



ANEMIA IN RURAL MEERUT: A PUBLIC HEALTH PERSPECTIVE ON WOMEN OF REPRODUCTIVE AGE

Community Medicine

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ABSTRACT

Background: In India, anemia remains a severe public health concern, affecting more than 50.0% of individuals across most age groups. Among women of reproductive age in rural India, the prevalence is alarmingly high, compounding the challenges of maternal and child health. **Aim And Objectives:** The study was planned to assess the prevalence and severity of anemia in women of reproductive age group in rural Meerut. **Material And Methods:** The present cross-sectional study was conducted in Machhra village of district Meerut in 100 women of reproductive age group. Multi-stage random sampling method was used. Hemoglobin was tested using TrueHb hemoglobinometer. **Results:** The overall prevalence of anemia was 52.0% in all women (15-49 years). Highest percentage of anemia was found in lactating women (56.2%). Overall moderate anemia was the most common entity affecting more than half, (55.8%) of the anemic participants. **Conclusion:** More than half of the women of reproductive age group (15-49 years) had anemia. The present study concluded that lactating women were the most affected group. Moderate anemia was the most common entity affecting more than half of the anemic females. **Recommendation:** It is essential to provide regular iron and folic acid supplementation, promote locally available iron and Vitamin C-rich foods (spinach, jaggery, Indian gooseberries, green leafy vegetables, millets etc), and conduct routine anemia screenings, including hemoglobin checks in adolescent, antenatal and postnatal females through school health camps, ANC days.

KEYWORDS

Anemia, iron deficiency, hemoglobinometer, rural, nutrition

INTRODUCTION:

Anemia is a condition characterized by a reduced number of red blood cells or hemoglobin levels below normal, leading to symptoms such as fatigue, weakness, and shortness of breath.¹ Over time, untreated anemia can have severe health consequences, including growth retardation in adolescents, poor maternal and fetal outcomes during pregnancy, and increased susceptibility to infections. Globally, anemia is the second leading cause of disability and is associated with over 115,000 maternal deaths and 591,000 perinatal deaths annually, with the highest burden observed in Africa and Southeast Asia.²

In India, anemia remains a severe public health concern, affecting more than 50.0% of individuals across most age groups. Among women of reproductive age in rural India, the prevalence is alarmingly high, compounding the challenges of maternal and child health. According to the National Family Health Survey (NFHS-5), rural areas of Uttar Pradesh (U.P.) exhibits an anemia prevalence of 50.7% among non-pregnant females aged 15–49 years, 47.9% among pregnant females, and 52.8% among adolescent girls aged 15–19 years.³

The predominant cause of anemia in India is nutritional deficiency, particularly iron deficiency, which disproportionately impacts adolescent girls and pregnant women. Nutritional anemia contributes significantly to adverse health outcomes, such as high maternal mortality rates, low-birth-weight infants, and elevated perinatal mortality.⁴

Addressing anemia is critical for improving health indicators and enhancing the overall well-being of communities in rural India. This study was planned to evaluate anemia status in women of reproductive age (15-49 years) from rural area of Meerut (U.P.), for providing insights into its public health implications and the need for targeted interventions.

AIM AND OBJECTIVES:

The present study was undertaken to assess the prevalence and severity of anemia in women of reproductive age group (15-49 year), and to find out association between prevalence of anemia and pregnancy status of these women.

MATERIAL AND METHODS:

The present cross-sectional study was conducted in Machhra village of district Meerut. The study period was from February-September, 2022. Study population was women of reproductive age group (15-49 years)

residing in village Machhra. **Inclusion criteria:** All women aged 15-49 years in the study area. **Exclusion criteria:** All those who were not willing to participate or suffering from any chronic debilitating illness. Sample size was calculated as follows: $N = Z_{\alpha/2}^2 p q / d^2$, where p is the prevalence (taken from NFHS-5 as 50.7% in non-pregnant females aged 15–49 years), q = 1-p and d is absolute precision of 10%. The sample size came out to be 97, which was rounded off to 100.

Sampling Method:

Multi stage random sampling was employed as follows, out of 12 community health centres (CHC) in district Meerut, one CHC was randomly selected using lottery method, which came out to be CHC Machhra. Out of 136 villages catered by CHC, one village was randomly selected employing lottery method once again, and it turned out to be Machhra village. First household was selected using pencil tip method, subsequent households towards the right of the first house were taken till the desired sample size was obtained.

The participants were interviewed using pre-designed and pre-tested questionnaire and hemoglobin estimation was done using True-Hb hemoglobinometer, designed by Wrig Nano Systems Limited. WHO classification of anemia was used to classify the participants for presence/absence of anemia as well as for determining its severity⁵.

Data was tabulated and analysed using Microsoft Excel. Chi-square test was used as the test of significance. The results were considered significant at p value < 0.05. Consent and assent was obtained from the beneficiaries and guardians respectively. Ethical clearance was taken from institutional ethical committee.

RESULTS:

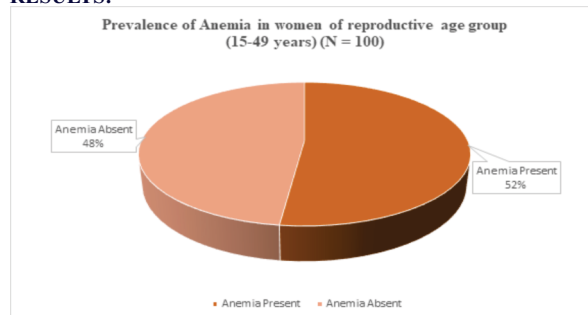


Fig-1: Prevalence Of Anemia In Women Of Reproductive Age Group

Out of 100 participants, majority of the females 61 (61.0%) were non pregnant, 23 (23.0%) were pregnant women, while 16 (16.0%) were lactating women. The overall prevalence of anemia was 52.0% in all women (15-49 years) as shown in figure-1. Amongst non-pregnant, pregnant, and lactating women, anemia was present in 33 (54.1%), 10 (43.5%) and 9 (56.2%) of females respectively as depicted in table-1. Although highest percentage of anemia was found in lactating women but the association between prevalence of anemia with pregnancy status was not significant ($p=0.64$).

Table-1: Association Of Prevalence Of Anemia With Pregnancy Status Of Women (N = 100)

Pregnancy Status of women (15-49 years)	Anemia			p-value
	Present n (%)	Absent n (%)	Total n (%)	
Non-pregnant	33 (54.1)	28 (45.9)	61 (61.0)	0.64 Not significant
Pregnant	10 (43.5)	13 (56.5)	23 (23.0)	
Lactating	09 (56.2)	07 (43.8)	16 (16.0)	
Total	52 (52.0)	48 (48.0)	100 (100)	

Table-2 demonstrates the distribution of anemic participants according to severity of anemia. Highest percentage of participants in each category (non-pregnant, pregnant, and lactating) were moderately anemic i.e., 17 (51.5%), 6 (60.0%), and 6 (66.7%) respectively, whereas mild anemia was present in 9 (27.3%), 3 (30.0%), and 1 (11.1%) of non-pregnant, pregnant, and lactating females respectively. Amongst non-pregnant anemic participants, 7 (21.2%) had severe anemia, followed by 2 (22.2%) of lactating woman, and 1 (10.0%) of pregnant women.

Table-2: Distribution Of Anemic Participants According To Severity Of Anemia (n = 52)

Pregnancy Status of women (15-49 years)	Severity of anemia			Total n (%)
	Mild n (%)	Moderate n (%)	Severe n (%)	
Non-pregnant	09 (27.3)	17 (51.5)	07 (21.2)	33 (63.5)
Pregnant	03 (30.0)	06 (60.0)	01 (10.0)	10 (19.2)
Lactating	01 (11.1)	06 (66.7)	02 (22.2)	09 (17.3)
Total	13 (25.0)	29 (55.8)	10 (19.2)	52 (100)

Overall moderate anemia was the most common entity affecting more than half, 29 (55.8%) of the anemic participants followed by mild anemia 13 (25.0%) and severe anemia 10 (19.2%), as shown in figure 2.

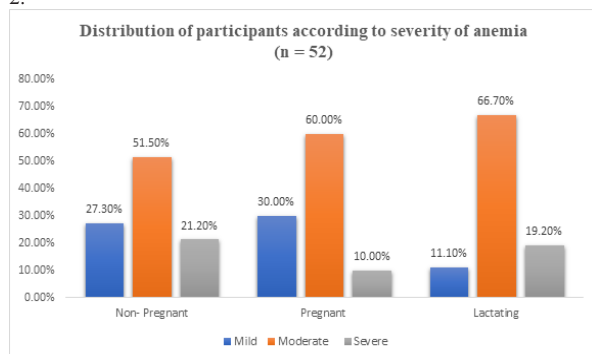


Fig-2: Distribution of participants according to severity of anemia

DISCUSSION:

Anemia is a major public health concern in adolescent girls and pregnant women in the developing world. While many studies have examined pregnant women extensively, there is a paucity of data on anemia among adolescent girls and young women who were living in developing countries, in the complex cycle of poverty and malnutrition. The high incidence of anemia among women of reproductive age is attributed to several factors: increased iron demands due to growth, menstrual blood loss, high iron requirements for hemoglobin production and low consumption of iron-rich foods, irregular eating patterns, aversion to iron-rich foods such as green leafy vegetables, and the presence of iron absorption inhibitors in the diet (phytates, tannins specially in tea).

of reproductive age group were anemic, the findings were comparable with NFHS-5³, which shows 50.7% prevalence of anemia in all women (15-49 years) from rural area of U.P. NFHS-5 was conducted in U.P. in January-March, 2020, whereas present study was conducted in 2022, similar prevalence which can be implicated to slowdown of Anemia Mukh Bharat programme during covid-19.

The findings of the present study align with Kamble BD et al. (2021)⁶ who reported 59.0% prevalence of anemia in adolescent girls of Delhi. Patil SD et al.⁷ in Ukkali village, Vijayapur district, Karnataka reported 61.4% prevalence among pregnant women (20-34 years) and 65.0% among lactating women (20-34 years). In the present study highest prevalence of anemia was observed in lactating women (56.2%) followed by non-pregnant women (54.1%), and lowest in pregnant women (43.5%).

Similar findings were reported by Gollandaj J.A. (2019)⁸ in Karnataka among women of reproductive age group where the prevalence of anemia was higher in lactating mothers (48.0%) followed by pregnant (45.4%) and non-pregnant/non-lactating women (44.4%). Lower prevalence of anemia amongst pregnant women can be due to effective ante-natal care (ANC) in terms of early registration and proper utilization of resources.

The present study reported that moderate anemia was most common form of anemia reported in 55.8% of all anemic women. The findings were consistent with that of Yadav U (2019)⁹ who similarly reported that amongst anemic women, majority (63.2%) were moderately anemic.

CONCLUSION:

More than half of the women of reproductive age group (15-49 years) had anemia. The present study concluded that lactating women were the most affected group, followed by non-pregnant, and pregnant women. Moderate anemia was the most common entity affecting more than half of the anemic females, it was followed by mild anemia in one-fourth of the anemic participants, which was closely followed by severe anemia.

Recommendation:

To tackle the high prevalence and severity of anemia among women of reproductive age, it is essential to provide regular iron and folic acid supplementation, promote locally available iron and Vitamin C-rich foods (spinach, jaggery, Indian gooseberries, green leafy vegetables, millets etc), and conduct routine anemia screenings, including hemoglobin checks in adolescent, antenatal and postnatal females through school health camps, ante-natal care (ANC) days. Health education campaigns should raise awareness about anemia prevention and emphasize proper nutrition during pregnancy and lactation. Strengthening maternal health services and better utilization of facilities under Anemia Mukh Bharat programme are critical steps to curb anemia in India. Collaboration with food industries to fortify staples and improve local healthcare delivery can further enhance outcomes, reducing anemia rates and improving maternal and child health.

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The present study reveals that more than half 52 (52.0%) of the women