

**Assessing the Role of Mothers in Prevention of Nutritional Anemia in the Early Childhood: An Observational Study**Priya Verma<sup>1</sup>, Jiteshwar Prasad Mandal<sup>2</sup><sup>1</sup>Assistant Professor, Department Of Pediatrics, Shri Krishna Medical College and Hospital, Muzaffarpur, Bihar, India<sup>2</sup>Associate professor, Department Of Pediatrics, Shri Krishna Medical College and Hospital, Muzaffarpur, Bihar, India

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**Abstract****Aim:** The aim of the present study was to analyze the risk factors and vital role of mothers in prevention of nutritional anemia in the early childhood.**Methods:** This study was carried out at Department in Pediatrics, Shri Krishna Medical College and Hospital, Muzaffarpur, Bihar, India and 200 children aged 6 months–2 years admitted at the hospital during the study period of 1 year were included.**Results:** Majority of the mothers were aware that neural development of child could be affected by anemia. Maternal knowledge regarding cow's milk was poor and had a faulty belief that it increases iron absorption, whereas 16% were unaware of the relationship between cow's milk and anemia. Many mothers believed anemia to occur only in children on vegetarian diet. Around 75% mothers recognized green leaves and 70% women recognized jaggery to be enriched with iron. Although 78% identified vitamin C containing fruits, many were not aware of its vital role in increasing the iron absorption. Mothers of children with more than one sibling had a relatively greater incidence of "poor" knowledge unlike mothers of children with single or no sibling. This implies that those with "poor" knowledge were also unaware of the importance of birth spacing.**Conclusion:** It is necessary to provide age-appropriate foods at the right time. There is a direct relationship between the lack of education in mothers and the occurrence of anemia in infants. Enhancing the physicians' knowledge and understanding of maternal health will contribute to the achievement of a nation without anemia.**Keywords:** Maternal awareness, Iron deficiency anemia, Child nutrition, WeaningThis is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.**Introduction**

A quarter of the world's population suffers from anemia, making it a critical public health issue. This condition disproportionately affects children and women of childbearing age. [1] Twenty-five percent of the world's population suffers from anemia, making it a significant public health concern. [2] Iron deficiency anemia (IDA) accounts for 42% of cases of anemia, however there are other factors at play as well. [3] Approximately 20% of children under the age of five in developed nations suffer from anemia, compared to 39% in less developed nations. [4]

Iron needs are increased by a factor of two to three and folate needs are increased by a factor of ten to twenty during a typical pregnancy. [5-7] The iron needs of pregnant women can be met by universal iron supplementation and screening for anemia, according to the CDC. [8] The World Health Organization also suggests that all pregnant women

take a tablet containing 400 micrograms of folic acid and 60 milligrams of iron daily. [9] Pregnant women have an increased iron requirement owing to physiological demands, so it is crucial that they adhere to anemia prevention techniques in order to prevent and treat anemia. [5] To reduce the prevalence of anemia, it is crucial to have knowledge about the condition and to properly implement strategies for preventing anemia. [10]

A mother's nutritional status during pregnancy has an effect on her unborn child's weight because it impacts the fetus's development. [11] Since LBW and other complications during pregnancy can be caused by maternal malnutrition, the fetus's nutritional intake is crucial. Pregnant women and their unborn children are vulnerable to the negative consequences of nutritional deficiencies, which can result from either low dietary intake or inadequate storage of these nutrients. [12-14] Iron

supplementation, frequent de-worming, controlling and preventing parasitic infections during pregnancy (i.e., using an insecticide-treated bed net consistently), eating iron-rich foods, receiving nutritional counseling (e.g., not having coffee, tea, or milk with meals), having access to clean water, and treating the underlying causes and complications are all ways to prevent anemia. [15]

Hence the aim of the study was to analyze the risk factors and vital role of mothers in prevention of nutritional anemia in the early childhood.

### Material & Methods

In this study, 200 children admitted to Department of pediatrics, Shri Krishna Medical College and Hospital in Muzaffarpur, Bihar, India for 1 year, between the ages of 6 months and 2 years were included.

We removed children with chronic illnesses, such as hemoglobinopathies or hemolytic anemia, as well as those who were treated for anemia or were using immunosuppressants like steroids or biologics, as a way to indirectly eliminate chronic disease-related anemia.

Hospital Ethics and Scientific Committee gave its approval for the project to proceed. Each mother gave her written, informed agreement before her kid was studied.

### Methodology

Later, a pre-designed pro forma was used to record the relevant information. The two pages pro forma would include six sets of questionnaire. Only the mother was allowed to answer the questionnaire. The first part comprises general details including demography, personal data, socioeconomic status, and family background. Information pertaining to significant history of both mother and child was

included in the second part. A detailed nutritional history of the child was assessed in the third part of the pro forma. Clinical presentation and investigation details were recorded in the fourth and the fifth, respectively. The final part of the questionnaire was added to analyze the awareness of the mothers on anemia and their extent of knowledge on the risk factors, clinical features, and the importance of treating IDA. Length and weight were measured uniformly using infantometer and digital weighing machine to the nearest 0.1 cm and 0.001 kg, respectively. Nourishment was graded based on the World Health Organization (WHO) guidelines and chronically malnourished children were excluded from the study.<sup>16</sup> Children were classified based on Modified Kuppusswamy scale of socioeconomic strata.<sup>17</sup> Two generations of family living in the same household were considered "nuclear" family. Anything beyond was considered "joint" family. Complete blood count including red blood cell indices was calculated using Coulter LH 780 Hematology analyzer. Mentzer index was calculated along to differentiate between IDA and Thalassemia. Anemia was graded as per the WHO guidelines.<sup>2</sup> Questionnaire was prepared in both English and vernacular language for better understanding. On designing the questionnaire, it was validated by an expert panel consisting of a Pediatrician, healthcare workers, and academic professionals including experts in vernacular language for easy comprehensibility.

### Statistical Analysis

Descriptive analysis was carried out by mean and standard deviation for quantitative variables, frequency, and proportion for categorical variables.  $p < 0.05$  was considered statistically significant. IBM SPSS version 22 was used for statistical analysis.<sup>18</sup>

### Results

**Table 1: Tabular column showing the percentage of answers by the mothers**

Correct answer	No. of correct answers (%)	No. of incorrect answers (%)
Anemia is a deficiency of hemoglobin	156 (78)	44 (22)
Iron is important for carrying oxygen in the blood to various organs	52 (26)	148 (74)
Infants at weaning age are at high risk for anemia	44 (22)	156 (78)
Infants at weaning age are at high risk for anemia	50 (25)	150 (75)
Anemia affects both vegetarians and non-vegetarians equally	32 (16)	168 (84)
Large quantities of cow's milk decreases iron absorption	32 (16)	168 (84)
Complementary feeds should be started at 6 months	36 (18)	164 (82)
Jaggery contains more iron	140 (70)	60 (30)
Green leaves are rich in iron	150 (75)	50 (25)
Meat is rich in iron	40 (20)	160 (80)
Orange is rich in vitamin C	160 (80)	40 (20)
If mother takes iron supplements, breastfed infant doesn't get more iron	160 (80)	40 (20)
Vitamin C is necessary for absorption of iron	156 (78)	44 (22)
Anemia is often asymptomatic	156 (78)	44 (22)
Anemia can cause neurodevelopmental delay in infants	156 (78)	44 (22)

Government provides free iron supplements	24 (12)	176 (88)
Anemia can be prevented	150 (75)	50 (25)
Iron causes constipation but should not be avoided	10 (5)	190 (95)
Blood transfusion is not necessary for all children with anemia	20 (10)	180 (90)

Majority of the mothers were aware that neural development of child could be affected by anemia. Maternal knowledge regarding cow’s milk was poor and had a faulty belief that it increases iron absorption, whereas 16% were unaware of the relationship between cow’s milk and anemia. Many

mothers believed anemia to occur only in children on vegetarian diet. Around 75% mothers recognized green leaves and 70% women reconized jaggery to be enriched with iron. Although 78% identified vitamin C containing fruits, many were not aware of its vital role in increasing the iron absorption.

**Table 2: Comparison of number of siblings across knowledge about nutrition and anemia**

Number of siblings	Maternal awareness on anemia and nutrition			P Value
	Poor knowledge	Fair knowledge	Good knowledge	
Nil (20)	4	14	2	0.021
One (70)	11	49	10	
More than one (10)	4	5	1	

Mothers of children with more than one sibling had a relatively greater incidence of “poor” knowledge unlike mothers of children with single or no sibling. This implies that those with “poor” knowledge were also unaware of the importance of birth spacing.

**Discussion**

Worldwide, anemia affects 25% of the population, making it a substantial public health burden. [19] There are many causes of anemia, but iron deficiency anemia (IDA) accounts for 42% of cases. [20] Because the symptoms are not always easy to pinpoint, many of the affected youngsters go untreated until something serious happens to their health. [19,21] Some of the earliest causes of anemia include improper infant weaning and poor food habits. Anemia is more common among premature children and those with a low birth weight, in addition to the aforementioned modifiable risk factors. [22] Motor and neurocognitive function are negatively impacted by all of these factors that lead to IDA during infancy and early childhood. [23] Throughout a child's development, iron is a crucial mineral for healthy growth. [24] New red blood and muscle cells, DNA replication, and the maturation of the central nervous system, the immunological system, and the brain all rely on iron. [24-26] Infants with an iron deficiency may exhibit behavioral changes related to social and emotional regulation, impaired vision and hearing, impaired attention and memory, and an increased likelihood of attention deficit hyperactivity disorder. [27]

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green leaves and 70% women recognized jaggery to be enriched with iron. Although 78% identified vitamin C containing fruits, many were not aware of its vital role in increasing the iron absorption. Mothers of children with more than one sibling had a relatively greater incidence of “poor” knowledge unlike mothers of children with single or no sibling. This implies that those with “poor” knowledge were also unaware of the importance of birth spacing. This stresses the importance of the WHO’s exclusive breast feeding in the early infancy sufficing the lesser iron requirements. Only 17% of mothers were aware of the importance of timely introduction of complementary feeds, proving the misconceptions on duration of breast feeding. Iron requirements after 6 months are 0.9–1.3 mg/kg/day [28], whereas the iron content of cow’s milk is 0.2–0.5 mg/L, of which only 10% is absorbed. [29] In addition, cow’s milk causes asymptomatic micro-hemorrhages in intestine further increasing the loss of iron. [30] This explains the reason why excess cow’s milk had a negative influence on hemoglobin level in our study.

Several mothers believed that only children on vegetarian diet would be affected by IDA. However, iron status is a common nutritional problem among both vegetarian and nonvegetarian consumers, despite few studies reporting IDA of higher incidence in the former. This relative increase in IDA among vegetarians is probably due to their dependence on non-heme iron and the presence of iron absorption inhibitors in plant foods. [31] Apt feeding practices are thus fundamentally important to ensure an appropriate nutrition in a growing child. Clinical features are non-specific in anemic children as evidenced in our study, which when untreated lead to neurodevelopment delay and cognitive deficits. Their attention span is often reduced and this reflects on the child’s academic performance. [23,32] On a positive note, most of the mothers had

acknowledged the possibility of neural development being affected by anemia. Understanding this would stress the importance of supplementing iron in infants. The prime source of knowledge in our study was the community health workers. Training and engagement of the health workers are critical in increasing the healthcare awareness in low- to middle-income countries. [33] Parenting knowledge plays a key role in the biological, physical, socioeconomic, and cognitive needs of the child. It also has a direct influence on their everyday decisions about upbringing, developmental expectations which, in turn, determines their child's health and well-being. [34] Overall most of the mothers had "fair" knowledge of anemia and its implications. Mothers with "poor" understanding of nutrition predominantly had anemic children. Furthermore, mothers with better educational status had better awareness in terms of questionnaire. Thus, maternal knowledge plays a key role in preventing anemia.

### Conclusion

Our understanding of anemia is still limited, even though everyone has access to the internet. Proper nourishment is fundamental during the second half of infancy. The word should go out that cow's milk has a bad effect on hemoglobin. The significance and supply of nutrients for a weaning infant should be clarified to mothers. Addressing worries regarding IDA can be achieved by improving mother educational status. The end goal should be to encourage moms to think critically and make informed decisions, not blindly follow cliches. There is a tremendous need for pediatricians to raise awareness among these moms.

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