

Study of Prevalence of Severe Anemia in Pregnancy and the Associated Adverse Maternal and Fetal Outcomes

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ABSTRACT

Background: Anemia in pregnancy remains a worldwide public health problem, particularly affecting developing countries. It is observed to be associated with multitudes of both maternal and fetal complications. The present study was undertaken to study the prevalence of severe anemia in pregnancy and assess the associated adverse maternal and fetal outcomes.

Materials and methods: A total of 680 patients diagnosed with severe anemia in pregnancy during the study period were included and relevant parameters were analyzed.

Results: The prevalence of severe anemia was 4.4%, with 21.80% of those having very severe anemia. Preterm labor (26.2%) was the most common adverse maternal outcome, followed by preeclampsia/eclampsia (10.3%), sepsis (6.5%), and wound gape (5%). Low birth weight (LBW)–intrauterine growth restriction (IUGR) (45.0%) was the commonest adverse fetal outcome, followed by LBW-prematurity (28.8%), birth asphyxia (6.1%), and intrauterine device (IUD)/stillbirth (3.3%). Associated risk factors were rural residence (60.4%), referral from periphery (59.3%), lower socioeconomic status (89.1%), unbooked pregnancy (76.2%), multigravida (63.8%), and no iron/folic acid supplementation during pregnancy (44.7%).

Conclusion: Severe anemia in pregnancy remains a major concern, both from the maternal and fetal point of view. Early detection and management are recommended to prevent adverse obstetric outcomes.

Keywords: Fetal outcome, Maternal outcome, Severe anemia, Pregnancy.

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INTRODUCTION

Anemia is a common nutritional deficiency known to occur at all stages of the life cycle, with significant repercussions for health and overall socioeconomic development.^{1,2} The World Health Organization (WHO) categorizes pregnant ladies with hemoglobin (Hb) below 11 gm% as being anemic.³ It has been further classified into mild (10–10.9 gm%), moderate (7–10 gm%), and severe (<7 gm%) anemia by the Indian Council of Medical Research (ICMR).⁴

Iron deficiency is by far the most prevalent reason for anemia in pregnancy. World Health Organization estimates suggest that around 14–51% women of the developed countries are suffering from it, and in India, nearly 65–75% of pregnant women are presumably afflicted.^{5,6} Other associated risk factors are malnutrition, unhealthy lifestyle, hemoglobinopathies, higher age, twin/multiple pregnancies, smoking/alcohol use, history of menstrual disorders or past severe infections, etc.^{7,8} Maternal anemia is known to cause an adverse impact on the fetus in the form of low birth weight (LBW), premature birth, anomalous development, and even fetal demise. If severe anemia is detected early, the potential risk of parenteral iron therapy and blood transfusion in pregnancy can be avoided.⁹

Thus, the prevention and management of maternal anemia are crucial. The interventions may incorporate imparting education about adequate spacing between babies, improvement in the nutritional well-being of prospective mothers, and maintenance of better hygiene.¹⁰ Despite concerted efforts, the progress remains unremarkable. Only limited studies have emphasized the prevalence and outcome of severe anemia in rural areas till now, which is much needed to make a meaningful impact. This research was aimed at studying the prevalence of severe anemia

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in pregnancy and assessing the associated adverse maternal and fetal outcomes among them.

MATERIALS AND METHODS

This was a cross-sectional prevalence study conducted at a tertiary care teaching center (Seth GS Medical College and KEM Hospital, Mumbai, Maharashtra, India) over 18 months (December 2017–May 2019). There were 15,406 pregnant women admitted to the obstetrics department during the study period (“study population”); out of which 680 patients were diagnosed with severe anemia, which was defined as Hb below 7 gm%.⁴ Those with Hb less than 4 gm/dL were operationally defined as having “very severe anemia.” Pregnant women with Hb above 7 gm% and pregnancy with anemia

secondary to acute hemorrhagic events were excluded, along with those unwilling to consent.

After obtaining institutional ethical committee approval and eliciting written informed consent from all the participants, relevant data were collected using a prevalidated questionnaire. The information collected included sociodemographic parameters such as age, residence, monthly income, and dietary habits. Information about parity, registration during pregnancy, symptoms, number of antenatal visits, history of heavy menstrual bleeding, past history of abortions, cesarean section, anemia, history of iron and folic acid tablets received, and the spacing interval was also collected. Detailed records were maintained about blood profiles such as Hb level, peripheral blood smear presentation, mode of delivery, maternal and fetal outcome, number of blood transfusions, and duration of hospitalization.

The data were entered into Microsoft Excel and analyzed using WHO Epi Info software. The frequency distribution tables and graphs were prepared for the studied variables.

RESULTS

The maximum number of cases belonged to the 21–30 years age-group (67.8%), hailed from rural areas (60.4%), were referred from peripheral health center (59.3%), had a past history of anemia (72.4%) and most of them underwent vaginal delivery (VD) (62.4%); with fetal distress being the commonest indication for lower segment cesarean section (LSCS) (44.7%) (Table 1).

The prevalence of severe anemia in the present study was 4.4%. The majority (532; 78.2%) of the participants with severe anemia had Hb between 4 and <7 gm/dL, with the remaining 148 (21.8%) cases having Hb less than 4 gm/dL (Fig. 1).

Peripheral blood smear findings revealed two-thirds of the participants (456; 67.1%) had a microcytic, hypochromic picture, and the remaining one-third (224; 32.9%) cases had a normocytic hypochromic picture (Fig. 2).

The majority of the participants (44.7%) did not consume iron and folic acid tablets during this pregnancy.

The majority of patients (592; 87.1%) had symptoms, while 88 (12.9%) were asymptomatic. Breathlessness was the commonest presenting symptom (80.30%) followed by fatigability/giddiness (62.2%) and loss of appetite (56.3%) (Fig. 3).

Preterm labor (26.2%) was the commonest adverse maternal outcome followed by preeclampsia/eclampsia (10.3%), sepsis (6.5%), and wound gape (5%); whereas the commonest adverse fetal outcome was LBW-IUGR (45.0%), followed by LBW-prematurity (28.8%), birth asphyxia (6.1%) and intrauterine device (IUD)/stillbirth (3.3%) (Table 2).

Most of the cases (476; 70.0%) had more than 7 days of hospital stay, while 204 (30.0%) cases had hospital stay up to 7 days. Out of a total of 680 patients, the management of 562 (82.6%) and 118 (17.4%) cases necessitated blood transfusion up to 4 units and above 4 units, respectively.

DISCUSSION

The present study attempted to assess severe anemia in pregnancy and reviewed the associated adverse maternal and fetal outcomes. The prevalence of severe anemia was high at 4.4%, similar to the findings of Jaleel R and Khan A (4.8%), and Sarala V and Gopalan U (5%).^{11,12} Most other Indian studies have also reported high prevalence in close approximation only.^{13–16} This may be attributable to low intake of iron/folic acid in the diet, relatively

Table 1: Sociodemographic and obstetric characteristics of severe anemia cases

Characteristics	Frequency (n = 680)	Percentage (%)
Age-group (years)		
<20	125	18.4
21–30	461	67.8
>30	94	13.6
Residence		
Rural	411	60.4
Urban	269	39.6
Socioeconomic class		
Upper class (classes I/II)	74	10.9
Lower class (classes III/IV/V)	606	89.1
Gravida		
Primigravida	246	36.2
Multigravida	434	63.8
Registration at first antenatal visit		
First trimester	164	24.1
Second trimester	459	67.5
Third trimester	57	8.4
Antenatal visits		
Unbooked	518	76.2
Booked	162	23.8
Referred or not referred		
Referred	403	59.3
Not referred	277	40.7
History		
Heavy menstrual bleeding	178	26.2
Abortion	233	34.3
Anemia	314	72.4
Spacing interval		
<2 years	272	62.7
>2 years	162	37.3
Mode of delivery		
VD	424	62.4
Instrumental VD		
Forceps	23	3.4
Vacuum	45	6.6
LSCS	188	27.7
Indication for LSCS		
Fetal distress	84	44.7
Cephalopelvic disproportion	32	17.0
Malpresentation	37	19.7
Previous LSCS	29	15.4
Failure of induction	06	3.2

LSCS, lower segment cesarean section

lower bioavailability of iron, and prolonged blood loss due to gastrointestinal infections.

Severe anemia was most prevalent in 21–30 years age-group (67.8%), in line with previous similar studies.^{17–19} Maximum (60.4%) cases were from rural areas, similar to the Nair M et al. study.¹⁹ Regarding socioeconomic class, anemia was overwhelmingly

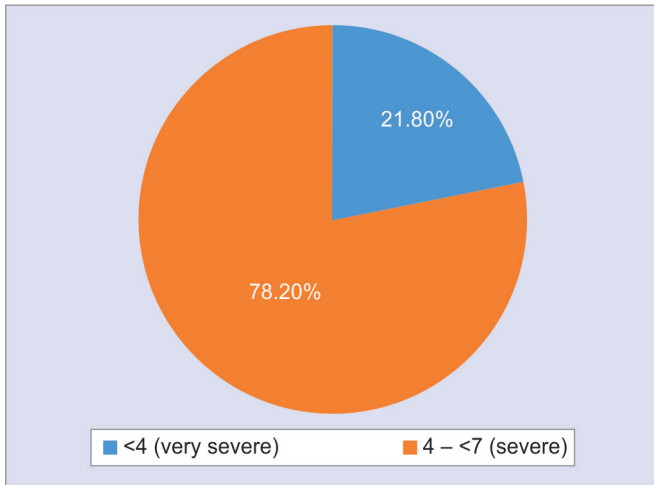


Fig. 1: Distribution of anemia cases as per the Hb level (n = 680)

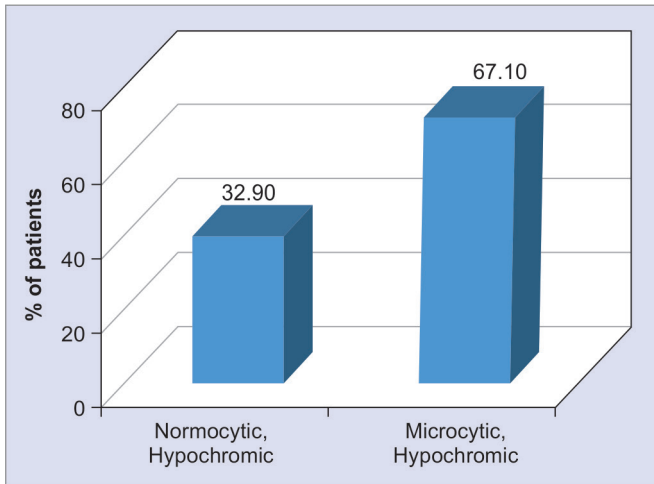


Fig. 2: Peripheral blood smear report of study participants (n = 680)

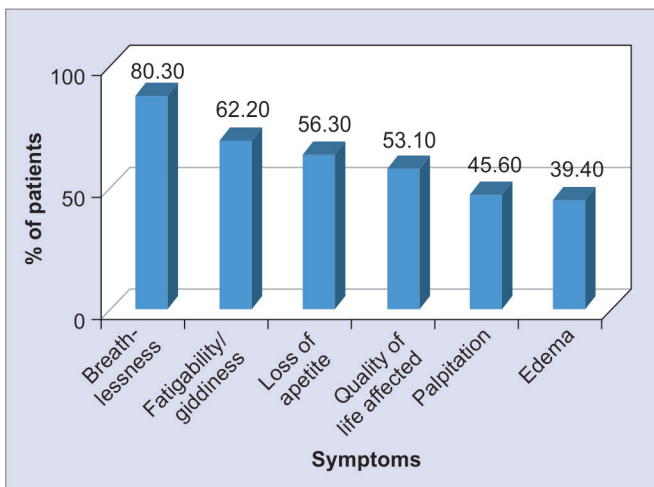


Fig. 3: Symptomatology of the study participants

commoner in lower status (89.1%). This finding correlates well with other studies.¹⁷⁻²⁰ Severe anemia was more common in multigravida (63.8%), as is the case in previous studies.¹⁷⁻²⁰ The maximum

Table 2: Adverse maternal and fetal outcomes among study participants

Parameters	Frequency	Percentage
Maternal outcome		
Preterm labor	178	26.2
Preeclampsia/eclampsia	70	10.3
Sepsis	44	6.5
Wound gape	34	5.0
Cardiac failure	12	1.8
ICU admission	06	0.8
Maternal death	02	0.3
Fetal outcome		
LBW-IUGR	272	45.0
LBW-Prematurity	174	28.8
Birth asphyxia	37	6.1
IUD/stillbirth	20	3.3
NICU admission	90	14.9
Neonatal death in 7 days	12	1.8

ICU, intensive care unit; IUD, intrauterine device; NICU, neonatal intensive care unit

(67.5%) number of severe anemia cases were registered during the second trimester, which is comparable with the study done by Suryanarayana R et al.¹⁸ In India, patients with anemia are often identified late in their antenatal period. The same is evident here wherein a majority of cases with severe anemia were unbooked (76.2%), reflecting a lack of public awareness regarding the importance of antenatal check-ups. Maximum (59.3%) cases of severe anemia were referred from primary or secondary care centers. Around one-fourth had a history of heavy menstrual bleeding, 34.3% had a history of previous abortion and 72.4% of cases had anemia in the past, which is comparable with the Nair M et al. study.¹⁹ Most of the cases (62.7%) had a spacing of <2 years between births, as has also been reported in earlier studies.¹⁸⁻²¹ Majority (62.4%) had a vaginal delivery, 10.0% had an instrumental vaginal delivery and 27.7% of cases had LSCS, the proportion is similar to observations of Nair M et al., and Upadhyay C and Upadhyay M.^{19,20}

The ICMR survey reported more than 70% of pregnant Indian women have anemia and that most of the time, it is due to iron and folic acid deficiency.⁵ The present study validates this finding, as the majority of (44.7%) the patients with severe anemia did not receive iron and folic acid tablets.

Anemia is understood to be putting the prospective mothers at risk for poor obstetric outcomes, which is known to be directly proportional to the severity of anemia. The most common maternal outcome associated with severe anemia was preterm labor (26.2%) followed by Preeclampsia/eclampsia (10.3%), sepsis (6.5%) and wound gape (5%), cardiac failure (1.8%), intensive care unit (ICU) admission (0.8%) and maternal death (0.3%). These findings are in line with the Malaysian study authored by Tusimin M et al. apart from previously similar Indian studies.²² Studies in India had also attributed a higher percentage of maternal deaths to severe anemia.²³

As far as fetal outcomes are concerned, only 75 (11.0%) participants had normal fetal outcomes and 605 (89.0%) cases had adversities. The commonest adverse fetal outcome observed was LBW-IUGR (45.0%) followed by LBW-prematurity (28.8%), birth asphyxia (6.1%), and IUD/stillbirth (3.3%). These findings are comparable with the previous similar studies, which have also reported LBW as the overwhelming common birth outcome.

CONCLUSION

The prevalence of severe anemia in pregnancy is substantial, with a significantly high risk of undesirable maternal and fetal outcomes. Appropriate preventive measures in line with the identified risk factors are suggestible for implementation in the community at the earliest. Public awareness with respect to dietary habits, birth interval, prepregnancy Hb status, regular intake of iron, and the importance of antenatal check-ups and their relationship with maternal and fetal outcomes should be emphasized. Further concerted efforts towards this are recommended.

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