

# Evaluation of Hematological Values of Pregnant Non-Exercisers During The First Trimester of Pregnancy: A Comparative Study

Anjali Agarwal<sup>1</sup>, Mahavir Prasad Agarwal<sup>2\*</sup>

<sup>1</sup>Principle Specialist, Department of Obstetrics & Gynecology, District Hospital, Dhoulpur, Rajasthan, India.

<sup>2\*</sup>MD (Pathology & Microbiology), District Hospital, Dhoulpur, Rajasthan, India.

## ABSTRACT

**Introduction:** In state of pregnancy many physiological and haematological changes are observed in the body, which can be considered as pathological in the non-pregnant state. It is also one of the physiological state in which marked haematological variations from the normal are seen. The haematological values have direct influence on pregnancy and its possible outcome.

**Materials and Methods:** A cross-sectional study was conducted in the department of general pathology with collaboration of department of gynaecology. A total of 102 pregnant women were selected in their first trimester of pregnancy as study samples in our analysis over a period of one year. The age group selected was from 22years-39 years of age. It was confirmed with series of questions whether the women were exercising on daily basis.

**Results:** Considering the haemoglobin levels, 81% of non-exercising women (61) had levels less than 11gm/dl and 12% of exercising women (3) had levels less than 11 gm/dl. Considering the blood pressure levels 41 % of

non-exercising women had a continuous low blood pressure less than 120/80 mm hg, and hardly any evidence of blood pressure alteration was observed.

**Conclusion:** In conclusion, exercise does not appear to be a limiting factor in haematological values in the first trimester of pregnancy.

**Keywords:** Exercising, Haematological, Pregnancy.


## \*Correspondence to:

**Dr. Mahavir Prasad Agarwal,**  
MD (Pathology & Microbiology),  
District Hospital, Dhoulpur, Rajasthan, India.

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## INTRODUCTION

In state of pregnancy many physiological and haematological changes are observed in the body, which can be considered as pathological in the non-pregnant state.<sup>1</sup> It is also one of the physiological state in which marked haematological variations from the normal are seen. The haematological values have direct influence on pregnancy and its possible outcome.<sup>2</sup> The haematological values present a clear picture of an individual's general health.<sup>3</sup> It is well known that blood is a specialised connective tissue consisting of elements in a fluid matrix. Majority of the haematological values are influenced by many factors such as sex, seasonal variation, lactation, pregnancy health, and nutritional status of the women.<sup>4</sup> It is also a well-known fact that, for comparative analysis among individuals and with present data in clinical diagnostic conditions, it becomes absolute necessity to consider the normal variations because of the sex, age, and race in order to achieve diagnostic precision.<sup>5</sup> Anaemia has been widely identified as haematological condition associated with negative outcomes of pregnancy.<sup>6,7</sup> The condition of anaemia in pregnant women can be defined with two common references (a) the haemoglobin concentration less than 11.0 gm/dL (b) the 5<sup>th</sup> percentile of the distribution of haemoglobin concentration with

respect to in a healthy reference in population.<sup>8</sup> Such analysis is only possible through a series of tests showing different variables.<sup>9</sup> Many studies are suggestive that haematological indices of the pregnant woman as one of the important factors affecting pregnancy health.<sup>10,11</sup> An attempt has been made to study haematological variables in non-exercising pregnant women in their first trimester through a comparative analysis in this study.

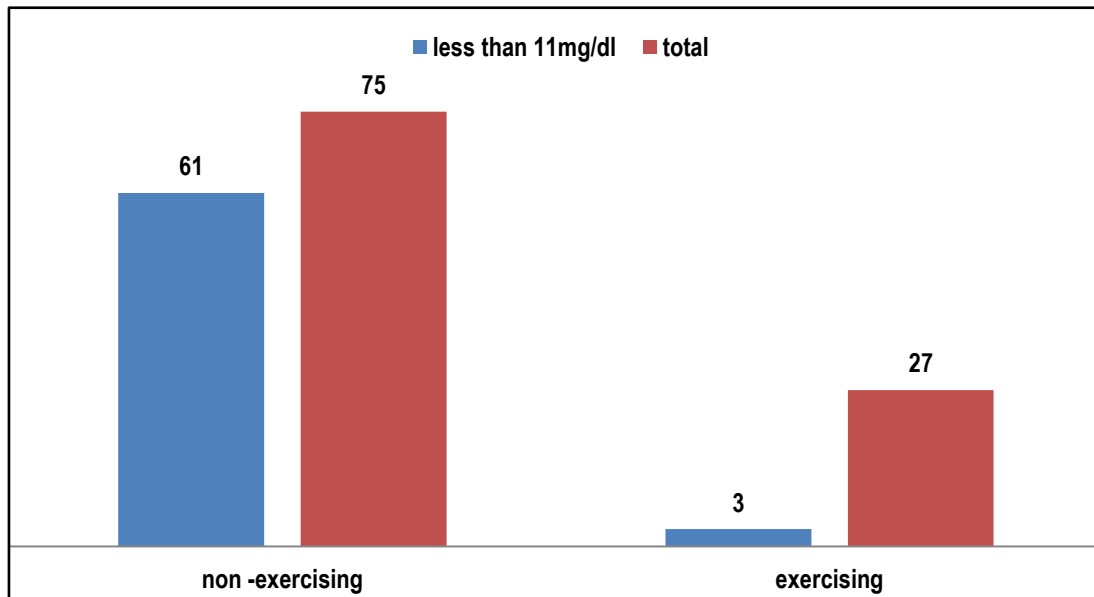
## MATERIALS AND METHODS

A cross-sectional study was conducted in the department of general pathology with collaboration of department of gynaecology. A total of 102 pregnant women were selected in their first trimester of pregnancy as study samples in our analysis over a period of one year. The age group selected was from 22years-39 years of age. It was confirmed with series of questions whether the women were exercising on daily basis. The bare minimum for brisk walking and jogging was 30-45 minutes daily for over a period of 8 months, at least a minimum of 20-30 minutes of running or cycling for a period of 8 months, weight lifting or systemic cardio exercise for at-least 30 minutes over a period of 8 months, swimming atleast thrice a week for about 6 months and

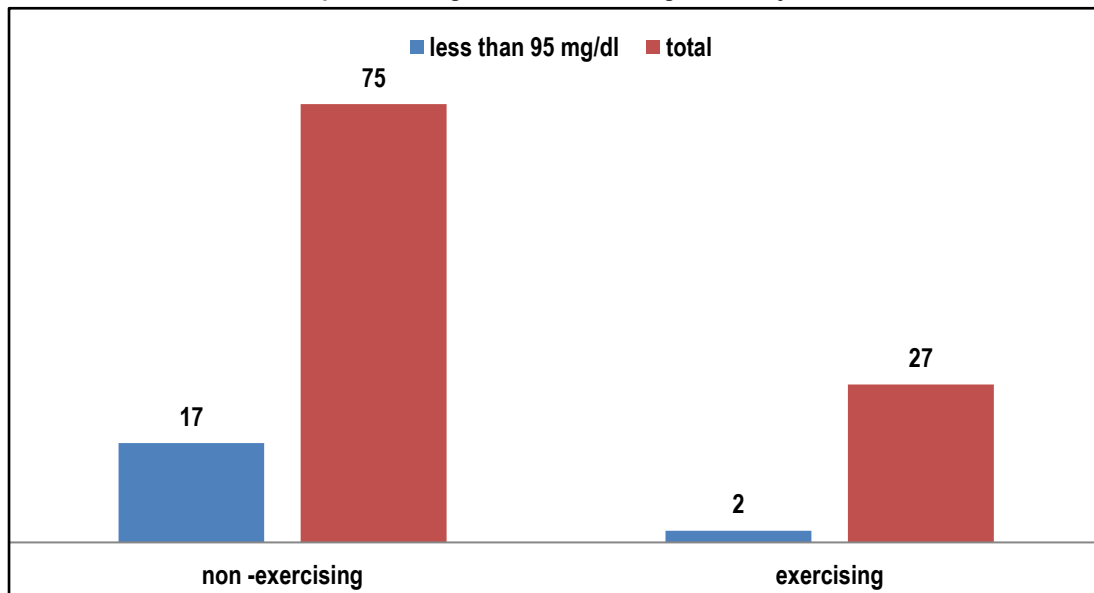
yoga exercises for 1 hour daily for at-least 1 year was considered a bare minimum to put them in exercising category. Merely 27 women were taken up in exercising category; rest 75 women were kept in non-exercising category. A routine blood profile was maintained for each of them after every month, comprising blood

sugar levels, blood pressure, haemoglobin levels, and CBC. The results were recorded manually and later on maintained electronically for comparative evaluation. Any subjects having history of substance allergy, chronic respiratory disease, cardiac disease, diabetes were excluded from the study.

**Graph 1: Hemoglobin levels amongst the subjects**



**Graph 2: Blood glucose levels amongst the subjects**



**Table 1: Haematological values amongst the study subjects**

Blood profile category (Elevated Values)	Non -Exercising	Exercising
TLC	8	2
RBC count	5	0
PCV	6	0
MCV	2	0
MCH	2	1
MCHC	1	0
Platelet	3	3
DLC	30	2

## RESULTS

Considering the haemoglobin levels, 81% of non-exercising women (61) had levels less than 11gm/dl and 12% of exercising women (3) had levels less than 11gm/dl. (Graph 1). Considering the blood pressure levels 41% of non-exercising women had a continuous low blood pressure less than 120/80 mm hg, and hardly any evidence of blood pressure alteration was observed. Blood glucose levels (random) in case of non-exercising women (17) were seen below 95 mg/dl. (Graph 2). Considering values of CBC; TLC, RBC count, PCV, MCV, MCH, MCHC and Platelet count values were seen elevated in around 36% of the non-exercising women (27). Differential leucocyte count values in 40% non-exercising women were highly elevated when compared to exercising women. (30) (Table 1)

## DISCUSSION

Considering the iron deficiency anaemia iron is a balanced essential mineral to the body, and is needed in most systems for proper functioning. Nearly 70% of body iron is classified as essential or functional and is contained in the haemoglobin, myoglobin and other respiratory enzymes. Haemoglobin makes up about 85%, and myoglobin comprises for about 4% of the total count. Therefore the function of any tissue or organ, especially the brain, may be affected terribly by an iron deficiency. Overall increased levels of white blood cell count (WBC) were seen throughout in both women groups, as white blood cells are primarily responsible for body defence during pregnancy. White blood cells were comparatively higher in exercising women. Few studies are suggestive that high values of white blood cells in early pregnancy will keep high values throughout pregnancy.<sup>12</sup> In non-exercising group the decrease in PCV may be due to increase in plasma volume during pregnancy which leads to haemo-dilution, and thus increasing chances of infection especially malaria, hormonal changes, and other conditions that promote fluid retention and iron deficiency. A marked variation in the values of MCV, MCH and MCHC between women groups was observed. The exercising group had quiet normal values of MCH, MCV and MCHC when compared to non-exercising group. Considering the blood pressure values around all exercising women had an average blood pressure of 116/97 mm of Hg, whereas non exercising women either had a low blood pressure values or had high blood pressure values.<sup>13</sup> A generalised high blood glucose levels were seen in all the women, but the women of non-exercising group had values which were quite worrying. This analysis shows that physicians might be treating women on the sole basis of haemoglobin and CBC values, without even considering other aspects needed to determine pregnancy status. These factors might be diet, lifestyle, physical activity and geographical conditions. So, these prescribing habits might be unnecessary.

## CONCLUSION

In conclusion, exercise does not appear to be a limiting factor in haematological values in the first trimester of pregnancy. Iron deficiency was found in majority of subjects of either group. However, values were found diverse in both groups which may indicate a need for further haematological and dietary assessment of iron status for the high risk groups of female athletes.

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