



CHANGES IN HEMOGLOBIN STATUS OF WOMEN IN VARIOUS AGE GROUPS (20 - 60 YEARS)

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ABSTRACT

The aim of the present study was to analyze the changes in hemoglobin level among an adults woman with age. Hemoglobin, the iron containing metallo protein in the red blood cells, transports oxygen from the lungs to the rest of the body, where it releases its load of the oxygen. A total of 2000 women categorized in four age groups: 20-30, 31-40, 41-50, and 51-60 years were examined. Hemoglobin level estimated by using Cyanmethemoglobin method. In this study we find that anemia is the most common nutritional deficiency disorder in the world. It affects all age groups but the most vulnerable are 20-30 years women, after analyzing hemoglobin, in age group 31-60 years it was found that more than half of the women were normal hemoglobin. Most of the subjects are having the healthy level of hemoglobin (g/dl), which is given by the WHO. But some of the peoples are having very less amount of hemoglobin than the normal healthy hemoglobin levels, so they were anemic patients 31-60 years women were found to be in the normal range.

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INTRODUCTION

Blood is a specialized body fluid in animals that delivers necessary substances such as nutrients and oxygen to the cells and transports metabolic waste products such as carbon dioxide away from those same cells (<https://www.scribd.com/document/.../Blood-Wikipedia-The-Free-Encyclopedia>). Hemoglobin is the iron containing oxygen transport metallo protein in the red blood cells. Hemoglobin has an oxygen binding capacity of between 1.36 and 1.37 mL oxygen per gram of hemoglobin, which increases the total blood oxygen capacity seventy fold compare to dissolved oxygen in blood. Normal person has about 14-15g of hemoglobin. (www.sources.com/SSR/Docs/SSRWHemoglobin.htm). The normal adult hemoglobin molecule contains two alpha-globulin chains and two beta-globulin chains. In fetus and infants, beta chains are not common and the hemoglobin molecule is made up of two alpha chains and two gamma chains. As the infant grows, the gamma chains are gradually replaced by beta chains, forming the adult hemoglobin structure. Any person whose hemoglobin level is below 12mg / 100mL blood is considered anemic. (<https://www.omicsonline.org/blood-and-lymph/haemoglobin-scholarly-journal.php>).

Anemia is the most common nutritional deficiency disorder in the world.

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It is a condition that occurs when the red blood cells do not carry enough oxygen to the tissues of the body. WHO defines anemia as a condition in which the Hemoglobin (Hb) content of blood is lower than normal as a result of deficiency of one or more essential nutrients, regardless of the cause of such deficiencies (WHO,1989). Most of the anemia's are due to inadequate supply of nutrients like iron, folic acid and vitamin B12, proteins, amino acids, vitamins A, C, and other vitamins of B-complex group i.e., niacin and pantothenic acid are also involved in the maintenance of hemoglobin level (Lee *et al*,1998)

Anemia is associated with increased morbidity and mortality in the elderly, though what constitutes a normal hemoglobin level is less clear (Denny *et al*, 2006). Increasing evidence suggests that the World Health Organization (WHO) anemia criteria are insensitive to important clinical endpoints such as functional decline, cognitive impairment, and mortality especially in the elderly. Although hemoglobin levels decrease with age, there is little information on the association this decline with development of medical conditions, cognitive or physical impairment, and mortality (Tang *et al*, 2008)

METHODOLOGY

Subject selection

The present study was conducted in the urban areas Baghpat district (Uttar Pradesh). For the study 2000 women age between 20 to 60 years were selected. All 2000 individuals were from four age groups and these age groups were 21 to 30 years (group 1), (group 2) 31 to 40 years, 41 to 50 years (group 3) and 51-60 years (group 4). Sample selection was done in

such way so that each category should have at least 500 samples for making even sample distribution in all groups.

Data collection

Information on about age, occupation and educational status was obtained from all subjects with the help of a questionnaire. 1 ml blood from subjects were drawn by vein puncture under contamination controlled conditions with disposable syringe and transferred in vacuettes which contain K3EDTA as an anticoagulant. These samples were stored in the freezer at -20 o C till the analysis.

Hemoglobin determination by Cyanmethemoglobin method

In this study hemoglobin content is determined by cyanmethemoglobin method within 24 hrs after obtaining the blood samples. For this purpose the blood sample is mixed with Drabkin's solution, a solution that contains ferricyanide and cyanide. The ferricyanide oxidizes the iron in the hemoglobin, after that hemoglobin changes to methemoglobin. Methemoglobin then unites with the cyanide to form cyanmethemoglobin which is coloured. Its absorbance is measured on a spectrophotometer at 540 nm. This absorbance is related to the concentration of haemoglobin in the blood which is expressed as g / dl. Freshly collected whole blood vials (1ml) were placed under the collection tube of the analyser. The extracted blood was then mixed well with haemolyser and diluents in the dilution flask, and the absorbance was read automatically at 540nm(Sharma S,)

RESULTS AND DISCUSSION

Hemoglobin estimation in blood sample is of prime importance in medical investigations. It is advised in every admitted case and in all females undergoing antenatal check up. Hemoglobin is porphyrin iron protein compound that transfers oxygen from the lungs to the body tissues where it utilized for energy metabolism. Low hemoglobin is referred to as anemia and is defined as reduction in number of or volume of circulating red blood cells (erythrocytes) or an alteration in hemoglobin. There are 400 types of anemia. The origin of anemia is classified as either nutritional or non nutritional. Anemia of nutritional origin is those that stem from deficiency of some nutrient, mainly iron, vitamin B 12 or folic acid, vitamin B2, vitamin B6, C, A, D, E and K as well as zinc, calcium, protein (Rajurkar *et al*,2012)

Hemoglobin concentration is the most reliable indicator of anemia at the population level and its measurement is relatively easy and inexpensive. It is frequently used as proxy indicator of anemia. Hemoglobin levels of the subjects under study were estimated by colorimetric method and are shown in Table 1.

Table 1 Variation of hemoglobin level and t value of women in various age groups.

Variables	20-30years (group 1)	31-40years (group 2)	41-50 years (group 3)	51-60years (group 4)	t value					
	mean±sd	mean±sd	mean±sd	mean±sd	1 vs.2	1vs.3	1vs.4	2vs3	2vs.4	3vs.4
Hemoglobin(g/dl)	10.97±1.57	11.39±1.3	11.14±4.82	11±1.70	0.82ns	0.82ns	0.37ns	1.2ns	3.99*	0.62ns

The mean hemoglobin(g/dl) of the age group 20-30 years were 10.97±1.57 g/dl, for 2nd group 31-40 years was 11.37±1.3 g/dl, and the mean hemoglobin of 11.14 g/dl and 11 g/dl for age group 3 (41-60) years and the (51-60) years respectively and not significantly different from each other. There was

significant difference was observed in the age group 2nd and 4th. By compare the hemoglobin level between the age group (31 - 40) years having more amount of hemoglobin 11.39 than the other groups.

Table 2 Percentage of hemoglobin level in women of various age groups.

Age group	>12g/dl	11-12g/dl	7.0-9g/dl	<7g/dl
20-30 years	(300)60%	(111)22.2%	(63) 12.6%	(26) 5.2%
31-40 years	(366) 73.2%	(79) 15.8%	(35) 7%	(19)3.8%
41-50 years	(301)60.2%	(83)16.6%	(83) 16.6%	(33)6.6%
51-60 years	(159)31.8%	(247)49.4%	(63)12.6%	(30) 6%

After analyzing hemoglobin, in age group 21-60 years it was found that more than half of the women were normal hemoglobin. Most of the subjects are having the healthy level of hemoglobin (g/dl), which is given by the WHO. But some of the peoples are having very less amount of hemoglobin than the normal healthy hemoglobin levels, so they were anemic patients. The anemic condition of that person is due to the improper diet.

The main reason for having less amount of hemoglobin due to by taking improper diet and some habits, like smoking. Because iron is an important component of hemoglobin, consuming iron-rich foods will raise the hemoglobin levels. The iron rich foods, like Fortified Foods These products include breakfast cereals, pasta, bread, malted drinks and grits. The Food and Nutrition Board recommends 18 mg of iron for women and 8 mg for men),animal sources (seafood, poultry, eggs and beef),plant sources (red kidney beans, lentils, soybeans, black beans, white beans and cowpeas) (<https://www.healthline.com/health/iron-deficiency-inadequate-dietary-iron>).

In India, anemia affects an estimated 50% of the population. The problem becomes more severe as more women are affected with it as compared to men. It is estimated that about 20%-40% of maternal deaths in India are due to anemia and one in every two Indian women (56%) suffers from some form of anemia. According to National consultation on control of nutritional anemia in India and, anemia is defined as the hemoglobin of less than 12 g/dl in females. Mild anemia is defined as hemoglobin level of 10-11.9 g/dl, moderate anemia as hemoglobin level of 7-9.9 g/dl and severe anemia was defined as hemoglobin level of less than 7g/dl among females. (Kaur K, 2014)

According to WHO if the prevalence of anemia at community levels is more than 40%, it is considered as problem of high magnitude (Seshadri S, 2000). The problem of anemia is related to wider population than the traditionally considered groups of the pregnant and lactating females and children.

With the onset of menstruation and associated blood loss, there is a further rise in prevalence and severity of anemia in adolescent girls (Beard JL, 2000). There is an urgent need for improving overall nutritional status of adolescents through nutrition education, community awareness and

supplementation programmes. The need for regular blood tests to check hemoglobin levels is emphasized. Nutrition component needs to be included in the school curriculum. Emphasis is needed for corrective measures of anemia and iron deficiency in girls before they enter into adolescent age group (Kaur K, 2014).

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