Original Research Article

The Moringa Leaves Effectiveness in Raising Haemoglobin in Among Anaemia under Reproductive Age

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Abstract: The effectiveness of moringa leaves preparation increasing hemoglobin in among anemia under reproductive age. Anemia is indeed a common condition affecting many people today, often due to nutritional deficiencies, lifestyle or chronic disease. Raising awareness and promoting prevention strategies are crucial for improving overall health. Moringa, known popularly as drumstick tree, is a tropical plant grown for its nutritious leafy-greens, flower buds, and mineral-rich green fruit pods. Moringa is rich in phytonutrients, which helps to prevent conditions such as cancer, bronchial asthma, high cholesterol, high BP, as well as helping to build a strong immune system. Moringa is a rich source of essential amino acids, which are the building blocks of proteins. It provides vital vitamins, including A, B1, B2, B6, folate, and ascorbic acid. By promoting awareness and integrating moringa into diets, we can enhance overall health and combat anemia effectively.

Keywords: Moringa leaves, effectiveness, nutritional intervention, anemia, women.

INTRODUCTION

"Do not wait to strike till the iron is hot, but make hot by striking". Anemia is not a specific disease state but a sign of an underlying disorder. It is so far is a most common hematology condition. Anemia is a condition in which Hemoglobin concentration is lower than normal, reflects presence of fewer than normal RBCs with in circulation of oxygen delivered to body tissues.

According to WHO, Anemia is a condition in which the number of red blood cells or their oxygen-carrying capacity is insufficient to meet physiologic needs which vary by age, sex, altitude, smoking and pregnancy status.

Anemia is one of the most widespread nutritional deficiency disease and a major public health concern all over the world affecting all the ages and both gender. It is a one of the most prevalent health issue among women within reproductive age group. WHO has estimated that prevalence of anemia among reproductive age women is 14% in developed and 51% in developing countries while it is 65-75% in India.

Anaemia is the decreased ability of the red blood cells to provide adequate oxygen to body tissues. It may be due to a decreased number of red blood cells, a decreased amount of substance in red blood cells, which transports oxygen (haemoglobin), or a decreased volume of red blood cells. There are over a dozen different types of anaemia, some due to a deficiency of either a single or several essential nutrients and others from conditions that are not related to nutrition such as infections. "Nutritional Anaemia" describes a condition in which the haemoglobin or red blood cell content of the blood is lower than normal because of too little iron and is the most common anaemia in South Asia.

According to WHO, criteria mild anaemia ranges from 11- 11.9gms, moderate anaemia from 8-10.9 grams and severe anaemia is less than 8gms.Iron deficiency anaemia is one of the most widespread preventable nutritional problems in the world, despite the continuous implementation of global programs for its control. Globally 50% of anaemia is attributed to iron deficiency and accounts for approximately 841,000 deaths annually worldwide.

In India alone 80% of women are iron deficient, both pregnant and non pregnant. It is also the most

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neglected of disorders since it does not have any typical presentation unless the iron deficiency is severe. Also this can be attributed to the ignorance and the tendency to underestimate their problems. Some of the common causes of iron deficiency are inadequate intake, chronic or acute blood loss, malabsorption, hookworm infestations, and menstruation. Clinically it usually presents with pallor, fatigue reduced capacity to work, cheilosis and koilonchia.

Iron deficiency anaemia is the most prevalent disorder among Indian women in the reproductive age (15 to 45yrs) from the lower socio economic strata. In Bangalore 39% of the women were found to have anaemia of which 95% were iron deficient.

Need for the Study
Evaluating the Effectiveness of Moringa Leaves in Raising Hemoglobin Levels Among Anemic Women of Reproductive Age. Prevalence of AnemiaAnemia, particularly iron-deficiency anemia, is a significant public health concern, especially among women of reproductive age. This demographic is at higher risk due to menstruation, pregnancy, and dietary deficiencies. Understanding and addressing this issue is crucial for improving overall health outcomes.

Low hemoglobin levels can lead to fatigue, weakness, and decreased productivity, adversely affecting quality of life and daily functioning. In pregnant women, anemia is linked to complications such as preterm delivery and low birth weight, impacting both maternal and child health. Many women in reproductive age groups face challenges in accessing sufficient and nutritious food. Moringa leaves are rich in iron, vitamins, and minerals, making them a potential natural remedy for improving hemoglobin levels. Moringa is a drought-resistant plant that can be cultivated in various environments, making it an accessible source of nutrition in many regions. Promoting its use can contribute to sustainable health practices and food security.

While Moringa is known for its nutritional benefits, there is limited research specifically examining its impact on hemoglobin levels in anemic women of reproductive age. This study aims to fill that gap, contributing valuable data to the field of nutrition and public health.

While understanding the role of natural supplements like Moringa can encourage a more holistic approach to managing anemia, integrating dietary practices with medical interventions to promote overall well-being.

By addressing these needs, the study will contribute to developing effective strategies for managing anemia, improving health outcomes for women of reproductive age, and promoting the use of natural resources in nutritional interventions.

STATEMENT OF THE PROBLEM
"A study to evaluate the effectiveness of moringa leaves preparation on increasing hemoglobin level among woman with anemia under reproductive age group in selected community areas, Bangalore".

OBJECTIVES OF THE STUDY
1. To assess the hemoglobin level among woman with anemia under reproductive age group.
2. To evaluate the effectiveness of moringa leaves preparation on hemoglobin level among woman with anemia under reproductive age group.
3. To find-out the association between pre-test score on hemoglobin level among woman with anemia under reproductive age group with selected demographic variables.

OPERATIONAL DEFINITION:-
➢ **Evaluate:** It refers to finding the impact of moringa leaves preparation on increasing hemoglobin levels among woman with anemia under reproductive age group.
➢ **Effectiveness:** It refers to determining the extent to which the moringa leaves preparation helps in increasing hemoglobin level woman with anemia under reproductive age group as indicated by pre test and post test score.

Moringa leaves preparation: Moringa leaves are also known as drum stick leaves which helps to improve the hemoglobin levels. In this study it is a homemade preparation of moringa leaves with jaggery in a ratio of 80:20.
➢ **Hemoglobin level:** Hemoglobin is the oxygen carrying pigment and predominant protein molecule in red blood cells that carries oxygen from the lungs to the body's tissues and returns carbon dioxide from the tissues back to the lungs. The normal range of hemoglobin in an adult woman is 12gm/dl to 14 gm/dl. In this study it refers to women with anemia with hemoglobin level between 7-12g/dl.
➢ **Anemia:** It is a condition in which the number of red blood cells or their oxygen carrying capacity is insufficient to meet physiologic needs and the hemoglobin level will be less than 12 gm/dl. (Moderate anemia 7-10 g/dl, Mild anemia 10.1-12g/dl).
➢ **Reproductive age group;** It refers to women coming under the age group of 15 to 45 years.

HYPOTHESIS:
H_1 – There is a significant increase in the hemoglobin level after administering moringa leaves extracts in the experimental group
H_2 – There is significant association between the pretest score of hemoglobin level among women

with anemia under reproductive age group and selected demographic variables.

MATERIALS AND METHODS

Design
The present study sample pre- experimental research design adopted with one group pre- test and post- test design.

Group	Pre-Test	Intervention	Post Test
E – Research Group	O_1	X	X_2

KEY
E = Research Group
O_1 = Pre-assessment of haemoglobin level
X = Administration of moringa leaves preparation
O_2 = Post-assessment of haemoglobin level

RESEARCH VARIABLES
Independent Variable: The independent variable for this study is Moringa leaves preparation

Dependant Variable: The dependent variable for this study is Haemoglobin level

BASELINE VARIABLE
The baseline variable for the study is Age, educational status, religion, type of family, no of siblings, monthly income of the family, source of information, menstrual history, dietary pattern and hygienic practices.

SETTING OF THE STUDY
The setting was selected based on acquaintance of the investigator with the institution, feasibility of conducting the study, availability of the sample, permission and proximity of the setting to investigation. The study was conducted in community areas at reproductive age group woman who is situated at a distance of 7 km from Little flower College of nursing, Bangalore. There are woman coming to the community areas. Keeping in mind, the time available for data collection and familiarity to the area, the investigator has chosen this settings.

Population Target: The target population of this study was comprised of the entire Woman with Anemia.

ACCESSIBLE
The accessible populations were Woman with anemias that were coming to the community areas at Bangalore.

Sampling Technique: Non probability Purposive sampling was used to select the sample for the study.

SAMPLES
In the present study women with anemia under reproductive age group in selected community areas at Bangalore.

SAMPLE SIZE
The total sample of study consists of 40 women with anaemia under reproductive age group (15 to 45 years).

CRITERIA FOR SAMPLE SELECTION
The samples were selected based on the following inclusion and exclusion criteria.

Inclusion Criteria
- Women with anemia under reproductive age group (15 to 45 years) in selected PHC at Bangalore.
- Women with anemia under reproductive age group who are having haemoglobin level between 7gm/dl to 11gm/dl.
- Women with anemia under reproductive age group who are willing to participate in the study.
- Women with anemia under reproductive age group who are available at the time of data collection.
- Women with anaemia under reproductive age group who are able to read and write English or Kannada.

Exclusion Criteria
- Women with anemia under reproductive age group who are not willing to participate in the study.
- Women with anemia under reproductive age group who are lactating.
- Women with anemia under reproductive age group who are pregnant.
- Women with anemia under reproductive age group who are having haemoglobin level less than 7gm/dl.

DEVELOPMENT OF AN INSTUMENT
After intensive library search and consultation with experts and with the personal and professional experience, an observational checklist was prepared to assess the prevalence of anemia and well-structured questionnaire to collect the demographic data of the adolescent girls were developed.

DESCRIPTION OF THE INSTRUMENT
The tool for data collection consist of 4 parts
Part 1: Demographic data

Consist of 10 questions about demographic variable such as age, educational status of father, educational status of mother, religion, type of family, no of siblings, monthly income of the family, source of information, menstrual history, dietary pattern and hygienic practices.

Part 2: Observational checklist

An observational checklist consists of 20 items which used to assess the signs and symptoms of anaemia among adolescent girls through clinical assessment.

There were 20 items pertaining to the conditions related to anaemia such as 1) Shortness of breath, 2) Dizziness, 3) Palpitation, 4) Loss of appetite 5) Numbness or coldness in your hand.

Part 3: Clinical assessment of haemoglobin level estimation of Woman before and after intervention.

Part 4: A well-structured questionnaire which consists of 23 questions regarding knowledge on anemia The questions were further divided into 8 parts. General, risk factors, causes, signs and symptoms, diagnostic findings, treatment and management, preventive measures and complication.

SCORING PROCEDURE

As per the WHO/ UNICEF, the estimation level of:
Haemoglobin Mild anemia   - 10.1 to 11.9 gm%
Moderate anemia   - 7 to 10 gm %
Severe anemia   - < 7 gm %

Normal- 12 gm % and above
The knowledge score was classified as follows:
0 – 50% - Inadequate knowledge
51 – 75% - Moderate knowledge
76 – 100% - Adequate knowledge

VALIDITY OF THE TOOL

The content validity of the tool was obtained from 12 experts including 10 nursing experts, 1 sociologists and 1 physicians. Based on their valid suggestions, a few items were modified and the final tool was prepared as per the suggestions given by the experts.

RELIABILITY OF THE TOOL

Reliability was established through test – retest method. The tool was administered to 10 Woman with anemia in community areas at Bangalore. After the gap of 15 days, the retest was done. The Karl Pearson's coefficient of correlation was computed and the reliability was found to be 0.96. The tool was found to be reliable.

DATA COLLECTION PROCEDURE

Data collection is the process of gathering information needed to discuss a research problem. Data collection was done for the period of 6 weeks. Before commencing the special project, the permission to conduct the study should obtained by the headmistress.

On the 1st day onwards, the Moringa leaves preparation100 ml was prescribed by the medical officer was given before food to the sample for 15 days and after that on 16th day, the post test was done by the assessment of haemoglobin.

RESULTS AND DISCUSSIONS

This chapter deals with the analysis and interpretation of the data. In this study, the effectiveness of moringa leaves preparation in increasing haemoglobin level among women was assessed. The data were collected through observational checklist among women regarding signs and symptoms of anemia. This result was computed using descriptive and inferential statistics based on the objectives of the study. The findings of the study are presented in this chapter under the four sections as follows:

- Section I: To assess the hemoglobin level among woman with anemia under reproductive age group.
- Section II: To evaluate the effectiveness of moringa leaves preparation on hemoglobin level among woman with anemia under reproductive age group.
- Section III: To find-out the association between pre-test score on hemoglobin level among woman with anemia under reproductive age group with selected demographic variables.

SECTION I: DEMOGRAPHIC VARIABLES OF WOMEN WITH ANEMIA.

Table 1.1: Distribution of women with anemia based on their demographic variables such as age, religion, type of family and total no of siblings; N = 40

S. No	Demographic variables		Frequency	Percentage (%)
1.	Age	15- 30	27	67.5
		30- 45	13	32.5
2.	Religion	Hindu	35	87.5
		Christian	5	12.5
		Muslim	0	0
		Others	0	0
3.	Type of family	Nuclear	35	87.5
		Joint	4	10
		Extended	1	2
4.	Total No of siblings	Below 2	33	82.5
		Above 2	7	17.5

SECTION II: EFFECTIVENESS OF MORINGA LEAVES PREPARATION ON LEVEL OF HAEMOGLOBIN AMONG WOMEN WITH ANEMIA.

Table 1.8: Distribution of the pretest level of haemoglobin among women with

Level of	MODERATE		MILD		NORMAL	
Haemoglobin	N	%	N	%	N	%
Haemoglobin	N	%	N	%	N	%
Pre test	17	42.5	23	57.5	0	0
Post test	0	0	24	60	16	40

Table 1.8 acknowledge that among women with anemia, 23 (57.5%) had mild level of anemia and 17 (42.5%) had moderate level of anemia in pre-test and 24 (60%) had mild level of anemia and 16 (40%) had no anemia in post-test.

Table 1.9: Mean score difference of pre and post test level of haemoglobin

Among women with anemia.				N = 40
Subjects	Pre test		Post test	MD
	Mean	SD	Mean	SD	
Over all	10	1.08	11.7	0.62	1.7

Table 1.9 explains that the mean score and standard deviation between pre and post- test level of haemoglobin among women with anemia, the mean score was increased and the standard deviation score was decreased after the intervention of moringa leaves preparation. This shows that there is a significant difference between the mean score after the intervention.

Table 2.0: Paired 't' test on level of haemoglobin score among women with anemia within pre and post intervention; N = 40

Subjects	Pre test	Post test	't' value	Mean	SD
Overall	10	1.08	11.7	0.62	9.44*

x Significant at 0.01 level.

Table 2.0 reveals that the obtained "t" value was found to be extremely significant at the level of $p < 0.01$. It is inferred that the administration of the moringa leaves preparation for an women with anemia had a significant increase in post test estimation of haemoglobin.

SECTION III: TO FIND THE ASSOCIATION BETWEEN, THE POST TEST LEVEL OF HAEMOGLOBIN AMONG WOMEN WITH ANAEMIA WITH SELECTED DEMOGRAPHIC VARIABLES.

Table 2.1: Association between the post test level scores of haemoglobin with selected demographic variables among women with anemia such as age and type of family; N = 40

S. No	Demographic variables		Frequency
1.	Age	15- 30	11
		30- 45	5
2.	Type of family	Nuclear	14
		Joint	4
		Extended	1

not significant in the level of <0.05

CONCLUSION

"Reasoning draws a conclusion, but does not make the conclusion certain, unless the mind discovers it by the path of experience".

Anemia is not a specific disease state but a sign of an underlying disorder. It is so far is a most common hematology condition. Anemia is a condition in which.

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ACKNOWLEGMENT

DECLERATION

AUTHORS CONTRIBUTION

[1]Lead Researcher Contribution by following sections

- Conceptualized the study and developed the research design.
- Conducted the literature review and defined the methodology.
- Coordinated data collection and analysis.
- Performed statistical analyses and interpreted data results.
- Contributed to the discussion of findings and their implications.
- Led participant recruitment and ensured ethical compliance.
- Collected primary data and managed participant interactions.

[2]Literature Specialist

- Reviewed and synthesized relevant literature on Moringa and anemia.
- Assisted in drafting the manuscript and integrating references.

[3]Manuscript preparation

- Provided expertise on anemia and reproductive health.
- Contributed to the formulation of manuscript

General Contribution

All authors reviewed and approved the final manuscript, ensuring accuracy and completeness of the research findings.

Competing Interest

The authors declare that there are no competing interests regarding the publication of this study. No financial or personal relationships with other individuals or organizations could influence the conduct or reporting of this research.

Ethical Clearance

This study was conducted in accordance with the ethical standards of the relevant institutional research committee. Ethical clearance was obtained from Institutional Review Board. Informed consent was obtained from all participants prior to their inclusion in the study, ensuring that they were fully aware of the study's purpose and procedures. All participant data were anonymized to maintain confidentiality.

REFERENCES

- Umeta, M., Haidar, J., Demissie, T., Akalu, G., & Ayana, G. (2008). Iron deficiency anaemia among women of reproductive age in nine administrative regions of Ethiopia. *The Ethiopian Journal of Health Development*, *22*(3). Umeta. M, Haider J, Demissie G, Akalu G, Ayana G (2018).
- Saini, R. K., Sivanesan, I., & Keum, Y. S. (2016). Phytochemicals of Moringa oleifera: a review of their nutritional, therapeutic and industrial significance. *3 Biotech*, *6*, 1-14.
- Gayathri, S., Manikandanesan, S., Venkatachalam, J., Gokul, S., Yashodha, A., & Premarajan, K. C. (2021). Coverage of and compliance to iron supplementation under the National Iron Plus Initiative among reproductive age-group women in urban Puducherry–a cross-sectional study. *International Journal of Adolescent Medicine and Health*, *33*(2), 20180094.
- Nogales, S. H. Trabajo Fin De Grado Título: Actualidad De Moringa Oleifera En Terapéutica.
- Kaur, K. (2014). Anaemia 'a silent killer'among women in India: Present scenario. *European Journal of Zoological Research*, *3*(1), 32-36.
- World Health Organization. (2008). Worldwide prevalence of anaemia 1993-2005: WHO global database on anaemia.
- De Benoist, B., Cogswell, M., Egli, I., & McLean, E. (2008). Worldwide prevalence of anaemia 1993-2005; WHO Global Database of anaemia.
- Nwaoguikpe, R., Ujowundu, C., Igwe, C., & Dike, P. (2015). The effects of Moringa oleifera leaves extracts on Sickle Cell Hemoglobin. *Journal of Scientific Research and Reports*, *4*(2), 123-132.