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Assessment of micronutrient intake on the prevalence of anemia among pregnant women in a District of Northern India.

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Abstract:
Objective: This study was undertaken to assess the role of micronutrient intake on prevalence of anemia amongst pregnant women in Lucknow Utter Pradesh India

Study design: cross-sectional study.

Study area: Urban and rural areas of Lucknow.

Study subjects: A total of 420 pregnant women of reproductive age group.

Results: The overall prevalence of anemia was 73.1% among the pregnant women. Of these, the moderate anemia was found in 47.6% women, mild anemia was 43.6% and severe anemia was 8.8%.The prevalence of anemia was lower in married women as compared to divorced/widow women (RR=0.91, 95%CI=0.59-1.42, p=0.73). The multivariate logistic regression analysis indicated that the women who were in 4-6 months (OR=4.51, 95%CI=1.95-10.43, p<0.0001) and more than 6 months (OR=12.14, 95%CI=4.77-30.90, p<0.0001) of gestational age had highest odds of being anemic when compared to those who were in 1-3 months of gestational age, after controlling for socio-demographic, and BMI variables in the model. The illiterate women had higher risk of being anemic as compared to literates (OR=2.42, 95%CI=1.36-4.30, p<0.0001) after controlling for socio-demographic, micronutrient intake and BMI variables in the model. Other factors studied, were not found to be statistically significant.

Conclusion: The micronutrient intake was lower in the studied population and it was found to be significantly associated with problem of anemia amongst pregnant women.

Key words: Pregnant women, anemia, micronutrient intake

INTRODUCTION:

Anaemia 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. The main causes of anaemia in developing countries include: inadequate intake and poor absorption of iron,

malaria, hookworm infestation, diarrhoea, HIV/AIDS and other infections, genetic disorders (e.g., sickle cell and thalassemia), blood loss during labour and delivery, heavy menstrual blood flow and closely spaced pregnancies (WHO, 2001).

This study investigated the prevalence and determinants of anemia among urban and rural pregnant women in the district of Lucknow, UP, India.

MATERIAL AND METHODS:

Study area:

The present study was carried out in rural and urban areas of Lucknow

Study Population:

All pregnant women registered at UHTC and RHTC were assessment of micronutrient intake on the prevalence of anemia amongst pregnant women.

Study design:

The present study was a cross-sectional study in the urban and rural areas of Lucknow district.

Period of study:

Study was carried out for a period of one year from 2010 to 2011.

Sample size:

Sample size was calculated by using the following formula:

$$n= 4\ p\ x\ q/\ (d^2)$$

Where

n= sample size

p= prevalence

q= 100-p

d= error

As per NFHS-3 UP (2005-06), prevalence of anemia in reproductive is 51.6 percent. Thus, p is 51.6

q Calculated comes 48.4

Taking error of 10% of prevalence, d comes out to be 5.16.

Sample size comes out be 375.19=375.

Taking non response to be 10%, sample size comes out to be 420. The study included 420 pregnant women from urban (210) and rural areas (210).

Hb estimation:

Sahli's method was used to estimate the concentration of hemoglobin in capillary blood. A single drop of blood was taken from a finger prick after removing the first two drops of blood to ensure that the sample was based on fresh capillary blood. The graduated tube placed between the brown glass standard of Sahli's haemoglobinometer is filled with N/10 hydrochloric acid up to lowest mark (mark 2). Blood sample obtained from the finger prick or from the vein is 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 minutes for acid hematin to form. Distilled water is added drop by drop mixing it with a stirrer until color in the graduated tube is matched with the brown glass standard. Results were read as g/dl present on the side of the graduated tube considering the lower level of meniscus.

Data collection

A structured pre-tested interview schedule was used. The schedule consisted demo-graphic information of the women as well as other related variables such as nutrient intake, anthropometric measurements and hemoglobin estimation. 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. The confidentiality was assured. Interview was started with general discussion to gain confidence and it slowly extended to the specific point.

Analysis

The data collected was entered in Microsoft Excel and checked for any inconsistency. The dichotomous/categorical variables were analysed 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 non-anemic pregnant women. The relative risk with its 95% confidence interval was used to find the risk of anemia in different socio-demographic groups, women's profile etc. The multivariate logistic regression analysis was carried out to find the risk

factors associated with prevalence of anemia. The p-value<0.05 was considered as significant. All the analysis was carried out by using SPSS 15.0 version.

RESULTS

Profile of women Majority (88.1%) of the women get married between age 18-30 years. Overall, more than half (63.1%) of the respondents belonged to Hindu and 36.9% were Muslims. In urban area, 61% were Hindu while 39% respondents were Muslims. In rural area, 65.2% respondents were Hindus while 34.8% respondents were Muslims. Overall, 65.5% respondents belonged to nuclear family. In urban area, 33.3% respondents belonged to nuclear family and in rural area, 64.3% respondents belonged to nuclear family. Overall, the average family size was 4.8. However, the average family size was 4.0. About half (53.6%) of the women were literate, 96% were housewives and 98.8% were married. More than half (56%) of the women had 4-6 months of gestational age (Table-1).

Prevalence of anemia

The overall prevalence of anemia was 73.1% among the pregnant women. The moderate anemia was found in 47.6% women, mild anemia was 43.6% and severe anemia was 8.8% (Fig.1).

Micronutrient intake

The calorie intake was significantly ($p<0.0001$) lower in anemic women (1798.51± 278.00) as compared to non-anemic women (2241.14±351.94). The protein intake was significantly ($p<0.0001$) lower in anemic women (36.42±10.24) as compared to non-anemic women (41.07±11.38). The fat intake was significantly ($p<0.0001$) lower in anemic women (33.25±10.88) as compared to non-anemic women (39.79±13.99). The iron intake was significantly ($p<0.0001$) lower in anemic women (23.32±5.65) as compared to non-anemic women (25.16±6.55). The folic acid intake was significantly ($p<0.0001$) lower in anemic women (137.96±35.51) as compared to non-anemic women (147.42±42.05) (Table-2).

DISCUSSION

In the present study, overall 63.1% women were Hindu while 36.9% were Muslims. In urban area, majority 61% were Hindu while 39% women were Muslims while in rural area, 65.2% women

were Hindus and 34.8% women were Muslims. As per NFHS-3 (2005-06), 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 centres are Muslims predominate.

The literacy status in the present study was 53.6% in women, which is less than NFHS-3[1] (2005-06) -Uttar Pradesh data of 79% probably because of the low socio-economic status and Muslims predominance in the rural and urban training centre. The literacy status in females in the present study came out to be 52.2% which corresponds to NFHS-3 data in Uttar Pradesh of 46%.

In the present study, Overall 275 (65.5%) respondents belonged to nuclear family and 145 (34.5%) belonged to joint family. In urban area, 70 (33.3%) respondents belonged to nuclear family while 75 (35.7%) belonged to joint family. In rural area, 135 (64.3%) respondents belonged to nuclear family while 75 (35.7%) belonged to joint family. The difference in percentage of type of family between urban and rural area was statistically insignificant (p>0.05).

The micronutrient intake was not good in quantity as observed in the present study which supported the studies conducted by Panwar and Punia[2] (2000) and Pathak et al[3] (2004).

In our study, the prevalence of anemia was 73.1%. Ray et al[4] (2000) also reported a high prevalence of anemia (86.4%) in Haryana. The mildly anemic women were 43.6%, moderate were 47.6% and severely anemic were 8.8% in the present study. The World Health Organization also estimated that 58% of pregnant women in developing countries were anemic Galloway et al[6], (2002). In our study, the prevalence of anemia was slightly higher in urban women as compared to rural which contrast with the findings of NFHS-3 (2005-2006). Toteja et al[5] (2006) assessed the status of anemia among pregnant women from 16 districts of 11 states of India and found that 84.9% of pregnant women (n=6,923) were anemic (hemoglobin < 110 g/L); 13.1% had severe anemia (hemoglobin < 70 g/L), and 60.1% had moderate anemia (hemoglobin >= 70 to 100 g/L). They concluded that any intervention strategy for this population must address not only the problem of iron deficiency, but also deficiencies of other

micronutrients, such as B12 and folic acid and other possible causal factors.

Anemia among women in this large, southern Indian state cuts across social class, place of residence, and other factors that normally discriminate health status. Rich or poor, fat or thin, urban or rural—the prevalence of anemia is high among women in all these groups and differences are only relative. Respondents with a BMI less than 18.5 kg/m^2 were observed to be insignificantly more likely to be anemic than those with a normal BMI (18.5 – 24.9 kg/m^2) (OR=0.58, 95%CI=0.29-1.18). Similary, overweight respondents with a BMI >=25 kg/m^2 were observed to be insignificantly less likely to be anemic than those with a BMI less than 18.5 kg/m^2 (OR=0.43, 95% CI=0.17- 1.08).

Despite greater opportunities for health care in urban areas, the urban poor are often more marginalized than rural populations in their ability to access health services because of constraints in financial and administrative resources that are necessary to access the services in urban areas. Likewise, although urban areas theoretically have greater access to a wide variety of food and nutrients through close access to markets, extreme poverty limits the ability of the urban poor to purchase them.

CONCLUSION

The micronutrient intake was lower in the studied population and thus, the prevalence of anemia was higher in the study area

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Table-1: Socio-demographic profile of the pregnant women

Profile of Women	Place of residence				Total (n=420)	
	Urban (n=210)		Rural (n=210)			
	No.	%	No.	%	No.	%
Age at marriage (in years)						
<18	16	7.6	24	11.4	40	9.5
18-30	184	87.6	186	88.6	370	88.1
31-40	10	4.8	0	0.0	10	2.4
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		5.6		4.8	
Marital status						
Married	208	99.0	207	98.6	415	98.8
Widow/	2	1.0	3	2.4	3	1.2

Separated						
Education of women						
Illiterate	69	32.9	126	60.0	195	46.4
Literate	141	67.1	84	40.0	225	53.6
Occupation						
Housewife	198	94.3	205	97.6	403	96.0
Others	12	5.7	5	2.4	17	4.0
Gestational age in months						
1-3	20	9.5	14	6.7	34	8.1
4-6	128	61.0	107	51.0	235	56.0
>6	62	29.5	89	42.4	151	36.0
Anthropometric measurements						
Height (in cm)	157.58 ± 6.705		158.49 ± 4.87		158.19 ± 6.096	
Weight (in kg)	48.60 ± 8.30		56.74 ± 6.56		52.67 ± 8.67	
BMI	20.24 ± 3.53		23.30 ± 2.69		21.77 ± 3.49	

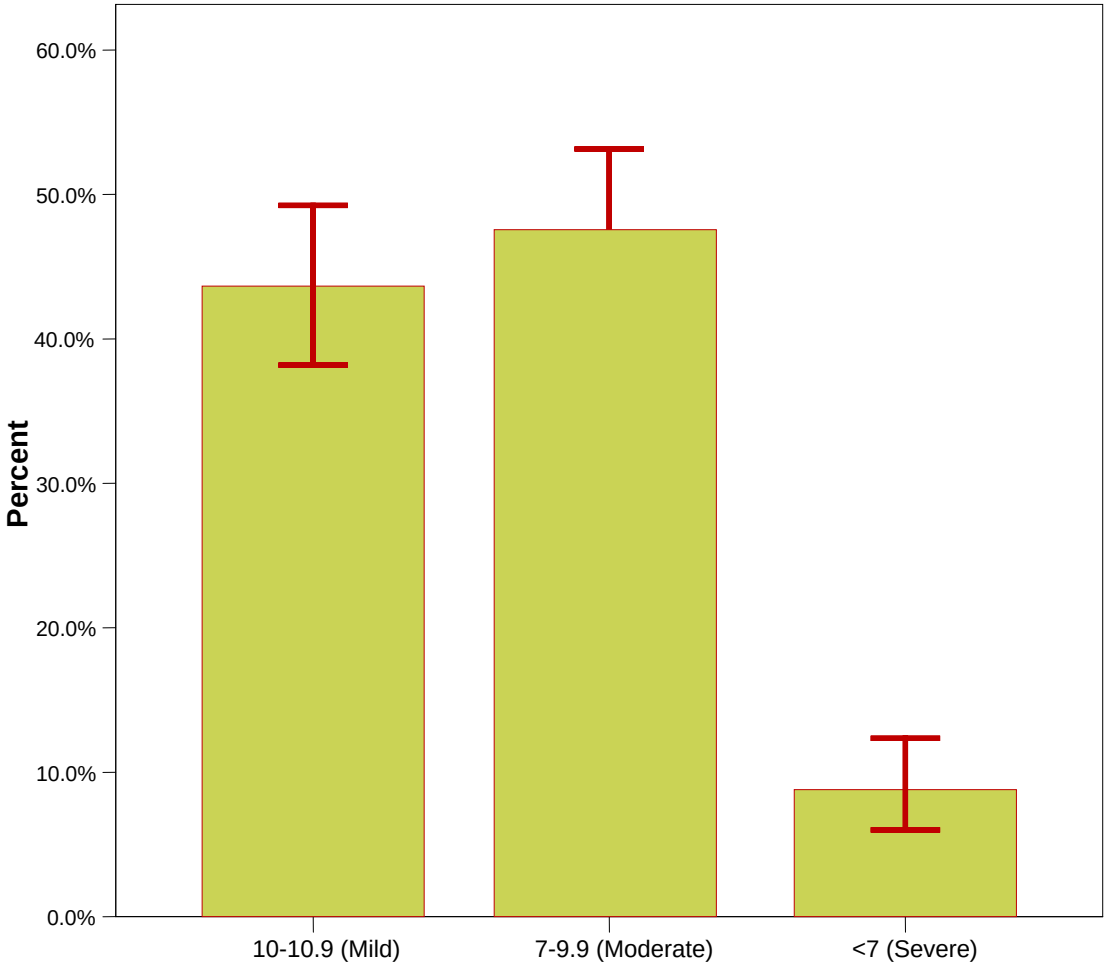
*Significant

Table-2: Micronutrient intake (Mean±sd) by Anemia status among women

Type of micronutrient intake	Anemic (n=307)	Non-anemic (n=113)	t and p-value
Calories	1798.51± 278.00	2241.14±351.94	**13.43, <0.0001***
Protein	36.42±10.24	41.07±11.38	**4.00, <0.0001***
Fat	33.25±10.88	39.79±13.99	**5.03, <0.0001***
Iron	23.32±5.65	25.16±6.55	**2.84, 0.005***
Folic acid	137.96±35.51	147.42±42.05	**2.3, 0.02***

*Significant

Fig.1: Severity of Anemia


60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
Percent
10-10.9 (Mild)
7-9.9 (Moderate)
<7 (Severe)