A STUDY TO ASSESS THE KNOWLEDGE REGARDING PREVENTION AND MANAGEMENT OF NUTRITIONAL DEFICIENCY ANEMIA AMONG ANTENATAL MOTHERS AT SELECTED PHC'S, DISTRICT BARMER (RAJ.) WITH A VIEW TO DEVELOP AN INFORMATION BOOKLET

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ABSTRACT

Introduction: Anemia in pregnancy is a major public health concern, particularly in developing countries like India. Nutritional deficiency anemia can lead to severe maternal and fetal complications. This study aimed to assess the knowledge regarding prevention and management of nutritional deficiency anemia among antenatal mothers at selected PHCs in Barmer, Rajasthan. **Methodology:** A non-experimental descriptive research design was adopted. A total of 100 antenatal mothers were selected using a non-probability convenience sampling technique from PHCs in Khadeen and Bhadakha. Data was collected through a structured knowledge questionnaire consisting of 26 multiple-choice items. Descriptive and inferential statistics, including chi-square tests, were used for analysis. **Results:** Findings revealed that 58% of antenatal mothers had poor knowledge, 29% had average knowledge, and only 13% demonstrated good knowledge. Significant associations were found between knowledge levels and education, type of family, and source of information ($p < 0.05$), while variables such as age, occupation, and gravida were not significantly associated. **Conclusion:** The study highlights a substantial gap in knowledge among antenatal mothers regarding anemia prevention and management. Educational interventions targeting low-literacy populations and improved communication from healthcare providers are essential to address this gap.

KEYWORDS: *Nutritional deficiency anemia, antenatal mothers, knowledge assessment, education, PHC, maternal health, Barmer, Rajasthan.*

INTRODUCTION

Anemia continues to be one of the most prevalent and persistent global health issues, particularly among women of reproductive age and pregnant women. The World Health Organization (WHO) defines anemia in pregnancy as a hemoglobin concentration less than 11 g/dL, and globally, an estimated 29.9% of women aged 15–49 years and 36.5% of pregnant women were anemic as of 2019.[1] This condition is predominantly caused by nutritional deficiencies, most notably iron, folic acid, and vitamin B12. Other contributory factors include parasitic infections, chronic diseases, hemoglobinopathies, and socio-economic determinants. Nutritional anemia, particularly iron deficiency anemia (IDA), is the most widespread and significant form of anemia due to its severe implications for both maternal and fetal health outcomes.[2]

The physiological demands of pregnancy significantly elevate a woman's nutritional requirements, particularly for iron, making pregnant women highly susceptible to anemia. Iron is a critical micronutrient essential for DNA synthesis, cellular growth and differentiation, immune function, mitochondrial energy production, and adaptation to hypoxia. During pregnancy, iron requirements increase nearly tenfold—from approximately 0.8 mg/day in the first trimester to around 7.5 mg/day in the third trimester. This rise supports the expansion of maternal red blood cell mass, ensures adequate placental and fetal development, and compensates for anticipated blood loss during childbirth. The placenta alone demands nearly 90 mg of iron, while approximately 270 mg is transferred to the fetus throughout gestation. Inadequate iron intake or absorption during this critical period can lead to iron

deficiency anemia, which is associated with a range of adverse maternal and neonatal outcomes. These include fatigue, reduced physical and cognitive performance, heightened risk of infections, intrauterine growth retardation, low birth weight, preterm birth, perinatal mortality, and in severe cases, maternal death. Maternal anemia has long-term repercussions, including impaired cognitive and motor development in offspring and the perpetuation of intergenerational cycles of malnutrition and poverty.[3]

In India, anemia remains a major public health concern despite decades of government efforts through programs like the Anemia Mukt Bharat, the National Iron Plus Initiative (NIPI), and the National Nutrition Mission. As per the National Family Health Survey, approximately 57.2% of Indian women aged 15–49 years and 52.2% of pregnant women are anemic. Alarmingly, this shows an increase from NFHS-4 (2015–16), indicating that the problem is worsening rather than improving. The causes include inadequate intake of iron-rich foods, poor bioavailability of dietary iron due to phytate-rich cereals, frequent pregnancies, poor antenatal coverage, and lack of awareness and education about nutrition and supplementation.[4]

The situation is especially critical in the state of Rajasthan. As per the NFHS-5 Rajasthan State Fact Sheet (2021), 46.6% of pregnant women were found to be anemic, with a higher prevalence in rural areas (47.5%) compared to urban areas (41.4%).[5] Barmer district, located in the arid western part of the state, faces challenges such as limited access to healthcare, high illiteracy rates among women, and inadequate nutritional intake during pregnancy.

A study by Sharma et al., (2020) adds to this body of evidence by highlighting various socio-demographic risk factors for anemia. Conducted as a case-control study at a Primary Health Centre, the study involved 308 pregnant women, with 50 anemic (Hb <11 g/dL) and 50 non-anemic controls (Hb >11 g/dL). The findings revealed a significant association between anemia in pregnancy and variables such as diet, family size, educational level, social class, gravida, and parity. The mean hemoglobin levels were 9.58 g/dL in anemic participants and 11.55 g/dL in controls. This study supports the notion that sociodemographic variables are key determinants of anemia during pregnancy and must be considered while planning interventions.[6]

During a clinical posting at the Primary Health Centre (PHC) in Khadeen, Barmer district, the investigator noted that a significant number of pregnant women attending antenatal check-ups were diagnosed with anemia. It was also observed that these women had poor understanding of the causes, symptoms, consequences, and preventive measures related to nutritional deficiency anemia. Despite receiving iron and folic acid (IFA) tablets, many did not comply with the prescribed regimen due to lack of awareness, myths, or side effects. These findings highlighted the critical gap in health education among antenatal mothers.

The current study was thus conceptualized to assess the knowledge of antenatal mothers regarding prevention and management of nutritional deficiency anemia and to develop an information booklet as an educational intervention. Enhancing knowledge can lead to early detection, improved compliance with supplementation, better dietary habits, and, ultimately, reduction in maternal morbidity and mortality associated with anemia.

By focusing on the rural population of Barmer, this study seeks to provide insights into the level of awareness among antenatal women and reinforce the importance of structured educational programs as part of maternal healthcare services. The findings aim to support healthcare professionals and policymakers in implementing targeted, community-based interventions to combat nutritional anemia during pregnancy.

METHODOLOGY
Research Approach: The study employed a quantitative research approach.

Research Design: A non-experimental descriptive cross-sectional design was used.

Study Setting and Participants: The study was conducted at two selected Primary Health Centres (PHC Khadeen and PHC Bhadakha) located in Barmer district, Rajasthan.

Sampling: A non-probability convenience sampling technique was used to select 100 antenatal mothers who met the inclusion criteria and were available during the data collection period at the selected PHCs.

Data Collection: Data were collected using a structured questionnaire developed by the investigator to assess antenatal mothers' knowledge on nutritional deficiency anemia, along with their socio-demographic details such as age, education, occupation, family type, gravida, and source of information.

Data Analysis: Collected data were compiled and organized in a master data sheet. Descriptive statistics were used to summarize the socio-demographic data and knowledge levels. To assess the association between knowledge levels and selected socio-demographic variables, inferential statistics using the Chi-square (χ^2) test were applied. The significance level was set at *p < 0.05* for all statistical tests.

RESULT

Table 1: Frequency and percentages of distribution of socio - demographic variables of antenatal mothers. N= 100

S.N.	Demographical Variables	Categories	Frequency [f]	Percentage [%]
1	Age [Years]	≤ 20	16	16%
		21-25	40	40%
		26-30	25	25%
		>30	19	19%
2	Education	Primary	36	36%
		Secondary	29	29%
		Graduation and above	17	17%
		No formal education	18	18%
3	Occupation	House wife	90	90%
		Self employed	02	02%
		Private job	07	07%
		Govt. job	01	01%
4	Type of family	Joint family	62	62%
		Nuclear family	38	38%
5	Information about nutritional deficiency anemia	Yes	45	45%
		No	55	55%
	If yes, Source of information	Health care provider (Asha, ANM, Anganwadi worker)	25	55.56%
		Family members	06	13.33%
		Relatives and friends	08	17.78%
		Social media	06	13.33%
6	Gravida	Primigravida	48	48%
		Multigravida	52	52%

The Table 1 shows demographic data of 100 antenatal mothers revealed that the majority (40%) were aged between 21–25 years, followed by 25% in the 26–30 years age group, 19% above 30 years, and 16% aged ≤20 years. In terms of education, 36% had completed primary education, 29% had secondary education, 17% had graduation or above, while 18% had no formal education. A significant proportion (90%) were housewives, while a small number were engaged in private jobs (7%), self-employment (2%), or government jobs (1%). Most participants (62%) belonged to joint families, and 38% were from nuclear families. Regarding awareness, 55% of the antenatal mothers reported having no prior information about nutritional deficiency anemia, while 45% had some awareness. Among those who were informed, the majority (55.56%) cited health care providers such as ASHA workers, ANMs, or Anganwadi workers as their source, followed by relatives and friends (17.78%), family members (13.33%), and social media (13.33%). Regarding obstetric history, 48% were primigravida and 52% were multigravida, indicating a fairly balanced distribution in terms of pregnancy experience.

Table 2: Frequency and percentage distribution of knowledge level of antenatal mothers regarding nutritional deficiency anemia. N=100

S. No.	Level of knowledge Score	Frequency [f]	Percentage [%]
1	POOR (0-13)	58	58%
2	AVERAGE (14-19)	29	29%
3	GOOD (20-26)	13	13%
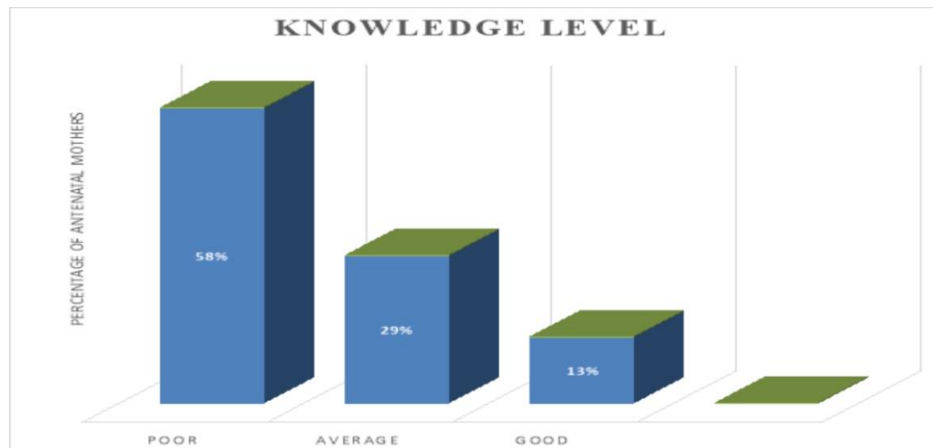
Figure 1: Frequency and percentage distribution of knowledge level of antenatal mothers regarding nutritional deficiency anemia.

The findings from Table 2 & Figure 1 shows that 58% of antenatal mothers had poor knowledge, 29% had average knowledge, and only 13% had good knowledge regarding nutritional deficiency anemia, indicating a need for improved awareness.

Table 3: Findings related to Association of the level of knowledge with selected demographic variables among antenatal mothers. N= 100

S. N.	Demographic Variables	Chi- Square (χ^2)	Df	Tabulated value	LOS @ 0.05
1.	Age (Year)	10.0884	6	12.59	N.S.
2.	Education	46.7628	6	12.59	S.
3.	Occupation	9.3976	6	12.59	N.S.
4.	Type of family	13.2356	2	5.99	S.
5.	Source of information	12.9252	6	12.59	S.
6.	Gravida	5.6188	2	5.99	N.S.

The Table 3 presents Chi-square test results indicate a significant association between knowledge levels and the variables education, type of family, and source of information, as their calculated values exceeded the tabulated value at 0.05 level of significance. However, age, occupation, and gravida showed no significant association with knowledge levels, as their chi-square values were below the tabulated value, indicating no statistically significant relationship.

DISCUSSION
The present study aimed to assess the knowledge regarding prevention and management of nutritional deficiency anemia among antenatal mothers at selected PHCs in Barmer, Rajasthan. The findings revealed that a majority of antenatal mothers (58%) had poor knowledge, 29% had average knowledge, and only 13% demonstrated good knowledge. This indicates a considerable gap in awareness among the target population. One of the key findings supporting this conclusion is the significant association found between educational status and knowledge level (χ^2=46.76, p<0.05), suggesting that maternal education plays a critical role in understanding and managing anemia during pregnancy.

The study's findings align with those of T. Rani et al. (2018), which found that 70% of antenatal women had inadequate knowledge of anemia, with only 6.67% demonstrating adequate knowledge. The study also showed that variables like education and antenatal care attendance were significantly associated with knowledge levels, supporting the idea that lack of formal education and ANC exposure contributes to poor anemia awareness.[7] Similarly, Kaur and Singh (2000) demonstrated that women who received structured health education showed significantly better knowledge scores compared to those who did not, highlighting the impact of targeted education.[8] The present study also noted a significant relationship between source of information and knowledge level. This finding is supported by Ejidokun (2000), who found that in Lagos, Nigeria, the recognition of anemia-related complications among pregnant women was very low, particularly among those without access to health communication strategies.[9]

In comparison to Pushpa Lokare et al. (2012), who reported an 87.2% prevalence of anemia among urban pregnant women and identified socio-demographic factors such as education and economic status as significant, our findings further confirm that educational background directly affects awareness and practices concerning anemia.[10] Sharma et al. (2003) also

emphasized the role of dietary habits and cultural practices on anemia levels, finding that knowledge varied with diet type, but was uniformly low across education levels in urban Delhi.[11] This is consistent with our observation that only 13% of women had good knowledge, despite nearly half being multigravida. Galloway et al. (2002), in a multicountry study, reported that most women were unaware of the purpose of iron supplementation and feared side effects—aligning with our field observations that many antenatal mothers did not comply with supplementation due to lack of awareness.[12]

Our results further resonate with F Moradi et al. (2007), who found that only 43.3% of Iranian pregnant women used iron tablets correctly despite being aware of their importance.[13] Similarly, Fredy Marwa et al. (2025), who found that although 70.4% of pregnant women reported receiving anemia-related information during ANC visits, only 34.4% were informed on at least five key topics, indicating gaps in health worker communication and consistency in educating pregnant women. In our study, the most common source of information was healthcare workers (55.56%), which was similar to findings in study conducted by Kalimbira et al. (2009) where health facilities were the primary source of iron supplements, yet actual compliance was low.[14] Finally, Raksha et al. (2016) found that while 54% of primigravida women had heard of anemia, only 30% translated this into dietary or supplement practice, similar to our study where knowledge levels were poor despite ANC visits.[15]

The study assessed knowledge of nutritional deficiency anemia among antenatal mothers at PHCs in Barmer, Rajasthan, aiming to identify awareness gaps and test the link between knowledge and sociodemographic factors. It found that 58% had poor knowledge, with significant associations to education, family type, and information source. Strengths included a structured, validated tool, while limitations were the small, localized sample and non-random sampling. No unexpected findings emerged, but low knowledge despite ANC visits stood out. The study highlights the need for targeted education and suggests future research with larger, more diverse samples to evaluate intervention effectiveness.

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