Prevalence and risk factor of anemia among pregnant women admitted in antenatal ward in PBMH Bhubaneswar, Odisha

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Abstract

Background: Anemia is one of the contributing factors for morbidity and mortality during pregnancy in developing country including India, which eventually leads to fetal and maternal consequences. Growing fetus depends completely on mothers for all its growth and maturity. Anemia is one of the nutritional deficiency disorders and around 56% of women are suffering from anemia in India. It is one of the reasons for maternal deaths and fetal complication during pregnancy. **Aim:** The aim of the study was to assess the prevalence of anemia and to determine the risk factors of anemia among pregnant women in PBMH hospital, Bhubaneswar, Odisha. **Materials and Methods:** A descriptive cross-sectional study was conducted over a period of 1 month from October 11, 2022, to November 11, 2022, from the Department of Obstetrics and Gynecology of Pradyumna Bal Memorial Hospital KIMS, Bhubaneswar. A total sample comprised of 52 pregnant women who were interviewed by using self-structured questionnaire for data collection and classification of anemia was performed according to the Indian Council of Medical Research (ICMR) criteria. **Results:** A total of 52 antenatal mothers were admitted during this study period (October 11, 2022, to November 11, 2022), and all were selected as study sample. The incidence of anemia among antenatal mother in PBM hospital was found as follows: 17 (33%) mild, 04 (07%) moderate, and 02 (04%) were severe in this present study. The most common indication of anemia among antenatal mother as per the present study was found to be H/O infection (21%), chronic malaria (15%), hook worm (27%), and birth interval (42%). **Conclusion:** The study implies that the prevalence rate of Anemia is high, that is, 44.2%. Spacing between pregnancy and H/O infection plays a significant role in considering anemia in pregnant women, which eventually affects both maternal and fetal condition.

Keywords: Anemia, antenatal care, pregnant women, prevalence, tertiary care hospital

Introduction

A global health issue, anemia affects both industrialized and underdeveloped nations. Anemia affects over 1.62 billion individuals worldwide, or 24.8% of the population, and it is common in pregnancy in about 74% of cases. Data from the National Family Health Survey (NFHS) 4 show that anemia is 50.3% more common in India than in Karnataka. Nearly 50% of the population is anemic, with rural areas generally bearing a heavier burden than urban ones. Anemia during pregnancy has an impact on the mother's health, including maternal mortality and morbidity, as well as the baby's health, resulting in low birthweight, early delivery, and impaired brain development, which increases mortality and morbidity.[1]

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Anemia is one of the highlighted health problems in both developed and developing countries, affecting both maternal and child health.[2] The World Health Organization (WHO) defines anemia as a condition in which the hemoglobin concentration of a woman during pregnancy is <10 g/dl. Globally, 1.62 billion people are suffering from anemia, and the prevalence of anemia among pregnant women in Indian is 56% and 47.6% in Odisha.[3,4]

Anemia prevalence rates among expectant moms range from 35% to 72% in Africa and from 37% to 75% in Asia. It is reasonable to assume that 2–7% of pregnant women have hemoglobin levels below 6.5 g/dL. Anemia is the ninth most important factor in both women and adolescent girls developing the condition, according to the World Bank. In India, anemia due to iron deficiency affects 80% of pregnant women. In the majority of the world, anemia is one of the leading causes of disease and mortality. Anemia during pregnancy has a negative impact on both the mother and the unborn child's health; in Africa, anemia is thought to be a factor in 20% of all maternal deaths.[4,5]

In India, the risk of anemia is higher due to wide range of factors such as insufficient knowledge, low income, and illegal abortion. It is the second leading cause of maternal deaths in India.[6]

Anemia has also been found to be associated with increased risk of birth asphyxia and low APGAR score less than 7.[7,8] A recent meta-analysis showed that the risk of maternal mortality decreases by 20% due to increase in the hemoglobin concentration by 1 g/dl. Thus, treating anemia is a major health implications in pregnancy and would go a long way in improving maternal and fetal outcome.[9]

The levels of hemoglobin used for the classification of anemia in pregnant women as mild, moderate, and severe anemia were those recommended by the Indian Council of Medical Research (ICMR), which is defined as follows:

Mild anemia: Hb 10.0 mg/dl–10.9 mg/dl. Moderate anemia: Hb 7.0 mg/dl-10.0 mg/dl. Severe anemia: Hb less than 7 mg/d.

Materials and Methods

A descriptive cross-sectional study was conducted over a period of 1 month from October 2, 2022, to November 1, 2022, from the Department of Obstetrics and Gynecology of Pradyumna Bal Memorial Hospital KIMS, Bhubaneswar. In considering the inclusion and exclusion criteria, the pregnant mother were selected in the study. The study sample was explained the purpose of the study and informed regarding potential benefit in health, which eventually helped them in making decisions regarding participation in the study. A total sample comprised of 52 pregnant women who were interviewed by using self-structured questionnaire for data collection, and classification of anemia was performed according to Indian Council of Medical Research (ICMR); among them, 23 mothers were suffering from mild, moderate, and severe anemia.

Self-structured tool pertaining to various independent variable in sociodemographic profile such as education, family monthly income, number of antenatal visits, intervals of pregnancy, and level of Hb. It also encompasses of contributing factors including H/O malaria, hook worm infection, consumption of iron, and folic acid tablets during present pregnancy. Determining the outcome variable level of hemoglobin was considered through laboratory report. Pregnant mother with Hb level less than 11 gm/dl was considered as anemic further classification of mild, moderate, and severe anemia were those recommended by the Indian Council of Medical Research (ICMR), which is defined as follows:
* Mild anemia: Hb 10.0 mg/dl-10.9 mg/dl.
* Moderate anemia: Hb 7.0 mg/dl-10.0 mg/dl.
* Severe anemia: Hb less than 7 mg/dl.

Data was analyzed by the process of compilation, tabulation, and classification and result was expressed in form of frequency and percentage.
* Mild anemia: Hb 10.0 mg/dl-10.9 mg/dl.
* Moderate anemia: Hb 7.0 mg/dl-10.0 mg/dl. Severe anemia: Hb less than 7 mg/dl.

Result

A total of 77 pregnant mothers were admitted during this study period (October 2, 2022, to November 1, 2022) out of which 52 pregnant mothers were selected as a study sample. The incidence of anemia rates in PBM Hospital was 17 (33%) were mild, 04 (07%) were moderate, and 02 (04%) were severe during the present study period.

Following are the observations for the variables of the study conducted during the period of January 2021 to August 2021 is discussed below.

Table 1 shows that percentage distribution of women by their sociodemographic characteristic out of 52 women:

14 (27%) were in between the 20-25 yrs of age group, 13 (25%) were in between 26 and 30 yrs of age group, 21 (48%) were in between 31 and 35 yrs of age group, 29 (56%) antenatal women were from rural area, 23 (54%) women were from urban area, 21 (40%) women were educated, and 31 (60%) women were non educated, 5 (9%) of women family monthly income were in between 46094 and 68961/-, 11 (21%) were in between 27654-46089/-, 25 (49%) were in between 9232-27648/-, and 11 (21%) were in the category <9226/-. 23 (44%) women belong to nuclear family, 29 (56%) belong to joint family, 15 (28%) were employed, and 37 (71%) were unemployed. 19 (35%) were having no children, 20 (39%) were single child, and 13 (25%) were ≥2 no. of children. 18 (35%) were vegetarian, and 34 (65%) were nonvegetarian category of dietary practices. 17 (32%) were primigravida, and 35 (68%) were multigravida. 01 (02%) were nullipara, 23 (44%) were primipara, and 28 (54%) were multipara woman.

Table 1: Sociodemographic variable parameter		Frequency	Percentage
Age	20-25 years	14	27
	26-30 years	13	25
	31-35 years	25	48
Residence	Rural	29	56
	Urban	23	44
Mother's educational level	Yes	21	40
	No	31	60
Socioeconomic status	≥184376	0	0
	92191-184370	0	0
	68967-92185	0	0
	46095-68961	5	9
	27654-46089	11	21
	9232-27648	25	49
	<9226	11	21
Types of family	Nuclear	23	44
	Joint	29	56
Employment status	Employed	15	28
	Unemployed	37	71
No. of children	None	19	35
	1	20	39
	≥2	13	25
Dietary Practices	Veg	18	35
	Nonveg	34	65
Gravida	Primigravid	17	32
	Multigravid	35	68
Parity	Nullipara	1	2
	Primipara	23	44
	Multipara	28	54

Table 2: Frequency and percentage distribution on contributing factors of anemia (*n*=52)			
Contributing Factor	Parameter	Frequency	Percentage
H/O abortion	No	31	60
	Yes	21	40
H/O infection	Yes	11	21
	No	41	79
H/O chronic malaria	Yes	8	15
	No	44	85
H/O hook worm	Yes	14	27
	No	38	73
Menstruation flow	Low	13	26
	Moderate	34	65
	High	5	9
Antenatal visit	<4 visit	20	38
	≥4 visit	32	62
Iron supplement	Yes	32	62
	No	20	38
Previous history of anemia	Yes	17	33
	No	35	67
Birth interval (year)	Not applicable	17	33
	Yes	13	25
	No	22	42
Body mass index (BMI)	Underweight <18.9	7	13
	Normal weight 19-24.9	24	46
	Overweight 25-29.9	21	41
No. of previous pregnancies	0	13	25
	1	20	39
	2-4	19	36
Hemoglobin level	Normal	29	56
	Mild	17	33
	Moderate	4	7
	Severe	2	4

Table 2 shows the contributing factors leading to anemia in antenatal women, 31 (60%) were not having any H/O abortion, 21 (40%) were having H/O abortion, 41 (79%) were not having any H/O infection, 11 (21%) were having history of infection, 08 (15%) were having H/O chronic malaria, 44 (85%) were not having any H/O chronic malaria, 14 (27%) were having H/O hook worm, 38 (73%) were not having any H/O hook worm infection, 13 (26%) had low menstruation flow, 34 (65%) were moderate, 05 (09%) were high, 20 (38%) attended <4 antenatal visit, 32 (62%) attended ≥4 antenatal visit, 32 (62%) were taking iron supplement, 02 (05%) were not taking iron supplement, 17 (33%) were having previous H/O anemia, 35 (67%) were not having previous H/O anemia, 13 (25%) were having birth interval, 22 (42%) were having no birth interval, 07 (13%) of mother were underweight <18.9, 24 (46%) were normal weight and 21 (41%) were overweight, 13 (25%) were having no previous pregnancies, 20 (39%) were history of single pregnancies, 19 (36%) were 2-4 no of previous pregnancies, 29 (56%) were having normal Hb level, 17 (33%) were mild, 04 (07%) were moderate, and 02 (04%) were severe.

Discussion

Anemia is a well-known public health issue that primarily affects developing nations rather than developed nations. Anemia in pregnancy, in particular, has a negative impact on the health of both the mother and the unborn child and can have an intergenerational cycle of anemia, malnutrition, etc., as well as other comorbidities. Anemia is a serious global public health problem that particularly affects pregnant women. The World Health Organization (WHO) estimates that 1,15,000 maternal deaths globally are attributable to iron-deficiency anemia annually.[10] Fetal complications include prematurity, low birthweight, intrauterine growth restriction, and child mortality.

In India, anemia during pregnancy is a significant public health problem, with 45.7% of pregnant women in urban areas and 52.1% in rural areas having hemoglobin levels <11 g/dl.[3] Anemia is the underlying cause or contributing factor for 20-40% of maternal deaths in India, Odisha reported anemia during pregnancy in urban area, which is 46.2% and 47.8% in rural area.[11,12]

According to a survey conducted by the Indian Council of Medical Research, more than 50% of children, adolescents, and expectant mothers are anemic.[13]

Research by Ravishankar Suryanarayana *et al.* in the Kolar area revealed a frequency of 63% among pregnant women. In our

study, the prevalence of anemia (68.6%) was comparable to that in Kolar.[14]

According to a study conducted in a rural area of Mysore, 64.2% of pregnant women had anemia, and there was a strong correlation between anemia and sociodemographic features, parity, and age at first pregnancy. Similar results were reported in our study, but there was a significant correlation between hemoglobin status and the interval between pregnancy and ICDS service use.[15]

Data of national family health survey of 2, 3, and 4 indicated that about 50 per cent of pregnant women in India were anemic; among South Asian countries, India had the highest prevalence of anemia. National family health survey 4 of 2018 reported high rate of anemia during pregnancy in some of the states in India: 62.6% in Jharkhand, 58.3% in Bihar, 51.3% in Gujrat, 50.2% in Himachal Pradesh, 47.6% in Odisha, and 44.8% in Assam, as compared to Kerala, Punjab, Himachal, and Delhi. No substantial or consistent decline was observed in prevalence of anemia in pregnant women between NFHS 2, 3, and 4 in any of the states.[16,17]

Punjab has reported the risk factor for anemia in pregnancy is directly proportional to parity women had parity >3, spacing between two pregnancies. 90.8% anemic and 87.5% women with spacing between pregnancy <1 year suffered more from maternal anemia as compared to women with birth interval more than 3 years, H/O chronic malaria. It is highly recommended that more effective guidelines regarding educating girl child, spreading effective awareness regarding balanced diet, regular antenatal checkups, regular intake of iron–folic acid tab, should start at grassroot levels to get safe motherhood.[18,19]

As per the present study conducted in the Department of Obstetrics and Gynaecology in KIMS, PBMH, Bhubaneswar, was found out to be 44.23% of women are suffering from anemia in antenatal women.

The characteristics of variables, that is, risk factors of anemia, are described in terms of the frequency and percentage distribution, which posturizes that:

The major indications for anemia in pregnancy was found out to be 21 (40%) H/O abortion, 11 (21%) were having history of infection, 08 (15%) were having H/O chronic malaria, 14 (27%) were having H/O hook worm, 13 (26%) had low menstruation flow, 34 (65%) were moderate, 05 (09%) were high, 20 (38%) attended <4 antenatal visit, 02 (05%) were not taking iron supplement, 17 (33%) were having previous H/O anemia, 22 (42%) were having no birth interval, 07 (13%) of mother were underweight <18.9, 24 (46%) were normal weight and 21 (41%) were overweight, 20 (39%) were having history of single pregnancies, 19 (36%) were having 2-4 no of previous pregnancies, 17 (33%) were mild, 04 (07%) were moderate, and 02 (04%) were severe.

Conclusion

Anemia is the most common hematological disorder during pregnancy. Prevalence of anemia in South Asian countries is among the highest in the world, and National Family and Health Survey (NFHS)-3 reported that 56.4% of pregnant women in India were anemic.[20] It is associated with multiple factors such as poor socioeconomic status, high parity, short birth interval, poor diet both in quantity and quality, lack of health and nutrition awareness, and a high rate of infectious diseases.[21]

National family health survey record reveal that all the efforts made in direction to reduce the anemia prevalence in country are promising but still not able to bring the prevalence below 50% in children and women; therefore, efforts need to be improved and continued further.[22]

Our study findings suggest important factor, that is, risk factors indicating anemia are as follows: 21 (48%) were in between 31 and 35 yrs of age group, 29 (56%) antenatal women were from rural area, 31 (60%) women were noneducated, 25 (49%) of women's monthly income were in between 9232 and 27648/-, 29 (56%) belong to joint family, 18 (35%) were having ≥2 no. of children, and 28 (54%) were multipara woman.

Some of the contributing factors are 21 (40%) H/O abortion, 11 (21%) were having history of infection, 08 (15%) were having H/O chronic malaria, 14 (27%) were having H/O hook worm, 13 (26%), 20 (38%) attended <4 antenatal visit, 02 (05%) were not taking iron supplement, 17 (33%) were having previous H/O anemia, and 22 (42%) were having no birth interval.

Implication

Prevalence of anemia in pregnancy in KIMS, PBMH, Bhubaneswar, was sound to be high, that is, 44.2%; therefore, few significant recommendations to reduce anemia in pregnancy from this study are as follows:
- Screening program of girls from the adolescent period and regular antenatal visit
- Mass education and awareness campaigns regarding primordial prevention about the counseling on iron-rich diet and early detection of symptoms of anemia
- Free distribution of iron folic acid tablet to the remote and hilly area by the government
- Strict vigilance of antenatal mother by Accredited Social Health Activist worker
- Implementing this measure will go a long way in solidifying health outcome of pregnant mother in antenatal, intranatal, and postnatal period, which eventually leads to positive result in fetal outcome.

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Conflicts of interest

There are no conflicts of interest.

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