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Risk factors for anaemia in pregnancy

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Summary

A case control study was undertaken at the Maternal and Child Health Clinic at Urban Health Training Centre, affiliated to Dept. of Preventive and Social Medicine, Govt. Medical College, Nagpur. There were total 621 study subjects and with cut off for anaemia at 11 gm/dL, study cases were 372 and controls were 249. Risk factors considered in the study were extremes of maternal age (<20 years and > 30 years), lower socioeconomic status, illiteracy, parity>2, spacing < 2 years., calorie intake< 80% of expected, undernutrition (BMI < 18.5), vegeterian diet, unemployment of woman, history of worm infestations in last six months. As we did not control for any variable at the design stage, multivariate analysis was carried out. We observed the significant association of all the factors except type of diet, illiteracy, age > 30 years with anaemia in pregnancy.

Introduction

Anaemia is a health problem of global dimension, particularly so in women in the reproductive age group from developing countries including India. Its prevalence in India is reported upto 60% (WHO , 1968) and may increase to 80% in pregnancy (Shankar 1962). It becomes more manifest during pregnancy in view of their increased demand for nutritional requirements duly compounded by other socioeconomic factors, often operating in developing countries like India. The disease entity places the pregnant women in a high risk category and as such the risk factors predisposing to its pathogenesis deserve a careful study and analysis. Inspite of National Nutritional Anaemia Prophylaxis Programme in action since 1970 (Park 1997), the scenario has not much changed (Shankar 1962; Basu et al, 1973; Luwang 1980) probably due to non availment of services by those who need it or inadequate understanding of various factors influencing it (Basu et al, 1973; Yusuf 1987).

Though factors responsible for anaemia in pregnancy are well known and many studies are available in this regard (Subramaniyan and Fernandes 1970; Luwang et al, 1980; Edet 1990; Dutta et al, 1992) to identify the effect of each factor by proper methodology that too from this part of the country.

Against this background, the present study was undertaken to gain some insight into medico-socio demographic attributes of anaemia in pregnancy and their multivariate significance.

Material and Methods:

A case control study was conducted in Urban Health Training Centre (UHTC) affiliated to Dept. of Preventive and Social Medicine, Govt. Medical College Nagpur to assess the risk factors for anaemia pregnancy. Pregnant mothers, in second trimester pregnancy, attending UHTC for check up for first [illegible]

not having taken iron-folic acid supplementation were included in the study. Total 621 pregnant mothers were included in the study. Cases and controls were selected out of these mothers based on haemoglobin concentration of less than 11 gm/dL and 11 gm/dL or above respectively (Kark et al, 1964; WHO, 1968). According to this cut off for anaemia, there were 372 cases and 249 controls. Data was collected using predesigned questionnaire and by interview technique.

Risk factors for anaemia in pregnancy in this study are, teenage pregnancy (<20 years of age), elderly pregnancy (>30 years), lower socioeconomic status (Mahajan and Gupta, 1995), maternal illiteracy, parity > 2, spacing ≤ 2 years, calorie intake < 80% of expected, history of worms in last 6 months, malnutrition (BMI < 18.5), vegeterian diet, unemployment.

Univariate analysis for all risk factors (listed in table I) were carried out by chi-square test and odds ratio with 95% confidence interval. Multivariate analysis was carried out by Unconditional Multiple Logistic Regression Analysis using 'MULTLR' software package. All factors significant at a = 0.1 were included in full model and those coming significant again at a = 0.1 level were included in the final model.

Results

Table I shows the univariate analysis of all risk factors for anaemia in pregnancy. Except type of diet (OR = 1.1, 95% CI = 0.8- 1.5), and maternal illiteracy (OR = 1.4, 95% CI = 0.9-2.0) all factors were observed to be significant risk factors for anaemia in pregnancy.

Table I
Risk factors for anaemia in pregnancy
(Univariate analysis)

Variables (Risk factors)	Cases n=372	Controls n=249	OR (95% CI)
Age group < 20 years	41 (11.1)	8 (03.2)	42 (1.9-9.2)
Age group > 30 years	63 (16.9)	20 (08.1)	2.6 (1.5-4.4)
Lower socioeconomic status*	164 (44.1)	73 (29.3)	1.9 (1.4-2.7)
Illiterate woman	16 (31.2)	60 (24.1)	1.4 (0.9-2.0)
Parity > 2	200 (53.8)	86 (34.5)	2.2 (1.6-3.0)
Spacing ≤ 2 years	208 (55.9)	59 (35.1)	4.1 (2.6-26.4)
Calorie intake < 80% of expected	295 (79.3)	161 (64.7)	2.1 (1.7-3.1)
History of worms in last 6 months	41 (11.1)	13 (05.2)	2.2 (1.2-4.1)
Malnutrition (BMI < 18.5)	235 (63.2)	128 (51.4)	1.6 (1.2-2.2)
Vegetarian diet	214 (57.3)	139 (55.8)	1.1 (0.8-1.5)
Unemployment (of woman)	282 (75.8)	227 (91.2)	0.3 (0.2-1.5)

As per modified Kuppuswamy socieconomic classification
(Mahajan BK et al, 1995).

In our study, the prevalence of anaemia in pregnant women was observed to be 59.9% (372/621). Risk factors studied are teenage pregnancy (<20 years of age), elderly pregnancy(≥ 30 years of age), lower socioeconomic status, illiteracy, parity > 2, spacing ≤ 2 years, caloric intake < 80% of expected, history of worms in previous 6 months, malnutrition (BMI < 18.5), vegetarian diet.

Table II depicts the results of unconditional multiple logistic regression analysis. Age group above 20 years, and ≥ 30 years, lower socioeconomic status, parity > 2, spacing ≤ 2, caloric intake < 80% of expected, history of worms, malnutrition were significant at a = 0.1 on full model. Significance of all were confirmed in final model except age ≥ 30 years.

Table II
Risk factors for anaemia in pregnancy (Multivariate analysis)

Risk factors	OR (95% CI)	p-value
	Full Model	
Age group < 20 years	3.9 (1.3-9.7)	0.0002
Age group ≥ 30 years	2.1 (1.0-4.6)	0.0574
Lower socioeconomic status	2.4 (1.1-4.7)	0.0019
Illiterate woman*	1.1 (0.74-2.2)	0.2469
Parity > 2	2.7 (1.9-4.2)	0.0011
Spacing ≤ 2 years	5.3 (2.9-13.5)	0.0001
Calorie intake <80% expected	2.9 (1.7-4.2	0.0067
History of worms in last 6 months	2.4 (1.2-8.3	0.0054
Undernutrition (Malnutrition)	1.9 (1.1-2.9)	0.0078
Unemployment of women*	0.3 (0.2-1.5)	0.2164
	Final Model	
Age group < 20 years	3.6 (1.4 – 7.3)	0.0006
Age group ≥ 30 years*	1.6 (0.7-3.9)	0.20012
Lower socioeconomic status	3.7 (1.5-6.1)	0.0001
Parity > 2	2.9 (1.6 – 4.8)	0.0021
Spacing ≤ 2 years	5.7 (3.2-9.7)	0.0000
Calorie intake < 80% of expected	3.4 (1.3 – 6.5)	0.0001
History of worms in last 6 months	2.5 (1.2 – 8.7)	0.0008
Undernutrition (Malnutrition)	3.6 (1.4 – 6.1)	0.0001

* Statistically non significant

Discussion:

We identified eleven factors that could be associated with anaemia during pregnancy in one way or other. Teenage pregnancy and elderly pregnancy was reported to be associated with increased prevalence of anaemia (Kark et al, 1964; Gale et al, 1989; Edet 1990, Dutta et al, 1992). In adolescent pregnancies increased growth requirement is overburdened by increasing demands of growing foetus and inadequate diet which may lead to anaemia. We also appreciate the importance of both the factors. Though conflicting, there are some evidences of increased prevalence of anaemia in elderly pregnancy (Kark et al, 1964; Edet 1990). Increased parity with inadequate spacing may be additional factors with old age pregnancy contributing to anaemia (Edet 1990, Dutta et al, 1992). Probably this may explain the significant association of elderly pregnancy with anaemia on univariate analysis but insignificant in multivariate set up. Multiparity that too at shorter interval leads little

time to replenish decreased iron store in initial pregnancy, resulting in anaemia (Dutta et al, 1992). Though importance of haeme iron in animal food was stressed and in fact proved experimentally (Shrikantia 1989), we did not observe relation between type of diet and anaemia in pregnancy. It may be due to the fact that no one in the study was totally non vegeterian and were non vegeterian infrequently. Significant association of anaemia with inadequate calorie intake indicates that, even though haem iron is important, adequate calorie intake can serve the purpose. Socioeconomic status has broad perspective and probably acts through affecting all the factors considered in this study. Its individual role is also significant and further in depth appreciation of its role in anaemia of pregnancy is required. Probably, overall education does not speak about their awareness regarding proper dietary practices. Further dichomatization of educational status results in loss of information. Worms compete with maternal nutrition and also are responsible for loss of blood and thus, can cause anaemia (Subramaniyan and Fernandes 1970). We too observed their association with anaemia which is endorsed by Dutta et al (1992). History is not a reliable way to detect parasitic or worm infestations because of their mostly asymptomatic presentation. But probably, this unreliability was uniformly distributed over the entire study population, thus it was unlikely to affect the association, though this resulted in underestimation of the problem. We included working status of mother on the assumption that maternal employment means more income in family, consequently better diet and lower prevalence of anaemia. Thus we included unemployment of mother as a risk factor for anaemia; but contrary to our assumption, unemployment was observed to be a protective factor on univariate analysis and non significant in multivariate setup. Our study area comes in the category of slums and semi-urban population, where the female opts for employment only when economic sources are very weak. In such situation probably our hypothesis does not hold true.

Thus, the present study brings out the independent effect of each factor associated with anaemia in pregnancy. Interventions aimed at reducing these factors can go a long way in alleviating this problem in India and many other developing countries.

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