

PREVALENCE OF ANEMIA AMONG THE GENERAL POPULATION OF MALWA (M.P.), INDIA

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ABSTRACT: BACKGROUND: Anemia is highly prevalent in infants, children and females of reproductive age group because of increase demand of iron and micronutrients. Studies from different geographical areas have been published from time to time regarding its prevalence in different age groups, but there are very few studies published from central India. With this background we started our study to assess prevalence of anemia in general population of malwa region of Madhya Pradesh, so that in future we can intervene early in high risk groups and prevent complications. **AIMS:** As very few study have been published regarding the prevalence of Anemia in Madhya Pradesh ,our present study aims to assess the prevalence of anemia in the general population of Malwa region of Madhya Pradesh. **MATERIALS & METHODS:** In this study, 1645 cases were selected randomly from the attendants of patients coming to different OPDs of Sri Aurobindo institute of medical sciences Indore, Madhya Pradesh from January 2011 to January 2012, including both sexes and from different age group. Pregnant woman and elderly (>60 yr) were excluded in this study. The study recorded the Hemoglobin, Red cell indices, Peripheral blood smear examination and used these parameters to classify anemia morphologically. **RESULTS:** Out of 1645 cases selected randomly from apparently normal people, 740(44.98%) people were found to be anemic out of them 426 (25.90%) were female and 314 (19.08%)were male, with a male to female ratio of 1:1.35.Maximum cases were found to be in age group of 20-40 years 474/740(64.19%). **CONCLUSION:** In our study we found

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44.98% of clinically normal subjects to be anemic that to more common in age group of 20-39yr. These are productive years of life, Thus by early screening, proper diagnosis we can intervene early and can prevent further anemia related grave complications. These finding indicates the necessity of health awareness, and significance of program like deworming.

KEYWORDS: Anemia, Prevalence, Madhya Pradesh.

INTRODUCTION: A high prevalence of anemia is noted among pregnant, lactating women, and preschool children in India due to rapid growth need of iron and other essential nutrients ⁽¹⁾. In Malwa region, two studies showed high prevalence of anemia among adolescent girls. ⁽²⁻³⁾ Anemia is the commonest hematological abnormalities noted all over the world and more so in developing countries like India. The high risk groups for anemia are infants, children and female during their reproductive years. Anemia is defined as an insufficient RBC mass to adequately deliver Oxygen to the peripheral tissues ⁽⁴⁾. Screening for anemia in general population has been done in various geographical areas time to time. Very few studies have been published regarding prevalence of anemia in general population of central India hence the present study was undertaken to find out anemia prevalence in Malwa region among the OPD attendants of our institute.

MATERIAL AND METHODS: In this study 1645 cases were selected randomly among the attendants of the patients coming to medicine OPD of Sri Aurobindo institute of medical sciences Indore Madhya Pradesh from Jan. 2011 to Jan. 2012, of different age groups and both sexes. Written informed consent was obtained from the entire participant prior to enrolment, after approval of study protocol. Careful history was taken and detailed physical examination was done to establish the underlying cause of anemia.

Pregnant woman and attendants with age more than 60 yr were excluded from this study group. We also exclude patients with comorbidities like tuberculosis, stigmata of malnutrition, chronic blood loss, melena, and chronic inflammatory disease like rheumatoid arthritis, leprosy, and sarcoidosis.

The laboratory work was done based in Automated Cell Counter Sysmex KX 21 (Medical Electronics Co Ltd., Japan) We recorded the Hemoglobin and all routine hematological parameters like MCV were analyzed by cell counter Sysmex Peripheral blood smears with Leishman's stain were prepared for morphologic studies of Red Blood Cells and Brilliant cresyl blue stain was used for reticulocyte count.

Based on Hemoglobin levels, using cutoff values given by WHO in 1968 these 1645 cases were divided into anemic and non-anemic. Mild anemia was defined as Hemoglobin ranging from 10-12.9 gm/dl in adult males and 10-11.9 gm/dl in adult females. Moderate anemia was defined as Hemoglobin level of 7-9.9 gm/dl and severe anemia was defined as Hemoglobin level of less than 7 gm/dl for all the age group. Finding of red cell indices and Peripheral blood smear examination were used to classify anemia morphologically into three types, microcytic, Normocytic and Macrocytic.

OBSERVATION: Out of 1645 apparently normal people, the anemia were found in 740 subjects, among them 314 were male & 426 were female. Anemia was more common in the age group 20-40 years (28.82%) as compared to younger, <20 years (3.95%) and older age group 40-60 years, (12.16%) (Table 1)

Based on red cell indices and peripheral smear examination they were classified into three morphological subtypes microcytic, normocytic and macrocytic. The most common type was

microcytic hypo chromic anemia (55.53%) amongst them 30.54% were female & 24.45% were male. Normocytic normochromic anemia was found in 28.1% of patient. Male were 13.24% & female were 14.86%, and microcytic anemia was found in 16.8% of subjects out of them 12.16% were female & 4.73% were male. (Table 2.)

According to severity, mild anemia was present in 79.5% of subjects in which 33.6% were male & 45.85% were female. Moderate anemia was present in 16% in which 6.89% were male & 9.11% were female. In our study severe anemia was present in 4.5% with 1.89% male and 2.61% female. (Table 3.)

DISCUSSION: Anemia is defined as hemoglobin concentration of less than 12 gm% in female and < 13 gm% in male. Mild anemia was defined as Hemoglobin ranging from 10-12.9 gm/dl in adult males and 10-11.9 gm/dl in adult females. Moderate anemia was defined as Hemoglobin level of 7-9.9 gm/dl and severe anemia was defined as Hemoglobin level of less than 7 gm/dl for all the age group (WHO 1968). The present study was done to estimate the prevalence of anemia, which is one of the common hematological problems among the general population of developing countries. The overall prevalence was found to be 44.98% among clinically normal general population.

Muthayya et al⁽⁵⁾ in their study shows a low prevalence (13.6%) in school children in Bangalore which they associated with school based intervention program like deworming, where as another study shows a prevalence (56.5%) in school children in Uttarakhand (Neeraj Jain et al 2012)⁽⁶⁾. Various studies on different study group have demonstrated that a high prevalence of anemia is common feature in almost all parts of India. While maximum studies reported a high prevalence^(2-4&6-13).

In our study anemia was more common in the age groups 20-39 years (28.82%), with females (17.87%) predominance as compared to males (10.95%). In all age groups, females outnumbered males. A study from Bihar, by Sushila Kumara et al in 2009 showed prevalence of anemia in general population to be 43.21% in which maximum cases belonged to 0-20 yr of age group (47.11%)⁽⁷⁾. A survey of 10.5-18 yr old adolescent girls shows anemia prevalence rate of 63.15% amongst girls in school & 96.5% amongst girls that are not in school (Gwarikar 2006)⁽³⁾, Where as in another survey of 12-18 yr old girls shows anemia prevalence rate of 82.9% amongst girls in school & 92.7% amongst girls that are not in school. (Vasanthi et al 1994).

As pregnant females were not included in the study in order to reduce the bias arising due to anemia of pregnancy, there was no rise in the prevalence of anemia in female in reproductive age group. M: F ratio in reproductive age group is more due to menstrual losses, deliveries, abortions and is compounded by the poor diet available to females in many low socioeconomic settings.

Based on Clinical history, Physical examination, Red cell count, Red cell indices, Red Cell distribution width, Peripheral blood smear examination, Reticulocyte count and by other hematological parameters taken by automated cell counter, anemia's were classified into Microcytic Hypochromic (24.74%), Normocytic Normochromic (12.64%) and Macrocytic types (7.50%) Verma M et al⁽⁸⁾ reported 55.4% Microcytic Hypochromic type, 37.5% Normocytic Normochromic type and 1.7% Dimorphic type of Anemia where as Kumari et al⁽⁵⁾ reported Microcytic Hypochromic (53.3%), Normocytic Normochromic (35.8%) and Macrocytic types (10.8%). Such morphological typing of Anemia allows an estimate of the prevalent etiology in the absence of confirmatory tests in screening studies. The etiology can be derived from those parameters which need further confirmation by more specific tests like Iron studies,

Vitamin B 12/ Folate levels or Electrophoresis e.g.- to detect Iron deficiency anemia, Thalassemia syndromes Anemia of chronic disorders, Megaloblastic anemia etc.

Severe anemia was seen in 33/1645(2%) cases in our study. Bentley and Griffith⁽⁹⁾ found 2.2% cases of severe anemia in their study. Sharma *et al* ⁽¹⁰⁾ and Toteja *et al*⁽¹¹⁾ found severe anemia in 5.3% and 13.1% respectively. This slightly higher percentage could be attributable to the fact that they had all pregnant females in their study.

Screening also gives evidence for Thalassemia minor which can later be confirmed by Electrophoresis. In our study, many cases showed indices suggestive of Thalassemia minor. Such diagnosis made while screening can prevent Thalassemia major in offspring's which causes great economic and emotional burden to the family and to the society in the form of usage of Medical resources which can be prevented by timely intervention.

Thus the main factors which may be responsible for such a high prevalence of anemia in malwa may be inadequate absorption of dietary iron, infections such as hookworm and malaria. Malaria especially chronic malaria is common in this region. More over The best sources of dietary iron are meat, fish and poultry. These foods have a major influence on iron status, but intakes are low among poor people or when such foods are avoided for religious or cultural reasons.

At certain periods in life, iron requirements are particularly high, and therefore less likely to be met. Iron requirements are highest for pregnant women: 1.9 mg/1,000 kcal of dietary energy in the second trimester and 2.7 in the third. The figures for other groups are: infants, 1.0; adolescent girls, 0.8; adolescent boys, 0.6; nonpregnant women, 0.6; preschool and school children, 0.4; and adult men, 0.3. Assuming that individuals within a household eat a similar diet, those with the highest iron requirements are at highest risk of becoming iron deficient.

Women have a substantially higher prevalence of anemia than men, because about half of their iron requirement is needed to replace iron losses in menstruation. In adolescence, anaemia again becomes common: girls start to lose iron in menstrual blood, and both boys and girls deposit iron in lean tissue. Because adolescent boys gain more lean tissue than girls, the prevalence of anaemia may be similar between the genders.

Thus the finding of higher prevalence of anemia among the general population of Malwa region shows that the population needs health awareness, early diagnosis and treatment so that the grave complications of anemia can be prevented. Kumari S⁽¹²⁾ conducted studies on scheduled caste preschool children in Bihar and found that socioeconomic environment is responsible for poor nutritional status. Friedman and Somani⁽¹³⁾ have studied health conditions in tribal villages in South Bihar and concluded that disease prevalence and mortality rates are significantly higher here and the main obstacles are lack of health awareness and education. Therefore the interventions for anemia should be directed on the community as a whole.

CONCLUSION: The overall prevalence of anemia was found to be 44.98% among the clinically normal general population of Malwa. Based on Clinical history, Physical examination, Peripheral blood smear examination and by other hematological parameters taken by automated cell counter, anemia can be classified morphologically which can give an insight into etiology. Later confirmation can be done by specific tests. Such studies including screening are important in order to assess the prevalence in various areas of the country so that preventive and curative measures can be taken to control anemia in the society. More studies of this type should be done in a national scale in order to get even more meaningful data.

REFERENCES:

1. Toteja G.S., Padam Singh, Dhillan BS, Saxena BS. Micronutrient deficiencies disorder in sixteen districts of India. ICMR task force study. District nutrition project 2001.
2. Gawarikar R, Gawarikar S, Triathi CB. Prevalence of anemia in adolescent girls of Ujjain in western India. The Ind. J. of Nutrition and Dietetics. Vol 39:111; Nov. 2002.
3. R. Gawarika, S. Gawarika. A.K. Mishra. Prevalence of Anemia in Adolescent Girls Belonging to Different Economic Group. Indian Journal of Community Medicine Vol.31, No.4 (2006-10-2006-12).
4. Greer J.P., Rodgers G. M., Foerster J., Paraskevas F., Lukens J.N., Glade B., editors- Wintrobe's Clinical Hematology, Eleventh Edition. Philadelphia: Lippincott & Wilkins; 2004.
5. Muthayya S., Thankachan P., Zimmermann M.B., Anderson M., Eilander A., Misquith D. et al.-Low anemia Prevalence in school-aged children in Bangalore, South India: possible effect of school health initiatives. Eur J Clin Nutr. 61 (7);865-869;2007 Jul.
6. Neeraj Jain and Vibha Mangal Jain. Prevalence of anemia in school children. Indian Medical Practice and Review. Vol.3 (1); 1-4: February 2012.
7. Kumari S, Choudhary AK, Negi G., Prevalence of anemia among the general population of Bihar, India. Ind Med Gaz 2009;11: 418-21.
8. Verma M, Chhatwal J, Kaur G. Prevalence of anemia among urban school children of Punjab. Indian Pediatr 1998; 35: 1181-1186
9. Bentley M.E., Griffiths PL.-The burden of anemia among women in India .Eur J Clin Nutr. 57 (1): 52-60, 2003 Jan.
10. Sharma J.B., Sony D., Murthy N.S., Malhotra M. Effect of dietary habits on prevalence of anemia in pregnant women of Delhi. J Obstet Gynaecol Res 29 (2):73-78; 2003 Apr.
11. Toteja G.S., Singh P., Dhillon B.S., Saxena B.N., Ahmed F.U., Singh R.P. et al.-Prevalence of anemia among pregnant women and adolescent girls in sixteen districts of India. Food Nutr. Bull. 27 (4):311-315, 2006 Dec.
12. Kumari S.- Nutritional status of scheduled caste pre-school children. Indian J Public Health. 49 (4):258-259, 2005 Oct-Dec.
13. Friedman M.S., Somani J.- Health conditions in the tribal villages of South Bihar: an epidemiologic survey. J Assoc Physicians India. 50:1376-1380, 2002 Nov.

Table 1: Demographic Profile of anemic cases: - (n =1645)

Sex	<20yrs	20-39yrs	40-60yrs	Total (%)
Male	20(1.23%)	181(10.95%)	113(6.87%)	314/1645(19.08%)
Female	45(2.73%)	294(17.87%)	87(5.29%)	426/1645(25.90%)
Total	65(3.95%)	475(28.82%)	200(12.16%)	740/1645(44.98%)

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Table 2: Anemia Typing :- (n =740)

Sex	Microcytic Hypochromic	Normocytic Normochromic	Macrocytic	Total
Male	181(13.24%)	98(13.24%)	35(4.73%)	314
Female	226(14.86%)	110(14.86%)	90(12.16%)	426
Total	407(55.53%)	208(28.10%)	125(16.89%)	740

Table 3: Severity of Anemia age adjusted: - n =740

Age (Years)	Mild Anemia		Moderate Anemia		Severe Anemia		Total
	Male	Female	Male	Female	Male	Female	
<20	15 (2.03%)	41 (5.54%)	5 (0.67%)	4 (0.54%)	0	0	65/740
20-39	149 (20.13%)	226 (30.51%)	18 (2.43%)	49 (6.62%)	14 (1.89)	19 (2.57%)	475/740
40-60	85 (11.48%)	72 (9.73%)	28 (3.78)	15 (2.03%)	0	0	200/740
	249	339	51	68	14	19	