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Original Research Article

Impact of anemia over maternal and fetal outcome in tertiary care centre

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ABSTRACT

Background: Anemia is a major public health problem especially among the poorer segments of the population in developing countries like India and hence there was a need to study the risk factors, complications and outcome of the impact of anemia on maternal and fetal outcome.

Materials and Methods: A hospital based cross-sectional study was conducted on 400 ANC anemic women. A face to face interviews was taken and data of demographics and history of patient was collected using a standard questionnaire in a tertiary care hospital in a central India.

Results: In the present study, most of the patients, (50.5%) were from age group 21 to 25 years. Most of them 66.8% were house maker and 68% visited hospital > 4 times, 60.75% were multi-gravida and 83% have normal BMI. 17% have severe, 67% have moderate and 16% had mild anemia.

Conclusion: There was significant positive correlation between maternal haemoglobin and BMI and birth weight. Most common Foetal complication was LBW and IUGR.

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1. Introduction

Anemia is a major public health problem in developing countries like India and it is one of the major challenges an obstetrician faces. In India, it is frequently severe and contributes to maternal mortality and reproductive health morbidity. It deserves more attention than its currently receiving. Recently lot of program has been focused on safe motherhood but maternal anemia remains a problem of great concern.¹

Gender discrimination is another important factor in India as the girl child, right from youth, is denied proper food and education. Anemia in pregnancy accounts for 25 percent of deaths due to associated causes and 11.5% of all maternal deaths. anemia contributes to 10-15% of direct maternal deaths in India.¹

An estimated 60% of all pregnant women in developing countries have anemia. Anemia either directly or indirectly contributes to about 20% of maternal deaths in third world countries.¹

Among all causes of anemia, nutritional anemia is of greatest concern, 90% due to iron deficiency. In places where malaria or hook worm infestation is endemic, prevalence of anemia is as high as 90%. Multipara, multiple pregnancy, blood donors and persons with a diet low in meat / vegetarian are more prone for anemia. Adolescents because of their low body iron stores are also at risk.¹

In India the prevalence of iron deficiency anemia has come down due to fortification, prophylactic iron supplementation, better health care programmes aimed at women and children.¹

The incidence and prevalence of anemia in the pregnant women of Maharashtra is very high. Most of the women attending the ANC OPD have an HB around 8-10gm/dl.

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These patients come from low socioeconomic strata. They are unable to come for regular antenatal checkups. They prefer to work and earn their livelihood rather than get admitted and get their anemia treated. This study aims as to assess the severity of anemia among antenatal woman and its impact on maternal and fetal outcomes in tertiary care center.

2. Aims

To study impact of anemia over maternal and fetal outcome in tertiary care center.

3. Objectives

1. To study the demographic and antenatal factors among anemic antenatal women admitted in the tertiary care center
2. To study the severity, impact and outcome antenatal period among anemic antenatal women
3. To study the impact of anemia over fetal outcomes like LBW, IUGR, Preterm, low APGAR score, need for Caesarean section, Still Birth, Neonatal mortality et.

4. Materials and Methods

The present study was conducted on 400 anaemic antenatal patients having Haemoglobin <11 gm/dl and who were admitted and delivered at tertiary care center, Maharashtra in the year November 2019- October 2020.

4.1. Study design

Hospital based cross sectional study.

4.2. Study setting

Tertiary care center, Maharashtra.

4.3. Study population

Patients who were admitted and delivered at tertiary care center, Maharashtra having Haemoglobin <11 gm/dl on admission.

4.4. Duration of data collection

November 2019 to October 2020.

4.5. Inclusion criteria

1. Patients admitted and delivered in tertiary care center having Haemoglobin <11 gm/dl.
2. Patients who have given consent.

4.6. Exclusion criteria

1. Patients delivered outside and then admitted.
2. Patients with underlying chronic diseases.
3. Pregnancy turned out to be ectopic pregnancy or ended with abortion or molar pregnancy.
4. Patients not willing to give consent.

4.7. Sample size

400.

4.8. Sampling technique

Convenience sampling method.

4.9. Sample size

Calculated with reference to the study by Kalaivani K. et al,² with standard formulae

$$\text{Sample size } n = z^2 \times P \times QL2.$$

Though our calculated minimum sample size was 384, in given study period we included 400 patients having haemoglobin <11 gm/dl on admission admitted and delivered in our hospital and fulfilling the inclusion criteria.

4.10. Sample collection procedure

All the patients attending OPD were screened and selected according to the selection criterion of study after due consent face to face interviews taken and clinical examination was carried out and the data of demographics and outcome was collected:

4.11. Ethical consideration

The prior approval of Institutional Ethics Committee was taken before starting the study.

4.12. Statistical analysis

Data was entered into Microsoft excel sheet and was analyzed using SPSS 22 version software.

5. Observation and Results

A total of 400 anaemic patients who were admitted and delivered at tertiary care center (Haemoglobin <11 gm/dl) attending the ANC OPD were taken into the study and foetal outcome were studied.

In the present study, graph 1 shows, 202 (50.5%) patients were from age group 21 to 25 years and 123 (30.8%) from <20 years. Only 8 (2%) from age group >31 years.

Similarly, out of 400, 267 (66.8%) were house maker and 133 (33.3%) were laborer.

Graph 2 shows the family size and hence, 68% had no children, 24.8% had 1, 5.3% had 2 and remaining 2% had 3 childrens.

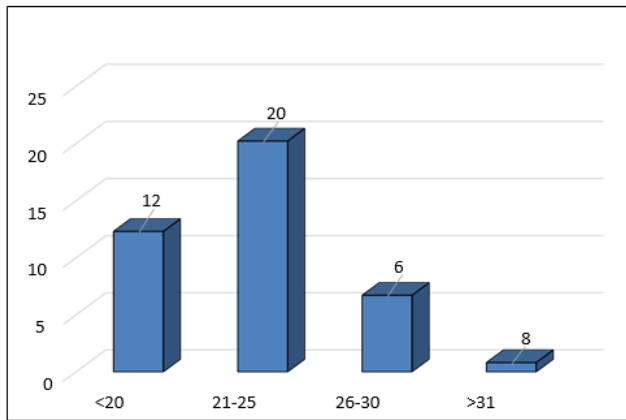


Fig. 1: Age wise distribution of patients

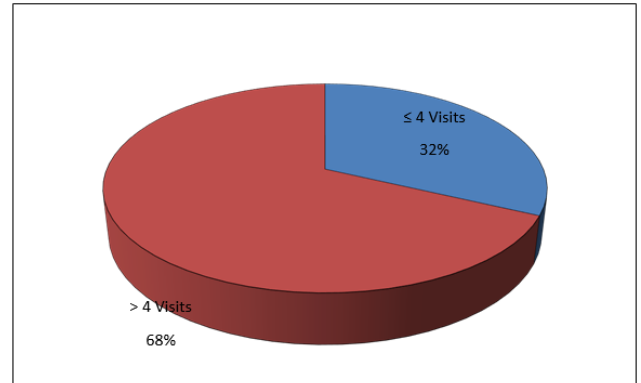


Fig. 3: No. of ANC visits

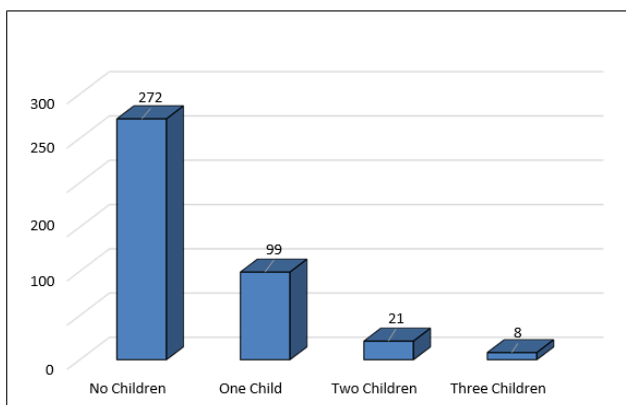


Fig. 2: Family size of patients

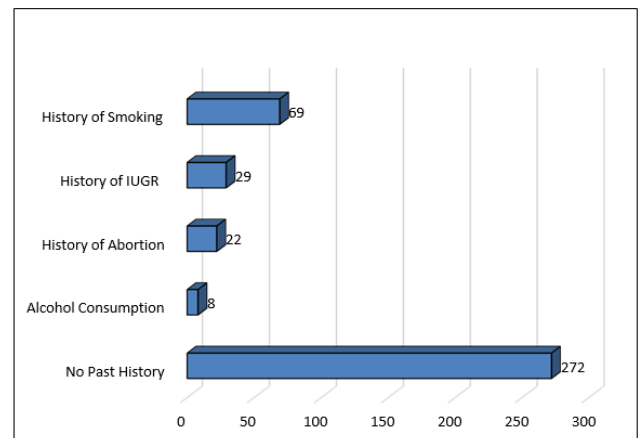


Fig. 4: Past history of patients

Most of the patients, 90.5% consume mixed diet and 9.5% consume pure vegetarian diet.

In this study, 68% patients visited hospital 4 times and 32% visited hospital ≤ 4 times. Out of all 60.75% were multi-gravida and 39.25% were prim-gravida.

Figure 3 shows, out of 157 ANC patients with previous pregnancy, 15.29% patients had birth interval less than 2 years. 53.50% patients had birth interval 2 to 3 years and 31.21% patients had birth interval more than 3 years.

128 patients had past history. Figure 4 shows, 17.3% had history of smoking, 7.3% had history of IUGR, 5.5% had history of abortion, and only 2% had history of alcohol consumption.

In this study, 83.3% had normal BMI between 18.5 to 24.99 kg/m², 13.3% patients had BMI >25kg/m², only 3.5% patients had BMI < 18.5kg/m².

Figure 5 shows, 17% patients had severe anemia (Hb level <7 gm%), 67% had moderate anemia (Hb level 7 to 9.9 gm%) and 16% had mild anemia (Hb level 10 to 10.9 gm%).

Figure 6 shows significant positive correlation between Maternal hemoglobin level and Maternal Body mass index

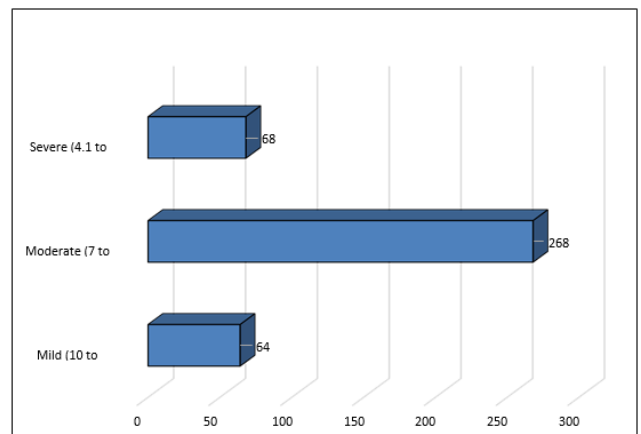


Fig. 5: Anaemia classification

and their Hemoglobin level. (r^2 value +0.153, p value 0.002).

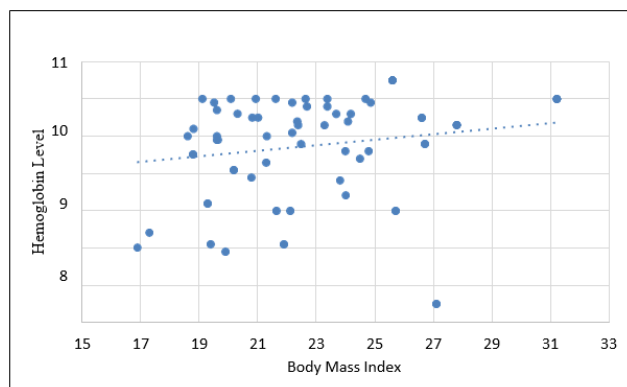


Fig. 6: Correlation between BMI and Hb levels

Figure 7 shows significant positive correlation between Maternal hemoglobin level and Birth Weight of the Neonates. (r^2 value +0.144, p value 0.003).

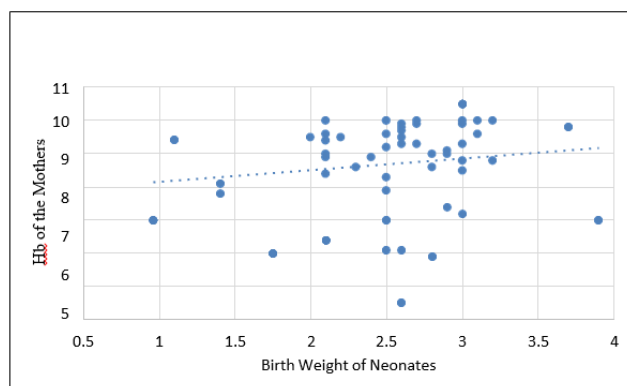


Fig. 7: Correlation between Birth weight of the Neonates and Hb status of the mothers:

Most common fetal complication was low birth weight seen in 46.5% patients, followed by IUGR in 27.5% and preterm birth and APGAR score <7 (at 5 minutes) was seen in 9.3% patients each. Lesser common adverse outcomes were still-births and neonatal deaths seen in 1.8% patients each.

Figure 8 shows maternal complications in anaemic patient. Post-partum Infections were seen in 23.5% patients, 20.3% patients developed Pregnancy Induced Hypertension.

Though post-partum Haemorrhage and Pregnancy Induced Hypertension were more prevalent among anaemic mothers but these were not found to be significantly associated with Haemoglobin Level <7gm% (p values 0.414 and 0.527).

It is found that preterm neonates, IUGR, Still Birth, Neonatal Death and APGAR <7 are significantly associated with Haemoglobin Level <7 gm% (p values <0.05).

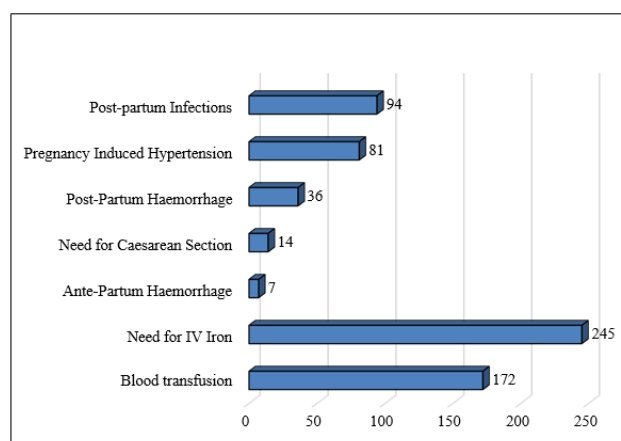


Fig. 8: Maternal complications

Though low birth weight neonates were more among anaemic mothers but the association was not found to be significant with Haemoglobin Level <7gm% (p value 0.097).

6. Discussion

The present study highlights the adverse neonatal and maternal outcomes among anaemic pregnant women. Maternal anaemia is considered as risk factor for poor pregnancy outcomes, and it threatens the life of foetus. As understood by the results, maternal anaemia is a significant risk factor for neonatal birth weight, IUGR, Still Birth, Neonatal Death or APGAR<7 and maternal outcomes like type of delivery, antepartum haemorrhage, post-partum haemorrhage, puerperal infections or need for Blood Transfusion.

6.1. Age wise distribution of patients

In this study, most of the patients, were from age group 20 to 25 years.

Similar findings was seen, in a study by Moghaddam Tabrizi F and Barjasteh S (2015).³ Kavle JA et al (2008)⁴ in their study on Anaemia during Pregnancy, found that median age of participants was 25.5 years.

6.2. Occupation of patients

In the present study, most of the patients were house maker and some were labourer. Kefiyalew F et al (2014)⁵ did a study on anaemia among pregnant women found the same.

In the study by Kavle JA et al (2008)⁴ on Anaemia during Pregnancy, found that 19.6% women were employed and 80.4% were not.

6.3. Family size of patients

In the present study, most of the patients, 68% had no children, 24.8% had 1 child, 21.53% had 2 children and remaining 8.2% had 3 children. In a study by Tabassum Zehra et al⁶ on anaemia in Pregnancy, found that Family size of 22% anaemic patients was ≤ 2 , 39%.

6.4. Diet of patients

In the present study, 90.5% consume mixed diet and 9.5% consume vegetarian diet. Similarly, findings were found in study by Manpreet Kaur et al. (2015).⁷

6.5. Gravid status of the patients

In the present study, 60.75% were multi and 39.25% were prim-gravida. A Retrospective cohort study conducted by Ram Hari Ghimire et al⁸ at Nepal stated that anaemia was more common in multigravida.

In a study by Tabassum Zehra et al⁶ found that 30% of anaemic patients were primi-gravida and remaining 70% anaemic patients were multigravida.

6.6. Past history

17.3% had history of smoking, 7.3% had history of IUGR in previous pregnancy, 5.5% had history of abortion, and only 2% patients had history of alcohol consumption. History of miscarriage was seen in 4.3% patients in a study by Kefiyalew F et al (2014).⁵

6.7. Birth Interval

In the present study, 15.29% patients had birth interval, less than 2 years. 53.50% patients had birth interval 2 to 3 years and 31.21% patients had birth interval more than 3 years. Remaining patients were Primi-gravida.

In a study by Kefiyalew F et al (2014)⁵ 88.2% patients had Birth Interval of <2 years and 11.8% had that of >2 years.

6.8. Body Mass Index

In the present study, 83.3% had normal BMI and 13.3% patients had BMI >25kg/m², only 3.5% patients had BMI >25kg/m².

Our findings are in accordance with a study by Kefiyalew F et al (2014)⁵ but contradicts to the study by Tabassum Zehra et al⁶ were only 34% anaemic patients had normal BMI.

6.9. Anaemia classification

In the present study, 17% patients had severe anaemia (Hb level < 7 gm%), 67% had moderate anaemia (Hb level 7 to 9.9 gm%) and 16% had mild anaemia (Hb level 10 to 10.9 gm%).

This study was correlated with the descriptive case study at Karnataka by R. G. Viveki et al.⁹

6.10. Adverse foetal outcomes

Most common complication was low birth weight followed by Intra Uterine Growth Restrictions and preterm birth and APGAR score <7.

6.11. Maternal complications

Post-partum Infections were seen in 23.5% patients, 20.3% developed PIH. Studies in India demonstrated that the high proportion of maternal deaths are due to anaemia in pregnant women,¹⁰ whereas in the present study, there were no maternal deaths. Outcome, 82% had normal delivery, 10% had breech, 6% had forceps and only 2% had caesarean delivery.

6.12. Association between haemoglobin level and maternal complications

It is found that requirement of Caesarean delivery, Ante-partum Haemorrhage, Post-partum Infections, Need for IV Iron and Blood Transfusion are significantly associated with Haemoglobin Level <7gm%. (all p values <0.05).

Though PPH, PIH were more prevalent among anaemic mothers but these were not found to be significantly associated with Haemoglobin Level <7gm% (all p values 0.414 and 0.527).

Also, P Vasanthamani et al (2019)¹ on Maternal and foetal outcome in anaemia complicating pregnancy mentioned that lower the haemoglobin the greater the risk of atonic PPH. Similarly, in the study by Kavle JA et al (2008)⁴ on Anaemia during Pregnancy, found that in bivariate analyses, increased blood loss at childbirth and postpartum was strongly associated with the severity of maternal anaemia at enrolment (p=0.02) and at 32 weeks gestation.

6.13. Association between haemoglobin level and foetal complications

It is found that preterm neonates, IUGR, Still Birth, Neonatal Death and APGAR<7 are significantly associated with Haemoglobin Level <7 gm% (all p values <0.05), Though low birth weight neonates were more among anaemic mothers but the association was not found to be significant with Haemoglobin Level <7gm% (all p values 0.097) There is a substantial amount of evidence showing that maternal iron deficiency anaemia early in pregnancy can result in LBW subsequent to preterm delivery.⁴

Our finding extends the knowledge of positive association between maternal haemoglobin and neonatal birth weight. In a study by Moghaddam Tabrizi F and Barjasteh S (2015)³ found that the higher haemoglobin

levels are associated with higher birth weight values. Babies born to the anaemic mothers had lower birth weight compared to nonanemic. Also, studies by James TR et al. (2012)¹¹ is agreement with the current study and demonstrate the importance of normal haemoglobin level on pregnancy outcome.

This study was compared with a retrospective cohort study at Nobel medical college Nepal by Ram Hari Ghimire, Sita Ghimire⁸ during the period of April 2011 to April 2012 to find out the association between anaemia and perinatal and maternal complications showed the following, Intra uterine death occurred in 6%, Preterm babies about 9.9%, IUGR babies -8.6%, Low birth babies -22%, Perinatal death 11%.⁸ A meta-analysis summarizing 48 randomized controlled trials and 44 cohort (up till 2012) found that, for each 0.1 g/dL increase in maternal haemoglobin, neonatal birth weight increased by 14.0 (6.8 to 21.8) g.¹²

A study shows that prevalence of several maternal risk factors which are associated with low birth weight, increased perinatal, maternal morbidity and mortality, such as twins, PIH and APH are higher among anaemic women.¹³ A significant fall in birth weight due to increase in prematurity rate and intrauterine growth restriction has been reported when maternal haemoglobin levels were below 8.0 g/d.^{14,15}

7. Conclusion

High prevalence of anaemia in pregnant women is a major public health problem in India. Present study shows maternal anaemia is a significant risk factor for maternal outcomes like type of delivery, APH, PPH, puerperal infections or need for Blood Transfusion and fetal outcomes like neonatal birth weight, IUGR, Still Birth, Neonatal Death or APGAR<7. Lower the haemoglobin, greater was the incidence of LBW, Lower Apgar score, APH and perinatal mortality.

There is need for increased awareness, regular antenatal check-ups, early detection and treatment of anaemia in the general population. Also, there is need to strengthen our outreach services and family welfare services.

8. Source of Funding

None.

9. Conflict of Interest

None.

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