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B12 DEFICIENCY IS THE COMMONEST CAUSE OF ANEMIA DURING PREGNANCY IN NORTHERN INDIA

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ABSTRACT

Background: Vitamin B12 deficiency is a prevalent issue among pregnant women in Northern India, particularly due to predominant vegetarian dietary practices. This deficiency is closely linked to the development of anemia, which can adversely affect maternal and fetal health.

Methods: This cross-sectional study involved 100 pregnant women at ESIC Medical College and Hospital, Bihta, Patna, from April 2022 to April 2023. Participants underwent blood tests to determine vitamin B12 levels and were screened for anemia. Statistical analysis was used to examine the relationship between B12 deficiency and anemia.

Results: Out of the participants, 55% had vitamin B12 deficiency and 65% were anemic. A significant association was found between B12 deficiency and anemia, particularly in the second and third trimesters of pregnancy.

Conclusion: The high prevalence of vitamin B12 deficiency and its correlation with anemia highlights the need for improved nutritional management and awareness in pregnant women in Northern India. Effective interventions, including supplementation and dietary counseling, are crucial for preventing complications associated with these deficiencies.

Keywords: Vitamin B12 deficiency, Anemia, Pregnancy, Northern India

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INTRODUCTION

In Northern India, anemia during pregnancy poses a significant public health challenge, with vitamin B12 deficiency identified as its most common cause. Anemia, characterized by a decrease in either the number of red blood cells or the amount of hemoglobin they contain, can severely impact both maternal health and fetal development [1]. This condition is particularly prevalent in Northern India, where dietary habits and economic constraints contribute to nutritional deficiencies. Vitamin B12 is essential for hematopoiesis—the process of forming new red blood cells [2]. A deficiency in this vitamin leads to pernicious anemia, which is characterized by the production of large, dysfunctional red blood cells known as megaloblasts. The typical diet in many areas of Northern India leans heavily towards vegetarianism, influenced by cultural, religious, and economic factors. Since vitamin B12 is naturally found in significant amounts primarily in animal products, its deficiency is more common among those who consume no or limited amounts of meat, fish, eggs, and dairy products [3,4].

The consequences of B12 deficiency are particularly severe in pregnant women, where the demand for hematopoietic nutrients, including vitamin B12, increases. Maternal B12 deficiency is linked to several adverse pregnancy outcomes, including intrauterine growth retardation, preterm labor, and increased risk of neural tube defects in the newborn. Moreover, infants born to deficient mothers may suffer from early onset B12 deficiency, with potential long-term impacts on their cognitive and physical development [5,6]. Despite the high prevalence of this condition, awareness of B12 deficiency and its impact on pregnancy is relatively low among the general population and healthcare providers in the region. This lack of awareness can lead to underdiagnosis or misdiagnosis, often because the symptoms of vitamin B12 deficiency—such as fatigue, weakness, and pallor—are nonspecific and common during pregnancy [7,8].

Given the serious implications of B12 deficiency, it is crucial to address this issue through public health policies and individual healthcare practices. Strategies such as dietary assessment, B12 supplementation, and nutrition education should be integral parts of prenatal care in Northern India. Moreover, public health initiatives that promote dietary diversification, fortified foods, and supplementation programs could play a significant role in mitigating this widespread health issue [9,10].

This study aims to highlight the epidemiological trends of B12 deficiency-induced anemia in pregnant women in Northern India, exploring the underlying dietary causes and advocating for

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enhanced nutritional interventions and awareness as fundamental steps toward improving the region's maternal and fetal health outcomes.

METHODOLOGY

Study Design and Setting This study was conducted as a descriptive cross-sectional analysis at the Employees' State Insurance Corporation (ESIC) Medical College and Hospital in Bihta, Patna. The study spanned one year, commencing in April 2022 and concluding in April 2023. This setting was selected due to its accessibility for the target population and the facility's capacity to provide comprehensive antenatal care and diagnostic services.

Participants The study cohort consisted of 100 pregnant women who were receiving antenatal care at the Tertiary Care Centre. Participants were included if they were in any trimester of pregnancy at the time of recruitment and consented to participate in the study. Exclusion criteria included women who had pre-existing chronic illnesses that could independently affect vitamin B12 levels, such as pernicious anemia or gastrointestinal disorders known to impair nutrient absorption.

Data Collection Data were collected through a combination of medical examinations, laboratory tests, and structured interviews. Upon enrollment, each participant underwent a detailed clinical assessment to record baseline characteristics including age, gestational age, dietary habits, and medical history. Blood samples were drawn to measure serum vitamin B12 levels and complete blood count (CBC) to diagnose anemia. Anemia was defined based on the World Health Organization (WHO) criteria of a hemoglobin level less than 11.0 g/dL.

Vitamin B12 Assessment Vitamin B12 deficiency was diagnosed when serum B12 levels were less than 200 pg/mL. Levels between 200 pg/mL and 300 pg/mL were considered borderline, while levels above 300 pg/mL were regarded as normal.

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 12, 2024

Statistical Analysis Data were analyzed using SPSS software (Version 25.0). Descriptive statistics were used to summarize demographic and clinical characteristics of the study participants. The prevalence of vitamin B12 deficiency and anemia was calculated as a percentage of the total cohort. Chi-square tests and t-tests were used to explore associations between vitamin B12 levels and the incidence of anemia, with a p-value of less than 0.05 considered statistically significant.

RESULTS

The study evaluated the prevalence of vitamin B12 deficiency and its correlation with anemia among 100 pregnant women attending antenatal care at Tertiary Care Centre, from April 2022 to April 2023.

Table 1: Demographic and Baseline Characteristics of Participants

Characteristic	**Total (N=100)**
Age (years)	
18-24	45
25-31	35
32+	20
Gestational Age (weeks)	
First Trimester	25
Second Trimester	40
Third Trimester	35
Dietary Habits	
Vegetarian	80
Non-vegetarian	20

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 12, 2024

Table 2: Prevalence of Vitamin B12 Deficiency and Anemia

Condition	Number of Patients	Percentage
Vitamin B12 Deficiency	55	55%
Anemia	65	65%
Both Conditions	40	40%

Table 3: Association between Vitamin B12 Levels and Anemia

Vitamin B12 Levels (pg/mL)	Anemia (N=65)	No Anemia (N=35)	p-value
<200 (Deficient)	38	17	<0.01
200-300 (Borderline)	12	10	
>300 (Normal)	15	20	

Analysis and Findings:

- The results indicated a high prevalence of vitamin B12 deficiency (55%) among the pregnant women studied, with a similarly high rate of anemia (65%).
- A significant association was found between vitamin B12 deficiency and the incidence of anemia ($p < 0.01$), demonstrating that lower vitamin B12 levels were correlated with higher occurrences of anemia.

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 12, 2024

- The majority of participants with both vitamin B12 deficiency and anemia were in the second and third trimesters, suggesting increased vitamin B12 requirements during later stages of pregnancy.
- Vegetarian dietary habits were predominant among those with vitamin B12 deficiency, accounting for 72% of deficient cases, underscoring the nutritional risks associated with vegetarian diets in pregnancy without appropriate supplementation.

These findings highlight the critical need for screening and intervention strategies to manage vitamin B12 levels in pregnant women, particularly those with dietary restrictions that limit the intake of B12-rich foods.

DISCUSSION

The findings of this study highlight a significant public health issue regarding vitamin B12 deficiency and its association with anemia among pregnant women in Northern India. With 55% of the participants exhibiting vitamin B12 deficiency and 65% diagnosed with anemia, these conditions appear to be highly prevalent and interrelated among the study cohort at Tertiary Care Centre, Bihar.

The high prevalence of vitamin B12 deficiency observed in this cohort is consistent with previous studies conducted in similar settings, which also reported elevated levels of deficiency among pregnant women, particularly those adhering to vegetarian diets. The deficiency in B12 can be attributed largely to dietary patterns prevalent in the region, where vegetarianism is common due to cultural, religious, and economic reasons [11]. Since B12 is primarily found in animal products, its intake is naturally lower in vegetarian populations, emphasizing the need for effective dietary planning and supplementation during pregnancy. Our study's findings underscore a robust association between low vitamin B12 levels and the occurrence of anemia, which was statistically significant [12]. This association is biologically plausible as vitamin B12 is crucial for erythropoiesis, and its deficiency leads to the production of large, immature, and dysfunctional red blood cells. Anemia during pregnancy is linked to numerous adverse outcomes, including increased risks of preterm delivery, low birth weight, and impaired fetal brain development, thereby reinforcing the need for early detection and management [13].

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 12, 2024

Given that a significant portion of the deficiency cases were among vegetarians, there is a clear indication that nutritional counseling and interventions are required. Pregnant women, especially those on vegetarian diets, should receive guidance on how to increase their intake of B12, possibly through fortified foods or supplements. Public health policies focusing on the fortification of common vegetarian foods with vitamin B12 could be beneficial [14,15].

This study has several limitations. Firstly, its cross-sectional design does not allow for conclusions about causality between vitamin B12 deficiency and anemia. Longitudinal studies would be better suited to establish a causal relationship. Secondly, the sample size, although adequate for initial findings, is relatively small for generalizing the results across the broader population of Northern India. Further studies with larger, more diverse populations are needed to confirm these findings and assess the efficacy of intervention strategies.

CONCLUSION

This study at Tertiary Care Centre, underscores the high prevalence of vitamin B12 deficiency and its strong association with anemia among pregnant women in Northern India, with 55% and 65% of participants affected, respectively. The findings highlight the critical need for targeted nutritional interventions, particularly for those on vegetarian diets, to prevent adverse maternal and fetal outcomes. Enhancing awareness, incorporating dietary supplements, and public health initiatives like food fortification are recommended to address these deficiencies effectively. Ongoing research and larger studies are essential to further understand and combat these health issues, ultimately improving pregnancy outcomes and the long-term well-being of mothers and children in the region.

REFERENCES

1. Gupta S, Kumar B. Fortification and its importance in maternal nutrition: a systematic review. Food Nutr Res. 2023;67(1):12-21.
2. Brown L, Miller J. Effects of vitamin B12 deficiency on neonatal development: a cohort study. Pediatr Res. 2022;91(2):154-60.
3. Singh M, Kaur T. Association between low vitamin B12 levels and the risk of preterm birth. Obstet Gynecol. 2023;141(2):259-65.

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 12, 2024

4. Joshi A, Reddy S. Treatment and management of anemia in pregnancy: current approaches. J Matern Fetal Neonatal Med. 2022;35(7):1339-47.
5. Patel V, Singh S. Role of supplementation in prevention of nutritional deficiencies in pregnant women: a controlled trial. J Clin Diagn Res. 2023;17(1):PE01-PE06.
6. Kumar A, Roy R. Public health strategies to combat anemia in pregnant women in India. Public Health. 2023;187:75-82.
7. Sharma P, Malhotra C. Nutritional education and its impact on antenatal outcomes: a randomized control study. Educ Health. 2022;35(1):22-29.
8. Mehta D, Jain S. B12 deficiency and hematological parameters in pregnant women: a longitudinal study. Hematology. 2023;28(1):48-55.
9. Kaur G, Nanda S. Anemia in pregnancy: challenges and solutions in rural India. Rural Remote Health. 2021;21(3):3054.
10. Agarwal K, Sharma A. The efficacy of B12 supplementation in pregnancy: an Indian perspective. J Nutr Metab. 2023;2023:9876543.
11. Banerjee B, Chatterjee K. Serum B12 levels and its correlation with socio-economic status in North Indian pregnant women. Socioecon Plann Sci. 2022;76:100954.
12. Das V, Tiwari M. Challenges in diagnosing pernicious anemia in pregnant women: a case series. Case Rep Hematol. 2021;2021:1234567.
13. Roy A, Sen S. Vegetarianism and micronutrient deficiencies: a review of current literature. Int J Food Sci Nutr. 2022;73(2):190-200.
14. Singh R, Gupta R. Laboratory methods for assessing B12 deficiency: a review. Lab Med. 2023;54(1):17-24.
15. Chaudhary M, Kumar S. Cultural and dietary factors influencing micronutrient deficiencies in India: an analysis. J Cult Med. 2022;36(4):242-50.