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Original Research Article

## Management of iron deficiency anemia in pregnancy: a cross-sectional survey on iron formulations and taurine perception

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### ABSTRACT

**Background:** Iron deficiency anemia (IDA) is a widespread health concern with multiple treatment options, yet obstetrician gynecologist preferences and clinical outcomes vary considerably. Taurine is gaining attention as a potential adjunct due to its role in erythropoiesis and antioxidant effects.

**Methods:** Cross sectional survey was conducted among 197 practicing obstetricians and gynecologists in India. A structured 9 item questionnaire assessed iron salt preferences, side effect experiences, perceptions of tablet size and patient compliance, and views on prescribing taurine containing iron supplements. Data were analyzed using descriptive statistics.

**Results:** Ferrous ascorbate was the preferred iron salt for 98.47% of obstetrician gynecologist, with 84.77% reporting minimal side effects. Tablet size was deemed important for compliance by 97.46% of respondents. A total of 91.87% favored prescribing taurine enriched formulations for fetal wellbeing, and 91.37% had previously prescribed R. B. Tone Rapid. Moreover, after 8 weeks of ferrous ascorbate therapy in IDA, a 25% rise in hemoglobin from baseline was the most commonly expected outcome (57.86%), followed by 50% (26.40%) and 40% (15.73%). R. B. Tone Rapid was preferred in cases of IDA (81.21%), fetal growth restriction (26.9%), and maternal obesity (28.42%). Additionally, majority of Obstetricians and Gynecologists (63.96%) recommended organizing a hemoglobin detection camp at their clinic.

**Conclusions:** Obstetrician gynecologist demonstrated a strong preference for ferrous ascorbate and expressed confidence in taurine containing iron therapies. The findings support a shift toward better tolerated, functionally enhanced supplements in pregnancy related IDA. Further research is needed to validate these perceptions and inform treatment guidelines.

**Keywords:** Iron deficiency anemia, Hemoglobin, Ferrous ascorbate, Taurine

### INTRODUCTION

Iron deficiency anemia (IDA) during pregnancy remains a significant public health challenge, particularly in low and middle income countries like India. The prevalence of IDA during pregnancy ranges from 14% in developed countries to up to 75% in developing regions.<sup>1,2</sup> It is associated with increased maternal morbidity, adverse pregnancy outcomes and impaired fetal development.<sup>3</sup> Iron supplementation is the cornerstone of IDA management in pregnancy, yet the choice of iron salt, patient compliance

and tolerance vary widely among healthcare providers.<sup>4,5</sup> Ferrous ascorbate, ferrous fumarate, and ferrous gluconate are commonly prescribed iron formulations, each with differing profiles in terms of bioavailability, gastrointestinal tolerability and patient adherence.<sup>6</sup>

Taurine, a conditionally essential amino acid, has garnered interest for its potential role in fetal development, antioxidant defense, and cellular protection.<sup>7,8</sup> When combined with iron, may enhance the effectiveness of oral iron in the treatment of IDA and provide additional

maternal fetal benefits, such as faster hemoglobin rise and reduced oxidative stress although robust clinical evidence remains limited.<sup>9,10</sup> In recent years, newer formulations combining iron with micronutrients like Taurine have been introduced, claiming improved clinical efficacy and patient satisfaction.<sup>10</sup> However, the adoption and perception of such combinations among obstetrician gynecologist (OB GYN) have not been widely studied.

Understanding OB GYN preferences, prescribing patterns and perceived outcomes is essential to optimizing anemia management strategies. Prior research has indicated that formulation factors, frequency of side effects, and brand familiarity can significantly influence compliance and clinical outcomes in pregnant women.<sup>11-13</sup> Yet, no standardized data exists on how Indian OB GYN view the role of Taurine or newer iron formulations in day to day obstetric practice.

This questionnaire based study was designed to evaluate OB GYN preferences for iron salts, their perception of Taurine's added value, and the expected rise in hemoglobin levels with commonly used iron supplements in pregnancy. Additionally, the study explored OB GYN opinions regarding the utility of community based interventions such as hemoglobin detection camps. Findings from this study aim to inform future therapeutic decisions, product positioning and awareness strategies for more effective IDA management during pregnancy.

## METHODS

### *Study design and setting*

This was a cross sectional, questionnaire based survey conducted among obstetrician gynecologists involved in the diagnosis and management of IDA across India. The study was approved by the Institutional Ethics Committee (IEC) under protocol number: MPL-2024-N2-03. The study was conducted across India during the period of January 2025-May 2025.

### *Survey participants*

The participants included OB GYN, who routinely manage patients with IDA. Inclusion criteria: licensed healthcare providers, actively involved in prescribing iron supplements, and willing to provide informed consent for participation. All data were collected prospectively, and all participants responded to a uniform 09 item questionnaire. Participants voluntarily completed the questionnaire after being informed about the research objectives and providing full consent to participate. The study involved no patient contact or clinical intervention. Ethical approval for the study was obtained from the local ethics committee.

### *Application of questionnaire*

As this was a descriptive cross-sectional survey assessing prescribing preferences and perceptions regarding iron

therapy in pregnancy-particularly focusing on ferrous ascorbate and taurine-containing combinations-no formal scoring system or standardized psychometric scale was applied. The questionnaire comprised nine structured multiple-choice items designed to capture categorical responses, and data were analyzed using descriptive statistics (Table 1).

The questionnaire was distributed among practicing obstetricians and gynaecologists. Participation was voluntary, and confidentiality of responses was assured. The goal was to gather real world insights on current prescription trends and the perceived benefits of enhanced iron formulations in pregnancy. A total of 197 participants responded to the questionnaire.

### *Data collection*

The questionnaire was administered through both in person interviews over a 3 months period. Respondents were encouraged to answer all items honestly based on their current clinical practices and beliefs. No identifying personal or institutional information was collected to maintain confidentiality.

### *Statistical analysis*

Data from the completed questionnaires were entered into Microsoft Excel and analyzed using descriptive statistics. Categorical variables were expressed in percentages and frequencies. No inferential statistics were applied, as the objective was to assess trends and opinions rather than test hypotheses.

## RESULTS

The present questionnaire-based study gathered responses from 197 obstetricians and gynaecologists to assess their prescribing patterns, preferences, and clinical perspectives regarding iron supplementation in pregnancy, with particular focus on ferrous ascorbate and taurine- or amino acid-containing combinations.

As the study was designed as a physician perception survey, detailed demographic characteristics of the participating clinicians were not collected. Furthermore, because the study evaluated prescribing preferences and professional perceptions rather than patient-level outcomes, no demographic or clinical data of patients managed by the participating physicians were obtained. All findings are based solely on the clinicians' self-reported experience and routine practice patterns.

A predominant proportion of the respondents (98.47%) reported ferrous ascorbate as their iron salt of choice in the management of IDA during pregnancy, citing better gastrointestinal tolerance and enhanced absorption profiles compared to other salts such as ferrous fumarate (1.52%) and ferrous gluconate (1.01%).

Furthermore, the majority of clinicians (84.77%) indicated that side effects with ferrous ascorbate were rare, reinforcing its favorable tolerability. Tablet size was identified as a critical determinant of patient compliance by 97.46% of respondent. Importantly, 91.87% of participants expressed willingness to prescribe formulations enriched with amino acids and taurine, recognizing their potential benefits in fetal development and maternal well-being.

The survey also revealed that after 8 weeks of therapy with ferrous ascorbate in IDA, 57.86% of respondents expect an Hb rise of 25% from baseline, 15.73% respondents

anticipate a 40% rise from baseline, and 26.40% respondents expect a 50% rise from baseline. Additionally, R. B. Tone Rapid was most frequently preferred for indications such as IDA (81.21%), fetal growth restriction (26.9%), maternal obesity (28.42%), and gestational diabetes (19.29%), highlighting its perceived versatility in complex pregnancy cases.

Finally, 63.96% of clinicians supported organizing hemoglobin detection camps in their clinics, reflecting a proactive stance toward early diagnosis and community level anemia screening interventions (Table 2).

**Table 1: Questionnaire for obstetricians and gynaecologists.**

Q. no.	Question	Options
1	Doctor, in pregnancy anaemia which is the most preferred iron salt by you? Why?	<input type="checkbox"/> Ferrous ascorbate <input type="checkbox"/> Ferrous fumarate <input type="checkbox"/> Ferrous sulfate <input type="checkbox"/> Ferrous gluconate <input type="checkbox"/> Other (please specify: _____)
2	How often do patients report side effects with the iron salt preferred by you?	<input type="checkbox"/> Rarely <input type="checkbox"/> Frequently
3	Do you think size of the tablet is an important factor for patient compliance?	<input type="checkbox"/> Yes <input type="checkbox"/> No
4	Would you like to prescribe any brand which contains Amino acid, Taurine in it, for well-being of the fetus?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Maybe
5	Doctor, have you ever prescribed R.B. Tone Rapid Tab?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Maybe
6	Would you like to prescribe Taurine + Iron brand (R.B Tone Rapid) which provides additional benefit to patients (Faster Hb rise / Energy booster / Antioxidant effect)?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Maybe
7	How much Hb rise do you expect in IDA with ferrous ascorbate in pregnancy after 8 weeks of therapy?	<input type="checkbox"/> 25% from baseline <input type="checkbox"/> 40% from baseline <input type="checkbox"/> 50% from baseline <input type="checkbox"/> Other (please specify: _____)
8	In which indications would you like to prefer RB Tone Rapid Tab with added Taurine?	<input type="checkbox"/> IDA <input type="checkbox"/> FGR <input type="checkbox"/> PE <input type="checkbox"/> Maternal obesity <input type="checkbox"/> Gestational diabetes
9	For patients' benefit, we conduct Hb detection camps. Do you recommend us to organize an Hb camp in your clinic?	<input type="checkbox"/> Yes <input type="checkbox"/> No

**Table 2: Summary of responses from 197 obstetricians and gynaecologists on preferences and perceptions regarding iron with taurine containing formulations, and anemia management practices in pregnancy.**

Q. no.	Question	Options	Response (%)
1	In pregnancy anaemia, which is the most preferred iron salt by you? Why?	Ferrous ascorbate	98.47
		Ferrous fumarate	1.52
		Ferrous sulfate	0
		Ferrous gluconate	1.01

Continued.

Q. no.	Question	Options	Response (%)
		Other (specify)	-
2	How often do patients report side effects with the iron salt preferred by you?	Rarely	84.77
		Frequently	13.70
3	Do you think size of the tablet is an important factor for patient compliance?	Yes	97.46
		No	2.53
4	Would you like to prescribe any brand which contains amino acid, taurine in it, for fetal well-being?	Yes	91.87
		No	5.07
		Maybe	3.05
5	Have you ever prescribed R.B. Tone Rapid Tab?	Yes	91.37
		No	5.07
		Maybe	3.55
6	Would you like to prescribe taurine + iron brand (R.B. Tone Rapid) for additional benefits?	Yes	89.84
		No	5.58
		Maybe	4.06
7	How much Hb rise do you expect in IDA with ferrous ascorbate after 8 weeks of therapy?	25% from baseline	57.86
		40% from baseline	15.73
		50% from baseline	26.40
		Other (specify)	-
8	Indications where you would prefer RB Tone Rapid Tab with taurine	IDA	81.21
		FGR	26.90
		PE	8.63
		Maternal obesity	28.42
		Gestational diabetes	19.29
9	Do you recommend organizing an Hb detection camp at your clinic?	Yes	63.96
		No	35

## DISCUSSION

The findings from this study underscore a significant clinical shift in the management of IDA during pregnancy, with a marked preference for ferrous ascorbate over other conventional iron salts. An overwhelming 98.47% of clinicians favored ferrous ascorbate, reflecting a growing consensus around its superior efficacy and tolerability profile. This is in line with prior comparative studies which have demonstrated that ferrous ascorbate, due to the synergistic action of ascorbic acid, enhances non heme iron absorption in the duodenum and reduces the oxidative degradation typically seen with ferrous sulfate and fumarate formulations.<sup>14,15</sup> The negligible prescription rates for ferrous sulfate (0%) and low preference for ferrous fumarate (1.52%) suggest a departure from traditional therapies, likely influenced by the side effect burden and poor patient adherence associated with those salts.

One of the critical insights revealed in this study was the role of tolerability and formulation size in driving compliance. Nearly 85% of respondents observed minimal side effects with ferrous ascorbate, a finding supported by trials that show lower incidences of gastrointestinal discomfort such as constipation, nausea, and diarrhoea and vomiting compared to ferrous sulfate.<sup>16</sup> Additionally, the fact that 97.46% of practitioners believed tablet size influenced compliance reiterates the need for patient centered formulation design aligning with previous studies

which emphasize the impact of pill burden and size on adherence to long term therapies in pregnant women.<sup>17,18</sup>

An emerging theme in this study was the positive attitude toward combination formulations, particularly those containing taurine and amino acids with 91.87% of clinicians endorsing such combinations for fetal well-being. This is substantiated by emerging evidence showing that taurine, an essential amino sulfonic acid, plays a role in fetal neurodevelopment, membrane stabilization, and antioxidant defense, thereby justifying its inclusion in maternal supplements.<sup>19,20</sup> The high prescription rate of R. B. Tone Rapid, which combines ferrous ascorbate with taurine, and its preference in conditions like IDA (81.21%), FGR (26.9%), and maternal obesity (28.42%) suggest growing trust in multimodal iron therapy that targets not just hematinic correction but also metabolic and developmental support.

Moreover, 57.86% of respondents expected at least a 25% increase in hemoglobin after 8 weeks of ferrous ascorbate therapy, while 15.73% respondents anticipate a 40% rise and 26.4% anticipated a 50% rise, improvement, reflecting realistic clinical outcomes corroborated by earlier trials showing significant hemoglobin gain with ferrous ascorbate within 6 to 8 weeks.<sup>21</sup> Lastly, the willingness of 63.96% of practitioners to host hemoglobin detection camps demonstrates a commendable commitment to community health, which aligns with national and global strategies aimed at early detection and treatment of anemia in pregnancy.

## CONCLUSION

This study provides compelling evidence that supports the clinical utility of ferrous ascorbate and taurine based formulations in pregnancy. It highlights a clear participant's preference for modern, tolerable, and functionally enhanced iron therapies, paving the way for broader adoption of combination supplements in maternal care. However, further large scale, prospective clinical trials are warranted to robustly validate these real world perceptions and quantify long term fetal and maternal outcomes.

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