



DIETARY FACTORS OF ANAEMIA AMONG PREGNANT WOMEN DELIVERING IN A RURAL TERTIARY CARE HOSPITAL IN SONIPAT, HARYANA: A CASE CONTROL STUDY

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ABSTRACT

Background: Pregnant women are predominantly susceptible to nutritional deficiencies because of the increased metabolic demands imposed by pregnancy and its related factors. Pregnancy is a physiologically demanding process and its outcome is strongly influenced by the nutritional status of the mother both before pregnancy and her nutrient intake and utilization during pregnancy. More risk of developing nutritional anaemia if the diet of pregnant women does not contain enough meat, poultry, dairy products and eggs.

Objective: To determine the dietary factors associated with anaemia among pregnant women delivering at a tertiary care hospital in Haryana.

Methods: The hospital based case control study carried out in BPS GMC for Women, Khanpur Kalan, Sonipat, Haryana. One hundred sixty eight pregnant women selected for study. We included 18 years and above respondents and residents of Sonipat district. Analysis were performed by using R statistical software. Odds ratio, P value and Chi-square were calculated.

Results: We found that Odds of having anaemia in pregnant mothers who consumed meals two and three times during their pregnancy were 3.46 times and 1.01 times greater than the odds of mothers who consumed four times respectively per day during their pregnancy. The Odds of getting anaemia was around 4.54, 19.09 and 3.0 times significantly greater among mothers who were taking green leafy vegetables two or three times in a week; once a week and seldom as compare to those who consumed daily during their current pregnancy.

Conclusion: Intake of extra meal during pregnancy and consumption of green leafy vegetables and drinking milk can prevent anaemia during pregnancy.

KEYWORDS : Anaemia, Pregnant women, Dietary, Case - Control Study

INTRODUCTION

Pregnancy is a physiologically demanding process and its outcome is strongly influenced by the nutritional status of the mother both before pregnancy and her nutrient intake and utilization during pregnancy.^[1] Anaemia in pregnancy (AIP) is one of the most frequently encountered public health problem. According to NFHS-4 in Haryana state, the prevalence of anaemia among pregnant women is 50.2% in urban areas and 58.1% in rural areas. All pregnant women are at risk of developing anaemia.

The normal physiological increase in plasma volume causes haemodilution in a pregnant woman. In pregnancy, plasma volume increases which leads to lowering of the haemoglobin level. Therefore, mild anaemia in pregnancy is considered normal.^[2] Studies undertaken by the National Institute of Nutrition (NIN) Hyderabad, shows that there is a fall in T and B cell count with fall in haemoglobin levels below 11 gm/dl. The fall in T and B cells is statistically significant in women with haemoglobin levels below 8 g/dl.^[3]

There are two sources of dietary iron, haem-iron and non-haem iron. Haem-iron is better absorbed than non-haem iron. Foods containing non-haem iron are those of vegetable origin e.g., cereals, green leafy vegetables, legumes, nuts, oilseeds, jaggery and dried fruits. They are important sources of iron in the diets of a large majority of Indian people. The bioavailability of non-haem iron is poor owing to the presence of phytates, oxalates, carbonates, phosphates and dietary fibre which interfere with iron absorption. Other foods which inhibit iron absorption are milk, eggs and tea.^[4]

Micronutrient deficiency anaemia occurs in pregnancy due to deficiency of iron, folic acid and vitamin B12. The most common is iron deficiency anaemia often known as nutritional anaemia. There is a greater risk of developing nutritional anaemia if the diet of pregnant women does not contain enough meat, poultry, dairy products and eggs (Nahid *et al.*, 2019).^[5] High prevalence of anaemia among pregnant women still persists. The available research concerning of nutritional

etiologic factors of anaemia during pregnancy in Sonipat district of Haryana are limited. There is a need to strengthen the loop wholes, which are causative factors for anaemia but ignored. The present study conducted to know the different dietary risk factors for anaemia among delivered pregnant mothers.

MATERIAL AND METHODS

It was a case control study carried out from March 2018 to February 2019 in the ward of Obstetrics & Gynaecology department, in GMC for Women, Khanpur Kalan, Sonipat, Haryana. Study. One hundred sixty eight pregnant women chosen for study after sample size calculation by n Master 2.0 software, considering 10% non-response rate. Inclusion criteria for cases and controls was age of 18 years and above and local residents of district. In study tools, we used assessment of dietary intake related questions and dietary practices like frequency of consumption of non-vegetarian food items, green leafy vegetables, fruits and number of meals. World Health Organization criteria or definition for anaemia in pregnancy used for Haemoglobin (Hb) levels and written informed consent were taken from respondents. Research data was coded and analysis performed by using R statistical software. Crude Odds Ratio (COR), Chi Square, degree of freedom and P value were calculated. Finally, variables with P-value < 0.05 in the multivariable logistic regression model were taken as statistically significant and Adjusted Odds Ratio (AOR) with its 95% confidence interval was considered to see the association between various dietary factors.

RESULTS

Table-1 depicts that most of the study subjects i.e.63 (75.0%) cases and 59 (70.2%) controls were vegetarian followed by 16 (19.0%) cases and 18 (21.4%) controls were Non - vegetarian while 5 (6%) cases and 7 (8.3%) controls were Eggetarian. It was found that Odds of developing anaemia was 1.495(CI= 0.450-4.970) and 1.244 (CI= 0.329-4.708) among study subjects who consume Vegetarian and Non-Vegetarian diet during her pregnancy respectively as compare to who consumed

Vegetarian diet. Maximum i.e. 67 (79.8%) cases and 72 (85.7%) controls had not habit of taking tea or coffee. The Table - 2 shows that the Odds of having anaemia in pregnant mothers who consumed meals two and three times during their pregnancy were 2.9 times and 1.1 times greater than the odds of mothers who consumed four times respectively per day during their pregnancy (AOR = 2.94, CI: 0.46 – 21.2) and (AOR = 1.19, CI: 0.21 – 7.41) respectively. The Odds of getting anaemia was around 7, 37 and 4.1 times significantly greater among mothers who were taking green leafy vegetables two or three times in a week; once a week and seldom as compare to those who consumed daily during her current pregnancy (AOR = 6.90, CI: 1.59 – 42.4), (AOR = 37.0, CI: 6.36 – 300.1) and (AOR = 4.17, CI: 0.29 – 59.4) respectively. The Odds of having anaemia was 0.71 times lower but 2.06 times higher and 1.5 times among those who consumed fruits once a week; two/three times a week and seldom as compare to those who consumed fruits daily during her current pregnancy (AOR = 0.71, CI: 1.18 – 4.13), (AOR = 2.06, CI: 0.36 – 12.6) and (AOR = 1.58, CI: 0.14 – 18.7) respectively. The odds of anaemia was 0.43, 0.64, 30.7 and 4.25 times among pregnant mothers who had drunk milk daily, once a week, seldom and two/three times as compare to those who had never drunk milk during her current pregnancy (AOR = 0.43, CI: 0.018 – 4.36), (AOR = 0.64, CI: 0.014 – 21.7), (AOR = 30.7, CI: 0.66 – 1345.1) and (AOR = 4.25, CI: 0.111 – 131.1) respectively while this was found statistically insignificant.

Table:1 Association of study participants according to Dietary Intake Habit

Variable	Cases N (%)	Control N (%)	COR(95% CI)	P Value
Diet Preference				
Vegetarian	63 (75)	59 (70.2)	1.495 (0.450-4.970)	0.512
Non Vegetarian	16 (19)	18 (21.4)	1.244 (0.329-4.708)	0.747
Eggetarian	5 (6)	7 (8.3)	1	
$X^2 = 0.582; df = 2; P value = 0.747$				
Number of meals				
Once	1 (1.2)	0	31.9 (3.07-N.A)	0.986
Twice	37 (44)	16 (19)	3.46 (8.74-15.2)	0.080
Thrice	42 (50)	62 (73.8)	1.01 (2.73-4.17)	0.981
Four times	4 (4.8)	6 (7.1)	1	
$X^2 = 13.6; df = 3; P value = 0.004$				
Habit of taking coffee or tea				
Yes	17 (20.2)	12 (14.3)	1	
No	67 (79.8)	72 (85.7)	1.522 (0.677-3.424)	0.309
$X^2 = 1.042; df = 1; P value = 0.307$				
Time of taking beverages				
<20 minutes	13 (15.5)	7 (8.3)	1.973 (0.740-5.259)	0.174
>20 minutes	7 (8.3)	9 (10.7)	1	
Not applicable	64 (76.2)	68 (81)	0.826 (0.291-2.3)	0.721
$X^2 = 2.171; df = 2; P value = 0.338$				
Green Leafy Vegetables				
Daily	7 (8.3)	35 (41.7)	1	
Two/Three times a week	30 (35.7)	33 (39.3)	4.54 (1.83-12.5)	0.0017
Once a week	42 (50)	11 (13.1)	19.09 (7.05-58.4)	0.0035
Seldom	3 (3.6)	5 (6)	3.00 (5.21-15.48)	0.190
Never	2 (2.4)	0	28.2 (2.61-NA)	0.986
$X^2 = 39.44; df = 4; P value = 0.0001$				
Eating Fruits per week				
Daily	7(8.3)	14(16.7)	1	
Two/Three times a week	26(31)	38(45.2)	1.36(0.49-4.03)	0.52
Once a week	42(50)	25(29.8)	3.36(1.22-9.93)	0.02
Seldom	9(10.7)	6(7.1)	3.0(0.77-1.25)	0.12
Never	0	1(1.2)	0.0(NA)	0.98
$X^2 = 10.9; df = 4; P value = 0.033$				
Eating meat frequency				

Two/Three times a week	1(1.2)	3(3.6)	1	0.863
Once a week	2(2.4)	6(7.1)	1.402(0.562-3.50)	0.469
Seldom	13(15.5)	9(10.7)	0.32(0.63-1.661)	0.176
Never	68(81)	66(78.6)	0.324(0.33-3.190)	0.334
$X^2 = 3.75; df = 3; P value = 0.289$				
Eating egg frequency				
Two/Three times a week	1(1.2)	4(4.8)	0.235(0.011-1.643)	0.201
Once a week	3(3.6)	4(4.8)	0.707(0.135-3.32)	0.658
Seldom	10(11.9)	10(11.9)	0.942(0.364-2.43)	0.902
Never	70(83.3)	66(78.6)	1	
$X^2 = 2.06; df = 3; P value = 0.560$				
Drinking Milk Frequency				
Daily	46 (54.8)	76 (90.5)	0.172 (0.025-0.751)	0.33
Two/Three times a week	15 (17.9)	2 (2.4)	2.14 (0.22-21.13)	0.488
Once a week	4 (4.8)	2 (2.4)	0.571 (0.049-6.33)	0.635
Seldom	12 (14.3)	2 (2.4)	1.71 (0.173-17.10)	0.626
Never	7 (8.3)	2 (2.4)	1	
$X^2 = 27.9; df = 4; P value = 0.0001$				
Total	84 (100)	84 (100)		

Table-2 Association of Respondents after AOR (Adjusted Odds Ratio)

Variable	Adjusted Odds Ratio (95% CI)	P- Value
Number of Meals		
Once	Omitted	0.99
Twice	2.94 (0.46- 21.2)	0.260
Thrice	1.19 (0.21 – 7.41)	0.839
Four times	1	
Green Leafy Vegetables		
Once a week	37.0 (6.36 – 300.1)	0.001
Two/Three times a week	6.90 (1.59 – 42.4)	0.018
Seldom	4.17 (0.29 – 59.4)	0.27
Never	Omitted	0.98
Daily	1	
Eating Fruits		
Once a week	0.71 (1.18 -4.13)	0.70
Two/Three times a week	2.06 (0.36 – 12.6)	0.41
Seldom	1.58 (0.14 – 18.7)	0.70
Never	Omitted	0.99
Daily	1	
Drinking Milk frequency		
Once a week	0.64 (0.014 -21.7)	0.80
Two/Three times a week	4.25 (0.111 – 131.1)	0.39
Seldom	30.7 (0.66 – 1345.1)	0.06
Daily	0.43 (0.018 – 4.36)	0.51
Never	1	

DISCUSSION

The present study conducted in a rural tertiary care hospital to find out the dietary determinants of pregnant women. In the present study there was no association found between Vegetarian, Non- Vegetarian and Eggetarian. In similar to our study, a prospective case control study by Singh R et al., 2019.^[6] In contrast to our study Abiselvi et al., 2018 in Tamil Nadu had reported that those on vegetarian diet have 6.2 times anaemia than those on mixed diets.^[7] In an unmatched case control study by Weldekidan F et al., 2018 found that 2.5 times greater anaemia than the odds of mothers who consume additional food at least one times per day during their pregnancy.^[8]

No association was found between consumption of meat and non-vegetarian diet in our study. An unmatched case control study by Weldekidan F et al. reported that pregnant women who did not eat meat at least one time per week compared to those who ate two times had the likelihood of developing

anaemia.^[8] Tadesse SE et al., revealed that inadequate intake of chicken was significantly associated with anaemia.^[9] In a study by Agraw B et al., 2015 found that those pregnant women who have not eaten meat or organ meat (such as liver and kidney) were nearly three times more likely to be anemic compared to other who ate.^[10] Likewise, other reports showed lower consumption of meat is significantly associated with a higher rate of anaemia.^[11,12] In our study, the Odds of developing anaemia were significantly more among cases who consumed green leafy vegetables once a week & two or three times a week in comparison to those who consumed daily. A study by Dutta S et al., 2013 (Bengal) consumption was protective factor for anaemia among pregnant women.^[13]

Present study found no association with eating fruits and only 8.3% cases and 16.7% controls had taken fruits daily during current pregnancy. Similar to our findings a study by Dutta S et al., 2013.^[13] Chakona and Shackleton (2019) reported that 37% of the pregnant women one or more food practices shaped by local cultural taboos or beliefs. The most commonly avoided foods were meat products, fish, potatoes, fruits, beans, eggs, butternut and pumpkin, which are rich in essential micronutrients, protein and carbohydrates.^[14] In our study, most of the study subjects consumed milk daily i.e. 46 (54.8%) cases and 76 (90.5%) controls. In contrast to our study conducted by Nivedita K et al., 2016 in Puducherry.^[15] Food taboos have been identified as one of the factors contributing to maternal under nutrition in pregnancy especially in rural areas.^[16] Milk, green vegetables and fruits were the most commonly mentioned beneficial food items during pregnancy in a study conducted in Bihar.^[17]

CONCLUSION

The present study concluded that drinking milk frequency, eating fruit, number of meals found significant with Odds ratio and green leafy vegetables found highly significant with Adjusted Odds ratio.

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