Original Research Article

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Anaemia among pregnant women in a rural area of Kancheepuram district, Tamil Nadu

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ABSTRACT

Background: Anaemia is a major public health problem in developing countries. The vulnerable groups include adolescent girls, pregnant and lactating mothers. Despite several National and International strategies to control anaemia, the magnitude of the problem remains high. Lack of adequate program implementation strategies could be a possible reason for this problem and therefore, we aimed to estimate the prevalence of anaemia among rural pregnant women in our field practice area in Tamil Nadu.

Methods: This cross sectional study was carried out among 270 pregnant women registered at our Rural Health Training Centre. All these pregnant mothers gave informed consent to participate in the study. A structured interview schedule was administered and hemoglobin levels were recorded from their Mother Child Protection Card. A mean hemoglobin value was calculated and anaemia was defined as a Hemoglobin level <11 g/dl as per WHO classification.

Results: About 48.5% of pregnant women were in the age group of 15-24 years. In this study, 41.5% were found to be anaemic. About 38.1% of the study participants were found to have mild anaemia (hemoglobin level between 10.0-10.9 g/dl), while 1.9% had moderate anaemia (Hb between 7.0 - 9.9 g/dl) and 1.5% had severe anaemia (Hb below 7 g/dl).

Conclusions: Anaemia is an imminent public health problem, which requires due attention. It is a social problem, wherein the knowledge and attitudes of the pregnant women deeply influence the disease burden. Adequate measures to address these issues have to be in place as a priority, in order to minimize the magnitude of anaemia.

Keywords: Iron deficiency, Hemoglobin level, Antenatal mothers

INTRODUCTION

Pregnancy is a natural process that occurs in women during her reproductive years. The antenatal period of a woman is a crucial period, which demands adequate care and monitoring. Several medical and obstetric factors of the mother tend to make the pregnancy a high risk one, thereby directly or indirectly complicating the pregnancy outcome. Of the many medical factors, anaemia is a

serious public health problem warranting due attention and focus.

It is estimated that more than 50% of pregnant women are anemic and majority (90%) belongs to iron deficiency anaemia. Women often become anemic during pregnancy because the demand for iron increases as a result of the physiological changes. The inability to meet the required level either due dietary deficiencies,

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inadequate absorption or infection in conjunction with blood loss during pregnancy gives rise to anemia.³ Major health consequences of anaemia includes, maternal and infant mortality and morbidity, poor pregnancy outcome (premature birth, low birth weight) and is responsible for about 20% of all maternal deaths.⁴

Prevalence of anaemia in pregnancy has been estimated by World Health Organization to be around 14% in developed countries and 56% in developing countries, which ranges between 35 to 100% among different regions of the world. The prevalence of anaemia varies widely in different settings and accurate data among pregnant mothers is often lacking. In developing countries every second pregnant woman is estimated to be anemic. Prevalence of anaemia in South Asian countries is highest in the World and among the South Asian countries; India has the highest prevalence (84%) of anaemia.

According to National Nutrition Monitoring Bureau Technical Report No. 2, (2003) about 74.6% of pregnant women in India was anemic. Karnataka had 79.8% followed by Andhra Pradesh (73.8%) and Tamil Nadu (69 percent). Prevalence of anaemia was least in Kerala (50.2%). The more important fact is that about half of the global maternal deaths due to anaemia occur in South Asian countries and India alone contributes to about 80% per cent of the maternal deaths due to anaemia in South Asia and 50% of maternal deaths globally. 10

In spite of several intervention strategies, India continues to face the challenge of anaemia during pregnancy. The underlying problem for this is lack of sufficient data and enumeration. There are few studies that were done after NFHS -3 to estimate the regional prevalence. According to NFHS 3 (2005-2006) about 55.3% of pregnant women in India were anaemic. Adequate knowledge on the magnitude of the problem is the key to any program implementation. This will also help in devising strategies for early detection and effective management of anaemia in pregnancy.

Based on the above scenario, this study was carried out with the objective to estimate the prevalence of anaemia among pregnant women in the rural community in Sripuram area in Tamil Nadu.

METHODS

Study design

This is a community based cross sectional descriptive study

Study area

This study was carried out in Sripuram, the rural field practice area of our medical college in Kancheepuram district of Tamil Nadu.

Study population

All the pregnant mothers attending the Rural Health Training Center, Sripuram were defined as the study population.

Sample size

Based on a study done in 2011, the prevalence of anaemia among pregnant women in rural South India was estimated to be 66.7%. At 95% confidence limits and with 10% limit of accuracy, the sample size was estimated as 191.6 based on the formula N =4PQ/L². Accounting 10% for non-response, the sample size derived was 210.7. The final sample size was rounded off to 210.

Study period

Four months from September to December 2015.

Sampling method

All the pregnant mothers who were registered in the Rural Health Training Center, Sripuram, in Kancheepuram district between 1stSeptember 2015 and 31st December 2015 were listed out from the antenatal register available at RHTC. A total of 270 women were registered during this period. The list of all the antenatal women was prepared, and all the 270 participants were selected for the study.

Ethical committee approval

The institutional ethics committee of our medical college approved the study protocol.

Informed consent

Informed consent in the local language (Tamil) was obtained from the study participants before administering the questionnaire.

Pilot study

Pre-testing was carried out for standardizing the questionnaire. Based on the observations made during the pilot testing, necessary changes were made in the questionnaire. The results of the pilot study were not included in the final analysis.

Tool for data collection

A Pre-tested, structured interview schedule was prepared to elicit questions related to socio-demographic factors of the study group. Data related to Haemoglobin level were recorded from the mother child protection card available with them. All the hemoglobin values were recorded and a mean value for each participant was calculated. The

mean hemoglobin level was later categorized for the estimation of prevalence of anaemia.

Inclusion criteria

All pregnant mothers residing in the rural field practice area (Sripuram) of the medical college at the time of survey were included in the study.

Data collection methods

This community based cross sectional study was carried out among 270 pregnant mothers by making house visits to study the participants. The purpose of the study was clearly explained to them. Informed consent was obtained in local (Tamil) language before administering the structured interview schedule. The questions related to socio-demographic factors were collected from the mother and all the haemoglobin values were recorded from the mother child protection card.

Statistical analysis

The data was collected and entered in an Excel sheet. Then data was analyzed using SPSS version 16. Prevalence of anaemia was expressed in frequencies.

Operational definition

According to World Health Organization, anaemia in pregnancy was defined as hemoglobin levels less than 11 g/dl. ¹² Further grading of anaemia is as follows:

Table 1: Grading of anaemia among pregnant women. 12

S. No	Grading of anaemia	Hemoglobin level (g/dl)
1	Mild anaemia	10-10.9
2	Moderate anaemia	7.0-9.9
3	Severe anaemia	<7.0

RESULTS

This study was carried out among 270 pregnant mothers of Sripuram, the rural field practice area of our Medical College and Hospital. Table 2 illustrates the demographic information of the respondents. The study participants were between the age group of 15 to 35 years. Majority of the respondent belonged to the age group of 15 to 24 years (48.5%) It is found that 8 [3%] of the pregnant women were in their late adolescent age between 15 to 17 years. This is indicative of the prevalent early marriages in the study area.

Majority of the respondent (40.4%) have completed their middle school level education. About 98.9% of the study participants are home workers. About 56.7% of them were from nuclear families. Majority of the study

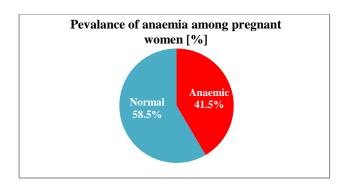
participants were belonging to the upper middle class (54.4%) as per Modified BG Prasad's Classification.

Table 2: Socio-Demographic characteristics of the study population.

S. No	Particulars	Frequency (N =270)	Percentage
1	Age		
	15-24	131	48.5
	25-29	108	40.0
	>=30	31	11.5
2	Religion		
	Hindu	242	89.9
	Muslim	8	3.0
	Christian	20	7.4
3	Education status		
	Graduate/PG	42	15.6
	Intermediate/post high school diploma	12	4.4
	HSC	85	31.5
	Middle school	109	40.4
	Primary	21	7.8
	Illiterate	1	0.4
4	Occupation status		
	Professional	1	0.4
	Semi-professional	1	0.4
	Unskilled worker	1	0.4
	Unemployed	267	98.9
5	Type of family		
	Nuclear	153	56.7
	Joint	116	43.0
	Three generation	1	0.4
6	Diet history		
	Vegetarian	11	4.1
	Mixed diet	243	90.0
	Eggeterian	16	5.9

Prevalence of anaemia among the study participants is given in Figure 1. It was observed that anaemia (Hb<11 g/dl) was prevalent among 41.5% (95% CI: 36.7 to 47.3) of the study participants. Anaemia among the study participants was graded into mild, moderate and severe, based on their hemoglobin levels. This is illustrated in Figure 2. It was observed that 38.1% of the participants had mild anaemia, while 1.9% had moderate anaemia. Also, 1.5% of the study participants had severe anaemia.

Maximum participant in this study were belonging to primi-gravida (68%) among whom 41.5% had anaemia while among the multi-gravida (32%) the level of anaemia was almost similar at 41% (Table 3). Nearly 51.4% of the first trimesters were anaemic, while 50.6% of the second trimesters and 29.4% of the third trimesters were found to be anaemic (Table 4 and Figure 3).



Grading of anaemia among participants [%] Anaemia in pregnancy 50 41.5 38.1 40 30 20 10 1.9 0 Mild Moderate Severe Total

Figure 1: Prevalence of anaemia among the study participants.

Figure 2: Grading of anemia among study participants.

Table 3: Anaemia in relationship to gravidity of the study participants.

Gravidity	Frequency [N =270]	Anaemia [N =112]	Percentage	Chi square	P value
Primi-gravida	183	76	41.5%	0.001	0.001
Multi-gravida	87	36	41.4%		0.981

Table 4: Gestational age and prevalence of anaemia among the study participants.

Gestational age	Antenatal women [N =270]	Antenatal women with anaemia [N =112]	%	Chi square	P value
First trimester	72	37	51.4	12.778	0.001*
Second trimester	79	40	50.6		
Third trimester	119	35	29.4		
Total	270	112	41.5		

^{*}Statistically Significant

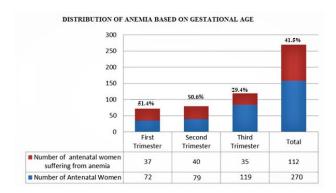


Figure 3: Distribution of anaemia based on gestational age among study participants.

DISCUSSION

The present study is a cross sectional study conducted in a rural field practice area (Sripuram) of our medical college, to determine the prevalence of anemia among pregnant mothers.

In this study, majority of the study participants belonged to age between 15 to 24 years (48.5%). Similarly, in studies done by Alem et al, in Ethopia during 2013, found that 49.5% of the participants were in the age group 18-25. 13 In another study done by Madhavi, in Karnataka, India, during 2011, the maximum percentage (37.61%) of women were in the age group of 20-24 years. 11 Sharma et al, in Jaipur, India during 2013 reported in their study that the majority (63%) of the participants were in the age group of 20-25. 4 Most of these findings are comparable to the outcome of our study.

The current study showed that majority of the participants were from Hindus religion (89.9%) which is similar to a study done by Madhavi et al, where Hindus were 88.8%, while Sharma et al, found Hindus were 62%. 11,14 About 56.7% of participants were from nuclear family, which was similar to a study done by Nadeem et al, (56.55%). 15 The present study shows that about 43% of the study participants were from joint family. Similar finding were reported by Lokare et al, (45.4%). Overall 90% of the study participant were on mixed diet, which is much higher to the studies done by Nadeem et al, (62.9%), and Kendre et al, in Maharashtra (65.7%). 15,17

Overall prevalence of anaemia in this study was 41.5% (95% CI 36.7 to 47.3). This prevalence is comparable to the outcome of studies conducted by Larocque et al (47.31%), and Suega et al, (46.2%). Higher prevalence was observed in the study conducted by Sharma et al (63%) and Madhavi et al, (66.67%) and still higher prevalence was observed in a study by Gautam et al. (96.5%).^{6,11,14} Another study by Ivan et al reported 83% of prevalence of anaemia.¹⁹

In the present study, 38.1% were found to have mild anaemia. In a study done by Bivalkar, around 40% of the study participants had mild anaemia, which was comparable to our results. ²⁰ While a study done by Balgir to assess the prevalence of anaemia in Odisha found that only 29.4% of the participants had mild anaemia.² Higher prevalence was observed in a study conducted by Ahmad et al, among rural women in Maharashtra, showed that 74.8% were found to be anaemic. Among them 50.9% demonstrated moderate anaemia while mild and severe anaemia were recorded in 30.17% and 18.9% respectively. 15 Ahmad et al, also found that there was a significant relationship of parity ($\chi^2 = 46.69$, p<0.001) with anaemia and among the primi-gravida, 86.22% were found to be anaemic. In this study prevalence is found to be almost equal on both primi-gravida and multi-gravida without any statistically significant association.

In this study nearly 51.4% of the first trimesters were anaemic, while 50.6% of the second trimesters and 29.4% of the third trimesters were anaemic. There is a statistically significant association between the different trimesters and the prevalence of anaemia. In a study done by Kumar et al, at Mysore found that 55.3% of the mothers were anaemic in the first trimester. Higher percentage of anaemia was seen in the second trimester (64.7%) and was lowest in the third trimester (44%).²² It is a well-established fact that there is a physiological drop in hemoglobin (Hb) in the mid-trimester.^{23,24} It is also observed that more than 50% of the mothers in India were anaemic at some point of time during their pregnancy and more than one-third of the mothers remained anaemic throughout all the trimesters.¹⁵

The possible reasons for the varying difference in the prevalence of anaemia may be due to the geographical variation and other prevailing socio-economic factors across different areas/regions, which influence the nutritional status of the mothers. The lower prevalence of anaemia found in this study may be due to better lifestyle conditions, improved health services and active implementation of the anaemia control measures and extensive antenatal care provided by the government.

CONCLUSION

Anaemia among pregnant mothers is an imminent public health problem, especially in a developing country like India. Severe or untreated iron-deficiency anemia during pregnancy can increase the risk of having a preterm or low-birth-weight baby, a blood transfusion (if there is significant amount of blood loss during delivery), postpartum depression, a baby with anemia or a child with developmental delays.

Though the implementation of several national health programs to alleviate this problem has been largely successful, further aggressive measures are required to minimize the magnitude of anaemia. This can be effectively achieved only if there is adequate change in

the attitudes of women and their families towards their lifestyle and treatment seeking behavior in order to achieve better prevention and control of anaemia and its complications.

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Institutional Ethics Committee

REFERENCES

- 1. Ghimire N, Pandey N. Knowledge and practice of mother regarding the prevention of anaemia during pregnancy, in teaching hospital. Kathmandu J Chitwan Med Coll. 2013;3(5):14-7.
- Suega K, Dharmayuda T, Sutarga I, Bakta I. Irondeficiency anemia in pregnant women in Bali, Indonesia: a profile of risk factors and epidemiology. Southeast Asian J Trop Med Public Health. 2002;33:604-7.
- Idowu OA, Mafiana CF, Sotiloye D. Anemia in pregnancy: A survey of pregnant women in Abeokuta, Nigeria. Afr Health Sci. 2005;5(4):295-9.
- 4. WHO. Micronutrient deficiencies. IDA (Internet). 2017. Available at: http://www.who.int/nutrition/topics/ida/en/. Accessed on 24 March 2017.
- World vision International Anaemia Assessment Guidance. 2017 (Internet). Available at: http://www.wvi.org/nutrition/article/anaemiaassessment-guidance. Accessed on 24 March 2017.
- 6. Gautam VP, Bansal Y, Taneja DK, Saha R. Prevalence of anaemia amongst pregnant women and its socio-demographic associates in a rural area of Delhi. Ind J Com Med. 2002;27(4):157-60.
- 7. Nik Rosmawati NH, Mohd Nazri S, Mohd Ismail I. The Rate and Risk Factors for Anemia among Pregnant Mothers in Jerteh Terengganu, Malaysia. J Community Med Health Educ. 2012;2:150.
- 8. Agarwal KN, Agarwal DK, Sharma A, Sharma K, Prasad K, Kalita MC, et al. Prevalence of Anaemia in pregnant and lactating women in India. Indian J Med Res. 2006;124(2):173-84.
- Prevalence of Micronutrient Deficiencies. National Nutrition Monitoring Bureau Technical Report No.2, (2003). Table 15 P49. Prevalence of anaemia among pregnant women. NIN, ICMR, Hyderabad. Available at: http://nnmbindia.org/NNMB%20M ND%20REPORT%202004-Web.pdf. Accessed on 24 March 2017
- 10. Kalaivani K. Prevalence and consequences of anaemia in pregnancy. Indian J Med Res. 2009;124:627-33.

- 11. Madhavi LH, Singh HKG. Nutritional Status of Rural Pregnant Women. Peoples J Sci Res. 2011;4(2):20-3.
- 12. World Health Organization. Haemoglobin Concentrations for the diagnosis of anaemia and assessment of severity. Available at: http://www.who.int/vmnis/indicators/haemoglobin.pdf?ua=1. Accessed on 24 March 2017
- 13. Alem M, Kena T, Baye N, Ahmed R, Tilahun S. Prevalence of Anemia and Associated Risk Factors among Adult HIV Patients at the Anti-Retroviral Therapy Clinic at the University of Gondar Hospital, Gondar, Northwest Ethiopia. J Interdiscipl Histopathol. 2013;1(3):137-44.
- 14. Priyanka SP, 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.
- 15. Ahmad N, Kalakoti P, Bano R, Syed MMA. The prevalence of anaemia and associated factors in pregnant women in a rural Indian community. AMJ Australasian Med J. 2010;3(5):276-80.
- 16. Lokare PO, Gattani PL, Karanjekar VD, Kulkarni AP. A study of prevalence of anemia and socio-demographic factors associated with anemia among pregnant women in Aurangabad city, India. Ann Nigerian Med. 2012;6(1):30-4.
- 17. Kendre VV. Prevalence of Anemia among Pregnant Women of Eastern Maharashtra. IJRTSAT. 2014;10(1):166–71.
- 18. Larocque R, Casapia M, Gotuzzo E, Gyorkos T. Relationship between intensity of soil transmitted

- helminthic infection and anaemia during pregnancy. Am J Trop Med Hyg. 2005;73(4):783-9.
- Amel EI, Mangaiarkkarasi A. Evaluation of Anaemia in Booked Antenatal Mothers During the Last Trimester. J ClinDiagn Res. 2013;7(11):2487– 90.
- 20. Neha YB, Wingkar KC, Joshi AG, Swati J. Assessment of severity & types of anaemia during pregnancy in rural population in Western Maharashtra. Indian J Basic Applied Med Res. 2014;4(1):160-3.
- 21. Balgir RS, Panda J, Panda AK, Ray M. A cross sectional study of anaemia in pregnant women of eastern coast of Odisha. Tribal Health Bulletin. 2011;17(1&2):1-7.
- 22. Kumar KJ, Asha N, Murthy DS, Sujatha M, Manjunath V. Maternal anemia in various trimesters and its effect on newborn weight and maturity: an observational study. Int J Prev Med. 2013;4(2):193–9.
- 23. Kalaivani K. Prevalence and consequences of anaemia in pregnancy. Indian J Med Res. 2009;130(5):627–33.
- 24. Carlin A, Alfirevic Z. Physiological changes of pregnancy and monitoring. Best Pract Res Clin Obstet Gynaecol. 2008;22(5):801-23.

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