RESEARCH ARTICLE

STUDY OF MULTIPLE CASUAL FACTORS ASSOCIATED WITH VARYING DEGREE OF ANAEMIA AMONG RURAL PREGNANT WOMEN

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ABSTRACT

Background: Anaemia is a global public health problem affecting more South East Asia in India the rate is even higher and moderate to severe is more among the pregnant women. Moderate to severe anaemia is important contributory factor in maternal death and leads to various maternal morbidities. Just knowing anaemia prevalence is not useful until associated with a picture of the various multiple causal factors in specific settings.

Aims & Objective: To find the prevalence of severity of anaemia and evaluate the multiple casual factors among recently pregnant women in this rural area.

Material and Methods: A cross sectional study was done in the OBGY OPD of tertiary care rural hospital. All the recently pregnant women diagnosed to be anaemic and residing in rural area with no other chronic infection or diseases. The pretested questionnaire was administered to them for personal details .BMI was calculated and peripheral smear, Stool examination, and electrophoresis done in cases as per clinical findings.

Results: Prevalence of anaemia was 86 %. Overall 44.3 %, 50.3% and 5.3 % had mild, moderate and severe anaemia. Severe anaemia was more prevalent in women less than 18 yrs (12%), illiterate (8.8%), lower class (7.1% & 8.3%), spacing less than one yr (18.2%), and inadequate diet (6.2 %). Most were suffering due to iron deficiency (77%).

Conclusion: High prevalence of anaemia early in pregnancy depicts the pre- pregnant status. Adolescent need to be given health education and develop mechanism to improve compliance of iron tablets.

KEY-WORDS: Anaemia; Rural; Pregnant Women; Cause

Introduction

Anaemia is a global public health problem affecting both developing and developed countries, more prevalent in pregnant women and young children. Globally, as per WHO report on prevalence of anaemia worldwide, 2005[1], 41.8% of pregnant women are anaemic. The African region with 57.1% has maximum percentage of anaemic pregnant women followed by Southeast Asia at 48.2%. Nearly three fourth (75%) of women in India are anaemic, with the prevalence of moderate to severe anaemia being highest (50%) among pregnant women.[2] It is estimated that nutritional anaemia contributes to about 24% of maternal deaths every year and is one of the important causes of low birth weight. Most troubling is the fact that the NFHS-3 reveals that the incidence of anaemia among women in India has worsened over the past ten years.[3]

Anaemia is a contributory factor in maternal deaths caused by haemorrhage, septicaemia and eclampsia, and when severe can even cause cardiac arrest.[4] Anaemic women are increasingly susceptible to communicable diseases such as tuberculosis (TB) and malaria[5], which are associated with adverse outcomes during and after pregnancy. Anaemic women face the further risk of falling into a cycle of multiple pregnancies in their efforts to have children that survive, since nutritional deficiencies during pregnancy notably reduce the chances of infant survival.[6]

According to WHO, in ranking iron deficiency anaemia is third leading cause of disability adjusted life year lost for female aged 15-44 years.[7] The main risk factors for IDA include a low intake of iron, poor absorption of iron from diets high in phytate or phenolic compounds, and period of life when iron requirements are especially high (i.e. growth & pregnancy). Among

the other causes of anaemia, heavy blood loss because of menstruation or parasite infections like hookworms, ascaris and schistosomiasis can lower blood haemoglobin (Hb) concentrations. Acute and chronic infections, including malaria, cancer, tuberculosis, and HIV can lower blood Hb concentrations. The presence of other micro-nutrient deficiencies, including vitamins A and B12, folate, riboflavin, and copper can increase the risk of anaemia. Furthermore, the impact of haemoglobinopathies on anaemia prevalence needs to be considered within some populations. In addition, there are behavioural risk factors that dietary pattern, and health seeking behaviour. In India, many dietary restrictions are laid down on a woman that adversely affects her health. Social risk factors include socio-economic status and literacy level of mother.

However knowing anaemia prevalence by them is only useful if they are associated with a picture of the various causal factors which are multiple and complex that contribute to the development of anaemia in specific settings. So there was need to collect the information about them in this rural part of India to provide the basis for developing the best interventions for anaemia control.

Aims & Objectives: (1) to find the prevalence of anaemia and its severity among recently pregnant women in this rural area; (2) to evaluate the multiple casual factors associated with varying degree of anaemia.

Materials and Methods

All the pregnant women coming to OPD of obstetrics and gynaecology for first time for confirmation of pregnancy during period of six months from Jan – June 2011, were screened for anaemia by Sahli's method. All those found to be anaemic were included in study and verbal consent was obtained. Those residing in urban area and having chronic medical conditions like heart disease, multiple pregnancies were excluded from study. The pretested questionnaire was administered to them, which included socio demographic profile, diet, occupation, parity, and spacing. Their weight (Kilograms) and height (Centimetres) were recorded to calculate the Basal metabolic rate. Anaemia was classified according to WHO criteria.[8] Haemoglobin concentration of less than 11.0 gm/dl was considered as an indication of anaemia. Haemoglobin concentration of 10.0-10.9 gm/dl, 7.0-10.0 gm/dl and less than 7.0 gm/dl were considered to indicate mild, moderate and severe anaemia respectively. Peripheral blood smear (PBS) was examined and further necessary investigations were carried out to find the cause of anaemia. Diet was calculated by 24-hour recall method. Recommended value was calculated on individual basis according NIN dietary guideline.[9] Social status was classified according to modified Prasad classification for year 2011.[10]

Results

It is clearly seen in Table 1, 50 % of participants less than 18 years of age had moderate anaemia while 12.5 % had severe anaemia. While in higher age group the prevalence of moderate anaemia was almost same to previous group (i.e. 48%, 52% respectively), marked difference in severe anaemia was seen. Lower the education, severe is the degree of anaemia as shown in table 1. Only 3.4 % of secondary educated were having severe anaemia as compared to 8.8 % of illiterate. Also 52.6 % and 54 % of illiterate and primary educated had moderate anaemia significantly more than secondary educated and above. Anaemia study participants belonging to class I, II and III had significantly lower severity of anaemia compared to class IV and V. 7.1 and 8.3 % of participants belonging to class IV and V had severe anaemia as against 5.3 % and 3.4 % of class II and III respectively. 60.7 % of working women were found to have moderate anaemia compared to 44.7 % of housewife, difference was also found to be significant.

Prevalence of moderate and severe grade of anaemia was higher in multiparous women (52% and 5.8%) compared to primigravida (48.3% and 4.8%) but difference was not significant. Of that multiparous less than 1 year of spacing, 18% had severe anaemia and 51.5% moderate anaemia. More is the spacing, lesser the severity of anaemia was found as in (Table 2). This difference was significant when multiparous study participants with less than one year and more than one year was compared.

Table-1: Socio–Demographic Profile of Anaemic Study Participants

Socio–Demographic Parameters		Mild N=141 (44.3%)	Moderate N=160 (50.3%)	Severe N=17 (5.3%)	Total N=318 (100%)	Significance
Age	<18 yrs	6 (37.5%)	8 (50%)	2 (12.5%)	16 (100%)	Not done (cell has value < 5%)
	18-25 yrs	71 (45.8%)	75 (48.4%)	9 (5.8%)	155 (100%)	
	>25 yrs	64 (43.5%)	77 (52.4 %)	6 (4.1%)	147 (100%)	
Education	illiterate	22 (38.6%)	30 (52.6%)	5 (8.8%)	57 (100%)	F- 7.756; Df – 2; p = 0.02
	Primary	76 (40.6%)	101 (54 %)	10 (5.3%)	187 (100%)	
	Secondary	32 (55.2%)	24 (41.3%)	02 (3.4 %)	58 (100%)	
	Higher Secondary	11 (68.7%)	05 (31.2%)	00 (0 %)	16 (100%)	
Social Status	Class I	04 (66.7%)	02 (33.3%)	00 (0%)	06 (100%)	χ^2-7.08; df -2 p = 0.02
	Class II	09 (52.9%)	07 (41.2%)	01 (5.9%)	17 (100%)	
	Class III	79 (50%)	73 (46.2%)	06 (3.8%)	158 (100%)	
	Class IV	41 (36.3%)	64 (56.6 %)	08 (7.1 %)	113 (100%)	
	Class V	08 (33.3%)	14 (58.3 %)	02 (8.3%)	24 (100%)	
Occupation	House wife	102 (49.5%)	92 (44.7%)	12 (5.8%)	206 (100%)	χ^2-7.5; df -2 p = 0.02
	Working	39 (34.8%)	68 (60.7%)	5 (4.5 %)	112 (100%)	

Table-2: Parity and Spacing between Two Children in Study Participants

Parity and Spacing		Mild N=141 (44.3%)	Moderate N=160 (50.3%)	Severe N=17 (5.3%)	Total N=318 (100%)	Significance
Parity	Multi	72 (42.1%)	89 (52%)	10 (5.8%)	171 (100%)	p = NS
	Primi	69 (46.9%)	71 (48.3%)	7 (4.8%)	147 (100%)	
Spacing of two children (only multipara)	<1 yr	10 (30.3%)	17 (51.5%)	6 (18.2%)	33 (100%)	F-11.9 df -2 p-0.002
	1-2 yrs	22 (40%)	31 (56.3%)	2 (3.6%)	55 (100%)	
	2-3 yrs	19 (43%)	24 (54.5%)	1 (2.3%)	44 (100%)	
	> 3 yrs	21 (53.8%)	17 (43.6%)	1 (2.6%)	39 (100%)	

Table-3: Dietary Pattern and Nutritional Status of Study Participants

Dietary Pattern and Nutritional Status	N=141 (44.3%)	Moderate N=160 (50.3%)	Severe N=17 (5.3%)	Total N=318 (100%)	Significance
Vegetarian	92 (43.4%)	110 (51.9%)	10 (4.7%)	212 (100%)	χ^2-0.91; df -2 p- NS
Non- Vegetarian	49 (46.2%)	50 (47.2%)	7 (6.6%)	106 (100%)	
< RDA	81 (38.7%)	115 (55%)	13 (6.2%)	209 (100%)	F-7.847; Df-2 p-0.02
≥ RDA	60 (55.0%)	45 (41.3%)	4 (3.7%)	109 (100%)	
< 18 kg/m^2	33 (34.0%)	56 (57.7%)	8 (8.2%)	97 (100%)	χ^2-6.831; df -2 p-0.03
18-25 kg/m^2	75 (43.6%)	90 (52.3%)	9 (5.2%)	172 (100%)	
> 25 kg/m^2	33 (67.3%)	16 (32.6%)	0 (0%)	49 (100%)	

No significant difference of degree of anaemia was found between vegetarian and non – vegetarian type of diet. Table 3 also documents increase severity of anaemia with lesser calorie intake than recommended as shown in above table 55% and 6.2% with lesser calorie intake had moderate to severe anaemia compared to 41% and 3.7% with recommended dietary intake. Participants with BMI < 18 kg/m^2 had significantly more severe grade of anaemia (57.7%, 8.2% with moderate and severe anaemia respectively) than BMI more than 18 kg/m^2.

244 cases (77%) had picture of microcytic anaemia (iron deficiency) on PBS , 16 (5%) cases with dimorphic picture (iron and folate deficiency), followed by megalobalstic (folate or vitamin B12 deficiency) and Pl. Vivax each in 14 cases(4%). 13 cases (4%) had worm imfestation as found on stool examination. 9 cases (2.8%), 6 cases (2%) and 2 cases (0.6%) had history of sickle cell, mennorhagia and thalessemia respectively as depicted in Figure 1.

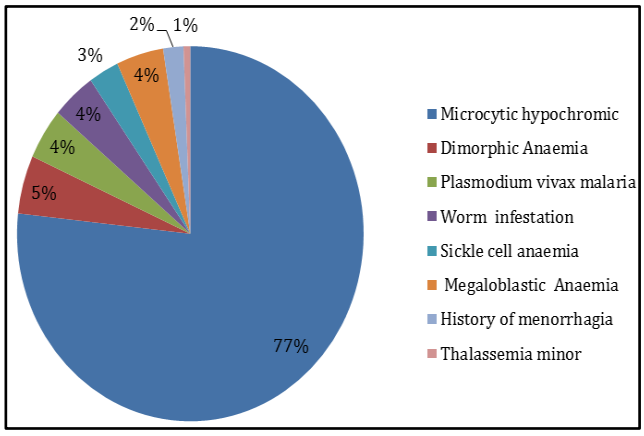

Figure-1: Distribution as per Suspected Causes of anaemia according to picture in PBS, history and stool examination in study participants

Discussion

Anaemia is major public health problem and has intergenerational self-perpetuating vicious cycle of anaemia in Indian population.. Investigations carried out in villages near Hyderabad indicated that the prevalence of morbidity due to infections was doubled in women with haemoglobin levels below 8.0 g/dl.[11] Most of studies have proved the fact that fall in maternal haemoglobin below 11 gm % significantly increases the perinatal mortality.[11,12]

The prevalence was found to be 86.64% which reflect the prevalence of anaemia in reproductive age group itself as only the newly registered mothers with mean gestational age of 9.46 ± 2.3 weeks , hemodilution effect of pregnancy had not occurred which would again worsen the anaemia further. The prevalence found is comparatively higher than rural Tamil Nadu[13] but similar high prevalence was found in other studies like G.S Toteja et al (84.9%)[14], VP Gautam et al (96.5%)[15]. NFHS 3 reported lower prevalence (58%) as it has representative sample of rural and urban India.[3] Not surprisingly, it is higher than in other regions of South East Asia.[1] Mean haemoglobin level was 9.34 ± 1.81 gm/dl (6- 12.3 gm/dl) similar to that reported by Mengi.[16] In addition, the distribution of severity of anaemia was similar to other studies.[13,15] The cause of concern was more than half the anaemic were having moderate degree of anaemia in spite of existing nutritional programmes. Early marriage and adolescent pregnancy aggravates anaemia. The prevalence of severity of anaemia was more in those less than 18 years but the significance cannot be determine due to small sample of less than 18 years age group. Higher education and economic status is inversely related to degree of anaemia. As the study participants are from rural area, few participants were highly educated and belonged to social status I or II. For this reason, we had to merge the groups for applying significance test. The relation is also evident from other studies like for age[15,17], education[15,17,18] and social status[15,17].

Severity of anaemia was found to be more significantly associated with the working women than housewife similar to that reported by Viveki et al.[17] In present study, most of working women were daily wage labourers belonging to lower class may have confounded the result. No relation was found with type of diet and degree of anaemia, which contradicts the earlier study.[17] But fact is that even if mixed diet the frequency and quantity of animal food consumed is less than 1 per week. In cereal and pulse based Indian diet linear correlation is found between the calorie and iron intake.[11] In present study, the severity of anaemia is significantly more in lower calorie intake and lower body mass index. Anaemia is one of the manifestations of overall maternal dietary inadequacy and consequent under nutrition.

Very few mothers in study had parity of more than 2 so no significant difference could be establish as reported by other studies.[16-18] Spacing less than one year was significantly associate with degree of anaemia as evident in present study and earlier studies.[15,17]

In present study, 77.59 % had microcytic hypochromic picture depicting iron deficiency followed by dimorphic (5%) (iron and folic acid deficiency), approximately 4 % prevalence of megaloblastic (vit B12 or folic acid deficiency), plasmodium vivax and worm infestation. It is consistent with other studies.[15,19] Therefore an attempt should be made to identify all pregnant women, mandatory monthly screening for anaemia and monitor them to consume at least 100 tablets each containing 100 mg of iron and 500 µg of folic acid.

Limitations of the Study

Haemoglobin and peripheral blood smear was used for diagnosing anaemia. Stool was examined in some suspected cases. Other laboratory investigations like total iron binding capacity, serum ferritin, and serum folic acid were not done as they are expensive. So, exact cause of anaemia cannot be determined.

Conclusion

High prevalence of anaemia early in pregnancy depicts the pre- pregnant status. Thus, it calls for the strategic shift in programme focussing only on pregnant women to include children and

adolescent girls too. Adolescent need to be educated regarding the importance of literacy, delayed age of marriage, spacing between children, small family norm and balance diet in preventing the anaemia. Women empowerment is to enforce to improve the status of women in society. There is need of Operational research to effectively implement the nutritional supplementation programme, motivate the adolescent and pregnant women to monitor the haemoglobin level and improve the compliance of iron and folic acid tablets.

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