Studies on Human Anaemia based on Hemoglobin (Hb) estimation and R.B.CS. Count in Rural and urban population in Ujjain, MP, India

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Abstract

"Anaemia" is the most common diseases due to malnutrition in world and it is recognized as a major "Public Health problem" throughout the world, especially in the developing countries. Infants, young children are most frequently affected by Anaemia. Both male and female anemic patients were studied from the Jan.2011 to Dec. 2011 from the R.D. Gardi Medical College Ujjain, SS. Hospital and CHL applo hospital. Among the selected patients 72.53% were female anemic patients and 26.19% were male anemic patients. The aim of the study is to determine the risk factors for anemia among Population of Ujjain district (M.P.).A clear understanding of risk factor in this population will help to plan for more effective strategies to control this nutritional deficiency. The present study done in the hospitals of Ujjain district will provide the information about the Anaemia and the data were analyzed based on sex, hemoglobin percentage, R.B.Cs count, and the social status.

Keywords: Weakness and fatigue, low blood pressure, poor memory, iron deficiency.

Introduction

Aneamia is a clinical condition in which the red blood cells count and hemoglobin (Hb) content is less than normal, generally different in males and females .For men anemia is typically defined as hemoglobin level less than 12 gram /100ml blood and in women hemoglobin level less than 11 grams/100 ml blood. "English physician "Thomas Addison "(1793-1860) gave the first complete description of the disease– "a remarkable form of general Anaemia" in 1849 hemoglobin (found inside R.B.Cs) normally carries oxygen from the lungs to the tissues, Anemia leads to hypoxia (lack of oxygen) in organs.

Human cells are dependent on oxygen for survival. Anaemia is the most common disorder of the blood. Hemoglobin has an oxygen binding capacity of 1.34 ml O_2 per gram of hemoglobin.

Among the various causes of anemia nutritional deficiencies are believed to be of fore most importance. Two main causes of Anaemia are i. a decrease in production of R.B.Cs or Hb and ii. a loss or destruction of R.B.Cs, abnormally. In addition to nutrient deficiency infections also contribute to Anaemia, these include: - Malaria parasite infection, Jaundice Hepatitis's B, kidney failure, etc. Poverty is an important factor that limits required balanced diet leading to various deficiencies and chronic malnutrition.

Some important "symptoms" are: weakness fatigue skin paleness, shortness of breath , fast irregular heartbeat, low blood pressure, headache, poor memory difficulty in thinking, cold Hands and feet. In severe Anaemia, there may be signs of a hyper dynamic circulation: tachycardia (a fast heart rate), bounding pulse, flow murmurs', and cardiac ventricular hypertrophy (enlargement).

Material and Methods

In the present study of anemic patients was done in the R.D.Gaardi Medical College Ujjain and in SS and CHL hospitals, in Ujjain (MP).India • Experiment was done by taking blood from patients for estimating Hb.and R.B..cs. • Hemoglobin was measured by C.B.C.method.

Sample preparation: Blood samples were collected by finger stick. The finger end lightly pressed using a rocking motion to stimulate blood flow. Two or three drops of the blood is collected directly in to the cuvettes. Results were recorded by automated analyzers using complete blood counter method: Hemoglobin concentration was determined by the Coulter LH 750, Advia 2120/120 or Sysmex XE 5000 /2100 cell counter.

The blood is well mixed and placed on a rack in the analyzer .The cell counting component counts the numbers and types of different cells, and 'Hb', then printed.

Quality control: Maintain the proper storage conditions, keeping the cuvettes tightly closed at room temperature. Blood samples must be dated when opened and be stored at room temperature or in the refrigerator. They are good for 30 days from the opening date. Bring the samples to room temperature before use and be sure to mix them well before testing. Statistical analysis: probabilities of significant difference in the mean of Anaemia patients from different anemic conditions

were determined according to student's t-test Confidence limits were set at p= <.001.

Results and Discussion

This study was carried out from Jan 2011 to Dec 2011 refers a total 21,329 cases. A total of 15742 females and 5587 males were included. Information was collected about education religion social status; physiological condition, age, sex, Hb%, R.B.Cs. etc. Women mild anemic are 6784, moderate anemic are 5084, severe anemic are 3824 and men mild anemic are 1725, moderate anemic are 2100 severe anemic are 1666. The commonest age group affected by anemia was found from 21-30 age years (figure-1 to figure-4). And next higher cases are found in children of 1-10 yrs age group. Anaemia prevalence was lower in boys than girls'.

Recent estimates from India for Anaemia prevalence is approximately 80% in children aged between 6 and 36 months[1].

i. Present data based on "'Hb' estimation" shows that in **female,** 1-10 age group (12.43%), 11-20(8.6%), 21-30(19.43%), 31-40(7.26%), 41-50(7.26%), 51-60(5.65%), 61-70(8.46%), 71-80(3.4%), in **male group** 1-10(4.1%), 11-20(2.29%), 21-30(6.94%), 31-40(2.82%), 41-50(2.55%), 51-60(2.40%), 61-70(2.65%), 71-80(2.3%) (table-1), ii. Present data based on "R.B.Cs. count (M.C..V) "shows that in **female**, 1-10 age group (9.1%) , 11-20(4.3%), 21-30(11.96%), 31-40(4.57%), 41-50(4.48%), 51-60(3.36%), 61-70(4.63%), 71-80(4.11%), in **male group** 1-10(1.94%), 11-20 (1.05%), 21-30(1.7%), 31-40(1.0%), 41-50(1.9%), 51-60(1.5%),61-70(1.07%),71-80(1.55%) table-2. Earlier studies by same Authors also shown more or less same pattern[2].

Socio economic status, higher percentage of Anaemia is found in female class III was 23.69% ,class IV 17.69% and in male class III 10.85% Class IV 6.17% (table -3).

Table -1
In female, shows Anaemia in hospital patients, according to Hb level and R.B.Cs count also include statistical analysis

Age group	Mild 10-10.9g/dl	Moderate 8-9.9 g/dl	Severe <8g/dl	Total	Female vs. male P.values	Types of Anaemia Microcytic Anaemia Iron deficiency
1-10	1026	914	713	2653	>0.001	1941
11-20	813	615	412	1840	>0.001	925
21-30	2115	1116	914	4145	>0.001	2551
31-40	716	518	315	1549	>0.001	975
41-50	572	419	216	1207	>0.001	957
51-60	668	620	517	1805	>0.001	718
61-70	613	663	518	1799	>0.001	988
71-80	261	264	219	744	>0.05	878
Total	6784	5084	3824	15742	>0.001	9933

Table-2
In male, shows Anaemia in hospital patients, according to Hb level .and R.B.Cs. count

Age group	Mild 10-10.9g/dl	Moderate 8-9.9 g/dl	Severe <8g/dl	Total	Types of Anaemia Microcytic Anaemia Iron deficiency
0-10	253	372	261	886	415
11-20	114	213	162	489	225
21-30	455	614	413	1482	364
31-40	166	272	164	602	215
41-50	168	203	175	546	426
51-60	187	189	136	512	328
61-70	179	171	217	567	229
71-80	203	162	138	509	331
Total	1725	2100	1666	5587	2533

Table -3
Distribution of study of female and male subjects by socio –demographic profile
Socio demographic factors: (a) Socio economic status (According to modified BG Prasad classification)

	Female Anemic Patients	Female Anemic Patients %	male anemic patients	male Anemic patients%	Female vs. male P.values
Class –I (richest)	1513	9.6%	513	9.1%	>0.001
Class-II (richer)	2032	12.9%	625	9.3%	>0.001
Class-III (middle)	5054	32.1%	2315	39%	>0.001
Class-IV (poorer)	3832	24%	1316	21%	>0.001
Class-V (poorest)	3311	21%	1215	20%	>0.001
Total	15742		5587		

(B)Religion

Hindu	10232.3	65%	3631.55	65%
Muslim	3148.4	20%	1117.4	20%
Others	2361.3	15%	558.7	15%
Total	15742		5587	

(C) Category

Rural	12593.6	80%	4469.6	80%
Urban	3148.4	20%	117.4	20%
Total	15742		5587	
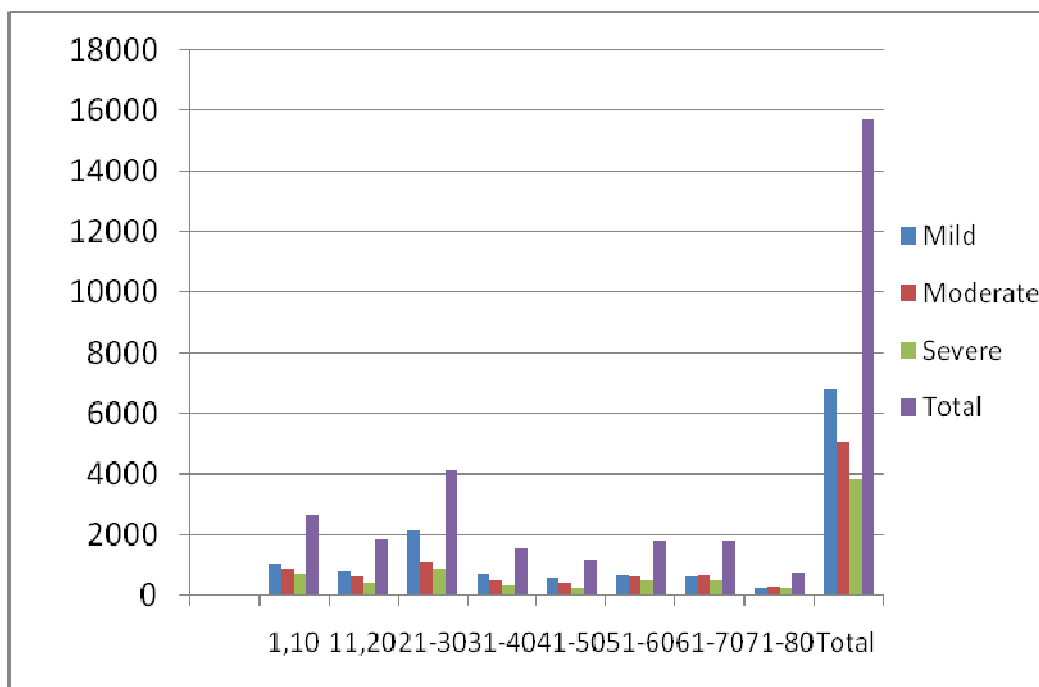
Figure-1
Female anaemic conditions, The highly affected age groups by anaemia was found 1-10 and 21-30 yrs, compared to other age groups
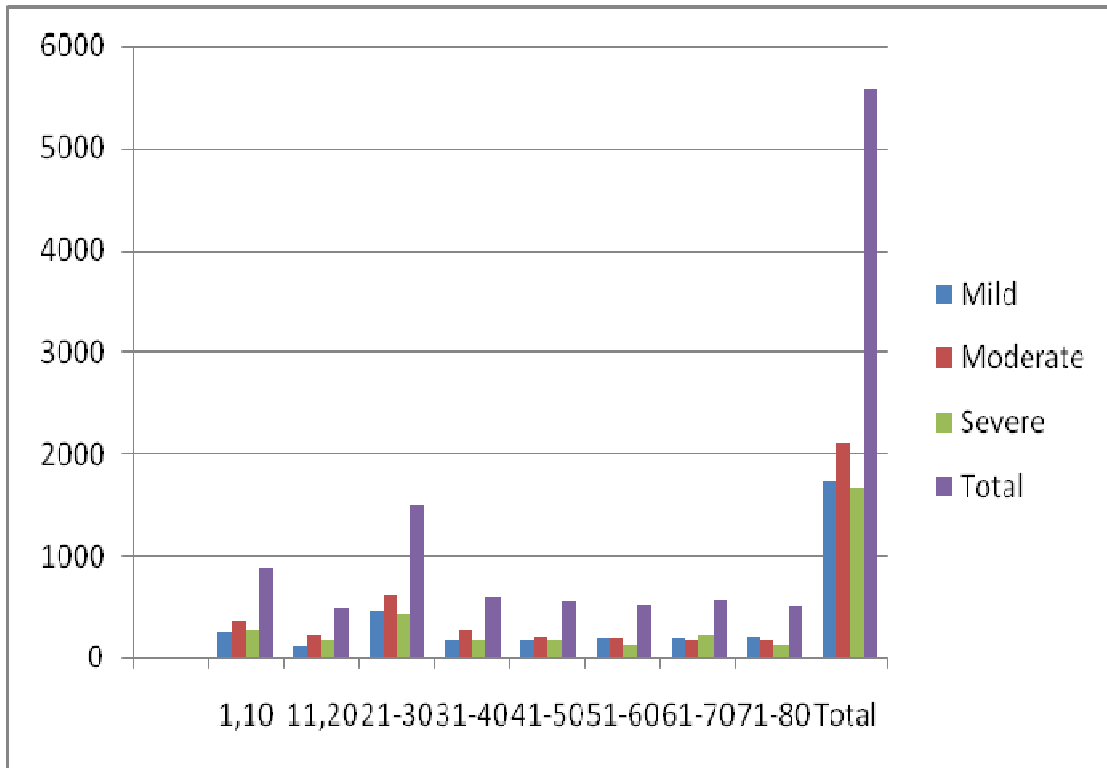
Figure-2
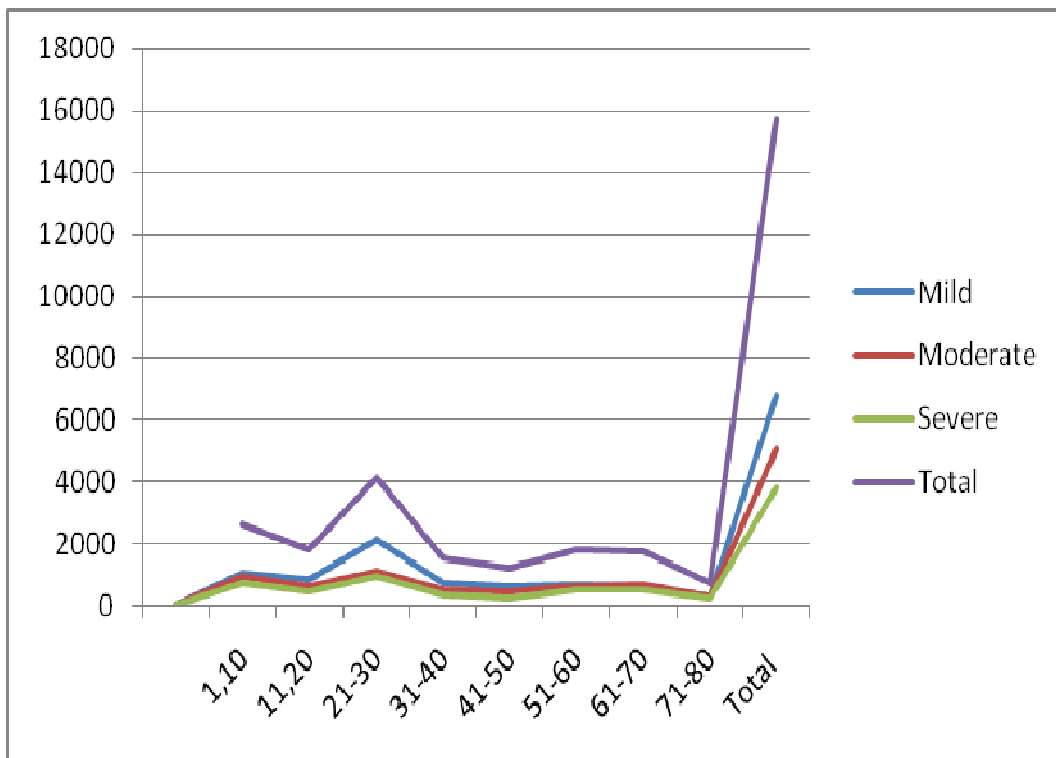**Male anemic conditions, the highly affected age group by anemia was found 21-30 yrs compared to other age groups**

Figure-3
In females, graph showing comparative Hb values in mild, moderate and severe anemic patients, in different age groups
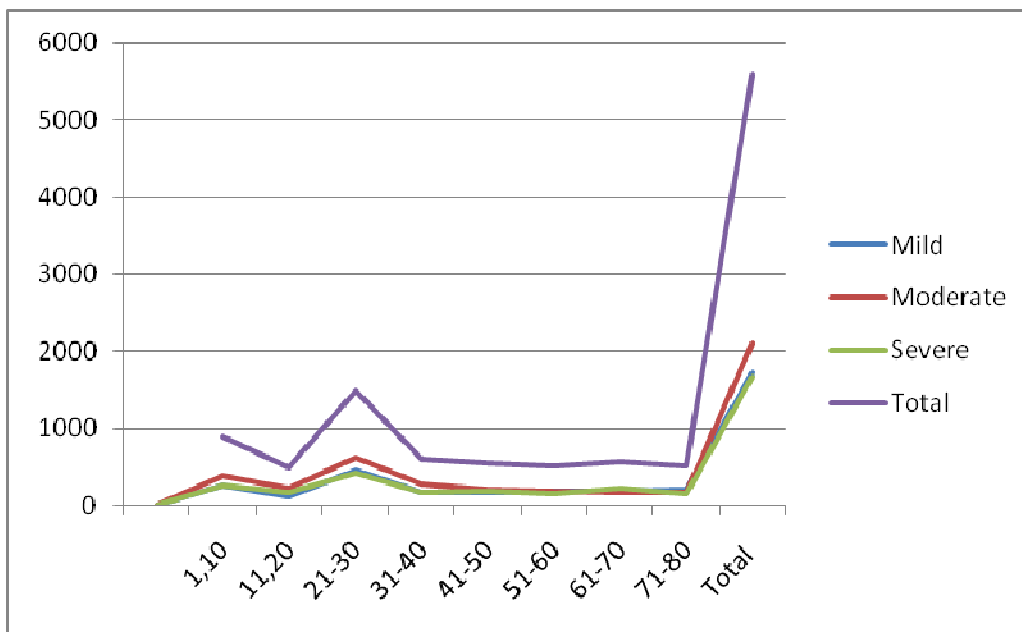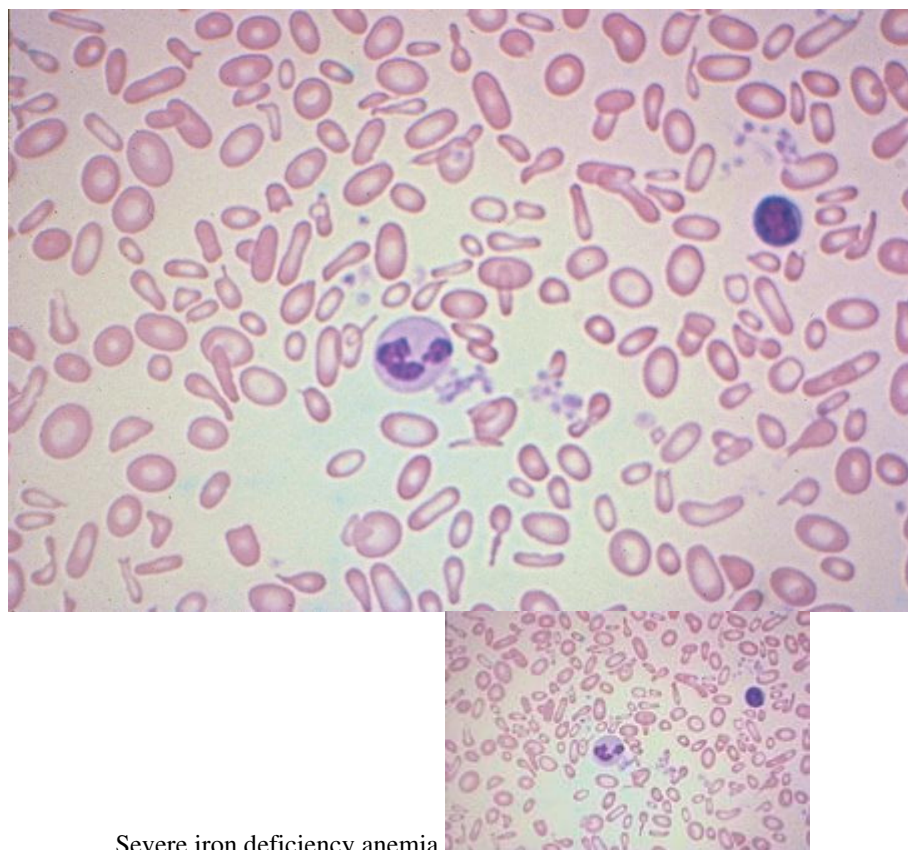
Figure-4
In males, graph showing comparative Hb values in mild, moderate and severe anemic patients, in different age groups

Severe iron deficiency anemia

Figure-5
Low-power view of the peripheral blood in a patient with severe iron deficiency Aneamia. A normal lymphocyte is present (for comparison purposes) to the right of center. Marked anisocytosis and poikilocytosis can be appreciated as can microcytosis and hypochromia

There was significant difference in anemia Prevalence between women and men (P>0.001). i. Among the various causes of Anaemia, "nutritional deficiencies" are believed to be of foremost importance, and worldwide, most common being" iron deficiency"[3]. ii. We are facing the major problem of "high population growth" in Ujjain, India like in other developing countries. Resources are inadequate which badly affect the socio-economic development of the country as a whole. iii. Low literacy rate, poor hygiene, and limited health care are the key problems leading to a variety of nutritional deficiencies. The problem is of more serious concern and magnitude in 'infants' and 'children'.

Anaemia is a serious public health problem that affect population in both rich and poor countries[4]. It was a hospital based study which included female and male patients of different age groups that clearly show, and confirm three population groups; are i. preschool age children, ii. pregnant women and iii. non pregnant women. The proportions of the population covered by W.H.O. survey reports that, preschool-age children (76.1%) pregnant women 69% and non pregnant women (73.5%), but lower for school –age children (33.0%), men (40.2%) and the elderly (39.1%)[5].

Anaemia continues to be a major public health problem worldwide, particularly among females of reproductive age in developing countries in 1992, WHO global estimates of anemia prevalence averaged 56%, with range of 37-75% depending on geographic location[6,7,8] reported that the prevalence of Anaemia among Indian women is 52%. 15% percent of these women are classified as moderately Anemic (Hb <70 g/l). Prevalence rates across the states are remarkably similar, reflecting important factor that include i. diet low in Heme- iron and ii. high in phytates, iii. high levels of malaria and other infectious diseases, and iv. frequent reproductive cycling that decrease iron stores. However, studies in India of micronutrient deficiency confirm the high prevalence of Anaemia among adolescent girls and women[9-12].

Anaemia among children "6-59 months" is highest in Bihar (78%), Madhyapredesh (74.1%), Uttarpradesh (73.9%), Chhattisgarh (71.2%) and Jharkhand (70.3%) (NFHS-3 25 FEB, 2011). The prevalence of anemia in pregnant women in some of these countries reported as follows Bahrain 33%, Egypt 26%, and Jordan 35%.

Conclusion

The present study done in the hospital of Ujjain district will provide the information about the Anaemia our studies and the data were analyzed based on, sex, hemoglobin percentage, R.B.Cs count, social status. The present study suggest that there is a definite role of the nutritional deprivation in the development of anemia and lack of balanced diet especially deficient in protein group has much stronger association with the type of anemia; animal protein is more useful than the plant protein. However national nutritional programs for the fortification of flour with iron and folic acid may also help to reduce the prevalence of Anaemia.

Anaemia in human being is grooving fast in India and also in Ujjain district, for so many reasons, therefore the present study provides important data, to the Govt. and other agencies so as to control this problem in future in India and also launch some special program to prevent Anaemia.

The high prevalence of Anaemia among women in India is burden for them their families, and for the Nation, therefore, iron folic acid supplementation is immensely required for overall health of women.

Acknowledgement

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