Original Article

Association of Iron Deficiency Anemia in Mothers with Low Ferritin Level of New Born

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Abstract

Objective: To determine the association of maternal iron deficiency anemia with lower ferritin level of new born among pregnant women at tertiary care Hospital.

Methodology: The descriptive case series study was conducted at Obstetrics and Gynaecology Unit-III of Liaquat University Medical Hospital Hyderabad from June 2019 to November 2019. A total of 184 antenatal mothers with hemoglobin less than or equal to <10.5gm% were selected for this research. All detailed history was inquired. Venous blood samples were obtained from pregnant women during their labor and from umbilical cord immediately after clamping for complete blood count (CBC) to check hemoglobin levels and serum ferritin levels of mother and new born. The proforma attached was filled accordingly.

Results: The average age of the mother was 27.56±2.12 years. The incidence of low ferritin level of news born among pregnant women with iron deficiency anemia was found in 58.7%. There was found a significant impact of maternal iron deficiency anemia on ferritin level of news born (p-0.001)

Conclusion: Maternal iron deficiency anemia was observed to be the associate with lower ferritin level of new born. Maternal anaemia is a serious health problem in which the lives of pregnant women and their children are endangered. It is therefore highly recommended that more effective guidelines regarding educating her child, spreading effective awareness regarding balanced diet, regular antenatal checkups, regular intake of iron-folic acid tab, should start at grass-root levels get safe motherhood.

Key Words: Anemia, Iron deficiency anemia, Low ferritin level. Maternal anemia affects.

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Introduction

Around two billion people around the world suffer from iron deficiency and iron-deficiency anaemia (IDA).[1] Since a long time, anaemia has piqued people's interest all around the world. In undeveloped and underdeveloped nations, it is a very prevalent hematological condition, especially among susceptible groups as children, adolescents, and females during reproductive age.[2] Women during pregnancy in underdeveloped nations often start their pregnancy with depleted or low bodily iron levels, putting them at risk of iron deficiency anaemia (IDA).[3] Anemia is frequently severe, and typically occurs in conjunction with maternal malnutrition.[3,4] The conflicting requirements of mother and foetus in these settings may disrupt the normal maternal-fetal iron homeostasis.[4-6] Premature birth, intrauterine growth retardation, and newborn and postnatal death are all possible outcomes for both the mother and foetus.[4] Given that mothers iron is the primary supply of iron for infants until they reach the age of six months, it is reasonable to examine the extent to which maternal IDA affects the foetus during and after its time in the womb.[4,8] Ferritin-level data for certain gestational ages are only available in much research. A median ferritin level of 45g/l at 14–16 weeks

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gestation and 200g/l at 39 weeks of gestation has been recorded.[9,10] Average plasma ferritin improved from 17.7g/l at 18–20 gestational weeks to 56.8g/l at 32–35 gestational weeks in fetuses who underwent percutaneous umbilical blood sampling but were not influenced by any pathologic maternal foetal circumstances.[11] A similar trend has been observed in preterm appropriate-for-gestational-age newborns with birth weights ranging from 600 to 2,000 g. Jansson et al. found that serum ferritin level was considerably lower in pre-term newborns 34-week gestation (range 26–270g/l) compared to normal infants 34-week gestation (range 20–600g/l) at 24–48 hours of age.[10] This study determined the prevalence of ferritin level in newborns of mothers with anemia. Maternal anaemia affects the hematological state of the newborn, which may not be noticeable at birth but becomes obvious after 2–3 months. This emphasizes the need to prevent maternal anaemia, not just for moms but also for their children's health.

Methodology

This descriptive case series study was conducted at the Obstetrics and Gynaecology department of Liaquat University Medical Hospital Hyderabad, from June 2019 to November 2019. The sample calculation was done using the raosoft software for “Sample size calculation” by using the proportion of (61.5% frequency of iron deficient anemic in Newborns) with 95% confidential interval and 7% margin of error, the sample size stands to be (n=184). All antenatal mothers aged 20 to 30 years of primigravida and multigravida with hemoglobin less than or equal to ≤10.5gm% in ward at term, antenatal mothers who are willing to participate were included in the study. Mothers with PIH, diabetes, antepartum hemorrhage, with other chronic diseases like HIV, cardiac diseases, renal diseases, multiple pregnancy, mothers who received blood transfusion and non-iron deficiency anemia were excluded. Venous blood samples were obtained from pregnant women during their labor (or before caesarean section as applicable) and from umbilical cord immediately after clamping for complete blood count (CBC) to check hemoglobin levels and serum ferritin levels of mother and new born. The proforma attached was filled accordingly. After the collection of data, the analyses were conducted using Statistical Package for Social Science (SPSS) software, Version 21.

Results

A total of 184 antenatal mothers with hemoglobin less than or equal to ≤10.5gm% were selected and average age of the mother was 27.56±2.12 years. Out of 184 women with iron deficiency anemia, mild deficiency was observed in 31.52%, moderate was 61.41% and severe iron deficiency anemia was observed in 7.07% and parity educational status and socioeconomic status as presented in table I.

Table I: Descriptive statistics of basic data and maternal iron deficiency anemia (n=184)

Variables		Statistics
Age		27.56+2.12 years
Parity	Nulliparous	86(46.74%)
	Primiparous	74(40.22%)
	Multiparous	24(13.04%)
Educational status	Illiterate	50(27.17%)
	Literate	107(58.15%)
	Educated	27(14.67%)
Socioeconomic status	Poor	13(7.07%)
	Middle	102(55.43%)
	Upper	69(37.50%)
Maternal anemia	Mild	58(31.52%)
	Moderate	113(61.41%)
	Severe	13(7.07%)

The frequency of low ferritin level of news born among pregnant women with iron deficiency anemia was found in 58.7%. Out of 108 low ferritin levels of new born cases, mild was observed in 48.15% (52/108), moderate 45.37% (49/108) and severe cases was observed in 6.48% (7/108). Table II

Table II: Frequency of low ferritin level of neonates and its severity (n=184)

Variables		Statistics
Low Ferritin Level	Yes	108(58.70%)
	No	76(41.30%)
Educational status	Illiterate	50(27.17%)
	Literate	107(58.15%)
	Educated	27(14.67%)
Severity Low Ferritin Level n=108	Mild	52(48.15%)
	Moderate	49(45.37%)
	Severe	07(06.48%)

The frequency of low ferritin level of new born among pregnant women with iron deficiency anemia was significantly high below and equal to 25 years of age women as compare to 26–30 years of age women (p=0.003). It was also significantly high in women who had primigravida and nullipara. The frequency of low ferritin level of new born among pregnant women with iron deficiency anemia was also observed with respect

Table III: Low ferritin level of new born a by Maternal age, parity, educational status, SES and maternal Iron deficiency anemia (n=184)

Variables		Low Ferritin Level of new born		P-Value
		Yes	No	
Age groups	≤25	31(79.5%)	8(20.5%)	0.003
	26-30	77(53.1%)	68(46.9%)	
Parity	Nulli	79(91.9%)	7(8.1%)	0.0005
	Primi	22(29.7%)	52(70.3%)	
	Multi	7(29.2%)	17(70.8%)	
Educational status	Illiterate	24(48%)	26(52%)	0.040
	Literate	63(58.9%)	44(41.1%)	
	Educated	21(77.8%)	6(22.2%)	
Socioeconomic status	Poor	7(53.8%)	6(46.2%)	0.726
	Middle	58(56.9%)	44(43.1%)	
	Upper	43(62.3%)	26(37.7%)	
HemoglobinLevel of mother	Mild	37(63.8%)	21(36.2%)	0.244
	Moderate	66(58.4%)	47(41.6%)	
	Severe	5(38.5%)	8(61.5%)	

to education of mothers, socio economic status and hemoglobin level of mothers as shown in table III.

Discussion

Anemia is a topic that has piqued people's interest all across the world. Women during pregnancy in underdeveloped nations often start their pregnancy with depleted or low bodily iron levels, putting them at risk of iron deficiency anaemia (IDA). In this study, the average age of the mother was 27.56±2.12 years. Our results are similar to those found by Gerald Obai et al. in Uganda,[12] where pregnant women under the age of 20 years and under 25 years were among the highest among other age groups. Berhan EF et al[13] in Ethiopia found a proportion of 77. 5% of subjects under 25 years. The same observations were made by ShilpaA et al[14] and Shradha S et al[15] in India, where pregnant women predominated with the prevalence of anaemia at 45.7% and 58% in each respective study.

In this study, most of the females were literate and belonged to middle and upper classes, as shown. The study found that the lack of education was linked to a high prevalence of anaemia. This is similar to research conducted in Korangi Karachi and district Karak, which found a significant occurrence of anaemia in illiterate pregnant women (55.6 percent and 88.0 percent, respectively). [16,17] From the preceding data, it is clear that the lower a woman's educational level is, the greater her risk of anaemia during pregnancy. Women with iron deficiency anemia, mild deficiency was observed in 31.52%, moderate was 61.41% and severe iron deficiency anemia was observed in 7.07% in this study. In Qazi et al[17] study the prevalence of mild anemia was 52.5% moderate anemia followed by 27.5% of mild anemia and 19.9% severe anemia, respectively. In the study by Vanamala et al[18] reported that the commonest kind of anaemia was moderate, which was seen in 83 (58 percent) of the anaemic individuals, followed by mild (34.3%). A total of 11 (7.8%) of the anaemic patients had severe anaemia. In a study by Kefiyalew et al[19] demonstrated that most of the patients had moderate anemia, while 12.9% had severe anemia.

Low ferritin level of new born cases, was observed in 48.15%, moderate 45.37%, and severe cases in 6.48% in our study. Shams et al[20] reported that the Serum ferritin levels in the range of 12–30 ng/ml are found in 43.5% of people, indicating poor iron reserves. Only 11.7 percent of people had a normal S. Ferritin level (between 31 and 300 ng/ml).Jansson et al. found that serum ferritin level was considerably lower in pre-term newborns 34-week gestation (range 26–270g/l) compared to normal infants 34-week gestation (range 20–600g/l) at 24–48 hours of age.11 Consistently Terefe B et al[4] reported that the women were studied as iron deficient anaemic and nonanemic according to hemoglobin and serum ferritin levels, and babies of IDA mothers had significantly lower serum ferritin and hemoglobin concentrations (p-0.017). In this study, the frequency of low ferritin level of news born among pregnant women with iron deficiency anaemia was significantly high below and equal to 25 years. Most of the patients who were anemic were primigravida and nullipara. This agreed with the findings of Ahmed et al. who found that Primipara women were more prone to anaemia. This was in contrast to a study by Zama et al[21], which revealed that a higher percentage of multiparous women were anaemic. It has been reported that

nutritional deficiencies such as iron, folate, vitamins A, D, C, B12, and zinc as a result of inadequate dietary intake and poverty are risk factors for anaemia in pregnant women in Pakistan, while other contributing factors include medications that suppress hemopoiesis, intestinal helminth infection, malaria, and menstruation.When women in pregnancy who did not receive iron supplements throughout pregnancy were compared with those who did, the likelihood of having anaemia increased.[22] This could be related to iron deficiency developing during pregnancy because of the increased iron required to supply the mother's expanding blood volume as well as the foetus and placenta's rapid growth. The findings agree with research undertaken in India's Karnataka state, Uganda, and Ethiopia's Eastern region

Conclusion

The prevalence of low ferritin levels in newborns among women during pregnancy with iron deficiency anaemia was found to be high in the current study. In Pakistan, anaemia is a severe health condition that puts the lives of pregnant mothers and their children in jeopardy. It is linked to lower educational status and is directly proportional to parity and the gap between pregnancies. More efficient rules for educating girls, spreading effective information about a nutritious diet, routine antenatal checks, and regular consumption of iron-folic acid tabs should begin at the grass-roots level to ensure healthy motherhood.

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