

# The Study of Red Cell Indices and Hemogram in Anemic Condition

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**Abstract:** Anemia (also spelled anemias) is a decrease in the total amount of red blood cells (RBCs) or hemoglobin in the blood, or a lowered ability of blood to carry oxygen. The aim of the study was find out the identification of anemia using Red cell indices and hemogram. Malappuram was selected for the study as the place had more middle-class peoples and without proper nutrition. Since poverty and malnutrition is highly prevalent among this population, iron deficiency anemia. This most common type of anemia seen in nutritional deficiency anemia category. A total of 200 cases were collected from Anemia patients. 200 patients with positive Anemic test were studied among these patients. A detailed Red cell Indices examination and Hemogram, Hb levels were also analyzed and the cases were morphologically categorized. Among 200 cases, (Hb level below 10g/dl) Females (68%) are more affected anemia than the males (31%). Moderate anemia (74%) is highly affected than the severe anemia (26%). The study of Red cell indices showed that Hb (<10g/dl) had the strongest correlation with MCH, MCHC, HCT, RDWCV because P value ranges from (MCH-0.02, MCHC-0.003, HCT 0.0002 RDW CV-0.003). "P" value less than 0.05 (typically  $\leq 0.05$ ) is statistically significant. Our study shows that females are more affected anemia than the males. Moderate anemia patients are highly seen than the severe anemia patients. Low MCV although considers as the sign of microcytosis. The correlation with anemia was poor because "P" value is not significant. In the current study anemia based on Hb had the strongest correlation with MCH, MCHC HCT, RDWCV because "P" value is significant. Our study also showed high RDW CV possibly indicates anisocytosis may be due to nutritional deficiency. Although iron deficiency anemia by microcytic hypochromic, same indices may be obtain in  $\beta$  thalassemia minor.

**Keywords:** MCV: Mean Corpuscular Volume, MCH: Mean Corpuscular Hemoglobin, MCHC: Mean Corpuscular Hemoglobin concentration, RDWCV: Red Cell Distribution Width coefficient Variation, RDWSD: Red Cell Distribution Width Standard Deviation, WHO: World Health Organization.

## 1. Introduction

Anemia- a condition in which hemoglobin (Hb) concentration and/or red blood cell (RBC) numbers are lower than normal and insufficient to meet an individual physiological needs-affect roughly one-third of the world's population. Anemia associated with increased morbidity and mortality. In women and children, poor birth outcomes, decreased work productivity in adults, and impaired cognitive and behavioral development in children. Preschool Children (PSC) and women of reproductive age (WRA) are particularly affected.

Establishing appropriate Hb thresholds and red cell indices to define anemia is essential for ensuring that anemia is currently identified, and its negative effects prevented. Understanding the diverse and complex etiology of anemia is crucial for developing appropriate interventions that address the context specific causes of anemia and for monitoring the success of anemia control programs. To that end, the primary aims of this paper are to outline definitions and classifications of anemia describe the biological mechanisms through which anemia develops: review the variety of factors and conditions that contribute to anemia development, emphasizing those most prevalent in low-and middle-income countries (LMICs), and identify research needs. Although our primary focus is on anemia and its etiology at a population level, the information we present on definitions and classification of anemia, as well as its etiology, is relevant to individual-level assessment by clinicians.

People of all ages, races and ethnicities can develop anemia at some point in their lives. There are many types of anemia, and they are linked to a variety of diseases and conditions. Some types of anemia are very common, and some are very

rare. Some are very mild and have little or no impact on a Person's life. Some are severe and can even be life-threatening if not treated aggressively. All anemias have on thin in common, though: They all affect you blood and that affects your overall health. The good news is that anemia often can be successfully treated or even prevented.

## 2. Methods

CBC print, only taken Red cell indices criteria's Hb below 10g/dl in this type of CBC results are taken to this study. 1 ml of blood taken in the tube.

### Methodology

Various hematological parameters were obtained from CBC print, and noted. Then following values were recorded.

- Red blood cell
- Hemoglobin
- Hematocrit
- Red cell indices (MCV, MCH, MCHC)
- Red cell Distribution Width (RDW)

100 control samples taken from normal healthy individual with normal CBC values.

## 3. Result

**Table 1:** Shows classification of anemia based on MCV

MCV	Number	Percentage
Below Normal (<80.0)	128	64%
Normal (80.0 – 100.0)	64	32%
Above Normal (>100.0)	8	4%

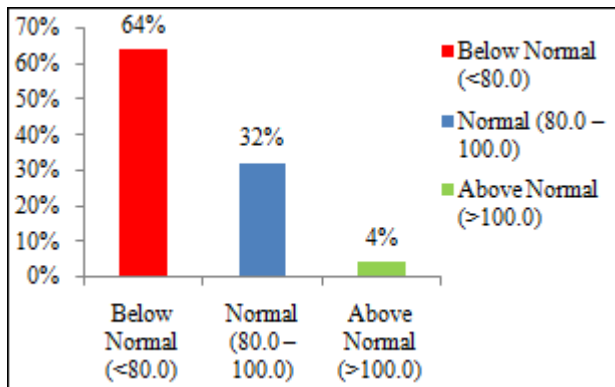


Table 2: Shows classification based on MCH

MCH	Number	Percentage
Below Normal (<27.0)	139	69.5%
Normal (27.0 – 34.0)	54	27%
Above Normal (>34.0)	7	3.5%

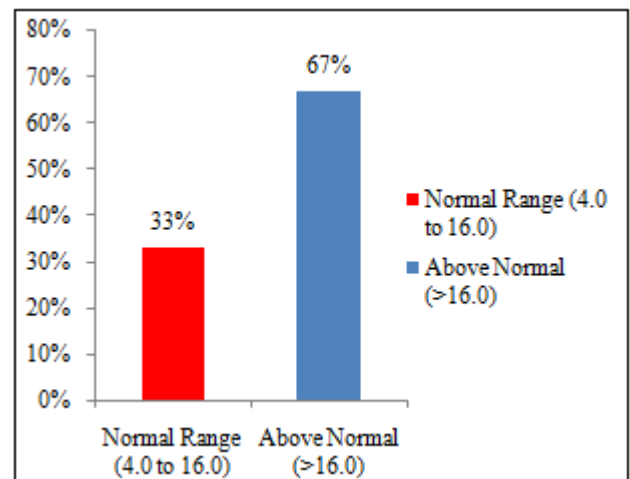


Table 5: Shows classification based on RDWSD

RDWSD	Number	Percentage
Below Normal (<35.0)	2	1%
Normal (35.0 to 56.0)	170	85%
Above Normal (>56.0)	28	14%

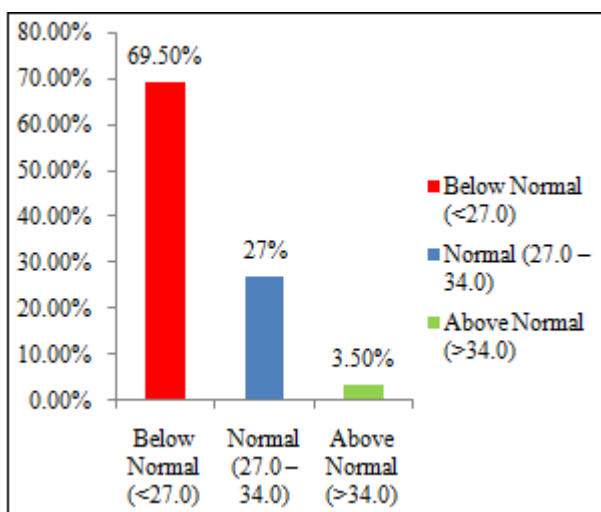
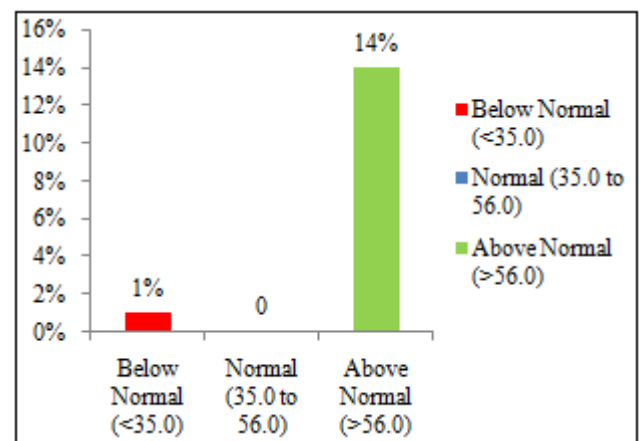


Table 3: Shows classification based on MCHC

MCHC	Number	Percentage
Below Normal (<32.0)	110	55%
Normal (32.0 – 36.0)	86	43%
Above Normal (>36.0)	4	2%



#### 4. Conclusion

In the current study females are more affected in anemia (68%) than the male (31%). Moderate anemia (74%) is more than the severe anemia (26%) low MCV (64%) although considers as the sign microcytosis. The correlation with anemia was poor because P value (0.18) is no significant

In the current study anemia based on HB (<10g/d) had the strongest correlation with Red cell indices such as MCH, MCHC, HCT, RDWCV P value ranges from (MCH-0.02, MCHC-0.003, HCT-0.0002 RDWCV-0.003).

High RDWCV possibly indicate anisocytosis may be due to nutritional deficiency. Although iron deficiency anemia by microcytic hypochromic, same indices may be obtain in  $\beta$  thalassemia minor.

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Table 4: Shows classification based on RDWCV

RDWCV	Number	Percentage
Normal Range (4.0 to 16.0)	66	33%
Above Normal (>16.0)	134	67%

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