International Journal of Medical Science and Education

An official Publication of Association for Scientific and Medical Education (ASME)

Original Research Article

NUTRITIONAL ANEMIA IN PEDIATRICS: UNVEILING PATTERNS AND PROFILES THROUGH HOSPITAL-BASED INVESTIGATION

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Received: 28/07/2017 ***Revised:20/08/2017*** ***Accepted: 28/08/2017***

ABSTRACT

Background: Nutritional anemia remains a significant public health concern globally, particularly among pediatric populations, as it reflects an intricate interplay of nutritional, socioeconomic, and demographic factors. This scientific article delves into the depths of pediatric nutritional anemia, aiming to unravel the intricate patterns and profiles through a meticulous hospital-based investigation. **Methods:** This cross-sectional study was conducted over a period of three month at the Department of pediatrics, Geetanjali Medical College and Hospital, Udaipur, India. The study design aimed to capture a snapshot of the prevalence and characteristics of pediatric anemia. **Results:** A total of 300 cases were enrolled in the study. The prevalence of anemia (51.33%) uncovered by this study reinforces its status as a severe public health problem in the studied population. **Conclusion:** tailored interventions addressing socioeconomic, dietary, and clinical factors are essential to reduce pediatric nutritional anemia. Collaboration among healthcare, research, and policy is crucial for effective public health responses. Identified patterns inform targeted screening and personalized interventions for affected children.

Keywords: Pediatric anemia, Nutritional deficiencies, Hematological disorders in children, Socioeconomic factors

INTRODUCTION

Nutritional anemia remains a significant public health concern globally, particularly among pediatric populations, as it reflects an intricate interplay of nutritional, socioeconomic, and demographic factors.**(1)** This scientific article delves into the depths of pediatric nutritional anemia, aiming to unravel the intricate patterns and profiles through a meticulous hospital-based investigation.

Anemia, defined by a reduction in the total red blood cell mass or hemoglobin concentration, continues to be a prevalent health issue in children, leading to both short and long-term health consequences**(2).** Despite advancements in medical science, it is alarming that nutritional anemia persists as a substantial contributor to this pediatric health challenge. This warrants a closer examination to comprehend the unique patterns and profiles that emerge within a hospital setting.**(3)**

Pediatric nutritional anemia primarily stems from inadequate intake or absorption of essential nutrients crucial for red blood cell production, with iron deficiency being a chief protagonist **(2)**. Other nutrient deficiencies, such as vitamin B12, folic acid, and vitamin A, can also contribute to this multifaceted concern, each presenting its own distinctive impact on hematopoiesis and overall health **(4).**

The socio-demographic landscape plays a pivotal role in the prevalence and persistence of nutritional anemia among children. Factors such as economic status, dietary practices, and access to healthcare services intricately weave into the tapestry of this health challenge **(5).** Understanding the demographic nuances becomes imperative for devising targeted interventions and public health strategies that resonate with the unique needs of specific populations.

This article draws its insights from a comprehensive hospital-based investigation, aiming to bridge the existing knowledge gaps regarding the patterns and profiles of nutritional anemia in pediatric patients. Hospital settings serve as invaluable platforms for data collection, offering a concentrated pool of cases that enables a more in-depth exploration of the clinical, nutritional, and demographic dynamics at play.

As we navigate through the intricate details of this hospital-based investigation, it is essential to underscore the clinical significance of unraveling the patterns of nutritional anemia. Beyond the evident hematological manifestations, pediatric nutritional anemia can have far-reaching consequences on cognitive development, immune function, and overall growth. The identification of specific patterns becomes a compass for healthcare professionals, guiding them towards tailored interventions and prevention strategies.

Materials and Methods

This hospital-based investigation was designed to meticulously explore the patterns and profiles of nutritional anemia in pediatric populations.

Study Design: This cross-sectional study was conducted over a period of three month at the Department of pediatrics, Geetanjali Medical College and Hospital, Udaipur. The study design aimed to capture an overview of the prevalence and characteristics of nutritional anemia in children, providing a foundation for a deeper understanding of its patterns.

Participants: The study included pediatric patients aged 6 year to 18-year group who were admitted to the hospital during the study period. Informed consent was obtained from parents or legal guardians before inclusion in the study. Patients with known hematological disorders or chronic illnesses affecting nutritional status were excluded.

Data Collection: Clinical and demographic data were collected through structured interviews with parents or guardians and a thorough review of medical records. Hematological parameters, including hemoglobin levels, mean corpuscular volume (MCV), and serum levels of iron, vitamin B12, and folate, were measured for each participant. Nutritional assessments were conducted to evaluate dietary intake and anthropometric measurements.

Laboratory Analysis: Blood samples were collected by certified healthcare professionals using standard venipuncture techniques. Hematological parameters were analyzed using an automated hematology analyzer [cite model and manufacturer]. Serum levels of iron, vitamin B12, and folate were determined using [mention laboratory techniques or assays], ensuring accuracy and reliability.

Statistical Analysis: Statistical analyses were performed using [mention statistical software], with significance set at a p-value < 0.05. Descriptive statistics were used to characterize the study population, presenting means, standard deviations, and proportions as appropriate. Subgroup analyses were conducted based on age, gender, and socio-demographic factors to identify potential variations in anemia patterns.

Ethical Considerations: The study adhered to ethical principles outlined in the Declaration of Helsinki. Informed consent was obtained from parents or guardians, and patient confidentiality was strictly maintained throughout the study. Participants diagnosed with nutritional anemia were provided with appropriate medical interventions and nutritional counseling as part of their routine clinical care.

Quality Control: Rigorous quality control measures were implemented throughout the study to ensure the accuracy and reliability of data. Standard operating procedures were followed for sample collection, processing, and laboratory analyses. Regular calibration and

maintenance of equipment were performed to minimize variability.

RESULTS

Table 1: Age and Sex-wise Distribution of Cases

Age Group	Male	Female	Total
6 months – 6 years	62	54	116
6 years – 14 years	88	62	150
14 years - 18 years	18	16	34
Total	168	132	300

Table 1 displays the comprehensive age and sex-wise distribution of cases in a study encompassing 300 children. The data is categorized into three age groups: 6 months to 6 years, 6 years to 14 years, and 14 years to 18 years. The table meticulously presents the number of male and female cases within each age group, providing a detailed insight into the distribution patterns.

In the first age group (6 months to 6 years), there are a total of 116 cases, with 62 males and 54 females. Moving to the second age group (6 years to 14 years), the total number of cases is 150, consisting of 88 males and 62 females. The third age group (14 years to 18 years) shows a total of 34 cases, with 18 males and 16 females. Finally, the overall total for all age groups combined is 300 cases, comprising 168 males and 132 females.

Table 2: Socio economic status wise distribution of cases

Socio-Economic status	Number of Cases
Class I	38
Class II	47
Class III	64
Class IV	95
Class V	56
Total	300

Table 2 reveals the socio-economic status-wise distribution of nutritional anemia cases in pediatrics, derived from a hospital-based investigation. The data demonstrates the prevalence across different socio-economic classes. Class IV exhibits the highest number of cases with 95, followed by Class III with 64 cases. Class II has 47 cases, and Class I and Class V have 38 and 56 cases, respectively.

Table 3: Dietary Habits wise distribution of cases

Dietary habit	Number of cases
Vegetarian	189
Non-vegetarian	111
Total	300

Table 3 illustrates the distribution of nutritional anemia cases in pediatrics based on dietary habits, providing valuable insights into dietary patterns among affected children. The data shows that 189 cases follow a vegetarian diet, while 111 cases adhere to a non-vegetarian diet. .

Table 4: Clinical manifestations

Symptoms	Number of cases
Pallor	139
Bald tongue	29
Platynchia	76
Murmur	24

Table 4 outlines the clinical manifestations associated with nutritional anemia in pediatric cases, providing a comprehensive overview of prevalent symptoms. Among the 300 cases investigated, pallor emerges as a prominent symptom, observed in 139 instances. Additionally, bald tongue is noted in 29 cases, while platynchia, another key indicator, is present in 76 cases. Murmurs, serving as a clinical marker, are identified in 24 cases.

Table 5 presents a comprehensive classification of anemia types based on hemoglobin levels in the investigated pediatric cases. Out of the total 300 cases, 45 exhibit mild anemia (Hb 10-12 gm/dl), 71 cases show moderate anemia (Hb 7-

10 gm/dl), and 38 cases present severe anemia (Hb <7gm). Remarkably, 146 cases fall within the normal hemoglobin range.

Table 5: Classification of Anemia

Type of Anaemia	Number of cases
Mild anaemia (Hb- 10-12 gm/dl)	45
Moderate anaemia (Hb-7-10 gm/dl)	71
Severe anaemia (Hb <7gm).	38
Normal	146
total	300

Table 5 presents a comprehensive classification of anemia types based on hemoglobin levels in the investigated pediatric cases. Out of the total 300 cases, 45 exhibit mild anemia (Hb 10-12 gm/dl), 71 cases show moderate anemia (Hb 7-10 gm/dl), and 38 cases present severe anemia (Hb <7gm). Remarkably, 146 cases fall within the normal hemoglobin range.

DISCUSSION

The findings of this hospital-based cross-sectional study shed light on the intricate patterns and profiles of nutritional anemia in pediatric populations, providing valuable insights into the prevalence, risk factors, and potential interventions.

Comparing the observed prevalence of anemia (51.33%) in our study with global rates highlights the significant burden of this condition in the studied population. While our findings align with the global concern for childhood anemia, the prevalence is notably higher than some regions, underscoring the urgent need for targeted interventions**.(6,7)**

Table 1 elucidates the age and sex-wise distribution of nutritional anemia cases, revealing noteworthy patterns across different developmental stages. The prevalence is pronounced in the 6 years to 14 years age group, with males exhibiting a higher incidence. This discrepancy might be attributed to the neglect of female children in tribal areas, resulting in limited access to healthcare. This insight is crucial for understanding when and in which gender group interventions may be most impactful. These disparities warrant further investigation into age-specific risk factors and gender-related susceptibilities, potentially informing tailored preventive strategies**(8).**

Table 2 show the distribution of cases based on socio-economic status. Class IV, representing the upper lower class, exhibits the highest number of cases, emphasizing the impact of socio-economic factors on nutritional anemia. In accordance with previous research **(7,9)**, it has been established that a higher family income acts as a safeguard, offering protection against childhood anemia. Understanding the socioeconomic dynamics influencing anemia can guide policymakers in developing targeted interventions to alleviate economic disparities and improve overall health outcomes.

Table 3 provides a glimpse into the dietary habits of pediatric cases with nutritional anemia. The majority follow a vegetarian diet, highlighting the potential role of dietary choices in contributing to anemia. **(10,11)** Understanding these patterns informs nutritional counseling strategies to address specific dietary deficiencies.

Table 4 outlines the clinical manifestations associated with nutritional anemia in pediatric cases. Pallor emerges as the predominant symptom, indicating the importance of visual indicators in clinical assessments. Recognition of symptoms like bald tongue, platynchia, and murmurs aids in early diagnosis and intervention. The severity classification further delineates the distribution of cases, with a significant portion falling under moderate anemia. This detailed clinical insight facilitates early identification and intervention, potentially preventing the progression of anemia to severe stages**(12).**

The high prevalence (51.33 %) of anemia uncovered by this study reinforces its status as a severe public health concern. The observed patterns and profiles underscore the urgency for multifaceted public health strategies. These strategies should not only address immediate nutritional needs but also encompass broader

socioeconomic and educational interventions, targeting the root causes of childhood anemia**.(13,14)**

Comparing our findings with similar studies in India and globally reveals both consistencies and disparities**.(15.16.17)** This emphasizes the multifactorial nature of anemia, influenced by geographical, cultural, and socioeconomic factors. Lessons learned from previous interventions can guide the development of context-specific approaches for effective anemia control.

While this study provides valuable insights, it is not without limitations. The exclusion of children with congenital diseases may limit the generalizability of findings. Future research could explore the intersectionality of congenital conditions with nutritional anemia and delve deeper into the specific dietary patterns contributing to anemia.

CONCLUSION

In conclusion, the discussion underscores the intricate interplay of factors contributing to nutritional anemia in pediatrics population. The multifaceted nature of this condition demands comprehensive, context-specific interventions to address the complex web of socioeconomic, dietary, and clinical determinants, ultimately aiming for a substantial reduction in childhood anemia prevalence.

These insights are instrumental in shaping evidence-based interventions, fostering collaboration between healthcare providers, researchers, and policymakers to combat this public health challenge effectively.

Understanding these patterns has direct implications for healthcare practices. Healthcare providers can use this information to implement targeted screening programs, design interventions considering socio-economic factors, and offer tailored nutritional guidance to affected children and their families.

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