

A Study on Developing Iron Rich Product (Nutri Haemball) and it's Efficacy of Supplement on Nutritional Anaemia among Female Students at Selected College in Coimbatore

J. S. Pooja^{1*}, P. Thenmozhi², G. Nandhini³ and P. Priscilla⁴

¹PG Scholar, Ganga Institute of Health Sciences Affiliated to the Tamil Nadu Dr MGR Medical University, Chennai – 600032, Tamil Nadu, India; jspooja57@gmail.com

²Chief Dietician, Ganga Institute of Health Sciences Affiliated to the Tamil Nadu Dr MGR Medical University, Chennai – 600032, Tamil Nadu, India

³Professor, Ganga Institute of Health Sciences Affiliated to the Tamil Nadu Dr MGR Medical University, Chennai – 600032, Tamil Nadu, India

⁴Assistant Professor, Ganga Institute of Health Sciences Affiliated to the Tamil Nadu Dr MGR Medical University, Chennai – 600032, Tamil Nadu, India

Abstract

Objectives: To compare the effectiveness of Nutri Haemball with amla and without amla among female college students. **Material and Methods:** Quantitative approach, experimental design was adopted to compare the effectiveness of Nutri Haemball with and without amla among female college students (Experimental group I - 30 samples and Experimental group II - 30 samples) studying in Ganga Institution of Health Sciences, Coimbatore who fulfilled the inclusion criteria. Samples were selected through purposive sampling technique. Pre-test haemoglobin level was evaluated and Nutri Haemball with amla for Experimental group I and Nutri Haemball without amla for Experimental group II was administered for a period of 4 weeks and post-test level of haemoglobin level was analysed. **Results:** The post-test mean haemoglobin score of Experimental group I and II was 10.98 with SD of 2.05 and 9.19 with SD of 0.84. The calculated unpaired t value ($t = 4.434$) of pre-test and post-test levels of haemoglobin indicates that the statistical difference was high at $p < 0.001$ among female college students. **Conclusion:** The result stated that the Nutri Haemball was effective in increasing haemoglobin level among female college students and can be further utilized as a measure for preventing Nutritional anaemia (Iron Deficiency Anaemia).

Keywords: Haemoglobin, Nutritional Anaemia, Nutri Haemball

1. Introduction

Anaemia is currently the major nutritional problem worldwide. Iron Deficiency Anaemia occurs generally in all stages of life, but its prevalence was high among women¹. Iron Deficiency Anaemia is one of the nutritional deficiency anaemia and it's the most prevalent

micronutrient deficiency and it was characterized by haemoglobin defect in synthesis². Iron Deficiency Anaemia can affect the growth and development. Iron Deficiency Anaemia can lead to faintness, shortened attention and learning difficulties. Females were at higher risk of Iron Deficiency Anaemia because of heavy menstrual blood loss³.

*Author for correspondence

Anaemia occurs when hemoglobin falls below 10.5 mg/dL and the adolescents are mainly prone to iron deficiency anaemia because of insufficient iron intake⁴. Anaemia being a multi factorial disorder, it can be prevented and controlled mainly through food-based approaches. Intervention to prevent Iron Deficiency Anaemia and to correct is just a significant measure to increase iron intake. This can be done through food-based approaches, Iron supplementation and also improving the sanitation health services.

Because of high recommendation of nutrition supplementation for adolescent girls the researcher involved in developing Iron rich product using locally available ingredients⁵. This would be cost effective and helps in increasing haemoglobin level in adolescent girls⁶.

1.1 Statement of the Problem

An experimental study on developing iron rich product (Nutri Haemball) and it's efficacy of supplement on nutritional anaemia among female students at selected college in Coimbatore.

2. Objectives

- To perform nutritive analysis for Nutri Haemball with amla and without amla supplementation.
- To compare the pre-test and post-test level of Haemoglobin between female college students.
- To assess the effectiveness of Nutri Haemball with amla and without amla on Haemoglobin level among the Experimental group I and II participants.
- To associate the selected variables with mean differed level of haemoglobin among Experimental group I and II participants.

2.1 Hypotheses

2.1.1 Alternative Hypotheses

AH1: There will be significant difference in the pre-test and post-test levels of Haemoglobin between female college students at selected college in Coimbatore.

AH2: There will be significant difference in the effectiveness of Nutri Haemball with amla and without amla on Haemoglobin level among Experimental group I and II respectively.

AH3: There will be significant association in the selected demographic variables with mean differed level of haemoglobin among female college students at selected college in Coimbatore.

3. Materials and Methods

A quasi experimental research design was adopted in order to assess the efficacy of Nutri Haemball in increasing the level of haemoglobin among female college students. The sample size consisted of 60 female college students, 30 samples were in Experimental Group I and 30 samples were in Experimental Group II (who fulfilled the inclusion criteria) selected through purposive sampling technique. The study sample includes female college students in the age group 17-22 years. The independent variables of the study were Nutri Haemball with and without amla. The dependent variable was haemoglobin level. The study was conducted at Ganga Institute of Health Science, Coimbatore.

The study includes the female college students who were willing to participate in the age group of 17-22 years.

The tool consisted data collection tool and intervention tool. Self-structured questionnaire was used as a data collection tool.

PART- I Section-A

3.1 Assessment of Demographic Variables

Age, Gender, Religion, Locality, Education (self and parent), Types of family, Income (parent), Types of diet, Occupation.

Section-B

3.2 Assessment of Biochemical Analysis

Haemoglobin test.

PART- II

After the pre-test level haemoglobin assessment of participants were administered with 100 g of Nutri Haemball with amla for Experimental group I and 100 g of Nutri Haemball without amla for Experimental group II. The intervention was given for a period of 4 weeks.

After the intervention the investigator did the post-test assessment on haemoglobin level among female college students. The collected data was analysed and

compared to identify the effectiveness of Nutri Haemball in increasing haemoglobin level among Experimental group I and II participants.

The findings proved that the Nutri haemball has effectively improved the level of haemoglobin among female college students. The health care providers in their practice can use Nutri haemball as iron supplement for the prevention of Nutritional anaemia (Iron Deficiency Anaemia). Nutri Haemball can be used for improving the level of haemoglobin.

3.3 Ethical Consideration

Ethical approval was obtained from the Institutional Ethical Committee and formal approval was obtained from the Dean cum Principal of the College to conduct the study among students studying in Ganga Institute of Health Sciences, Coimbatore. The researcher has

followed the fundamental ethical principles like the right to freedom from harm and discomfort, respect for human dignity. The researcher gave freedom to the participants to decide voluntarily whether to participate in the study or to withdraw from the study and right to ask questions at any time during the course of study. Participant's privacy was maintained throughout the study.

4. Statistical Analysis

Descriptive statistics was used to describe the demographic variables. Unpaired t test is used to analyse the pre- and post-test of Haemoglobin between Experimental groups I and II. The association of mean differed haemoglobin level with selected demographic variables were done through One Way Variance (ANOVA).

Table 1. Frequency and percentage distribution of food frequency among female college students in Experimental group I

Food frequency	More than once a day	Once a day	Two to fourtimes per week	Once in a week	One to three times/month	Never or less than once per month
Cereals	Rice (60.0%)			Rice flakes (46.7%)		Barley (93.3%) Oats (90.0%) Ragi (80.0%)
Pulses			Peas (43.3%)	Green gram (36.7%)	Bengal gram (36.7%)	Cow peas (53.3%)
Other Vegetables						Broccoli (66.7%)
Nuts and Seeds			Almond (50.0%)	Drumstick (30.6%)		
Mear and Poultry						Egg (43.3%) Meat liver (60.0%)
Green Leafy Vegetables			Amaranth (23.3%)	Drumstick (30.6%)		
Fruits						Pomegranate (50.0%) Pineapple (50.0%)

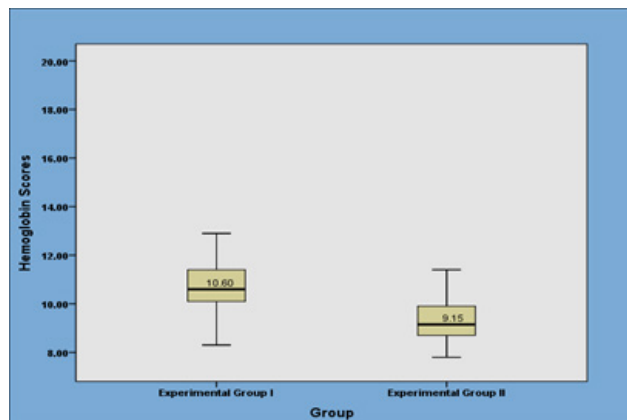


Figure 1. Comparison of pre- and post-test hemoglobin level between Nutri Haemball with amla group and Nutri Haemball without amla group.

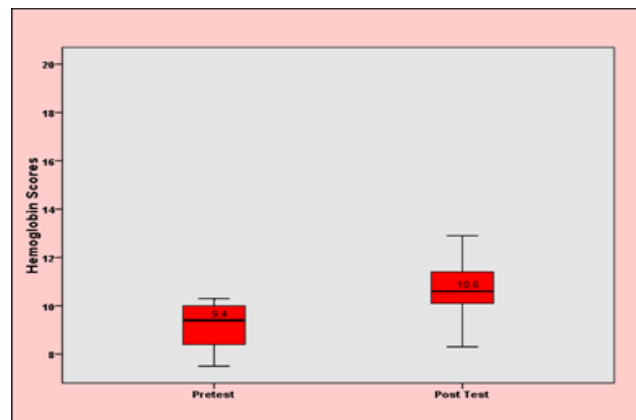


Figure 2. Effectiveness of Nutri Haemball with amla among female college students with low level of hemoglobin in the Experimental group I.

Table 2. Frequency and percentage distribution of food frequency among female college students in Experimental group II

Food frequency	More than once a day	Once a day	Two to four times per week	Once in a week	One to three times/month	Never or less than once per month
Cereals		Rice (60.0%)	Rice flakes (56.67%)			Barley (80.0%) Oats (86.7%) Ragi (60.0%)
Pulses			Peas (43.3%)	Green gram (36.7%)	Bengal gram (36.7%)	Cow peas (53.3%)
Other Vegetables						Broccoli (66.7%)
Nuts and Seeds	Groundnut (46.7%)	Almond (50.0%)	Dates(43.3%)	Sesame seed (40.0%)		
Mear and Poultry					Egg (43.4%)	Meat liver (50.0%)
Green Leafy Vegetables				Amaranth (76.7%) Cauliflower green (46.7%)		
Fruits				Pomegranate (46.7%)	Pineapple (40.0%)	

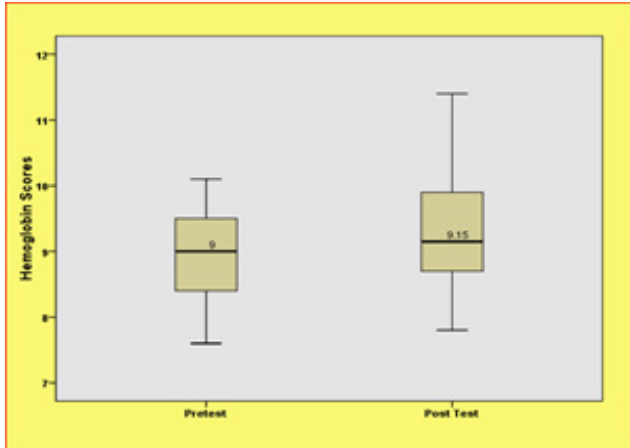


Figure 3. Effectiveness of Nutri Haemball without amla among female college students with low level of hemoglobin in the Experimental group II.

5. Result

Most of the participants in the Experimental group I were 17 (56.7%) from urban area, 17 (56.7%) were in the age group of 20 years, 17 (56.7%) belonged to Hindu religion and 25 (83.3%) living in single. Regarding type of family 24 (80.0%) were in nuclear family and 28 (93.3%) followed non vegetarian diet pattern. 26 (86.7%) of the female college students were undergraduate. 12 (40.0%) of the students had fathers with high school education and 10 (33.3%) mothers with higher secondary school education. Regarding occupation 19 (63.3%) of their fathers were self-employed/skilled labors and 23 (76.7%) of their mothers were homemaker with a monthly family income of Rs. 20,000-40,000.

Table 3. Comparison of pre and post-test hemoglobin level of Nutri Haemball with amla group and Nutri Haemball without amla group between female college students

Test	Experimental grp I		Experimental group II		Mean difference & percentage	t test and p value
	Mean	S.D	Mean	S.D		
Pre-test	9.23	0.91	8.95	0.75	0.28	t = 1.299p = 0.199, N. S
Post-test	10.98	2.05	9.19	0.84	1.79	t = 4.434p = 0.0001, S***

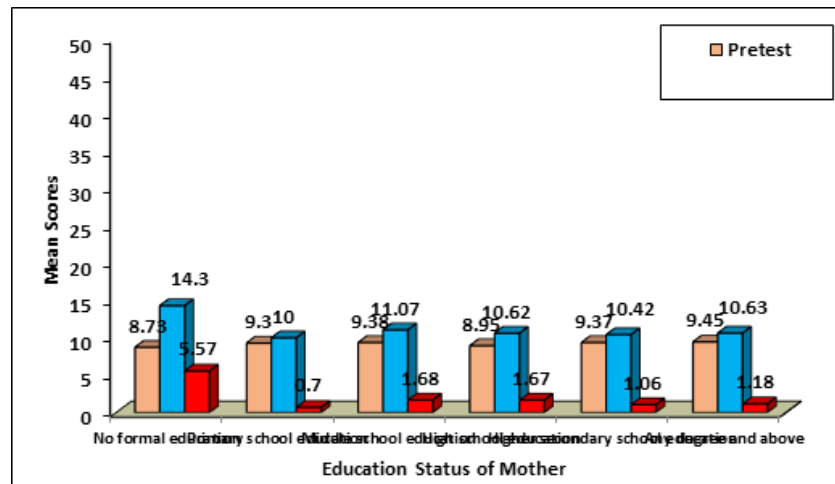


Figure 4. Association of the selected demographic variables with mean differed hemoglobin scores between female college students in the Experimental group I and Experimental group II.

In Experimental group II most of them 17 (56.7%) were from urban area and 14 (46.7%) were in the age group of 19 years, 25 (83.3%) belonged to Hindu religion and 28 (93.3%) were single. Regarding the type of family 24 (80.0%) were living in nuclear family and 27 (90.0%) followed non vegetarian diet pattern. Most of the female college students 20 (66.7%) were undergraduates, 10 (33.3%) of the students had fathers with higher secondary school education and 14 (46.7%) mothers with higher secondary school education. Regarding occupation of their fathers 12 (40.0%) were self-employed/skilled labors and 25 (83.3%) of their mothers were homemaker with family monthly income of Rs. 15,000-20,000.

The above Table 3 depicts the association of selected demographic variables with mean differed haemoglobin scores between female college students in Experimental group I and Experimental group II.

6. Discussion

The finding of the study revealed that administration of Nutri Haemball with and without amla for a period of 4 weeks stated that there was a significant difference in pre and post-test level of increased haemoglobin among Experimental Group I and II participants.

The post-test analyses on the level of haemoglobin among Experimental group I participants shows that the mean difference was 10.98 with unpaired 't' value $t = 4.839$ and p value 0.001 which shows the level of haemoglobin in post-test was found statistically highly significant. The post-test analyses on the level of haemoglobin among Experimental group II participants shows that the mean difference was 9.19 with unpaired 't' value $t = 1.883$ and p value 0.070.

This value indicates the effectiveness of Nutri Haemball with amla was highly significant compared to Nutri haemball without amla. Thus the Nutri Haemball can be used in improving the level of haemoglobin among female college students.

7. Limitation

The investigator felt difficult in monitoring the female college students while taking the intervention. The study was conducted for a period of 4 weeks.

8. Conclusion

The findings proved that the Nutri haemball has effectively improved the level of haemoglobin among female college students. The health care providers in their practice can use Nutri haemball as iron supplement for the prevention of Nutritional anaemia (Iron Deficiency Anaemia). Further it can be considered as an effective intervention for increasing the level of haemoglobin.

9. Acknowledgement

We offer our heartfelt thanks to the God almighty for showering his blessings, grace, incomparable wisdom on me and holding my hand throughout the journey of my research project. I would like to thank our Dean cum Principal mam who gave permission to conduct the main study in college and my special and warm thanks to all the participants who remained as my study samples inspite of their routine and extend their fullest cooperation throughout this study.

10. Contributors

PJS: Conceptualization of the study, collection, analysis of the data, writing the manuscript, finalized the manuscript and will act as the guarantor of the paper; **TP:** Conceptualization of the study, collection, analysis of the data, writing the manuscript, finalized the manuscript, editing and critically evaluated the manuscript; **NG, PP:** Edited and critically evaluated the manuscript.

11. References

1. Chandar D, Naik BN, Thumati G, Sarkar S. Assessment of dietary habits and nutritional status among adolescent girls in a rural area of Puducherry: A community-based cross-sectional study. *International Journal of Adolescent Medicine and Health*. 2020; 32(5). <https://doi.org/10.1515/ijamh-2018-0001> PMID: 30864427
2. Ghaffar F, Waqar F. Prevalence of iron deficiency anaemia in young adolescent girls at University of Peshawar. *Pakistan Journal of Physiology*. 2018; 14(3):33–6.
3. Rehmat T, Yousuf N, Zia N, Tariq U. Assessment of Hemoglobin level in relation to dietary habits among adolescent girls. *Annals of Punjab Medical College*.

- 2020; 14(3):240–4. <https://doi.org/10.29054/apmc/2020.877>
4. Rajkumar DJ, Manikandan R, Mathuf MA, Aakash KS, Kumar TR, Sarumathy S, Logaraj M. Effect of health education and iron supplementation on haemoglobin levels in adolescent girls. *Research Journal of Pharmacy and Technology*. 2018; 11(7):2761–4. <https://doi.org/10.5958/0974-360X.2018.00510.3>
 5. Christian SV, Sarate S. Effectiveness of iron supplements on haemoglobin level - A literature review. 2020.
 6. Grover K, Choudhary M. Effectiveness of long-term community-based nutrition intervention for prevention and management of anaemia among adolescent girls. *Asian J Dairy Food Res*. 2017; 36(3):235–40. <https://doi.org/10.18805/ajdfr.v36i03.8961>