ORIGINAL ARTICLE

FREQUENCY, DISTRIBUTION AND DETERMINANTS OF IRON DEFICIENCY ANEMIA AMONG THIRD TRIMESTER INDOOR PREGNANT WOMEN

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ABSTRACT

Background: Iron deficiency anemia is a common health problem during pregnancy in developing countries. The objectives of this study were to determine the frequency, distribution & determinants of iron deficiency anemia among third trimester pregnant women in our population.

Materials & Methods: This cross-sectional study was conducted in Department of Gynecology and Obstetrics, Hayatabad Medical Complex, Peshawar, Pakistan from October 2015 to March 2016. Sample size was 360 calculated through an online calculator. The inclusion criteria was third trimester pregnant women. Demographic variables were age in years, age groups and social class. Research variables were Hb in mg/dL, presence of iron deficiency anemia, grades of iron deficiency anemia (mild/ moderate/ severe) and iron intake (yes/no). Numeric variables such as age in years and Hb were analyzed as mean and SD, whereas rest of the variables being categorical as count and percentages. Chi-square tests of association was computed.

Result: The mean age of the sample was 29.31 ±6.99 and CI of 27.92-30.70. The mean hemoglobin level was 10.33 ±1.7 and 95% CI of 9.99-10.67. The overall frequency of iron deficiency anemia was found out to be 52%, in which 25% were mild, 22% moderate and 5% were severely anemic. Women with middle class had higher frequency of 145 cases. Association of iron deficiency anemia with social class ($\chi2=7.95$, $p < 0.05$) and with iron intake was found ($\chi2=5.29$, $p < 0.05$).

Conclusion: The study established high frequency of iron deficiency anemia among third trimester indoor pregnant females. Presence of anemia was associated with social class and iron intake.

KEY WORDS: Iron deficiency anemia; Pregnancy; Hemoglobin; Third trimester; Knowledge.

INTRODUCTION

Iron deficiency anemia is the most prevalent nutritional deficiency and a significant public health issue affecting fertile age women world wide. This pregnancy related anemia prevalence alters because of diversity in socioeconomic conditions, lifestyles, and health-seeking behaviors across distinct cultures.[1]

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Anemia is a condition having decreased number of red blood cells causing reduced oxygen-carrying capacity. Anemia is prevalent in females during pregnancy as increase amount of blood production is needed to support the fetal growth. Anemia in pregnancy results due to reduction of red blood cells further leading to inadequate oxygen delivery to the fetus. Worldwide the most common cause of anemia is iron deficiency, although other conditions, such as vitamin B12 and folate deficiency, parasitic infections, chronic inflammation and inherited disorders can all cause it.[2]

In developing countries like Pakistan the major cause of anemia is poor nutrition, micronutrient deficiencies, malaria, closely spaced conceptions, multi parity and heavy menstrual bleeding. Iron deficiency anemia in pregnancy is also associated with weakness, fatigue and drowsiness. In severe cases if not treated, it leads to serious complications like pre

term delivery, low birth weight, increases vulnerability to infections and ultimately death.[3]

Globally the highest prevalence is among fertile age women of South East Asia with 48.7%. The prevalence of iron deficiency anemia in pregnant women is 51% in developing while 14% in developed countries. According to World Health Organization approximately 42% of women worldwide suffer from iron deficiency anemia during pregnancy. One fifth of maternal deaths globally are due to iron deficiency anemia in pregnancy. In Pakistan the prevalence of iron deficiency anemia among women of reproductive age is 51%. Iron deficiency anemia is the most prevalent nutritional deficiency in Pakistan.[4]

A Multan based study in Pakistan showed a correlation between the prevalence of iron deficiency anemia and the dietary habits of the mothers. Other risk factors responsible for the development of iron deficiency anemia include illiteracy, lack of supplements, multi parity and intrauterine growth retardation.[5] In developing countries, pregnant women start pregnancy with already depleted body stores of iron and other vitamins. This is mainly due to poor nutritional intake, repeated infections, menstrual blood loss and frequent pregnancies. It is also associated with socioeconomic conditions, lifestyles, and health-seeking behaviors across different cultures.[6,7]

Nutritional deficiencies are common in Pakistan with iron deficiency anemia being the commonest and most prevalent due to unawareness and lower socioeconomic status, which can be even more profound in pregnancy.[8] Severe iron deficiency anemia leads to maternal and fetal morbidity and mortality. Knowledge of socio-demographic factors associated with iron deficiency anemia will help to formulate strategies to cope this important public health problem in pregnancy. Identifying the frequency of iron deficiency anemia along with its causes in high-risk vulnerable groups like pregnant women is a dire need of the day specially in developing countries including Pakistan, where the socio demographic conditions pose stern challenges to women.[9]

The operational definitions were used as per WHO criteria which states iron deficiency anemia in pregnancy with hemoglobin levels below 11g/dL. WHO categorizes hemoglobin levels of mild type with (10-10.9g/dl), (07-9.9g/dl) as moderate and the severe category of iron deficiency anemia depicted as (<7g/dl). Iron uptake means daily oral 30-60 mg elemental iron taken by pregnant women. The objectives of this study were to determine the frequency, distribution & determinants of iron deficiency anemia among third trimester pregnant women in our population.

MATERIALS AND METHODS

This cross-sectional study was conducted in the De-partment of Gynecology and Obstetrics, Hayatabad Medical Complex, Peshawar, Pakistan from October 2015 to March 2016. Sample size was calculated as 360 using consecutive sampling technique, through an online Rao soft sample size calculator with margin of error of 4.30%, confidence level of 90%, estimated population of 20,000 and response distribution of 50%.[13] The inclusion criteria for the study was third trimester indoor pregnant women. Patients with bleeding disorders and those reluctant to give consent were excluded from the study.

Data on hemoglobin levels was collected from the hospital record on performa. Demographic variables were age in years, age groups (<29, 30-39, ≥40) and social class (upper class/ middle class/ lower class). Research variables were Hb in mg/dL, presence of iron deficiency anemia (yes/ no), grades of iron deficiency anemia (mild/ moderate/ severe) and iron intake (yes/ no). Numeric variables such as age in years and Hb were analyzed as mean and SD, whereas rest of the variables being categorical were analyzed as count and percentages. Chi-square tests of association was computed for association between the presence of iron deficiency anemia and age groups & social class. Statistical analyses were performed in SPSS version 20.0.

RESULTS

The mean age of the sample of 360 was 29.31 ±6.99 with 95% CI of 27.92-30.70. The mean Hemoglobin level was found to be 10.33 ±1.7 with 95% CI of 9.99-10.67. The overall frequency of iron deficiency anemia was found out to be 187 (52%), in which 90 (25%) were mild, 79 (22%) were moderate and 18 (5%) were severely anemic. (Table 1)

Table 1: Grades of iron deficiency anemia in sample and population among third trimester indoor pregnant women in Peshawar, Pakistan (n=360).

Grades of iron deficiency anemia	Frequency	% age	95% CI for proportion
Mild	90	25	20.5-29.4
Moderate	79	22	17.7-26.2
Severe	18	5	2.7-7.2
Total	187	52	46.8-57.1
No anemia	173	48	42.84-53.16
Grand total	360	100	-

Iron deficiency anemia was recorded with higher frequency among age group <29. (Table- 2)

Table 2: Distribution of iron deficiency anemia

by age groups in sample and population among third trimester indoor pregnant women in Peshawar, Pakistan (n=360).

Age Categories	Anemia	Percentage	95% CI for proportion
<29	97	27.0	22.4-31.6
30-39	65	18.0	14.0-22.0
≥40	25	7.0	2.3-11.7
Total	187	52.0	--

The results of association between iron deficiency anemia and social class are given in table 3.

Table- 3: Association of iron deficiency anemia among third trimester indoor pregnant women with social class in Peshawar, Pakistan (n=360).

Social Class	Presence of anaemia		P value
	Yes	No	
Upper class	43	18	
Middle class	0	18	< 0.05
Lower class	144	137	
Total	187	173	

Association of iron deficiency anemia with iron intake during pregnancy was also found. (Table 4)

Table- 4: Association of iron deficiency anemia among third trimester indoor pregnant women with iron intake in Peshawar, Pakistan (n=360).

Iron intake	Presence of anaemia		Total	P Value
	Yes	No		
Yes	79	36	115	
No	108	137	245	<0.05
Total	187	173	360	

DISCUSSION

Global prevalence of iron deficiency anemia as per WHO (2011) report among pregnant women of 15-49 years in South Asia is 52 %.[2] In the present study the estimated prevalence of iron deficiency anemia in third trimester pregnant women of reproductive age showed the same high percentage as 52 %. One possible explanation could be that majority of the pregnant women in their third trimester tend to have their hemoglobin concentration at its lowest levels. These results are also in correlation with the findings of a study conducted in 2013 at Korangi- Karachi with 54% of pregnant women as anemic.[8]

According to a report of national health survey of Paki-

stan, 50-60% of expectant mothers are affected by iron deficiency anemia. In this study anemic women had low iron intake during pregnancy suggesting iron and vitamins supplementation together with other appropriate nutritional counseling during pregnancy may be the best intervention to reduce the prevalence of iron deficiency anemia.[9]

Proper management of pregnancy, early identification of risk factors and appropriate treatment for the hazards and complications are mandatory during ante natal examinations. Unfortunately, women of reproductive age group rarely perceive this period as a threat and do not seek health care which worsens the condition further [10]. This study conducted at Ghana investigated parity, gestational age, antenatal visits of the women with level of education and found significant results except ante natal visit. Whereas present study investigated only age, social status and iron intake among the study participants without antenatal visit estimation.

A study conducted in Capital Developing Authority Hospital, Islamabad [11] included history of abortion, pica (soil eating habit) and contraceptive use, whereas these components were lacking from this present study. Bashir Bhatti's study had a huge percentage of iron deficiency anemia as 57 with multiparity as the risk factor and frequency of iron deficiency anemia maximum in age groups 15- 30 years of age, which is in accordance with the present study findings of 54% iron deficiency anemia in pregnant females, women with more than 3 children being the most affectees and vulnerable age groups as 20- 39 years. These statistics of iron deficiency anemia in pregnant women in both studies pose to be encouraging findings for the government and policy makers as reducing the iron deficiency anemia in nearly half of the pregnant women will have big impact on the overall prevalence of iron deficiency anemia.

Iron deficiency anemia in non pregnant reproductive age group was found to be 18.1 % with significant association of obesity with iron deficiency anemia in the study using secondary data from National survey findings in collaboration with Aga Khan University [12], which is contradictory to present study results as only pregnant women participated.

A few of the important mentionable limitations of the present study should be kept in mind. First the cross sectional nature of the study means the temporality between iron deficiency anemia and the associated factors cannot be established. Secondly, the hemoglobin levels of pregnant females were not determined by researchers themselves but it was taken as secondary data from the reports of hospital based laboratory that is likely to introduce bias in the study. Last but not the least the limited budget also did not allow the researchers to determine micronutrient deficiencies. So anemia here could not be related to any deficiency, however, iron deficiency is the dominant cause of anemia throughout the world.

CONCLUSION

The study established high frequency of iron deficiency anemia among third trimester indoor pregnant females. Presence of anemia was associated with social class and iron intake. There is need for nutritional education and dietary counseling in antenatal clinics to cope this major public health problem.

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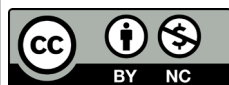
AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

Conception or Design: AR, FRM

Acquisition, Analysis or Interpretation of Data: AR, FRM, MAJ, MZ, ZUAS,DZ

Manuscript Writing & Approval: AR, FRM, MAJ, SS, BK

All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.