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Study of Anaemia and Its Associated Risk Factors among Pregnant Women in a Rural Field Practice Area of a Medical College

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ABSTRACT

Background: Anaemia in pregnancy accounts for one fifth of maternal death worldwide. The association between anaemia and adverse pregnancy outcome, higher incidence of preterm & low birth weight deliveries has been demonstrated.

Objective: This research was conducted to study the prevalence of anaemia among pregnant women in the rural field practice area of a medical college and also to study some risk factors associated with anaemia among pregnant women.

Materials and Method: A community-based cross-sectional study was carried out among 350 pregnant women from August 2015 to December 2015 in the rural population of Mudkhed , Maharashtra. The study participants were selected by using simple random sampling method. The hemoglobin estimation was done. Data were collected and analyzed with SPSS version 16.

Results: Overall prevalence of the anaemia among pregnant women was found to be 84.85%. Various socio-demographic factors like Age, Education of women, Socioeconomic class, Gravid status, Gestational age, were found to be significantly associated with anaemia in pregnancy.

Conclusion: High prevalence of anemia among pregnant women indicates anaemia to be a major public health problem in the rural community. Factors such as socioeconomic status, and educational status contribute to this high prevalence.

Key Words: Anaemia in pregnancy, socioeconomic status, birth interval.

INTRODUCTION

Anaemia (Pandu) has been well discussed in Ayurveda since ancient times. Rugveda mentions it and Atharvaveda finds the relation with Ayas i.e Iron. Charaka, Susruta, Harita and Bhela etc. described its management in detail.[1]

The WHO (World Health Organization) Global Database on Anaemia for 1993–2005, covering almost half the world's population, estimated the prevalence of anaemia worldwide at 25 percent.[2] For the year 2011, it is estimated that roughly 43% of children, 38% of pregnant women, and 29% of non-pregnant women and 29% of all women of reproductive age have anaemia globally.[3]

Nutritional anaemia is a major public health problem in India and is primarily due to iron deficiency.[4] The National Family Health Survey-3 (NFHS-3) data suggests that anaemia is widely prevalent among all age groups, and is particularly high among the most vulnerable.[5] Nearly 58 percent among pregnant women, 50 per cent among non-pregnant non-lactating women, 56 percent among adolescent girls (15–19 years), 30 per cent among adolescent boys and around 80 percent among children under 3 years of age.[6]

Anaemia in Pregnancy (AIP), according to WHO is defined as hemoglobin concentration below 11gm/dl.[7] Indeed AIP is a known factor for many

maternal complications such as poor weight gain, premature labor, and dysfunctional labor and fetal and neonatal complications such as Prematurity , low birth weight, fetal distress and neonatal distress requiring prolong resuscitation and causing neonatal anemia due to poor reserve.[8,9]

The National Nutritional Anemia Prophylaxis Programme (NNAPP) was initiated in 1970 with the aim to reduce the prevalence of anemia to 25 percent.[10] Since 1992 the daily dosage of elemental iron for prophylaxis and therapy has been increased to 100 mg and 200 mg, respectively under Child Survival and Safe Motherhood (CSSM) Programme.[11]

Unfavorable socio-demographic factors are the major barriers to the efforts done for the prevention of anaemia during pregnancy. Focusing on these socio-demographic factors might provide a channel to study the risk associated with these factors for anaemia among pregnant women. Study of these socio-demographic factors will also help to formulate multiprong strategy to attack the important public health problem of anaemia in the pregnancy. In view of the above the present study was planned to find out the prevalence of anemia among pregnant women, the socio-demographic factors associated with anemia.

MATERIALS AND METHODS

The present study was Community based, cross sectional study. It was conducted during 1st August 2015 -15th December 2015. The study was undertaken in rural field practice area under the department of community medicine of Government Medical College Nanded. Rural Health Training centre Mudkhed; covers three primary health centres (P.H.C). All three P.H.C covers 53 villages in their administrative area.

Sample size: The prevalence of anaemia among pregnant women was reported as 57.8% in Maharashtra, by NFHS 3 data.[5] By using the above prevalence, the sample size calculated by the Cochran's formula.[12] Thus the sample size of 350 pregnant women was taken in the present study.

In the present study to achieve the desired sample size of 350, Lottery method was used as simple random sampling technique for the selection of villages. After completion of the survey of one village next chit was drawn from the box and survey was completed in second village. In such a way, 15 villages were visited to achieve the sample size of 350.

All pregnant women willing to participate in the study and permanent resident of that area were included in the study.

All pregnant women with Chronic and systemic infections like HIV, Tuberculosis etc., Not a permenant resident of that area, History of passing worms in the stool, History of high grade fever in the past three months were excluded from the study.

Data collection tool: All the pregnant women were interviewed with the predesigned, pretested proforma and clinical examination.

A detailed demographic profile of the women, that is, age, age at first pregnancy, religion, type of family, family size, educational level of a woman and her husband, occupation of a woman and her husband, was collected. Socioeconomic classification suggested by B.G. Prasad was adopted and updated.[13] Gestational age was assessed from the last menstrual period. For those women who did not remember the last menstrual period date, gestational age was co-related to the local calendar events and assessing fundal height. The height and weight were measured using a detecto weighing scale, which has in-built adjustable height measures. Informed consent was obtained and explanation as to the purpose of the study was offered.

Blood Sample for Haematological investigation:[14]

The blood sample from each female was drawn for the Hb investigation. The blood sample was transferred to an EDTA coated vaccutainer tube after labeling it with the identification data of the female. The tube was then shaken well so that the blood mixes well with the EDTA to avoid its clotting. All the blood samples were then brought to the Government Medical college on the same day for the Hb investigations through the cell counter method .

According to ICMR recommendations hemoglobin level below 11g/dl is labelled as anaemia during pregnancy and classified as mild (10.0–10.9 g/dL), moderate (7.0–9.9 g/dL), and severe (<7.0 g/dL) anemia. The same criteria were used for diagnosing anemia in pregnancy.[15,16]

Ethical consideration: Ethical approval for the study was obtained from the Institutional ethical committee at Government Medical College.

Statistical analysis: Data was entered in Microsoft excel and tabulated and analysed by using SPSS version 16 Mean values, percentages were calculated. Chi-square and Chi square for trend were calculated to determine association between anaemia and socio-demographic factors . Statistical significance was set at 95% confidence level (p-value of less than or equal to 0.05 (p-value ≤ 0.05).

RESULTS

The present study included 350 pregnant women having an average age of 23.42 years. The majority of the subjects were young mothers, between 20 to 29 years. 8.00% of the pregnant women were below 20 years and 8.30% were above 30 years. The youngest and oldest participants were respectively 17 and 35 years old. The majority of study subjects (30.85%) were having education upto middle school and least i.e (4.20%) were educated upto graduation and above. The majority of study subjects (85.70%) were housewife by occupation, followed by agricultural labourers (7.70%), then 4.90% were doing their own business.1.70% were included in others category. As per the modified B.G. Prasad classification, maximum numbers of the antenatal women were from class V and class IV (27.10% and 47.10% respectively).Very few subjects i.e.3.4% were from class I.

Table 1: Distribution of study subjects as per the grading of anaemia

Anaemic status (Hb in gm%)	Cases (n=350)(%)
Non-anaemia (>11gm%)	53 (15.2)
Anaemia	297 (84.9)
Mild (10-10.9 gm%)	113 (32.3)
Moderate (7-9.9gm%)	163 (46.6)
Severe (<7 gm%)	21 (6)

Table 1 shows that out of 350 pregnant women 297 were anaemic and 53 women were having normal haemoglobin concentration. Overall prevalence of the anaemia among pregnant women was found to be 84.85%. Proportion of the pregnant women having normal haemoglobin level was only 15.15%. Prevalence of mild, moderate, severe anaemia was observed as 32.28%, 46.57% and 6.00% respectively. The mean haemoglobin for the study subjects was 9.6gm/dl (SD=1.3). The range was from 6 gm/dl to 13.8 gm/dl.

Table 2: Distribution of study subjects according to the age and anaemic status

Age (yrs)	Anaemia				Nonanaemia	Total	Odds Ratio	95% CI	P Value
	Mild	Moderate	Severe	Total					
<20	9(7.90)	13(7.97)	1(4.76)	23(7.74)	5(9.43)	28(8.00)	0.86	0.30-2.39	0.7715
20-24	66(58.40)	89(54.60)	7(33.33)	162(54.54)	41(77.35)	203(58.0)	1.00	-	-
25-29	31(27.43)	47(28.83)	6(28.57)	84(28.28)	6(11.32)	90(25.71)	0.28	0.11-0.69	0.0057
≥ 30	7(6.19)	14(8.58)	7(33.33)	28(9.42)	1(1.88)	29(8.28)	0.14	0.01-1.06	0.0579
Total	113(100)	163(100)	21(100)	297(100)	53(100)	350(100)	0.70	0.441-1.10	0.1283

χ^2=9.603, d.f=1 , p=0.001 (Figures in parenthesis indicate percentages)

Table 3: Distribution of study subjects according to education and anaemic status:

Educational status	Anaemia				Non anaemia	Total	Odds Ratio	P value	95% CI
	Mild	Moderate	Severe	Total					
Illiterate	2(1.76)	12(7.36)	9(42.85)	23(7.74)	1(1.88)	24(6.85)	0.04	0.00-0.35	0.0043
Primary school	17(15.04)	27(16.56)	8(38.09)	32(17.50)	7(13.20)	59(16.85)	0.19	0.05-0.70	0.0129
Middle school	35(30.97)	64(39.26)	2(9.52)	101(34.00)	7(13.20)	108(30.85)	0.06	0.01-0.21	<0.0001
High school	39(34.51)	37(22.69)	1(4.76)	77(25.92)	11(20.75)	88(25.14)	0.12	0.03-0.41	0.0006
Intermediate	18(15.92)	18(11.04)	1(4.76)	37(12.45)	19(35.84)	56(16.00)	0.45	0.14-1.42	0.1748
Graduation & above	2(1.76)	5(3.06)	0(0.)	7(2.35)	8(15.09)	15(4.28)	1.00	-	-
Total	113(100	163(100)	21(100)	297(100)	53(100)	350(100)	2.57	1.13-5.84	0.0238

χ^2=17.79, d.f=1 , p=<0.0001 (Figures in parenthesis indicate percentages)

Table 4: Distribution of study subjects according to the socioeconomic status and anaemic status

Socioeconomic class	Anaemia				Non anaemia	Total	Odds ratio	95% CI	P value
	Mild	Moderate	Severe	Total					
I	6(5.30)	3(1.84)	0(0.00)	9(3.03)	3(5.66)	12(3.42)	1.87	0.47-7.37	0.37
II	8(7.07)	12(7.36)	1(4.76)	21(7.07)	8(15.09)	29(8.28)	2.13	0.85-5.34	0.11
III	12(10.61)	28(17.17)	1(4.76)	41(13.80)	8(15.09)	49(14.00)	1.09	0.45-2.60	0.84
IV	59(52.21)	70(42.94)	11(52.38	140(47.13)	25(47.16)	165(47.14)	1.00		
V	28(24.77)	50(30.67)	8(38.09	86(28.95)	9(16.98)	95(27.14)	0.59	0.26-1.31	0.19
Total	113(100)	163(100)	21(100	297(100)	53(100)	350(100)	0.99	0.59-1.67	0.998

χ^2=4.936, d.f=1 , p=0.0263 (Figures in parenthesis indicate percentages)
(Note:- Modified B.G. Prasad classification was used)

Table 2 shows that proportions of the pregnant women suffering from anaemia were maximum (96.55%) in the age group 30 years or above and minimum (79.8%) were in the 20-24 age group. The association observed between age and prevalence of anaemia during pregnancy was statistically significant (p=0.001).

Table 5: Distribution of study subjects according to the gestational age and anaemic status

Gestational Age	Anaemia			Total	Non-anaemia	Total	Odds Ratio	95% CI	P value
	Mild	Moderate	Severe						
Ist Trimester	15(13.27)	14(8.58)	4(19.04)	33(11.11)	12(22.64)	45(12.85)	2.6281	1.18-5.8	0.0175
IInd Trimester	32(28.31)	65(39.87)	8(38.09)	105(35.35)	19(35.84)	124(35.42)	1.3078	0.67-2.53	0.4266
IIIrd Trimester	66(58.40)	84(51.53)	9(42.85)	159(53.53)	22(41.50)	180(51.42)	1.0000	-	-
Total	113(100)	163(100)	21(100)	297(100)	53(100)	350(100)	1.2897	0.75-2.19	0.3496

$\chi 2$ for linear trend=5.109, d.f=1, p=0.02, (Figures in parenthesis indicate percentages)

Table 6: Distribution of study subjects according to the birth interval and anaemic status

Birth interval in months	Anaemia			Total	Non anaemia	Total	Odds ratio	95% CI	P value
	Mild	Moderate	Severe						
<18	9 (11.84)	19(17.43)	10 (52.63)	38 (18.62)	3(14.28)	41(18.22)	0.80	0.21-2.93	0.7315
18-36	52(68.42)	72(66.05)	7(36.84)	131(64.21)	13(61.90)	144(64.00)	1.00	-	-
> 36	15(19.73)	19(17.43)	2(10.52)	36(17.64)	4(19.04)	40(17.77)	1.12	0.34-3.64	0.8511
Total	76 (100)	109 (100)	19(100)	204(100)	21(100)	225(100)	1.04	0.50-2.41	0.9211

χ^2 =0.07416, d.f=1 p=0.7854 (Figures in parenthesis indicate percentages)

Table 3 shows that the proportion of anaemic subjects were highest in illiterates and was least among those \who were educated upto graduation and above. Anaemia was found to be highly significantly associated with the educational status (p<0.0001).

From the table 4, It was observed that as the socio-economic status decreased the prevalence of anaemia increased. Thus, lower socio-economic status is associated with the increase in the risk of development of anaemia in pregnancy. This association between the socioeconomic status of the family and anaemia in pregnancy was found to be statistically significant (p=0.02).

Table 5 shows that out of 350 study subjects maximum (180) were in the third trimester followed by 124 in second trimester and only 45 were in first trimester. It was observed that as the gestational age increased the prevalence of anaemia increased. It was observed that gestational age was significantly associated with the occurrence of anaemia in pregnancy (p=0.02).

Table 6 had estimated that as the spacing interval increased the prevalence of anaemia decreased. Out of the total 350 pregnant women, 125 primigravida were excluded to estimate the relation of anaemia with spacing interval. The spacing interval was not significantly associated with the prevalence of anaemia during pregnancy (p >0.05).

DISCUSSION

In the present study the overall prevalence of the anaemia among pregnant women was found to be 84.85% which was similar to study done by **Lokare et al**[17]The high prevalence of anaemia may be attributed to the low dietary intake of iron and poor bioavailability of iron.

In the present study, higher prevalence of anaemia was found above the age of more than 25 years in the pregnancy. The association observed between age and the prevalence of anaemia during pregnancy was statistically significant (p<0.05). **Kaul R et al**[18] found that age of women was a significant factor having a bearing on hemoglobin status. The anaemia was found to be more (100%) in the age group above 35 years. This might be due to the cumulative effect of the repeated pregnancies, persistent inadequate diet, similar environmental and social factors all that drain on the maternal health and lead to anaemia in pregnancy.

Proportions of anaemic subjects were highest in illiterates and least among those who were educated upto graduation and above. This shows that educated women were more aware about the problems that might occur during pregnancy and they are in a better position to take care of such problems. In the present study it was observed that the socioeconomic status of the family was significantly associated with the occurrence of anaemia during pregnancy. Anaemia was found to be significantly associated with lower socioeconomic status. Similiarly, **Mahashabde P** et al[19] found that severity of anaemia was inversely related to educational status and socioeconomic class.

It was observed that the proportion of women experiencing anemia increased with the increase in gestational age (I trimester 73.33% to 88.33% in III trimester).Similar findings were observed in study by **Suryanarayana et al.**[20]The study conducted by **Vemulapalli** et al[21] in Andhra Pradesh reported that pregnant women in I trimester showed higher anemia prevalence rate than in II and III trimesters, quite different from our findings. Low antenatal-care coverage at the rural primary health center coupled with poor screening for anemia without appropriate therapy might be the contributing fac-

tors for the increased prevalence in later half of pregnancy.

In the present study, anaemia prevalence during pregnancy was low among the women with spacing interval more than 36 months. Spacing interval was not found to be significantly associated with anaemia. In contrast to our finding **Swarnlatha N[22]** observed that the birth interval less than 18 months was significantly associated with anaemia among pregnant. Women who have born children at close intervals become anaemic due to additional demands of the rapid pregnancies and loss of blood in each delivery as more duration is required for the replenishment.

CONCLUSION

A high prevalence of anemia (84.85%) indicates that the anemia continues to be a major public health problem in rural area. Socioeconomic status, literacy of women, gravida, and birth interval are the major determinants that contribute to the problem of anemia. Anaemia was high in III trimester, and this can be prevented by advocating proper antenatal services in the early stage of pregnancy. Therefore, strategic efforts are needed to broaden the coverage of iron and folic acid distribution.

REFERENCES

1. Giridhar V. A Profile on medico-historical aspects of anaemia in Ayurveda. Int J Med Sci Clin Invent 2015; 2(2):751-60.
2. Worldwide prevalence of anaemia 1993–2005. WHO Global database on anaemia. Geneva: World Health Organization; [Online] 2008[cited on 2015 Dec 21] Available from. http: // whqlibdoc .who . int /publications / 2008/ 9789241596657 _eng.pdf.
3. The global prevalence of anaemia in 2011. World Health Organization;[Online] 2015 [cited on 2016 Dec 21] Available from apps who.int/iris/bitstream/10665/177094/1/ 9789241564960_eng.pdf
4. Guidelines for Control of Iron deficiency anemia.National Iron plus initiative. Ministry of Health & Family Welfare Government of India.[Online] 2013[cited 2015 Nov 22] Available from: http: // www . pbnrhm .org/docs/iron_ plus_guidelines.
5. National Family Health Survey (NFHS-3): International Institute for Population Sciences Mumbai India.[Online] 2007 [cited on 2015 Dec 21] 192-222. Available from http://www.nfhsindia.org
6. Patel S, Dhuppar P, Bhattar A (2017) Nutritional Anemia Status in Adolescent Girls in Rural Schools of Raipur, India. Med Chem (Los Angeles) 7:853-856
7. Centers for disease control: Criteria for anemia in children and childbearing –aged women. MMWR 1998; 38: 400-404
8. Barooti, E, Rezazadehkermani M, Sadeghirad B, Motaghipisheh Sh, Arabi M, Salahi S, Haghdoost AA. Prevalence of Iron Deficiency Anemia among Iranian Pregnant Women; a Systematic Review and Meta-analysis. J Reprod Infertil. 2010;11(1):17-24.
9. Omoniyi Y. Adebisi, Gregory strayhorn. Anemia in Pregnancy and race in the United states: Blacks at risk, Fam med 2005; 37(9): 655-62
10. Agrawal DK, Agrawal KN, et al. Targets in National Anaemia prophylaxis programme pregnant women. Indian Paediatric 1988; 25: 319-22.
11. Khan MS, Srivastav A, Dixit AK. The study of anaemia & its related socio-demographic factors amongst pregnant women in rural community of Uttar Pradesh. Journal of Evolution of Medical and Dental Sciences. 2014 Jan 6;3(1):14-20.
12. Lwanga SK, Lemshaw S. Sample size determination in health studies: A practical Manual. Geneva: World Health Organization; 1992
13. Baride JP, Kulkarni AP. Textbook of Community Medicine. 4th ed. Vora Medical Publication; 2006.30-32.
14. Sharma V, Sahni B, Jamwal DS, Singh K. Nutritional anaemia among currently married females in the reproductive age group in rural jammu. Journal of Evolution of Medical and Dental Sciences. 2013 Oct;2(42): 8176-85.
15. Sharma JB, Shankar M. Anaemia in pregnancy. Differential Diagnosis in Obstetrics and Gynaecology: An AZ. 2008 Oct 31:19.
16. ICMR: Evaluation of National Nutrition Anaemia Prophylaxis Program. 1989. ICMR, New Delhi.
17. Lokare PO, Karanjekar VD, Gattani PL, Kulkarni AP. A study of prevalence of anemia and sociodemographic factors associated with anemia among pregnant women in Aurangabad city, India. Ann Nigerian Med 2012;6:30–4.
18. Kaul R, Ahmad J, Baba TA, Sheikh S, Ahmad A, Ashraf M. Anaemia in pregnant women in a rural block of Kashmir valley: its prevalence and sociodemographic associates. Int J Med Sci Public Health 2013;2:814–8.
19. Mahashabde P, Arora VK, Sharma S, Shahjada A, Dabhi HM. Prevalence of Anaemia and Its Socio-Demographic Determinants in Pregnant Women: A Cross-Sectional Study in Tertiary Health Care Setup in Central India. Natl J Community Med 2014; 5(1): 126-130.
20. Suryanarayana R, Santhuram AN, Chandrappa M, Shivajirao P, Rangappa SS. Prevalence of anemia among pregnant women in rural population of Kolar district. Int J Med Sci Public Health 2015;5(1):1-5
21. Vemulapalli B, Rao KK. Prevalence of anaemia among pregnant women of rural community in Vizianagaram, North coastal Andhra Pradesh, India. Asian J Med Sci 2014; 5(2):21–5.
22. Swarnlatha N. Prevalence of anaemia and its socio demographic determinants among pregnant women attending government maternity hospital, Tirupathi, AP. Int J Biol Med Res 2012; 3(4):2485–8.