

Original Research Article

Assessment of prevalence of anemia and study of anemic patients in population of Nanded district

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ABSTRACT

Background: Anemia is one of the most common health problems in India. Understanding the variations among the prevalence of anemia between population groups in this large and heterogeneous country is crucial to inform relevant health policy and health service interventions. The present study was conducted to assess prevalence of anemia in the population of Nanded district, Maharashtra.

Methods: All subjects between 13-70 years of age were enrolled in the study for screening of prevalence of anemia. Under complete aseptic conditions, 10 ml of blood was withdrawn from antecubital vein and 2 ml was used for complete blood count estimation and for further blood investigations as necessary. Various hematological parameters were tested in correlation to history and clinical examination of the patients. All data thus obtained was arranged in tabulated form and analyzed using SPSS software.

Results: There were a total of 2190 subjects evaluated, out of these 560 were anemic and 1630 were non-anemic. Out of 560 anemic subjects, 420 were of female gender and remaining 140 were male. The mean iron levels were 64 ± 34 µg/dl. The mean screen ferritin levels were 201 ± 183 ng/dl.

Conclusions: There were 26% of subjects in our study who were anemic, and majority of them were females. Although, Iron deficiency anemia revealed as a most common type of anemia, vitamin B12 and folic acid deficiencies also contributed significantly to nutritional anemias. The disease widely occurs and affects mostly children of growing age, females in reproductive ages and elderly population.

Keywords: Anemia, Ferritin, Vitamin B12

INTRODUCTION

An estimated 1.9 billion people-27% of the world's population-had anemia in 2013. Hence, anemia is a major public health issue, and particularly so in low income and middle-income countries where 93% of all cases of anemia globally are thought to occur.¹

Anemia is one of the most common health problems in India.^{2,3} The problem is much more in rural than the urban area.³ The high-risk groups for anemia are pregnant and lactating females and children.^{2,3}

Prevalence in this subgroup has been found to vary from 50-90% in different parts of India.³ Almost all interventions at national and local level have focused predominantly on these groups. India is thought to account for approximately a quarter of all cases of anemia globally.⁴

Anemia is a common morbidity in elderly persons (aged 60 years or above). Anemia in elderly may result in a number of adverse health outcomes, including functional dependence and increased risk of therapeutic complications, falls, dementia, and death.⁵

Studies on anemia in low-income and middle-income countries have focused on women of reproductive age and their children because anemia during pregnancy and early childhood is associated with important adverse effects for the child-including low birthweight.⁶

Anemia can have a variety of causes, including nutrient deficiencies, acute and chronic infections, and genetic hemoglobin disorders.⁷ Although the degree to which anemia in a population can be attributed to these causes varies across populations,⁸ most cases of anemia globally are thought to be due to iron deficiency, which can be prevented and treated effectively using iron supplementation and food fortification.⁷ Similarly, inexpensive treatments exist for many other common causes of anemia, especially anemia caused by vitamin B12 or folic acid deficiency and by infection with intestinal nematodes.^{9,10}

Iron deficiency accounts for about half the world's anemia burden.¹¹Forty-seven percent of Asian Indians had Vitamin B12 deficiency showing a high prevalence of this magnitude in Indians¹² Folate deficiency has traditionally been linked to poverty, which (by Indian standards) afflicts around 33% of the population of India.¹³

The prevalence of anemia in all age groups is higher in India as compared to other developing countries.¹⁴ Hence, Understanding the variations among the prevalence of anemia between population groups in this large and heterogeneous country is crucial to inform relevant health policy and health service interventions. Thus, for combating anemia epidemiologic study on anemia is crucial. The present study was conducted to assess the condition of anemia amongst subjects of Nanded district, which lies in semi-rural part of the developing country, the India.

METHODS

The present study was conducted to assess the prevalence, causes and co-morbidities associated with anemia in population of Nanded district visiting at, Sanjeevani Hospital-critical care and trauma center, which is a secondary care center at Nanded between periods of 1st September 2014 to 31st October 2015.

The present observational study was approved by institutional ethical board and all the subjects were informed about the study and a written consent was obtained from them in their vernacular language. All the subjects between 13-70 years of age were enrolled in the study for screening of prevalence of anemia. Hemoglobin of less than 13 g/dl in males and less than 12 g/dl amongst females were classified as anemic.

Under complete aseptic conditions, 10ml of blood was withdrawn from antecubital vein and 2ml was used for complete blood count estimation. Rest of it was for

further investigations as needed.

Inclusion criteria- all the patients presented to Sanjeevani hospital-critical care and trauma center, Nanded between age 13-70 years during the time of study period

Exclusion criteria- patients which are too young (less than 13/pediatric age group) and too old (more than70) which are difficult to keep follow up due to their dependent age

The following investigations were performed amongst all subjects: Hemoglobin, total leucocyte count (TLC), differential leucocyte count (DLC), erythrocytic sedimentation rate (ESR), hematocrit, mean corpuscular Hb (MCV), packed cell volume (PCV), serum folic acid level, reticulocyte count, serum ferritin, serum vitamin B12 levels.

Estimation of serum ferritin level is most reliable and efficient way for diagnosis of iron deficiency anemia (IDA. If level of serum ferritin is less than 15 ng/ml, then presence of IDA is certain. Vitamin B12 deficiency was considered if serum B12 levels were less than 200 pg/ml. Folate deficiency was regarded when serum folate levels were less than 2.6 ng/ml.

Additional investigations were performed as designated for detecting underlying ethology e.g. chest x-ray, ultrasound abdomen and pelvis, upper G1 endoscopy and tissue biopsy, stool examination for parasites.

All the data thus obtained was arranged in a tabulated form and analyzed using SPSS software.

RESULTS

There were a total of 2190 subjects evaluated out of which 1630 were non-anemic and 560 were anemic. Out of 560 anemic subjects, 420 were of female gender and remaining 140 were male; i.e. 75% of anemic subjects were female. The mean age of the subjects was 20±6 years. There were majority of females who were anemic.

Table 1: Incidence of anemia amongst subjects.

Characteristic	Frequency
Anemic	560 (420 females+140 males)
Non anemic	1630
Total	2190

Out of 560 anemic subjects, 240 subjects were having low iron and low serum ferritin levels presented as IDA.

There were significant number of subjects i.e. 120 subjects, were having low serum vitamin B12 and folic acid levels presented as macrocytic anemia.

Table 2: Biochemical features amongst the subjects with anemia.

Analytes	Mean \pm SD
Serum iron level (microg/dl)	62 \pm 34
Serum ferritin level (ng/ml)	201 \pm 183
TIBC (microg/dl)	399 \pm 76
TSI (%)	16 \pm 7
Serum vitamin B12 level (pg/mL)	287 \pm 138
Serum folic acid level (ng/ml)	8.5 \pm 3.7
Sex (females/males)	420/140
Hemoglobin (g/dl)	11.1 \pm 1.3
Hematocrit (%)	34.3 \pm 3.9
MCV (fl)	78.6 \pm 8.2
RDW (%)	15.4 \pm 1.7
Platelets (103/microl)	266.6 \pm 80.5
MPV (fl)	8.8 \pm 1.5

The mean iron levels were 62 \pm 34 μ g/dl. Mean serum ferritin levels were 201 \pm 183 ng/dl. Mean TIBC levels were 399 \pm 76 μ g/dl. Mean TSI percentages were 16 \pm 7%. Mean serum vitamin B12 levels were 287 \pm 138 pg/dl. Mean platelet count was 266.6 \pm 80.5. There were 420 females versus 140 males, mean Hb level was 11.1 \pm 1.3 mg/dl. Mean hematocrit was 34.3 \pm 3.9%.

DISCUSSION

The present study has found high prevalence of anemia in 13-70 years age group of population of Nanded district. The prevalence of anemia among females was around 75% while among males it was 25%. Also, the present study reveals that the iron deficiency anemia is most common cause of anemia in the population of this region. Although dietary habits were not studied in detail but it is likely that individuals in these groups take nutritionally deficient diet and are more susceptible to parasitic infestations and other chronic infections. Iron deficiency anemia is prevalent worldwide. Iron has a major role in human body. According to previous study iron is needed for various functions. Oxygen transport, DNA synthesis, and electron transport are few examples.¹⁵

According to a study report by WHO, iron deficiency is nearly 2.5 times more prevalent in comparison to IDA. WHO estimates nearly two billion people suffering from anemia and approximately 50% of these cases are due to iron deficiency.¹⁶ Although IDA occurs at all age and involves both the sexes, adolescent girls are more prone to it. The WHO defined adolescent as the population of 10-19 years of age.¹⁷ In India, the prevalence of anemia in adolescent girls is 56% (64 million girls).¹⁸ Adolescent girls are more vulnerable to iron deficiency and anemia due to increased requirement of iron which in turn is caused by abrupt increase in lean body mass and total blood volume, and menstrual blood loss.

IDA is a common problem among women, primarily due to their recurrent menstrual loss. Demand for iron is higher among pregnant women, and women with anemia in combination with early onset of childbearing, a high number of births, short intervals between births and poor access to antenatal care and supplementation are likely to experience poor pregnancy outcome.¹⁹ Thus, it is not surprising that India has the highest number of women with anemia globally, which increases the probability of maternal and child mortality and has significant economic implications for the nation's development.²⁰

In the present study, microcytic anemia was found to be the most common cause of anemia followed by macrocytic anemia due cobalamin and folic acid deficiency. Vitamin B12 deficiency has been a well-known health problem. However, now there is evidence that the disease is more common than was previously believed.²¹ Vitamin B12 deficiency may present in multiple ways, from a hematological manifestation such as megaloblastic anemia to a neurological one such as subacute combined degeneration of the spinal cord.^{22,23} Vitamin B12 deficiency has variable clinical manifestations but is usually associated with megaloblasts in the bone marrow, macrocytosis in the peripheral smear and a raised MCV. Pernicious anemia is the most common form of vitamin B12 deficiency in the West. However, folate deficiency is another important cause of megaloblastic anemia. In contrast, in India, pernicious anemia is uncommon.²⁴

Anemia prevalence also found in elderly population in this study is significant concern in geriatric population. Anemia in aged is mainly caused by a gradual decrease in erythropoietin production by the kidneys; nonetheless, the decrease in Hb levels and consequent anemia in this age group should not be presumed to be a part of normal aging and should be adequately investigated and managed.²⁵

CONCLUSION

Anemia is common in all phases of life. Adolescent age group and females are most commonly affected populace. There were 26% of the subjects in our study who were anemic and majority of them were females. Iron deficiency anemia revealed as a most common type of anemia among the research population. The contributing factors observed were malnutrition and parasitic infection. Besides IDA, vitamin B12 and folic acid deficiencies are also present as a macrocytic anemia in significant population. Anemia in geriatric population is significant health problem. The disease is widely occurring and affects mostly children of growing age, females in reproductive ages and elderly population. Hence it is important to diagnose anemia at an earlier stage so that it can be completely eradicated.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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