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A study to identify the factors associated with anaemia among rural and urban antenatal women

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Abstract

Introduction: Anaemia is the term that indicates a low red cell count and a below normal haemoglobin or haematocrit level. A reduction in the concentration of haemoglobin in the blood stream to a level below 11gm/dl for pregnant women. Among different types of anaemia iron deficiency anemia is the most common nutritional disorder (66-80%), in the world as per WHO (2002). Problem statement a study to identify the factors associated with anaemia among rural and urban antenatal women. Conceptual frame work was adopted from modified Rosenstock and Beckers (1974) Health Belief Model.

Material and Methodology: The research approach used was the quantitative descriptive survey approach and the design was exploration survey design. In the present study the variable are age, gestational age, parity, socioeconomic status and body mass index (BMI). The target population of the study was antenatal woman from urban and rural area. The non-probability convenient sampling technique was used to obtain an adequate size of sample. The sample was selected according to the criteria laid down by the investigator. The data collection tool consisted of two sections. Section I: Demographic profile of 5 items which includes the information of antenatal woman, like: age, marital status, education, socioeconomic status and occupation. Section II: Section II consists of obstetric profile which includes 19 items. The content validity was obtained by consulting the experts from the medical as well as nursing field. Almost all the questionnaire was approved by the experts. The tool was pretested on 30 antenatal women. The reliability was not tested as it is a survey method.

Result: The factors associated with anaemia in urban and rural antenatal women Kruskal Wallis test was used. The p value of all demographic and obstetric variables is greater than 0.005 except for history of miscarriage, where the p value is 0.002. So it can be concluded that there is association of level of haemoglobin and history of miscarriage at 5% level of significance.

Conclusion: The prevalence of anaemia differs in different epidemiological and socio-economical settings. In some settings malaria is an important cause while in others intestinal worms plays an important role as the causative factor which results into blood loss and malnutrition. Chronic illnesses and socioeconomic status have an important role to the development of anaemia by increasing problems of affordability of food and accessibility of preventive and curative measures. Hence, the researcher was curious to assess the prevalence of anaemia in antenatal women and related background variables, in different epidemiological and socio-economical settings that is from urban and rural population.

Keywords: Factors, anaemia, antenatal woman

Introduction

Among different types of anaemia iron deficiency anemia is the most common nutritional disorder (66-80%), in the world as per WHO (2002). Iron deficiency continues to be the leading single nutritional deficiency in the world, despite considerable efforts over the past 3 decades to decrease its prevalence. The high frequency of iron deficiency anaemia in the developing world has substantial health and economic costs. Women in developing countries are always in a state of precarious iron balance during their reproductive years. Their iron stores are not well developed because of poor nutritional intake, recurrent infections, menstrual blood loss, and repeated pregnancies. Gender discrimination in a country like India resulting girls lacking access to a balanced diet, adequate health care and proper education. Thus the average Indian woman enters her reproductive years, and particularly pregnancy, with iron and foliate deficiency. Many affected individuals live in the developing countries. The world health organization (WHO) estimates that 39% of children younger than 5 years,

48% of children between 5 and 14 years, 42% of all women, and 52% of pregnant women in developing countries are anaemic. In India the second national family health survey in 1998-1999 (NFHS) showed that 54% rural women of childbearing age were anaemic compared with 46% of women in urban areas. Prevalence of anaemia more in many north-eastern states of India i.e. 62% compared to the south-eastern states.

Methodology

Research Approach

Quantitative descriptive survey approach.

Research Design

Exploration survey design

Variables under study

The variable in this study are age, gestational age, parity, socioeconomic status and body mass index (BMI).

Research Setting

The study was conducted at urban area which includes selected hospital and rural area which includes Rural Hospital, PHC, and sub centres.

Population

The target population of the study was antenatal women from urban and rural areas.

Sample Selection criteria (Inclusion and Exclusion)

Inclusion criteria

1. Antenatal women in urban and rural area.
2. Women who are willing to participate in the study.
3. Women who cannot read or understand Marathi, Hindi or English

Exclusion criteria

1. Women who are not anaemic.
2. Women with anaemia and associated disease condition e.g. diabetes mellitus, hypertension and cardiovascular disease.

Sample

Primi and multi para antenatal women from urban and rural areas were selected.

Sample Size: Total 300 out of which 150 samples were from rural and 150 samples were from urban areas.

Sampling technique

Non Probability Convenience Sampling Technique

Development of tool

Tools were developed in consultation with the experts in the field of obstetrics and gynaecology and nursing personnel from obstetrics and gynaecology.

Description of the tool

It included two sections

Section I: Demographic profile of 5 items which includes the information of antenatal woman, like: age, marital status, education, socioeconomic status and occupation.

Section II: Section II consists of obstetric profile which includes 19 items.

Validity

To obtain the content validity, the tools (Demographic profile, semi structured questionnaire), objectives of the study, evaluation criteria checklist, and brief details of the study were submitted to seven experts. The experts were in the field of the gynecologist and nursing personnel. Their permission for tool validation was obtained prior by sending the requisition letter. Experts were requested to verify items for their relevance, accuracy and appropriateness.

Demographic profile consists of 5 items. There was 100% agreement for all the items. Obstetric profile consists of 19 items. Some corrections of the item were there in the interview questionnaires in the obstetric profile. On common agreement, a few deletions and additions were made in the questionnaire.

Ethical consideration

The research problem and the objectives were approved by the research and ethical committee. Written informed consent was taken from the subjects. The privacy and the confidentiality of the information were ensured. Permission was obtained from the related authority of the hospital.

Reliability

In this study self-reporting technique was used, responses of individuals in the self-reporting would differ according to their own perception of the situation and experience. The tool therefore did not need to be tested for reliability.

Pilot study

After doing pilot study investigator found that it is feasible to carry out actual study.

Plan for data collection

1. Requisition letter for conducting research study and brief details of study were sent to the authority of urban and rural areas.
2. The investigator met the medical director of the urban and rural hospital personally in order to ascertain the support and cooperation in the success of the study. The investigator explained the nature of the study to the medical directors of those areas.

Data analysis and interpretation

The data obtained was analyzed using both descriptive and inferential statistics based on the objectives and research question of the study under the following headings.

1. To identify the hemoglobin level of urban and rural antenatal women from the blood investigation report
2. To find out the factors associated with anaemia among the urban and rural antenatal women.
3. To compare the factors associated with anaemia in urban and rural antenatal women.

Result

The major findings of the study were based on the objective of the study.

1. Findings related to demographic factors:

The study findings related to demographic factors with regards to age it was found that maximum number 42.7 % of the antenatal women from urban and rural from the age between 22 -25 years, 36.3% were in the age range between

18-21 years, and 21% of the subjects were more than 26 years.

All the subjects who had participated in the study were married. 5% got married when they were they were below 18 years of age.

The subjects in the rural and urban areas shows 55% had secondary education, subjects received primary education are 32.3%, where as 9.3% were graduate, and 3.3% were illiterate.

The subjects in the rural and urban area reveals that 53% have 10000-15000/month income, about 26.7% have 5000-10000/month, whereas 16.7% have more than 15000/month and 5% have less than 5000/month.

In rural and urban area it reveals that 84.3 % of the subjects are housewives, subjects doing service are 9.3%, subjects doing others are 4.3%, laborers are 1.6%, and house maids are 0.3%.

2. Findings related to obstetric factors

In rural and urban area 75.7% of the subjects belong to age group of 18-21 years, 12.7% of the subjects belong to age group more than 22 years and 11.7% of the subjects belong to age group less than 18 years

In rural and urban area reveals that 75.7% of the subjects belong to age group 18-21 years, whereas 15.3% of subjects belong to age group of 22-25 years, 5% of the subjects belong to age group less than 18years, and 4% of the subjects belong to age more than 26 years.

In rural and urban area reveals that 52% of the subjects are primi para, about 42% of the subjects belong to group of 1-2 parity, whereas 6% of the subjects belong to group of 3-4 parity and none belong to group more than 5 parity.

The distribution of subjects in rural and urban area reveals that 47.3% of the subjects belong to 3rd trimester, about 45.7% of the subjects belong to 2nd trimester and 7 % of the subjects belong to 1st trimester.

The subjects in rural and urban area reveals that 46.7% of the subjects have first pregnancy, about 38.3% of the subjects belong to gap of 1-2 years between two pregnancies, 12.7% of the subjects belong to gap of 2-4 years between two pregnancies, whereas 2.3% of the subjects belong to gap of more than 4 years between two pregnancies.

In rural and urban area reveals that 89.7% have no miscarriage, around 7% of the subjects have 1 miscarriage and 3.33% of the subjects have more than 2 miscarriage. Hence it can be concluded that antenatal women from urban area have history of more than two miscarriages against it rural antenatal women do not have such experience.

3. Finding related to haemoglobin level among the urban and rural antenatal women

In rural and urban area 108% of the respondents have mild anaemia, 88.66% of the respondents have moderate anaemia and 3.33% of the respondents have severe anaemia.

4. Finding the factors associated with anaemia among the rural antenatal women.

The Kruskal Wallis test was used for finding the factors associated with anaemia among the rural antenatal women. The p value of all demographic and obstetric variables was greater than 0.005 at 5% level of significance. So it can be concluded that there is no association of anaemia and factors associated with it.

5. Finding out the factors associated with anaemia among the urban antenatal women.

The Kruskal Wallis test was used for finding out the factors associated with anaemia among the urban antenatal women. The p value of all demographic and obstetric variables was greater than 0.005 except for history of miscarriage, where the p value is 0.003. So it can be concluded that there is association of level of haemoglobin level and history of miscarriage at 5% level of significance.

6. Comparison of the factors associated with anaemia in urban and rural antenatal women.

Comparison of the factors associated with anaemia in urban and rural antenatal women Kruskal Wallis test was used. The p value of all demographic and obstetric variables is greater than 0.005 except for history of miscarriage, where the p value is 0.002. So it can be concluded that there is association of level of haemoglobin and history of miscarriage at 5% level of significance.

Table 1: The obstetric factors associated with anaemia among urban antenatal women N=300

Sr. No.	Obstetric factors	f	%	Urban			H	DF	p value
				Mean	SD	Median			
1	Age at marriage in years								
	<18	18	12.0	9.6	1.2	9.9	0.33	2	0.847 ^{NS}
	18-21	106	70.7	9.7	0.8	10.0			
	>22	26	17.3	9.6	0.9	9.7			
2	Age at first pregnancy								
	<18	7	4.7	9.4	0.7	9.5	2.13	3	0.545 ^{NS}
	18-21	110	73.3	9.7	0.8	10.0			
	22-25	25	16.7	9.6	1.0	9.9			
	>26	8	5.3	9.8	0.7	10.0			
3	Parity								
	0	87	58.0	9.6	0.9	9.8	1.54	2	0.463 ^{NS}
	1-2	58	38.7	9.7	0.8	10.0			
	3-4	5	3.3	10.1	0.3	10.2			
	>5	0	0.0						
4	Gestational age								
	1 st trimester	9	6.0	9.0	1.4	9.1	2.99	2	0.224 ^{NS}
	2 nd trimester	73	48.7	9.8	0.8	10.0			
	3 rd trimester	68	45.3	9.7	0.8	10.0			

5	Interval between pregnancy							0.76	3	0.859 ^{NS}
	First pregnancy	73	48.7	9.7	0.9	9.9				
	1 to 2 years	54	36	9.7	0.8	9.9				
	2 to 4 years	17	11.3	9.7	0.9	10				
	More than 4 years	6	4	9.2	1.4	9.7				
6	History of miscarriages							11.76	2	0.003 ^{**}
	0	127	84.7	9.8	0.8	10				
	1	13	8.7	9.3	0.8	9.5				
	>2	10	6.7	8.7	1.2	8.3				
7	Diet							0.24	1	0.627 ^{NS}
	Vegetarian	37	24.7	9.7	0.9	10				
	Mixed	113	75.3	9.7	0.8	9.8				

Note: NS=Not Significant, *= Significant, **= Highly Significant

The findings of relationship between anaemia and obstetrics factors revealed that the obtained *p* value output is more than 0.005 at 5% level of significance except for history of miscarriages. The *p* value for history of miscarriages is 0.003 at 5% level of significance. Hence it can be concluded that there is a highly significant relationship between the anaemia and obstetric factors that is history of miscarriages among urban antenatal women.

Discussion

The findings of this study have been discussed with reference to the objectives and others added aspects of antenatal anaemia.

In the present study it is seen that in urban and rural area 35 antenatal women reported their age at marriage 18 years and 10 % of the women had first pregnancy when they were below 18 years. Early marriage and adolescent pregnancy aggravate anaemia. The study findings of Banerjee B, Pandey G and Deb. S. have noticed in their study that teen age pregnancy is often referred to as at high risk pregnancy and is of grave concern. In present study all most all (100 %) antenatal women from urban as well as rural area have haemoglobin less than 9.9 gm/dl. The mean haemoglobin of these antenatal women found to be 9.7 gm/dl. The present study findings observed very high prevalence of anaemia. Hence present study findings are concluded that all 300 (100%) antenatal women from urban and rural area have haemoglobin less than 11 gm/dl. The prevalence of anaemia is very high amongst urban and rural population.

Conclusion

The prevalence of anaemia differs in different epidemiological and socio-economical settings. In some settings malaria is an important cause while in others intestinal worms plays an important role as the causative factor which results into blood loss and malnutrition. Chronic illnesses and socioeconomic status have an important role to the development of anaemia by increasing problems of affordability of food and accessibility of preventive and curative measures. Hence, the researcher was curious to assess the prevalence of anaemia in antenatal women and related background variables, in different epidemiological and socio-economical settings that is from urban and rural population.

Anaemia remains endemic in women of childbearing age in urban as well as rural India; despite intervention measures such as the distribution of Fe-folic acid tablets to each pregnant woman. Prevalence of anemia among pregnant women is great challenges of the developing country. In order to decrease prevalence of anemia among the pregnant women following things should be taken into consideration:

1. Government should provide affordable and accessible health facility to rural area of country;
2. Husband, family and community should be made aware of anemia and its associated risk factors;
3. Nutritional education should be given to pregnant women;
4. Infectious diseases should be timely controlled;
5. Fortification of food should be done.
6. Provides advocacy for iron supplementation during pregnancy where the Decentralized Planning for the Child Programme is implemented;
7. Development of radio and TV spots for broadcast throughout the country in order to increase general awareness about anaemia and to promote the use of iron supplements during pregnancy.

Limitations of the study

Few limitations were faced while doing the study

1. The study was confirmed to specific geographical areas which obviously imposes limits of any larger generalizations.
2. The present study is limited to identification of anaemia and a few selected factors associated with it.

Recommendations

On the basis of findings and the experiences while conducting the study the following recommendations are offered for future research.

1. A study can be conducted to find out the effectiveness of the learning module on anaemia and factors associated with it.
2. A similar study can be conducted in other settings of urban and rural area.
3. A study can be conducted on anaemia and factors associated with it among adolescent girls of urban and rural area.
4. Interventional studies to improve hemoglobin level need to be conducted which may include food based approaches, and nutrition education to improve dietary intake.

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References

- Noron J, Bhadaui A, Bhat H. Prevalence of anaemia among pregnant women. Health and perspectives and issues. 2008; 31(1):31-40.
- Mohanraj Sujata J. A study to assess the effectiveness of Nutritional intervention among Women with anemia. Nightingale Nursing Times. 2008; 4(4):9-11.
- Gautam C, Sana Sekhi L. Iron deficiency anaemia in pregnancy and the rationality of iron supplements prescribed during pregnancy. Medscape J med December. 2008; 10(12):783.
- Ezzati M, Lopus A, Dogers A, Vander H, Murray C. Selected major risk factors and global and regional burden of disease. Lancet. 2002; 360:1347-60.
- Kalaivani K. Prevalence & consequences of anaemia in pregnancy. Indian J Med Res. 2009; 130:627-633.
- ICMR Task Force. Study Evaluation of the National Nutritional Anaemia Prophylaxis Programme, New Delhi: Indian Council of Medical Research, 1989.
- Seshadri S, Sharma K. Iron supplementation to control pregnancy anaemia. Proc Nutr Soc India. 1994; 41:131-140.
- Agarwal K, Agarwal D, Sharma A. Anaemia in pregnancy-interstate differences. Project by Department of Family Welfare, Government of India. 2009, 2005.
- Sharma A, Patnaik R, Garg S, Ramachandran P. Detection & management of anaemia in pregnancy in an urban primary health care institution Indian. J Med Res. 2008; 128:45-51
- Polit DF, Beck CT. Nursing Research 8th edition, New Delhi (India): Wolterskluwer publications, 2008.
- Polit FD, Hungler PB. Nursing Research. Principles and Methods. 6th ed. Philadelphia: Lippincott Williams and Wilkins Publication, 2006.
- Basavantha BT. Nursing Research. 2nd Ed. New Delhi: Jaypee Brothers, 2003.
- Kozier Erb, Berman Burke. Fundamental of Nursing, Concepts, Process & Practice. 7th Ed.
- Demarche, A study was carried out to determine the prevalence of anaemia among pregnant women receiving antenatal care, Pub Med, 2011, 2160-8439
- Xing Y. An exploratory study was conducted to identify the prevalence of anemia is regarded as a major risk factor for unfavorable pregnancy Journal List BMC Public Health, 2009, 9.
- Vitull Gupta K, Arun Kumar Maria, Rajiv Kumar, Jagjeet Singh Bahia, Sonia Arora. to Study the Prevalence of Anaemia in Females with Respect to the Age, Body Mass Index (BMI), Activity Profile and the Socioeconomic Status in Rural Punjab. URL: <http://www.jcdr.net/articles/PDF/1513/29-%202932>.
- Ms. Indu Capoor, a retrospective and cross-sectional study was conducted to determine the prevalence of anaemia in antenatal mothers, URL:<http://www.novartisfoundation.org/platform/content/element/293>.
- EO Uche-Nwachi, Odekunle A, Jacinto S, Burnett M, Clapperton M, David Y *et al*. Anaemia in pregnancy: associations with parity, abortions and child spacing in primary healthcare clinic attendees, Afr Health Sci March. 2010; 10(1):66-70.
- Rao S, Joshi S, Bhide P, Puranik B, Kanade A. Social dimensions related to anaemia among women of childbearing age from rural India, Public Health Nutr. 2011; 14(2):365-72.
- Habib F, Habib Zein Alabdin E, Alenazy M, Nooh R. Compliance to iron supplementation during pregnancy, journal of the Institute of Obstetrics and Gynaecology 08/. 2009; 29(6):487-92.
- Sulabha V. Anaemia and pregnancy. The India Journal of diet and nutrition Nov-Dec. 1992; 6(6):25-29.
- Thangaleela T, Vijayalakshmi P. Prevalence of Anaemia in pregnancy. The Indian Journal of Nutrition and Dietetics. 1994; 31(2):26-29.
- Djua Pinky. Anaemia of Pregnancy women Era march. 1999; I:106-108.
- Gopalan C. Nutritional research in South East Asia 1st Ed. Delhi; ATB publishers, 1996, 42-44.

25. Agarwal KN, Agarwal DK, Sharma A, Sharma K, Prasad K, Kalita MC *et al.* prevalence of Anaemia in pregnancy women. *Indian J Med. Res. Agu.* 2006; 124(2): 173-84.
26. Leblanc CP, Rioux FM. Iron deficiency Anaemia following prenatal Nutrition Intervention www.Medline.Com.
27. Gadallah M, Rady M, Salem B, Aly EM, Anwer W. The effect of Nutritional Intervention programme on the prevalence of Anaemia among pregnant women in rural area. *Egypt public health Assoc.* 2002; 77(3-4):261-73.
28. Parra BE, Manjarres LM, Gomez AL, Ailzate DM, Jaramillo ML. Assessment of nutritional education and iron supplement impact on prevention of pregnancy Anaemia *Universidade Antiquia, Medline, Colombia, 2006*
29. Verhoeff FH, An analysis of the determinants of Anaemia in pregnant women in Rural Malawi and a basis for action. *Annals of tropical medicine and parasitology.* 199; 93(2): 119-133.
30. Kaur AM, Singh K. Effect of health education on knowledge about Anaemia among rural women in Chandigarh. *Indian Journal as community medicine.* 2001; XXVI(3):25-28
31. Shali T, Singh C, Goindi G. prevalence of anaemia amongst pregnant mothers and children in Delhi. *Indian Journal of Paediatrics.* 2004; 17(3):946.
32. Kaur M. Compliance with prescribed treatment among antenatal women. *Nightingale Nursing Times.* 2010; 6(6):5-8.
33. Nordeng H, Eskild A, Nesheim BI, Aursnes I, Jacobsen G. Guidelines for iron supplementation in pregnancy: compliance among 431 parous Scandinavian women. *European Journal of Clinical Pharmacology,* 59(5), 163-8.
34. Monica T, Kapil U, Singh C. Prevalence of iron deficiency anaemia amongst pregnant women in urban slum communities of Delhi. *Indian Paediatrics.* 1999; 36:322-3.
35. Kulkarni B, Christian P, Leclercq S, Khantry SK. Determinants of compliance to antenatal micronutrient supplementation and women's perceptions of supplement use in rural Nepal. *Public Health Nutrition.* 2010; 13:82-90.
36. Yajnik CS, Deshpande SS, Jackson AA, Refsum H, Rao S, Fisher DJ *et al.* Vitamin B12 and folate concentrations during pregnancy and insulin resistance in the offspring: the Pune Maternal Nutrition Study. *Diabetologia.* 2008; 51:29-38.
37. Prema Ramachandran. Nutrition in Pregnancy. In: Gopalan C, Kaur S, editors. *Women and nutrition in India, Special Publication No. 5.* New Delhi: Nutrition Foundation of India, 1989, 153-93.
38. WHO/MCH/MSM/92. 2nd ed. WHO, Maternal Health and Safe Motherhood Programme, Division of Family Health, 1992.
39. Van Den Broek N. Anaemia in pregnancy in sub-Saharan countries. *European J of Obstet and Gynae Reprod and Biol.* [PubMed], 1996; 96:4-6.
40. Brabin L, Verhoeff FH, Kazembe P, Brabin BJ, Chimsuku L, Broadhead R. Improving antenatal care for pregnant adolescents in Southern Malawi. *Acta Obstetrics and Gynaecology Scandinavia.* 1998; 77:402-409.
41. Kalaivani K. Prevalence & consequences of anaemia in pregnancy *Indian J Med Res,* November. 2009; 130:627-633.
42. Balarajan Y, Ramakrishnan U, Özaltın E, Shankar AH, Subramanian SV. Anaemia in low-income and middle-income countries. *The Lancet.* 2012; 378(9809):2123-2135.
43. Gulani A, Nagpal J, Osmond C, Sachdev HP. Effect of administration of intestinal anthelmintic drugs on haemoglobin: systematic review of randomised controlled trials. *BMJ.* 2007; 334:1095. doi: 10.1136/bmj.39150.510475.AE.
44. *Journal of Health, Population and Nutrition,* 29(3), 218-28. Retrieved from URL: <http://search.proquest.com/docview/879405641?accountid=28682>
45. Rao S, Joshi S, Bhide P, Puranik B, Kanade A. Social dimensions related to anaemia among women of childbearing age from rural India. *Public Health Nutrition,* 14(2), 365-72. URL: <http://dx.doi.org/10.1017/S1368980010002776>
46. Korenke GC, Hunneman DH, Eber S, Hanefeld F. Severe encephalopathy with epilepsy in an infant caused by subclinical maternal pernicious anaemia: Case report and review of the literature. *European Journal of Pediatrics.* 2004; 163(4-5):196-201. doi: URL: <http://dx.doi.org/10.1007/s00431-004-1402-4>
47. Kavle JA, Stoltzfus RJ, Witter F, Tielsch JM, Khalfan SS, Caulfield LE. Association between anaemia during pregnancy and blood loss at and after delivery among women with vaginal births in Pemba Island, Zanzibar, Tanzania. *Journal of Health, Population and Nutrition,* 26(2), 232-40. 2008. Retrieved from URL: <http://search.proquest.com/docview/202995984?Accountid=28682>
48. Sharma Anshu, Patnaik Rita, Garg Suman, Ramachandran Prema. Prema Ramachandran. *Indian Journal of Medical Research* 128.1. 2008, 45-51.
49. Gupta SK, Pal DK, Tiwari R, Garg R, Shrivastava AK, Sarawagi R *et al.* Impact of Janani Suraksha Yojana on institutional delivery rate and maternal morbidity and mortality: An observational study in India. *Journal of Health, Population and Nutrition.* 2012; 30(4):464-71. Retrieved from URL: <http://search.proquest.com/docview/1284533385?Accountid=28682>
50. Mahajan S, Aalinker R, Shah P, Singh S, Kochupillai N. Nutritional anaemia dysregulates endocrine control of fetal growth. *The British Journal of Nutrition.* 2008; 100(2):408-17. doi: URL: <http://dx.doi.org/10.1017/S000711450889438X>
51. Ali AA, Rayis DA, Abdallah TM, Elbashir MI, Adam I. Severe anaemia is associated with a higher risk for preeclampsia and poor perinatal outcomes in Kassala hospital, eastern Sudan. *BMC Research Notes.* 2011; 4:311. doi: URL: <http://dx.doi.org/10.1186/1756-0500-4-311>
52. Rusia U, Madan N, Agarwal N, Sikka M, Good SK. Effect of iron deficiency anemia on foetal outcome. *Indian J pathol Microbiol.* 1995; 38(3):273-9.
53. Malhotra M, Sharma JB, Batra S, Sharma S, Murthy N S, Arora R. Maternal and perinatal outcome in varying degrees of anemia. *Int J Gynaecol Obstet.* 2002; 79:93-100.

54. Stommel M, Wills. Clinical Research Concepts & principles for Advanced Practice Nurses. Lippincott Williams & Wilkins, 2004.
55. Denise F, Polit PhD, Cheryl Tatano Beck, DNSc CNM FAAN. Nursing research generating and assessing evidence for nursing practice. English edition, Lippincott Williams & Wilkins a Wolters Kluwer business, 2011, 768.
56. Denise F, Polit PhD, Cheryl Tatano Beck, DNSc. CNM Faan. Nursing research generating and assessing evidence for nursing practice. English edition, Lippincott Williams & Wilkins a Wolters Kluwer business, p 755.
57. Gautam VP Anaemia during pregnancy, Indian Journal of Community Medicine. 2002; XXVII:4.
58. Luwang NC, Gupta VM, Khanna S. Anaemia in pregnancy in a rural community of Varanasi, Ind J Prev Soc Med. 1980; 11:83-8.
59. WHO. Global Database on Anaemia.
<http://www.unitedcalltoaction.org>
60. Agrawal V, Tejwani S. Prevalence of iron deficiency anaemia in Indian antenatal women especially in rural areas. Ind Med Gaz, Sept. 1999; 300:3.
61. Prema Ramachandran. Nutrition in Pregnancy. In: Gopalan C, Kaur S, editors. Women and nutrition in India, Special Publication New Delhi: Nutrition Foundation of India.1989; 5:153-93.
62. Maternal Mortality in India, 1997-2003, Registrar General of India, 2012.
Available from: URL: <http://www.censusindia.net/>
accessed on December 15.
63. Anaemia in pregnancy: associations with parity, abortions and child spacing in primary healthcare clinic attendees in Trinidad and Tobago. Uche-Nwachi EO, Odekunle A, Jacinto S, Burnett M, Clapperton M, David Y, Durga S, Greene K, Jarvis J, Nixon C, *et al.* Afr Health Sci. 2010; 10(1):66-70.
64. Thangaleela T, Vijayalakshmi P. Prevalence of anaemia in pregnancy. Ind J Nutr Dietet. 1994; 31:26-9.