

Anaemia and its associated factors among pregnant women in rural area of North India

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ABSTRACT

Objective: The aim of the present study is to determine the prevalence of anaemia among pregnant women and its association across socio-demographic and other risk factors. **Methodology:** It was a cross-sectional study conducted in the Faridkot district of Punjab. A total of 594 pregnant women were enrolled by consecutive sampling. Data were collected through semi-structured interview schedule and haemoglobin estimation was done using Sahli's method. **Results:** The prevalence of anaemia was found to be 89.7% (with 55.4% and 34.3% of pregnant women having moderate anaemia and mild degree of anaemia). No case of severe degree of anaemia was reported. Prevalence of anaemia was significantly ($p < 0.05$) higher among women belonging to the scheduled castes, middle income groups and those who went out in the fields for open defecation. **Conclusion:** In addition to preventive programs against anaemia, the study highlights the need for dietary counselling and nutritional education among the pregnant women as well as their family members.

Keywords: Anaemia, haemoglobin, pregnant women, prevalence.

Anaemia is one of the major public health problem and common nutritional deficiency across the world¹. It is especially prevalent in women of reproductive age group, particularly during pregnancy^{2, 3}. As per estimates, anaemia during pregnancy is present in around 14% of the pregnant women in developed countries and 51% in developing nations⁴. As per results of Indian Council of Medical Research Micronutrient survey, conducted across 16 districts in India, anaemia among pregnant women was found to be in the range of 33% and 89%^{5, 6}.

Anaemia is the second most common cause of maternal deaths across the world, out of which 20% of the total deaths are reported from India⁷. Also, this death constitutes 80% of the total maternal deaths in South Asian region⁸. Further, anaemia is also the 9th leading cause of disability adjusted life years (DALY) loss among women of age group 15-49 years across the world⁴. Furthermore, anaemia causes various pregnancy related complications such as premature labour, poor weight gain and dysfunctional labour, low birth weight, foetal and neonatal distress⁹⁻¹¹.

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Iron and folate deficiency is seen as one of the major cause of anaemia among the women of reproductive age group. This deficiency is related to either low dietary intake of these nutrients or poor bioavailability or chronic blood loss during infections such as malaria and hookworm infestations¹². Considering this, Government of India launched an iron supplementation program i.e., National Nutritional Anaemia Prophylaxis Program (NNAP) in 1970 during the fourth 5-year health plan with the aim of reducing anaemia among the women of reproductive age group¹³. Under this program a minimum dose of 100 iron and folic acid tablets (IFA) during the period of pregnancy had been recommended. In addition to this, IFA tablets are also being distributed to pregnant women as a part of service package under RCH (Reproductive and child health) program since 1997, which has now been modified to RMNCHA program¹⁴. Further, recently introduced Weekly iron folic acid scheme (WIFS) distributes IFA tablets to adolescent/teenage girls to improve their anaemic status before they enter the reproductive age group¹⁵.

Despite all these efforts, anaemia stills remain prevalent across India. The present study hypothesized that various socio-demographic and risk factors during pregnancy could be the barriers in front of the efforts put in place for the prevention of anaemia. In view of the above, the present study was planned to determine the prevalence of anaemia among pregnant women and study its association across socio-demographic and other pregnancy related risk factors in rural area of Faridkot district of Punjab, India.

Material and Methods

It was a descriptive cross sectional study conducted in the rural area of Faridkot district of Punjab. There are 2 blocks in the Faridkot district i.e., Baja Khana and Jand Sahib with 37 and 25 sub health centres in each block respectively, with a total of 62 sub centres in the district. All the pregnant women coming for their ante natal check-ups (ANC) at the sub centre irrespective of their gestational age and previous ANC visits were considered eligible for the study. Systematic random sampling was adopted to select every 3rd sub health

centre in the study. Thus, a total of 20 sub centres were shortlisted i.e., 12 from Baja Khana and 8 from Jand Sahib. A total of 594 pregnant women were enrolled in the study by consecutive sampling method during 2 months period from April to May 2012. A pre-tested, semi-structured interview schedule was used for data collection. Socio-demographic information like age, marital status, educational status, occupation, source of drinking water and defecation facility and other relevant risk factors like number of children, gestational period, pregnancy gap and intake of iron folic acid supplements by the pregnant women were collected using this schedule. Written informed consent was obtained before starting of any interview with the patient. Ethical clearance was obtained from the Institutional Ethical Committee of Baba Farid University of Health Sciences, Faridkot.

Haemoglobin estimation was done by Sahli's method by a trained laboratory technician and Sahli's haemoglobinometer was used to determine haemoglobin level^{16, 17}. Typing of anaemia was done as per standard peripheral blood smear examination. Anaemia was classified as per WHO (World Health Organization) criteria. According to this classification, haemoglobin (Hb) concentration level below by 11.0 gm/dl was considered as anaemia during pregnancy. Hb concentration level in the range of 10.0-10.9 gm/dl, 7.0-10.0 gm/dl and less than 7.0gm/dl were labelled as mild, moderate and severe degree of anaemia respectively¹⁸.

Data entry and analysis was done in SPSS version 17. Frequency distribution and chi-square tests were applied to see the association between anaemia and selected socio-demographic and other pregnancy related risk factors. P value of less than 0.05 was taken as statistically significant.

Results and Observations

Out of total sample, around half of the women were in the age group of 21-25 years (n=318, 53.5%) with the mean age of around 23.9 years (SD: 3.04). Around 60% of these women belonged to the scheduled caste category (n=368), 51% had primary or middle level of education (n=173), 39% used storage tank as a source

of drinking water and 69% (n=402) belonged to the families where either agriculture or daily wage labour was the main source of income (Table 1). The sample was divided into income quintiles based on the annual income of the households of the pregnant women.

Thirty eight percent (n=224) of the pregnant women belonged to the primi-gravida group followed by 1/3rd (n=193) in the second, and the remaining in the third and above gravida. As far as parity is concerned, nullipara was most commonly reported (46%).

Among those women, who had given previous birth (n=316), 18-36 months was the most common birth interval (44%). Around 94% (559) of the women had consumed iron folic acid tablets (IFA) during the current pregnancy and 6% (n=37) had undergone abortion during previous pregnancies (Table 2).

Out of total sample, 89.7% (n=533) were anaemic, with mild and moderate anaemia in 34.3% (n=204) and

55.4% (n=329) of the women respectively (Table 3). None of the women was found to be severely anaemic. The mean Hb level was 10.17g/dl (SD 1.278). Further, median level of Hb was 9.8g/dl with a range from 7-13.8 g/dl.

Anaemia was statistically (p<.05) higher among women belonging to the scheduled castes (92%),

Table-1: Anaemia and associated socio demographic factors

Variable	Category	Overall (N=594) N (%)	Presence of Anaemia (N=533) N (%)	Absence of anaemia (N=61) N (%)	P value
Current age	< 21 years	77 (100)	67 (87)	10 (13)	0.741
	21-25 years	355 (100)	318 (89.6)	37 (10.4)	
	26-30 years	145 (100)	132 (91)	13 (9)	
	> 30 years	17 (100)	16 (94)	1 (6)	
Age at marriage	< 21 years	355 (100)	320 (90)	35 (10)	0.855
	21-25 years	226 (100)	201 (89)	25 (11)	
	>25 years	13 (100)	12 (92.3)	1 (7.7)	
Caste	Scheduled caste	368 (100)	338 (92)	30 (8)	0.029
	Backward class	67 (100)	61 (91)	6 (9)	
	General	159 (100)	134 (84)	25 (16)	
Education	Illiterate	109 (100)	103 (94.5)	6 (5.5)	0.285
	Primary	173 (100)	155 (90)	18 (10.4)	
	Middle	129 (100)	115 (89)	14 (11)	
	Matriculation and above	183 (100)	160 (87)	23 (17)	
Income quintiles	Poorest	130 (100)	112 (86)	18 (14)	0.015
	Poor	111 (100)	107 (96)	4 (4)	
	Middle	120 (100)	109 (91)	11 (9)	
	Rich	131 (100)	120 (92)	11 (8)	
	Richest	102 (100)	85(83)	18 (17)	
Source of water	Common storage tank	232 (100)	207 (89)	25 (11)	0.115
	Hand pump	223 (100)	206 (92)	17 (8)	
	Well	11 (100)	11 (100)	0	
	R.O.	128 (100)	109 (85)	19 (15)	
Main Occupation of the household	Agriculture	174 (100)	151 (87)	23 (13)	0.187
	Business	135 (100)	127 (94)	8 (6)	
	Service (Pvt/Govt)	46 (100)	40 (87)	6 (13)	
	Labour	239 (100)	215 (90)	24 (10)	
Defecation facility	Flush system	415 (100)	364 (88)	51 (12)	0.034
	Soak pit	135 (100)	126 (93)	9 (7)	
	Open space	44 (100)	43 (98)	1 (2)	

backward class (91%), middle income groups (poor: 96%; middle: 91%) and those who went into the field for defecation (98%) as shown in the table 1. A nearly

Discussion

The present study was undertaken in the rural area of Punjab to assess the prevalence of anaemia among

pregnant women. The results showed that 90% of the sampled pregnant women were anaemic with around 62% of them having moderate anaemia. The high prevalence of anaemia in the state of Punjab, is consistent with the finding of a previous studies^{19, 20}. One of these studies showed 84% of the pregnant women being anaemic¹⁹ while other showed prevalence of anaemia as 89% among adolescent girls²⁰.

Table-2: Anaemia and associated pregnancy related risk factors

Variables	Category	Overall (N=594)	Presence of Anaemia (N=533)	Absence of anaemia (N=61)	P value
		N (%)	N (%)	N (%)	
Parity	Nullipara	274 (100)	239 (87)	35 (13)	0.079
	Primipara	219 (100)	198 (90.4)	21 (9.6)	
	Multipara	101 (100)	96 (95)	5 (5)	
Birth interval	0-18 months	136 (100)	125 (92)	11 (8)	0.987
	18-36 months	139 (100)	128 (92)	11 (8)	
	> 36 months	41 (100)	38 (93)	3 (7)	
Trimester	First	153 (100)	135 (88)	18 (12)	0.701
	Second	283 (100)	254 (90)	29 (10)	
	Third	158 (100)	144 (91)	14 (9)	
Earlier abortion	Yes	37 (100)	35 (95)	2 (5)	0.314
	No	557 (100)	498 (89)	59 (11)	
Consumed IFA tablets	Yes	559 (100)	504 (90)	55 (10)	0.167
	No	35 (100)	29 (83)	6 (17)	

significant high prevalence (p=0.07) was reported among women in the multiparous group (95%) as compared to nulliparous (87%) or primiparous group (90.4%) (Table 2).

Further, anaemia was also higher among those women who were aged >30 years (94%), illiterate (95%), used well (100) or hand pump (92%) as a

Table-3: Prevalence of Anaemia

Severity of anaemia	N (%)	Overall (%)
No Anaemia	61 (10.3)	61 (10.3)
Anaemia		533 (89.7)
Mild Anaemia	204 (34.3)	
Moderate Anaemia	329 (55.4)	
Severe Anaemia	0	
Overall	594 (100)	594 (100)

source of drinking water, belonged to business class families (94%), had undergone previous abortion (95%) or had consumed IFA tablets during current pregnancy (90%). But none of these associations were found to be statistically significant (Table 1 and 2).

When compared to other states of India, the prevalence of anaemia among the pregnant women ranged from 75%-100%²¹⁻²⁴, showing a similar type of picture across the nation. However, when compared to developing countries of Tanzania, Nigeria and Sudan²⁵⁻²⁷, anaemic among pregnant women was reported to be low, i.e., in the range of 60-77%. This suggests that there certain factors specific to Indian context, which need to be studied and controlled in addition to only implementing iron supplementation programs.

The study showed high prevalence of anaemia among women who were illiterate, belonged to socially deprived communities (scheduled caste and backward class) and lower income groups. The findings are similar to those reported from the studies conducted in Delhi²⁸, Kashmir²³ and Maharashtra²¹, where both education and income status was inversely linked to the prevalence of anaemia. Scheduled castes and backward class are considered socially and educationally disadvantaged communities in the Indian

society^{29,30}. Further, in the Indian culture, as scheduled castes comes low in the ladder as compared to other castes, these are considered inferior and neglected part²⁹. Low community status and lack of social support from the society could create barriers against access to appropriate health knowledge and health care for women belonging to these deprived communities. Further this type of discrimination along with low economic status forced the women from these families to be dependent upon their routine staple diet, even during the period of pregnancy. Moreover, women who are illiterate, have low knowledge on the role of diet and nutrition and lack of confidence in decision making capacity in choosing the appropriate diet³¹. The present study also showed that women belonging to families, who went for open defecation or drank water directly from storage tanks or wells, were more anaemic. As results showed seen that 93% and 86% of the total families who went for open defecation or used storage tanks/wells belonged either to scheduled castes or backward class, strengthened the fact of having low awareness and socio-economic power among these communities in having appropriate knowledge and capacity to build hygienic amenities.

The present study showed a proportional relationship with increasing age and anaemia, similar to the findings from the studies done in Maharashtra²¹, Aurangabad³², and Kashmir valley²³. Further, women who were multiparous or had undergone previous abortions were reported to more anaemic. It could be that women having history of any of the above factor or both, might had suffered from acute or chronic periods of blood loss during previous pregnancies, were not properly been supplemented there after and entered as blood deficient in their next pregnancy.

Government of India started various iron supplementation programs such National Nutritional Anaemia Prophylaxis Program (NNAP) in 1970¹³, Reproductive and child health (RCH) in 1997¹⁴ and a recent one in the form of Weekly iron folic acid scheme (WIFS)¹⁵. Under all these programs, iron and folic acid tablets are distributed free of cost to pregnant women and adolescent girls. As expected, women who

consumed these tablets should have better haemoglobin levels. However, in the present study it was reported that women who consumed these tablets, still had higher prevalence of anaemia. One of the reasons could be that these tablets were consumed only by those who were severely anaemic and during the present study their haemoglobin levels were improved and they were reported as mild or moderately anaemic. The other reason could be lack of adherence in completing the full course of IFA tablets as 70% of the women who consumed these tablets, did not complete the full course as recommended in guidelines.

Conclusion

Although no severe case of anaemia was reported, but still very high prevalence of anaemia (89.7%) was found. There is a need for dietary counselling and nutritional education in antenatal clinics, so that women, who are illiterate or belong to low socio-economic strata, could get appropriate and timely knowledge about this issue. Further, family members of these pregnant women should also be counselled about the health of the mothers not only during pregnancy but post pregnancy period also.

Conflict of interest: None. **Disclaimer:** Nil.

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