

**Study to Determine The Normal Range Of  
Hemoglobin for Men  
In The West Coast Of Tehama**

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## **Abstract**

Cyanmethemoglobin method is used to determine the number of hemoglobin in 1086 donor by donor selection form and records reception center blood bank Found that the normal range for the hemoglobin of 12-16 in the west coast of Yemen Tehama

## **Introduction:-**

### **Hemoglobin**

Hemoglobin, the main component of the red blood cell, functions in the transportation of oxygen and CO<sub>2</sub>. Hemoglobin consists of 1 molecule of globin and 4 molecules of heme (each containing 1 molecule of iron in the ferrous state). Globin consists of 2 pairs of polypeptide chains. In the hemoglobin molecule, each polypeptide chain is associated with 1 heme group; each heme group can combine with 1 molecule of oxygen or CO<sub>2</sub>.

Hemoglobin carries oxygen from places of high oxygen pressure (lungs) to places of low oxygen pressure (tissues), where it readily releases the oxygen. Hemoglobin also returns CO<sub>2</sub> from the tissues to the lungs.

## **Methods**

Methods for hemoglobinometry can be grouped into 4 main classes depending on the basic technique employed with variants within each class:

1. Colorimetric Methods
2. Gasometric Methods
3. Specific Gravity Methods
4. Chemical Methods

The method of choice for hemoglobin determination is the cyanmethemoglobin method (This is a type of colorimetric method). The principle of this method is that when blood is mixed with a solution containing potassium ferricyanide and potassium cyanide, the potassium ferricyanide oxidizes iron to form methemoglobin. The potassium cyanide then combines with methemoglobin to form cyanmethemoglobin, which is a stable color pigment read photometrically at a wave length of 540nm.

Three advantages of the cyanmethemoglobin method are:

1. measures all forms of hemoglobin except sulfhemoglobin
2. can be easily standardized
3. cyanmethemoglobin reagent (also called Drabkin's solution) is very stable

## **Normal:**

Men Donor      12 - 16 g/100 ml blood (g/dl) (g%)

## **Cyanmethemoglobin Method for Determining Hemoglobin Concentration**

### **I. Materials needed:**

- 12 x 75 tubes
- 20  $\mu$ l capillary pipettes
- aspirator
- gauze squares
- ruler
- graph paper
- Hgb standard
- cyanmethemoglobin reagent (Drabkin's solution)
- normal, low, and high controls
- test tube rack
- spectrophotometer
- Measuring blood pressure
- Measuring the pulse
- vital signs
- Malaria
- pain
- Health & Lunch
- Others

### **II. Procedure:**

1. Label a series of tubes as follows:
  - BLANK
  - Lo STD
  - Norm STD
  - Hi STD
  - Norm CONTROL
  - Hi CONTROL
  - Patient (PT)
2. Pipette 5 ml of Cyanmethemoglobin reagent into each tube. Add 20  $\mu$ l of the appropriate sample into each tube. Do not add anything other than the Cyanmethemoglobin reagent to the reagent BLANK.
3. Allow tubes to stand for 10 minutes.
4. Read Absorbance (A) in the spectrophotometer at 540 nm, zeroing the spectrophotometer with the BLANK solution.
5. Plot Absorbance vs. Hemoglobin Concentration in grams % on linear graph paper.

### **III. Interpretation of Results**

Normal Hgb values are as follows:

Men donor            12-16 g/100 ml blood (g/dl) (g%)

The hemoglobin value is decreased in anemia and increased in polycythemia and dehydration.

#### IV. Sources of Error

- A. Inadequate mixing of blood sample
- B. Incorrectly calibrated pipettes
- C. Incorrectly calibrated spectrophotometer
- D. Incomplete conversion of Hgb to cyanmethemoglobin
- E. Lipemic specimen
- F. High concentration of WBC's or platelets
- G. Does not measure sulfhemoglobin

#### Results:

To study the clinical tests to donor that need measures of hemoglobin in the number of 1086 donor.

including table the measures of hemoglobin donor of the following:-

hemoglobin	Number donor	%
10.1 – 11g/dl	11	1%
11.1 – 12g/dl	17	1.7%
12.1 – 13g/dl	137	12.6%
13.1 – 14g/dl	412	37.9%
14.1 – 15g/dl	328	30.2%
15.1 – 16g/dl	138	12.7%
16.1 – 17g/dl	37	3.4%
17.1 – 18g/dl	6	0.55%
<b>Total</b>	<b>1086</b>	<b>100%</b>

#### Statistical analysis

All the data was analyzed using Calculator manual And calculating the results of all samples from the same period of the arithmetic average for each period on alone Note in the previous table results for measuring hemoglobin of the donors were as follows :-

- When hemoglobin (10.1 - 11) and (11.1 - 12) will be low in the number of donors at a rate of 1% and 1.7%. This means that the average rate of the donors donated 135.7 12.5 %
- When hemoglobin (16.1 - 17) and (17.1 - 18) are low in the number of donors at a rate of 3.4% and 0.55%. This means that the average rate of the donors donated 135.7 12.5 %
- When hemoglobin (12.1 - 13) and (15.1 - 16) the results of the donors when the average number of donors 135.7 12.5%
- When hemoglobin (13.1 - 14) and (14.1 - 15) the results are 37.9% and 30.2% of the number of donors on the average number of donors to the number 135.7 12.5%
- The calculation of the normal range of hemoglobin to donors in the western coast of Tehama is when measuring hemoglobin average number of donors point in less than a measure of the largest and Hmocalobin measuring hemoglobin at any (12.1 - 16)
- The normal range of hemoglobin to donors in the west coast of the Tihama region is (12.1 - 16)

## **Discussion**

The procedures employed during the process of measures of hemoglobin donor in accordance with the process of measures all forms of hemoglobin donor in the United donor Standards . And according to the World Health Organization standards for safety when those procedures for measures all forms of hemoglobin donor in the Revolution Hospital in Hodeida body as a model for hospitals in the province for measures of hemoglobin donor in Hodeida to the largest number of donor in the blood transfusion process

## **Conclusion**

1. The normal range of hemoglobin in the population of the Arab coast of Yemen Tehama is (12.1 - 16) for men
2. The study worked on the selection of individuals to the population of the west coast of Tehama by blood donor selection according to international standards for the selection of donors in terms of clinical detection of donor and laboratory test to measure hemoglobin in a way Aldrapkin
3. the absence of randomized study included estimates of the odds are not really in the study of the normal range of hemoglobin to residents of the western Alsahal to Tehama

## **Recommendations**

1. dissemination of the study in blood transfusion centers in the west coast of Tehama normal rate for measuring hemoglobin
2. circulating study in Public Health and Population Office to adopt the normal range for the hemoglobin of the population of the west coast of Tehama for Men
3. dissemination of study at the Faculty of Medicine