



# Prevalence of Type and Severity of Anemia in Antenatal Cases in a Tertiary Care Hospital in North India

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### ABSTRACT

Anemia in expectant women is a serious world-wide public health problem with adverse pregnancy outcomes. It remains one of the India's major public health irrespective of the fact that it is preventable and easily treatable. The present study is being done to assess the severity and type of anemia in a tertiary care hospital in North India. A total of 3000 pregnant women were included in our study in the reproductive age group. Out of 3000 pregnant females, 2600 were found to be anemic showing 86.6% prevalence which is a staggering level of anemia. Out of the anemic cases 60.30% were moderately anemic followed by 32.5% mildly anemic cases and 7.23% severely anemic cases.

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## Introduction

Anemia is a global public health problem is affecting both developing and developed countries<sup>1</sup>. The burden of this disease is heavy yet poorly estimated. Iron deficiency anemia is the third leading cause of disability adjusted life years lost in females aged 15-44 years as per WHO rankings<sup>2</sup>. Anemia in pregnancy is defined as hemoglobin concentration less than 11 gram/dl and hematocrit less than 33 gram percent<sup>3</sup>. The cut off of hemoglobin reduces to 10.5 gram/dl during second trimester of pregnancy.

WHO further subclassified anemia into mild anemia (10.10.9gram/dl), moderate anemia (7-9.9gram/dl) and severe anemia (<7 gram/dl)<sup>4</sup>. Etiologically anemia can be classified into 3 major groups i.e nutritional, marrow disease and hemolytic disease. Iron deficiency anemia is the most prevalent form (76%) followed by folate deficiency (20%) and combined iron-folate deficiency (20%)<sup>1</sup>.

Great variations are seen in the prevalence of anemia in pregnancy in different parts of the world. A crude estimate is that 500 million women between 15 to 49 years of age world wide are anemic<sup>3</sup>. The World Health Organization estimated that 56% of all pregnant women in developing countries are anemic, about 75% are from Southern Asia, and 88% from India<sup>5</sup>. Anemia is primarily responsible for 20% maternal deaths and is an associated cause in another 20%<sup>6</sup>. Prevalence of anemia in India as per WHO is in the range of 33-89% and is different in different regions of the country<sup>3</sup>. 19% maternal deaths are due to anemia in India<sup>7</sup>.

Maternal anemia increases the risk of low birth weight, premature delivery, intrauterine growth retardation, perinatal and neonatal mortality, inadequate iron stores for newborn and increased risk of maternal morbidity. The increasing prevalence of maternal anemia is not only a serious hazard for the patient but also for their family and for economic development of the country<sup>7</sup>. Therefore, this study is an attempt to determine anemia in pregnant women in a tertiary care hospital in North India.

## Materials and Methods

The present cross sectional study was conducted among the pregnant women coming for antenatal check-up in Safdarjung Hospital New Delhi from 1 November 2015 to 31 December 2015. A total of 3000 pregnant women were included in our study in the reproductive age group. The trimester status was noted apart from taking their blood sample.

20 microlitre of blood was collected using a fixed volume pipette and transferred into a test tube containing 5ml of Drabkin's solution. The hemoglobin concentration was

estimated by the cyanmeth-hemoglobin method using a colorimeter at 540 nm wavelength using a green filter.

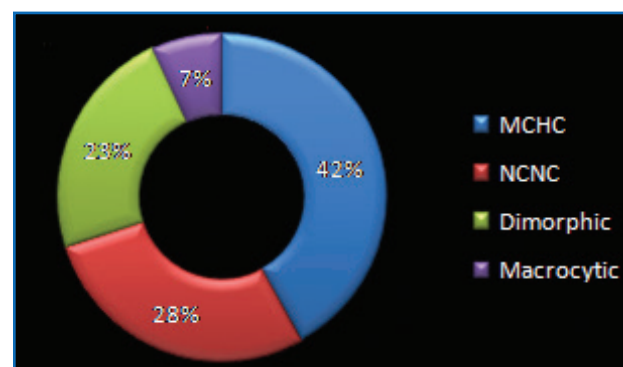
Anemia in this study was defined by using World Health Organisation and was classified into mild anemia (Hb 10-10.9g/dl), moderate anemia (Hb 7-9.9g/dl) and severe anemia (Hb <7g/dl). A peripheral smear was also made to study the type of anemia as normocytic normochromic, microcytic hypochromic, macrocytic or dimorphic anemia. The size of RBC was compared to the nucleus of small lymphocyte to label a cell as microcytic, normocytic or macrocytic. If the area of the central pallor was more than one third of cell diameter the cell was counted as microcytic. Simple tabulation and proportions were calculated.

## Result

In this study of 2 months duration, out of 3000 pregnant females coming for antenatal check-up 2600 were found to be anemic showing 86.6% prevalence which is a staggering level of anemia. The hemoglobin concentration ranged from 5-12.5gm/dl with a median of 8.7gm/dl. Majority of the pregnant females were less than 30 years of age. Out of the anemic cases 60.30% were moderately anemic followed by 32.5% mildly anemic cases and 7.23% severely anemic cases (Table 1). Morphological subtyping showed that majority of the cases had microcytic hypochromic anemia (42%) as shown in Table 2. Prevalence of normocytic normochromic anemia was 28% followed by dimorphic anemia in 23% and 7% cases showed macrocytic anemia (Figure 1). High prevalence of anemia was seen in second trimester followed by first trimester (Table 3).

**Table 1: Severity of anemia in pregnant females**

Grades of anemia	Total number of patients	Percentage
Mild (10-10.9 gm%)	844	32.5%
Moderate (7-9.9 gm%)	1568	60.30%
Severe (<7 gm%)	188	7.23%
<b>Total</b>	<b>2600</b>	



**Fig.1 : Morphological type of anemia**

**Table 2: Morphological type of anemia in pregnant females**

Type of anemia	Number of patients	Percentage
Microcytic hypochromic anemia	1090	42%
Normocytic normochromic anemia	730	28%
Dimorphic anemia	600	23%
Macrocytic anemia	180	07%
<b>Total</b>	<b>2600</b>	

**Table 3: Trimester wise distribution of anemia**

Trimester	Total number of cases studied	Total number of anemic patients
First	770	650 (84.4%)
Second	1160	1050 (90.52%)
Third	1070	900 (84.11%)
<b>Total</b>	<b>3000</b>	<b>2600</b>

## Discussion

Pregnant women are one of the vulnerable groups of a population to develop anemia especially in developing countries. Important factors which aggravates anemia in pregnancy includes reduced intake and increased demands of iron, pre-pregnant health status, excess iron demand in multiple pregnancies, blood loss during labour, inflammation and infectious diseases<sup>8</sup>. Therefore, this study aimed to determine the prevalence of anemia in pregnant women in North India.

The prevalence of anemia among pregnant women in the present study was very high (86.6%). Our study were similar to studies done by G.S Toteja et al (84.9%), V.P Gautam et al (96.5%)<sup>9,10</sup>. Similar studies conducted in other countries showed a lower prevalence of anemia. It was 39.6% in South- East China, 34.44% in Venezuela, 40.4% in South East Nigeria and 36.1% in Tanzania<sup>6</sup>. In India, prevalence of anemia in pregnant women in Rajasthan was comparable to our study (84%)<sup>7</sup>. Previous studies conducted by Umesh Kapil et al and Priyali Pathak et al in the slum areas of Delhi concluded the prevalence to be 78.8% and 69.3% respectively<sup>11,12</sup>. Socio-economic factors and geographical variation might be responsible for different prevalence of anemia across countries and regions. Different methods of hemoglobin estimation along with different cut-off points may also result in variation of prevalence of anemia in pregnant women<sup>13</sup>.

In our study the prevalence of moderate anemia was found to be highest 60.30% followed by mild anemia 32.5% and

severe anemia 7.23%. The findings are consistent with the study done by Mridul Malakar et al who conducted the study in Lakhimpur district of Assam and found the prevalence of moderate anemia as 61.0% followed by mild anemia 29.5% and severe anemia 2.3%<sup>14</sup>. The low prevalence of severe anemia is in concordance with the other studies conducted in India by G.S Toteja et al (13.1%), Raman et al (8.3%) and only 1.6% by Umesh kapil et al<sup>8,15,10</sup>. It is a favourable sign that pregnant women suffering from severe anemia are not found in alarming numbers. However, high prevalence of moderate and mild anemia in our study alarms us to take prompt action to minimize the overall high load of anemic pregnant women in this area. Severe anemias are mostly related to parasitic infections (malaria, intestinal worms). Low incidence of severe anemia indicates that the intervention strategies for the control of infectious disease are successful in our area.

Morphological typing in our study showed that microcytic hypochromic anemia (42%) is most prevalent followed by normocytic normochromic anemia (28%) and dimorphic anemia (23%). The findings were in concordance with study done by Babita Bansal et al in Rajasthan who quoted the prevalence of microcytic hypochromic anemia to be slightly higher (47.6%) followed by normocytic normochromic anemia (35.7%)<sup>7</sup>. The commonest type of anemia in pregnancy is iron deficiency anemia<sup>16</sup>. The requirement of iron is 1000mg during pregnancy and diet alone cannot replenish the extra iron needed. If the body iron stores are already deficient, iron deficiency anemia manifests<sup>17</sup>. Though no iron estimation studies were done but the commonest cause of microcytic hypochromic anemia is iron deficiency.

In our study highest prevalence of anemia was found in second trimester (90.52%). Similar observations were seen in 2001 by Rajaratnam in his study and he quoted 56.6%, 70.2% and 69.5% prevalence respectively in I<sup>st</sup>, II<sup>nd</sup> and III<sup>rd</sup> trimester in the rural area of Vellore<sup>18</sup>. Babita et al also reported concordant findings with higher prevalence in second trimester (93.7%). This finding indicates the need of iron supplementation to start as early as fourth month of pregnancy as plasma volume expands upto 34 weeks, after which there is no further change. Less prevalence in first trimester could also be partly due to physiological hemodilution taking place early in pregnancy. Requirement for iron as well as folate are greater for a women in last two trimester<sup>19</sup>. So there is a prompt need for improving our Iron supplementation policy. This study had various limitations like other variables like gestation history, socio-economic history, religion etc were not included.

## Conclusion

Anaemia in pregnancy is associated with adverse consequences both for the mother and the foetus. Studies have shown that the adverse consequences of maternal anaemia may affect not only the neonate and infant but also increase the risk of non communicable diseases when the child grows into an adult and the risk of low birth weight in the next generation. The high prevalence of anemia in our study hints towards more strict measures in investigating and screening of pregnant women. Screening and treatment of parasitic infections should also be encouraged. Health education talks on nutrition needs, education of mothers should also be carried out. Poverty, ignorance, non-availability and failure to utilise available facilities play an important role in maternal anemia. Therefore to reduce the deleterious effect on health of mother and child early intervention by clinicians is also needed.

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## Competing Interests

Not Declared

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