



IRON DEFICIENCY ANEMIA -A STUDY DONE BY PERIPHERAL BLOOD SMEAR EXAMINATION AND ITS CORRELATION WITH CELL COUNTER GENERATED RED CELL PARAMETERS AT A TERTIARY CARE CENTRE IN JHARKHAND

Pathology

Dr. Jitendra Kumar Singh

Tutor / Department of Pathology /MRMCH, Palamu, India.

Dr. Nilam Kumari* Tutor / Department of Pathology /MRMCH, Palamu, India. *Corresponding Author

Dr. Kamendra Prasad

HOD and Associate Professor / Department of Pathology /MRMCH, Palamu, India.

ABSTRACT

SUMMARY- Iron deficiency anemia is one of the most common health problem specially among women between age of 19 to 45 and children. It leads to poor physical growth, weakness, poor immune system which decreases the ability to fight infection and increasing morbidity in the Asian and African countries mainly^[1].

The present study was conducted for one year starting from August 2020 to July 2021 on patients attending OPD of Medinirai Medical College and Hospital, Palamu who presented with complaints of weakness, fatigue, irritability, headache and exercise intolerance. These patients were examined in OPD and blood sample sent to automated hematology analyzer for different red cell indices and also for peripheral blood smear examination at Medinirai Medical College and Hospital, Palamu.

A total of 1156 study subjects with Hb (hemoglobin) less than 12.5 gm% were investigated where 620(53.6%) were female and 536(46.4%) were male.

KEYWORDS

INTRODUCTION

Examination of peripheral blood smear has been window for hematological procedures since so many decades. Analyzing peripheral blood smear routinely has facilitated interpretation of various hematological disorders and have been used a major tool for diagnostic purpose. Over the past few years, cell counter is major tool which have penetrated medical laboratory services in a ubiquitous manner with increasing efficacy and accuracy and also decreasing cost all over the world. Now a days, complete blood count done by automated hematology analyzer and PBS examination has complemented each other to provide an accurate and comprehensive report to a patient blood sample^[2-4].

Iron deficiency anemia is present in 1-2% in United states but is more common in Asian and African countries. The major causes of IDA is blood loss i.e, severe trauma, food deficient of iron, active blood loss from gastro-intestinal tract and menstruation etc.

Classical finding of Iron deficiency anemia is low Hb (hemoglobin) and decreased mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), and mean corpuscular hemoglobin concentration (MCHC) and increased red cell distribution width (RDW), low serum iron, low serum ferritin, elevated total iron binding capacity (TIBC), also measured as transferrin, and low transferrin level.

The peripheral blood smear shows hypochromic, microcytic blood cell, anisopoikilocytosis, thin elliptocytes and decreased reticulocytes while bone marrow lack iron stores.

As a patient recovering from iron deficiency, red blood cell may have dimorphic appearance with hypochromic microcytes remaining from the period of iron deficiency and normochromic, normocytic red cells that are formed after initiation of iron therapy.

AIMS AND OBJECTIVES

To determine the incidence of Iron Deficiency Anemia.

To aid in determining the underlying cause or disease affecting IDA.

To compare trends of IDA in India compared to different geographic regions throughout the world.

MATERIAL AND METHODS

Study Design: Retrospective study.

Study Location: Department of Pathology at Medinirai Medical College and Hospital, Palamu.

Study Duration: August 2020 to July 2021.

Sample size: 1156.

The blood samples were collected in EDTA tubes and were immediately analyzed in automated hematology analyzer in clinical Pathology Laboratory. The evaluated parameters included the hemoglobin concentration and red blood cell indices- Mean Cell Volume (MCV), Mean cell hemoglobin (MCH), Mean cell hemoglobin concentration (MCHC), hematocrit (PCV), Red blood cell count, total leucocyte count, differential count and platelet count along with peripheral blood smears.

OBSERVATION & RESULTS

In the present study a total of 1156 study subjects were investigated during the one year period from August 2020 to July 2021. The reference ranges of following were taken as: Mean Cell Volume (MCV) = 80-100fl. Mean cell hemoglobin (MCH) = 27-32pg. Mean cell hemoglobin concentration (MCHC) = 32-36g/dl. Microcytic anemia was taken as MCV value less than 80fl and MCH less than 27. Macrocytic was taken when MCV is greater than 100fl. Normocytic Normochromic was taken when all hematological indices are within range.

The observations and results of our study of 1156 subjects by analyzing the hematological parameters, RBC indices and Peripheral blood smear examinations are summarize in the following tables:

Table 1: Gender distribution of subjects

	Total numbers	Percentage
Female	620	53.6%
Male	536	46.4%

In the study total numbers of females were 620 and male were 536. There was no statistical difference in both genders.

Table 2: Grading of Anemia

Severity of Anemia	Number of subjects	Percentage
Mild	522	45.2%
Moderate	456	39.4%
Severe	178	15.4%
Total	1156	100%

In our study, Mild anemia was most common followed by moderate and severe anemia.

Table 3: prevalence of morphological anemia by Peripheral smear examination

Peripheral blood smear	Total subjects	Percentage
Microcytic hypochromic	548	47.4%
Normocytic normochromic	446	38.6%

Macrocytic	55	08.6%
Dimorphic	63	05.4%

Out of 1156 anemic patients 548 had microcytic hypochromic anemia (47.4%) this is the most common type of anemia in the study.

DISCUSSION

In our study by using hematological parameters and peripheral blood smear examination, anemia was present in the majority of adults mainly women and young children. Results showing high proportion of microcytic hypochromic anemia and their association with women following menarche period indicating iron deficiency as a main cause. In the study by Qureshi et al^[5] anemia was present in the majority of adults mainly women and young children as similar to our study. Other Indian studies have also shown high prevalence of microcytic anemia due to iron deficiency among young women.^[6,7] The high prevalence of iron deficiency in women of childbearing age has major public health implications, it is estimated that anemia accounts for 12.8% of maternal mortality in asia.^[8]

In our study 53.6% were females and 46.4% were males, which was similar to the Kaur et al^[9] in which 57% were females and 43% were males, and in contrast to the Chul Won^[10] study in which 42.4% were females and 57.6 % were males.

Microcytic Hypochromic anemia was commonest morphologically classified anemia followed by normocytic normochromic anemia accounting 47.6% and 38.6 % respectively, similar to the Gerado et al^[11] and S Patel et al^[12] study in which microcytic hypochromic anemia was seen in 72%. This finding was in contrast to the Kauret al^[9] in which normocytic normochromic anemia is the predominant type 56%.

CONCLUSION

Our study showed the high prevalence of microcytic anemia followed by normocytic normochromic anemia by analyzing the hematological parameters and peripheral blood smear examination which differ in various age groups and gender reflecting the varying etiologies behind this. In women and younger age group the predominant type is microcytic hypochromic anemia which primarily due to iron deficiency.

In India anemia is a major public health problem accounting for high mortality of children and women in childbearing age, though anemia is not a disease it is a manifestation of a variety of pathologies which deserves adequate medical attention along with various programs and projects to prevent and control anemia must be constrained for effective interventions.

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