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Iron Deficiency Anemia in Infancy—Pediatric Expert Opinions and Path Forward in Indian Context

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Abstract

Background: Iron deficiency anemia (IDA) is a major global nutritional disorder and a persistent health burden in India. In infants, it can impair cognitive development, weaken immunity, and stunt growth. This study explored current approaches to screening and managing IDA in infants, emphasizing early diagnosis and intervention.

Methodology: A cross-sectional survey was conducted among pediatricians across India using a pretested, validated online questionnaire. Data analysis identified correlations influencing iron supplementation practices.

Areas covered: The main areas of discussion included:

- Critical role of iron in infant growth and development, key signs of IDA, causes of IDA, and associated risk factors.
- Current clinical practices related to IDA screening, diagnosis, and management.
- Iron supplementation, including the use of iron-fortified complementary foods, in preventing and treating IDA during infancy.

Results: Among 413 pediatricians surveyed, 89.2% linked IDA in infants to poor iron-rich diets, and 85.9% to delayed complementary foods. Most pediatricians (69.2%) identified infants aged between 6 to 12 months as a high-risk group for IDA. A significant association was found between age group and the prescription of iron supplementation ($p<0.001$). Most experts preferred to prescribe iron supplementation starting at 4 or 6 months of age (46% and 41.9%, respectively). Based on the pediatricians' opinions, preterm and low–birth-weight infants were likely to benefit from iron supplementation (86.9% and 89.1%, respectively).

Conclusion: The survey highlighted that infants aged 6 to 12 months are at high risk for IDA. Pediatricians favor bioavailable iron fortified nutrition solutions to address this critical need.

Keywords: Iron deficiency anemia; Infants; Pediatricians; Iron supplementation; Nutritional deficiencies; Complementary foods; Breastfeeding

Introduction

Iron deficiency anemia (IDA), one of the most prevalent nutritional disorders around the world, has a high prevalence among infants and young children [1]. Iron plays several crucial physiological roles, especially during early development. It is essential for oxygen transport, cellular biosynthesis, immune function, and brain development [2-4]. Iron deficiency in infancy

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can lead to impaired cognitive development, reduced immune function, and growth retardation. This reflects the need for early diagnosis of IDA and appropriate intervention [5,6].

Despite advancements in various fields of medicine, India continues to grapple with significant public health challenges, such as IDA [7]. Anemia is a significant contributor to child mortality and requires urgent attention as a critical public health concern [8]. Data from the National Family Health Survey-5 (NFHS-5) indicate a troubling rise in anemia prevalence among children aged 6–59 months, escalating from 58.6% in NFHS-4 (2015–2016) to 67.1% in NFHS-5 (2019–2021) [9]. This surge underscores the broader issue of iron deficiency, which serves as the primary cause of anemia in India [10,11].

Iron requirements are highest during the first 1000 days of life, a critical window for optimal growth and neurodevelopment. IDA at this stage can lead to irreversible neurological impairment, developmental delays, and weakened immunity [3,12]. It is worth mentioning that infants are born with iron stored in their bodies. These stores are subsequently mobilized to supply iron for growth needs and to replace losses; hence, during this period, the requirement for dietary iron is minimal. However, by 4 months of age, iron stores decrease significantly, and infants need a generous dietary intake of iron to maintain hemoglobin concentration during the rapid phase of growth between ages 4 and 12 months [13,14].

During the first year of life, infants typically need an estimated 0.55 to 0.75 mg of absorbed iron per day [15]. However, beyond 6 months of age, exclusive breastfeeding alone may not meet these iron requirements. Studies show that the average iron concentration in breast milk varies but generally declines during lactation [16]. Siimes *et al*. [16] reported a median decrease of iron in breast milk from 0.6 to 0.3 mg/L over 9 months. Nakamori *et al*. [17] observed an average of 0.43 mg/L iron content in breast milk. Despite the high bioavailability, with roughly 50% of this iron being absorbed, exclusive breastfeeding provides approximately 0.2 mg of absorbable iron daily, which falls short of the infant's needs [18-20].

The etiology of IDA is multifactorial, encompassing factors such as lack of iron supplementation, early introduction to cow's milk, low birth weight (LBW), and inadequate dietary iron intake [18-20]. In India, cow's milk is commonly introduced as a primary source of nutrition after 6 months of age [21]. This early transition can impair iron absorption, further increasing the risk of IDA in infants. It is important to mention that insufficient dietary iron intake is not solely due to the low iron content in foods but also because of the poor bioavailability of iron. Low intake of bioavailable iron from complementary foods is the major cause of the high prevalence of iron deficiency and anemia among children aged 6–24 months in developing countries [22]. Additionally, the use of single-grain diets, such as rice and wheat, with limited awareness of the need for iron-rich foods, such as green leafy vegetables and fortified cereals, further worsens the situation [21,23-27].

The management and prevention of IDA requires early diagnosis, appropriate supplementation, and regular monitoring. Pediatricians play a pivotal role in identifying and treating IDA, with their expertise and intervention being critical in reducing its prevalence, improving pediatric health, and achieving better long-term health outcomes. Their involvement is fundamental to effective IDA management and ensuring the well-being of affected children in a developing country like India [11,15,28].

Despite extensive interventions, the burden of IDA in infants remains substantial, underscoring persistent gaps in awareness, prevention, and treatment strategies. This expert opinion study aims to capture and analyze these insights from a clinical perspective, highlighting both challenges and actionable recommendations. By offering a comprehensive overview of current practices and barriers, this study seeks to serve as a roadmap for practitioners, guiding them toward more effective, evidence-based approaches for assessing IDA in infants.

Materials and Methods

This was a cross-sectional qualitative/quantitative survey conducted among 413 pediatricians, including neonatologists and clinical practitioners in the pediatric domain across India. Electronic informed consent was obtained from the pediatricians before survey initiation. Data privacy and confidentiality were ensured, with personal information securely stored and used solely for research. The key opinion leaders and pediatricians were selected by convenience sampling based on their willingness to participate in the online survey.

Survey instrument

The survey instrument was a self-administered, pretested, and validated questionnaire developed based on a comprehensive literature review that focused on the current burden of IDA and opinions and practices of clinicians regarding clinical presentation, screening, diagnosis, and management of IDA in infants and children. The questionnaire was developed by incorporating valuable insights from experts in the field, blending literature with real-world clinical insights. The final questionnaire was administered as a web-based survey. The questionnaire comprised 28 items across four sections: (i) demographics and background information (gender, professional information, and clinical practice), (ii) role of iron in children's growth, burden of IDA, and risk

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factors, (iii) clinical presentation, screening, and diagnosis of IDA, and (iv) the management of IDA.

Data reliability

The reliability of the questionnaire was assessed using Cronbach's alpha, with a value of 0.7 or higher, considered indicative of acceptable internal consistency. In this survey, the overall Cronbach's alpha was 0.8814, falling within the 0.8 to 0.9 range, which is interpreted as "Good" internal consistency (Table 1).

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was also used to assess the validity of the questionnaire, ensuring that the dataset was suitable for factor analysis. This high level of consistency suggests that the questionnaire items reliably measure the intended constructions, supporting their validity and potential application in future studies for consistently capturing the underlying concepts.

Data collection and analysis

Data were collected online from 16 April 2024 to 17 August 2024. The questionnaire was composed of multiple-choice questions to capture comprehensive responses.

To ensure accuracy and completeness, the gathered data were first cleaned and arranged. Subsequently, descriptive statistical analyses were performed to compile the study subjects' answers to the survey questions. Data analysis was performed using inferential statistical tests, such as t-tests or chi-square tests, to identify associations between variables of interest. Finally, correlation analysis was performed to evaluate how knowledge, attitudes, and practices relate to one another.

Results

A total of 413 pediatricians participated in the survey. Of these, approximately 22% had more than 20 years of experience, and nearly 30% had between 6 and 10 years of clinical practice (Figure 1).

The largest proportion of participants (83.6%) consisted of pediatricians, while 13.3% were neonatologists.

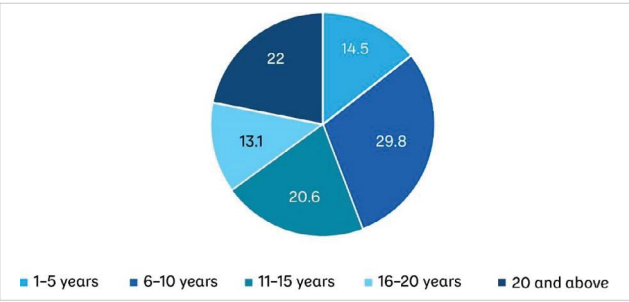

Figure 1: Demographic characteristics of participants based on years of experience.

A small proportion of participants (2.9%) comprised general practitioners with pediatric practice. The detailed demographic distribution is presented in Figure 2.

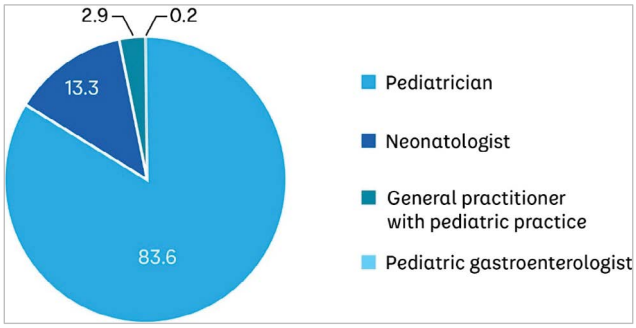

Figure 2: Demographic characteristics of participants based on clinical practice.

Role of iron in growth, anemia presentation, and iron requirements in infants

About 54.0% of pediatricians recognized the crucial role of iron in an infant's brain development. Additionally, 30.3% agreed on the importance of iron in cellular, biosynthetic, and metabolic processes. When queried on primary signs and symptoms associated with IDA, the majority (77.2%) identified fatigue and tiredness as the most frequently observed symptoms among affected children (Table 2).

Causes and risk factors for IDA in infants

Figures 3 and 4 illustrate the experts' opinions on potential causes and risk factors for IDA, respectively. About 70.7% of

Table 2: Opinions of pediatricians on the role of iron in growth and anemia presentation.

Category	Question	Responses	Percent (%) (n=413)
Role of iron in growth	What is the key role of iron in infants' growth and development?	Normal brain development	54.0
		Cellular, biosynthetic, and metabolic processes	30.3
		Immune system function	9.7
		Influence on gut microbiota	5.6
		Others	0.5
Signs of IDA	What is the primary sign/ symptom of IDA?	Fatigue and tiredness	77.2
		Impaired cognitive development	9.7
		Susceptibility to infections	9.0
		Social and behavioral concerns	3.6
		Others	0.5

IDA: Iron deficiency anemia.

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pediatricians indicated that micronutrient deficiencies were the primary cause of anemia among infants, while 18.4% highlighted the role of iron malabsorption as one of the key causes.

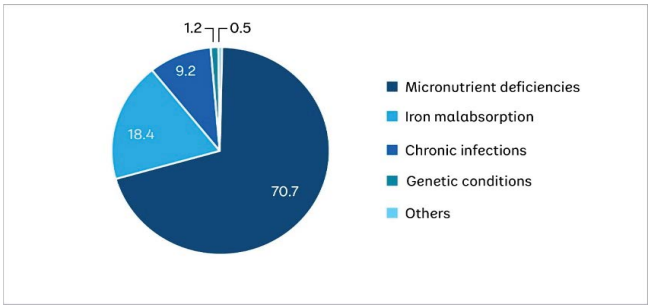

Figure 3: Opinions of pediatricians on the causes of anemia in infants.

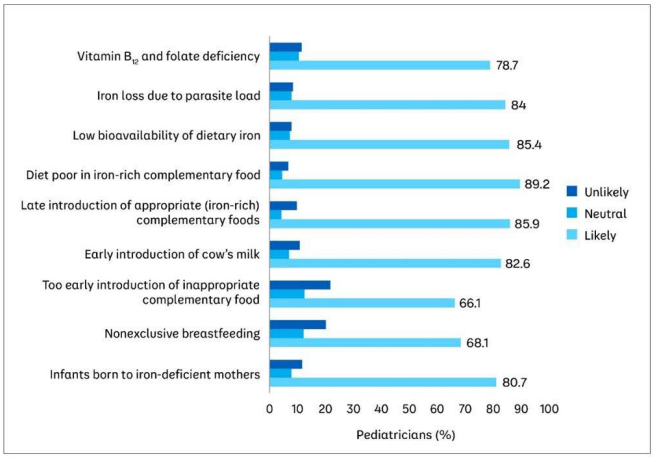

Figure 4: Opinions of pediatricians on risk factors for IDA in infants.

The highest percentage of respondents (89.2%) emphasized the significance of timely and appropriate dietary interventions, noting that a diet lacking iron-rich complementary foods is a major concern (Figure 4). About 85.9% of respondents opined that the late introduction of appropriate (iron-rich) complementary foods was a key contributor to IDA. Additionally, 85.4% identified the low bioavailability of dietary iron as a likely risk factor, while 84.0% highlighted iron loss due to parasite load as a contributing factor. Other potential risk factors included early introduction of cow's milk before age 12 months (82.6%), infants being born to iron-deficient mothers (80.7%), deficiencies in vitamin B_{12} and folate (78.7%), nonexclusive breastfeeding (68.1%), and early introduction of inappropriate complementary foods (66.1%) (Figure 4).

Screening and diagnosis of IDA in infants

The majority of pediatricians (79.2%) reported relying on clinical signs and symptoms to screen and diagnose IDA. Pale skin and mucous membranes were the primary clinical signs that raised suspicion of IDA, as noted by 78.0% of pediatricians. About 69.2% pediatricians identified infants aged between 6 to 12 months as a high-risk age group susceptible to IDA (Figure 5A). Regarding the ideal age for screening, 41.2% of pediatricians recommended 6 months, while 25.2% and 23.7% favored 9 and 4 months, respectively (Figure 5B).

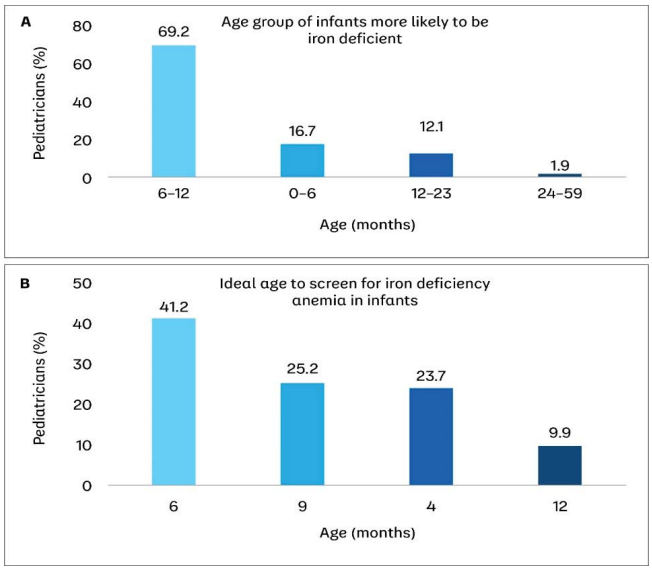

Figure 5: High-risk age group for IDA and optimal age for screening. **A)** Age group of infants more likely to be iron deficient. **B)** Ideal age to screen for IDA in infants.

While responding to the need for early screening in high-risk infants (preterm infants, LBW infants), 73.8% of the pediatricians believed that all preterm infants born before 32 weeks of gestation are at high risk for IDA and require early screening (Figure 6). The preferred diagnostic test for IDA in Indian settings, as reported by 43.8% of pediatricians, was complete blood count; serum ferritin level testing was favored by 31.7%.

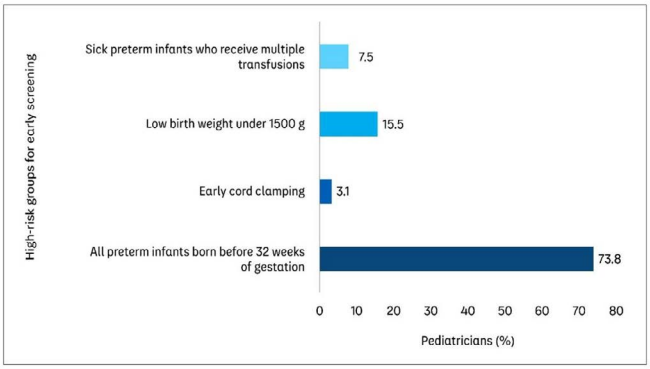

Figure 6: High-risk infant groups that need early screening as per pediatricians.

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Management of IDA: Feeding practices and nutritional strategies

Opinions of pediatricians concerning iron supplementation and feeding practices for managing IDA are shown in Figures 7-10.

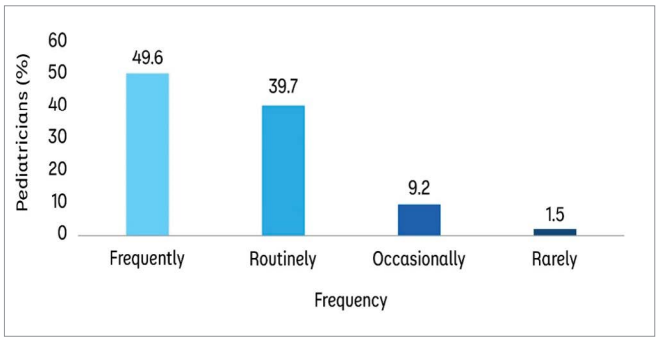

Figure 7: Frequency of prescribing oral iron supplementation for infants during their first year of life.

Regarding the prescription of oral iron supplementation in the first year of life, 49.6% of pediatricians reported prescribing it frequently, while 39.7% did so routinely (Figure 7).

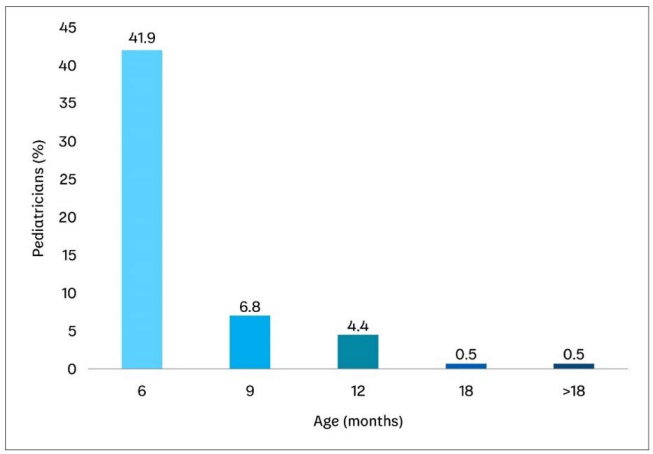

Figure 8: Preferred age to initiate iron supplementation in infants with IDA.

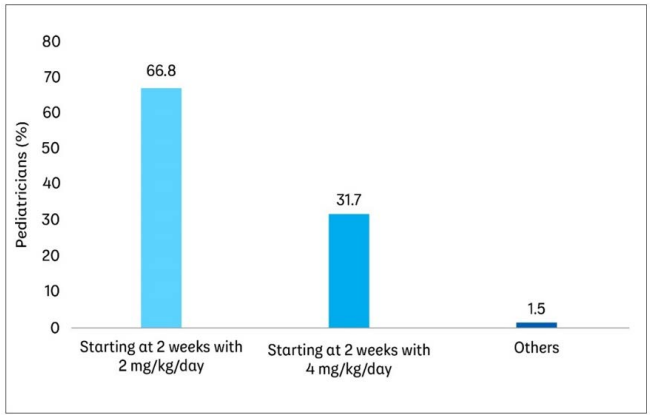

Figure 9: Ideal period and the ideal recommended dose for initiating iron supplementation in preterm babies.

The preferred age for initiating iron supplementation in infants with IDA was predominantly 4 months (46.0%) and 6 months (41.9%) (Figure 8). For preterm infants, 66.8% of pediatricians recommended starting iron supplementation at 2 weeks with a dose of 2 mg/kg/day, while 31.7% suggested iron supplementation at the same age but with a higher dose of 4 mg/kg/day (Figure 9). This reflects a strong consensus on early supplementation in preterm infants with a preference for the 2 mg/kg/day dose.

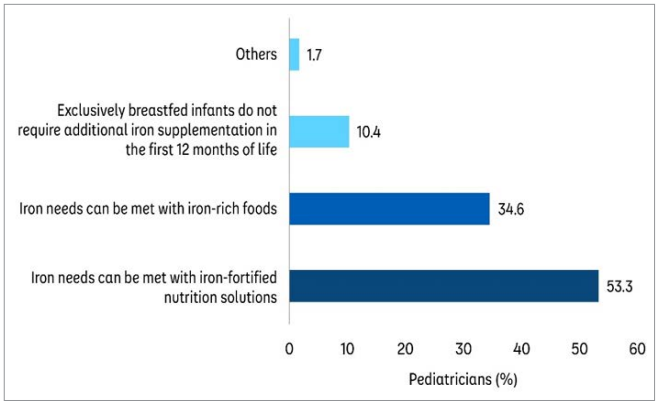

Figure 10: Opinions of pediatricians on feeding practices for exclusively breastfed infants.

In terms of feeding practices for exclusively breastfed infants, slight variation was observed in the opinions of experts. Although 53.3% of pediatricians believed that iron needs can be met with iron-fortified nutrition solutions, 34.6% opined that iron-rich foods were sufficient (Figure 10).

Table 3 highlights the perceived benefit of iron supplementation across different infant groups. Most pediatricians reported iron supplementation as beneficial for LBW infants, both breastfed (89.1%) and not/partially

Table 3: Opinions of pediatricians on infant groups likely to benefit from iron supplementation.

Infant group	Opinion on iron supplementation		
	Beneficial (%)	Uncertain (%)	Not beneficial (%)
Healthy full-term infants (breastfed)	67.3	17.7	15.0
Healthy full-term infants (not/partially breastfed)	78.5	14.0	7.5
Low–birth-weight infants (breastfed)	89.1	6.3	4.6
Low–birth-weight infants (not/partially breastfed)	84.7	7.7	7.5
Preterm infants (breastfed)	86.9	7.7	5.3

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breastfed (84.7%), as well as for preterm infants (86.9%). The benefit was perceived to be higher in non-breastfed or partially breastfed healthy full-term infants (78.5%) than exclusively breastfed infants (67.3%). Uncertainty and skepticism about the benefit of supplementation were notably higher for healthy full-term infants, especially those exclusively breastfed.

Correlation between risk factors and prescription patterns for oral iron supplementation in infants

The association between specific IDA risk factors in infants, as perceived by pediatricians, and the frequency of oral iron supplementation prescriptions during the infant's first year of life was assessed. The aim was to determine whether the presence of risk factors such as maternal iron deficiency and dietary iron insufficiency influenced the frequency of these prescriptions. Pediatricians indicated how frequently they would prescribe iron supplementation for each risk factor based on varying perceived likelihoods of IDA risk (Table 4).

Table 4: Chi-square analysis of prescribing frequency and preferred age for oral iron supplementation.

Risk factors	p value
Infants born to iron-deficient mothers	0.010
Early introduction of cow's milk (before age 12 months)	0.045
Late introduction of appropriate (iron-rich) complementary foods	0.009
Low bioavailability of dietary iron (e.g., nonheme iron)	0.033
Iron loss due to parasite load (e.g., malaria, intestinal worms)	0.089
Vitamin B_{12} and folate deficiency	0.014

Infants born to iron-deficient mothers (p=0.010) and those introduced to cow's milk early (before age 12 months) (p=0.045) were significantly more likely to receive iron supplementation frequently or routinely. Additionally, a significant association was observed between higher prescription rates of iron supplements and delayed introduction of iron-rich complementary foods (p=0.009) and low bioavailability of dietary iron (p=0.033). Furthermore, infants with the risk of vitamin B_{12} and folate deficiencies were significantly more likely to receive iron supplementation (p=0.014).

Infant groups for whom iron supplementation is beneficial

Pediatricians who frequently or routinely prescribed oral iron supplementation tended to initiate it earlier in infants with IDA, with a strong preference for starting at 4 or 6 months of age. Among frequent prescribers, the majority indicated 6 months (n=94) and 4 months (n=86) as preferred starting points, whereas routine prescribers favored initiation at 4 months (n=100) and 6 months (n=53). This significant association between prescribing frequency and earlier initiation (p<0.001) suggests that clinicians who prescribe iron more regularly are more likely to advocate for earlier intervention in managing IDA in infants (Table 5).

For preterm breastfed infants, iron-fortified nutrition solutions would be a primary approach to meet iron needs (n=190, p=0.027). For LBW breastfed infants, experts expressed a preference for iron-fortified nutrition solutions (n=201) and iron-rich foods (n=133), with a significant association (p=0.006). Healthy, full-term breastfed infants would likely benefit from iron supplementation; their iron needs could predominantly be met through iron-fortified nutrition solutions (n=160, p=0.023).

Table 7 highlights the distribution of pediatricians' responses regarding challenges associated with iron supplementation in infants based on a Likert scale evaluation. Taste/acceptance (52.6%) and constipation (46.7%) were the most significant challenges faced by pediatricians when prescribing iron supplements for infants. These findings underscore the need to address these barriers to improve compliance with iron supplementation.

Discussion

Iron plays a crucial role in the growth and development of infants, particularly in supporting neurological and metabolic functions. This is particularly pertinent in the Indian context, where IDA continues to be a significant public health challenge [10,29,30] The aim of this survey was to understand and highlight the critical gaps in the current practice of IDA management and propose potential solutions to address the same.

Risk factors for IDA

Pediatricians are increasingly aware of the key factors contributing to IDA, such as maternal iron deficiency,

Table 5: Chi-square analysis of prescribing frequency and preferred age for initiating iron supplementation in infants with IDA.

Frequency of oral iron supplementation in first year of life	p value
How often do you prescribe oral iron supplementation for infants during their first year of life?	<0.001

Table 6: Chi-square analysis of feeding practices for exclusively breastfed infants and perceived benefit of iron supplementation for different infant groups.

Infant groups	p value
Preterm infants who are breastfed	0.027
Low–birth-weight infants who are breastfed	0.006
Healthy full-term infants who are breastfed	0.023

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Table 7: Challenges associated with iron supplementation for infants.

Type of challenge	Responses of pediatricians (%)				
	Not a challenge	Slight challenge	Moderate challenge	Significant challenge	Very significant challenge
Taste/acceptance	2.9	16.5	28.1	30.8	21.8
Constipation	3.4	20.1	29.8	32.9	13.8
Black stools	11.6	22.8	28.8	23.2	13.6
Teeth staining	6.3	27.4	31.5	24.5	10.4
Complaint of diarrhea	8.5	29.5	32.2	22.5	7.3

early introduction of cow's milk, delayed addition of iron-rich foods, and low dietary iron absorption. Maternal iron deficiency notably raises the risk of IDA in infants [31,32]. Maternal iron status is crucial for fetal and neonatal iron stores that are often inadequate in infants born to iron-deficient mothers [8-11]. According to NFHS-5, over 57% of pregnant women in India are anemic, highlighting the need for early interventions to reduce IDA risk. The present survey found a significant link between the pediatric perspective on maternal iron deficiency and the likelihood of infants receiving routine iron supplementation ($p=0.010$). Other key risk factors for prescribing iron in infants during their first year included introducing cow's milk before the age of 12 months, delaying the introduction of iron-rich foods, low bioavailable iron, and deficiencies in vitamin B_{12} and folate ($p<0.05$).

Nutritional strategies for healthy term, preterm, and LBW infants

Preterm and LBW infants are at higher risk of developing IDA due to limited iron stores at birth and increased postnatal iron demands for growth [24,33,34]. These infants often experience critically low hemoglobin levels, contributing to clinical signs of anemia. Additionally, preterm infants are more susceptible to severe illnesses that require frequent blood drawings, leading to further blood loss and increase in the risk of IDA [24,33,35].

A substantial majority (74%) of experts opined that all preterm infants born before 32 weeks of gestation are at elevated risk for IDA and advocated for early screening. Among these experts, most pediatricians (66.8%) recommended initiating iron supplementation at 2 weeks of age, with a 2 mg/kg/day dosage. In contrast, 31.7% of pediatricians proposed a higher dosage of 4 mg/kg/day, beginning at 2 weeks of age. This aligns with the Indian Academy of Pediatrics (IAP) guidelines, which endorse early administration of elemental iron for preterm infants, recommending a dosage of 2–4 mg/kg/day starting at 2 weeks [36,37].

In India, around 20% of newborns have LBW (<2.5 kg), which is higher than that in many other countries [6,10]. Pediatricians prioritized iron supplementation for LBW infants, regardless of breastfeeding, due to their vulnerability to IDA and possible lack of access to breast milk. A preference for iron-fortified nutritional solutions for these infants was noted ($p=0.006$). ESPGHAN (European Society for Paediatric Gastroenterology Hepatology and Nutrition) guidelines recommend continuing iron supplements or iron-fortified formula until 6–12 months of corrected age for preterm and LBW infants [38]. Full-term healthy infants have high blood volume and hemoglobin concentration at birth, which decreases due to the transition from fetal hemoglobin to adult hemoglobin. By 6 weeks, hemoglobin levels drop from 170 g/L to 120 g/L [39,40].

Although human milk contains low iron concentrations (~0.4 mg/L), the iron from breast milk is highly bioavailable. Iron requirements for infants during this period have sparked varied opinions among researchers [14]. The Institute of Medicine (IOM) recommends a dietary iron intake of 0.27 mg/day for infants under 6 months of age [41], while Indian Council of Medical Research (ICMR) does not provide specific dietary iron intake recommendations for this age group [42]. The American Academy of Pediatrics (AAP) recommends iron supplementation of 1 mg/kg daily for exclusively breastfed infants starting at 4 months of age to prevent IDA [24], while IAP recommends starting iron supplementation at the age of 6 months for breastfed infants [36].

A significant correlation was observed between the experts' opinion on the frequent prescribing of iron supplements and the tendency to initiate iron supplementation as early as 4 to 6 months of age ($p<0.001$). This preference for earlier intervention aligns with national and international guidelines, which recommend early iron supplementation for infants at risk of IDA [24,36]. Research supports this approach, demonstrating that iron supplementation from 4 to 9 months of age significantly improves IDA in breastfed infants [43].

The critical role of iron and iron requirements during the complementary feeding stage

Research highlights that the brain undergoes rapid growth in the first 1000 days, requiring adequate iron for cognitive, behavioral, and motor development [44]. Iron is vital for neuron myelination, neurotransmitter synthesis (serotonin and dopamine), and cellular metabolism via cytochrome C oxidase during this period [45-47]. Deficiency in iron during

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early life can disrupt these processes, leading to long-lasting and potentially permanent neurocognitive and behavioral impairments later in life [48-49]. Most pediatricians (54.0%) participating in the current survey acknowledged that iron plays a critical role in normal brain development during childhood.

Infants aged 6–24 months require additional dietary iron to meet elevated demands, with the IOM recommending 11 mg/day for those aged 7–24 months [41]. ICMR recommends 6 mg/day of dietary iron for infants aged 6–12 months and 8 mg/day for 1–3-year-old children [42]. Introducing iron-rich complementary foods or oral nutritional supplements during this period is crucial to prevent IDA. However, cultural practices in rural India often delay this introduction beyond 6 months of age, creating nutritional gaps and increasing IDA risk [32]. Survey results reveal 85.9% of pediatricians identify delayed introduction of iron-rich foods as a significant IDA risk factor.

The traditional Indian diet, predominantly plant-based, lacks bioavailable iron, especially heme iron from animal sources, contributing to IDA [11,50,51]. Insufficient intake of dietary iron and vitamin C-rich foods also increases the risk of anemia [6]. Beyond iron intake, deficits in essential micronutrients such as vitamins A, B_6, B_{12}, and folate play a significant role in the development of IDA [5,52]. Most pediatricians in the survey recognized that multiple micronutrient deficiencies could contribute to IDA, with 78.7% specifically identifying vitamin B_{12} and folate deficiencies as significant contributors to the condition. These insights emphasize the multifaceted approach required to address IDA in infants. In addition to the timely introduction of iron-dense complementary foods, prioritizing overall dietary quality is essential.

Iron supplementation/fortification strategies

Many countries have adopted food fortification as a public health strategy to combat iron deficiency. In India, initiatives such as the Food Fortification Initiative and private partnerships promote fortifying staples such as rice and wheat with iron [30,50-53]. A study by Moumin *et al*. found that introducing iron-fortified foods to breastfed infants aged 6–12 months reduced iron inadequacy, demonstrating its effectiveness against iron deficiency [54]. The AAP and ESPGHAN recommend iron-fortified formula for formula-fed infants to maintain adequate iron stores and prevent deficiency [39,55]. Early iron supplementation is vital to meet the demands of hemoglobin and tissue iron, especially during the transition to iron-poor cow milk-based diets [5].

The present survey revealed that pediatricians frequently prescribed iron supplements for infants at increased IDA risk. Many believed that the iron needs of exclusively breastfed infants could be met through iron-fortified nutritional solutions. These findings underscore the importance of targeted nutritional evaluations by pediatricians to effectively address and reduce IDA risk in Indian infants.

Conclusion and Recommendations

Through this survey, we were able to identify a significant gap in the effective strategies for the management of IDA among infants and children in India. Although most pediatricians emphasize the importance of early screening of at-risk infants and iron-fortified nutritional solutions for vulnerable groups, there still exists a significant gap in effective nutritional strategies. A unified approach toward managing IDA among pediatricians in India is needed. In conclusion, despite significant advancements in the management of IDA in India, there is an alarming increase in its prevalence among infants, which necessitates immediate attention and action.

To effectively tackle the issues pertaining to the management of IDA, the following are some of the expert opinions based on the survey:

1. The ideal age for IDA screening is 6 months onward.
2. Preterm infants, LBW infants, and healthy, full-term infants (breastfed, not breastfed, or partially breastfed) would likely benefit from iron supplementation with a preference for iron-fortified nutrition solutions.
3. Iron supplementation can help prevent IDA, particularly among high-risk groups, including those with maternal iron deficiency or early exposure to cow's milk.
4. The ideal time for initiating iron supplementation among preterm infants is 2 weeks after birth. The ideal recommended dose is 2 mg/kg/day.
5. In exclusively breastfed infants, iron needs can be met with iron-fortified nutrition solutions.
6. Iron supplementation would be an ideal preventive strategy for infants with low dietary iron bioavailability.
7. High bioavailable forms of iron, such as oral nutritional supplements (instead of iron supplementation), would be beneficial when initiated in infants with IDA at 4 to 6 months of age, along with breastfeeding.
8. Iron supplementation can help mitigate the compounded risk of IDA in infants who face additional deficiencies, such as vitamin B_{12} and folate deficiency.

Ethical approval

The study was approved by the Institutional Ethics Committee.

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Author Contributions

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Conflict of Interest

Preethi Rahul and Dr. Priya Karkera are the employees of Nutricia International Pvt. Ltd. (Danone India). All other authors declare no conflict of interest.

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