Original Research Article

~~Uncovering the Hidden Epidemic:-~~ Investigating Nutritional Anemia Prevalence Among Patients Seeking Care at Chuadanga Sadar Hospital in which country?

Comment [LKYVM1]: Tthe authur should complete the table to reflect the variable been measured.
2. look for the correct spelling for ANAEMIA/~~ANEMIA~~
~~3~~-PROOF READ THE WORK

Comment [LKYVM2]: Investigating Nutritional Anemia Prevalence Among Patients Seeking Care at Chuadanga Sadar Hospital-Bangladesh

ABSTRACT

Aim and objective: Nutritional anaemia ~~is a condition resulting~~results from inadequate intake of essential hematopoietic nutrients required for haemoglobin and red blood cell synthesis. It is often acquired through a diet lacking ~~a sufficient quantity of~~sufficient bioavailable nutrients. In addition, exposure to environmental factors such as hookworm, schistosomiasis, and other parasites can cause excessive loss or competition for hematopoietic nutrients. This study aimed to determine the prevalence of nutritional anaemia among patients receiving care at Chuadanga Sadar Hospital.

Materials and Methods: This study was conducted at the laboratory of Chuadanga Sadar Hospital in Bangladesh. A retrospective and cross-sectional study design was used, and the study population consisted of 96 non-hospitalized patients with suspected nutritional anaemia. Blood samples were collected from eligible patients, and the Sysmex 500i automated machine was used to analyze the samples. Data on factors associated with nutritional anaemia were collected through questionnaires and analyzed using the Statistical Package for Social Sciences (SPSS) version 20. The study found a high prevalence of nutritional anaemia, with factors such as malnutrition and intestinal worm infection ~~being~~ significantly associated with the condition.

Results: This study found that iron deficiency anaemia was prevalent among 68.0% of children and 77.2% of women, with MCV and MCH serving as useful indicators. The study also identified risk factors for nutritional anaemia, including intestinal and blood parasites (27.6% and 12.9%, respectively), pregnancy (6.4%), prolonged menstruation (7.7%), and taking food supplements (22.9%). The chi-square test revealed a statistically significant association between these risk factors and nutritional anaemia ($p < 0.05$). The sample size included 96 individuals.

Conclusion and recommendation: This study found that iron deficiency anaemia was prevalent among ~~both~~ children and women attending Chuadanga Sadar Hospital, with MCV and MCH serving as useful indicators. Risk factors for anaemia included environmental factors such as parasitic infections, physiological status such as prolonged menstruation and pregnancy, and nutritional factors such as ~~taking~~ food supplements. The study highlights the need for targeted interventions to improve nutrition, access to healthcare, and prevent parasitic infections ~~to reduce~~from reducing the burden of anaemia. Limitations of the study include a small sample size and investigation of only two types of anaemia.

Keywords: Nutritional Anemia, Iron Deficiency Anemia, MCV, MCH, Risk Factors, Parasitic Infections, Malnutrition, Food Supplements, Bangladesh.

Comment [LKYVM3]: At most 6 keywords. Please not not abbreavate the key words

1. INTRODUCTION

Red blood cell volume and haemoglobin levels in the blood are reduced in the presence of anaemia. Haemoglobin is crucial for t~~he transportation of~~ransporting oxygen to bodily tissues and organs [1]. Nutritional anaemia encompasses anaemia caused by a deficiency in iron,

folate, vitamins B and B12, a~~s well as trace elements necessary for the synthesis of~~nd trace elements necessary for synthesizing red blood cells [2]. Nutritional anaemia in children is associated with poor mental and physical growth~~, and~~. It can be a significant concern for pregnant women, increasing the risk of preterm birth and low birth weight [3]. Anaemia is prevalent worldwide, and while it is more widespread in underdeveloped nations, it is also common in industrialized countries [1]. Anaemia prevalence is estimated to be 9% in industrialized countries, whereas it is 43% in less developed nations. Globally, anaemia affects 47% of children under ~~the age of~~age 5, 42% of pregnant women, and 30% of non-pregnant women aged 15 to 49 [5]. Africa and Asia are responsible for over 85% of the total anemia burden in high-risk categories. Hemoglobin concentration may vary depending on age, sex, smoking habits, and pregnancy status [6]. Anemia is a significant socioeconomic issue due to its association with decreased physical and mental productivity [7].

Comment [LKYVM4]: 3 similar sentences in a row.
These sentences seem repetitive because they all follow the same pattern. Consider changing the word order.

Previous research has identified several potential factors that may contribute to anemia in women, including living in a rural area, being young, being pregnant, and having poor nutritional status [8]. Malaria and helminths have also been identified as significant causes of anemia [4].

Despite the government's strong commitment to working with development partners and educational institutions to find solutions, anemia remains a significant threat to public health in Bangladesh. The prevalence of anemia among children is 37%, while just 19% of women have some degree of anemia compared to 22% of children. Women in rural areas (20%) have a slightly higher incidence of anemia than those in urban areas (16%) [10]. However, the prevalence of nutritional anemia among different age groups and socioeconomic strata is unknown. Therefore, th~~e objective of this study was~~is study aimed to determine the prevalence of nutritional anemia among patients visiting Chuadanga Sadar Hospital.

2. MATERIALS AND METHODS

2.1 Study area: The research was conducted at the laboratory of Chuadanga Sadar Hospital, which is located in Chuadanga District, Khunla Division, Bangladesh.

2.2 Study design: The study design used was retrospective and cross-sectional. In the retrospective study, the archived data of patients with nutritional anemia were retrieved from the laboratory logbook from 25th February to 21st October 2022. Whereas, in the cross-sectional study, qualified outpatients were approached and requested to give voluntary consent to enr~~o~~ll in the study, and the study was conducted from 25th October to 27th December 2022.

2.3 Study population: The study population consisted of patients who were suggested to have nutritional anemia and were attending Chuadanga Sadar Hospital. All patients were selectively included in the sample size of 96 non-hospitalized patients.

2.4 Inclusion criteria: The study included all malnourished children aged between 6-59 months and women aged between 15-49 years who were suggested to have nutritional anemia and met other criteria for ~~being enrolled~~enrolling in the study.

2.5 Exclusion criteria: The study excluded patients with chronic diseases, patients who refused to participate, and those suspected to have other types of anemia besides nutritional anemia.

2.6 Sample Collection: Patient blood samples were collected in EDTA tubes at the phlebotomy service after completing questionnaires about factors associated with nutritional

anemia. The blood collected in EDTA tubes was directly transported to the Hematology department for complete blood count analysis.

2.7 Sample Analysis: The received samples were mixed properly, aspirated, and analyzed using the Sysmex 500i automated machine. The machine gave results of complete blood count (CBC). The laboratory interpretation of iron-deficiency anemia showed that RBC, Hb, Hct were decreased and MCV and MCH were often decreased, resulting in microcytic/hypochromic cells. For vitamin-deficiency anemia (vitamin B12/Folic acid deficiencies), RBC, WBC, Platelet, Hb, and Hct were decreased, and MCV was elevated.

2.8 Data Collection: The consent form and questionnaires were administered to the study participants. Laboratory obtained results and ~~patients'~~ patients' records from the haematology service and nutrition services were used during data collection~~, and t~~. The questionnaire was used to collect information related to the factors associated with nutritional anemias such as malnutrition, intestinal worm infection (mostly in children), and education level.

2.9 Data Analysis: Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 20. Descriptive statistics were used to determine the prevalence of nutritional anemia. Univariate analysis was used to assess the association of the risk factors with nutritional anemia. Factors ~~indicating an association~~associated with nutritional anemia at a p-value <0.05 were considered significant.

3. RESULTS

The table 1 provides information on the prevalence of different types of anemia and associated indicators among children and women in Chuadanga Sadar Hospital. The types of anemia investigated in the study were iron deficiency anemia and megaloblastic anemia, and the indicators of anemia were mean corpuscular volume (MCV) and mean corpuscular hemoglobin (MCH). Among the children, 68.0% had iron deficiency anemia with MCV greater than 80 fL and 11.8% had megaloblastic anemia with MCV greater than 100 fL. Among the women, 77.2% had iron deficiency anemia with MCV greater than 80 fL and 9.3% had megaloblastic anemia with MCV greater than 100 fL. Regarding MCH, 53.8% of children and 70.7% of women had iron deficiency anemia with MCH less than 28pg. Only 2.5% of children and 1.8% of women had megaloblastic anemia with MCH greater than 32pg. Overall, the results suggest that iron deficiency anemia was the most prevalent type ~~of anemia among both~~among children and women in Chuadanga Sadar Hospital. The findings also indicate that MCV and MCH were useful indicators for differentiating between iron deficiency ~~anemia~~ and megaloblastic anaemia.

Table: 1 Prevalence of Different Types of Anemia and Associated Indicators among Children and Women

Indicators of anemia	Children (n %)	Women (n %)	Types of anemia
Mean Corpuscular Volume (MCV)			
>80 fL	28 (68.0)	41 (77.2)	iron deficiency anaemia
>100 fL	5 (11.8)	5 (9.3)	Megaloblastic anemia
Mean Corpuscular Hemoglobin (MCH)			
<28pg	22 (53.8)	37 (70.7)	Iron deficiency

			anaemia
>32pg	1 (2.5)	1 (1.8)	Megaloblastic anemia

The table shows the risk factors associated with nutritional anemia in the study population, with a sample size of 96 individuals. The data is presented in ~~both~~ absolute numbers (n) and percentages (%). The environmental factors considered in the study were having intestinal ~~parasites and having~~and blood parasites. Of the ~~total~~ participants, 27.6% had intestinal parasites and 12.9% had blood parasites. ~~In terms of~~Regarding physiological status, 6.4% of the participants were pregnant, and 7.7% reported having prolonged menstruation. The nutritional factors considered were taking food supplements, and 22.9% of the participants reported taking them. The chi-square test ~~was performed to determine~~determined the association between these risk factors and nutritional anemia. The degree of freedom (df) was 4, and the chi-square value was 21.88, indicating a statistically significant association between the risk factors and nutritional anemia ($p < 0.05$).

Table 2: Risk Factors Associated with Nutritional Anemia in the Study Population

Risk factors associated to nutritional anemia	**Nutritional anemia** (n=96)	
	n	%
Environmental factors		
Having intestinal parasites	27	27.6
Having blood parasites	12	12.9
Physiological status		
Pregnant	6	6.4
Prolonged n1enses	7	7.7
Nutritional factors (Take food supplements)	21	22.9
P-value	0.0002	
df	4	
x2	21.78	

Comment [LKYVM5]: Variable/n-96/frq/percetage/chi2/p-valve/ Arrange the table this way.

Comment [LKYVM6]: Which variable was the chi2 representing

4. DISCUSSION

The present study aimed to determine the prevalence of nutritional anemia among patients visiting Chuadanga Sadar Hospital. The findings of the study revealed that iron deficiency anemia was the most common type of anemia among both children and women in the study population. These findings are consistent with previous research that has identified iron deficiency as the leading cause of anemia worldwide [1, 2]. The study also found that MCV and MCH were useful indicators for differentiating between iron deficiency anemia and megaloblastic anemia. These findings are consistent with previous studies that have suggested that MCV and MCH are essential indicators for diagnosing different types of anemia [9].

In terms of risk factors, the study found a significant association between nutritional anemia and environmental factors such as having intestinal and blood parasites, physiological status such as prolonged menstruation and pregnancy, and nutritional factors such as taking food supplements. These findings are consistent with previous research that has identified these factors as significant risk factors for anemia in women [8]. It is worth noting that the prevalence of anemia among women in this study (19%) was lower than the national

average in Bangladesh (22%). However, the prevalence of anemia among children in the study (37%) was higher than the national average of 47% [5]. This difference in prevalence may be attributed to differences in the study population and sample size. The study's strengths include its cross-sectional design, which allowed for the collection of data from a diverse group of patients attending the hospital. Additionally, the use of retrospective data from laboratory logbooks provided a broader view of the prevalence of anemia in the study population. However, the study also has several limitations. Firstly, the study's sample size was relatively small, which may affect the generalizability of the findings. Secondly, the study only investigated two types of anemia, which may not provide a comprehensive understanding of the different types of anemia prevalent in the study population. Thirdly, the study did not investigate the possible interactions between risk factors, which may have an impact on the prevalence of anemia.

5. CONCLUSION

The study found that iron deficiency anemia was the most prevalent type of anemia among both children and women, with mean corpuscular volume and mean corpuscular hemoglobin proving to be useful indicators for differentiating between iron deficiency anemia and megaloblastic anemia. Additionally, the study identified several risk factors associated with nutritional anemia, including the presence of intestinal and blood parasites, prolonged menstruation, and poor nutrition. These findings highlight the need for targeted interventions to address the underlying causes of anemia, particularly in high-risk populations such as children and pregnant women. Efforts to improve nutrition, increase access to healthcare, and prevent parasitic infections may help reduce the burden of anemia and improve overall health outcomes.

ETHICAL APPROVAL

The ethical approval for this study was considered by the District Civil Surgeon Office, Chuadanga under Ministry of Health, Government of Peoples Republic of Bangladesh

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