

Study of prevalence of anemia among women of suburbs of Hyderabad, India and its correlation with hematological parameters

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ABSTRACT

Background: Anemia is a major public health problem in India with major consequences for human health as well as social and economic development. Iron deficiency anemia continues to be an overwhelmingly major cause of anemia. Women with even mild anemia may experience fatigue and have reduced work capacity. In our cross sectional study, we tried to assess the prevalence of anemia in semi-urban women in selected outskirts of Hyderabad. **Methods:** This cross sectional study has been initiated using consecutive sampling methodology on the specified days of study implementation based on the selection and exclusion criteria in the Guru Nanak Care Hospital laboratory. Samples were collected from 501 individuals who were eligible for the study from urban slums of Quthbullapur, Ranga Reddy district. Any female visiting the lab for hematological parameters testing falling between 11-40 years of age were included till the sample size was achieved. Data analysis was done using Microsoft Excel and SPSS 20.0. **Results:** The study sample of 501 cases had only 50% population with normal Hb%. The remaining half of the population had mild anemia in 20% of cases, moderate anemia in 25% and severe anemia in 5% of cases. Severe Anemia was more prevalent among 31-40 age group (7.2%; 9/125) followed by among 21-30 age groups (6.1%; 14/231). Moderate anemia was highest among 11-20 age groups with 32.7% of total sample with 11-20 age groups (33/101). **Conclusions:** Prevalence of moderate and severe anemia is more than 25% among the child bearing age group women and hence need to be focused in public health programs planned as part of Anemia prevention activities.

Key-words: women, anemia, hematological parameters

INTRODUCTION

According to WHO anemia is defined as condition in which the hemoglobin concentration in the blood is below for that particular Age and sex¹. Anemia is a global public health problem with major consequences for human health as well as social and economic development¹. Anemia is a major public health problem in India. The high-risk groups for anemia are pregnant and lactating females and children²⁻³. Prevalence in this subgroup has been found to vary from 50-90% in different parts of India³. According to NFHS (National Family health survey – 2005/2006) the prevalence of anemia among reproductive age group women 15- 49 is 55% and 70%, in children aged 6 – 59 months⁴. Anemia is considered as an indicator of both poor nutrition and poor health and linked with major development goals⁵.

In developing countries most common cause of anemia is nutritional. Iron deficiency anemia continues to be an overwhelmingly major cause of anemia and is a major global health challenge. There are many classifications of anemia. Morphological characteristics provide etiological clues. In order to characterize the type of anemia the workup should include hematological parameter like the Hb%, PCV, RBC indices and peripheral smear study. The potential impact of anemia in women of child bearing age include increased risk of low birth weight or prematurity,

perinatal and neonatal mortality, inadequate iron stores for the newborn, increased risk of maternal morbidity and mortality, and lowered physical activity, mental concentration, and productivity⁶⁻⁸. Women with even mild anemia may experience fatigue and have reduced work capacity⁶. NNACP- National Nutritional Anemia Control Program aims to control anemia in India. The program, implemented through the Primary Health Centers and its subcenters, aims at decreasing the prevalence and incidence of anemia in women of reproductive age. It focuses on three vital strategies: promotion of regular consumption of foods rich in iron, provisions of iron and folate supplements in the form of tablets to the high risk groups, and identification and treatment of severely anemic cases.⁹ In 1991, NNAPP was renamed as NNACP with new strategies to control nutritional anemia. Studies on Anemia in India are highly focused on either rural women or urban women¹⁰⁻¹¹. Suburban inhabitants are generally considered better than the rural women; however, the demographic challenges such as higher cost of living, higher expenditure towards health, education and other basic needs of life make them more vulnerable to poor nutrition compared to rural women.

MATERIALS AND METHODS:

Study was done by Guru nanak CARE hospital in co-ordination with an NGO organization to assess the severity, prevalence of anemia in an urban slum in Quthbullapur, Ranga Reddy district.

Setting: Samples were collected in the community halls of the suburbs. The samples were collected in EDTA vacutainers and transported by maintaining cold chain. The samples were processed in Department of Laboratory Medicine at Guru Nanak CARE Hospital. This cross sectional study has been initiated using consecutive sampling methodology on the specified days of study implementation based on the selection and exclusion criteria in the hospital laboratory. Samples were collected from 501 individuals who were eligible for the study. Samples were collected from females only. Above 11 years of age was included as a criteria. Males were not included in the study. Geriatric population was excluded. The hematological testing was done in Department of Laboratory medicine, Gurunanak care hospital. The equipment used included XN-350 5 Part hematology analyzer. The evaluated parameters included Hb (Hemoglobin) concentration, RBC (Red Blood Cells) indices- MCV (Mean Corpuscular Volume), MCH (Mean Corpuscular Hemoglobin), MCHC (Mean Corpuscular Hemoglobin Concentration), PCV, RBC, TLC (Total Leukocyte Count), Platelet count. Slides were prepared for peripheral smear examination.

Following was the criteria used to define Anemia by age group which is based on hemoglobin concentration according to world health organization.

Table 1: Definition of Anemia by age group of study participants

AGE	MILD	MODERATE	SEVERE
11 – 14 YEARS	11 – 11.9 gms/dl	8 – 10.9 gms/dl	< 8 gms/dl
>14 YEARS (FEMALE)	11 – 11.9 gms/dl	8 – 10.9 gms/dl	< 8 gms/dl
> 14 YEARS (MALE)	11 – 12.9 gms/dl	8 – 10.9 gms/dl	< 8 gms/dl

Data analysis: The data entry and analysis was done using Microsoft word, Microsoft Excel & and SPSS 20.0.

RESULTS

The study sample of 501 cases had only 50% population with normal Hb%. The remaining half of the population had mild anemia in 20% of cases, moderate anemia in 25% and severe anemia in 5% of cases (**Figure 1**). Statistical analysis was done using percentages for identifying the prevalence of anemia, distribution of anemia cases across various age groups, grading of anemia and observations in peripheral smear.

Severe Anemia was more prevalent among 31-40 age group (7.2%; 9/125) followed by among 21-30 age groups (6.1%; 14/231). Moderate anemia was highest among 11-20 age groups with 32.7% of total sample with 11-20 age groups (33/101) (**Figure 2; Table 2**). When analyzed

within category of Anemia, 21-30 age group contributed to 58.3% (14/24) for cases with severe anemia followed by 31-40 age group with 37.5% (9/24) (**Table 3**). On the whole, the age group of >40 years has highest number of Normal Hb% cases (63.6%). The age groups of 21-30 and 31-40 are have more cases of all categories of Anemia in the study population (**Table 2**).

Figure 1: Distribution of Hb% status in the study sample

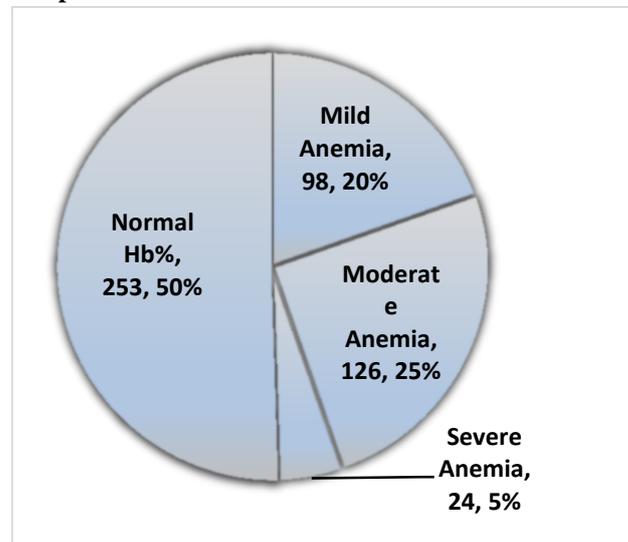
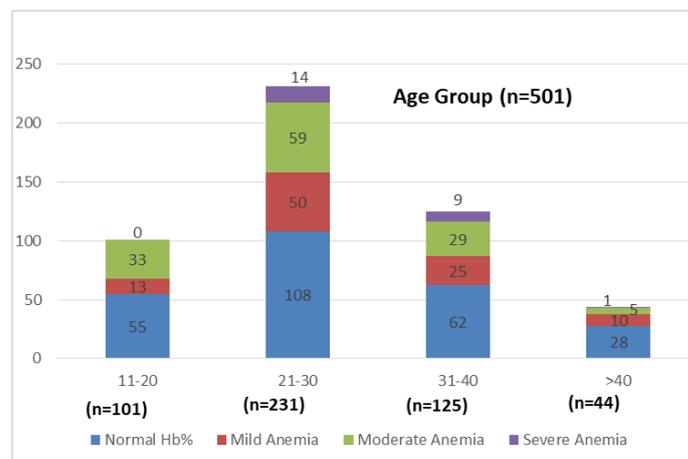


Table 2: Anemia category wise distribution of patients

Age Group	Normal Hb% n (%)	Mild Anemia n (%)	Moderate Anemia n (%)	Severe Anemia n (%)	Total n (%)
11-20	55 (54.5%)	13 (12.9%)	33 (32.7%)	0 (0.0%)	101 (100%)
21-30	108 (46.8%)	50 (21.6%)	59 (25.5%)	14 (6.1%)	231 (100%)
31-40	62 (49.6%)	25 (20.0%)	29 (23.2%)	9 (7.2%)	125 (100%)
>40	28 (63.6%)	10 (22.7%)	5 (11.4%)	1 (2.3%)	44 (100%)
Total	253 (50.5%)	98 (19.6%)	126 (25.1%)	24 (4.8%)	501 (100%)

Figure 2: Age group wise distribution of Anemia



There were two cases of macrocytic anemia identified in the study population. However, around 30% of the study population had microcytic/ hypochromic anemia (**Table 5**).

Table 3: Anemia category wise distribution of patients

Age-group	Normal Hb%	Mild Anemia	Moderate Anemia	Severe Anemia	Total
	n (Col %)	n (Col %)	n (Col %)	n (Col %)	
11-20	55 (21.7%)	13 (13.3%)	33 (26.2%)	0 (0.0%)	101 (20.2%)
21-30	108 (42.7%)	50 (51.0%)	59 (46.8%)	14 (58.3%)	231 (46.1%)
31-40	62 (24.5%)	25 (25.5%)	29 (23.0%)	9 (37.5%)	125 (25.0%)
>40	28 (11.1%)	10 (10.2%)	5 (4.0%)	1 (4.2%)	44 (8.8%)
Total	253 (100%)	98 (100%)	126 (100%)	24 (100%)	501 (100%)

Table 4: Categorization of Mean Corpuscular Volume of RBCs

Age-group	Low MCVn (%)	Normal MCVn (%)	Total
11-20	29 (28.7%)	72 (71.3%)	101
21-30	61 (26.4%)	170 (73.6%)	231
31-40	34 (27.2%)	91 (72.8%)	125
>40	7 (15.9%)	37 (84.1%)	44
Total	131 (26.1%)	370 (73.9%)	501

Table 5: Peripheral smear examination for anemia

Age-group	Macrocytic	Microcytic/Hypochromic	Normocytic/Normochromic	Total
11-20	1	34	66	101
21-30	1	76	154	231
31-40	0	39	86	125
>40	0	9	35	44
Total	2	158	341	501

Discussion:

It is evident from the current study that the burden of nutritional anemia is high among adolescent girls and women of reproductive age. We observed that moderate anemia was prevalent nearly among 25% of population while the severe anemia was more observed among 21-40 years age group women which is primarily of child bearing age. Various studies on prevalence of anemia from India show values ranging from 41 – 66%. However; the Mean Corpuscular Volume (MCV) was not much different across various age groups. There were also 2 cases of macrocytic anemia observed.

Our findings of RBC indices and peripheral smear examination conclude that Microcytic/hypochromic the most common cause of which is Iron deficiency in the study subset. Dietary counseling done by the

nutritionist from Care hospital revealed poor food intake, low socio economic status and lack of dietary knowledge which could not be backed up with structured data collection.

Iron deficiency anemia impair the concentration among adolescent girls, reduces their academic achievement, physical strength and increase risk of infection and women of child bearing age has important public health implications. Iron deficiency is a treatable cause of anemia. Reasons why urban poor women may be at higher risk of anemia than rural poor women is their lack of access to their own income or resources because of lower rates of extra-household employment and reduced economic power within the household¹²⁻¹⁵. The urban poor may also experience higher rates of infection related to poor sanitation or high rates of reproductive tract infections, gynecological morbidity, or sexually transmitted diseases¹⁶⁻¹⁷. Although urban areas theoretically have greater access to a wide variety of food and nutrients through close access to markets, extreme poverty limits the ability of the urban poor to purchase them.

The results of this study can be used by public health programs to design target interventions aimed at reducing the huge burden of anemia in India. The high prevalence of mild and moderate anemia demands due emphasis on iron and folic acid supplementation and health education.

Conclusions:

Prevalence of moderate to severe anemia is more than 25% among the child bearing age group women and hence must be considered in planning of suitable public health programs for better society and healthy future generations.

Limitations:

We did not have comparative groups of rural or urban women in the study population which would have given better analysis across age groups. The occupational, economic and nutritional status of the study population was also not available for detailed analysis. Comparison across men of similar age groups in the same geographic location would have made the status of anemia clear in the population across gender.

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REFERENCES:

1. World Health Organization. Prevention of iron deficiency anaemia in adolescents.
2. Alvarez-Uria G, Naik PK, Midde M, Yalla PS, Pakam R. Prevalence and severity of anaemia stratified by age and gender in rural India. Anemia. 2014;2014.
3. Malhotra P, Kumari S, Kumar R, Varma S. Prevalence of anemia in adult rural population of north India. JOURNAL-ASSOCIATION OF PHYSICIANS OF INDIA. 2004 Jan 1;52:18-20.
4. International Institute for Population Sciences (IIPS) and Macro International. [9]National

- FamilyHealth Survey (NFHS-3), 2005–06. Mumbai: IIPS, 2007.(accessed on Oct 2016)
5. DeMayer EM. Preventing and controlling iron deficiency anemia through primary health care. A guide for Health administrators and program mangers. 1989.
 6. Gillespie S, Johnston JL. Expert consultation on anemia determinants and interventions. Ottawa: The Micronutrient Initiative. 1998.
 7. Stoltzfus RJ. Rethinking anaemia surveillance. The Lancet. 1997 Jun 14;349(9067):1764-6.
 8. Allen LH. Pregnancy and iron deficiency: unresolved issues. Nutrition reviews. 1997 Apr;55(4):91-101.
 9. Kumar A. National nutritional anaemia control programme in India. INDIAN JOURNAL OF PUBLIC HEALTH.. 1999;43(1):3-5.Malhotra P, Kumari S, Kumar R, Varma S. Prevalence of anemia in adult rural population of north India. JOURNAL-ASSOCIATION OF PHYSICIANS OF INDIA. 2004 Jan 1;52:18-20.
 10. Rakesh PS. Prevalence of Anaemia in Kerala State, Southern India-A Systematic Review. Journal of clinical and diagnostic research: JCDR. 2017 May; 11(5):LE01.
 11. Basu AM. Women's roles and gender gap in health and survival. Economic and Political Weekly. 1993 Oct 23:2356-62.
 12. Bennett L. Gender and poverty in India. World Bank; 1991.
 13. Banerjee N. Household dynamics and women in a changing economy.
 14. Sen A, Tinker I. Persistent inequalities: Women and world development.
 15. Bhatia JC, Cleland J. Self-reported symptoms of gynecological morbidity and their treatment in south India. Studies in family planning. 1995 Jul 1:203-16.
 16. Brabin L, Nicholas S, Gogate A, Gogate S, Karande A. High prevalence of anaemia among women in Mumbai, India. Food and Nutrition Bulletin. 1998 Sep; 19(3):205-9.
 17. Qureshi NA, Chauhan MA, Goswami AP, Suri SK. Study of anemia and its correlation with hematological parameters in patients of various age group. J Dental Med Sci. 2015;14(9):29-35.
 18. World Health Organization. Iron deficiency anemia. assessment, prevention, and control. A guide for programme managers. 2001:47-62.
 19. Kumar V, Abbas AK, Fausto N, Aster JC. Robbins and Cotran pathologic basis of disease.
 20. Chellan R, Paul L. Prevalence of iron-deficiency anaemia in India: results from a large nationwide survey. Journal of population and social studies. 2010 Jan;19(1):59-80.
 21. Upadhye JV, Upadhye JJ. Assessment of anaemia in adolescent girls. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2017 Jun 24;6(7):3113-7.

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