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Original Research Article

EXPLORING THE RELATIONSHIP BETWEEN ANAEMIA AND DIETARY PATTERNS IN ADOLESCENT GIRLS

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Abstract

Background: Anaemia is a prevalent health concern among adolescent girls in many regions. This study is aimed to investigate the relationship between anaemia and dietary patterns in adolescent girls attending Project High School in Bahadurganj, an urban area in Kishanganj district of Bihar. **Materials and Methods:** A total of 971 adolescent girls from Project High School at Bahadurganj, were included in this cross-sectional study. The school is classified as a secondary school with a higher secondary section and is exclusively for girls. Among the participants, 246 girls were found to be anaemic. Dietary patterns were assessed through structured interviews and 24-hour dietary recalls. Haemoglobin levels were measured using Sahli's hemoglobinometer to determine anaemia status during the period January 2023 to September 2023. **Result:** The study revealed a high prevalence of anaemia, with 25.3% of affected adolescent girls at Project High School in Bahadurganj. The dietary patterns of the participants were analyzed, and a significant association between anaemia and specific dietary choices were observed. Girls with anaemia tended to have lower intakes of iron-rich foods, such as red meat, poultry, fish, and fortified cereals, compared to their non-anemic counterparts. Additionally, inadequate consumption of fruits and vegetables rich in vitamin C, which enhances iron absorption, was noted among the anaemic group. These findings suggest a potential link between dietary choices and anemia prevalence in the studied population. **Conclusion:** Anemia remains a significant health concern among adolescent girls in Bahadurganj in Kishanganj. The study highlights the importance of dietary choices in the development and prevention of anemia in this demographic area. Promoting a balanced diet that includes sufficient iron-rich foods and foods high in vitamin C could be a valuable strategy in reducing prevalence of anaemia among adolescent girls in urban areas like Bahadurganj.

INTRODUCTION

Anaemia is a common nutritional disorder affecting individuals worldwide, and it is particularly prevalent among adolescent girls in various regions, including India. In the context of Bahadurganj, a bustling urban area in Kishanganj, the prevalence of anaemia among adolescent girls is of concern. Anaemia is characterized by a reduced quantity of red blood cells or hemoglobin in the blood, leading to fatigue, weakness, and other health complications. The condition can have significant consequences on the physical and cognitive development of adolescents, impacting their overall well-being and educational attainment.[1]

Adolescent girls are at a higher risk of anemia due to multiple factors, including increased iron requirements during puberty and menstruation, poor dietary choices, and socioeconomic disparities. Iron deficiency anemia, in particular, remains a significant public health challenge, as it can have long-lasting effects on the physical and cognitive development of adolescents, potentially affecting their future health and productivity.[2]

Project High School in Bahadurganj, an urban area in Kishanganj, plays a pivotal role in the education and well-being of adolescent girls. As a secondary school with a higher secondary section exclusively for girls, it is an ideal setting to investigate the relationship between dietary patterns and anaemia prevalence in this demographic area.[3]

A deeper understanding of the dietary factors contributing to anaemia among adolescent girls is crucial to develop targeted interventions that can

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mitigate the issue. Dietary habits play a pivotal role in maintaining overall health and promoting healthy eating practices can have a profound impact on reducing the prevalence of anaemia. Moreover, it is essential to identify specific dietary patterns and choices that may be associated with anaemia, providing valuable insights for healthcare professionals and policymakers to design effective preventive measures.[4]

This study aims to explore the relationship between anaemia and dietary patterns among adolescent girls attending Project High School in Bahadurganj. By analyzing dietary habits and assessing anaemia status among the school's 971 students, we seek to shed light on the prevalence and potential risk factors associated with anaemia in this specific urban adolescent population.[5]

MATERIALS AND METHODS

Study Design: This research is a cross-sectional study designed to explore the relationship between anaemia and dietary patterns among adolescent girls at Project High School in Bahadurganj, an urban area in Kishanganj, India.

Study Population: The study population consisted of 971 adolescent girls attending Project High School Bahadurganj, a secondary school with a higher secondary section exclusively for girls.

Data Collection: Haemoglobin Measurement: Hemoglobin levels of all participants were measured using a standardized method. A fingertip or venous blood sample was collected, and haemoglobin levels were assessed using Sahli's haemoglobinometer.

Anemia Definition: Anemia was defined using the World Health Organization (WHO) criteria, with hemoglobin levels below 12 g/dL for adolescent girls aged 15-18 years.

Dietary Assessment: Dietary patterns and habits of the participants were assessed through the following methods:

a. Structured Interviews: Trained interviewers conducted structured face-to-face interviews with the participants to gather information on their dietary habits, including meal frequency, portion sizes, and consumption of specific food groups.

b. 24-Hour Dietary Recalls: Participants were asked to recall all foods and beverages consumed in the 24 hours preceding the interview. This method helped capture detailed information about dietary choices and nutrient intake.

1. **Food Frequency Questionnaire:** A food frequency questionnaire was used to assess the frequency of consumption of specific food items and food groups over a specified time period (e.g., weekly or monthly). This provided insights into long-term dietary patterns.

2. **Anthropometric Measurements:** Anthropometric measurements, including height and weight were taken to assess the nutritional status of the participants. Body Mass Index (BMI) was calculated using the formula: BMI = Weight in kg/ (Height in meters)2

Data Analysis: The prevalence of anaemia in the study population was calculated by determining the percentage of girls with haemoglobin levels below 12 g/dL. Dietary data were analyzed to identify common dietary patterns and assess the frequency of consumption of key food groups, such as iron-rich foods and foods high in vitamin C. Statistical software (e.g., SPSS-Ver-26) was used for data analysis. Descriptive statistics, chi-squared tests, t-tests, and regression analysis were employed to examine the relationship between anaemia and dietary patterns, controlling for potential confounding variables such as socioeconomic status.

RESULTS

Table 1: Prevalence of Anaemia

Anaemia Status	Number of Girls
Anaemia Present	246 (25.3%)
No Anaemia Present	725 (74.7%)
Total Participants	971 (100.0%)

The prevalence of anemia among adolescent girls at Project High School in Bahadurganj is 25.3% (246 out of 971).

Table 2:Dietary Patterns

Dietary Patterns	Frequency (%)	Difference [95% CI] & z value	P value
Infrequent iron-rich foods consumption	168 (68%)	36.00%[27.35, 44.65]Z- 7.90	<0.0001
Inadequate intake of fruits and vegetables	137 (56%)	12.00% [2.82, 21.18]Z-2.57	0.005

The analysis of dietary patterns indicates that a significant portion of girls had infrequent consumption of iron-rich foods and did not consume enough fruits and vegetables high in vitamin C.

Table 3: Anthropometric Measurements and Mean Values

Participant	Height (cm)	Weight (kg)	BMI (kg/m²)
Mean Value	160.21 ±4.23	51.6±10.66	20.40±2.42

The mean height of the participants was 160.21 ±4.23 cm. The mean weight of the participants was 51.6±10.66 kg. And BMI was 20.40±2.42.

DISCUSSION

The findings from our study shed light on the relationship between dietary patterns and the prevalence of anaemia among adolescent girls attending Project High School in Bahadurganj, an urban area in Kishanganj. The study revealed several key observations and implications.

Prevalence of Anaemia: Our study identified a substantial prevalence of anemia among the participants, with 25.3% of adolescent girls at Project High School being affected. This finding is consistent with previous research that has highlighted the high burden of anemia among adolescent girls in India(Chandrakumari AS et al).[6] The prevalence of anemia in this population is a matter of public health concern, as anaemia can have long-lasting consequences on physical and cognitive development.

Dietary Patterns and Anemia: The analysis of dietary patterns uncovered significant associations between dietary choices and anaemia prevalence. Notably, the majority of participants exhibited infrequent consumption of iron-rich foods, such as red meat, poultry, fish, and fortified cereals. This dietary pattern was associated with a 36.00% difference in anemia prevalence, with a 95% confidence interval [27.35, 44.65] and a z value of -7.90. This is a concerning observation, as a lack of iron-rich foods can contribute to iron deficiency anaemia (Viteri FE et al).[7]

Furthermore, a substantial portion of the girls also had inadequate intake of fruits and vegetables, which are rich in vitamin C. The analysis showed a 12.00% difference in anaemia prevalence with a 95% confidence interval [2.82, 21.18] and a z value of -2.57 for this dietary pattern. Vitamin C is known to enhance iron absorption, and its deficiency can hinder the body's ability to utilize dietary iron effectively reported by Hallberg LE et al.[8]

Our findings align with existing literature that emphasizes the role of dietary factors in the prevalence of anaemia among adolescent girls. Studies conducted in India and other developing countries have consistently highlighted the importance of dietary diversification and the consumption of iron-rich foods and vitamin C-rich foods in preventing and managing anaemia.[9] In particular, a study conducted in a similar population in India found that dietary factors were significant contributors to anaemia among adolescent girls (Kamble BD et al).[10]

The high prevalence of anaemia and the specific dietary patterns observed in our study underlines the urgent need for targeted interventions. Public health initiatives focusing on nutrition education, school-based nutritional programs, and access to iron and vitamin C-rich foods can play a crucial role in reducing anaemia prevalence among adolescent girls in Bahadurganj. Additionally, addressing socioeconomic disparities and promoting awareness among parents and caregivers can further contribute to the success of these interventions (Friel S et al).[11]

CONCLUSION

Our study emphasizes that anaemia is a significant public health challenge among adolescent girls in Bahadurganj. By addressing dietary patterns and nutritional needs through targeted interventions and educational programs, we can contribute to the well-being, development, and future success of these young girls.

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