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A pilot study to assess the effectiveness of drumstick leaves powder supplementation in prevention of anemia among adolescent girls

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Abstract

Anemia is one of the most common cause of malnutrition, has a major community health significance affecting adolescent girls, women and children worldwide. Anemia highly prevalent among adolescent girls of Indian population mainly from lower socio-economic status. This study was done with the intention of finding an efficient substitute in the form of non-haem iron of vegetable origin in drumstick leaves by administering as supplementation to treat anemia. Randomized clinical trial design was used in this study, the target group consisted adolescent girls with mild and moderate anemia. 12 (Experimental n=6, Control n=6) adolescent girls with their hemoglobin level between 9-12 gm/dl were selected as samples. Intervention was started with one tea spoon (about 5gm) dried drumstick leaves powder supplementation once a day with meals for 30 days to the experimental group. At the end of intervention, the posttest hemoglobin level was assessed. The result revealed that the subject showed a significant improvement in Hb level at ($p < 0.001$ level), drumstick leaves powder had significantly improved mean Hb levels in the posttest from (10.7167 ± 0.25) to (11.1000 ± 0.32) gm/dl.

Keywords: Anemia, malnutrition, adolescent, randomized

Introduction

Moringa Oleifera is native to the sub-Himalayan tracts of India, Pakistan, Bangladesh and Afghanistan where it is used in Folk Medicine ^[1] (Fahey, 2005), it is now widely distributed all over the world ^[2] (Locket, 2000). Moringa Oleifera is referred to as a "Miracle tree" or a "Wonder tree" ^[3] (Fuglie, 2001) of significant socio-economic importance because of its several nutritional pharmacological (Caceres *et al.* 1991; 1992; Fuglie, 2001) and industrial applications (Makkar and Becker, 1997; Foidl, 2001). Fuglie (2005) 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 person needs in a day. One 100gm portion of leaves could provide a woman with over a third of her daily need of calcium and give her important quantities of iron, protein, copper and Sulphur and vitamin-B ^[4]. Effects caused by malnutrition can be particularly associated with the micronutrient's insufficiency, are zinc and iron deficiency. Both micronutrients play important role in development of the fetus. (Solistyongslish. H 2011). The total number of adolescent populations in world is 1.2 billion out of which around 243 million belongs to India. (UNICEF, 2011) ^[5]. Adolescent are the future generation of any country and their nutritional needs are critical for well-being of the society. Several factors affect the nutritional status of adolescent, World Health Organization has defined, adolescent as a period between 10-19 years. In girls it has been recognized a special period of transaction from girlhood to womanhood. Particularly adolescent between age group of 12-15 years are vulnerable to iron deficiency mainly because requirements are at peak. Iron deficiency anemia is one of the most widespread preventable nutritional problem in the world, despite the continuous implementation of global programs for its control.

Moringa Oleifera (Drumstick leaves powder) have long been used to overcome the problem of malnutrition among children, pregnant women and breastfeeding. In addition, with micronutrient substances Moringa Oleifera can be used alternative supplementation for adolescent girls to prevent anemia ^[4].

UNICEF in the year 2011 reported that around 64 million adolescent girls are anemic which accounts for 56% of global population of adolescent girls.

The above report is an alarming statement which focuses on the prevalence of anemia among adolescent girls. Moringa Oleifera with its enormous health benefits is used for the treatment of anemia.

Objective of the Study

To determine the effectiveness of dry drumstick leaves powder supplementation in prevention of anemia among adolescent girls.

Assumptions

- Anemia is more prevalent among adolescent girls because they do not consume adequate diet containing iron rich meals.
- Adolescent girls may have less knowledge about anemia.
- Dietary supplementation of dry drumstick leaves powder can contribute to combat iron deficiency anemia.
- Collection of blood sample for Hb estimation is a therapeutic, aseptic and painful procedure which can cause discomfort to the client.

Delimitations

- The pilot study was delimited to adolescent girls age between the age group of 10-19 Years.
- Only two samples of blood were collected for pre-test and posttest for estimation of Hb gm/dl.
- Only Cyanmethaemoglobin method was used to estimate Hb level.

Materials and Methods

The pilot study was carried out in R. R. College of Nursing, Bangalore. Randomized clinical trial (one control group one experimental group with pre-test and post-test) design was used. In this study the target group consisted adolescent girls with mild and moderate anemia. 12 (Experimental n=6, Control n=6) adolescent girls with their hemoglobin level between 9-12 gm/dl were selected as samples. Written permission was obtained from the principal, along with ethical clearance was obtained from the ethical committee

of R.R. College of Nursing to conduct the pilot study. The study was conducted over a period of 30 days, from 15th March, 2019 to 15th April, 2019. The purpose of the study was explained to every respondent so as to get their full cooperation and consent was obtained from them. Before intervention hemoglobin level was checked. Adolescent girls with Hb level ranging from 9-12 gm/dl were included in the study. Intervention was started with one tea spoon (5gm) dried drumstick leaves powder supplementation once a day with meals for 30 days. Inhibitors of iron absorption such as tea coffee were withheld along with the dietary supplementation to the experimental group during the intervention. At the end of the study, 30th day 2ml of blood was drawn through vein puncture from both the groups in EDTA tubes. The samples were transported in a portable box to the laboratory within 2 hours and hemoglobin level were assessed.

Baseline Data

Baseline data were collected on socioeconomic status, based on clinical symptoms checklist to identify anemia, and laboratory examination for estimation of Hemoglobin level.

Data Analysis

The data collected were coded. Descriptive (Mean, Standard Deviation) and inferential statistics (Independent t test), ANCOVA were used for data analysis.

Result

Baseline data, on religious reveal that majority of selected adolescent girls were Hindu (75%) and Muslim (25%). 73% parents of samples were educated and high school passed out. Family income for all the girls were more than Rs.15000 per month. Flow of menstruation found 58% normal, where 47% girls were having history of heavy menstrual flow based upon the number of using sanitation pads during periods. 36% girls were having history of 6 to 8 days duration of menstruation. 41% girls were vegetarian and 58% girls were having history of less than 6 hours of sleeping pattern per day.

Table 1: After the pretest hemoglobin estimation 12 girls were found to be anemic (Hb <12gm/dl).

| Test | Group | N | Mean | SD | P Value Inference |
|-----------|--------------|---|---------|---------|-------------------|
| Pre-test | Experimental | 6 | 10.7167 | 0.25626 | 0.000* |
| | Control | 6 | 11.0333 | 0.42740 | |
| Post-test | Experimental | 6 | 11.1000 | 0.32863 | 0.001* |
| | Control | 6 | 10.9333 | 0.43205 | |

*is significant, ^{NS} is not significant

As shown in the table no.1, it was revealed that there was a significant difference in the mean of hemoglobin level

between the Experimental group (11.1000) and Control group (10.9333) with p-value (0.001).

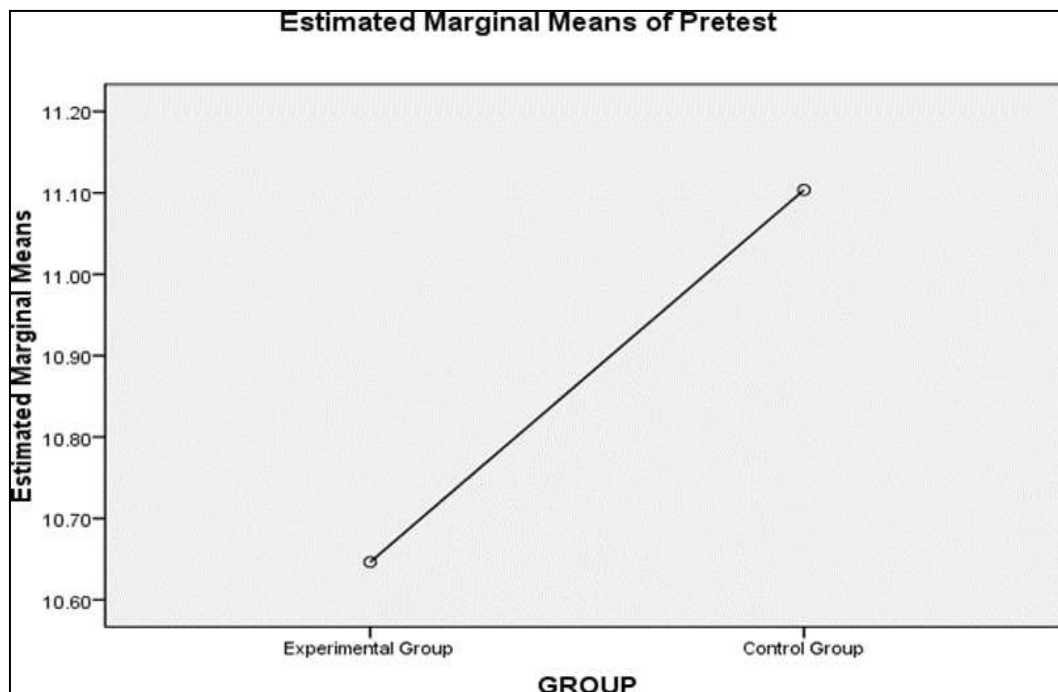


Fig 1: Estimated marginal means of Hemoglobin level of Pretest.

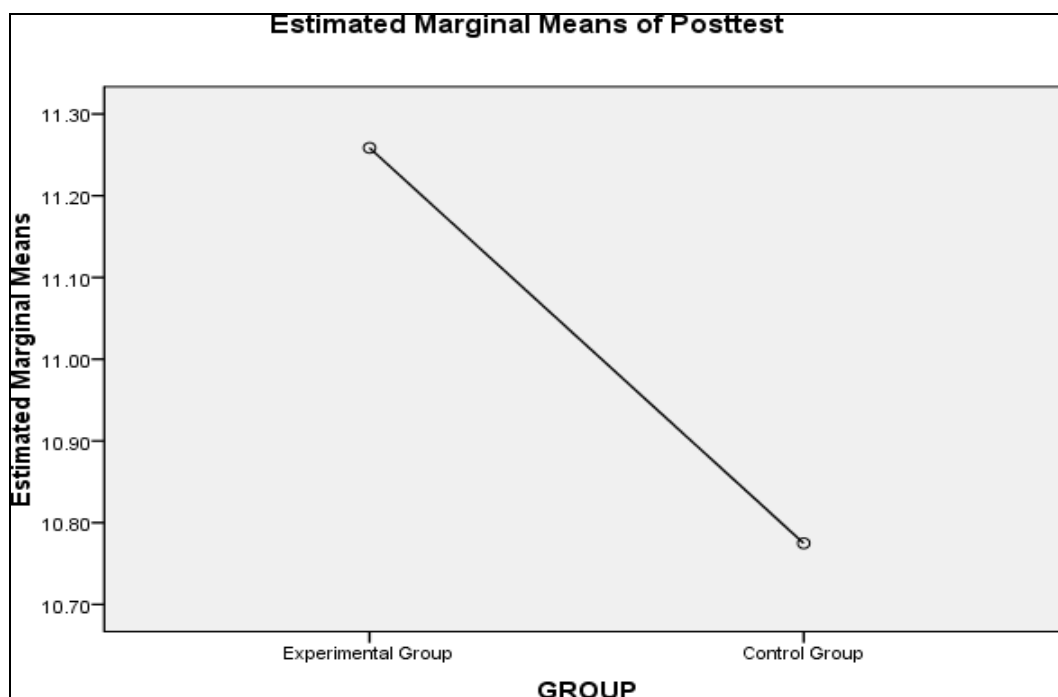


Fig 2: Estimated marginal means of Hemoglobin level of Posttest

The present study shows significant difference in mean pretest hemoglobin level (10.7167) which is less than the mean posttest hemoglobin level (11.1000) of experimental group with dry drumstick leaves powder intervention.

Conclusion

Dried Moringa Oleifera (Drumstick) leaves powder showed a mild positive relationship in the improvement of anemia. The study also emphasizes that anemia is still prevalent even in adolescent girls. Although hemoglobin concentrations were significantly increased in the Experimental group (p-value inference 0.001) at the end of 30 days supplementation. In this study drumstick leaves powder supplementation was found to be effective in

improving the hemoglobin level among adolescent girls. Nursing educators should teach the student nurses, Anganwadi workers, parents and school teachers to assess the features of anemia, stress on the use of drumstick leaves to prevent anemia.

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