Hematology Section **Original Article**

EFFECT OF ANTENATAL SERVICES DURING PREGNANCY ON PREVALENCE OF ANEMIA AMONGST PREGNANT WOMEN IN LUCKNOW

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ABSTRACT

OBJECTIVE: *To study the effect of antenatal care services (ANC) during pregnancy on prevalence of anemia amongst pregnant women in Lucknow.* **STUDY DESIGN:** *Cross-sectional study.* **STUDY AREA:** *Urban and rural areas of Lucknow.* **STUDY SUBJECTS:** *A total of 420 pregnant women.* **RESULTS:** *More than half (65.2%) of the pregnant women registered their pregnancy at any health facility. The overall prevalence of anemia was 73.1%. Of these, the moderate anemia was 47.6%, mild was 43.6%, and severe was 8.8%. The prevalence of anemia was significantly lower (35%) in those who have received ANC services than who did not (RR = 0.65, 95% CI = 0.59-0.72, P < 0.0001) and this was not associated with the number of visits. The prevalence of anemia was significantly lower (65%) in those who have consumed 100 IFA tablets (RR = 0.35, 95% CI = 0.24-0.51, P < 0.0001). The prevalence was also significantly lower (53%) in those who have received two doses of TT injection (RR = 0.47, 95% CI = 0.39-0.56, P < 0.0001). The results of the multivariate analysis indicated that the components of ANC services were significantly associated with the prevalence of anemia when adjusted for socio-demographic characteristics.* **CONCLUSION:** *The ANC services well correlated with the prevalence of anemia so, it is to be promoted that every pregnant woman should get ANC services in time.*

Key words: Anemia, antenatal care services, demographic characteristics, pregnant women

INTRODUCTION

Anemia is a major public health problem. It is now one of the most frequently observed nutritional diseases in the world. It is especially prevalent in women of reproductive age, particularly during pregnancy. DLHS-III (2007-2008) survey reported that around 96% of the pregnant women in India are suffering from some degree of anemia. It includes 51% of women who are suffering from mild anemia, 42% from moderate anemia and 3% from severe anemia.

Khosla *et al*., (2002)[1] conducted a study at rural north India on 5,124 delivered women and of these 386 patients (7.5%) were severely anemic (Hb < 6.0 g/dl). 1,083 units of blood were transfused to these patients, a mean of 2.80 units to each patient. There were two maternal deaths due to severe anemia. Of the 386 patients, 246 could be interviewed in detail and their demographic details were compared with 100 normal pregnant women with hemoglobin levels of 10 g/dl or more. In the anemic group, 62.1% had no antenatal checkup and in nonanemic group, 24% had no antenatal checkup. Agarwal *et al*., (2007)[2] in their study found that the prevalence of anemia was found to be significantly higher among women without antenatal care (95.8%) than those seeking antenatal care (53.9%).

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MATERIALS AND METHODS

Study area
The present study was carried out in rural and urban field practice areas of Department of Community Medicine, Era's Lucknow Medical College and Hospital Lucknow.

Study unit
Pregnant women in rural and urban field practice areas of Department of Community Medicine, Era's Lucknow Medical College and Hospital Lucknow were comprised as the study unit in the present study.

Total period of study
The period of study was 18 months, which was used for the development of study tools, collection of data analysis, and presentation of findings.

Study design
This was a community-based cross-sectional study.

Sample size
As per NFHS-3 UP (2005-2006), prevalence of anemia in reproductive was 51.6%. Taking 80% power, 5% significance level, and the total sample size calculated was 375. Taking nonresponse to be 10%, the final sample size came out to be 420.

Sampling technique
Multi-stage random sampling was used to selected study unit.

Selection of sample

Requisite sample size was reached in two stages:

- First stage: First, the sample size of 420 was divided equally into urban and rural areas
- Second stage: Simple random technique (using the last digit of currency) was used to select the first household for the survey.

Inclusion criteria

Pregnant women in the respective household and in the 1st, 2nd and 3rd trimester.

Exclusion criteria

Households not having pregnant women and not residing in that area for the last 6 months. Also, pregnant women with other complications of pregnancy like antepartum hemorrhage, hyper emesis gravid arum, and so on.

Tool of data collection

A predesigned and pretested questionnaire was used to elicit information on socio-demographic characteristics and required information.

Pretesting of the interview schedule

The schedule was pretested on a sample of 50 women, 25 each from urban and rural areas. Necessary modifications were made in the schedule to overcome the difficulties encountered during pretesting.

Data collection

First, household was selected randomly and then consecutive household was surveyed till the desired number of study units completed. Each participant was explained about the purpose of the study prior to administration of tool. Informed consent was taken from each participant.

Hemoglobin estimation

Sahli's method was used for Hb estimation. The graduated tube placed between the brown glass standard of Sahli's hemoglobinometer was filled with N/10 hydrochloric acid up to lowest mark (mark 2). Blood sample obtained from the finger prick or from the vein was drawn into Sahli's pipette till 20 mm-3 mark and added into graduated tube containing N/10 hydrochloric acid. The blood and acid are mixed thoroughly with a glass stirrer and allowed to stand for 3 min for acid hematin to form. Distilled water was added drop-by-drop mixing it with a stirrer until color in the graduated tube was matched with the brown glass standard.

Data analysis

The data collected were entered in Microsoft Excel and checked for any inconsistency. The dichotomous/categorical variables were analyzed by using Chi-square statistics. The unpaired t-test was used to test differences anthropometric and micronutrient intake between urban and rural areas as well as between anemic and nonanemic pregnant women. The Chi-square value is used to find out the association between anemia and women's profile, socio-demographic factors, hygienic status, and other characteristics. The $P < 0.05$ was considered as significant. All the analysis was carried out by using SPSS 15.0 version.

Ethical consideration

The ethical clearance was taken from the Ethical Committee of the College and consent from each pregnant woman was taken.

RESULTS

Table 1 shows the distribution of pregnant women according to their family profile. More than half (63.1%) belonged to Hindu community and nuclear family type (65.5%). More than one-third (44.8%) of the pregnant women had family size ≥4. Most of the pregnant women belonged to SES Group IV (44.8%) and V (39.5%).

Table 2 shows the distribution of pregnant women according to ante natal care (ANC) services received. More than half (67.4%) of the pregnant women received ANC services; however, no significant difference was seen among urban (71%) and rural (63.8%) women. The number of ANC visits was two in 59.4% pregnant women followed by three or more visits (29.3%). The Nurse/ANM/Female health worker (68.2%) were the main health personnel in providing ANC services.

Table 3 shows the association between anemia and demographic profile of pregnant women. The prevalence was almost similar in urban (73.3%) and rural (72.9%) pregnant women as well as in Hindu (72.5%) and

Table 1: Distribution of pregnant women according to their family profile

Family structure	Place of residence				Total (n=420)	
	Urban (n=210)		Rural (n=210)			
	No.	%	No.	%	No.	%
Religion						
Hindu	128	61.0	137	65.2	265	63.1
Muslim	82	39.0	73	34.8	155	36.9
Type of family						
Nuclear	140	66.7	135	64.3	275	65.5
Joint	70	33.3	75	35.7	145	34.5
Family size						
1-2	50	23.8	16	7.6	66	15.7
3-4	96	45.7	70	33.3	166	39.5
>4	64	30.5	124	59.0	188	44.8
Average	4.0±2.4		5.6±3.0		4.8±2.7	
SES*						
I	15	7.1	7	3.3	22	5.2
II	12	5.7	10	4.8	22	5.2
III	15	7.1	7	3.3	22	5.2
IV	92	43.8	96	45.7	188	44.8
V	76	36.2	90	42.9	166	39.5

*Modified B G Prasad classification

Muslim (74.2%) women. Age at marriage did not affect in the prevalence of anemia among pregnant women. The education of women had significant association with the prevalence of anemia as the anemia was significantly ($P < 0.0001$) higher in illiterate (81%) women than literates. The occupation of women was also significantly ($P < 0.05$) associated with the prevalence of anemia among pregnant women.

A total of 420 pregnant women (210 from each rural and urban area) were included in the study. The prevalence of anemia among the pregnant women was 73.1% [Table 4]. Mild and moderate anemia was 43.6 and 47.6%. However, severe anemia was only in 8.8% pregnant women [Figure 1].

DISCUSSION

The present study indicates that the 63.1% pregnant women were Hindu while 36.9% were Muslims. In urban area, most (61%) were Hindu while 39% women were Muslims while in rural area, 65.2% women were Hindus and 34.8% (73/210) women were Muslims. As per NFHS-3,[3] total 82.6% of households in Uttar Pradesh were Hindus and 16.3% Muslims. The reason for high Muslims representation in the study is because the catchment areas of urban and rural center are Muslims predominate. In our study, 65.5% pregnant women belonged to nuclear family and 34.5% belonged to joint family. However, in urban area, 33.3% pregnant women belonged to nuclear family while 35.7% belonged to joint family and in rural area, 64.3% pregnant women belonged to nuclear family while 35.7% belonged to joint family. However, as per NFHS-3, 55.9% population had nuclear family and 44.1% had joint type of family. In urban area, 59.1% had nuclear family and 40.9% had joint family. In rural area, 54.8% had nuclear family and 45.2% had joint family. The percentage type of nuclear and joint families was about 10% higher in our study as compared to the NFHS-3 findings. This may be due to small sample size in our study as compared to the NFHS-3 study.

According to our study, 39.5% pregnant women belonged to social class V. However, NFHS-3 (UP)[3] reported that 27.8% of the population belonged to social class V. The reason behind higher percentage of the population belonged to social class V is because the catchment area of the urban and rural health training center belongs to low socioeconomic group in our study.

According to our study, 67.4% of the women received ANC services. In urban area, 71% of the women received ANC services and in rural area, 63.8% received ANC services. The findings of the present study matched with the DLHS-III[4] findings in which 64.4% women received ANC services (Urban 73.6% and Rural 62.8%). However, more than three-quarters of women in India received antenatal

Table 2: Distribution of pregnant women according to Ante Natal Care services received

Components	Place of residence				Total (n=420)	
	Urban (n=210)		Rural (n=210)			
	No.	%	No.	%	No.	%
ANC services received						
Yes	149	71.0	134	63.8	283	67.4
No	61	29.0	76	36.2	137	32.6
X^2, P value	2.44, P=0.12					
No. of visits	n=149		n=134		n=283	
>=3	62	41.6	21	15.7	83	29.3
2	67	45.0	101	75.4	168	59.4
1	20	13.4	12	9.0	32	11.3
X^2, P value	28.42, P<0.0001*					
ANC Provided by						
Doctor	90	60.4	0	0.0	90	31.8
Nurse/ANM/ Female health worker	59	39.6	134	100.0	193	68.2
X^2, P value	57.0, P<0.0001*					

*Significant

Table 3: Association between anemia and demographic profile of pregnant women

Background characteristics	No. of pregnant women (n=420)	Prevalence (n=307)		X^2, P value
		No.	%	
Residence				
Urban	210	154	73.3	0.10, P=0.91
Rural	210	153	72.9	
Religion				
Hindu	265	192	72.5	0.15, P=0.70
Muslim	155	115	74.2	
Marital status				
Married	415	303	73.0	0.38, P=0.83
Widow	4	3	75.0	
Separate/ divorced	1	1	100.0	
Age at marriage				
<18	40	35	87.5	4.68, P=0.10
18-30	370	265	71.6	
31-40	10	7	70.0	
Education				
Illiterate	195	158	81.0	31.06, P<0.0001*
Primary	108	78	72.2	
Eighth	57	44	77.2	
High school	34	16	47.1	
Intermediate	16	7	43.8	
Graduate	10	4	40.0	
Occupation				
Housewife	403	296	73.4	15.29, P=0.009*
Unskilled	5	5	100.0	
Semi-skilled	4	4	100.0	
Skilled	4	2	50.0	
Semi-profession	2	0	0.0	
Profession	2	0	0.0	

*Significant

Table 4: Prevalence of Anemia according to place of Residence

Prevalence of Anemia	Place of Residence				Total	
	Urban		Rural			
	No.	%	No.	%	No.	%
Prevalence of Anemia						
Yes	154	73.3	153	72.9	307	73.1
No	56	26.7	57	27.1	113	26.9
X^2, P value	0.01, p = 0.91					

care for their most recent birth during the 5 years preceding the survey (NFHS-3).[3]
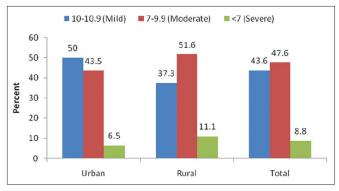
Figure 1: Severity of nutritional anema among pregnant women

Anemia in pregnancy is an important and preventable cause of maternal and fetal morbidity and mortality. In the present study, the overall prevalence of anemia was 73.1% among the pregnant women. Somewhat similar results have been reported where anemia in pregnant women were 96.5, 85.6, and 74.8% (Virender *et al.*, 2002, Toteja *et al.*, 2006 and Ahmad *et al.*, 2010).[5-7] The world health organization (WHO) also estimated that 58% of pregnant women in developing countries were anemic (Galloway *et al.*, 2002).[8]

In our study, more than one-third of the pregnant women had mild anemia (47.6%) and 43.6% were moderate anemia and 8.8% of pregnant women were severely anemic. Somewhat similar results have been reported in a study conducted in a rural Indian population. In which severe anemia was observed to be 18%, mild anemia in 43.6%, and moderate anemia in 47.6% of patients (Ahmad *et al.*, 2010).[7] In another study (Farzana *et al.*, 2010)[9] observed in study amongst pregnant women, 52% moderate, 36% were mildly anemic, and 12% severe anemic. In which low percentage of mild anemia has been reported as compare with the finding of my study. In India, 55% of women were found to be anemic. Thirty-nine percent of women are mildly anemic, 16% are moderately anemic, and 2% are severely anemic (NFHS-3).[3] The severity of anemia in our study and other studies in India and abroad are almost similar.

In the present study, out of 307 anemic women, the anemia was significantly (*P* < 0.0001) higher in those women who did not receive ANC services (95.6%) as compared

to those who received ANC services (62.2%). Similar association was observed in a study conducted by Khosla *et al.*, (2002),[1] where anemia was higher in those women who did not receive ANC services (62.1%) as compared of those who received ANC services (24%).

CONCLUSIONS

The ANC services well correlated with the prevalence of anemia so, it is to be promoted that every pregnant woman should get ANC services in time.

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