Prevalence of Anemia among Pregnant Women of Eastern Maharashtra

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Research Article

Abstract: **Introduction:** The prevalence of anemia among pregnant women is very high in India. There is an urgent need to rapidly expand efforts with respect to prevention and treatment of anemia among antenatal mothers. **Purpose:** To assess the prevalence and to study various socio-demographic factors and obstetric associated with it in pregnant women attending antenatal care in Urban Health Center, Latur. **Methodology:** A cross sectional observational study was undertaken among the pregnant women of Urban Health Center. Three hundred pregnant women were enrolled in the study. Pre structured and pretested questionnaire was used as a study tool. The questionnaire included topics related to socio demographic information, worm infections, gestational period, pregnancy gap and iron supplements, consumption of green vegetables, iron rich food items. **Results**: The prevalence of anemia was 94.3% in this study. Anaemia was more prevalent in the age group 21-25 years. there was significant association between anemia and age, socioeconomic status, consumption of green leafy vegetables, iron rich food items, history of worms, menorrhagia, presence of high risk pregnancy, age at 1st pregnancy, use of contraceptives. But anaemia was not significantly associated with religion, residence, occupation, type of family, education, diet, age at marriage, gestational age, parity, history of abortion, piles, consumption of iron-folic acid tablets, child spacing, antenatal checkups. **Conclusions:** The prevalence of anaemia in this study was higher in many other studies in Maharashtra as well as other states. This suggests that anaemia during pregnancy is a major public health problem. More emphasis should be given on prevention of anaemia during pregnancy to prevent further complications.

Keywords: anaemia, age, socioeconomic status, age at first pregnancy.

Introduction

Pregnancy is a unique and exciting time in a woman's life. The birth of a child is considered as worship of God and thing to be pride. Anemia is now one of the most frequently observed nutritional diseases in the world. It is especially prevalent in women of reproductive age, particularly during pregnancy. The most frequent cause of anemia is iron deficiency and less frequently folate and vitamine B12 deficiency[1]. Iron requirements are greater when there is rapid expansion of tissue and red cell mass, for example during pregnancy[1] Fifth of eight Millennium Development Goals (MDGs) is improving maternal health, aiming to reduce the maternal mortality ratio (MMR) by three quarters between 1990 and 2015[2] .The National Nutrition Monitoring Bureau (NNMB), District Level Household Survey-2 (DLHS), and Indian Council of Medical Research (ICMR) surveys showed that over 70% of pregnant women in the country were anemic, while the National Family Health Surveys 2 and 3 reported a comparatively lower prevalence of 50 and 58%, respectively[3,4]. The main causes of anemia in developing countries include: inadequate intake and poor absorption of iron, malaria, hookworm infestation, diarrhoea, HIV/AIDS, genetic disorders (e.g., sickle cell and thalassemia), blood loss during labor and delivery, heavy menstrual blood flow and closely spaced pregnancies[5, 6]. Maternal anemias was associated with increased risk of low birth weight deliveries, maternal Morbidity and mortality[7]. Prevention and treatment of anemia should get operationalized as an essential component of antenatal care in primary health care settings, otherwise reduction in the prevalence of anemia or its adverse effects is unlikely[8]. The present study was undertaken in an Urban Health Center to assess the prevalence of anemia among pregnant women and to study various factors associated with it.

Material and Methods

This was a cross sectional observational study undertaken among the pregnant women of Urban Health Center, Latur done during February 2013 to July 2013. Prestructured and pretested questionnaire was used as a study tool. After taking permission from the departmental authority, the pregnant women were explained the purpose of study. Verbal consent was taken and briefing of the questionnaire was done to them. The questionnaire included topics like age, marital status, educational status, residence and occupation, weeks of gestation, age of marriage, age at first pregnancy and other factors like gravida, parity number of children, number of abortions, parasitic infections, pregnancy gap and iron supplements, consumption of green vegetables, iron rich food items presence of high risk pregnancy etc. Prevalence of anemia was taken 58% as per National Family Health Surveys 3. Taking allowable error (d) = 10% of P, and using this in the formula of sample size n =4 P (1-P) /d^2, sample size was estimated to be 288.So 300 patients were included in

the study. Those pregnant women who self reported to the Urban Health Center were included until the required sample size was obtained. Each participants were recruited only once on their first visit during the study period. For Hemoglobin determination Sahlis method was used. Using micropipette, 20 µL of blood was taken and poured into a tube containing 0.1mol/l HCl. After 10 minutes, distilled water was added drop by drop, followed by mixing until the color of the solution matched with the color of glass standard positioned alongside the dilution tube. The concentration of hemoglobin was read from the graduated scale on the dilution tube. Anemia among pregnant women was classified as per the WHO severity grading criteria[9], mild type- Hgb 10.0–10.9g/dl, moderate anemia -7–9.9g/dl and severe anemia- Hgb< 7g/ dl. Socio-economic status of the study subjects was classified by using modified B.G. Prasad's Classification[20] based on Consumer Price Index of December 2012 of 969 (Correction Factor = 47.77). Data thus obtained was entered in MS-excel, and analyzed by using the SPSS version 21.0 statistical software. P<0.05 was considered as statistically significant. Multiple logistic regression, chi square test, percentage were statistical tests used.

Results

Table 1: Sociodemographic profile of pregnant women

Variable		Number	Percentage
Religion	Buddhist	31	10.3
	Muslim	134	44.7
	Hindu	135	45.0
Occupation	Housewife	286	95.3
	Labourer	2	0.7
	part time worker	12	4.0
Type of family	Joint	120	40.0
	Nuclear	176	58.7
	three generation	4	1.3
Education	Primary	140	46.7
	Secondary	53	17.7
	Ssc	29	9.7
	Hsc	24	8.0
	Graduate	4	1.3
	Illiterate	50	16.7
SES	Class I	6	2.0
	Class II	42	14.0
	Class III	72	24.0
	Class IV	130	43.3
	Class V	50	16.7
Diet	Veg	103	34.3
	non veg	173	57.7
	Mixed	24	8.0
Green. Vegetables consumption	Daily	147	49.0
	alternate days	2	0.7
	Weekly	151	50.3
Iron rich food consumption	Daily	51	17.0
	Weekly	222	74.0
	No	27	9.0
Worms	Yes	29	9.7
	No	271	90.3
Piles	Yes	40	13.3
	No	260	86.7

Table 2: Agewise distribution of anaemia in pregnant women

Age in yrs	Level of Haemoglobin(gm/dl)				Total
	Normal >/=11	Mild 10-10.9	Moderate 7-9.9	Severe <7	
15-20	6	8	86	0	100
21-25	11	18	144	2	175
26-30	0	1	17	0	18
31-35	0	0	3	0	3
36-40	0	1	3	0	4
Total	17	28	253	2	300

P=0.012

Table 3: Association of anemia with sociodemographic characteristics of pregnant women

Variable		Level of anaemia				P value
		Normal	Mild	Moderate	Severe	
Religion	Hindu	5(1.6)	3(1)	23(7.6)	0	0.43
	Muslim	6(2)	9(3)	118(39.33)	1(0.3)	
	Buddhist	6(2)	16(5.3)	112(37.33)	1(0.3)	
Residence	Rural	1(0.3)	2(0.6)	18(6)	0	0.823
	Urban	16(5.3)	26(8.6)	235(78.33)	2(0.6)	
Occupation	Housewife	17(5.6)	28(9.3)	239(79.66)	2(0.6)	0.944
	Labourer	0	0	2(0.6)	0	
	Parttimejob	0	0	12(4)	0	
Type of family	Nuclear	7(2.3)	9(3)	102(34)	2(0.6)	0.497
	Joint	10(3.3)	19(6.3)	147(49)	0	
	3generation	0	0	4(1.3)	0	
Socioeconomic Status	Class I	1(0.3)	0	5(1.6)	0	0.02
	Class II	3(1)	1(0.3)	38(12.66)	0	
	Class III	5(1.6)	5(1.6)	61(20.33)	1(0.3)	
	Class IV	5(1.6)	16(5.3)	109(36.33)	0	
	Class V	3(1)	6(2)	40(13.33)	1(0.3)	
Consumption Of green Vegetables	Daily	8(2.6)	18(6)	119(39.66)	2(0.6)	0.033
	Alternateday	1(0.3)	0	1(0.3)	0	
	Weekly	8(2.6)	10(3.3)	133(44.33)	0	
Consumption of iron rich foods	daily	1(0.3)	6(2)	42(14)	2(0.6)	0.028
	weekly	15(5)	20(6.6)	187(62.33)	0	
	no	1(0.3)	2(0.6)	24(8)	0	
Piles	Yes	1(0.3)	1(0.3)	38(12.66)	0	0.088
	No	16(5.3)	27(9)	215(71.66)	2(0.6)	
Worms	Yes	2(0.6)	4(1.3)	23(7.6)	0	0.022
	No	15(5)	24(8)	230(76.66)	2(0.6)	

Table 4: Association of anaemia with obestric profile of pregnant women

Variable		Level of anaemia				P value
		Normal	Mild	Moderate	Severe	
Gestational age	1st trimester	0	1(0.3)	21(7)	0	0.173
	2nd trimester	9(3)	10(3.3)	96(32)	0	
	3rd trimester	8(2.6)	17(5.6)	136(45.33)	2(0.6)	
Parity	1	3(1)	11(3.6)	97(32.33)	0	0.488
	2	4(1.3)	5(1.6)	33(11)	2(0.6)	
	3	0	1(0.3)	10(3.3)	0	
	4	0	0	7(2.3)	0	
	0	10(3.3)	11(3.6)	106(35.33)	0	
Abortion	0	0	1(0.3)	16(5.3)	0	0.112
	1	17(5.6)	27(9)	237(79)	2(0.6)	
Menorrhagia	yes	0	0	35(11.66)	0	0.001
	no	17(5.6)	28(9.3)	218(72.66)	2(0.6)	
High risk pregnancy	yes	3(1)	2(0.6)	21(7)	0	0.031
	no	14(4.6)	26(8.6)	232(77.33)	2(0.6)	
IFA tablets consumption	1-20	7(2.3)	8(2.6)	82(27.33))	0	0.631
	21-40	8(2.6)	14(4.6)	88(29.33)	1(0.3)	
	41-60	1(0.3)	2(0.6)	18(6)	0	
	61-80	0	1(0.3)	6(2)	1(0.3)	
	81-100	0	1(0.3)	13(4.3)	0	
	Nil	1(0.3)	2(0.6)	46(15.33)	0	
Age at 1st pregnancy	13-16	0	0	15(5)	0	0.04
	17-19	4(1.3)	7(2.3)	103(34.33)	1(0.3)	
	20-23	10(3.3)	20(6.6)	129(43)	1(0.3)	
	24-25	3(1)	1(0.3)	6(2)	0	
Interval betn.2 pregnancies	1-2	15(5)	19(6.3)	182(60.66)	2(0.6)	0.546
	2.1-2.9	0	0	9(3)	0	

	>/=3	2(0.6)	9(3)	62(20.66)	0	
	IUD	1(0.3)	2(0.6)	13(4.3)	0	
Contraceptive use	OC pills	1(0.3)	2(0.6)	21(7)	0	0.006
	condom	2(0.6)	3(1)	30(10)	1(0.3)	
	No	13(4.3)	21(7)	189(63)	1(0.3)	

When the age wise distribution of the study subjects was seen, most of the women i.e.175 out of total 300 was in the age group of 21 to 25 years, followed by 100 women in the age group 15-20 years, 18 women in 26-30 years age group and only 7 women above 30 years. Among 300 pregnant women, 283(94.3%) were anemic (i.e. Hbg <11gms/dl).Out of them 28(9.3%) had mild anemia(i.e., Hgb-10.0–10.9g/dl),majority i.e.253(84.3%) , had moderate anemia (Hbg7–9.9g/dl) and only 2(0.6) women had severe anemia-(Hgb< 7g/ dl).Anemia was more prevalent in 21-25 years age group as shown in table 2.The ages of the study participants were between 15 to 40 years. Table 1 depicts, most of the women were Hindus i.e. 135(45%), followed by Muslims i.e.134 (44.7%) and 31(10.3%) Buddhists. Most of the women were housewives by occupation i.e.95.3%, only 4% were part-time workers and 0.7% was laborers respectively. Out of 300 participants, 21 (7%) lived in rural areas and the rest 279(93%) were urban dwellers. About 58.7% women had nuclear families, 40% had joint families, and 1.3% had three generation families. Most of the women were educated up to primary school i.e.140 (46.7%), followed by Secondary, SSC, HSC and graduation respectively. About 50(16.7%) women were illiterate. When socio-economic status of the women was studied, about 43.3% women belonged to class IV, 24% to class III, 16.7% to class V, 14% to class II and only 2% to class I. When dietary habits of the women were studied, it was found that, 57.7% women were nonvegetarians, 34.3% were vegetarians and 8%had mixed type of diet. Consumption of green leafy vegetables was weekly in 50.3% women, daily in 49% women and on alternate day in 0.7% women. Consumption of iron rich food items was weekly in 74% women, followed by daily in 17% and none in 7% women. History of worms was present in 9.7% women. History of piles was there in 13.3% women. The age of marriage was between 16-20 years in about 256(85.3%) women, it was 11-15 years in 19(6.3%) women, 21-25 years in 25(8.3%) women. Most of the women in the study were primigravida i.e.41.7%, followed by 2nd gravida. About 54.3% women were in 3rd gravida. In this study, 42.3% women were Para zero, and followed by 37% primiparous women. About 54.3% women were in 3rd trimester, 38.3% in 2nd trimester and7.3% in 1st trimester. Only 5.7% had the history of one abortion. About 16.3% women had not taken iron tablets. About 69.3% women had taken up to forty iron-folic acid tablets. About 212(70.7%) women had 1-3

antenatal checkups, 83(27.7%) had 4-7 checkups, 5(1.7%) had 8-9 checkups. Age at first pregnancy was 13-19 in 43.4% women and it was 20-25 in the remaining women. Child spacing was less than 3 years in 75.7% women. History of menorrhagia was present in 11.7% women. High risk pregnancy was present in 8.7% women. Among all the women, 74.7% women had not used any contraceptives, 12% condom, 8% oral contraceptive pills, 5.3% used intrauterine devices. In the present study, as per table 3,there was significant association between anemia and age, socioeconomic status, consumption of green leafy vegetables, consumption of iron rich food items, history of worms. Anaemia was also significantly associated with history of menorrhagia, presence of high risk pregnancy, age at 1st pregnancy, use of contraceptives. But anemia was not significantly associated with religion, residence, occupation, type of family, education, type of diet, age at marriage, gestational age, gravid, parity, history of abortion, piles, consumption of iron-folic acid tablets, child spacing as shown in table 4.Significant association was also not seen between anemia and antenatal checkups(p= 0.974)

Discussion

The prevalence of anemia in pregnant women in this study was found to be very high,i.e.94.3%.It was higher than the findings of other studies by Anshu Sharma[8] ,Nadeem[10],Viveki[11] ,Langare[12], Pankaj kumar[13] , Hanmanta[14].This was also higher than the prevalence of anemia as per NFHS-3.This prevalence of anemia was also much higher than the prevalence in the other countries ex Ethiopia shown in the study[15] Nigeria[16] ,Jamaica[17].Some author[18] reported higher prevalence of anemia i.e. 96.5% than the present study. Number of pregnant women with moderate anemia (84.3%) was more than the number of mild (9.3%) and severe anemia (0.7%). The number of women with moderate anemia in this study was higher than the findings by other authors[10-15, 16]. The number of women with mild and severe anemia in this study was less than the findings by authors[10-15, 16] but the percentage of severe anemia is similar with the author[13]. The prevalence of anemia in the present study was high in the age group of 21-25 years. These findings are similar with the study[12, 13] .But anemias were common in the age 26 in study[11] and it was common below 20 years in the study[10]. The odds of anemia was 2.72 times higher for maternal age >34 as compared to age 18-25 in the study[15]. Anemia was significantly associated with

education, socioeconomic status, religion, parity, abortion in the study[10].These factors were different than our study except socioeconomic status. In the study[11], age, socioeconomic status, interval between two pregnancies, consumption of IFA tablets. Age was significantly associated with anemia as in our study. In the study[12],age,socioeconomic status, age at 1st pregnancy were significantly associated with anemia similar to our study, but education, parity, interval between two pregnancies were also significantly associated unlike in our study. In other study[13], there was significant association between anemia and age similar to our study, but other factors like education, ANC visits, and IFA tablets consumption were also significantly associated. The association of these factors could not be found in our study. In another study[15], age more than 34 years, rural residence, and history of malaria attack, hookworm infection and absence of iron supplements. In the present study, the age group significantly associated with anemia was 21-25 years this finding was different than finding reported by author[15].History of worm infestation was associated with anemia in both these studies. The prevalence of anemia at booking was significantly higher in those who registered for antenatal care in the third trimester than in those who registered in the second trimester, this finding was reported by author[16],but he could not find significant association between anemia and age,parity,interval between previous and index pregnancy. He also stated that, anemia in pregnancy results from multiple causes, including iron and folate deficiency; malaria and hookworm infestation; infections, such as HIV; and hemoglobinopathies in West Africa. Pica has been identified as a risk factor for anemia in pregnancy[19]. In the present study, anaemia was significantly associated with socioeconomic status; due to low socioeconomic status, women are not able to take nutritious food. Even if low cost iron rich food items, green vegetables are available, women are not consuming them because of their likes, dislikes. Blood losses like menorrhagia, worm infestations also contribute to anaemia.In India, despite legislation; early marriages take place leading to teenage pregnancy which is associated to anemia mostly in the age group of 21-25 years. Use of contraceptives is also associated with anemia. This may be due to their adverse effects like bleeding. The women in whom, high risk pregnancy was there, prevalence of anemia was less. This difference was statistically significant. But the reasons for this thing were not clear. The women with high risk pregnancy would have become more conscious about health and in them the prevalence of anemia was less as compared with others.

Conclusions

The prevalence of anemia was 94.3% in this study. This was much higher in many other studies in Maharashtra as well as other states. This was again very much high than foreign countries. Anaemia was more prevalent in the age group 21-25 years. A women's nutritional status depends upon her nutritional status during childhood, adolescence. So women who have insufficient iron stores before pregnancy are at more risk of developing anemia during pregnancy. In this study, age, socioeconomic status, consumption of green leafy vegetables, iron rich food items, history of worms, history of menorrhagia, presence of high risk pregnancy, age at 1st pregnancy, use of contraceptives were significantly associated with anemia in pregnancy.

Recommendations

Compulsory nutrition education should be given to pregnant women during their every antenatal visit about daily consumption of green leafy vegetables, cheap iron rich food items and fruits. Messages can be given to pregnant women about balanced diet through mobile. Iron supplements should be given to adolescent girls to prevent future anemia. The facilities for typing of anemia should be available at every primary health care institution, so that specific treatment can be given to the patients. Legislative and other efforts should be made to prevent early marriage and early pregnancy. Conditions like menorrhagia should be treated. More emphasis should be given on consumption of IFA tablets especially under supervision of health worker during pregnancy.

Acknowledgement

References

1. Park K.: Textbook of Preventive and Social Medicine, 22st edition. Banarasidas Bhanot Publishers Jabalpur, 2013; 840.
2. UN: The Millennium Development Goals Report 2008. United Nations Department of Economic and Social Affairs. New York; 2008.
3. Kalaivani K.: Prevalence and consequences of anemia in pregnancy. Indian J Med Res. 2009; 130:627–33. (PubMed)
4. Summary of key findings, India fact sheet, NFHS 3, 2005-06. [Last accessed on 2011 Oct 20]. Available from: http://www.nfhsindia.org/summary.html)
5. Karine Tolentino, Jennifer F. Friedman. An Update on Anemia in Less Developed Countries. Am. J. Trop. Med.Hyg, 2007; 77(1): 44-51.
6. Iron Deficiency Anaemia: Assessment, Prevention and Control; World Health Organization, Geneva, 2001.

7. Menon MKK. Observations on anaemia in pregnancy: Proceeding Nutrition Society of India, Vol. II. Hyderabad: National Institute of Nutrition; 1968. p. 1-18.

8. Anshu Sharma, Rita Patnaik, Suman Garg et.al. Detection & management of anaemia in pregnancy in an urban primary health care institution Indian J Med Res 128, July 2008, 45-51.

9. Preventing and controlling iron deficiency anaemia through primary health care, WHO, Geneva, 1989.

10. Nadeem Ahmad,Piyush Kalakoti,Rubeena Banu et althea prevalence of anaemia and associated factors in pregnant women in a rural Indian community: Australasian Medical Journal, 2010, 3(5), 276-280.

11. R.G. Viveki, A.B. Halappanavar, P.R. Viveki et al. Prevalence of Anaemia and Its Epidemiological Determinants in Pregnant Women: Al Ame en J Med S c 2 012, 5 (3) ,2 1 6 -2 2 3.

12. Langare SD, Rajderkar SS, Naik JD, et.al. A Cross Sectional Study to Assess Certain Determinants Co-Related with Anaemia in Pregnant Women attending Antenatal Clinic at Rural Health Training Centre in Western Maharashtra. Natl J Community Med 2013; 4(3): 454-456.

13. Pankaj Kumar, Prasad Pore,Usha patil. Maternal anemia and its impact on perinatal outcome in a tertiary care Hospital of Pune, in Maharashtra: Indian Journal of Basic & Applied Medical Research; March 2012: Issue-2, Vol.-1, P. 111-119.

14. Hanmanta V Wadgave. Burden of anemia among the pregnant women in rural Area:Healthline, Volume 2 Issue 2 July-December 2011,76-77.

15. Meseret Alem, Bamlaku Enawgaw, Aschalew Gelaw et.al. Prevalence of anemia and associated risk factors among pregnant women attending antenatal care in Azezo Health Center Gondar town, Northwest Ethiopia:J Interdiscipl Histopathology 2013; 1(3): 137-144.

16. Cyril C. Dim. The Prevalence of Anemia Among Pregnant Women at Booking in Enugu, South Eastern Nigeria: MedGenMed. 2007; 9(3): 11.

17. Predictors of anemia among pregnant women in Westmoreland, Jamaica Alyson M. Charles, Dianne Campbell-Stennett, Nelly Yatich et.al Health Care Women Int. 2010 July; 31(7): 585–598.

18. Gautam VP, Bansal Y, Taneja DK, et.al. Prevalence of Anemia Amongst Pregnant Women And Its Socio-Demographic Associates In a Rural Area of Delhi. Indian J Comm Med 2010; XXVII (4): 157-160.

19. Adam I, Khamis AH, Elbashir MI. Prevalence and risk factors for anaemia in pregnant women in eastern Sudan. Trans R Soc Trop Med Hyg. 2005;99:739–743. [PubMed]

20. Prasad B.G.: Changes proposed in social classification of Indian Families, Journal of Indian Medical Association,1970, 55 (16): 198-199.