

# Relationship of Anemia During Pregnancy With Education and Trimester of Pregnancy

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## ABSTRACT

**Objective:** To find out relationship of anemia during pregnancy with education and trimester of pregnancy.

**Study Design:** Community based cross-sectional descriptive study

**Place and Duration of Study:** This study was conducted in urban slum areas of Taluka Qasimabad, District Hyderabad during six months of studying period from 1<sup>st</sup> March 2011 to 31<sup>st</sup> August 2011.

**Materials and Methods:** The total population residing in the study areas was twelve thousand two hundred and seven (12207). During the study period of six months, two hundred and fifty (250) pregnant women were enrolled for the study. Pregnant women during 2<sup>nd</sup> and 3<sup>rd</sup> trimester of pregnancy were included in the study. The data was collected by conducting interviews, filling of the pre-tested, structured questionnaire and by assessing anemia by determining the hemoglobin level in the enrolled pregnant women. The questionnaire was a close-ended one, filled by the principle researcher herself. It comprised of demographic information about woman, her family, trimester of pregnancy about her education. Every woman's hemoglobin was determined by using Sahli's Hemoglobinometer. Anemia in pregnancy according to WHO classified into mild anemia hemoglobin level in the range of 10.0-10.9 g/dl, moderate anemia hemoglobin level in the range of 7-9.9 g/dl and severe anemia hemoglobin level is <7 g/dl

**Results:** The association of various factors (determinants) with anemia was analyzed by applying chi-squared test; the p-value of <0.05 was taken as the level of significance. Two hundred and thirty three pregnant women were anemic while only seventeen women (6.8%) were found non-anemic. Majority of the women i.e. 70% presented with moderate anemia (hemoglobin level 7.0-9.9 Gm /dl) while severe anemia (hemoglobin level <7 Gm/dl) was recorded in 5.2% pregnant women. Among total studied women, one hundred and forty seven were illiterate and were having different levels of severity of anemia; moderate anemia was recorded in majority of them ie in 127 pregnant women. The educational level had strong association with occurrence of anemia as well as on its severity (p=0.00). Regarding trimester of pregnancy and the occurrence of anemia, out of 158 pregnant women presenting in their third trimester of pregnancies, 143 were moderately to severely anemic. Trimester of pregnancy and occurrence of anemia were found statistically significant. It was also associated with severity of anemia (p=0.00).

**Conclusion:** Relationship of anemia during pregnancy with low level of education and trimester of pregnancy is very high residing in urban slum areas of Taluka Qasimabad, District Hyderabad is high. Current findings highlight the anemia in pregnancy, education and early booking during pregnancy as a priority area of concern.

**Key Words:** Anemia, Education, Trimester

## INTRODUCTION

Anemia in pregnancy is an important public health problem worldwide especially in most developing countries like in Pakistan.<sup>1</sup> Anemia is substantial public health problem in many developing countries and iron deficiency remain at epidemic level among women and children in many nation<sup>2</sup> who are at increased risk due to increased requirement.<sup>3</sup> The WHO estimates that 39 % of children, 52% of pregnant women in developing countries are anemia. The high frequency of iron deficiency anemia in the world levels the median value of physical productivity losses per year resulting from iron deficiency. Women in developing countries are always in state of precarious iron balance because of access to a balanced diet, adequate health care, proper

education, particularly in pregnancy, with iron and folate deficiency.<sup>4</sup>

Almost a third of the worlds' population suffers from micronutrient deficiency, also known as hidden hunger which mostly affects those living in developing countries. It has been estimated that around two billion people in the world are anemic, mostly in the lower income countries of Africa and Asia.<sup>5</sup> The average estimates for all cause of anemia attributable to maternal mortality (both direct and indirect) were 6.37%, 7.26% and 3% for Africa, Asia, and Latin America respectively.<sup>6</sup> The prevalence of IDA is increased 2-folds or more for those women who are below the poverty level or with <12 year of education.<sup>7</sup> Iron deficiency is responsible for approximately 95% of anemia during pregnancy reflecting the increased demand of iron. Total iron consists mostly iron in

hemoglobin (approximately 70% of total iron approximately (700mg in a 56 kg woman). Another form of iron in body is ferritin and hemosiderin. The absence of hemosiderin in the bone marrow indicative that iron stores are depleted. This finding is both diagnostic of anemia and an early sign of iron deficiency. Subsequent events are a decrease in serum iron, an increase in serum total iron binding capacity.<sup>8</sup>

In our society girls are lacking access to balanced diet, adequate health care and proper education particularly pregnancy with iron and folate deficiency due to increased demand because of physiological changes associated with pregnancy that exert a demand for additional iron needed for transfer to the fetus<sup>8,9</sup> and prevalence of anemia increases more than 6 fold with each trimester.<sup>7</sup> Study in India showed anemia as the second most common cause of maternal death, occurring for 20% of total maternal deaths,<sup>10</sup> and some studies demonstrated the association between maternal anemia and increased risk of preterm birth.<sup>11</sup> The control of iron deficiency anemia in an underlying factor for the achievement of several millennium developmental goals (MDG). It plays a role in combating MDG 1 (Poverty and hunger eradication), MDG 2 (Universal education) and contributes to reducing MDG 4 (Child mortality reduction) MDG 5 (reduction in maternal deaths).<sup>12</sup> As in other studies the severity of anemia was inversely related to educational status and income.<sup>10</sup> Women's education and standard of living in the households have a vital role in reducing anemia. Urban and well nourished women also suffer less from anemia.<sup>13</sup>

## MATERIALS AND METHODS

This community based cross sectional descriptive study. The study was conducted in urban slum areas of Taluka Qasimabad, District Hyderabad during six months ie from 1<sup>st</sup> March 2011 to 31<sup>st</sup> August 2011. It was a population based study. All the women in 2<sup>nd</sup> and 3<sup>rd</sup> trimester of pregnancy fulfilling the inclusion criteria were included in the study. While exclusion criteria are those women who are not willing to participate in study and those who were interviewed but later on refused to give blood sample for hemoglobin estimation and all pregnant women in first trimester of pregnancy. The total population residing in the study areas was twelve thousand two hundred and seven (12207). According to an empirical formula for estimating the number of expectant mothers in developing countries, 24% of the total population is the women in reproductive age and among them 4% are the estimated expectant mothers at a given time.<sup>14</sup> As it was a population based study therefore we did not do sampling. During the study period of six months, two hundred and fifty (250) pregnant women were enrolled for the study. The data was collected by conducting interviews, filling of the pre-tested, structured questionnaire and by assessing

anemia by determining the hemoglobin level in the enrolled pregnant women. The questionnaire was a close-ended one, filled by the principle researcher herself. It comprised of demographic information about woman, her family, trimester of pregnancy and her education. Every woman's hemoglobin was determined by using Sahli's Hemoglobinometer. Data Analysis: Data was entered in SPSS (Statistical Package for Social Sciences) version 16 after editing it. Frequencies for all qualitative and quantitative variables were computed. Prevalence of anemia was calculated separately for mild, moderate and severe anemia. The association of various factors (determinants) with anemia was analyzed by applying Fissure Exact test and chi-squared test; the p-value of <0.05 was taken as the level of significance.

## RESULTS

Two hundred and thirty three pregnant women were anemic while only seventeen women (6.8%) were found non-anemic (Table 1). The educational level had strong association with occurrence of anemia as well as on its severity [p=0.00] (Tables 2-3). Trimester of pregnancy and occurrence of anemia were found statistically significant [p=0.00] (Table 4). It was also associated with severity of anemia [p=0.00] (Table 5)

**Table No.1: Anemia in study population (n=250)**

| Anemia                                    | No. | %age |
|-------------------------------------------|-----|------|
| Mild (hemoglobin level 10.0-10.9 g/dl)    | 44  | 17.6 |
| Moderate (hemoglobin level 7.0-9.9Gm /dl) | 176 | 70.4 |
| Severe (hemoglobin level <7 Gm/dl)        | 13  | 5.2  |
| No                                        | 17  | 6.8  |

**Table No.2: Relationship between educational status and anemia in pregnancy**

| Educational status | No anemia | Anemia |
|--------------------|-----------|--------|
| Literate           | 16        | 87     |
| Illiterate         | 1         | 146    |

p =0.00 (Chi-square test was applied)

**Table No.3: Relationship between educational status and severity of anemia in pregnancy**

| Educational status | Mild anemia | Moderate anemia | Severe anemia |
|--------------------|-------------|-----------------|---------------|
| Literate           | 36          | 49              | 2             |
| Illiterate         | 8           | 127             | 11            |

p = 0.00 (Chi-square test was applied)

**Table No.4: Relationship between trimesters of pregnancy and anemia in pregnancy**

| Trimester of pregnancy    | No anemia | Anemia |
|---------------------------|-----------|--------|
| 2 <sup>nd</sup> Trimester | 15        | 77     |
| 3 <sup>rd</sup> Trimester | 2         | 156    |

p =0.00 (Chi-square test was applied)

**Table No.5: Trimester of pregnancy and severity of anemia in pregnancy**

| Trimester of pregnancy    | Mild anemia | Moderate anemia | Severe anemia |
|---------------------------|-------------|-----------------|---------------|
| 2 <sup>nd</sup> Trimester | 31          | 46              | -             |
| 3 <sup>rd</sup> Trimester | 13          | 130             | 13            |

p = 0.00 (Chi-square test was applied)

## DISCUSSION

Concerning educational status of women, 146 anemic pregnant women out of total two hundred and thirty three (62.7%) were found to be illiterate in my study. There was a strong association observed between illiteracy and occurrence of anemia as well as with severity of anemia (p=0.00). Study done by Rohra et al<sup>14</sup> speculates that adverse hemoglobin status of pregnant women attending public sector hospital might be due to the socioeconomic status as well as level of education. Generally speaking, less income in Pakistan is also associated with poor educational status and high parity. Study done by Bakhtiar<sup>1</sup> in Railway Hospital Rawalpindi regarding relation of anemia and maternal education also revealed the same picture. Study done by Hyder<sup>15</sup> in Bangladesh concluded that 56% of the pregnant women had attended school for at least a year. A study revealed by Scholl<sup>7</sup> reported that prevalence of iron deficiency anemia increased cumulatively two fold or more for those women who belonged to minority, were below the poverty level or were with <12 year of education. Study done by Piammongkol et al<sup>16</sup> confirmed that iron deficiency anemia is highly prevalent in lower southern Thailand where poverty and low levels of education prevailed. My study revealed one hundred and fifty six anemic women in 3<sup>rd</sup> trimester of pregnancy (66.9%). The trimester of pregnancy ie advancement of pregnancy had a significant association with occurrence of anemia (p=0.00) as well as severity of anemia (p=0.00).

The high frequency of anemia in 3<sup>rd</sup> trimester could be due to maximum demand of micronutrients, also due to the expansion of plasma volume which precedes the increase in red cell mass, creates a disproportion expansion of plasma volume 50% compared with the increase in red cell mass 30%. Therefore hemoglobin values start to decline during the early phase of first trimester and reach their lowest levels near the end of second trimester. The same trend was also found in study done by Bagchi et al<sup>17</sup> in which prevalence of anemia among pregnant women (Hb<11.0 g/dl) was found to be 17.4%, 26.5% and 35.8% in patients from 1<sup>st</sup> to 3<sup>rd</sup> trimester respectively. In Nepal, Dreyfuss<sup>18</sup> also demonstrated progressive iron depletion during pregnancy that became worse in the third trimester suggesting underlying iron deficiency as a cause for anemia. Study done by Scholl et al<sup>7</sup> in New York demonstrated prevalence of iron deficiency anemia as 1.8 % in 1<sup>st</sup> trimester, 8.21% in the 2<sup>nd</sup> trimester and 27.4% in 3<sup>rd</sup> trimester. This also indicating pregnancy

risk of iron deficiency increasing with gestation. During pregnancy, anemia increase >4 fold from the 1<sup>st</sup> to 3<sup>rd</sup> trimester in the low income monitored as part of pregnancy. Study done by Rizwana<sup>19</sup> found majority of patients (54%) presented in third trimester while 26% in first trimester and 20% in second trimester. The results of my study were also endorsed by the similar results in a study by Rohra et al<sup>20</sup> where the association between anemia and trimester of pregnancy was shown to be positive. In that study, moderate anemia was more often seen in second and third trimester, while mild anemia was more in first trimester of pregnancy. The distribution of severe anemia however, was not different in the three trimesters. Study done by Jagt et al<sup>21</sup> in North Nigeria revealed that overall, 32% of the pregnant women were anemic, lowest mean concentration of hemoglobin was seen in women in the third trimester. Another study done by Parveen<sup>22</sup> showed the frequency of anemia as 5%, 3.5%, 5.7% in the first trimester, second and third trimester respectively.

## CONCLUSION

Relationship of anemia during pregnancy with low level of education and trimester of pregnancy is very high residing in urban slum areas of Taluka Qasimabad, District Hyderabad is high. Current findings highlight the anemia in pregnancy, education and early booking during pregnancy as a priority area of concern.

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