


# Effectiveness of Fenugreek Leaf Powder with Iron Supplementation vs Iron Supplementation Alone on Increasing Hemoglobin Level among Adolescent Girls with Anemia at Koravallimedu, Puducherry

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## ABSTRACT

**Background:** Adolescence is defined by the World Health Organization (WHO), as the time span between the ages of 10 and 19 years. This is the “transitional period” between childhood and maturity. Major psychological, behavioral, and physical changes occur throughout this period; adolescence necessitates higher dietary requirements due to increased physical activity and fast growth.

**Aims and objectives:** To assess the pretest and posttest hemoglobin levels among the adolescent girls, to evaluate the effectiveness of fenugreek leaf powder with iron supplementation on anemia among adolescent girls. To compare the pretest and posttest hemoglobin levels among the adolescent girls in experimental and control group. To find out the association between hemoglobin level with selected demographic variables among the adolescent girls.

**Materials and methods:** The study used a two-group experimental pretest and posttest design. The sample of 60 adolescent girls was chosen using a random sampling procedure. The hemoglobin level was measured using a structured questionnaire and the mission Hb device.

**Results:** The study found a statistically significant difference between the effects of fenugreek leaf powder combined with iron supplementation vs iron supplementation alone on boosting hemoglobin levels in adolescent females with anemia in the control group.

**Conclusion:** The comparative study reveals that fenugreek leaf powder with iron supplementation is more effective than the iron supplementation alone on increasing the hemoglobin level among adolescent girls.

**Keywords:** Adolescent girls, Anemia, Fenugreek leaf powder, Hemoglobin, Iron supplementation.

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## INTRODUCTION

Adolescence is defined by the WHO, as the time span between the ages of 10 and 19 years. This time is known as the “transitional period” between childhood and maturity. Major psychological, behavioral, and physical changes occur throughout this period; adolescence necessitates higher dietary requirements due to increased physical activity and fast growth.<sup>1-5</sup>

Anemia is characterized as a decrease in hemoglobin, hematocrit, or red cell mass a hemoglobin level (Hb) of 10–12 gm/dL is considered mild anemia, whereas a Hb level of 7–10 gm/dL is considered moderate anemia, and a Hb level of less than 7 gm/dL is considered severe anemia, according to the WHO.<sup>6-10</sup> Anemia is described as a clinical condition in which a person’s hemoglobin level is abnormally low for his or her age, sex, physiological state, and illness condition. This can be caused by a variety of causes, the most frequent of which are a lack of necessary components for hemoglobin production, blood loss, insufficient iron intake, and worm infection.<sup>11-15</sup>

Due to a dietary imbalance and poor consumption habits, teenage girls are at risk for anemia. Because of increasing physical activity and development rates, teenage girls’ dietary demands rise. Adolescence is a time of rapid transformation that need a high level of nutrition. Anemia occurs in teenage girls when the need for iron increases, along with poor dietary habits, a high incidence of menstruation, and certain cases of worms. Iron insufficiency is one of the most prevalent micronutrient

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deficits.<sup>16-18</sup> Around the world, iron deficiency anemia is the major cause of morbidity and mortality among teenage girls aged 10–19 years. Iron deficiency anemia is connected to reduced work capacity and cognition, resulting in a loss of human capital and academic potential.<sup>19,20</sup>

## STATEMENT OF THE PROBLEM

A study to compare the effectiveness of fenugreek leaf powder with iron supplementation vs iron supplementation alone on

increasing hemoglobin level among adolescent girls with anemia in Koravallimedu, Puducherry.

## OBJECTIVES

- To assess the pretest and posttest hemoglobin level among the adolescent girls.
- To evaluate the effectiveness of fenugreek leaf powder with iron supplementation on anemia among adolescent girls.
- To compare the pretest and posttest hemoglobin level among the adolescent girls in experimental and control group.
- To find out the association between hemoglobin level with selected demographic variables among the adolescent girls.

## HYPOTHESIS

- **H<sub>1</sub>**: There is a significant difference between the effectiveness of fenugreek leaf powder with iron supplementation on anemia among adolescent girls in pretest and posttest in the intervention group.
- **H<sub>2</sub>**: There is a significant comparison difference between the effectiveness of fenugreek leaf powder with iron supplementation on anemia among adolescent girls in pretest and posttest in both groups.
- **H<sub>3</sub>**: There is a significant pretest association between hemoglobin levels with selected demographic variables among the adolescent girls in both the groups.

## RESEARCH METHODOLOGY

In the quantitative study, an experimental design (pretest and posttest design for the two groups) structured questionnaire to assess the demographic variables and the assessment of hemoglobin level using mission Hb apparatus were used in the study at Koravallimedu, Puducherry.

On the first day, data were collected from both control and experimental group by using demographic variable and laboratory measurements for hemoglobin level. For the experimental group, iron and folic acid supplementation (tablet) along with 5 gm fenugreek leaves powder mixed with 200 mL of water was given, under the supervision of the investigator, every morning after the breakfast for 21 days. Iron and folic acid tablets were provided to the control group on a daily basis for 21 days. On the 24th day, both the experimental and control groups were assessed.

Six adolescent girls were chosen from the experimental and control group for the pilot study. Data from all the adolescent girls using structured questionnaire and the pretest and posttest hemoglobin level after the intervention were obtained. The pilot study's findings demonstrated that the total found to be accurate and feasible.

## RESULTS AND DISCUSSION

*The first objective of the study was to assess the pretest and posttest hemoglobin level among the adolescent girls.*

Pretest and Posttest Level of Hemoglobin among Adolescent Girls with Anemia in Experimental Group: In pretest, all the adolescent girls 30 (100%) had moderate level of anemia, whereas in posttest, the majority of adolescent girls (23, 76.7%) had moderate level of anemia and 7 (23.3%) had mild level of anemia, respectively, as shown in Table 1.

Pre- and Posttest Levels of Hemoglobin in the Control Group of Adolescent Girls with Anemia: In the pretest, all the adolescent girls (30, 100%) had moderate level of anemia. In contrast, in the posttest, the majority of adolescent girls (28, 93.3%) had moderate level of anemia and 2 (6.7%) had mild level of anemia respectively as shown in Table 2.

*The second objective of the study was to evaluate the effectiveness of fenugreek leaf powder with iron supplementation on anemia among adolescent girls.*

The pretest mean score of effectiveness of fenugreek leaf powder with iron supplementation vs iron supplementation alone on the experimental group was 9.2470.724, and the posttest mean score was 10.3770.728, as shown in Table 3. The calculated paired t-test result of  $t = -28.342$  indicates a statistically significant difference between the effects of fenugreek leaf powder with iron supplementation vs iron supplementation alone on raising hemoglobin levels in adolescent girls with anemia in the experimental group.

*The third objective of the study was to compare the pretest and posttest hemoglobin level among the Adolescent girls in experimental and control group.*

On pretest, the experimental group's mean score for effectiveness of fenugreek leaf powder with iron supplementation vs iron supplementation alone was 9.247, 0.724 respectively, whereas the control group's mean score was 9.117, 0.658 respectively. In the

**Table 1:** Pretest and posttest levels of hemoglobin among adolescent girls with anemia in the experimental group, by frequency and percentage (N = 30)

Level of hemoglobin	Pretest		Posttest	
	N	%	N	%
No anemia (12 gm or above)	–	–	–	–
Mild anemia (11–11.9 gm)	–	–	7	23.3
Moderate anemia (8–10.9 gm)	30	100	23	76.7
Severe anemia (lower than 8 gm)	–	–	–	–
Total	30	100	30	100

**Table 2:** Frequency and percentage-wise distribution of pretest and posttest level of hemoglobin among adolescent girls with anemia in control group (N = 30)

Level of hemoglobin	Pretest		Posttest	
	N	%	N	%
No anemia (12 gm or above)	–	–	–	–
Mild anemia (11–11.9 gm)	–	–	2	6.7
Moderate anemia (8–10.9 gm)	30	100	28	93.3
Severe anemia (lower than 8 gm)	–	–	–	–
Total	30	100	30	100

**Table 3:** Effectiveness of the fenugreek leaf powder with iron supplementation vs iron supplementation alone on increasing hemoglobin level among adolescent girls with anemia in the experimental and control groups ( $N = 60$ )

Group	Test	Mean	Standard deviation	Mean difference	't' value paired t test	Df	p value
Experimental group	Pretest	9.247	0.724	-1.130	-28.342	29	<b>0.000**</b>
	Posttest	10.377	0.728				<b>HS</b>
Control group	Pretest	9.117	0.658	-0.836	-38.55	29	<b>0.000**</b>
	Posttest	9.953	0.682				<b>HS</b>

**Table 4:** Comparison of the effectiveness of fenugreek leaf powder with iron supplementation vs iron supplementation alone on increasing hemoglobin level among adolescent girls with anemia in the experimental group and control groups ( $N = 60$ )

Test	Group	Mean	Standard deviation	Mean difference	't' value independent t test	Df	p value
Pretest	Experimental group	9.247	0.724	0.1300	0.727	58	0.470
	Control group	9.117	0.658				NS
Posttest	Experimental group	10.377	0.7281	0.4233	2.324	58	<b>0.024*</b>
	Control group	9.953	0.6822				<b>S</b>

\* $p < 0.05$  significant, NS, nonsignificant

pretest, the calculated independent  $t$  test value of  $t = 0.727$  indicates that there is no statistically significant difference between the effectiveness of fenugreek leaf powder with iron supplementation vs iron supplementation alone on increasing hemoglobin level among adolescent girls with anemia in the experimental and control groups.

Table 4 shows the mean score of effectiveness of fenugreek leaf powder with iron supplementation vs iron supplementation alone on posttest in the experimental group was  $10.377 \pm 0.7281$  and the mean score in the control group was  $9.953 \pm 0.6822$ . In the posttest, the calculated independent  $t$  test value of  $t = 2.324$  indicates a statistically significant difference between the effectiveness of fenugreek leaf powder with iron supplementation vs iron supplementation alone on increasing hemoglobin level among adolescent girls with anemia in the experimental and control groups.

*The fourth objective was the association of the hemoglobin level with selected demographic variables among the adolescent girls.*

In terms of the relationship, there is no link between age, educational status, parents educational status, family income, diet pattern, and pretest hemoglobin levels among adolescent girls with anemia in the experimental and control groups.

## RECOMMENDATION FOR FURTHER STUDIES

- An information brochure on home treatment of anemia might be created as a teaching aid in health centers and outpatient clinics.
- To generalize the findings, the same study could be repeated with a larger sample size.
- The research might be repeated in other areas with similar resources.
- A Solomon four-group design might be used to conduct a comparable study.
- Other biological parameters could be measured as part of the study.

Serum ferritin level, for example.

## CONCLUSION

Fenugreek leaves powder juice with iron supplementation is a straightforward, easy-to-implement and well-tolerated treatment for anemic patients. The study's findings confirm this intervention for adolescent girls with anemia, which is the most effective way to increase hemoglobin levels.

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