IJNMI

Research Article

Effectiveness of Dietary Counseling on Improvement of Hemoglobin Level among Adolescents Girls at Selected School of Loni Village

Kalpana Kale, Sandnya Gawade

Department of Community Heath Nursing, Smt. Sindhutai Eknathrao Vikhe Patil College of Nursing, Pravara Institute of Medical Sciences (Deemed University), Loni Bk, Maharashtra, India

Abstract

Aims: This study evaluated the effectiveness of dietary counseling on the improvement of hemoglobin (HB) levels among adolescent girls.

Introduction: Unhealthy eating habits, exacerbated insufficient nutritional knowledge, significantly contribute to anemia in adolescents.

Objectives: To assess the HB level among adolescent girls at selected schools of Loni, to evaluate the effectiveness of dietary counseling on HB improvement and to determine the association between the post-test HB with their selected demographic variables.

Materials and Methods: A quasi experimental pre- and post-test study was conducted on 200 adolescent girls aged 10–14 years from the selected school of Loni village. HB levels were assessed pre- and post-counseling using Sahil's method. Participants received 3-months of dietary counseling statistical analysis involved descriptive and inferential methods.

Results: Study findings show that before dietary counseling HB level among subjects pre-test mean score was (9.11 ± 0.6) whereas after dietary counseling the post-test mean score was (11.41 ± 0.52) and the "*t*" value was (18.48) at 0.001. There was a significant association between the post-test HB level at the type of diet, Duration of the menstrual cycle, and menstrual flow at $P < 0.05$ level.

Conclusion: The study finding shows that dietary counseling was effective in improving the HB level. Nutrition education programs led to notable enhancements in the nutritional well-being and HB levels among adolescents.

Keywords: Adolescent girls, dietary counseling, effectiveness, hemoglobin level

Introduction

Health is a fundamental human right, a child's nutritional status plays a vital role in their growth and development. Without adequate nutrition, various health issues can emerge, including nutritional deficiencies. Adolescent health is a key focus of the reproductive and child health-II program, recognizing adolescence as a pivotal phase in human development that bridges childhood and adulthood. During this period of rapid growth, adolescents face an increased risk of developing iron deficiency anemia. As the second phase of the lifestyle, adolescence presents a crucial window for implementing health and nutrition interventions to promote long-term well-being.[1]

Worldwide, an estimated 33% of women in their reproductive ages suffered from anemia, with the highest prevalence reported in Asia.[2] The high rate of anemia among adolescents

Date of Submission: 31-08-2024
Date of Revision: 16-09-2024
Date of Acceptance: 10-10-2024

Access this article online
Website: http://innovationalpublishers.com/Journal/ijnmi
ISSN No: 2656-4656
DOI: 10.31690/ijnmi.2024.v09i04.008

Address for Correspondence:
Kalpana Kale, Smt. Sindhutai Eknathrao Vikhe Patil College of Nursing, Pravara Institute of Medical Sciences (Deemed University), Loni Bk, Maharashtra, India.
E-mail: kalpanakale1270@gmail.com

is largely attributed to inadequate knowledge, attitude, and practices related to healthy nutrition, However, this condition is preventable with proper awareness and interventions.[3]

The prevalence of anemia among adolescents is a significant global health concern. According to the World Health Organization (WHO), approximately two billion people worldwide are affected by anemia, with around 50% of these cases attributed to iron deficiency. Globally, anemia affects 47.4% of preschool children under 5 years of age, 41.8% of pregnant women, and 25.4% of school-aged children. In the Southeast Asian region, anemia prevalence among pre-school children and pregnant women is 65.5% and 48.2%, respectively, while the rates among adolescents girls vary between 17% and 90%. In Indonesia, there are 7.5 million cases of iron deficiency anemia, with a national anemia prevalence of 22.7% (WHO 2016).[4]

According to Chaudhary's research, a lack of nutritional knowledge is a key contributor to nutritional challenges, leading to inappropriate dietary practices and complications such as anemia.[5] Adolescent girls are particularly vulnerable to malnutrition and related chronic conditions due to their reproductive characteristics and socio-cultural factors, such as familial neglect, early marriage, and teenage pregnancy. Skipping breakfast or irregular eating habits can result in malnutrition, while frequent consumption of junk and fast foods increases the risk of obesity among adolescents.[5]

Providing nutrition education to adolescents about anemia can enhance their knowledge, attitudes, and practices, ultimately contributing to healthier families and communities while reducing the prevalence of anemia. However, limited research has been conducted on the impact of nutrition education in addressing anemia among adolescents. This study aims to evaluate the effectiveness of anemia-focused nutrition education in improving the knowledge levels of adolescent girls.[7]

India has the highest global prevalence of iron deficiency anemia among women, including adolescents, with 60–70% of Indian teenage girls identified as anemic (hemoglobin [Hb] <12 g/dL) Nutrition education is a promising strategy for addressing nutritional disorders, particularly iron deficiency anemia in adolescent girls. It emphasizes the importance of consuming hematopoietic nutrients and iron-rich food such as green leafy vegetables, which are also rich in essential micronutrients.

In recent years, the role of nutrition education in improving community health and nutrition has gained significant recognition. Adolescence, a critical period beginning with menarche and continuing through growth and development until reproductive age, is an opportune time for health and nutrition education intervention. This stage is particularly crucial for adolescent girls in developing countries, where early marriage is common. Implementing targeted education during adolescence can effectively combat iron deficiency and promote long-term health outcomes for women.[8]

Objectives

1. To assess the HB level among adolescent girls at selected schools of Loni village
2. To evaluate the effect of dietary counseling on the improvement of HB levels among adolescent girls at selected schools of Loni village
3. To determine the association between the post-test HB level among Adolescent girls with their selected demographic variables.

Hypotheses

- H_1: There will be a significant difference between pre- and post-test scores of HB level among adolescent girls at selected schools of Loni village
- H_{01}: There will be no significant difference between pre- and post-test scores of HB level among adolescent girls at selected schools of Loni village
- H_2: There will be a significant association between the post-test level of HB among adolescent girls with selected demographic variables
- H_{02}: There will be no significant association between the post-test levels of HB among adolescent girls with selected demographic variables.

Materials and Methods

Research design and approach

A quasi experimental study, pre- and post-test design without a control group with an evaluative approach was used to assess the effectiveness of dietary counseling on the improvement of HB levels among 200 adolescent girls from selected school of Loni (Bk) village of Ahmednagar district included as the sample unit. The selection of adolescents was done by non-probability purposive sampling technique.

Criteria for selection of sample

Inclusion criteria

The adolescent girls, who are:

- Between 10 and 19 years of age
- 7^{th}–9^{th} standard
- Studying in Ahilyabai Holkar and Rayat school of Loni (bk) village
- Willing to provide written informed consent.

Exclusion criteria

The adolescent's girls, who are:

- Taking iron supplements
- On medical treatment
- With severe anemia <8 g/dL.

Tools and techniques

The structured interview schedule was used to assess the effectiveness of dietary counseling on the improvement of

HB levels among adolescent girls The tool for data collection consists of 3 parts. Section-A: Consists of sociodemographic profile of adolescent girls (11 items), such as age, income, occupation of father, standard, religion, family income, type of family, type of diet, previous treatment for anemia, and duration of menstrual cycle, days and flow. Section-B: Assessment of nutritional status Section-C: Clinical assessment of HB level estimation among adolescent girls before and after dietary counseling (Sahli's method of HB testing).

Ethical consideration

Data collection commenced following approval from the Institutional Research Committee and the Institutional Ethical Committee of Pravara Institute of Medical Sciences, as well as consent from the principals of the selected schools. The study's purpose and procedure were explained to the participants, ensuring their voluntary participation, confidentiality of the provided data, and the right to withdraw at any time. Informed consent was obtained from both the parents and the students before data collection began.

Confidentiality was strictly maintained, and all data were used solely for research purposes. A pre-test questionnaire was administered to eligible students who agreed to participate in the study. The questionnaire, which took 10–15 min to complete, was explained to the students, and the researcher was available to address any queries. Simultaneously, blood tests were conducted using Sahil's Hemoglobinometer, followed by a nutrition counseling session for the students. A post-test was administered 6 months after the nutrition counseling to assess its effectiveness.

Pretest

The pre-test was done by using structure and interview schedule and assessment of HB level by Sahil methods.

Intervention

Adolescent girls received dietary counseling for 3 months, provided by the researcher, focusing on the importance of iron for their health during adolescence. The education covered topics such as symptoms and prevalence of iron deficiency anemia, the need for iron, sources of iron-rich foods, foods that inhibit iron absorption, and the significance of personal and hand hygiene, proper cooking, and healthy habits. Groups of 25 students were taught using charts, flashcards, and posters in 30-min sessions held in a conductive environment.

During the sessions, the girls were guided to identify locally available iron-rich foods, iron-enhancing foods, and ways to combine them with iron absorption enhancers. They were encouraged to adopt proper dietary habits and discouraged from following poor ones. After each session, participants received educational material for reference. Regular follow-ups were conducted through phone conversations, and the groups were visited every 15 days over a period of 6 months.

Post-test

Post-test was conducted after 6 months. The 3-month follow-up data were collection was done after the repetition of baseline assessment with sociodemographic, nutritional status, and HB assessment by the Sahil method.

Results

Demographic profile of adolescent girls

The total sample 239 adolescent girls of these, only 200 girls took the blood test for HB, and the rest girls refused because of their fear of needles. The majority 135 (68%) of the adolescents are belongs to 14–16 years of age. More than half 114 (57%) of them had first birth order. Most of them (71%) are from 8th to 9th standard. The majority (90%) of them are from the Hindu religion. Many of the girls (73%) belonged to the nuclear family. Most of them (69%) of them had mixed types of diet patterns. Very few (12%) of them had a history of previous treatment of anemia. (46%) of them had irregular menstrual cycles and heavy flow, respectively.

Table 1 depicts that, all the adolescent girls were assessed for HB level for selection of participants. From that total 200 girls were having HB levels under 10 g/dL. All 200 participants went through the blood test; the pre-test mean score was 10.11 ± 0.6 standard deviation (SD). The blood result revealed that more than half 117 (58.5%) of the adolescent girls had mild anemia, 83 (41.5%) had moderate anemia, and none of them had severe anemia.

Table 2 depicts the post-test HB level among adolescent girls after dietary counseling. Among 200 adolescent girls, the post-test mean score was 10.41 ± 0.52 SD. The blood test result shows that the highest 132 (66 %) girls had mild level anemia, 29 (14.5%) girls had moderate anemia, and 39 (19.5%) participants had normal HB levels. It interpreted that dietary counseling was effective in improving blood HB level.

Above Table 3 reveals the difference between the pre- and post-test HB levels it shows that there was a significant difference

Table 1: Pre-test hemoglobin level of adolescent girl (*n*=200)

S. No	Level of anemia	F (%)	HB parameters
1	Normal	00	>12 g/dL
2	Mild	117 (58.5)	10–11.9 g/dL
3	Moderate	83 (41.5)	8–9.9 g/dL
4	Severe	00	<8 g/dL
5	Total	200 (100)	

HB: Hemoglobin

Table 2: Frequency and percentage of post-test hemoglobin level among adolescent girls (*n*=200)

S. No	Level of anemia	Frequency (%)	HB parameters
1	Normal	39 (19.5)	>12 g/dL
2	Mild	132 (66)	10–11.9 g/dL
3	Moderate	29 (14.5)	8–9.9 g/dL
4	Severe	00	<8 g/dL
5	Total	200 (100)	

HB: Hemoglobin

found in pre- and post-test HB levels. It shows that in the pre-test 83 (41.5%) girls had moderate anemia whereas in the post-testonly 29 (14.5%) had a moderate level of anemia also in post-test 39 (19.5%) girls' HB level was normal whereas in the pre-test no one had normal HB. The result shows a significant improvement in HB level in post-test than in pre-test. Hence, it is interpreted that dietary counseling is effective in improving the level of HB among adolescent girls.

Above Table 4 reveals that before dietary counseling HB level among 200 subjects, pre-test mean score was 9.11 ± 0.6 SD whereas after dietary counseling HB among 200 adolescent girls post-test mean score was 11.41 ± 0.52 SD. The mean difference in the HB between pre- and post-test was 0.30. The "*t*" value is (18.48) was much higher than the table value at 0.001 (pre-test level of significance was 0.05 level).

It is interpreted that there is a significance difference in the HB level after the nutrition counseling. Significant at $P < 0.5$ level.

Association between post-test HB level and demographic variables

There was a significant association found with the type of diet (12.25), duration of menstrual cycle (10.24), and menstrual flow 11.25 at $P < 0.05$ level.

His study demonstrates the effectiveness of dietary counseling in improving HB levels among adolescent girls. The results align with prior research by Abu-Baker *et al*. (2021), highlighting the impact of nutrition education on anemia management. The findings emphasize the importance of targeted interventions during adolescence to prevent anemia and promote long-term health.

Discussion

This study demonstrates the effectiveness of dietary counseling in improving HB levels among adolescent girls. The results align with prior research by Abu-Baker *et al*. (2021) highlighting the impact of nutrition education on anemia management. The findings emphasize the importance of targeted intervention during adolescence to prevent anemia and promote long-term health. The reason for these differences may be their age group, sociocultural differences, and different economical backgrounds.[9] As per WHO, adolescents are between the ages of 10 and 19 years. Adolescence is a time of rapid growth and development in which the requirement of nutrients, micronutrients, and vitamins are high. Malnutrition and anemia in this age group are caused by various factors such as poor nutritional condition in childhood, wrong eating and food patterns.[10] Adolescence is a critical stage of growth and development, marked by transformative physical, psychological, and cognitive growth. Adolescents have a unique opportunity to adopt changes in diet and physical activity that can last into later life. Pre-existing cases and nutritional problems including nutritional deficiencies, bad food habits, poor diet, poor food habits, anemia, obesity, and malnutrition.[11]

Table 3: Comparison of pre- and post-test hemoglobin levels among adolescent girls (*n*=200)

S. No.	Level of anemia	Pre-test F (%)	Post-test F (%)	Diff
1	Normal	00	39 (19.5)	39
2	Mild	117 (58.5)	132 (66)	15
3	Moderate	83 (41.5)	29 (14.5)	54
4	Severe	00	00	00
5	Total	200 (100)	200 (100)	

Table 4: Mean, SD, and "*t*" value of pre- and post-test hemoglobin level

Test	Mean	SD	MD	"*t*" value
Pre-test	9.11	0.6	2.3	18.48 at $P<0.001$
Post-test	11.41	0.52		level significant

SD: Standard deviation

Conclusion

Dietary counseling effectively improves HB levels, emphasizing the critical role of nutrition education in adolescent health. Future programs should focus on integrating dietary counseling into school health initiatives to combat anemia and enhance overall well-being.

The study's findings are limited to a specific geographical area, affecting its generalizability. Future research should include diverse populations for broader applicability.

Limitation

The study's findings are limited to a specific geographical area, affecting its generalizability. Future research should include a diverse population for broader applicability.

Acknowledgment

We sincerely acknowledge the principal of all the selected schools and all the samples of this study.

Funding

None.

Conflict of Interest

None.

References

1. Arya AK, Lal P, Kumar N, Barman S. Prevalence of anemia among adolescent girls in an urban slum of Kanpur, Uttar Pradesh. Int J Med Sci Public Health 2017;6:1378-81.
2. Abdo N, Douglas S, Batieha A, Khader Y, Jaddou H, Al-Khatib S, *et al*. The prevalence and determinants of anaemia in Jordan. Eastern Mediterr Health J 2019;25:341-9.
3. Jalambo MO, Sharif R, Naser IA, Karim NA. Improvement in knowledge, attitude, and practice of iron deficiency anemia among iron-deficient female adolescents after nutritional educational intervention. Glob J Health Sci 2017;9:15-23.
4. World Health Organization. Guideline: Daily Iron Supplementation in Adult Women and Adolescent Girls; 2016. Available from: https://www.

who.int/iris/handke/10665/204761
5. Chaudhary P, Gupta R. Impact assessment of dietary and nutrition education intervention on hemoglobin level of moderately anemic adolescent girls. Indian J Ext Educ 2021;57:145-9.
6. Kotecha PV, Patel SV, Baxi RK, Mazumdar VS, Shobha M, Mehta KG, *et al*. Dietary pattern of school-going adolescents in urban Baroda, India. J Health Popul Nutr 2013;31:490.
7. Anik S, Slivi MA, Yuni P. Effectiveness of nutrition education on anemia on the level of knowledge in adolescent girls. Int Conf Nurs Health Sci 2022;3:131-8.
8. Kamalaja T, Prashanthi M, Rajeswari K. Effectiveness of health and nutritional education intervention to combat anemia problem among adolescent girls. Int J Curr Microbiol Appl Sci 2018;7:3152-62.
9. Abu-Baker NN, Eyadat AM, Khmaiseh AM. The impact of nutrition education on knowledge, attitude, and practice regarding iron deficiency anemia among female adolescent students in Jordan. Heliyon 2021;7:e06348.
10. World Health Organization. Meeting Report: WHO Technical Consultation: Nutrition-related Health Products and the World Health Organization Model List of Essential Medicines-practical Considerations and Feasibility: Geneva, Switzerland, 2021 September 2018 (No. WHO/NMH/NHD/19.1). Geneva: World Health Organization; 2019.
11. Hargreaves D, Mates E, Menon P, Alderman H, Devakumar D, Fawzi W, *et al*. Strategies and interventions for healthy adolescent growth, nutrition, and development. Lancet 2022;399:198-210.

How to cite this article: Kale K, Gawade S. Effectiveness of Dietary Counseling on Improvement of Hemoglobin Level Among Adolescents Girls at Selected School of Loni Village. Int J Nurs Med Invest. 2024;9(4):39-43.