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Original Research Article

Assessment of the Various Nutritional Factors That Can Influence the Prevalence of Anaemia Among Pregnant Women

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Abstract:

Aim: Nutritional factors affecting the prevalence of anemia among pregnant women in bihar region.

Methods: A cross-sectional study was conducted at Department of Community Medicine, Bhagwan Mahavir Institute of Medical Sciences, (BMIMS), Pawapuri, Nalanda, Bihar, India. All pregnant women registered at UHTC and RHTC were assessment of micronutrient intake on the prevalence of anemia amongst pregnant women. Sahli's method was used to estimate the concentration of hemoglobin in capillary blood.

Results: Majority (86.5%) of the women get married between ages 20-30 years. Overall, more than half (64%) of the respondents belonged to Hindu and 36% were Muslims. The overall prevalence of anemia was 70% among the pregnantwomen. The moderate anemia was found in 43.57% women; mildanemia was 47.14% and severe anemia was 9.29% (table 2). The calorie intake was significantly ($p<0.0001$) lower in anemic women (1841.59 ± 259.8) as compared to non-anemic women (2322.17 ± 309.07). The protein intake was significantly ($p<0.0001$)lower in anemic women (35.78 ± 10.03) as compared to non- anemic women (43.21 ± 10.74). The fat intake was significantly ($p<0.0001$) lower in anemic women (35.24 ± 10.26) as comparedto non-anemic women (41.12 ± 12.12). The iron intake was significantly ($p<0.0001$) lower in anemic women (25.12 ± 5.08) as compared to non-anemic women (26.84 ± 6.73). The folicacid intake was significantly ($p<0.0001$) lower in anemic women (132.54 ± 32.74) as compared to non-anemic women (145.42 ± 40.15).

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

Anemia affects almost two-thirds of pregnant women in developing countries and contributes to maternal mortality and low birthweight.[1,2] The World Health Organization (WHO) defines anemia as a condition in which the hemoglobin concentration of a woman during pregnancy is <11 g/dl.[3] Nutritional anemia as iron deficiency anemia (IDA) is the most common cause of anemia during pregnancy, globally affecting about 32 million women[3,4] and at least half of all the pregnant women in middle and low-income countries.[5] In these countries, the risk of anemia is higher due to a wide range of factors such as inadequate diet, hemoglobinopathies, and infections such as HIV, malaria, and parasitic infestation.[5,6] The prevalence of anemia is estimated to be higher in India when compared to all other developing countries.[7] Also, it is the second leading cause of maternal deaths in the country.[8] Numerous national health programs related to the prevention and control of anemia have been in existence. Initially launched as the National Nutritional Anemia Prophylaxis Programme (NNAPP) in the year 1973, iron–folic acid supplementation was later on integrated into the Reproductive and Child Health Programme as a part of which pregnant women are administered 100 mg of elemental iron along with 0.5 mg of folic acid.[9] According to the recent data of National Family Health Survey (NFHS-4), the prevalence of anemia is estimated to be 50.3%, with an overall burden of 45.4% in Karnataka.[10] Although there has been a reduction

in the prevalence of anemia from 58.3 (NFHS-3) to 50.3% (NFHS-4), there is not much difference in the prevalence of anemia reported in NFHS-2 (49.7%) and NFHS-4 (50.3%).[10]

In India, the prevalence of anaemia among pregnant women ranges from 58.7% to 87%.[11-12] 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 do not enhance, the body's own reserves are used, leaving a pregnant woman weakened. Energy needs increase in the second and particularly the third trimester of pregnancy, mainly due to increased maternal body mass.[14]

Material and Methods

A cross-sectional study was conducted in the Department of Community Medicine, Bhagwan Mahavir Institute of Medical Sciences, (BMIMS), Pawapuri, Nalanda, Bihar, India from April 2025 to September 2025. All pregnant women registered at UHTC and RHTC were assessment of micronutrient intake on the prevalence of anemia amongst pregnant women. 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 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.

Statistical 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 21.0 version

Results

Majority (86.5%) of the women get married between age 20- 30 years. Overall, more than half (64%) of the respondents belonged to Hindu and 36% were Muslims. In urban area, 61% were Hindu while 39% respondents were Muslims. In rural area, 65% respondents were Hindus while 35% respondents were Muslims. Overall, 67% respondents belonged to nuclear family. In urban area, 67% respondents belonged to nuclear family and in rural area, 65% respondents belonged to nuclear family. Overall, the average family size was 5.2 About half (55.5%) of the women were literate, 94% were housewives and 98% were married. More than half (55%) of the women had 4-6 months of gestational age (Table 1). The overall prevalence of anemia was 70% among the pregnant women. The moderate anemia was found in 43.57% women, mild anemia was 47.14% and severe anemia was 9.29% (table 2). The calorie intake was significantly ($p<0.0001$) lower in anemic women (1841.59 ± 259.8) as compared to non-anemic women (2322.17 ± 309.07). The protein intake was significantly ($p<0.0001$) lower in anemic women (35.78 ± 10.03) as compared to non- anemic women (43.21 ± 10.74). The fat intake was significantly ($p<0.0001$) lower in anemic women (35.24 ± 10.26) as compared to non-anemic women (41.12 ± 12.12). The iron intake was significantly ($p<0.0001$) lower in anemic women (25.12 ± 5.08) as compared to non-anemic women (26.84 ± 6.73). The folic acid intake was significantly ($p<0.0001$) lower in anemic women (132.54 ± 32.74) as compared to non-anemic women (145.42 ± 40.15) (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	9	9	12	12	21	10.5
20-30	86	86	87	87	173	86.5
30-40	5	5	1	1	6	3
Religion						
Hindu	61	61	67	67	128	64
Muslim	39	39	33	33	72	36
Type of family						
Nuclear	67	67	65	65	132	66
Joint	33	33	35	35	68	34
Family size						
1-2	23	23	7	7	30	15
3-4	47	47	33	33	80	40
>4	30	30	60	60	90	45
Average	4.2		5.9		5.2	
Marital status						
Married	99	99	97	97	196	98
Widow/ Separated	1	1	3	3	4	2
Education of women						
Illiterate	29	29	60	60	89	44.5
Literate	71	71	40	40	111	55.5
Occupation						
Housewife	93	93	95	95	188	94
Others	7	7	5	5	12	6
Gestational age in months						
1-3	11	11	9	9	20	10
4-6	59	59	51	51	110	55
>6	30	30	40	40	70	35
Anthropometric measurements						
Height (in cm)	157.84 ± 6.97		158.87 ± 4.93		158.69 ± 6.31	
Weight (in kg)	49.19 ± 7.89		57.12 ± 7.69		54.02 ± 9.36	
BMI	20.89± 3.77		23.79± 2.16		22.63± 3.93	

Table 2: Type of anaemia

Parameter	Number	Percentage
Mild 10-10.9 g/dl	66	47.14
Moderate 7–9.9 g/dl	61	43.57
Severe <7 gm/dl	13	9.29

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

Type of micronutrient intake	Anemic (n=140)	Non-anemic (n=60)	t and p-value
Calories	1841.59 ± 259.8	2322.17 ± 309.07	12.24, <0.0001
Protein	35.78 ± 10.03	43.21 ± 10.74	5.13, <0.0001
Fat	35.24 ± 10.26	41.12 ± 12.12	6.01, <0.0001
Iron	25.12 ± 5.08	26.84 ± 6.73	3.03, 0.005
Folic acid	132.54 ± 32.74	145.42 ± 40.15	3.4, 0.03

Discussion

Anemia is one of the main nutritional problems that affecting a large proportion of the population not only in developing country it's also in the industrialized country. Anaemia in pregnancy is a burning issue 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 (64%) of the respondents belonged to Hindu and 36% were Muslims. In urban area, 61% were Hindu while 39% respondents were Muslims. In rural area, 65% respondents were Hindus while 35% respondents were Muslims. Overall, 67% respondents belonged to nuclear family. In urban area, 67% respondents belonged to nuclear family and in rural area, 65% respondents belonged to nuclear family. Overall, the average family size was 5.2. 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 (1841.59 ± 259.8) as compared to non-anemic women (2322.17 ± 309.07). The protein intake was significantly ($p<0.0001$) lower in anemic women (35.78 ± 10.03) as compared to non- anemic women (43.21 ± 10.74). The fat intake was significantly ($p<0.0001$) lower in anemic women (35.24 ± 10.26) as compared to non-anemic women (41.12 ± 12.12). The iron intake was significantly ($p<0.0001$) lower in anemic women (25.12 ± 5.08) as compared to non-anemic women (26.84 ± 6.73). The folic acid intake was significantly ($p<0.0001$) lower in anemic women (132.54 ± 32.74) as compared to non-anemic women (145.42 ± 40.15). 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 70%. Ray et al., (2000) [17] also reported a high prevalence of anemia (86.4%) in Haryana. The overall prevalence of anemia was 70% among the pregnant women. The moderate anemia was found in 43.57% women, mild anemia was 47.14% and severe anemia was 9.29%. 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 <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/m2 were observed to be insignificantly more likely to be anemic than those with a normal BMI (18.5–24.9 kg/m2) (OR=0.58, 95% CI=0.29-1.18). Similary, overweight respondents with a BMI >=25 kg/m2 were observed to be insignificantly less likely to be anemic than those with a BMI less than 18.5 kg/m2 (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.[18]

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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