



## Estimation of Hemoglobin and Hematocrit Values in Postmenopausal Women

Authors

G. Ridhi<sup>1\*</sup>, B. Krishnaswamy<sup>2</sup>, U. Manohar<sup>3</sup>, N. Chidambaram<sup>4</sup>, T. Arivazhagan<sup>5</sup>

<sup>1</sup>III Year Post Graduate, Department of pathology, Rajah Muthiah Medical College and Hospital, Annamalai University, Chidambaram

Email: [rids.gj@gmail.com](mailto:rids.gj@gmail.com)

<sup>2</sup>Professor and Head of the Department, Department of Pathology, Rajah Muthiah Medical College and Hospital, Annamalai University, Chidambaram

<sup>3</sup>Professor, Department of Pathology, Rajah Muthiah Medical College and Hospital, Annamalai University, Chidambaram

<sup>4</sup>Professor, Department of Medicine, Rajah Muthiah Medical College and Hospital, Annamalai University, Chidambaram

<sup>5</sup>III Year Post Graduate, Department of Pathology, Rajah Muthiah Medical College and Hospital, Annamalai University, Chidambaram

Corresponding Author

**B. Krishnaswamy**

Email: [drbkrishnaswamy2014@gmail.com](mailto:drbkrishnaswamy2014@gmail.com)

### Abstract

**Background:** Menopause is associated with several physiological variations in the body. It has significant effect on the biologically important constituents of plasma including blood counts.

**Objective:** To estimate the hemoglobin, hematocrit values in postmenopausal females and analyze the results.

**Methods:** Fifty Random blood samples of postmenopausal women were taken for the present study. Hemoglobin and hematocrit values were estimated by using a semi-automated hematology analyzer.

**Results:** Out of 50 cases analyzed, 72% cases had lower hemoglobin levels and their corresponding hematocrit values were also reduced.

**Keywords:** Postmenopausal women, Hemoglobin, Hematocrit.

### Introduction

Menopause is a normal physiological ageing process which marks the end of reproductive life. It is associated with hormonal changes, resulting in varied symptoms. Menopause has a significant effect on various biological parameters.

Premenopausal and perimenopausal women are at increased risk of being anemic compared to the postmenopausal women. Hence the hemoglobin levels of premenopausal women tend to be lower than that of menopausal women. However some studies have shown, certain variations in the hematological parameters during menopause.

The aim of the present study was to analyze the effect of menopause on hemoglobin and hematocrit values of women. Hence the hematological values from the random blood samples of fifty menopausal women was observed and analyzed. All these fifty women were of menopausal age group who attended the hospital for various complaints. The study revealed deviations in the hemoglobin and hematocrit values from the normal cut off range in postmenopausal women.

### Materials and Methods

The study was carried out in the hematology laboratory of Rajah Muthiah Medical College and Hospital, Chidambaram, Tamil Nadu. Among the routine blood samples received in the hematology laboratory during the period of December 2016 – May 2017, fifty random blood samples of women who attained menopause were chosen. Socio-demographic and other relevant data were checked. All the females of menopausal age were included in the study, despite the severity of their illness. Menopausal women who underwent recent blood transfusion were excluded. The hematological parameters estimated were hemoglobin and Hematocrit values. Asemiautomated hematology analyzer was used for estimation of these values. WHO grading of anemia based on hemoglobin and hematocrit values was used to analyze the results.

### Observation and Results

In the present study, random blood samples of fifty post menopausal women were estimated for hemoglobin and hematocrit values.

**Table 1:** Hemoglobin

Hemoglobin (g/dl)	No. of. Cases (total cases = 50 )	% of cases
> 12.0 (Normal )	14	28%
9.0 – 11.9 (Mild)	15	30%
6.0 - < 8.9 (Moderate)	18	36%
<6.0 ( Severe )	3	6%

As per WHO classification of anemia, 36 / 50 cases were found to be anemic in the present study. 72% of cases (36/50) had hemoglobin less than 12.0g/dl. Among them, 36 % cases (18/50) had moderate degree of anemia, 30% cases (15/50) had mild degree of anemia and 6% cases (3/50) had severe degree of anemia. 28 % cases (14 /50) has hemoglobin levels equal to or greater than 12.0 g/dl.

**Table 2:** Hematocrit

Hematocrit	No. of. cases	% of cases
< 33	32	64%
> 33	18	36%

In the present study the corresponding hematocrit value was less than 33.0% in 64% cases (32/50). 36% cases (18/50) had a hematocrit morethan 33.0%.

### Discussion

Menopause is a physiological process, during which a women passes from the reproductive to non-reproductive years. Despite being a natural phenomenon, it has a great impact on the health<sup>[9]</sup>. Menopause begins with significant hormonal changes resulting in diverse symptomatology<sup>[9]</sup>. With the onset of menopause, physiological variations are observed in several bodily parameters including hematological values. These variations are a part of normal circadian rhythm and can be within the subject, seasonal or diurnal<sup>[11]</sup>. The first observed variation in menopausal women is the cessation of menstruation due to reduced ovarian function<sup>[9]</sup>. Therefore, the estrogen and progesterone levels decline<sup>[4]</sup>. Studies have also stated that, after menopause the regenerative capacity of the marrow decreases and takes a long timeto regain the depleted iron stores<sup>[7]</sup>. Hence post menopausal women are yet iron deficient leading to numerous health risks. Both iron and estrogen are crucial growth nutrients for development in a woman. While estrogen maintains tissue growth and function; iron helps in oxygen transport and DNA synthesis<sup>[9]</sup>.

Usually, premenopausal women have more risk of anemia and nutritional deficiencies due to blood loss as they menstruate cyclically. Since, women after menopause, no longer bleed they have lower incidence of anemia and nutritional demands. However, due to other pathological changes taking place in the body, variations in the blood counts and iron levels can be present. Majority of postmenopausal females are invariably prone to conditions that causes chronic blood loss eventually resulting in anemia. The chronic blood loss can be either due to external bleeding or an internal bleeding from alimentary tract, uterus and others.

Certain other health conditions like ulcers, hemorrhoids, worm infestation and malignancies can also cause iron levels to be low at this time. Menopausal women are often vitamin B12 deficient, which is essential for DNA synthesis and cellular energy<sup>[2]</sup>. It is mainly due to limited dietary intake of animal foods or malabsorption. Thereby, anemia in postmenopausal age group is not uncommon. But anemia is merely a sign of disease and not a disease by itself; which points, that further evaluation is essential for diagnosis.

Previously anemia was detected by the measurement of volume of packed red cells called as VPRC or hematocrit. Hematocrit values were considered to have a great precision and accuracy. It closely reflects the red cell count and hemoglobin concentration<sup>[8]</sup>. But now, estimation of hemoglobin concentration is preferred due to improved reproducibility and standardization. And also hemoglobin value is the most indicative parameter of pathophysiological consequences of anemia<sup>[8]</sup>.

Hence to arrive a useful understanding of anemia, estimation of hemoglobin and hematocrit along with RBC mass is mandatory as a primary investigation. We also recommend further investigations like iron studies, vitamin B12 / folic acid assay and malignancy work up to confirm the cause of disease.

## Conclusion

Some studies have shown rise in the hemoglobin and hematocrit levels after menopause. However, in the present study, hemoglobin along with the corresponding hematocrit values were low, among menopausal women suggesting features of anemia. Though the study documented anemia among menopausal women, it is only a sign of underlying disease. At times, anemia is the earliest presentation of occult malignancies. Thereby, screening for anemia is important in post menopausal age group.

Determination of erythrocyte count, hematocrit, and hemoglobin are the routine laboratory screening tests for anemia as these concentrations parallel each other. With limited resources, screening may be limited to any one of these or with either hemoglobin and hematocrit<sup>[10]</sup>. If any one of these screening test show deviations from the normal value, then further laboratory investigations can be done for confirming the diagnosis.

## References

1. L.N. Achie, K.V. Olorunshola and M. Mabrouk . A Study of some red cell indices in Menopausal Women in Zaria, Nigeria. *Asian Journal of Medical Sciences* 3(8): 154-157, 2011.
2. Vitamin B 12 in health and disease ; Nutrients ; Fiona O' Leary and Samir Samman : 2010 March ; 2(3) : 299 - 316 DOI :10.3390 / nu 2030299.
3. William J Williams. Hematology in the aged. Fifth edition. Williams hematology
4. Anjali N. Shete, K.D. Garkal, P.R. Deshmukh. Profile of Hematological values in menopausal women. ISSN2249-9598, Volume –IV, March 2014.
5. Ibeh Nancy, Aneke John C, Okocha Chide, Nkwazema Kenneth A, Mannafa Patrick O. Changes in the hematological indices of women at different fertility periods in Nnewi, south – east , Nigeria. *The journal*

of medical research 2016; 2(6) : 166 -169.

Departments Medical Laboratory Scien

6. Kirkland JL: The biochemistry of mammalian senescence. Clin Biochem 25:61,1992.
7. Kumar, Abbas and Aster ; Anaemias . Robbins and Cotran Pathologic Basis of Disease: South Asia edition. Vol 1.
8. Maxwell M. Wintrobe, John N.Lukens, and G. Richard Lee. The approach to the patient with anemia. 715 – 720 page. Ninth edition; volume 1; wintrobes clinical hematology.
9. Jinlong Jian, Edward Pelle, and Xi Huang. Iron and menopause: Does Increased iron affect the health of postmenopausal women. Antioxidation Redox Signal. 2009 Dec; 11(12): 2939–2943.
10. Shirlyn B McKenzie. Introduction to anemia . Clinical laboratory hematology. ISBN 0 -13-019996-6.