Prevalence of Anaemia and It's Associated Factors Among Pregnant Women in an Urban Slum Area in the South Eastern City of Maharashtra: A Cross Sectional Study

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ABSTRACT

One of the most prevalent dietary deficiencies that plague pregnant women is anaemia. It presents major health risks, which in turn have a big impact on maternal morbidity and death in developing nations. The prevalence of anaemia has increased by 6.2% over the past five years, according to NFHS 4 and 5 data. The purpose of the current study was to determine the prevalence of anaemia and the risk factors for anaemia in pregnant women. In the south-eastern city of Maharashtra, 164 pregnan t women living in an urban slum participated in a community-based cross-sectional study. Using Sahli's method to estimate haemoglobin, it was categorised in line with WHO guidelines. The socio demographic, dietary and obstetric details were collected and entered in excel sheet and was analysed by SPSS. About 59.8% of study subjects were above 20 years. About 32% belongs to lower middle socio economic class. About 94 out of 164 trial participants a frequency of 57% were determined to be anaemic. The contributions from mild, moderate and severe anaemia were 29, 21.08 and 6.02%, respectively. There is a statistically significant link between anaemia and consumption of IFA, religion, socioeconomic status, age at first childbirth and average spacing. Even though the national health programme offers IFA supplementation, anaemia among pregnant women continues to be a significant public health issue in our nation. There should be action taken to address this issue and identify the risk factors.

INTRODUCTION

Anaemia has been recognised as the most common form of nutritional deficiency world wide, particularly in developing countries like India. Reduced intake and increased demand of iron rich foods and excess demand in case of multigravida women, altered metabolism along with the background characteristics like low socio economic status, poor literacy, early age of marriage, reduced gap between consecutive pregnancies and increased susceptibility to hook worm infections during pregnancy are the main contributing factors for anaemia in pregnant women[1].

When the RBC count or oxygen carrying capacity is insufficient to meet physiologic demands, anaemia is present. Conventionally, anaemia is defined as having a haemoglobin level that is less than two standard deviations (SD) below the median value for a healthy population that has been matched by age, gender, altitude, smoking and pregnancy status. Anaemia is defined by the centres for disease control as pregnant haemoglobin levels of less than 10.5 g dL^{-1} and 11 g dL^{-1} (Haematocrit 33%) in the first and third trimesters, respectively[2].

Pregnancy anaemia is defined by the WHO as Hb less than 11 g dL^{-1}. According to the World Health Organisation, the prevalence of anaemia is 14% in affluent nations, 51% in poor nations and 65-75% in India[3,4].

One of the main causes of maternal and perinatal mortality among pregnant women is anaemia. Pregnancy-related anaemia causes one-fifth of maternal fatalities and is a significant contributor to low birth weight newborns. Anaemia is blamed for 16% of maternal fatalities in India. Due to the high frequency of anaemia, insufficient dietary intake of iron and folate and negative health effects. In 1970, India became the first developing nation to implement a national nutritional anaemia prevention programme[5-7]. In India, 57% of women and 25% of males between the ages of 15 and 49 have anaemia, per the NFHS-5 data. About 3% of women have severe anaemia, 29% have moderate anaemia and 26% have light anaemia. Prevalence of anemia has increased between NFHS 4 and NFHS 5. Among women the prevalence increased from 53% in 2015-16 to 57% in 2019-21. Anaemia varies with maternity status, 61% of women who are lactating are anaemic and 52% of pregnant women and 57% of women who are neither pregnant nor breast feeding are anemic[8,9].

Data from the NFHS 5 Maharashtra indicate that 54% of pregnant women have anaemia. They have anaemia in varying degrees, 24% have mild anaemia, 27% have moderate anaemia and 2.8% have severe anaemia[10-13].

Half of all anaemia in the world is thought to be caused by iron deficiency, however, anaemia can also be brought on by malaria, hook worms, other helminths, nutritional deficiencies, persistent illnesses and hereditary disorders. Anaemia can lead to low birth weight, early delivery, perinatal mortality, weakness, reduced physical and mental stamina, increased infection-related morbidity and maternal mortality[14].

Aims and objectives:
- To determine how common anaemia is among pregnant women in an urban field practise region of a tertiary healthcare facility
- To research nutritional, sociodemographic and obstetric aspects that are linked to anaemia in pregnant women

MATERIALS AND METHODS

A community-based descriptive cross-sectional study was done among 164 pregnant women living in a Latur district urban slum. The goal of the study was to determine the prevalence of anaemia and the risk factors for anaemia in pregnant women:

- **Study design:** A cross-sectional research conducted in a community
- **Study setting:** Urban slum area of latur
- **Study duration:** July 2022 to December 2022 (6 months)
- **Study population:** Population of an urban slum area of latur district
- **Study subjects:** Pregnant women residing in the urban slum area

According to NFHS-5 data, 54% of pregnant women in Maharashtra have anaemia. The sample size was determined using the equation:

$$n = \frac{4PQ}{L2}$$

Computed with a relative error of 10%. About 164 pregnant women living in the UHTC field practise region comprised the sample.

Stratified random sampling method was used for sampling. Study area was divided into 5 stratas according to religion. Probability proportional to sample size method was used to select the number of study subjects to be included from each strata. Then consecutive sampling method was used according to house number till desired sample size was obtained.

Inclusion criteria: Regardless of gestational age, all pregnant people who have lived in the study area for more than a year are included in the study.

Exclusion standards:
- Expectant mothers who refuse to take part in the study
- Expectant women with recent blood transfusions, significant surgeries, immune suppressive therapy, and known chronic medical illnesses such cancer, hemoglobinopathies and renal disease

Clearance from the ethical committee was obtained. House to house visits were used to enrol eligible pregnant women until the target sample size was reached. All study participants provided their written informed permission.

Predesigned, pretested questionnaire was used as the tool for data collection. The questionnaire was used as the tool for data collection. The questionnaire included identification data, socio demographic profile, detailed dietary history and obstetric history.

Educational status was classified according to Kuppuswamy classification. Socio Economic Status was classified according to modified BG Prasad's classification.

Grading of anemia was done according to WHO criteria:

- **No anemia:** Hb>11 g dL^{-1}
- **Mild anemia:** Hb 10-10.9 g dL^{-1}
- **Moderate anemia:** Hb 7-9.9 g dL^{-1}
- **Severe anemia:** Hb<7 g dL^{-1}

Data analysis: The data was entered into an Excel spreadsheet by Microsoft and examined with SPSS software. The estimated values for mean, standard deviation and percentages. The chi-square test was used to examine the relationships between anaemia and sociodemographic, nutritional and obstetric variables. The means of two samples were compared using an independent sample t-test. It was deemed important at $p = 0.05$.

RESULTS

Most of the study subjects were belonging to the age group of ≥20 (59.8%). Majority of participants were Hindus (45.7%) followed by Muslim (32.9%) and Jain (12.19%). Most of the study subjects were home makers (81.7%). Most of them were from nuclear families (58.5%). Majority of the study participants were studied upto high school level (72%). According to modified B G prasad classification majority of the stufy participants belongs to middle socioeconomic class (31.7%) followed by lower middle class (23.17%) (Table 1).

In the research area, the prevalence of anaemia among pregnant women was found to be 57.3%. Mild, moderate and severe anaemia each made up 30, 29 and 3% of the total. The average Hb of the study participants was 10.488 0.309 g%. Figure 1 a statistically significant correlation was found between anaemia and socioeconomic class (COR-3.19) and religion (Muslim COR-2.98 and Buddist COR-5.81) (Table 2).

In the current study, the relationship between anaemia and obstetric variables was examined. It was found that anaemia was significantly correlated with age at menarche 13 vs >13 years (69.84 vs 48.64%), gestational age of the third trimester vs the first trimester (70.83 vs 43.33%), average spacing 3 vs >3 Years (72 vs 25%), IFA consumption No vs yes (91.66 vs 58) (p<0.05) (Table 3).

The prevalence of anaemia was significantly higher in pregnant women (75%), vegetarians (76.92%) and those who consumed less protein and green leafy vegetables (72.5%) and fruits on a regular basis (76.81) (p<0.05) (Table 4).

Table 1: Socio-demographic characteristics of study participants (N = 164)

Variables	Sub-group	Frequency	Percentage
Age (years)	<20	65	39.6
	≥20	99	60.36
Religion	Hindu	75	45.7
	Muslim	54	32.9
	Jain	20	12.19
	Buddhist	9	5.4
	Others	6	3.6
Occupation	Home maker	134	81.7
	Working	30	36.5
Type of family	Nuclear	96	58.5
	Joint	68	41.4
Education	≥High school	72	72
	<high school	28	28
SES	Upper class (I)	18	11.18
	Upper middle class	24	14.6
	Middle class	52	31.7
	Lower middle	38	23.17
	Lower class	30	18.29

Table 2: Association of anemia with socio-demographic factors (N = 164)

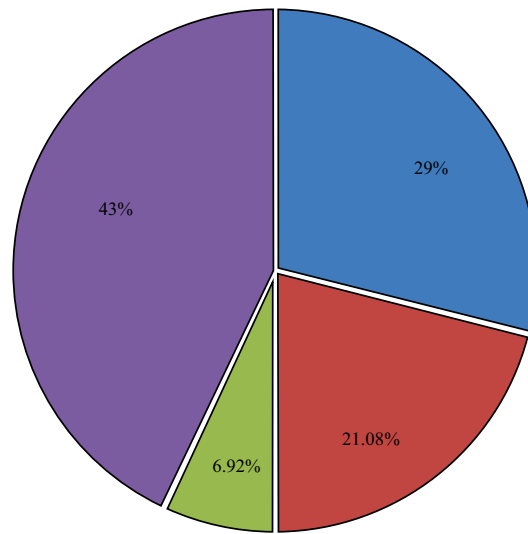| Variables	Sub-group	Anaemic (N = 68)	Non anaemic (N = 32)	Chi-square	p-value
Age (years)	<20	36	29	0.164	0.680
	≥20	58	41		
Religion	Hindu	50	20	10.99	0.026
	Muslim	26	28		
	Jain	12	8		
	Budhist	4	7		
	Others	2	4		
Occupation	Home maker	63	41	1.23	0.260
	Working	31	29		
Education	≥High school	46	26		0.266
	<high school	16	12		
SES	Upper class	6	12	7.35	0.118
	Upper middle	14	10		
	Middle class	33	19		
	Lower middle	20	18		
	Lower class	21	9		

Fig. 1: Grades of anemia among the pregnant women (N = 164)

Table 3: Obstetric factors associated with anaemia among pregnant women (N = 164)

Variables	Sub-groups	Anaemic (N = 62)	Non anaemic (N = 38)	p-value
Age at menarche	>13 Years	74 (69.84)	42 (30.15)	0.009*
	>13 years	20 (48.64)	28 (51.35)	
Trimester	1st	12 (43.33)	18 (56.66)	0.041*
	2nd	68 (69.56)	45 (30.43)	
	3rd	14 (70.83)	7 (29.16)	
Gravid status	Primi	41 (65.07)	22 (34.92)	
	Multi	21 (56.75)	16 (43.24)	
Average spacing (n = 63)	<3 years	38 (72)	4 (28)	
	>3 years	10 (25)	11 (75)	0.0002*
IFA consumption (n = 70)	Yes	28 (58.69)	66 (41.30)	0.0001*
	No	66 (91.66)	4 (8.33)	
Albendazole (n = 70)	Yes	22 (62.74)	58 (37.25)	
	No	72 (89.47)	12 (10.52)	0.0001*

*P: Significant, Chi- square test

Table 4: Dietary factors associated with anaemia among pregnant women (N = 164)

Variables	Sub-group	Anaemic (N = 62)	Non anaemic (N = 38)	Chi-square value	p-value
Type of diet	Vegetarian	64	33	7.280	0.006*
	Mixed	30	37		
Daily green leafy vegetables	Yes	36	48	14.700	0.0001
	No	58	22		
Daily fruits consumption	Yes	21	30	7.880	0.004*
	No	73	40		
Dairy products	Yes	47	41	0.106	0.74
	No	37	29		
Daily calories intake	Sufficient	20	51	43.500	0.00001*
	Deficient	74	19		
Daily protein intake	Sufficient	48	37	0.051	0.82
	Deficient	46	33		

*P: Significant, Chis-quare test

Anaemia was prevalent in 57% of pregnant women. Specifically, mild, moderate and severe anaemia each contributed 29, 21.08 and 6.92%.

DISCUSSIONS

In order to determine the prevalence of anaemia among pregnant women and the risk factors associated with it, a cross-sectional study was carried out in an urban slum area in the Latur district. The prevalence of anaemia among pregnant women was found to be 57% in the current study. Figure 1 According to a comparable study conducted by Kumar et al.[16] in Hyderabad, 57% of pregnant women in the sample population had anaemia. The results of these investigations agreed with those of the current study. In contrast to the current study, a study conducted in Aurangabad, Maharashtra by Lokare et al.[17] revealed a significant frequency of anaemia among pregnant women (87.21%). In the current research the percentages from mild, moderate, and severe anaemia were 29, 27 and 6.02%, respectively. In a study by IIPS[18], participants had a low prevalence of severe anaemia (2.3%). According to a 2012 study by Lokare et al.[17] mild, moderate and severe anaemia were all quite common (24.7, 54.5 and 7.9%, respectively).

Majority of participants were Hindus (45.7%) followed by Muslims (32.9%) and Jains (12.19%). Most of the study subjects were home maker (81.7%) and belonging to middle Socioeconomic class (31.7%) (Table 1). High prevalence of anaemia was seen among Hindus and Jains compared to Muslims. It can be because of their dietary habits. Most of the study subjects from Hindu community and Jain community were taking vegetarian diet. According to this study prevalence of anemia is more in vegetarians compared to those who consume non vegetarian food. A study by Park[19] found that a high percentage of vegetarians had reduced iron stores and a higher percentage of vegetarians than nonvegetarians had iron deficiency anaemia. In a study by Lokare et al.[17], similar results were seen. In the current study, the relationship between anaemia and obstetric variables was examined. It was shown that anaemia was substantially correlated with age at menarche (69.84 vs. 48.64%) among those under and over 13 years old. p-value less than 0.05. Similar results were found in a descriptive study conducted in Western Maharashtra by Mohite et al.[20]. A study done by Chaturvedi et al.[21]. in Kolhapur, Maharashtra showed higher prevalence of anemia among girls who had early menarche. High prevalence of anemia was seen in second trimester (69.56%) followed by 3rd trimester. Similar findings of higher prevalence of anemia during second trimester was found in a study done by Swarnlatha[22] which was 77% in second trimester. Hemodilution may be to blame for this. In this study, anaemia is caused by average separation of <3 years (3 vs. >3 years). Similar results were observed in studies conducted by Swarnlatha[22] and de Benoist et al.[2]. Women who were not taking iron and folic acid tablets had higher rates of anaemia. According to a study by Pandey et al.[15], preventive iron supplementation during pregnancy is significantly associated with anaemia. A study done by Mitra et al.[10], in Mangalore, Karnataka, showed higher prevalence of anemia among those who does not take IFA tablets. Consumption of deworming tablets also showed significant association with prevalence of anemia in the present study (Table 3).

The prevalence of anaemia was considerably higher among vegetarians, pregnant women who consumed insufficient calories each day and people who did not regularly consume green leafy vegetables and fruits (p0.05) (Table 4). It was found that eating of green leafy vegetables was independently related with IDA in a study conducted by Mohite et al.[20]. According to a different study by de Mayor et al.[1], eating fruit two or more times per week was linked to a lower incidence of anaemia. The results of this investigation are consistent with those of these studies.

CONCLUSION

The results of this study reveal that, despite the fact that iron-folic acid supplementation is provided under the national health programme to address this issue, anaemia is still a public health problem and its prevalence among pregnant women remains unchanged from previous years. When developing and putting into practise targeted therapies for the control of anaemia in specific groups, primary care physicians must take additional risk factors into account.

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