



Anemia in Pregnancy: A knowledge, Attitude and Practice Survey Amongst Obstetricians and Gynaecologists in India

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Abstract

Background Anemia continues to affect one-third of the global population and is one of the most common reasons for large-scale morbidity and mortality especially among women. The importance of iron-rich diet has always been the backbone of preventing iron deficiency anemia (IDA) in vulnerable age groups followed by oral iron therapy and parenteral iron therapy as the next options in management of iron deficiency.

Objective Objective of this survey was to assess the knowledge, attitude and practices of obstetricians and gynaecologists relevant to anemia in pregnancy and identify the practice gaps in management of anemia in pregnancy.

Methods This was a knowledge, attitude and practice (KAP) survey involving obstetricians and gynaecologists (ObGyns) across India. A validated questionnaire of twenty questions was used to assess knowledge, attitude and practice about anemia and its management. Results were expressed as percentages.

Results 1974 ObGyns participated in the survey. 88.7% ObGyns screen anemia in first trimester, 53.7% ObGyns perform CBC along with RBC indices. Majority of ObGyns estimate Hb thrice during antenatal period. 50% ObGyns do not consider thalassemia screening routinely and deworming regularly. 92.4% ObGyns believe that iron supplementation is required even if Hb > 11 g/dL. Majority of them prefer low-dose iron therapy, 59.9% prefer to use 100 mg oral iron daily. Almost half of ObGyns prefer to change iron salt when patients do not respond, instead of escalating to injectable iron. Interestingly 52% ObGyns evaluate serum ferritin before starting intravenous iron therapy. 43.5% perform Hb estimation as early as 2 weeks after IV iron therapy. Majority (82.2%) of ObGyns prefer blood transfusion as a treatment of choice when Hb < 5 g/dl at 34 weeks gestation. Only 40.5% of participants are aware of the exact cut-off for diagnosing postpartum anemia. Majority of the ObGyns are aware of the iron prophylaxis in postpartum period till 3–6 months. More than 90% ObGyns consider intravenous iron for severe anemia of postpartum period.

Conclusion The present KAP survey highlights the observation, perception and the practicing behaviour of obstetricians and gynaecologists on anemia in pregnancy and identifies practice gaps in anemia management.

Keywords Iron deficiency anemia (IDA) · India · Knowledge attitude and practice (KAP) survey · Obstetricians and gynaecologists

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Introduction

One-third of the global population is affected by anemia, with almost 1.2 billion individuals suffering from iron deficiency anemia (IDA). IDA is the leading cause of years lived with disability among women around the world [1].

In India, the most common cause of anemia in pregnancy is iron deficiency (ID) due to poor diet and inadequate antenatal care. IDA is highly prevalent in Indian pregnant women, with around 47% of women suffering from anemia during pregnancy. IDA during pregnancy can lead to maternal as well as fetal morbidity and mortality. Varying definitions of anemia during pregnancy have been proposed. Centre of Disease Control (CDC) defines anemia in pregnancy as hemoglobin (Hb) less than 11 g/dL in the first and third trimester and less than 10.5 g/dL in the second trimester, whereas World Health Organisation (WHO) and Indian Council of Medical Research (ICMR) defines it as Hb values less than 11 g/dL [2]. Postpartum anemia (PPA) is a major clinical condition commonly noted in majority of Indian women following childbirth, with prevalence varying from 4 to 27%. PPA adversely affects the critical initial interaction between mother and newborn which may lead to developmental deficits in infants of mothers with PPA [3].

According to FOGSI General Clinical Practice Recommendations (GCPR) on Management of IDA in Pregnancy, there are four groups of tests available for assessment of IDA: 1) Estimation of red blood cells (RBC) parameters and indices like hemoglobin, mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), etc.; 2) Assessment of iron stores in terms of serum iron, total iron-binding capacity (TIBC), serum ferritin, etc.; 3) Estimation of free erythrocyte protoporphyrin (EPP); 4) Assessment of iron uptake by measuring the soluble serum transferrin receptor (sTfR) and soluble transferrin receptor-log [ferritin] (sTfR-F) index [4]. Decrease in the Hb level, serum iron, serum ferritin level, transferrin saturation and an increase in total iron-binding capacity is the classic laboratory findings of IDA. It is always advisable to investigate the complete blood count and serum ferritin for correct diagnosis.

Oral iron therapy is the mainstay of IDA treatment. The Anemia Mukht Bharat Operational Guidelines for management of anemia recommend oral iron (100 mg elemental iron) daily for 6 months for treatment of mild-to-moderate anemia in pregnancy [3]. Inadequate treatment of anemia and non-compliance due to frequent gastrointestinal adverse effects are very common with oral iron. Even in compliant patients with ongoing blood losses or inflammatory conditions, oral iron fails to compensate the iron demand due to limited intestinal absorption [5]. The

Anemia Mukht Bharat Guidelines recommend parental iron (IV Iron Sucrose or Ferric Carboxymaltose) for management of anemia in pregnant women who are detected to be anaemic late in pregnancy, in whom compliance is likely to be low or in whom the oral iron is ineffective [3]. Parenteral iron therapy reduces the need for blood transfusions in the antenatal and postpartum periods [6]. These non-dextran preparations have a better safety profile, can be given more rapidly and in larger doses and replenish iron stores in a short duration [6].

A knowledge, attitude and practice (KAP) survey measures, through a structured, standardized questionnaire, changes in the knowledge, attitude and practice of a person in response to a specific intervention [7]. A KAP survey conducted in India assessed the rural health care provider's perspectives on the management and referrals of pregnant women with high-risk pregnancies, or with complications in pregnancy. Their knowledge, attitude and practices in management of anemia during and around pregnancy were also analysed as a part of the study. However, the findings of this study cannot be considered pragmatic as the study evaluated responses from doctors, nurses and other health care providers only from rural areas of just two states in the country. To the best of our knowledge, there is no literature available that elaborates the perspectives of obstetricians and gynaecologists (ObGyns) across India, towards anemia and its management. The present study was done with the objective to evaluate the knowledge, attitude and practices among ObGyns in management of anemia in routine clinical practice reflecting a real-life scenario in India.

Materials and Methods

This was cross-sectional, observational, questionnaire-based survey conducted among Indian ObGyns. A survey questionnaire with 20 multiple-choice questions on various practical aspects of anemia management, was developed and validated by FOGSI—Safe Motherhood Committee, under the chair of Dr. Priti Kumar. Survey participants were registered medical practitioners with recognised qualifications in obstetrics and gynaecology (DGO/MD/MS) working in outpatient departments of public and privately run clinics/hospitals in a tertiary care setting. The survey questionnaire was filled in by ObGyns, based on their prior clinical experience and knowledge of anemia and its management. The questionnaire was disseminated online and an online google form was provided to the participants to submit their responses. The respondents could select any one of all the pre-listed choices for each question. Data were collected, analysed and summarized in frequency and percentage. Data were summarized in frequency tables and graphs. This was a survey

and no patient-related data was captured and therefore ethics committee approval was not necessary and hence not obtained.

Results

In total, 1974 ObGyns participated in this survey across India. The following results were noted:

Knowledge Assessment of Anemia and its Management (Table 1):

Prevalence of Anemia

36.7% ObGyns reported prevalence of > 50%.

Cut-Off for Diagnosing Anemia in Postpartum Patient

There was no consensus on the diagnosis of anemia in postpartum. Only 40.5% ObGyns were aware of the correct cut-off for diagnosing post-partum anemia which is 10 g/dL.

Table 1 Knowledge Assessment of Anemia and its Management

Prevalence of anemia (Total respondents = 1974)	
Prevalence	Percentage of respondents
0–25%	21.2%
26–50%	42%
50–75%	29.4%
> 75%	7.3%
<i>Cut off for diagnosing anemia in post-partum patient (Total respondents = 1974)</i>	
Hemoglobin value (Hb)	Percentage of respondents
8 g/dl	20%
9 g/dl	17.9%
10 g/dl	40.5%
11 g/dl	20.7%
<i>Iron prophylaxis in postpartum period (Total respondents = 1974)</i>	
Duration of iron therapy	Percentage of respondents
6 weeks	25%
3 months	42.8%
6 months	27.8%
> 6 months	4.4%

Iron Prophylaxis in Postpartum Period

Majority of the ObGyns (70%) were aware about the iron prophylaxis in postpartum period till 3–6 months.

Attitude Assessment on Anemia and its Management

Oral iron Supplementation if Hb is ≥ 11 g/dl on Routine Screening

Total 92.4% ObGyns believed that iron supplementation is required if Hb ≥ 11 g/dL.

Low Dose of Iron for Antenatal Patients

61.9 % of ObGyns preferred to prescribe low dose of iron for antenatal patients.

Routine Screening for Anemia in Antenatal Period

Although majority (88.7%) of the ObGyns screened for anemia in first trimester still there were 10.3% who screened for anemia in second trimester and 1% in third trimester.

Practice Assessment on Anemia and its Management

Investigations for Routine Screening of Anemia

Total 53.7% ObGyns performed complete blood count (CBC) along with Red blood cells (RBC) indices; only 28.7% performed all the investigations like Hb, CBC and serum ferritin. Total 17.4% ObGyns performed only Hb estimation (Table 2).

Hemoglobin Estimation During Antenatal Period

Interestingly 14.8% ObGyns performed Hb estimation every month and 45% of ObGyns performed Hb estimation thrice during antenatal period (Table 2).

Test of Serum Ferritin Before Starting Injectable Iron Therapy

Practically 48% ObGyns did not consider testing serum ferritin before starting injectable iron therapy (Table 2).

Thalassemia Screening

Majority of ObGyns (71.9%) did not perform thalassemia screening routinely (Table 2).

Table 2 Practice Assessment On Anemia and its Management

Investigations for routine screening of anemia (Total respondents = 1974)	
Parameters	Percentage of respondents
Hemoglobin estimation	17.4%
Complete Blood Count + RBC indices	53.7%
Serum ferritin	0.2%
All of the above	28.7%
<i>Hemoglobin estimation during antenatal period (Total respondents = 1974)</i>	
Number of times Hb estimation done	Percentage of respondents
Once	0.2%
Twice	9.5%
Thrice	45%
Four times	30.5%
Every month	14.8%
<i>Test of serum ferritin before starting injectable iron therapy (Total respondents = 1974)</i>	
Response	Percentage of respondents
Yes	52%
No	48%
<i>Routine thalassemia screening (Total respondents = 1974)</i>	
Response	Percentage of respondents
Yes	28.1%
No	71.9%
<i>Routine deworming practice (Total respondents = 1974)</i>	
Response	Percentage of respondents
Yes	50.1%
No	49.9%

Deworming Practice

50.1% ObGyns did not perform deworming routinely before initiating the oral iron therapy (Table 2).

Management of Moderate Anemia in First Trimester

Overall 43.4% of ObGyns were not prescribing any oral supplementation and were managing only with dietary modification and 46.1% of ObGyns managed by diet and oral iron (Fig. 1).

Dose of Iron for Management of Anemia

A total of 40% ObGyns prescribed dose in the range of 60–100 mg/day. Of note, 59.9% prescribed doses more than 100 mg/day (Fig. 1).

Non-Compliance to Oral Therapy

If there was non-compliance to oral therapy, 52.9% of ObGyns preferred changing iron salt instead of escalating to injectable iron and 47.1% shifted to injectable iron therapy (Fig. 1).

Type of Injectable Iron in Antenatal Patients

Still 2% ObGyns were using iron dextran (Fig. 2).

Maximum Dose of FCM in a Day

Just 7.2% ObGyns were prescribing dose of 1500 mg/day. 32.7% ObGyns prescribed FCM in the dose of 500 mg/day (Fig. 2).

Intravenous Iron in Postpartum Period

A 9.2% of ObGyns did not consider intravenous iron for severe anemia (< 7 g/dL) in postpartum period (Fig. 2).

Hemoglobin Estimation After Iron Therapy

There was no uniformity in Hb estimation after intravenous iron therapy. 43.5% ObGyns performed Hb estimation as early as 2 weeks and 3.7% performed after 4 weeks. Only 26.5% ObGyns estimated Hb at 4 weeks (Fig. 3).

Routine Hemoglobin Estimation in Postpartum Patient

43% of ObGyns did not perform routine Hb estimation in post-partum patient.

Preferred Treatment Option in Antenatal Patients if Hb < 5 g/dL at 34 Weeks' Gestation

Total 82.2% of ObGyns preferred blood transfusion as a treatment of choice and 17.8% were managed by injectable iron therapy.

Through these questions, the main gap identified in the knowledge is that majority of ObGyns were not aware of the correct cut-off level of Hb for diagnosing post-partum anemia. The gaps identified in practices in anemia management were that almost half of the ObGyns did not test serum ferritin before starting injectable iron therapy and did not perform deworming routinely before initiating the oral iron therapy. Another gap in the practice was that majority of ObGyns (71.9%) did not perform routine thalassemia screening of pregnant women.

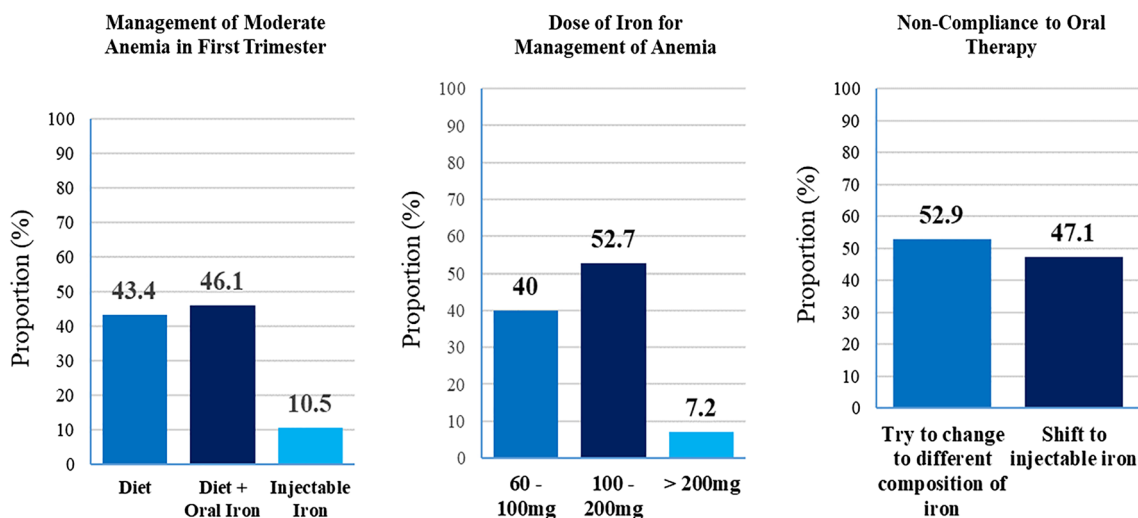


Fig. 1 Practice assessment on anemia and its management

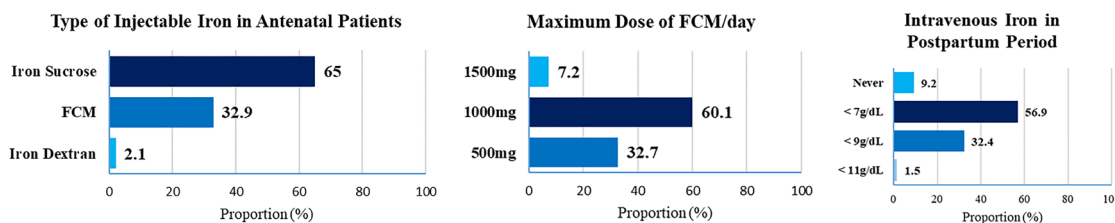


Fig. 2 Practice assessment on parenteral iron in anemia

Discussion

Iron deficiency in pregnancy significantly affects not only maternal but also fetal outcomes. Adverse outcomes like low birth weight, premature birth, increased neonatal and maternal morbidity has been associated with iron deficiency and anemia in pregnancy. Neural development of the infants born to anaemic mothers may be affected [9]. The NFHS-5 data shows 47.7% of pregnant women in the age group of 15 to 49 years are anaemic [10]. Hence the role of screening of anemia during pregnancy specially in Low and Middle-Income Countries (LMIC) becomes necessary.

Most guidelines recommend screening for anemia during pregnancy in the first trimester (or at booking) followed by 24–28 weeks and at 36 weeks of gestation [2]. As per the guidelines recommended by the National Institute of Health and Family Welfare (NIHFW), minimum of four Hb estimations should be done during the antenatal period [11]. Based on this recommendation, 30.5% of ObGyns gave accurate response, 54.7% gave underestimated response and 14.8% gave overestimated response in the present survey. In the present survey 10% ObGyns screened for anemia only in the

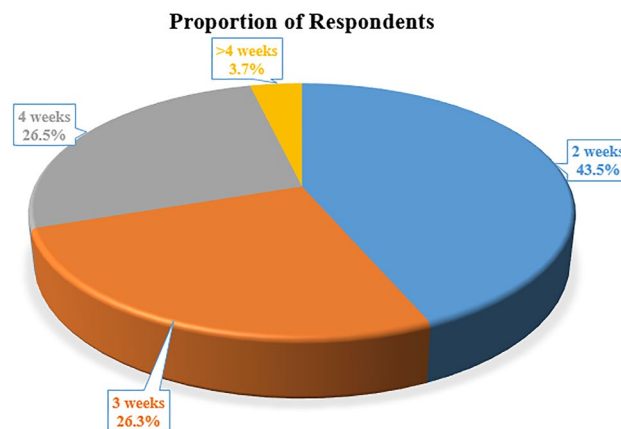


Fig. 3 Hemoglobin estimation after Iron Therapy

second trimester and 1% in the third trimester. Nearly 17% ObGyns simply relied on Hb estimation for diagnosis of anemia and only 29% ObGyns performed proper anemia work-up including serum ferritin. Total 72% ObGyns did not screen for thalassemia. WHO defines postpartum anemia (PPA) as Hb less than 10 g/dL in postpartum women [2]. Based on this

recommendation, 40.5% of ObGyns gave accurate response. Underestimated response and overestimated response were submitted by 37.9% and 20.7% of ObGyns, respectively.

Preventive chemotherapy (deworming), using single-dose albendazole (400 mg) or mebendazole (500 mg), is recommended after the first trimester for pregnant women living in endemic areas for hookworm and/or *T. trichiura* infection and where anemia is a severe public health problem, with a prevalence of 40% or higher among pregnant women [12]. Singh et al., conducted a KAP survey among health care providers in rural areas, to assess their perspectives on management and referrals of antenatal women [8]. In this survey it was found that negligible number of health care providers (< 10%) prescribed mebendazole to pregnant women [8]. In the present survey, 50% ObGyns did not perform deworming before starting hematinic. During the first trimester, 43% of ObGyns did not prescribe any oral supplementation despite anemia and manage only with dietary modification; on the contrary, 46.1% ObGyns preferred giving oral iron along with dietary modification in the first trimester. In patients with non-compliance to oral therapy, 52.9% of ObGyns preferred to change iron salt rather than switching to injectable iron. In KAP study conducted by Singh et al., it was observed that around 80% of health care providers prescribed oral iron and Folic-acid tablets in pregnant women and only one-third to half of health care providers prescribed injectable iron for management of antenatal anemia [8].

Measurement of the serum ferritin concentration is the most accurate test to diagnose IDA without any underlying inflammation. According to the NIHFW, serum ferritin concentration < 30 µg/L together with Hb concentration < 11 g/dL is diagnostic for anemia during pregnancy [11]. As per FOGSI's GCPR, serum ferritin below 15 µg/L indicates iron depletion in all stages of pregnancy and below 30 µg/L treatment should be initiated [4]. There is variation in serum ferritin thresholds used to define iron deficiency in pregnancy. This variation leads to challenges in interpreting the results of clinical interventions managing iron deficiency in pregnancy [13]. Measurement of serum ferritin at least once, early in pregnancy is recommended. Proper treatment should be started in cases of IDA diagnosed on basis of hemoglobin and ferritin levels [2]. In the present survey, 48% ObGyns did not assess serum ferritin before starting injectable iron therapy. There is a need for accurate and internationally unified definitions of iron deficiency using serum ferritin in pregnancy so that IDA could be managed appropriately.

Whereby rapid iron replacement is urgently required and transfusion services are poorly developed, management of iron deficiency anemia in pregnancy using the newer generation dextran-free parenteral iron preparations

can save lives and reduce morbidity in selected pregnancies. Old parenteral iron preparations were associated with a high incidence of anaphylaxis. Newer generation parenteral iron products have better side effect profiles and do not need test dosing [14]. In this survey, it is worthwhile to mention that still, 2% ObGyns were using Iron Dextran. As far as Hb estimation after IV Iron therapy is the concern there was no uniformity, and it varied from 2 weeks to more than 4 weeks post-transfusion.

Total 43% of ObGyns did not perform routine Hb estimation in the post-partum patients. There is no consensus on the diagnosis of anemia in post-partum; only 40.5% ObGyns were aware of the correct cut-off. 9% of ObGyns did not consider IV Iron for severe anemia in the post-partum period.

This KAP survey was performed by the Safe Motherhood Committee of FOGSI. This survey highlights that many of ObGyns are adequately working in the diagnosis and monitoring of anemia. However, certain practices in the management of anemia like proper diagnosis of anemia, screening for hemoglobinopathies, deworming, intravenous iron therapy, estimation of response to iron therapy need to be upgraded for a better outcome. Safe Motherhood Committee is planning to develop various training modules to match this need.

Conclusion

The present KAP survey highlights that majority of obstetricians and gynaecologists are adequately working in diagnosis and management of anemia. There is a need for knowledge and practice upgradation among obstetricians and gynaecologists in terms of correct hemoglobin cut-off to diagnose postpartum anemia, routine screening for hemoglobinopathies like thalassemia, routine deworming of pregnant women before initiating iron supplementation and performing essential investigations like serum ferritin evaluation before administering injectable iron.

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Declarations

Conflict of interest The authors declare that they have no competing interests.

Ethical approval This article does not contain any studies with human participants or animals performed by any of the authors.

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