

SHORT ARTICLE

Prevalence and socio-demographic factors affecting anaemia in pregnant women of Dibrugarh District, Assam, India

Indrani Gogoi¹, Tulika Goswami Mahanta², Ratna Sarma³, Pragyan Prakash Gogoi⁴, Hiranya Saikia⁵

¹Postgraduate Trainee, ²Associate Professor, ³Professor & Head, ⁴Demonstrator, ⁵Senior Lecturer, Department of Community Medicine, Assam Medical College, Dibrugarh, Assam

Abstract	Introduction	Methodology	Results	Conclusion	References	Citation	Tables / Figures
--------------------------	------------------------------	-----------------------------	-------------------------	----------------------------	----------------------------	--------------------------	----------------------------------

Corresponding Author

Address for Correspondence: Dr Indrani Gogoi, Postgraduate Trainee, Department of Community Medicine, Assam Medical College, Dibrugarh, Assam India
E Mail ID:dr.indranigogoi@gmail.com

Citation

Gogoi I, Mahanta TG, Sarma R, Gogoi PP, Saikia H. Prevalence and socio-demographic factors affecting anaemia in pregnant women of Dibrugarh District, Assam, India. Indian J Comm Health. 2016; 28, 2: 202-207.

Source of Funding: Indian Council of Medical Research (ICMR), New Delhi and Department of Biotechnology (DBT), Tezpur. **Conflict of Interest:** None declared

Article Cycle

Received: 07/04/2016; **Revision:** 15/04/2016; **Accepted:** 30/04/2016; **Published:** 30/06/2016

This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).

Abstract

Background: Anaemia is the most common nutritional deficiency observed globally. Anaemia worsens during pregnancy leading to adverse maternal and fetal outcome. Dibrugarh district has the highest maternal mortality in the country, one of the major factor being anaemia during pregnancy. **Aims & Objectives:** To assess the prevalence and socio-demographic determinants of anaemia in pregnant women of Dibrugarh District. **Material & Methods:** A community based, cross-sectional study was conducted in a block selected randomly. Study period was for the period from May'2015 to February'2016. Study sample included 290 participants. **Results:** Prevalence of anaemia among study participants was found to be 73.1%. (Mild 10%, moderate 43.1 % and severe 20%). Mean haemoglobin of study subjects was 9.07±2.26 g/dl. Average age of the study subjects was 23.24±4. Majority (27.2%) had their education upto primary school level and belong to class IV socioeconomic status. Univariate analysis and multiple logistic regression analysis shows educational qualification, socioeconomic status and type of housing are statistically associated with anaemia during pregnancy. **Conclusion:** Anaemia is rampant in the community needing urgent action to prevent morbidity amongst both mother and child

Key Words

Pregnant; Anaemia; Determinants; Dibrugarh

Introduction

Anaemia is one of the most common nutritional deficiencies accounting for one fifth of maternal deaths globally. (1) Although nutritional anaemia affects both sexes and all age groups, the problem is more prevalent among women especially aggravated during pregnancy and is associated with increased maternal morbidity and mortality with adverse pregnancy outcome. (2) Prevalence of anaemia is disproportionately high in developing countries, due to poverty, inadequate diet, certain diseases,

pregnancy/lactation and poor access to health services. (3,4)

In India prevalence of anaemia in pregnant women is 49.7%, against the global prevalence of 41.8%. (5) While that of Assam is 72.6% (National Family Health Survey-III, 2005-06), which is regarded as the severe public health problem. Scenario is even worse in Dibrugarh, it is found to be 96.3% in a study done in adolescent girls of tea garden of Dibrugarh district. (6) Though India is the first country to start National Nutritional Anaemia Prophylaxis Program (NNAPP) from 1970 to prevent anaemia among pregnant women, high prevalence of anaemia among

pregnant women still persists despite the availability of this effective, low-cost intervention for prevention and treatment. (7) Different socio-demographic factors play major role in the efforts put to prevent anaemia during pregnancy. Knowledge of these barriers of socio-demographic factors will not only help to understand the local causes but also will help to formulate strategy to combat anaemia in pregnancy. (8)

Aims & Objectives

1. To assess the prevalence of anaemia in pregnant women of Dibrugarh District of Assam
2. To assess the socio-demographic determinants of anaemia in pregnant women of Dibrugarh District of Assam.

Material and Methods

It is a community based cross sectional study carried out carried out within a period from May'2015 to February '2016.

Sample Size:

Taking the prevalence of anemia in pregnant women as 72.6% (9) with relative precision of 10% and 95% confidence interval the required sample size is 145. Considering design effect of 2 sample size turns out to be 290.

Sampling design:

Multistage sampling technique was used. One block was randomly selected from the 6 blocks of Dibrugarh district. Taking expected pregnancy rate to be 3% and rate of detectable pregnancy to be 1%-1.5%, (10) expected pregnant women in a village turns out to be 10-15. A total of 26 villages were required to meet the sample size.

Inclusion Criteria:

All pregnant women giving consent for study were included by consecutive sampling; while severely ill pregnant women and who were not willing to participate in the study were excluded.

Exclusion Criteria:

Pregnant women who were not present in home after three consecutive visits were excluded. Out of total visited homes around 20% pregnant women refused to take part in the study.

Study tool:

A predesigned- pretested questionnaire was used for data collection. Socioeconomic status was assessed using modified B. G. Prasad Classification based on Consumer Price Index of May 2014 of 1130 (Correction Factor = 55.71).

Laboratory test:

Haemoglobin estimation was done by cyan-meth haemoglobin method in all the study participants and were categorized as normal ($\geq 11\text{g/dl}$), mild anaemia ($10\text{-}10.9\text{g/dl}$) moderate anaemia ($7\text{-}9.9\text{g/dl}$), severe anaemia ($<7\text{g/dl}$). (WHO criteria for diagnosing anaemia in pregnant women at sea level). (11)

Ethical Approval: Permission for the study was obtained from the Institutional Ethical committee.

Consent:

Written informed consents obtained from each participant.

Statistical Analysis:

Data entry was done using statistical software (SPSS-16 version). Data was analyzed in percentages and proportions. Association with variables tested using univariate and multiple logistic regression.

Results

The mean ($\pm\text{SD}$) age of the study subjects was 23.24 ± 4 years, ranging from 17 to 38 years of age. Majority of the women were in the age group of 21-25 years. Majority of the women were Hindu 209 (72.1%) by religion. 160 (55.2%) women belong to nuclear family. Tea tribe population comprising of 21% of the population. Working population was 99 (34.1%) and majority 79 (27.2%) had their education upto primary school level. Majority of women belong to class IV socioeconomic status of BG Prasad Classification. 118 (40.7%) women live in kutcha house (temporary house) ([Table 1](#)) About 26.9% of the women had normal level of haemoglobin and rest 73.1% were anaemic (mild 10%, moderate 43.1% and severe 20%). Mean haemoglobin of study subjects was 9.07 g/dl with a standard deviation of 2.26 g/dl. Majority 37.9% women were in third trimester. All tea tribe pregnant women were found anaemic.

Univariate analyses showed that educational qualification of pregnant women ($p=0.000$), socioeconomic status ($p=0.000$), type of housing ($p=0.003$) were statistically associated with anaemia during pregnancy. ([Table 2](#))

On multiple logistic regression analysis, it was found that anaemia is significantly associated with educational qualification ($p=0.000$), socioeconomic status ($p=0.000$) and type of housing ($p=0.031$). ([Table 3](#))

Discussion

Prevalence of anaemia among the study participants was 73.1% which is slightly more than that of NFHS-3 data for Assam, where prevalence was found to be around 72% but it is much higher than national level 59% and global level 41.8%. (12) A recent study supported by UNICEF among adolescent tea garden girls of Dibrugarh district found prevalence as high as 96.3% which is a very alarming scenario. (6) Other studies also reported 61% to 96.8% of pregnant women suffer from anaemia during pregnancy in India. (13) Studies conducted in different parts of the country found a varied prevalence as in central India it was 62.7%, whereas high prevalence was found in Aurangabad and Kashmir 87.2% and 91% respectively. (8,14,15)

Prevalence of mild, moderate and severe anaemia was found as 29(10.0%), 125(43.1%) and 58(20.0%) respectively in the present study. Prevalence of severe anaemia in the present study was found very high in comparison to national and state statistics 2.2% and 3.4% respectively. (12) A study from Kashmir found similar prevalence of very high severe anaemia in 22.8% of study participants as in our study. (14) While a similar study in West Bengal observed mild, moderate and severe anaemia as 8.54%, 91.46% and 0.81%, respectively. (16) Studies from Dhaka and Ethiopia also found very high prevalence of anaemia among pregnant women with higher moderate degree of anaemia. (17,18) The mean haemoglobin in the study population was 9.07 g/dl with a standard deviation of 2.26 g/dl which is less than the cut off value for anaemia in pregnancy for WHO standard. (18) Similar result was found in study done in North east India and in a ICMR conducted study 9.14±1.51 g/dL and 9.2g/dl respectively. (2,19) Out of total pregnant women, 17(13.71%) were teenage pregnancy out of which 15(88.24%) were anaemic, similar finding was observed in a study done Dehradun and West Bengal where 71.4% and 63% teenage pregnancy were anaemic. (20,21)

On multiple regression analysis educational qualification, socioeconomic status and type of housing is found to be associated with anaemia in pregnancy. Studies done in Karnataka and Mumbai also found these factors associated with anaemia. (22,23). Similar findings were found in studies done in Ethiopia (24), Nigeria (25,26) Along with these factors short interval between pregnancies, booking in the third trimester, recent febrile illness, single or

divorced and high parity were found to be associated with anaemia. (25,26,27)

Conclusion

High prevalence of anaemia in comparison to other parts of the country is a matter of concern for Dibrugarh District. It has been one of the major causes of high maternal mortality ratio in Dibrugarh District (430/lakhs). Addressing these determinants, successful implementation of Government strategies to improve maternal anaemia may improve the situation.

Recommendation

High prevalence of anaemia along with strong association with socio-demographic factor indicating the necessity of improvement of socio-demographic factors to tackle this alarming condition amongst pregnant women. There is scope for intense research and evidence generation to combat anaemia in pregnancy.

Limitation of the study

Others causes of anaemia like haemoglobinopathies were not considered in the study which are also important causes of anaemia in the study area.

Relevance of the study

This study documents high prevalence of anaemia with strong association with socio-demographic factors is a matter of concern

Authors Contribution

IG & TGM: designing of the study, study tool development and methodology and manuscript writing. RS: reviewed manuscript. IG, PPG & HS: statistical analysis.

References

1. Addis Alene K, Mohamed Dohe A. Prevalence of Anemia and Associated Factors among Pregnant Women in an Urban Area of Eastern Ethiopia. *Anemia*. 2014;2014:561567. doi: 10.1155/2014/561567. Epub 2014 Aug 25. PubMed PMID: 25215230; PubMed Central PMCID: PMC4158560. [[PubMed](#)].
2. Kalaivani K. Prevalence & consequences of anaemia in pregnancy. *Indian J Med Res*. 2009 Nov;130(5):627-33. Review. PubMed PMID: 20090119. [[PubMed](#)].
3. Black RE, Allen LH, Bhutta ZA, Caulfield LE, de Onis M, Ezzati M, Mathers C, Rivera J; Maternal and Child Undernutrition Study Group. Maternal and child undernutrition: global and regional exposures and health consequences. *Lancet*. 2008 Jan 19;371(9608):243-60. doi: 10.1016/S0140-6736(07)61690-0. Review. PubMed PMID: 18207566. [[PubMed](#)].
4. Kaur S, Deshmukh PR, Garg BS. Epidemiological Correlates of Nutritional Anemia in Adolescent Girls of Rural Wardha.

Indian Journal of Community Medicine. 2006 October-December; 31(4): 255-258.

5. Noronha JA, AL Khasawneh, Seshan V, Ramasubramaniam S, Raman S. Anaemia in pregnancy – Consequences and Challenges : A Review of Literature. *J South Asian Feder Obst Gynae.* 2012; 4(1):64-70.
6. Mahanta TG, Mahanta BN, Gogoi P, Dixit P, Joshi V, Ghosh S. Anaemia, its determinants and effect of different interventions amongst tea tribe adolescent girls living in Dibrugarh district of Assam. *Indian J Comm Health.* 2014; 26(Suppl S2):300-309.
7. Agarwal DK, Agarwal KN, Roychoudhry S. Targets in National Anemia Prophylaxis Programme for pregnant women. *Indian Pediatr.* 1988 Apr;25(4):319-22. PubMed PMID: 3225040. [[PubMed](#)].
8. 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 of Nigerian Med.* 2012; 6(1):30-34.
9. International Institute for Population Sciences (IIPS) and Macro International. 2007. National Family Health Survey (NFHS-3), 2005–06: India: Volume I. Mumbai: IIPS.
10. Immunization handbook for medical officer: Department of Health and Family Welfare, Government of India.
11. International Institute of Population Sciences & ORC Macro (2007). National Family Health Survey (NFHS-3), 2005-06. India, Mumbai.
12. Toteja GS, Singh P, Dhillion BS, Saxena BN, Ahmed FU, Singh RP, Prakash B, Vijayaraghavan K, Singh Y, Rauf A, Sarma UC, Gandhi S, Behl L, Mukherjee K, Swami SS, Meru V, Chandra P, Chandrawati, Mohan U. Prevalence of anemia among pregnant women and adolescent girls in 16 districts of India. *Food Nutr Bull.* 2006 Dec;27(4):311-5. PubMed PMID: 17209473. [[PubMed](#)].
13. 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. 2014; 5(1):126-130.
14. Kaul R, Ahmad J, Baba TA, Sheikh S, Ahmad A, Ashraf M, et al. Anaemia in pregnant women in a rural block of Kashmir valley: Its prevalence and sociodemographic associates. *Int J Med Sci Public Health.* 2013; 2(4):814-818.
15. Mondal B, Maiti S, Maiti Y B, Ghosh D, Paul S. Prevalence of Anaemia among Pregnant Bauri Women of Bankura, West Bengal, India. *Journal of Clinical and Diagnostic Research.* 2012 April; 6(2):231-233.
16. Chowdhury HA, Ahmed KR, Jebunessa F, Akter J, Hossain S, Shahjahan M. Factors associated with maternal anaemia among pregnant women in Dhaka city. *BMC Womens Health.* 2015 Sep 22;15:77. doi: 10.1186/s12905-015-0234-x. PubMed PMID: 26395981; PubMed Central PMCID: PMC4580087. [[PubMed](#)].
17. Mihiretie H, Fufa M, Mitiku A, Bacha C, Getahun D, Kejela M. Magnitude of Anemia and Associated Factors among Pregnant Women Attending Antenatal Care in Nekemte Health Center, Nekemte, Ethiopia. *J Med Microb Diagn.* 2015; 4(3).
18. World Health Organization. Haemoglobin Concentrations for the Diagnosis of Anaemia and Assessment of Severity. Geneva, Switzerland: World Health Organization; 2011.
19. Bora R, Sable C, Wolfson J, Boro K, Rao R. Prevalence of anemia in pregnant women and its effect on neonatal outcomes in Northeast India. *The Journal of Maternal-Fetal & Neonatal Medicine: the official journal of the European Association of Perinatal Medicine, the Federation of Asia and Oceania Perinatal Societies, the International Society of Perinatal Obstet.* 2013; Epub 2013/09/18.
20. Banerjee B, Pandey G, Dutt D, Sengupta B, Mondal M, Deb S. Teenage pregnancy: a socially inflicted health hazard. *Indian J Community Med.* 2009 Jul;34(3):227-31. doi: 10.4103/0970-0218.55289. PubMed PMID: 20049301; PubMed Central PMCID: PMC2800903. [[PubMed](#)].
21. Singh AB, Kandpal SD, Chandra R, Srivastava VK, Negi KS. Anemia Amongst Pregnant and Lactating Women In District Dehradun. *Indian J Prev Soc Med.* 2009; 40(1):19-22.
22. Viveki RG, Halappanavar AB, Maled and Deshpande PS. Prevalence of Anaemia and Its Epidemiological Determinants in Pregnant Women. *Al Ameen J Med S ci.* 2012; 5(3): p. 216-223.
23. Shidhaye PR, Giri PA, Nagaonkar SN, Shidhaye RR. Prevalence of anemia in the postnatal women at a tertiary care teaching hospital in Mumbai. *J Med Nutr Nutraceut.* 2012; 1(54):54-57.
24. Melku M, Addis Z, Alem M, Enawgaw B. Prevalence and Predictors of Maternal Anemia during Pregnancy in Gondar, Northwest Ethiopia: An Institutional Based Cross-Sectional Study. *Anemia.* 2014:108593. 9 pages doi: 10.1155/2014/108593.
25. Anorlu RI, Oluwole AA, Abudu OO. Sociodemographic factors in anaemia in pregnancy at booking in Lagos, Nigeria. *J Obstet Gynaecol.* 2006 Nov;26(8):773-6. PubMed PMID: 17130028. [[PubMed](#)].
26. Geraldine U. Ndukwu, Paul O. Dienney. Prevalence and socio-demographic factors associated with anaemia in pregnancy in a primary health centre in Rivers State, Nigeria. *Afr J Prm Health Care Fam Med.* 2012; 4(1).
27. Nwizu EN, Iliyasu Z, Ibrahim SA, Galadanci HS. Socio-demographic and maternal factors in anaemia in pregnancy at booking in Kano, northern Nigeria. *Afr J Reprod Health.* 2011 Dec;15(4):33-41. PubMed PMID: 22571103. [[PubMed](#)].

Tables

TABLE 1 MATERNAL AND SOCIO-DEMOGRAPHIC PROFILE OF STUDY PARTICIPANTS

	Number	Percentage (%)	
Age (Years)	≤20	44	15.2
	21-25	186	64.1
	26-30	44	15.2
	31-35	7	2.4
	>35	9	3.1

Religion	Hindu	209	72.1
	Muslim	48	16.6
	Others	33	11.4
Type of family	Joint	130	44.8
	Nuclear	160	55.2
Caste	General	110	37.9
	Schedule caste	18	6.2
	Schedule tribe	25	8.6
	Tea tribe	61	21.0
	OBC/MOBC	76	26.2
Educational qualification	Illiterate	64	22.1
	Primary school	79	27.2
	Middle school	66	22.8
	High school	51	17.6
	Higher secondary and above	30	10.3
Socio economic status	Class I	5	1.7
	Class II	27	9.3
	Class III	84	29.0
	Class IV	118	40.7
	Class V	56	19.3
Type of housing	Kutcha (temporary houses)	120	41.4
	Semi pucca (combined variety)	116	40.0
	Pucca (solid and permanent structure)	54	18.6
Working status	Working	99	34.1
	Non working	191	65.9
Trimester	1st trimester	93	32.1
	2nd trimester	87	30.0
	3rd trimester	110	37.9

TABLE 2 UNIVARIATE ANALYSIS OF SOCIO-DEMOGRAPHIC FACTORS ASSOCIATED WITH ANAEMIA

Variable		Anaemic (%)	Non anaemic (%)	Odds ratio (C.I. 95%)	P value
Age group	31-35	5(71)	2(29)	Reference	0.96
	≤ 20	34(77)	10(23)	1.36(0.23-8.11)	
	21-25	135(73)	51(27)	1.06(0.20-5.63)	
	26-30	32(73)	12(27)	1.07(0.18-6.26)	
	>35	6(67)	3(33)	0.8(0.09-6.84)	
Educational status of PW	Higher secondary and above	12(40)	18(60)	Reference	0.000
	High school	22(43.1)	29(56.9)	1.14(0.45-2.85)	
	Middle school	52(78.8)	14(21.2)	5.57(2.18-14.25)	
	Primary school	71(89.9)	8(10.1)	13.31(4.74 -37.42)	
	Illiterate	55(85.9)	9(14.1)	9.17(3.32-25.29)	
Socio economic status	Class I	1(20)	2(80)	Reference	0.000
	Class II	6(22.2)	21(77.8)	1.14(0.11-12.25)	
	Class III	49(58.3)	35(41.7)	5.6(0.60-52.28)	
	Class IV	103(87.3)	15(12.7)	27.47(2.87-262.51)	
	Class V	53(94.6)	3(5.4)	70.67(5.91-844.64)	
Working status	Non-Working	133(70)	58(30)	Reference	0.06
	Working	79(80)	20(20)	1.72(0.96-3.08)	
Type of family	Nuclear	114(71.2)	46(28.8)	Reference	0.62
	Joint	98(75.4)	32(24.6)	1.24 (0.73-2.09)	
Type of housing	Pucca	33(61.1)	21(38.9)	Reference	0.003
	Semi Pucca	79(68.1)	37(31.9)	1.36(0.69-2.66)	
	Kutcha	100(83.3)	20(16.7)	3.18(1.54-6.59)	

TABLE 3 MULTIPLE LOGISTIC REGRESSION OF THE FACTORS ASSOCIATED WITH ANAEMIA

	Sig .	Exp (B)	95% C.I for EXP(B)	
			Upper	Lower
Educational qualification				
Higher secondary and above	.000			
High school	.015	.228	.069	.755
Middle school	.000	.094	.027	.328
Primary school	.008	.220	.072	.672
Illiterate	.910	.939	.316	2.793
Socioeconomic status				
Class I	.000			
Class II	.012	27.657	2.099	364.480
Class III	.000	49.704	10.089	255.875
Class IV	.001	8.553	2.334	31.339
Class V	.237	2.243	.588	8.556
Type of housing				
Pucca	.031			
Semi pucca	.026	.401	..180	.896
Kutcha	.032	.367	..147	.917