected using interview schedule.

Anthropometric measurements: Anthropometric observation such as height, weight of the selected subjects was measured by following standard procedure and the values of body mass index were calculated.

- **Height:** Standard height is preferable measure for all subjects. The subjects were asked to stand erect with feet together and to heel back against the wall.
- **Weight:** A digital weighing machine was used to measure body weight of the selected subjects. Subjects were asked to remove extra clothing and shoes before standing on weighing machine. The reading to the nearest half-kg was recorded.
- **Body Mass Index:** Body-mass index was determined using the body-weight (kg) and height (meter) measurements.

$$\text{BMI} = \frac{\text{Body Weight}}{\text{Height (m}^2\text{)}}$$

The most commonly used definitions by WHO in 1997 and published in 2000 classify BMI into following categories:

Grading	BMI
Underweight	<18.5
Normal	18.5-25
Overweight	25-29.9
Obesity	>30

Biochemical assessment: Laboratory evaluation can identify specific nutrition related abnormalities like anemia, iron deficiency or protein deficiency. The packed cell volume of whole blood (hematocrit) is often used to diagnose iron deficiency. The direct determination of iron and the degree of saturation of transferrin are extremely useful detection iron deficiency status. Blood haemoglobin level of the subjects was estimated before and after intervention.

Diet survey: Diet survey was conducted with the help of pretested schedule approved by ICMR (2000) [3]. 24-hour recall method was used to gather information on food intake. The data collected through diet-survey was converted in terms of weight and tabulated accordingly. Calories, proteins, fats,

carbohydrates, iron and vitamin A was calculated with the help of food composition tables of the ICMR. These were compared with Recommended Dietary Allowances (RDA) 2010.

Process of making drumstick leaves powder

Harvesting of leaves: Young and old leaves both are used for making dried leaf powder. Drumstick leaves can easily lose moisture after harvesting, therefore, harvest early in the morning and complete the initial phase of processing in the same day, if possible. Diseased and damaged leaves are discarded manually just after the collection of fresh leaves.

Washing: Collected leaves are washed in running tap water till the removal of dirt. After this leaves are soaked in 1% saline solution (NaCl) for 5 minutes to remove dust, pathogens as well as microbes present on the leave surface.

Drying: It is estimated that only 20-40% of vitamin A will be retained if leaves are dried under direct sunlight, but that 50-70% will be retained if leaves are dried in the shade therefore we just go to the shadow drying.

Grinding: In small scale dried leafs can be grinded by mortar and pestles or pulverizer machine can be used for fine grinding, but we used mixer grinder for this purpose.

Storage of leaves powder: Dried powder stored in clean airtight containers, protected from light and humidity, and kept below 24 °C (75.2 °F) for 6 month.



Proximate composition of dry drumstick leaves

Nutrients	Fresh leaves	Shadow dry leaves
Energy (Kcal)	92	271.83 (66.15)
Proteins (gm)	6.7	23.66 (71.68)
Fats (gm)	1.7	7.03 (75.81)
Carbohydrates (gm)	12.5	28.47 (56.10)
Iron (mg)	0.85	24 (96.45)
Calcium (mg)	440	3405 (82.88)

*figure in bracket represents percent increase in the nutrient content after dehydration (Joshi and Mehta, 2010) [4].

#The values of fresh leaves have been taken from the nutritive value of Indian food.

Results and Discussion

Socio-economic status

Table-1 show that the 48 per cent of the subjects was in the age group of 15 years, 30 per cent the subjects were in the age group of 14 years and 22 percent the subjects were in the age group of 13 years. Majority of subjects was Nuclear family. 84 per cent of subject was vegetarian whereas 16 per cent of subject was non vegetarian. Majority of the subjects were from class X.

Table 1: Socio Economic Status of sample

Variables	Percentage of Subject	
Age	13 years	22
	14 years	30
	15 years	48
Type of Family	Nuclear	86
	Joint	12
Educational Status	IX class	26
	X class	74
Type of meal	Vegetarian	84
	Non-Vegetarian	16

Anthropometric assessment

Table- 2 show that the Anthropometric measurement of the 20 anemic adolescence girl between age of 13-15. Pre and post observation after intervention of three month indicate that there was increase in average weight from 36 kg to 37.4 kg respectively. In case of height there are no significant observation was found as it is 144 cm before and after intervention. Body mass index (BMI) was calculated using formula weight (Kg) and height (in m²) before intervention it was 17.4 and after intervention it was recorded 18.1.

Table 2: Mean Anthropometric Measurements of Subject

Anthropometric parameters	Before intervention (Mean)	After intervention (Mean)
Height (cm)	144	144.4
Weight (kg)	36	37.4
BMI (kg/m ²)	17.4	18.1

Dietary survey

Table-3 indicate that mean nutrient intake of the subject from 24 hours recall method mean value of energy intake is 1850 kcal, which is less than RDA. Calories are the main content of food we eat. The inadequacy in calorie intake of selected subjects may be attributed to low calorie density in diets of adolescence. A study done in rural areas of Bhopal found that 70% of adolescents had a low intake of calorie (Joshi *et al.*, 2014) [5]. Mean value of protein intake is 42gm RDA for protein intake is 65gm, according to data protein intake of subject were below the RDA. Mean value of fat, calcium, iron, and vitamin A, is 29gm, 541mg, 18.5mg and 452mg, respectively. The table show that all nutrients were consumed in inadequate amount when compared with RDA (2010).

Table 3: Mean nutrient intake of the subject

S. No.	Nutrients	Mean nutrient intake of adolescence girl	RDA	Suffice/deficit
1	Energy (Kcal)	1850	2060	-210
2	Proteins (gm)	42	65	-23
3	Fat(gm)	29	22	7
4	Calcium (mg)	541	600	-39
5	Iron (mg)	18.5	28	-9.5
6	Vitamin A (mg)	452	600	-148

Clinical assessment: Clinical assessment was carried out with the help of pretested schedule. The pretested schedule was prepared by slightly modifying the list of clinical signs compiled by the WHO Expert committee (1963) [8]. Presence/absence of deficiency was observed in eyes, hair, face, lips, teeth, gum, tongue, skin and nails respectively. The general appearance was also observed. Clinical examination provides direct information of the signs and symptoms, dietary deficiencies prevalent among the people. Clinical examination of the subjects revealed majority of subject were

affected by mild and moderate anaemia. Pale skin and pale conjunctiva were found in the subject.

Biochemical assessment: After intervention of 25gm dry drumstick leaves powder for three months, the mean haemoglobin level of the selected sample had increased from the average increase in haemoglobin and was observed 1.4 g/dl. These results indicate more beneficial effect of dry drumstick leaves powder. Chandra *et al.*, (2015) [1] also found that in women of age group 15-45 years, the drumstick leaves poriyal has significant improvement in the Hb levels after supplementation.

Table 4: Biochemical assessment

Biochemical Analysis (gm/dl)	Normal (gm/dl)	Before intervention	After intervention
Haemoglobin	11-14	9.6	11

Conclusion

Anemia remains a very common health problem among the adolescence age group and in future these leads to high morbidity and mortality rates in motherhood stage. Most of the girls have poor knowledge regarding anemia, its cause, prevention and management. Dry drumstick leaves powder a mild positive relationship in the improvement of anemia. The present study shows that the haemoglobin levels of the adolescence showed a significant improvement post intervention with drumstick leaves powder. This may be promoted in the community as a dietary supplementation in anemic girls. After supplementation of 25gm of drum stick leave power approximate 67.9 Kcal. Energy, 6gm protein, 6 mg iron and 851 mg calcium, extra nutrient are consume by the adolescence girls. The result found that dry drumstick leaves is a low cost, locally available food material which is effective to combat the highly prevalent problem of iron deficiency and anemia in adolescent girls. Drumstick stick leaves powder is also useful to the economically weaker section of the society.

References

- Chandra T, Karunagari K, Felix AJW. Effect of drumstick leaves supplementation in treating iron deficiency anemia in women of reproductive age group (15-45yrs). *International Journal of Modern Research Reviews*. 2015; 3(11):1065-69.
- Fuglie LJ. The moringa tree: A local solution to malnutrition? Church world service, Senegal, 2005.
- ICMR. Recommended dietary intakes for Indians. Expert Group, Indian Council of Medical Research, New Delhi, 2000.
- Joshi P, Mehta D. Effect of dehydration on the nutritive value of drumstick leaves. *Journal of metabolomics and system biology*. 2010; 1(1):5-9.

5. Joshi SM, Swarna L, Agarwa SS, Mishra MK, Umashankar S. A study of nutritional status of adolescent girls in rural area of Bhopal district. National Journal of Community Medicine. 2015; 5:191-4.
6. Kaviyaasi R, Abirami J. Effect of cauliflowers greens poriyal supplementation on blood haemoglobin levels of anaemic adolescent girls. International Journal of Scientific and Engineering Research. 2017; 8(6):2229-55.
7. Mishra SP, Singh P, Singh S. Processing of *Moringa oleifera* leaves for human consumption. Bulletin Environmental Pharmacology and Life Science. 2012; 2(1):28-31.
8. WHO. WHO Expert committee on medical assessment of nutritional status. World Health Organization Technical Research Ser., 1963, 258.