



Original Research Article

Prevalence of anaemia in adolescents and young adult population in a tertiary care hospital of North India

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ABSTRACT

Background: Anaemia is a very common health problem seen globally as well as in India, more prevalent in pre-school children and women of reproductive age group.

Objective: In this study we have focussed on the prevalence of anaemia in young population excluding pregnant and lactating females to get an idea of severity, types and causes of anaemia in this most productive age in our region.

Materials and Methods: The present study is done in T S Misra Medical College and Hospital, Amausi, Lucknow. It is a six months duration retrospective study done in the 15-30 years age group population. Haemoglobin estimation and General blood picture were noted to categorize anaemia.

Results and Conclusion : A total of 2761 patients had undergone complete blood counts/ peripheral smear examination of which 1040 (37.66%) were found to be anaemic, categorized on the basis of WHO cut-off ranges for diagnosis and severity of anaemia. The prevalence was higher in female patients -40.17% (severe category of public health significance) as compared to males- 33.26%. (moderate category). Even after excluding the more vulnerable population from our study (pregnant / lactating females and small children), the prevalence of anaemia in our region is quite high which needs intervention for prevention and control.

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1. Introduction

Anaemia is a widely prevalent health problem in India especially in the rural confines of our country. It is seen more commonly in children and pregnant and lactating females with a prevalence ranging between 50-90%.¹

Anaemia is defined as a clinical condition characterised by reduction in haemoglobin concentration of blood below the normal for age, sex, physiological condition and altitude above sea level.²

WHO reports that about 2 million of global population is anaemic and India has the largest prevalence of anaemia among South Asian countries.³ The high percentage prevalence of anaemia in low and middle income countries leads to a major loss in physical productivity as well as

health and economic consequences.⁴

Anaemia is also the most common nutritional deficiency across the globe.⁵ Iron deficiency anaemia is a major cause of nutritional anaemia in India.⁶ Many studies have reflected the high burden of anaemia among women in India consequently leading to risk of low birth weight, neonatal mortality, lower physical and mental activity, reduced working capacity and fatigue.⁷

Other nutrients like Vitamin B12, folic acid, proteins, Vitamins A, C, Niacin, Pantothenic acid play a part in maintaining haemoglobin level.⁸

The criterion adopted by WHO to diagnose anaemia and assess its severity is shown in Table 1.^{9,10}

Broad classification/ causes of anaemia are enumerated in Table 2.¹¹

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Table 1: WHO recommendation of haemoglobin levels to diagnose anaemia at sea level:

Gender	Age	Non-anaemia	Anaemia Mild	Anaemia Moderate	Anaemia Severe
Females	≥15 yrs	≥12 gm/dl	11-11.9 gm/dl	8-10.9 gm/dl	<8 gm/dl
Males	≥15 yrs	≥13 gm/dl	11-12.9 gm/dl	8-10.9 gm/dl	<8 gm/dl

Table 2: Basis of anaemia classification:

On the basis of red cell characteristics	On the basis of underlying mechanisms	Based on peripheral loss/ destruction
Microcytic hypochromic	Decreased bone marrow production	Bleeding
Macrocytic	Bone marrow aplasia	Sequestration
Normocytic normochromic	Ineffective hematopoiesis (megaloblastic anaemia)	Hemolysis
Leuco-erythroblastic	Erythropoietin insufficiency	
Micro/ macroangiopathic		

Several steps are being taken in states like Odisha in India to improve uptake and ensure compliance of iron and folic acid supplements to reduce anaemia.^{12,13} In 2018 Prime Minister of India launched Anaemia Mukh Bharat (AMB) program to reduce prevalence of anaemia to reduce prevalence of anemia by 3 percentage points per year among children, adolescents and women in the reproductive age group (15-49 years), between the year 2018 and 2022.¹⁴

2. Materials and Methods

This is a six months retrospective study done in T S Misra Medical College and Hospital, Amausi, Lucknow from 11th March 2019 to 11th September 2019. Data, including haemoglobin (Hb), mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH) of all patients between 15 to 30yrs of age who had come for Complete blood count (CBC) examination was collected from haematology laboratory. This study included adolescents and young adults excluding pregnant females. A total number of 2761 samples in EDTA vial were received in lab in the above mentioned age group, of which 1001 samples were from male patients and 1760 samples were from non- pregnant female patients.

All the samples were run on Sysmex 6 part haematology analyzer in our lab and Leishman stained slides were prepared to assess the peripheral smear of patients and findings recorded in computer as well as registers. Data of the same was retrieved from the digital/ file records for our retrospective study. WHO criterion was applied to categorize patients into mild, moderate and severe anaemia groups, on the basis of haemoglobin.

3. Results

Anaemia was prevalent overall in 1040/2761 patients (37.61%). The prevalence was higher among female patients - 707/1760 (40.17%) as compared to males -333/1001 (33.26%).

On the basis of haemoglobin, patients who suffered from mild anaemia were more than those with moderate and severe anaemia in both males and females, as shown in Tables 3 and 4.

Table 3: Assessment of anaemia in males:

Males- Hb ref range- WHO	Total anaemic- 333/1001	Percentage
Mild (11-12.9gm/dl)	179	53.75%
Moderate (8-10.9gm/dl)	133	39.93%
Severe (<8gm/dl)	21	6.3%

Table 4: Assessment of anaemia in females:

Females- Hb ref range- WHO	Total anaemic- 707/1760	Percentage
Mild (11-11.9gm/dl)	354	50%
Moderate (8-10.9gm/dl)	300	42.43%
Severe (<8gm/dl)	53	7.49%

Majority of female patients suffered from microcytic hypochromic type of anaemia, followed by normocytic normochromic type and lastly by macrocytic type. Majority of male patients suffered from normocytic normochromic type of anaemia. Second predominant type of anaemia in male patients was macrocytic type followed by microcytic hypochromic anaemia (Tables 5 and 6). These findings were also consistent with the peripheral smear examination requested for General blood picture.

Table 5: Mean corpuscular volume (MCV):

Reference range (fl)	Number of males (%)	Number of females (%)
<80	72 (21.6%)	319 (45.1%)
80-100	180 (54%)	307 (43.4%)
>100	81 (24.3%)	81 (11.45%)

Table 6: Mean Corpuscular haemoglobin (MCH):

Reference range	Number of males (%)	Number of females (%)
<26	68 (20.4%)	323 (45.68%)
26-34	192 (57.6%)	315 (44.55%)
>34	73 (21.9%)	69 (9.75%)

4. Discussion

Our study was conducted to reflect the prevalence of anaemia in the young population (15-30yrs) around the newly built T S Misra Medical College and Hospital, Amausi which has access to mostly rural and few urban patients. The studies done earlier in other regions of India have focussed on pregnant, lactating females and children. This is the first study of its type in this area which includes adolescent and young adult population (15-30yrs) excluding the pregnant females. The cut-off ranges of haemoglobin have been taken for comparison from WHO guidelines on the diagnosis of anaemia and assessment of severity.¹⁰

The present study shows a higher prevalence of anaemia in females (40.17%) as compared to males (33.26%). Total prevalence of anaemia in 15-30 yrs age group was 37.66%. Malhotra et al showed prevalence of anaemia among females as 50% and in males was 44.3%.¹ Gerardo et al demonstrated in their study that after puberty, the prevalence of anaemia was over 50%.⁴ Our study showed lesser percentage of anaemia in females which can be attributed to the exclusion of pregnant and lactating females as well as children. The prevalence of anaemia in adult males in India was observed as 24% by Upadhyay et al.¹⁴

Our study showed that mild anaemia was more common in both males and females, followed by moderate and then by severe anaemia. Study by Akula et al showed that mild anaemia was more common in males as compared to females in which moderate type was more common.⁵

According to WHO, in a population, if the prevalence of anaemia (in %) is ≤ 4.9 it is not considered a public health problem. Between 5 to 19.9 it is of mild category and between 20-39.9 it is moderate category of public health significance. Prevalence ≥ 40 is of a severe category of public health significance.^{8,10}

The above when applied to our study shows that overall anaemia in our region falls into a moderate category type (37.66%). But in females it is a severe category of public health significance (40.17%), though borderline.

In the present study, microcytic hypochromic anaemia was more common type in females followed by normocytic normochromic and macrocytic types. Gerardo et al reported similar findings in their study.⁴ Normocytic normochromic anaemia was more common type in males. In the study by Akula et al and Patel et al microcytic hypochromic anaemia was the most common overall.^{2,5}

The higher incidence of microcytic anaemia in females in our region can be attributed to iron deficiency. A

considerable number of females also present with symptoms of menorrhagia and abnormal uterine bleeding.

A large population of males show macrocytosis in the peripheral smear which are mostly cases of megaloblastic anaemia (vit B12 and folate deficiency) and liver disease/alcoholism.

Apart from above mentioned causes, our zone also has a large number of patients with parasitic infestations, mostly malaria and filariasis.

Similar to this study, other studies in different regions of India should be done to assess prevalence and types of anaemia so that steps can be taken to implement control and prevention.

5. Conclusion

This study has found 37% overall prevalence of anaemia in the 15-30yrs age group which is of moderate public health significance. Measures should be taken to reduce the prevalence of anaemia by dealing with more common causes pertaining to that area so that improvement in health status can be initiated and productivity of the young population can be increased.

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7. Conflict of Interest

The authors declare they have no conflict of interest.

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