

# A Comparative Study on Rural and Semi Urban Population for Iron Deficiency Anemia

Epibeni N Humtsoe<sup>1</sup>, Suresh Kumar Mahaseth<sup>2</sup>

<sup>1</sup>Department of Medical Lab Technology, Mewar University Rajasthan, India

<sup>2</sup>Shree Balazi Action Medical Institute Paschim Vihar, New Delhi, India

**Abstract:** Anemia can be described as decrease concentration of blood hemoglobin, which cause decrease transport of oxygen in the tissue and various organ in the body, which may occur due to abnormal synthesis of red blood cell and hemoglobin. Iron deficiency, one of the major dietary insufficiency diseases seen and effects about more than half of the total population on the earth. Iron deficiency is the most important community health problem disturbing in every ages of the population, its highest occurrence in pregnant women and children below the age of five years. This practical worked was done in Zion hospital Dimapur, Nagaland. During the period of 1 may to 30 May 2019. I was studied on 100 blood sample in which 90 patient have low Hb below the normal level. Out of 90 patient sample 85 patient have Hb level below 10 g/dl and out of 85 patient sample 5 patient have Hb level below 5g/dl. On the basis of low Hb level (men 13-18g/dl, women 12-16g/dl), peripheral smear and ferritin level(male 20-250ng/ml, female 10-120ng/ml). Majority of Iron deficiency anemia were found in females, females were affected more than the males. Most affected age groups between 20–50. On the basis of ferritin concentration in serum, majority of the patients were observed to effected from iron insufficiency of anemia. In present study it was found that pregnant women are generally effected by iron deficiency. On peripheral smear we found most patients with hypochromic microcytic. Hemoglobin level is significantly decrease in most of the patients. Some of them having family history for iron deficiency anemia and other are due to malnutrition and deficiency of vitamin B12.

**Keywords:** Hemoglobin, Ferritine, Normochromic normocytic anemia, Hypochromic microcytic anemia, normochromic macrocytic anemia, normochromic microcytic anemia.

## 1. Introduction

Anemia can be define as a condition in which hemoglobin concentration level of red blood cells is poorly below the normal range (men 13-18g/dl, women 12-16g/dl), which is affected by different age, gender, and physical level of the particular person. Anemia is a clinical condition which progress if our blood circulation does not have sufficient healthy erythrocytes or hemoglobin. Innumerable factors also can be caused through anemia, deficiency of anemia is the most common essential elements for hemoglobin synthesis (e.g.: Iron, folic acid and Vitamin B12), excess loss of blood, frequent pregnancies in women, intestinal parasitic infection, direct or indirect hemolysis and bone marrow disorder which cause inhibition of erythropoiesis [1].

The normal adult body contains about 4000 mg of iron. About 10 percent of this iron is present in the circulating blood. Remaining part of iron is preserve in the cells of bone marrow and hepatic tissues. Each day 20 to 25 ml of red blood cells are broken down as a result of normal red cells ageing and about 25 mg of iron is released into the body. Approximately 1 mg of iron is excreted through urine and bile. The remaining about 19 to 24 mg of iron is reutilized in the formation of new red cells hemoglobin. When utilization of iron by the erythrocyte become fast (during infancy or bleeding), and the nutritional intake of iron is inadequate to balance with the increased requirement, the iron released for the production of hemoglobin from liver and reticuloendothelial cells of the bone marrow.

Iron deficiency is the commonest cause of hypochromic microcytic anemia. In iron deficiency, the amount of iron lost from the body exceeds the amount observed. The physiological demand for iron exceeds iron uptake. First

there is depletion of the iron store of the body followed by reduction in the plasma level of iron and development of hypochromic microcytic anemia. [9-16].

As per the record of World Health Organization (WHO), there are about more than two billion population effected with anaemia in all around the world and approx half of the anaemic cases are only occur due to lack iron [2]. It is also recorded that deficiency of iron observes very late in anemia., it is predictable that the occurrence of iron insufficiency is 2.5 times of anaemia [2, 3]. In a rising countries the expected occurrence of anaemia is about 45% in adults less than 60 years, 39% in children grater then 5 years, 48% in children age group of 5– 14 years, and 42% in female 15–59 years, 30% in men 15–59 years, [2].

Iron deficiency is defined as an imbalance of iron intake, absorption and iron loss. The most common symptoms of anaemia are Pallor, fatigue and dyspnea. Anemia with microcytosis and hypochromacia is find out in biological examination as an iron deficiency anemia. Microcytic anemia is originated in various cases of inflammatory etiologies, thalassemia and sideroblasticaemia [4-8].

As per the previous research, current work was carried out with two aim a) to find out the prevalence of different anemia in various age group patient who are admitted in Zion hospital and research center Dimapur, Nagaland. b) Comparative study between rural and urban patient which are admitted in Zion hospital and research center Dimapur, Nagaland.

## 2. Material and Method

In this present study, 100 blood specimen was taken for the detection of iron deficiencies in patients admitted in zion

Hospital and research center, Dimapur, Nagaland during the phase of may 2019 to June 2019.

Patient were selected on the basis of their history of current illness, previous illness, blood loss history, treatment history for any diseases, menstrual cycle and other gynecological history.

Symptoms of anemia are also observed which include pallor

Detailed previous history was taken from each patient, including history of present illness, past illness, anemia along with other family members, social & economic history, previous history for loss of blood, drugs administration, menstrual, gynecological and obstetrical occurrence in women's, previous occurrence of diarrhoea, dysphagia, malaria infection, consumption of food habits, quality of food, history of blood transfusion or donation and intestinal worm infection.

A systematic physical assessment was done with particular care to blood forming system i.e. pallor, koilonychias, lymphadnopathy, hepatomegaly, splenomegaly, purpura, bruises, pelvic assessment in females under the supervision of gynecologist and rectal examination. Routine hematological testing was carried out with 5 ml of blood specimen, semi automated analyzer, SWELEBALFA was used for obtaining histogram. In these testing hemoglobin, Red blood indices and RDW were noted. Westergreen method used for the determination of ESR.

Blood film examination done for suspected patient by staining with Leishman stain.

Serum ferritin level were carried out by patient serum following primary test in patients with clinical diagnosis of Iron deficiency anemia.

### 3. Result

The present study was conducted in Zion hospital Dimapur, Nagaland. During the period of May to June 2019. In this study out of 100 blood sample 90 sample have been found low Hb below the normal level. Out of 90 patient sample 85 patient have Hb level below 10 g/dl and out of 85 patient sample 5 patient have Hb level below 5g/dl. Around 40 patient were obtain positive for Iron Deficiencies anemia. On the basis of low Hb level (men 13-18g/dl, women 12-16g/dl), peripheral smear and ferritin level(male 20-250ng/ml, female 10-120ng/ml). Majority of Iron deficiency anemia were found in females, females were affected more than the males. Most affected age groups between 20 – 50. Based upon serum ferritin concentrations, most of the patients were found to suffer from iron deficiency anemia. We found that iron deficiency is more common in pregnant women. On peripheral smear we found most patients with hypochromic microcytic. Hemoglobin level is significantly decreased in most of the patients. Some of them having family history for iron deficiency anemia and other are due to malnutrition and deficiency of vitamin B12.

Serum ferritin level below 10ng/ml was considered diagnostic, values below 10ng/ml were considered as suggestive of iron deficiency

**Table 1: Result of Different Test**

Sl. No	Patient Name	Age/Sex	Hb.(g/dl)	MCH	MCV	RBC
1	P1	65/F	12	31.7	68.4	5.7
2	P2	17/M	15.6	35.1	91.4	4.5
3	P3	23/F	13.3	31.4	95	3.9
4	P4	34/M	15.9	31.9	84.9	5.5
5	P5	55/M	12	27.8	73.4	4.3
6	P6	28/M	13.8	29.4	71.4	3.8
7	P7	24/M	16.7	34.6	85.9	5.5
8	P8	20/F	12.9	31.3	72.7	4.6
9	P9	36/F	14.8	33.9	100	45
10	P10	13/F	13.7	27.9	68.4	3.9
11	P11	42/F	5.8	31.6	20	2.28
12	P12	21/F	9	31.2	40.9	1.5
13	P13	34/F	9.4	31.9	21.5	3
14	P14	1/M	6.4	31.9	21.5	2.9
15	P15	55/F	10.4	32.1	22.3	2.28
16	P16	65/M	10.8	35.7	20.8	2.4
17	P17	38/F	9.2	32.2	71.4	3.5
18	P18	75/F	8	31.7	23.5	3.2
19	P19	42/F	3.6	27.3	18.5	2.1
20	P20	58/M	10.6	32.2	24.1	2.28
21	P21	42/F	8.6	33.4	68.8	3.1
22	P22	33/F	9.4	30	69.4	2.7
23	P23	30/M	7.8	33.1	102.4	3.1
24	P24	6/M	8.8	21.43	66.4	2.8
25	P25	7/M	6.4	35.6	109.1	1.8
26	P26	1/F	9.6	3.9	8.6	2.1
27	P27	29/F	8.5	33.2	34.7	2.2
28	P28	65/F	10.6	71.1	23.8	2.28
29	P29	45/F	9.4	67.4	20.7	1.5
30	P30	8/M	10.6	67.4	20.7	3
31	P31	40/F	6.6	2.6	20.6	2.9
32	P32	14/F	10.6	64.7	22	2.28
33	P33	3/M	10.2	73.7	23.6	2.4
34	P34	70/M	10.4	73.6	24.9	3.5
35	P35	42/F	7.8	31.6	20	3.2
36	P36	21/F	9	31.2	40.9	2.1
37	P37	34/F	9.4	31.9	21.5	2.28
38	P38	9/M	6.4	31.9	21.5	3.1
39	P39	55/F	10.4	32.1	22.3	2.7
40	P40	65/M	10.8	35.7	20.8	3.1
41	P41	58/M	10.6	32.2	24.1	2.8
42	P42	42/F	8.6	33.4	68.8	1.8
43	P43	33/F	9.4	30	69.4	2.1
44	P44	30/M	7.8	33.1	102.4	2.2
45	P45	38/F	9.2	32.2	71.4	2.28
46	P46	75/F	10	31.7	23.5	1.5
47	P47	58/M	10.6	32.2	24.1	3
48	P48	42/F	7.8	31.6	20	2.9
49	P49	21/F	9	31.2	40.9	2.28
50	P50	34/F	9.4	31.9	21.5	2.4
51	P51	11/M	6.4	31.9	21.5	3.5
52	P52	55/F	10.4	32.1	22.3	3.2
53	P53	12/M	8.7	23.6	73.7	2.1
54	P54	55/M	10.6	32.2	24.1	2.28
55	P55	45/M	10.5	33.1	52.4	3.1
56	P56	37/F	8.9	32.2	71.4	2.7
57	P57	38/F	9.2	32.2	71.4	3.1
58	P58	75/F	10	31.7	23.5	2.8
59	P59	33/M	3.4	27.3	18.5	1.8
60	P60	58/M	10.6	32.2	24.1	2.1
61	P61	42/F	8.6	33.4	68.8	2.2

62	P62	33/F	9.4	30	69.4	2.28
63	P63	30/M	7.8	33.1	52.4	1.5
64	P64	38/F	9.2	32.2	71.4	3
65	P65	75/F	10	31.7	23.5	2.9
66	P66	42/M	3.6	27.3	18.5	2.28
67	P67	48/M	10.6	32.2	24.1	2.4
68	P68	42/F	8.6	33.4	68.8	3.5
69	P69	33/F	9.4	30	69.4	3.2
70	P70	50/M	7.8	33.1	102.4	2.1
71	P71	38/F	9.2	32.2	71.4	2.28
72	P72	75/F	10	31.7	23.5	3.1
73	P73	42/M	6.8	27.3	18.5	2.7
74	P74	58/M	10.6	32.2	24.1	3.1
75	P75	43/F	9.4	30	69.4	2.8
76	P76	30/M	7.8	33.1	102.4	1.8
77	P77	38/F	9.2	32.2	71.4	2.1
78	P78	75/F	10	31.7	23.5	2.2
79	P79	58/M	10.6	32.2	24.1	2.28
80	P80	42/F	7.8	31.6	20	1.5
81	P81	21/F	9	31.2	40.9	3
82	P82	34/F	9.4	31.9	21.5	2.9
83	P83	33/F	9.4	30	69.4	2.28
84	P84	30/M	7.8	33.1	102	2.4
85	P85	75/F	10	31.7	23.5	3.2
86	P86	31/F	6	33.1	102	2.1
87	P87	75/F	5.6	32.2	71.4	1.9
88	P88	42/F	5.5	31.7	23.5	1.9
89	P89	58/F	4.5	27.3	18.5	2.8
90	P90	42/F	6.9	32.2	24.1	2.3
91	P91	33/F	6.3	30	69.4	2.4
92	P92	30/F	5.9	33.1	102	1.9
93	P93	38/F	4	32.2	71.4	1.2
94	P94	75/F	5.8	31.7	23.5	1.5
95	P95	42/M	6.8	32.2	24.1	2.9
96	P96	38/M	9.8	31.6	20	3.1
97	P97	75/M	7.3	31.2	40.9	2.9
98	P98	42/F	6.9	31.9	21.5	2.8
99	P99	58/F	7.1	30	69.4	3.5
100	P100	42/M	10.5	33.1	22.4	3.2

**Table 2: Serum Ferritin**

Serum Ferritin Level	No. of Patient
Lessthen 10	40
Lessthen 20	28
Lessthen 150	32

**Table: Cell Morphology on Peripheral Smear**

Pperipheral Examination	No. Pation
Normochromic Normocytic	18
Hypochromic Microcytic	75
Normochromic Microcytic	07

#### 4. Conclusion

Iron deficiency anemia is the most common deficiency in the world. It is an essential element for blood production. The iron stored in the body in the form of ferritin that circulates in the blood. Deficiency of iron can lower the haemoglobin level causing reduced oxygen support to the body tissues.

In this present studied 100 blood sample from all aged group were collected. From rural (60 blood sample) and urban (50 blood sample) area. Overall anemia prevalence that was found in this study in Zion Hospital, Dimapur, Nagaland Most affected age groups between 20 – 50 years. In rural

and urban area of Dimapur, Nagaland is of public health concern. Anemia prevalence of more than 44% was found to have iron deficiency anemia where as 25% from rural area and 19% from urban area. It is observed that the majority of the anemic were pregnant women in age group of 20–30 years. A study was conducted on haemoglobin and red cell indices with serum ferritin in both male and female. We observed that an increased prevalence of anaemia with all age, but Majority of Iron deficiency anemia were found in females, females were affected more than the males. Most affected age groups between 20 – 50 years. Basting upon serum ferritin concentrations, most of the patients were found to suffer from iron deficiency anemia. We found that iron deficiency is more common in pregnant women. On peripheral smear we found most patients with hypochromic microcytic. Hemoglobin level is significantly decreased in most of the patients. Some of them having family history for iron deficiency anemia and other are due to malnutrition and deficiency of vitamin B12.

#### References

- [1] Viteri Fe. A new concept in the control of iron deficiency: community based preventive supplementation of at-risk group by weekly intake of iron supplements. *Biomed environ Sci* 1998, 11(1) :46-60.
- [2] WHO, UNICEF, and UNU, *Iron Deficiency Anaemia: Assessment, Prevention and Control, A Guide for Programme Managers*, WHO, UNICEF, UNU, Geneva, Switzerland, 2001.
- [3] M. B. Zimmermann and R. F. Hurrell, "Nutritional iron deficiency," *The Lancet*, vol. 370, pp. 511–520, 2007.
- [4] Akodu OS, Disu EA, Njokanma OF, Kehinde OA, 'Iron deficiency anaemia among apparently healthy pre-school children in Lagos, Nigeria.' *Afr Health Sci* 16: 61-68, 2016.
- [5] Baker SJ, DeMaeyer EM " Nutritional anemia: its understanding and control with special reference to the work of the World Health Organization". *Am J Clin Nutr* 32: 368-417, 1979.
- [6] WHO "Requirements of Vitamin A, Iron, Folate and Vitamin B12" Report of a Joint FAO/WHO expert consultation. FAO/WHO, Rome, p:107, 1988.
- [7] Cook JD, Skikne BS, Baynes RD. "Iron deficiency: the global perspective" *Adv Exp Med Biol* 356: 219-228, 1994.
- [8] Espanel C, Kafando E, Héroult B, Petit A, Héroult O, et al. "Iron deficiency anaemia: clinical presentation, biological diagnosis and management" *Transfus Clin Biol* 14: 21-24, 2007
- [9] Brown BA, Hematology, principle and procedures, lea and febiger, philadelphia, 2<sup>nd</sup> ed., 1976.
- [10] Lee GR, Bithell TC, Forester L, Athens JX, Lukens JN, Philadelphia, London. Vol 1, 9<sup>th</sup> ed., 1993.
- [11] Mazza 33, manual of clinical hematology, Marshfield clini, USA, 2<sup>ND</sup> ED., 1995.
- [12] Wintrobe MM, clinicalhematology, lea and febiger, Philadelphia, Pennsylvania, USA, 7<sup>th</sup> ed., 1989.
- [13] Lee GR, et al. wintrobe's clinical hematology. Philadelphia, lea and febiger, 9<sup>th</sup> ed., 1989

- [14] Henry JB. Todd- Sanford-davidsohn, clinical diagnosis and management by laboratory methods, W.B saunders company, USA. 17<sup>th</sup> ed., 1998.
- [15] Hoffbrand AV, Pettit JE, Moss PAH. Essential hematology, Blackwell science Ltd, USA. 4<sup>th</sup> ed., 2001.
- [16] Brawwald E, Fauci AS, Kasper DL, Hauser SL, Longo DL, Jameson JL. Harrison's principles of internal medicine, McGraw-Hill, USA. 15<sup>th</sup> ed., 2001