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Original research article

A study to assess the prevalence of anemia and its associated factors among pregnant women

Dr. Kumari Mona[1], Dr. Pulak Raj[2], Dr. Tulika Singh[3]

[1]Tutor, Department of Community Medicine, Nalanda Medical College and Hospital, Patna, Bihar, India

[2]Senior Resident, Department of Pathology, AIIMS, Patna, Bihar, India

[3]Tutor, Department of Community Medicine, Nalanda Medical College and Hospital, Patna, Bihar, India

Corresponding Author: Dr. Kumari Mona

Abstract

Aim: Nutritional factors affecting prevalence of anemia among pregnant women.

Methods: A cross-sectional study was conducted in the field practice area of department of community medicine, NMCH Patna, Bihar, India, for 10 months. All pregnant women registered at UHTC and RHTC were included in the study. Sahli's method was used to estimate the concentration of hemoglobin in capillary blood.

Results: Majority (88%) of the women get married between age 20- 30 years. Overall, more than half (62.5%) of the respondents were Hindu and 37.5% were Muslims by religion. In urban area, 60% were Hindu while 40% respondents were Muslims. In rural area, 65% respondents were Hindus while 35% respondents were Muslims. In urban area, 66% respondents lived in nuclear family, and in rural area 64% respondents lived in nuclear family. Overall, the average family size was 4.9. About half (54%) of the women were literate, 94% were housewives and 98% were married. More than half (56%) of the women had 4-6 months of gestational age. The overall prevalence of anemia was 73.5% among the pregnant women. The moderate anemia was found in 42.86% women, mild anemia was in 47.62% and severe anemia was in 9.52%. The calorie intake was significantly ($p<0.0001$) lower in anemic women (1821.59 ± 269.8) as compared to non-anemic women (2312.17 ± 359.97). The protein intake was significantly ($p<0.0001$) lower in anemic women (35.98 ± 11.03) as compared to non- anemic women (42.21 ± 11.74). The fat intake was significantly ($p<0.0001$) lower in anemic women (34.74 ± 11.26) as compared to non-anemic women (40.12 ± 14.12). The iron intake was significantly ($p<0.0001$) lower in anemic women (24.12 ± 5.78) as compared to non-anemic women (26.74 ± 6.63). The folic acid intake was significantly ($p<0.0001$) lower in anemic women (138.54 ± 34.74) as compared to non-anemic women (148.42 ± 42.15) (Table-3).

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.

Keywords: Pregnant Women; Anemia; Micronutrient Intake

Introduction

Globally, the mean blood hemoglobin concentration is 11.1 g/dl.[1] Anemia resulting from iron deficiency adversely affects cognitive and motor development, causes fatigue and low productivity.[2,3] When it occurs in pregnancy, may be associated with low birth weight and increased risk of preterm delivery.[4] The mechanism causing these effects are unknown, but they may be related to reduce oxygen delivery to the placenta and fetus, increased rates of

infection, or adverse effects of iron deficiency on brain development.[5] Anaemia in pregnancy is one of the major causes of maternal morbidity and mortality in the world including India.[6] Many factors predisposes to development of anaemia during pregnancy. Most important factors are nutritional (i.e., inhibitors of iron absorption, dietary deficiency of iron, folic acid and vitamin B12 in diet), pre-pregnancy iron deficiency anaemia, teenage pregnancy, lack of appropriate spacing between pregnancies, parasitic infestations (e.g. malaria, hookworm), open defecation, poor environmental and personal hygiene.[7] Anaemia during pregnancy can cause premature labour, postpartum haemorrhage, puerperial sepsis and thromboembolic phenomena in the mother, and can cause prematurity, IUGR, perinatal death and decreased iron stores in the foetus and subsequently in the neonate.[8] The status of anaemia can be assessed by haemoglobin (Hb) levels in blood. The World Health Organization (WHO) has defined anaemia when the Hb levels are less than 12 g/dL in non-pregnant women and less than 11 g/dL in pregnant women. Peripheral blood smear helps to determine the type of anaemia.[8] According to a WHO report, the global prevalence of anaemia among pregnant women is 41.8%.[9] In India, the prevalence of anaemia among pregnant women ranges from 58.7% to 87%.[10-12] The prevalence of anaemia at national level or state level cannot be generalised.[6] Pregnancy is a molecule-building process and a woman's normal nutritional requirement increases during pregnancy to meet the needs of the growing fetus and the maternal tissues associated with pregnancy.[13] If energy and other nutrient intake is not supplemented, then body's own reserves are used, leaving a pregnant woman weakened. Energy needs increases in the second and particularly in the third trimester of pregnancy, mainly due to increased maternal body mass.[14]

Material and methods

A cross-sectional study was conducted in the field practice area of department of community medicine, NMCH Patna, Bihar, India, for 10 months.

Methodology

All pregnant women registered at UHTC and RHTC were assessed for the prevalence of anemia. 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. 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 based on random sampling till the desired number of study population was completed. Each participant was explained about the purpose of the study prior to administration of tool. Informed consent was taken from each participant. The anonymity and confidentiality was maintained throughout. Interview was started with general discussion to gain confidence and it slowly extended to the specific point.

Results

Majority (88%) of the women get married between age 20- 30 years. Overall, more than half (62.5%) of the respondents were Hindu and 37.5% were Muslims by religion. In urban area, 60% were Hindu while 40% respondents were Muslims. In rural area, 65% respondents were Hindus while 35% respondents were Muslims. Overall, 65% respondents lived in nuclear family. In urban area, 66% respondents lived in nuclear family and in rural area 64% respondents belonged to nuclear family. Overall, the average family size was 4.9. About half (54%) of the women were literate, 94% were housewives and 98% were married. More than half (56%) of the women had 4-6 months of gestational age (Table 1). The overall prevalence of anemia was 73.5% among the pregnant women. The moderate anemia was found in 42.86% women, mild anemia was in 47.62% and severe anemia was in 9.52% females(table 2). The calorie intake was significantly ($p<0.0001$) lower in anemic women (1821.59 ± 269.8) as compared to non-anemic women (2312.17 ± 359.97). The protein intake was significantly ($p<0.0001$) lower in anemic women (35.98 ± 11.03) as compared to non-anemic women (42.21 ± 11.74). The fat intake was significantly ($p<0.0001$) lower in anemic women (34.74 ± 11.26) as compared to non-anemic women (40.12 ± 14.12). The iron intake was significantly ($p<0.0001$) lower in anemic women (24.12 ± 5.78) as compared to non-anemic women (26.74 ± 6.63). The folic acid intake was significantly ($p<0.0001$) lower in anemic women (138.54 ± 34.74) as compared to non-anemic women (148.42 ± 42.15) (Table-3).

Table 1: Demographic profile

Profile of Women	Place of residence				Total (n = 200)	
	Urban (n = 100)		Rural (n = 100)			
	No.	%	No.	%	No.	%
Age at marriage (in years)						
Below 20	7	7	11	11	18	9
20-30	87	87	89	89	176	88
30-40	6	6	0	0.0	6	3
Religion						
Hindu	60	60	65	65	125	62.5
Muslim	40	40	35	35	75	37.5
Type of family						
Nuclear	66	66	64	64	130	65
Joint	34	34	36	36	70	35
Family size						
1-2	23	23	7	7	30	15
3-4	45	45	33	33	78	39
>4	32	32	60	60	92	46
Average	4.1		5.7		4.9	
Marital status						
Married	98	98	97	97	195	97.5
Widow/ Separated	2	2	3	3	5	2.5
Education of women						
Illiterate	33	33	59	59	92	46
Literate	67	67	41	41	108	54
Occupation						
Housewife	94	94	97	97	191	95.5
Others	6	6	3	3	9	4.5

Gestational age in months						
1-3	10	10	7	7	17	8.5
4-6	60	60	52	52	112	56
>6	30	30	41	41	71	35.5
Anthropometric measurements						
Height (in cm)	157.64 ± 6.87		158.77 ± 4.83		158.49 ± 6.21	
Weight (in kg)	48.59 ± 8.45		56.84 ± 6.62		53.12 ± 8.49	
BMI	20.31± 3.65		23.42± 2.78		22.12 ± 3.59	

Table 2: Type of anemia

Anemia=147		
Parameter	**Number**	**Percentage**
Mild 10-10.9 g/dl	70	47.62
Moderate 7–9.9 g/dl	63	42.86
Severe <7 gm/dl	14	9.52

Table 3: Micronutrient intake (Mean±sd) by Anemia status among women

Type of micronutrient intake	**Anemic(n=147)**	**Non-anemic(n=53)**	**t and p-value**
Calories	1821.59 ± 269.8	2312.17 ± 359.97	13.54, <0.0001*
Protein	35.98 ± 11.03	42.21 ± 11.74	4.23, <0.0001*
Fat	34.74 ± 11.26	40.12 ± 14.12	5.31, <0.0001*
Iron	24.12 ± 5.78	26.74 ± 6.63	2.93, 0.005*
Folic acid	138.54 ± 34.74	148.42 ± 42.15	2.4, 0.02*

Discussion

Anemia is one of the main nutritional problem affecting a large proportion of population not only in developing country but also in the developed country. Anemia in pregnancy is a major problem since a very long time in India. The present study was undertaken in a rural community to estimate the prevalence of anaemia among pregnant women, and determine the factors influencing it. In the present study, Overall, more than half (62.5%) of the respondents were Hindu and 37.5% were Muslims. In urban area, 60% were Hindu while 40% respondents were Muslims. In rural area, 65% respondents were Hindus while 35% respondents were Muslims. In the present study, overall, 65% respondents lived in nuclear family. In urban area, 66% respondents lived in nuclear family and in rural area 64% respondents lived in nuclear family. Overall, the average family size was 4.9. The difference in percentage of type of family between urban and rural area was statistically insignificant ($p>0.05$). The calorie intake was significantly ($p<0.0001$) lower in anemic women (1821.59 ± 269.8) as compared to non-anemic women (2312.17 ± 359.97). The protein intake was significantly ($p<0.0001$) lower in anemic women (35.98 ± 11.03) as compared to non- anemic women (42.21 ± 11.74). The fat intake was significantly ($p<0.0001$) lower in anemic women (34.74 ± 11.26) as compared to non-anemic women (40.12 ± 14.12). The iron intake was significantly ($p<0.0001$) lower in anemic women (24.12 ± 5.78) as compared to non-anemic women (26.74 ± 6.63). The folic acid intake was significantly ($p<0.0001$) lower in anemic women (138.54 ± 34.74) as compared to non-anemic women (148.42 ± 42.15). The micronutrient intake was not good in quantity as observed in the present study which supported the studies conducted by Panwar and Punia (2000) and Pathak et al., (2004).[15,16] In

our study, the prevalence of anemia was 73.5%. Ray et al., (2000)[17] also reported a high prevalence of anemia (86.4%) in Haryana. The overall prevalence of anemia was 73.5% among the pregnant women. The moderate anemia was found in 42.86% women, mild anemia in 47.62% and severe anemia in 9.52%. The World Health Organization also estimated that 58% of pregnant women in developing countries were anemic (9). 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., (2006)[18] 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 <11.0 g/L); 13.1% had severe anemia (hemoglobin < 7.0 g/L), and 60.1% had moderate anemia (hemoglobin >= 7.0 to 10.0 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 BMI less than 18.5 Kg/m^2 were observed to be significantly 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 BMI >=25 Kg/m^2 were observed to be less likely 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. Likewise, although urban population have greater access to a wide variety of food and nutrients through close access to markets, low socio-economic status limits the ability of the urban poor to purchase them.[19]

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.

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