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A Pre Experimental Study to Evaluate the Effectiveness of Beetroot Juice on Anaemia among Adolescent Girls in Selected Areas of Sawer, Indore in Year 2026

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Abstract
Anaemia is a major public health concern affecting millions of people worldwide, particularly adolescent girls. According to the World Health Organization (WHO), anaemia is characterized by a reduced concentration of hemoglobin in the blood, leading to decreased oxygen-carrying capacity. During adolescence, rapid physical growth, the onset of menstruation, inadequate dietary intake of iron, and increased nutritional requirements place girls at a higher risk of developing iron-deficiency anaemia. If left untreated, anaemia can result in fatigue, weakness, poor cognitive performance, impaired immunity, decreased academic achievement, and reduced quality of life. India has one of the highest burdens of anaemia among adolescent girls.

Keywords: Adolescent girls, Beetroot, Hemoglobin, Anaemia & Nutrition.

Introduction

Despite ongoing government initiatives such as iron and folic acid supplementation and nutrition education programs, the prevalence of anaemia remains high due to poor dietary habits, low consumption of iron-rich foods, parasitic infections, and limited awareness regarding balanced nutrition. Therefore, there is a need to explore affordable, acceptable, and food-based interventions that can complement existing anaemia control strategies.

Beetroot (Beta vulgaris) is a highly nutritious root vegetable recognized for its rich content of iron, folate, vitamin C, dietary fiber, nitrates, and natural antioxidants such as betalains. These nutrients are believed to support red blood cell production, enhance iron absorption, improve blood circulation, and promote overall health. Although beetroot contains only moderate amounts of iron, its combination of vitamins, minerals, and bioactive compounds may contribute to improved hemoglobin levels when included as part of a balanced diet.

Background of the study

In India, anaemia among adolescent girls remains a major public health problem. Many girls consume

diets low in iron, folic acid, and vitamin B12, making them vulnerable to nutritional anaemia. Improving haemoglobin levels through affordable, natural, and locally available foods is an important strategy for preventing and controlling anaemia. The present study aims to evaluate the effectiveness of beetroot juice on the haemoglobin level of anaemic adolescent girls aged 12–16 years. The findings may provide evidence for a simple, economical, and natural dietary intervention that can be implemented in schools and communities to improve adolescent health.

Need of the study

Beetroot is a low-cost, easily available vegetable that contains iron, folic acid, vitamin C, antioxidants, and other essential nutrients that may support red blood cell production and improve nutritional status. Regular consumption of beetroot juice may serve as a natural dietary supplement for improving haemoglobin levels.

The present study was undertaken to evaluate the effectiveness of beetroot juice on haemoglobin levels among anaemic adolescent girls aged 12–16 years. The findings of this study will provide evidence for nurses, school health authorities, and community health workers regarding the usefulness of beetroot juice as a supportive nutritional intervention. The study may also help in developing health education programmes and promoting healthy dietary practices to reduce the burden of anaemia among adolescent girls.

Objectives:

1. To assess the pre-test hemoglobin level among adolescent girls with aemia before the consumption of beetroot juice.
2. To assess the post-test hemoglobin level among adolescent girls with anaemia after the consumption of beetroot juice.
3. To determine the association between post-test hemoglobin levels and selected demographic variables (such as age, dietary habits, socioeconomic status, menstrual history, and BMI) among adolescent girls with anaemia.

Hypothesis

H1: There will be a significant difference between pre test and post test hemoglobin level among adolescent girls after consumption of beetroot juice.

H2: There will be a significant association between pre test and post test hemoglobin level among adolescent girls after consumption of beetroot juice.

Methodology:

The present study adopted a pre-experimental one-group pre-test and post-test research design to assess the effectiveness of beetroot juice in improving haemoglobin levels among adolescent girls with anaemia. The study was conducted among 30 adolescent girls selected through non-probability purposive sampling based on the inclusion criteria.

The collected data were coded, tabulated, and analysed using descriptive statistics (frequency, percentage, mean, and standard deviation) and inferential statistics (paired t-test) to compare pre-test and post-test haemoglobin levels.

Results

The post-test mean score (44.80) was higher than the pre-test mean score (27.20). The standard deviation of the pre-test scores (SD = 11.85) was lower than that of the post-test scores (SD = 13.72). The calculated paired t-value ($t_{29} = 5.284$, $p < 0.05$) was greater than the tabulated t-value ($t_{29} = 2.045$, $p < 0.05$).
Hence, the null hypothesis (H_0) is rejected and the research hypothesis (H_1) is accepted. This indicates that beetroot juice was effective in improving haemoglobin levels among adolescent girls with anaemia.

Interpretation

Anaemia Grade	Mean	Percentage	Standard Deviation	Mean Difference	T-Value
Pre-test	27.20	20.4%	11.85	17.60	5.284
Post-test	44.80	33.6%	13.72		

Discussion

The present study was conducted to evaluate the effectiveness of beetroot juice in improving haemoglobin levels among 30 adolescent girls with anaemia. The findings revealed a significant improvement in haemoglobin levels following the intervention. The increase in post-test scores suggests that regular consumption of beetroot juice positively influenced haemoglobin levels. Beetroot is a rich source of iron, folate, vitamin C, and dietary nitrates, which are known to support red blood cell production and improve iron absorption. The statistically significant difference between the pre-test and post-test findings confirms the effectiveness of beetroot juice as a nutritional intervention for managing anaemia among adolescent girls.

Conclusion

The findings suggest that regular consumption of beetroot juice can serve as a safe, economical, and effective dietary supplement for improving haemoglobin levels and reducing the risk of anaemia among adolescent girls. It is recommended that beetroot juice be promoted as part of school health programmes and community nutrition initiatives to improve the nutritional status of adolescents.