Original Research Paper

Obstetrics & Gynaecology

PREVALENCE AND RISK FACTORS OF ANAEMIA IN ANTENATAL POPULATION OF MEERUT (UTTAR PRADESH)

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ABSTRACT
Aim: WHO estimated that prevalence of anaemia in pregnant women is 51% in developing countries and 65-75% in India.[1] It is associated with both maternal and fetal risks. The present study was done to assess prevalence and risk factors of anaemia in pregnant women.
Methods: 1000 antenatal women visiting outpatient department of Obstetrics & gynaecology of Subharti Medical College, meerut were included.
Results: Prevalence of anaemia in the study was found to be 67.2%. 74.55% had iron deficiency anaemia (IDA) and 25.45% had non-iron. A significant association was seen between IDA and booking status, literacy, socio-economic status, dietary habits, religion and serum ferritin levels of subjects (p<0.05). Conclusions: Government programmes focussing on pregnant women and adolescent girls are required to be implemented to eradicate this health problem

KEYWORDS : anaemia, literacy, iron-deficiency.

INTRODUCTION

According to ICMR data, relative prevalence of mild, moderate and severe anaemia are 13%, 57% and 12% respectively in India.[2] Maternal complications include poor weight gain, pre-eclampsia, ante-partum haemorrhage, post-partum haemorrhage and puerperal sepsis, whereas premature births, low birth weight babies and high perinatal mortality are the known fetal risks. Various factors contributing to high prevalence of iron deficiency in India are low dietary intake, inability to buy good quality food, poor eating habits, large proportion of population belonging to low socio-economic strata, poor bio-availability of iron in phytate and fibre rich Indian diet and chronic blood loss due to infections like malaria and hookworm infestations. The present study was conducted with the aim to assess the prevalence and associated risk factors of anaemia in pregnant women.

METHODS

It was a prospective cross-sectional study and included 1000 consecutive antenatal women visiting the Obstetrics&gynaecology department of Subharti medical college and associated hospital, meerut over a period of one and half years (Oct 2013- March 2015). A detailed history of the enrolled woman was taken. Multiple pregnancy and woman with significant bleeding in pregnancy were excluded. Pure vegetarian in the study were defined as those who did not consume any animal product except milk, whereas non-vegetarian were those who consumed animal products at least three meals in a week. Socio-economic status of subjects were calculated by modified Kuppuswamy classification 2012.[3] Blood samples for haemoglobin, general blood picture (GBP), serum ferritin and total iron binding capacity (TIBC) of all antenatal women in the study was sent. Electrophoresis was done to rule out haemoglobinopathies in subjects found to have anaemia and showing peripheral blood picture of normocytic normochromic or microcytic hypochromic with raised serum ferritin levels. Subjects with haemoglobin levels between 10-10.9gm/dl were classified as mild anaemic, between 7.0-9.9gm/dl as moderately anaemic, and with values less than 7.0gm/dl as severely anaemic as per ICMR classification.[4] We differentiated between iron and non-iron deficiency anaemia on basis of serum ferritin levels, with iron deficiency diagnosed with serum ferritin below 30μgm/l.[5] The data was compiled and statistical analysis was done. Normality of data

was tested by Kolmogorav-Simrnov test. Quantitative variables were compared using Mann-Whitney Test. Qualitative variables were compared using Chi-Square test. A p value of <0.05 was considered statistically significant. The data analysis was done using Statistical Package for Social Sciences (SSPS) version 21.0.

RESULTS

Out of 1000 antenatal women, 32.8% were non-anaemic and 67.2% were anaemic. Majority of the subjects included in the study i.e.57.14% had moderate anaemia, 28.57% had mild and 14.29% had severe anaemia. IDA was found in 74.55% of antenatal women, whereas 25.45% suffered from non-iron deficiency anaemia. Maximum enrolled women in the study were in age group of 26-30 years (Table I). Teenage pregnancy (<20 years) was seen in 13 antenatal cases (1.3%). 76.92% subjects with IDA were found to be <20 years , thus showing that adolescent group was at highest risk. 80.3% antenatal women were unbooked in contrast to 19.7% antenatal women who were booked at our hospital. More than half i.e. 53.42% unbooked antenatal women and 36.55% booked antenatal women had IDA. Significant association was seen between IDA and booking status (p<0.05)(Table I). Majority of the antenatal women were illiterate i.e. 55% and 45% were literate. Amongst the illiterate women, 74.9% had IDA whereas only 19.78% literate antenatal women had IDA. A significant association was seen between IDA and literacy status (p<0.05)(Table I). Maximum percentage of antenatal women i.e. 72% belonged to lower middle class. There was a significant association seen between IDA and socio-economic status of the subjects (p<0.05)(Table-I). Amongst the iron deficient antenatal women, 69.86% were vegetarian and 2.4% were non-vegetarian. A positive significance was found between vegetarian habits and IDA (p < 0.05)(Table-I). 31.3% of our enrolled subjects followed Hinduism. 67.3% muslim and 18.53 % hindu antenatal women exhibited IDA. None of the iron deficient women belonged to Sikhism or Christian religion. A significant association was seen between IDA and various religions (p<0.05)(Table-I). The general blood picture of all antenatal cases was evaluated and 60.7% showed normocytic normochromic picture, 31.2% showed microcytic hypochromic picture and 8.1% showed dimorphic picture. All antenatal women with IDA in the study had their serum ferritin levels between 1-30 μgm/dl. Thus there was a positive association seen between serum ferritin levels

and IDA (p<0.05). The sensitivity, specificity, positive and negative predictive value of serum ferritin and TIBC were calculated. Serum ferritin was more sensitive (74.55%) and specific (71.04%) than TIBC(Table-II)

Table I-Demographic characters of pregnant women

AGE(years)	Total number(n=1000)	Number of iron deficiency anaemia	Percentage of iron deficiency anaemia	P value
<20	13	10	76.92%	0.341
20-25	358	187	52.23%	
26-30	410	190	46.34%	
31-35	198	101	51.01%	
>35	21	13	61.90%	
GRAVIDITY				
G1	292	142	48.63%	0.661
G2	258	123	47.67%	
G3	196	99	50.51%	
>or=G4	254	137	53.94%	
BOOKING STATUS				
Booked	197	72	36.55%	p<0.05
Unbooked	803	429	53.42%	
LITERACY STATUS				
Illiterate	550	412	74.90%	p<0.05
literate	450	89	19.78%	
SOCIO-ECONOMIC STATUS				
Upper I	181	22	4.30%	p<0.05
Upper middle II	230	21	4.10%	
Lower middle III	435	361	72.06%	
Upper lower IV	129	88	17.50%	
Lower V	25	9	1.80%	
DIET				
Non-vegetarian	300	12	2.4%	p<0.05
vegetarian	700	489	69.86%	
RELIGION				
Christian	12	0	0%	p<0.05
Hindu	313	58	18.53%	
Muslim	655	443	67.30%	
sikh	20	0	0%	

Table II-showing sensitivity, specificity, positive predictive value and negative predictive value of serum ferritin and TIBC

Investigation	sensitivity	specificity	Positive predictive value	Negative predictive value
S.Ferritin(0-30)	74.55	71.04	84.06%	57.67%
TIBC(>400)	66.96	59.76	77.32%	46.89%

DISCUSSION

Iron deficiency anaemia (IDA) is an important public health problem for pregnant women living in developing countries, affecting 2/3rd of them and contributes to maternal morbidity and mortality and to low birth weight.[6] The prevalence of anaemia in this study was 67.2%. Findings of other studies too showed a high prevalence like that of Rauf-ur-rashid Kaul[7] (91%), Vijaynath[8] (88.64%), Reeta bora[9](89.6%), Nadeem ahmed[10](74.8%). With such high prevalence, it is worth mentioning that strategies being used to prevent and treat anaemia have not met much success. Therefore an awareness amongst the female population of the country regarding the cause of anaemia, its prevention, should be discussed. Our study had majority of the subjects with mild and moderate anaemia. Only few studies such as Rauf-ur-Rashid Kaul et al,[7] Reeta Bora et al[9] showed 22.8%, 8.3% subjects with severe anaemia. The index study had a higher percentage i.e. 14.29% subjects with severe anaemia, whereas Cyril.C.Dim et al[11] had none of the subjects with severe anaemia. These differences could be explained based on the regional variation where studies were conducted, difference in

literacy status, food taboos, cultural and social practices. On the basis of serum ferritin levels, 74.55% were found to have IDA and 25.45% were found to have non-iron deficiency anaemia. Sikosana P L et al,[12] in their study found that 33% of pregnant women suffered from IDA. As the scenario here in Western Uttar Pradesh is more inclined towards accessing antenatal care late in pregnancy, there is a high prevalence of IDA. Moreover as the prevalence of mild and moderate anaemia was more in the present study, less subjects were symptomatic and thus that may have been the reason for not accessing timely antenatal care. Adolescents were found to have maximum prevalence of IDA, 76.92% in the index study. A higher prevalence of IDA in our study in the teenage pregnant population definitely indicates that a woman enters her pregnancy in an already iron depleted state. This, thus depicts that anaemia has its roots in the childhood, it tends to worsen during adolescent period and is then aggravated during pregnancy. A timely diagnosis and intervention may prevent this cascade. Out of the unbooked antenatal women 53.42% had IDA. There was a positive association seen between booking status of antenatal women and IDA (p<0.05) similar to study of Razia Mustafa Abbasi et al[13]. A timely diagnosis of anaemia during booking provides the clinician an opportunity to intervene and prevent complications. Early booking of antenatal women would help us to prevent it, or rectify it. The present study showed that 74.9% of illiterate women and 19.78% literate women had IDA. A significant association between IDA and literacy status was seen (p<0.05) similar to that conducted by Judith A. Noronha et al,[14] Priyanka Sharma et al.[15] On the contrary Kendre V.V[16] in his study did not find any significant association between anaemia and literacy. Educating the girl child is essential for a change. Education would help them take their independent decisions regarding cultural practices, and food taboos prevalent in the society. 72.06% anaemic antenatal women belonged to lower middle class. A positive association was seen between IDA and socioeconomic status (p<0.05) similar to studies of Judith A Noronha et al[14] and Nadeem Ahmed et al.[10] The index study showed that majority of iron deficient women belonged to lower middle class, followed by upper lower class, whereas in studies discussed above all of them show that majority of anaemic women belong to lower class. A difference in our study, may be explained by the fact that, ours was a semi private institute which catered all classes of population. Secondly, socioeconomic status in the present study was calculated by Modified Kuppuswamy classification,[3] whereas in the studies stated above, different classification have been used by authors for calculating the socioeconomic status of their study groups. There was a positive association seen between dietary habits and IDA (p<0.05). Abrehet Abriha et al[17] in their study found meal frequency, dietary diversity and meat consumption to be significantly associated with anaemia in pregnancy. Contrary to this, Nadeem Ahmed et al[10] did not find any association of diet with anaemia. Pregnancy is the most nutritionally demanding period in a woman's life. Balanced and adequate diet during pregnancy needs to be emphasised on to prevent anaemia in pregnancy. Pregnancy is one period when every woman seeks advise and this gives opportunity to provide nutritional education to every antenatal women. They should be motivated to have iron and folic acid tablets provided free of cost by the government. Antenatal belonging to Muslim religion formed majority in the present study followed by hindu. Women belonging to Christianity and Sikhism formed a minority. 67.3% Muslims and 18.53% Hindu antenatal women exhibited IDA. A significant association of IDA and various religion was seen (p<0.05). Nadeem Ahmed et al[10] had a highly significant association of anaemia with religion(p<0.001). Meerut is a Muslim predominant city and that is the reason that the number of Muslim antenatal women visiting the hospital was double.Thus a study with a much larger population would be required to remove this bias. Consumption of non-vegetarian food rich in iron is more frequent amongst Muslims as compared to other faiths but in this study most of the Muslim women are vegetarian according to the criteria used. 60.7% of antenatal subjects had normocytic normochromic picture followed by 31.2% who had microcytic hypochromic type of blood picture in the present study.V P Gautam et al[18] found normocytic normochromic and microcytic hypochromic type of blood picture

to be the commonest. The present study concluded that serum ferritin is a sensitive indicator to predict IDA. This finding is similar with the studies by N.R. Van den Broek et al [19] who found serum ferritin as the single best indicator of storage iron with a cut off point of 30μg/l. Ferritin can be detected in serum and correlates well with body iron stores. Considering the high sensitivity of serum ferritin in index study and a high prevalence of IDA in a country like ours, utilizing ferritin levels for diagnosing IDA would result in supplementing all who appear deficient.

CONCLUSION

As prevalence of IDA was found to be high and that too in the younger age group antenatal women, this pushes us further to impart correct dietary knowledge , timely interventions, increase general awareness amongst the young to eradicate this problem from its roots so that no woman enters pregnancy in an iron-depleted state.

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