Public Health Review - International Journal of Public Health Research

Hemoglobin profile of full term pregnant women admitted for delivery in a teaching hospital: a case series study

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DOI: https://doi.org/10.17511/ijphr.2016.i3.03

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Background: Anemia in pregnancy is a common and serious public health problem in developing countries. It is associated with high incidence of premature births, postpartum hemorrhage, puerperal sepsis, etc in mother. **Objective:** 1) To assess the hemoglobin profile of full term pregnant women admitted for delivery. 2) To analyze the correlation of anemia with obstetrics parameters like gravida, parity, and history of abortions in the past. **Methods:** The present case series study was conducted among the pregnant women in latent stage of labor admitted in a teaching hospital by using pre- designed, pre- tested, structured schedule. Hemoglobin estimation was done by Shali's method and anemia was classified according to WHO criteria. Statistical analyses were done by percentages and proportions, Mean and Chi- square test. **Results:** A high prevalence (88.4%) of anemia (Hb% - < 11.0 gm/dl) was observed among 130 pregnant women at labor. Majority (58.5%) had moderate degree of anemia (Hb%– 7.0 to 10.0 gm/dl) and (04.6%) had severe anemia (Hb% - < 7 gm/dl). The study observed significantly higher prevalence of anemia among those pregnant women who studied upto secondary level (90.3%), and those from below class IV socio- economic status (96%), among those cases less than one year of spacing between previous and index pregnancies (90%). **Conclusion:** Monitoring the compliance of women with ante- natal care services and strengthening of their health care seeking behavior are important health care measures to be undertaken at the community level.

Keywords: Pregnant women, labor, Anemia, Prevalence, IFA tablets

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R G Viveki, Professor and Head, Department of Community Medicine, Belagavi Institute of Medical Sciences, Belagavi, Karnataka, India. Email: rgviveki@gmail.com	Soumyashree M N, Viveki R G. Hemoglobin profile of full term pregnant women admitted for delivery in a teaching hospital: a case series study. Public Health Rev Int J Public Health Res. 2016;3(3):102-108. Available From https://publichealth.medresearch.in/index.php/ijphr/article/view/39	

Introduction

Anemia in pregnancy is a common and serious public health problem in developing countries. Anemia is the term used to describe the condition in which there is a reduction in the concentration of hemoglobin in the blood stream to level below 11 gm/dl for pregnant women [1]. A complete antenatal care is received by the pregnant women, still anemia is persisting during ante, intra and post natal period.

In India, National Family Health Survey-2 in 1988 to 99 shows that 54% of women in rural and 46% women in urban areas are anemic. The relative prevalence of mild, moderate and severe anemia are 13%, 57% and 12% respectively in India (ICMR data) [2]. Anemia during pregnancy continues to be a major public health problem with the existing health care resources, despite the fact that anemia in pregnant women is largely preventable and easily treatable if detected in time.

A very high prevalence of anemia during pregnancy was observed in studies conducted in India by different authors 50.1%, 82.9%, 58%,[1,3,4] etc. According to WHO hemoglobin level below 11gm/dl in pregnant women constitutes anemia. The Indian Council of Medical Research Categories of anemia as mild (Hb%-10-10.9 gm%), Moderate- (Hb%-7-10 gm%), Severe- (Hb% -<7gm%) and very severe- (Hb%- <4 gm%) [2].

Many studies are on record about the prevalence of anemia in pregnancy but no study is done to find out what proportions of women are still delivering in anemic status. The present study was conducted to find out the degree and prevalence of anemia in full term pregnant women in latent stage of labor and to know correlation of anemia with obstetrics parameters like gravida, parity, and history of abortions in the past.

Material and Methods

The present case series study was conducted among the full term pregnant women of 37-42 weeks of gestation, who were in latent stage of labor admitted for delivery in the Department of Obstetrics and Gynecology, Belagavi Institute of Medical Sciences (BIMS) Hospital, Belagavi from September to December 2015.

Ethical clearance was obtained from Institutional Ethical Committee (IEC).

A formal permission to conduct the study was obtained from the authorities of the hospital and consent was taken from study participant. All the full term pregnant women in latent stage of labor admitted during the study period were included. Pregnant women with twins and chronic diseases leading to anemia such as renal, cardiac, lung diseases and haemoglobinopathies were excluded.

The information like age, age at marriage, age at first pregnancy, education, occupation, per capita income, type of family, diet, obstetric score, history of abortion, interval between previous and present pregnancy, history of blood transfusion in this pregnancy, duration of present pregnancy, duration of IFA tablets taken, previous Hb% etc was collected by interviewing the subjects by using pre-designed, pre-tested structured schedule.

Later, Hemoglobin estimation was done by Shali's method. Anemia was classified according to WHO criteria [3]. Hemoglobin concentration of 10.0-10.9 gm/dl 7-10.0 gm/dl and less than 7.0 gm/dl were considered to indicate mild, moderate and severe anemia respectively. All those pregnant women with any associated illness like pregnancy induced hypertension, Rhesus factor negative, gestational diabetes mellitus, Preterm and post term pregnancy and twin pregnancy were excluded.

For convenience, socio-economic status of the study subjects was classified into class I (>6100rs), class II (3050 - 6099), class III (1830 – 3049), class IV (915 – 1829) and class V (<915) by using B.G. Prasad classification based on All India Consumer Price Index of September 2015 i.e. 266 (correction factor = 22.82) [5].

Sample size: The minimum sample size required for this study was estimated by assuming confidence interval of 95% and 10% margin of error and a prevalence of 58% for anemia among pregnant women as per National Family Health survey –III (NFHS) in India [6]. Accordingly, the minimum sample size required for the study was 98.

However, the present study included 130 cases to increase the power of study. The statistical analyses were performed using SPSS version. The continuous and categorical data were expressed as mean $\pm$ Standard Deviation and number of patients respectively. $P < 0.05$ was considered statistically significant.

Results

The present study included 130 pregnant women. The general profile of the study subjects is shown in Table 1.

Average age of the cases was 23.24 ± 3.06 years ranging from 18 to 32 years. The mean age at marriage was 19 .27 ± 1.83 years and that at first pregnancy was 20.75 ± 2.19 years. The mean gestational age was 39.17 ± 1.11 weeks. Average interval between previous and index pregnancies was 31.74 ± 20.76 months.

Table 1: General profile of study subjects

Variable/ characteristics	Minimum	Maximum	Mean	S.D
Age (years)	18	32	23.24	03.06
Age at marriage (years)	12	26	19.27	01.83
Age at first pregnancy (years)	15	30	20.75	02.19
Parity	0	05	00.76	00.87
Gestational age (weeks)	37.2	41.3	39.17	01.11
Interval between previous and index pregnancy (months)	03	144	31.74	20.76
No. of abortions	00	02	00.14	00.43
Haemoglobin % at labour	05.7	12.9	09.39	01.24
S D = Standard deviation				

Table 2: Distribution of study subjects by socio-demographic and haemoglobin profile

Particulars	Haemoglobin profile (gm %)				Total N= 130 (%)	P value
	>11	10.9- 10	9.9- 7	<7		
	Normal N= 15 (%)	Mild N= 33(%)	Moderate N= 76 (%)	Severe N= 6 (%)		
Age in years						
18- 21	01(06.6)	07(21.2)	30(39.4)	02(33.3)	40(30.7)	P > 0.1
22- 25	09(60.0)	19(57.5)	34(44.7)	03(50.0)	65(50.0)	
> 26	05(33.3)	07(21.2)	12(15.7)	01(16.6)	25(19.2)	
Type of family						
Nuclear	03 (20.0)	07 (21.2)	20 (26.3)	02 (33.3)	32 (24.6)	P >0.5
Joint	98 (75.3)	26 (78.7)	56 (73.6)	04 (66.6)	12 (80.0)	
Education						
Illiterate	00	00	02(02.6)	02(33.3)	04(03.0)	P < 0.05
Primary	04(26.6)	07(21.1)	10(13.1)	02(33.3)	23(17.6)	
Secondary	01(06.6)	10(30.3)	12(15.7)	02(33.3)	25(19.2)	
Higher secondary	05(33.3)	06(18.1)	27(35.5)	00	38(29.2)	
> Graduate	05(33.3)	10(30.3)	25(32.8)	00	40(30.7)	
Occupation						
Housewife	08(53.3)	15(45.4)	49(64.4)	02(33.3)	74(56.9)	P < 0.5
Home maid	01(06.6)	06(18.1)	15(19.7)	01(01.6)	23(17.6)	
Labour	05(33.3)	10(30.3)	10(13.1)	01(01.6)	26(20.0)	
Employed	01(06.6)	02(06.0)	01(01.3)	01(01.6)	05(03.8)	
Others	00	00	01(01.3)	01(01.6)	02(01.5)	
Dietary habits						
Vegetarian	02(13.3)	11(33.3)	21(27.6)	02(33.3)	36(27.6)	P > 0.5
Mixed diet	13(86.6)	22(66.6)	55(72.3)	04(66.6)	94(72.3)	
Socio- economic Status						
Class I	03(20.0)	02(06.6)	02(02.6)	00	07(05.3)	P <0.05
Class II	02(13.3)	01(03.0)	02(02.6)	00	05(03.8)	
Class III	06(40.0)	05(15.1)	06(07.8)	01(16.0)	18(13.8)	
Class IV	03(20.0)	10(30.3)	10(13.1)	02(33.3)	25(19.2)	

Class V	09(06.6)	15(45.4)	56(73.6)	03(50.0)	75(57.6)

Table 2 shows Distribution of study subjects by socio-demographic and haemoglobin profile. 3/4th of the study subjects were from joint families and 40 (30.7%) were studied up to graduate level only. 74 (56.9%) were housewives and majority (72.3%) were having mixed dietary habits.

As per modified B G Prasad classification based on Consumer Price Index of September 2015, 76.9% were from below class IV socio- economic status. The study observed significantly higher prevalence of anaemia among those women who studied up to secondary level (90.3%), and those from below class IV socio- economic status (96%) (p< 0.05). The prevalence of anaemia was relatively more among those women aged 18- 21 years (97.5%),

Those from nuclear families (90.6%), those who were housewives (89.1%) and having vegetarian diet (94.4%). Table 3 depicts the obstetric and hemoglobin profile of study participants. High prevalence of anemia among those pregnant women at labor whose age at marriage was between 18- 21 years (90%) and age at first pregnancy was less than 18 years (100%). However, this difference was statistically not significant. There was significant higher prevalence of anemia among those cases less than one year of spacing between previous and index pregnancies (90%), those who did not receive iron folic acid (IFA) tablets (100%) and among those who took IFA tablets from both government and private institutions (94.3%).

**Table 3: Obstetric and haemoglobin profile of study participants**

Particulars	Haemoglobin profile (gm %)				Total N= 130 (%)	P value
	>11 N= 15 (%)	10.9- 10 N= 33(%)	9.9- 7 N= 76 (%)	<7 N= 6 (%)		
Age at marriage						
< 18 years	02(13.3)	01(03.0)	06(07.8)	00	09(06.9)	
18 – 21 years	11(73.3)	30(90.9)	66(86.8)	66(86.8)	111(85.3)	P > 0.5
02(13.3)	> 22 years	02(06.6)	04(05.2)	02(33.3)	10(07.6)	
Age at first pregnancy						
< 18 years	00	00	03(03.9)	00	03(02.3)	
18 – 21 years	07(46.6)	21(63.6)	56(73.6)	03(50.0)	87(66.9)	P > 0.5
22 – 25 years	07(46.6)	10(30.3)	15(19.7)	03(50.0)	35(26.9)	
> 26 years	01(06.6)	02(06.6)	02(02.6)	00	05(03.8)	
Parity						
0	05(33.3)	11(33.3)	38(50.0)	03(50.0)	57(43.8)	P > 0.5
1	08(53.3)	18(54.5)	26(34.2)	02(33.3)	54(41.5)	
> 2	02(13.3)	04(12.1)	12(15.7)	01(01.6)	19(14.6)	
Interval between previous and index pregnancy						
< 1 year	00	01(03.0)	03(03.9)	00	03(02.3)	
1 – 2 (years)	05(33.3)	13(39.4)	21(27.6)	02(33.3)	45(34.6)	
2 – 3 (years)	02(13.3)	06(18.2)	10(13.1)	00	15(11.5)	P > 0.5
> 3	03(20.0)	03(09.0)	08(10.5)	01(01.6)	13(10.0)	
NA	05(33.3)	10(30.3)	34(44.7)	03(50.0)	45(34.6)	
No. of abortion						
0	15(100)	30(90.9)	64(84.2)	01(01.6)	110(84.6)	
1	00	02(06.6)	09(11.8)	02(33.3)	13(10.0)	P < 0.05
> 2	00	01(03.0)	03(03.9)	03(50.0)	07(05.3)	
IFA tablets consumption						
Nil	00	01(03.0)	00	00	01(00.7)	
< 2 months	01(06.6)	00	10(13.1)	01(01.6)	12(09.2)	P < 0.05
2 – 3 months	01(06.6)	06(18.2)	06(07.8)	05(83.3)	18(13.8)	
> 3 months	13(86.6)	26(78.7)	60(78.9)	00	99(76.1)	

Source of IFA tablets						
Govt only	07(46.6)	12(36.6)	10(13.1)	06(100)	35(26.9)	
Private only	04(33.3)	10(30.3)	26(34.2)	00	41(31.5)	P < 0.05
Both	03(20.0)	10(30.3)	40(52.6)	00	53(40.7)	
Nil	00	01(03.0)	00	00	01(00.7)	
NA: Not Applicable (primigravida)						

Figure 1 shows hemoglobin % during earlier period of present pregnancy. The overall prevalence of anemia in earlier period of gestation was 91.3% with 29.8%, 58.6% and 02.8% prevalence of mild, moderate and severe anemia respectively. Significantly higher prevalence of anemia among delivering mother is seen in 3rd trimesters (95.7%). The present study found that still 88.4% of full term pregnant women were admitted for delivery in anemic status.

Figure-1: Haemoglobin profile of study subjects during earlier period of present pregnancy
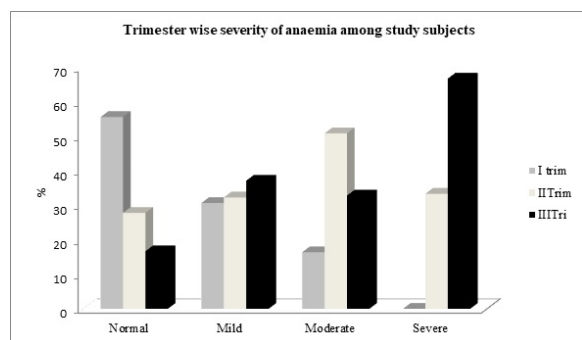
Discussion

The prevalence of anemia among pregnant women in labor in the present study was very high (88.4%), although similar study by Taner C E et al showed 41.6% [9]. Other studies in pregnant women by Viveki R G et al (82.9%) [3], Ansari N B et al (90%) [7], Umar Z et al (68.33%) [8] and Tiwan Lt M et al (58%) [4].

However, lower prevalence of anemia in pregnancy was reported by Noronha J A et al (50.1%) [1] and NFHS- 2 (49.7%) [10]. Significantly lower prevalence of anemia among pregnant women for delivery has been reported by similar study conducted in other country like Turkey (23.2%) [11]. The overall prevalence of severe anemia (Hb% < 7.0 gm/dl) among the study subjects was 4.6%.

In other studies during pregnancy in India, severe anemia was found in 7% by Viveki R G et al [3],

1.5% by Noronha J A et al [1] and 2.2% by Bentley M E et al [11]. The prevalence of anemia was significantly more in those studied up to secondary education and below Class IV socio economic status, similar to that reported by Viveki R G et al [3], Yadav R K et al [5] and by Taner C E et al [9].

Socio economic status reported similar to this study by Gautam V P et al [12]. Mean hemoglobin level among the pregnant women at labor were 9.3 ± 1.24 gm/dl ranging between 5.7 to 12.9, Ansari N B et al [7] reported 9.9 ± 1.0 gm/dl, while R G Viveki et al [3] reported 9.6 ± 1.63 gm/dl ranging between 5.1 to 12.4 gm/dl.

Conclusion

As observed in this study, still a very high proportions of pregnant women (88.4%) were found to be delivering in anemic status, is an indicator of the failure of national and WHO Programmes to address this problem. Socio- economic status, literacy status of women, child spacing and IFA tablets intake were significantly associated with anemia in this study.

Therefore, monitoring the compliance of women with ante- natal care services and strengthening of their health care seeking behavior are important health care measures to be undertaken at the community level. It is time for realization that health system should focus on various factors that contribute to anemia and include them as an important indicator in the national health care policy.

Acknowledgement

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