International Journal of Community Medicine and Public Health
Singh R et al. Int J Community Med Public Health. 2019 Feb;6(2):701-707
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20190194

Original Research Article

Pregnant women with severe anemia reporting in labor: prevalence, socio-demographic and obstetric determinants

Ruchika Singh[1], Mamta Gupta[2]*, Vandana Saini[1]

Department of Obstetrics and Gynaecology, [1]Hindu Rao Hospital and Associated NDMC Medical College, [2]Kasturba Hospital, Delhi, India

Received: 20 November 2018
Revised: 01 January 2019
Accepted: 02 January 2019

***Correspondence:**
Dr. Mamta Gupta,
E-mail: write2mamta55@gmail.com

ABSTRACT

Background: Severely anemic women reporting in labor remains one of the most important challenging situation for the obstetrician as well as for the mother and her family due to its adverse feto-maternal outcome. Various socio-demographic and obstetric conditions need to be explored which are important to tackle them, for primary prevention of anemia. The aim and objectives of the study were to estimate prevalence of severe anemia in pregnant women reporting in labor in a tertiary hospital of Delhi and to evaluate various socio-economic and associated obstetric factors associated.
Methods: This is a hospital based, prospective, case contol study. Hemoglobin was estimated at the time of labor room admission. Fifty consecutive antenatal women with severe anemia (Group A) and 50 non-anemic women (Group B) were enrolled in early labor. Socio-demographic and obstetric factors, were recorded and analyzed.
Results: Prevalence of severe anemia was estimated to be 2.23%. Determinants of severe anemia were found to be socio-economic status (p value 0.001), education (p value 0.001), rural living (p value 0.016), calorie intake (p value 0.001), BMI (p value 0.046), booking status of pregnancy (p value 0.001), gravida (p value 0.024), inter-conception interval (p value 0.002) and regular iron-folic acid intake (p value 0.001).
Conclusions: Primary prevention of anemia by targeting these factors at the community/state/ national level, by the policy makers is important. Early booking and screening for anemia in antenatal clinics, providing iron supplements to anemic women for secondary prevention of severe anemia is recommended so that no woman reports with severe anemia in labor.

Keywords: Severe anemia, Labor, Socio-economic factors, Obstetric factors, Determinants of anemia

INTRODUCTION

Anemia is the commonest medical disorder in pregnancy. It has a varied prevalence, etiology and degree of severity in different populations, being more common in developing and non-industrial countries.[1] It causes reduction in the circulating red cell mass and corresponding decrease in hemoglobin mass and oxygen carrying capacity of blood.

Estimates from the World Health Organization report that from 35% to 75% (56% on average) of pregnant women in developing countries and 18% of women from industrialized countries are anaemic.[2] Many of these women were already anemic at the time of conception with an estimated prevalence of anemia of 43% of non-pregnant women in developing countries and 12% in women in wealthier regions. The prevalence of anemia is high in central Asia and reported as 54%-98% in India.[2-4]

Maternal anemia is responsible for 20-40% of maternal deaths directly or indirectly because cardiac failure, preeclampsia, antepartum haemorrhage, postpartum haemorrhage and puerperal sepsis are commonly associated.[5-7] Also an increased perinatal morbidity and mortality in babies of anemic pregnant women has been reported. Risk of preterm delivery, low birth weight, prematurity, intrauterine growth retardation, intrauterine death and birth asphyxia are increased in these women.[7,8]

Various nutritional programmes have been advocated from the government and despite the use of iron and folic acid supplementation, the prevalence of anemia is quite high which shows that various other factors might be contributing to it. Many unbooked, underprivileged women report with severe anemia late in pregnancy when they are already in labor.

This makes timely intervention for correcting anemia and improving feto-maternal outcomes at the level of health providers quite difficult. There is not only need to prevent anemia at the level of health care provider, but, also to address the prevailing socio-economic and cultural factors associated with it. Very few published studies in India have addressed the role of socio-demographic factors in severely anemic women in late pregnancy or in labor. The current study is therefore, carried out to determine the prevalence and various socio-demographic factors associated with severe anemia in pregnant women coming in labor. The study is intended to provide useful information that would help in identifying and make appropriate recommendations for the modifiable socioeconomic factors at the community, state and national level.

Aims and objectives

Estimation of prevalence of severe anemia and evaluating various socio-economic and associated obstetric factors associated with it, in pregnant women reporting in labor.

METHODS

Inclusion criteria

Inclusion criteria were pregnant women with Hb <7 gm/dl reporting in labor (Group A), pregnant women with Hb ≥11 gm/dl reporting in labor (Group B).

Exclusion criteria

Exclusion criteria were pregnant women with haemoglobin between 7–10.9 g/dl in labor; not willing for participation; women with severe anaemia at term or at the time of delivery due to acute bleeding (antepartum hemorrhage) for group A; history of hemoglobinopathy; multiple pregnancy; pregnant women with pre-existing medical co-morbidities.

Sample size has been calculated by the formula: Prevalence of severe anemia (Hb<7 gm%) in labor in India has been reported to be 2.25%.[9]

$n= (Z_{1-\alpha})^2 P(1-P) / D^2$

Where n=sample size, $Z_{1-\alpha}$=1.96 for 95% level of confidence, P=expected prevalence =2% in our study. D= precision=0.05. Putting all the values in the equation-

$n= 1.96 \times 1.96 \times b0.0225 \times 0.9775 / 0.05^2$
$=33.8$

Sample size= 34. To increase precision of study, a sample size of 50 women with severe anemia was taken.

The study was approved by institutional ethical committee. This was a case control study conducted at Hindu Rao Hospital and associated NDMC Medical College at Delhi from November 2017 to January 2018. Study population included women admitted in early labor in labor ward. Hemoglobin measurement was done (along with CBC), using auto-analyzer. After informed written consent, fulfilling the inclusion and exclusion criteria, consecutive pregnant women with severe anemia (case group, Group A) were enrolled till a sample size of 50 was reached. 50 healthy pregnant women without anemia (control group, Group B) were enrolled. Data was collected on a pre-designed proforma for both the groups.

A detailed socio-demographic history including age, religion, education, income, residing in urban or rural area, eating habits i.e. vegetarian or mixed diet was obtained. Calorie count was done from previous 24 hours diet recalled by woman using calorie charts.[10] Socio-economic status was estimated using revised BG Prasad socio-economic classification scale, updated in 2016 on basis of consumer price index (industrial worker).[11]

Obstetric history (included gravida, parity, number of live issues, interval between index and last pregnancy, use of contraception), history of and folic acid intake was recorded and analyzed.

Statistical methods

Statistical analysis was done with the statistical package for the social science system version SPSS 20. The various baseline investigations (continuous variables) were presented as mean±SD. The data was presented in terms of frequencies and percentages for categorical variables. Categorical data analysis was carried out using Chi-squared test or Fisher's exact test as appropriate. The comparison of normally distributed continuous variables was performed using Student's t test. For all statistical tests, a p value less than 0.05 was taken to indicate a significant difference.

RESULTS

It was observed that socio - demographic factors in terms of age, religion, urban/rural living, type of family, occupation and dietary preferences were comparable. ($p>0.05$) in the 2 groups. However, a significant difference was observed in terms of education, urban/rural living, socio-economic status, calorie intake and BMI ($p<0.05$) (Table 1).

Table 1: Socio-demographic factors.

S. No	Parameter	Group A (anemia group) N (%)	Group B (control group) N (%)	P value
1.	**Age (years): mean**	24.20±3.66	25.58±3.43	0.055
	<20 (n=13)	10 (20.0)	3 (6.0)	
	20-25 (n=43)	23 (46.0)	20 (40.0)	1.00
	26-30 (n=39)	15 (30.0)	24 (48.0)	
	>30 (n=5)	2 (4.0)	3 (6.0)	
2.	**Religion**			
	Hindu (n=88)	44 (88)	44 (88)	
	Muslim (n=12)	6 (12)	6 (12)	1
	Others (n=0)	0 (0)	0 (0)	
3.	**Residence**			
	Urban (n=75)	34 (68)	41 (82)	0.016**
	Rural (n=25)	16 (32)	9 (18)	
4.	**Education**			
	Uneducated (n=28)	21 (42.0)	7 (14.0)	0.001**
	Primary school (n=41)	24 (48.0)	17 (34.0)	
	Secondary school (n=26)	5 (10.0)	21 (42.0)	
	Graduate (n=4)	0 (0.0)	4 (8.0)	
	Postgraduate (n=1)	0 (0.0)	1 (2.0)	
5.	**Type of family**			
	Nuclear (n=60)	27 (54.0)	33 (66.0)	0.221
	Combined (n=40)	23 (46.0)	17 (34.0)	
6.	**Socio-economic status**			
	Lower (n=40)	30 (60.0)	10 (20.0)	
	Upper lower (n=12)	2 (4.0)	10 (20.0)	
	Lower Middle (n=38)	16 (32.0)	22 (44.0)	0.001**
	Upper middle (n=6)	2 (4.0)	4 (8.0)	
	Upper (n=4)	0 (0.0)	4 (8.0)	
7.	**Occupation**			
	Housewife (n=91)	46 (92.0)	45 (90.0)	0.128
	Working (n=9)	4 (8)	5 (10)	
8.	**Diet**			
	Vegetarian (n= 84)	41 (82.0)	43 (86.0)	
	Mixed diet (n=16)	9 (18)	7 (14)	0.585
9.	**Calorie intake (kcal/day)**			
	<1500 (n=8)	8 (16.0)	0 (0.0)	
	>1500-2000 (n=44)	32 (64.0)	12 (24.0)	0.001**
	>2000-2500 (n=7)	10 (20.0)	31 (62.0)	
	>2500 (n=7)	0 (0.0)	7 (14.0)	
10.	**Hb mean (g/dl)**	5.8±0.87	12.35±0.83	0.001**
11.	**BMI kg/m^2**			
	<18.5 (n=11)	8 (16)	3 (6)	0.046**
	18.5-22.9 (n=56)	26 (52)	30 (60)	
	23-24.9 (n=15)	4 (8)	11 (22)	
	>25 (n=1)	0 (0)	1 (2)	
	*Not calculated (n=17)	12 (24)	5 (10)	

* Prepregnancy / 1st trimester pregnancy weight of some women was not known, therefore not accounted for. **significant

Table 2: Obstetric characteristics.

S. No	Parameter	Group A N (%)	Group B N (%)	P value
1.	**Gravida**			
	1 (n=28)	12 (24.0)	16 (32.0)	0.024*
	2-3 (n=56)	25 (50.0)	31 (62.0)	
	>3 (n=16)	13 (26.0)	3 (6.0)	
2.	**Parity**			
	Nullipara (n=37)	16 (32.0)	21 (42.0)	0.452
	Para 1 (n=35)	17 (34.0)	18 (36.0)	
	Para 2-3 (n=27)	16 (32.0)	11 (22.0)	
	para >3 (n=1)	1 (2.0)	0 (0.0)	
3.	**Interval last and index preg.**			
	<2 years (n=12)	12 (24.0)	0 (0.0)	0.002*
	≥2 years (n=60)	27 (54.0)	33 (66.0)	
	NA/nulligravida (n=28)	11 (22.0)	17 (34.0)	
4.	**No. of live issues**			
	None (n=39)	18 (36.0)	21 (42.0)	0.149
	1 (n=40)	17 (34.0)	23 (46.0)	
	2-3 (n=20)	14 (28.0)	6 (12.0)	
	>3 (n=1)	1 (2.0)	0 (0.0)	
5.	**Gestational age at delivery**			
	<37 weeks (n=20)	16 (32.0)	4 (8.0)	0.003*
	≥37 weeks (n=80)	34 (68.0)	46 (92.0)	
6.	**Antenatal booking**			
	Unbooked (n=18)	13 (26.0)	5 (10.0)	0.001*
	Registered (n=24)	18 (36.0)	6 (12.0)	
	Booked (n=58)	19 (38.0)	39 (78.0)	
7.	**Contraception use**			
	Used (n=31)	11 (22)	20 (40)	0.052
	Not used (n=69)	39 (78)	30 (60)	

*significant

Table 3: Iron supplements during pregnancy.

S. No	Parameter	Group A N (%)	Group B N (%)	P value*
1.	Iron-folic acid intake-			
	Yes (n=81)	36 (72.0)	45 (90.0)	0.02
	No (n=19)	14 (28.0)	5 (10.0)	
2.	In women taking iron folic acid	36 (72.0)	45 (90.0)	
	Compliant	19 (38.0)	40 (80.0)	0.001
	Non compliant	18 (36.0)	5 (10.1)	

*P value <0.05 significant.

Significant difference ($p<0.05$) was seen in the obstetric characters in the 2 groups in terms of total number of pregnancies (gravida), interval between last and index pregnancy, antenatal booking (minimum 3 antenatal visits) and period of gestation. However, obstetrical factors like parity and contraceptive use were found to be comparable in the two groups ($p>0.05$) (Table 2).

Iron-folic acid intake was significantly high and women were more compliant in group B compared to group A (p value 0.02, 0.001 respectively) (Table 3).

DISCUSSION

The study aimed to estimate prevalence and evaluate sociodemographic and obstetric factors in women with severe anemia coming in labor. 50 pregnant women with severe anemia in labour and 50 non-anaemic pregnant women in labor were enrolled and data analyzed.

During the study period a total of 2,242 women were admitted in labor room. Out of these 50 women were detected to have severe anemia with hemoglobin <7

gm/dL. Thus, prevalence of severe anaemia in women reporting in labor was estimated to be 2.23% in our study. Similar prevalence has been reported by Prashant D, Marhatta et al, Bentley et al.[9,12,13] However, studies by Gebre et al, Kaur et al and Rajamouli et al have reported a higher prevalence of 5.8%, 5.5%, 8.8% respectively.[14-16] The observed lower prevalence rate in our study could be attributed to the fact that it was conducted amongst pregnant women in labor. Women detected to have anemia in antenatal period were likely to be on haematinics which might have improved their haemoglobin levels reducing the prevalence of severe anemia at the time women goes in labor.

Mean age was found to be comparable in Group A and B in our study. Owais et al in his study concluded that age was no longer associated with increased risk of anemia.[17] We observed that only 20% severely anemic women below the age of 20 years compared to 6% in group B (Table 1). Similar observation was made by Yadav and Batar et al.[18,19] Mean Hb was found to be lower in adolescent primigravidae than in any other group of pregnant women in a study by Verhoeff et al.[20] Bhandiwad et al has reported that in women with severe anemia 51.3% were teenage pregnancies.[21] Thus, younger women require special care and intervention during antenatal period so that they do not land up in severe anemia during labor as the nutritional requirement in adolescent period is high further increased by pregnancy.

Distribution of women in terms of religion was equal in both the groups in our study, though most of the women were Hindus (Table 1). Batar has also reported no significant difference in both groups in terms of religion similar to our study.[19] However, Sharma P et al observed 37% of Hindu women were suffering from anemia as against 26% amongst Muslim women.[22]

Women residing in rural areas were significantly more severely anemic than those from urban areas (Table 1). Virendra et al in his study also found a high prevalence of anemia of 96.5% among women of rural area of Delhi.[23]

A significant higher number of women in our study were educated and belonged to higher socio-economic status in group B (control group) compared to group A. 42% women in group A were uneducated compared to 14% in group B. Women belonging to middle and upper socioeconomic status comprised 36% in group A compared to 60% in group B in our study. Similar observations has been made by Sharma et al and Upadhyay et al.[22,24] Lokhare et al, Khatod et al in their study have reported that the severity of anemia decreases as the education level and socioeconomic status increases.[25,26] Anemia in antenatal women is thus inversely related to the literacy status. Biswas et al has reported in a study in Assam that severity of the anemia decreases with increase in per capita income of the family.[27] Women in the low socio-economic class may have chronic iron deficiency anemia even before pregnancy which is further aggravated by the demands of the fetus during pregnancy. Lower socio-economic status with intake of diet deficient in essential nutrients and minerals, poor and unhygienic living conditions leading to worm infestation and poor access to health are important factors in women coming with severe anemia. Thus, socio-economic deprivation is an important factor that predisposes pregnant women to anemia. The issue of poverty and literacy are interlinked and should be tackled at the community /state and national level.

No significant difference in association of anemia was observed in our study in women having vegetarian diet and mixed diet in both the groups. Though, Abiselvi et al has reported that those on vegetarian diet have 6.2 times anemia than those on mixed diets.[28] Diet in women of lower socio-economic status contain less heme or no heme iron which contributes to anemia.

We observed that nutritional status, reflected by calorie intake and BMI was significantly lower in severe anemia group (p value 0.001) (Table 1). Maximum number of women in group A had calorie intake of 1500-2000 kcal/day whereas, in group B maximum number of women had intake of 2000-2500 kcal/day. Significant difference was observed in different categories of BMI by Bentelay et al in their study similar to our study.[13] Study by Abbas reported no significant difference in the rate of iron deficiency anemia between women in the different BMI groups.[29] Good nutrition and adequate calories are therefore, essential for a pregnant women, lack of which can lead to anemia.

In our study, severe anemia was found significantly more in unbooked women (Table 2). This is in corroboration with study by Batar et al, Kaur et al.[15,19] Bandiwad et al has observed 6.7% of unbooked cases and 1.7% of booked cases had severe anaemia.[21] Sahoo et al also reported that obstetric risks were more in unbooked pregnant women compared to booked ones.[30] Lack of education, awareness of prenatal care, accessibility of health facilities and poverty might be the factors that women do not come for availing antenatal services. As anemia is both detectable and preventable, focused antenatal care has an important role for preventing anemia thereby, reducing feto-maternal morbidity and mortality.

Number of total pregnancies (gravida) was significantly more in group A compared to group B. 26% women were gravida >3 in group A compared to only 6% in group B (Table 2). Devi et al has found 65.24% multigravidas with severe anemia.[31] Women with gravida >2 more had frequent severe anemia, reported by Virendra et al.[23] In our study inter pregnancy interval was also significantly associated with severe anemia similar to Bhindwad et al.[19] He reported that in women who had an interpregnancy interval of >2 years, 60% of patients had normal hemoglobin and only 1.6% were severely anemic whereas, patients with an inter-pregnancy interval of <6

months, only 12% of them were not anemic and 11% of patients were severely anemic.[19] Thus, multigravida and less birth spacing are important risk factors for anemia because repeated pregnancies and short intervals result in depletion of iron stores and micronutrients. There is a need to counsel every woman in her reproductive years especially in post-partum period, for using contraception for spacing pregnancies.

Iron-folic acid intake was significantly high (90% versus 72%) and women were more compliant (80% versus 38%) in group B compared to group A in our study (Table 3). This is similar to a study by Abiselvi et al, who has revealed an association between iron and folic acid tablet consumption and anemic status.[28] Study by Gopalakrishnan et al found that about 90% of pregnant women consumed 100 or more iron-folic acid tablets.[32] Regular intake of prophylactic and therapeutic iron is therefore, required to improve anemia status in pregnant women. Awareness creation and nutrition education on the importance of taking iron supplementation and counselling on consumption of iron-rich foods during pregnancy is recommended to prevent anemia in the pregnant women.

CONCLUSION

Teenage pregnancies, socioeconomic deprivation, low calorie intake, low BMI, unbooked status, a higher total number of pregnancies, short inter-pregnancy interval, inadequate/non-compliance to iron folic acid intake are important socio-demographic and obstetric determinants for severe anemia in a pregnant women reporting in labor. As all these factors are inter-related, improvement of literacy and socioeconomic status of woman, use of contraception for limiting family or spacing can be of great help to overcome severe anemia in pregnant woman. Targeting these factors by the policy makers at the community/state/ national level, is very important and need of the day, for primary prevention of severe anemia in women reporting late in pregnancy and labor. Also, early booking and screening for anemia in antenatal clinics, providing iron supplements to these anemic women for secondary prevention of severe anemia is recommended with an aim that “no woman should report with severe anemia in labor”.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Schwartz WJ, Thurnau GR. Iron Deficiency Anaemia in Pregnancy. Clin Obstet Gynecol. 1995;38(3):443-54.
2. WHO. The global prevalence of anaemia in 2011. Geneva: World Health Organization; 2015.
3. IIPS. National Family Health Survey 2005-06 (NFHS-3). Available at: http://mohfw.nic.in/ nfhsfactsheet.htmb.
4. Mangla M and Singla D. Prevalence of anaemia among pregnant women in rural India: a longitudinal observational study. Int J Reprod Contracept Obstetr Gynecol. 2016;5(10):3500-5.
5. Kathleen MR. Iron-Deficiency Anemia: Reexamining the Nature and Magnitude of the Public Health Problem. J Nutr. 2001;131:565S-7S.
6. Sharma JB. Nutritional anemia during pregnancy in non industrial countries, Progress in Obst Gynae (Studd). 2003;15:103-22.
7. Ghimire RH, Ghimire S. Maternal and fetal outcome following severe anaemia in pregnancy. J Nobel Med Coll. 2013;2(3):22-6.
8. Sangeetha VB, Pushpalatha S. Severe Maternal Anemia and Neonatal outcome. Sch J App Med Sci. 2014;2(1c):303-9.
9. Prashant D, Jaideep KC, Girija A, Mallapur MD. Prevalence of anemia among pregnant women attending antenatal clinics in rural field practice area of Jawaharlal Nehru Medical College, Belagavi, Karnataka, India. Int J Community Med Public Health. 2017;4(2):537-41.
10. Dietary guidelines for Indians. A manual.National Institute of Nutrition. ICMR. 2011. Available at: NINindia.org/DietryguidelinesforNINwebsite.pdf.
11. Shaikh Z, Pathak R. Revised Kuppuswamy and B G Prasad socio-economic scales for 2016. Int J Community Med Public Health. 2017;4(4):997-9.
12. Marhatta R. Study of anemia in pregnancy and its outcome in Nepal Medical college Teaching Hospital, Kathmandu, Nepal. Nepal Med Coll J. 2007;9:270-4.
13. Bentley ME, Griffiths PL. The burden of anaemia among women in India. Eur J Clin Nutr. 2003;57:52-60.
14. Gebre A, Mulugeta A. Prevalence of Anemia and Associated Factors among Pregnant Women in North Western Zone of Tigray, Northern Ethiopia:A Cross-Sectional Study. J Nutr Metabol. 2015;2015:165430.
15. Kaur K, Kaur A, Singh PSS. Maternal and perinatal outcome in cases of severe anaemia in labour. Int J Current Advanced Res. 2017;6(12):8413-5.
16. Rajamouli J, Ravinder A, Reddy SCK, Pambi S. Study on Prevalence of Anemia among Pregnant Women attending Antenatal Clinic at Rural Health Training Centre (RHTC) and Chalmeda Anand Rao Institute of Medical Sciences Teaching Hospital, Karimnagar, Telangana, India. International Journal of Contemporary Med Res. 2016;3(8):2388-91.
17. Owais MA, Kalsoom U. Effect of maternal Anaemia on Birth Weight. J Ayub Med Coll Abbottabad. 2011;23(1).
18. Yadav P. Severe anemia and adverse pregnancy outcome in a tertiary care hospital in North India. Int J Reprod Contracept Obstet Gynecol. 2018;7(2):483-6.

19. Batar A, Salvi A, Saini L, Agarwal S, Rajoria L, Mital P. Maternal and Perinatal Outcome of Pregnancy with Severe Anaemia. Int J Biomed Adv Res. 2015;6(08):611-6.
20. Verhoeff FH, Barbin BJ, Chimsuku L. An analysis of determinants of anaemia in pregnant women in rural Malawi – a basis for action. Annals Trop Med Parasitol. 1999;93(2):119-33.
21. Bhandiwad A, Surakshith L. Gowda, Anupama N. K. Impact of socio demographic factors on the severity of maternal anaemia. Int J Reprod Contracept Obstet Gynecol. 2016;5(3):868-72.
22. Sharma P, Mehta S, Nagar R. Prevalence of anemia and socio-demographic factors associated with anemia among pregnant women attending antenatal Hospital in Jaipur City, India. IOSR-JPBS. 2013;6(3):1-5.
23. Virendar P. Prevalance of anaemia amongst pregnant women and its socio – demographic associates in a Rural area of Delhi. Indian J Basic App Med R. 2012;2(1):111-9.
24. Upadhyay C, Upadhyay N. Effect of anemia on pregnancy outcome:a prospective study at tertiary care hospital. Int J Reprod Contracept Obstet Gynecol. 2017;6(12):5379-83.
25. 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.
26. Khatod L, Chidrawar S, Bhangadia S, Chakurkar J, Bhattad S, Bhattad S. Determination of Various Sociodemographic Factors Affecting Anemia in Pregnancy. Int J Recent Trends Sci Tech. 2013;1(8):27–30.
27. Biswas M, Baruah R. Maternal anaemia associated with socio-demographic factors among pregnant women of Boko-Bongaon Block Kamrup, Assam. Indian J Basic Applied Med Res. March 2014;3(2):712-21.
28. Abiselvi A, Gopalakrishnan S, Umadevi R, Rama R. Socio-demographic and obstetric risk factors of anaemia among pregnant women in rural Tamil Nadu. Int J Community Med Public Health. 2018;5(2):721-7.
29. Abbas W, Adam I, Rayis DA, Hassan NG, Mohamed F. Lutfi.A Higher Rate of Iron Deficiency in Obese Pregnant Sudanese Women. Open Access Macedonian J Med Sci. 2017;5(3):285-9.
30. Sahoo S, Somani SR, Somani S, Sree KG, Babu PS. Obstetric & perinatal morbidity & mortality in booked & unbooked antenatal Patients. Indian J Basic Applied Med Res. 2015;4(3):510-7.
31. Devi BN, Varalaxmi B, Jyothirmayi T, Lahari N. Maternal outcome in pregnancy with severe anaemia: Prospective study in a tertiary care hospital in Andhra Pradesh. IOSR J Dental Med Sci. 2015;14(4):6-10.
32. Gopalakrishnan S, Rama R. Assessment of knowledge regarding 'essential obstetrics care' among rural pregnant women in Kancheepuram District of Tamil Nadu, India. Int J Community Med Public Health. 2015;2 (4):526-30.

Cite this article as: Singh R, Gupta M, Saini V. Pregnant women with severe anemia reporting in labor: prevalence, socio-demographic and obstetric determinants. Int J Community Med Public Health 2019;6:701-7.