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IRON DEFICIENT MOTHERS;

FREQUENCY OF LOW IRON STORES IN BABIES BORN TO IRON DEFICIENT MOTHERS

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ABSTRACT… Background: Anaemia is nutritional deficiency disorder which is very common in developed countries and related with inauspicious maternal and perinatal outcome. Its prevalence in pregnancy is about 50-80% in Pakistan. It is a risk element for low iron stores in babies, preterm delivery, foetal anaemia, low birth weight as well as stillbirth. **Objectives:** To determine the frequency of low iron store in babies born to iron deficient mothers and effect of maternal anaemia on newborn weight and cord haemoglobin. **Study Design:** Prospective observational study. **Setting:** Government Sardar Begum Hospital Sialkot. **Period:** 1st January 2017 to 30th June 2017. **Materials and Methods:** 160 pregnant women delivering for antenatal and haemoglobin as well as weight of newborn babies, which was entered in computer software SPSS version 20. **Results:** Out of 160 mothers, 143 (89.37%) were anaemic. Out of 160 babies, 127 (79.37%) of babies had anaemia. The mean haemoglobin among babies was 12.9±2.01 g/dL. **Conclusion:** A notable positive correlation with maternal haemoglobin and newborn weight and cord haemoglobin.

Key words: Cord Blood, Low Birth Weight, Low Iron Stores, Maternal Anaemia, Premature Birth.

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INTRODUCTION

Anaemia is nutritional deficiency disorder which is very common in developing countries and is associated with inauspicious maternal and perinatal outcome. It also causes maternal infections, post partum haemorrhage and pre-eclampsia. Body aches and easy fatigability are common symptoms in anaemic pregnant women. Approximately, over 2.5 billion of global population is anaemic. In Pakistan, extensiveness of Anaemia in all groups of age is higher than other developing countries. According to World Health Organization (WHO) in South East Asia, the prevalence of anaemia in pregnancy is around 56%. But in Pakistan, it is 50-80% which is higher than other countries.[1-2]

In adult females, the normal Haemoglobin (Hb) value is 12-14 g/dl. During pregnancy, volume of plasma is increased 50% in midtrimester, red cell mass increases up to 25% and there is a notable fall in Hb concentration, haematocrit and red cell count resulting in notable hemodilution called physiological anaemia of pregnancy.[1] This helps improve circulation in placenta. WHO has accepted the normal haemoglobin level up to 11g percent during pregnancy. Therefore, haemoglobin level below 11g should be considered as anaemia during pregnancy. According to WHO, anaemia in pregnancy is when Hb <11 g/dl.[3] which is classified as mild (9-10.9 g/dl), moderate (7-8.9 g/dl) and severe (<7 g/dl). However, the lower limit is accepted as 10g percent in Pakistan as well as most of the other developing countries.

Maternal anaemia is a risk factor with harmful effects on foetus resulting in premature birth, stillbirth and low birth weight.[4,5,6] Anaemic mothers deliver babies are at higher risk of low iron stores having a low birth weight and foetal growth restrictions than babies born to mother which are non anaemic.

In Pakistan, amongst the anaemic women, the

menace of preterm delivery and low birth weight is 4 and 1.9 times higher.[7] Babies delivered to anaemic mothers have 1.8 times increased risk of an Apgar score of <5 at 1 min. Low level of maternal haemoglobin is related to bigger risk of preterm birth, low birth weight babies. Severe anaemia <8g/dl is associated with birth weight values i.e. 200-400g lower than in women with higher >10g/dl haemoglobin level. In a large study of United Kingdom, the highest birth weight was associated with haemoglobin between 8.6g and 9.5g.[4] Ren et al[4] also reported that the risk of preterm delivery was lowest among women with haemoglobin levels between 9.6 g and 10.5g. Some studies have reported a U-shaped association between haemoglobin concentration and adverse pregnancy outcomes with the lowest prevalence of low weight birth and preterm birth in that group of women who had haemoglobin values in pregnancy between 9.5 to 10.5 g/dl.[8,9]

The maternal transferrin supplies the iron to foetus. In the last four weeks of pregnancy, placenta entraps maternal transferring, disengages the iron and vigorously transports it to the foetus. The foetus cannot collect much iron when maternal iron stores are depleted then there is a reduction in foetal iron stores.[10,11]

MATERIALS AND METHODS

This prospective observational study was carried out at Government Sardar Begum Hospital Sialkot from 1st January 2017 to 30th June 2017. 160 terms and live born babies delivered in the hospital were included in the study. Babies born at 37 to 42 weeks of pregnancy, and singleton babies were included. Maternal chronic illness, birth asphyxia, chronic intrauterine infections and any major congenital anomalies were excluded. Pregnant women that visited hospital for antenatal checkup and tested for haemoglobin at 20th week of pregnancy and just before delivery by cyanmet haemoglobin method. At birth, weight of babies was recorded by electronic weight machine and cord blood was sent for haemoglobin. Routine hospital data of the pregnant women who registered and attended hospital for antenatal checkups were included in the study. The data was entered and analyzed in SPSS-20.

RESULTS

According to age, 142 (88.7%) mothers were in age group of 21-35 years and 18 (11.3%) mothers were in age group <20 years (Table-I). Out of 160 mothers, 63 mothers (39.4%) were primiparous and remaining 97 (60.6%) were multiparous (Figure-1). Out of 160 mothers, 143 (89.37%) mothers were anaemic (mild 26%, moderate 42% and severe 21.3%) [Figure-2].

Table-II shows the trends in the distribution of gestational age. Vaginal birth coat babies with favorable bacteria and reduce risk of certain immune system disorders as compared to those babies who are born LSCS (Table-III). There is a notable association between degree of maternal Hb levels and cord Hb. Out of 160 babies, 127 (79.3%) of term babies had anaemia. This mean haemoglobin among babies was 12.9±2.01 g/dl. Babies of severe anaemic mothers have low iron store as well as low haemoglobin. Affirmative relationship between maternal haemoglobin and newborn weight, the occurrence of low birth weight was 37.5%, 18.18% and 16.16% in severe, moderate and mild anaemic mothers. Only 9% were low birth weight in normal mothers.

Age (Years)	Frequency	%
<20	18	11.3
21-25	86	53.7
26-30	48	30
31-35	8	5

Table-I. Frequency and percentage of age (n=160)

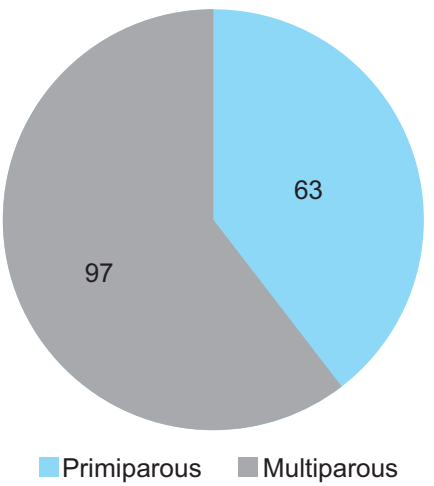

Figure-1. Parity-wise distribution of mothers

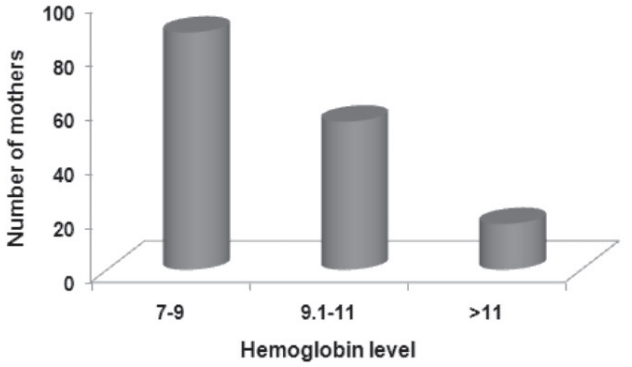

Figure-2. Assessment of maternal haemoglobin

Gestational Age in Weeks	Patients	%
37	1	0.6
38-39	128	80
>39	31	19.4

Table-II. Frequency of gestational age

Type	Patients	%
Vaginal	120	75
LSCS	40	25

Table-III. Distribution of type of delivery

DISCUSSION

Anaemia is a health problem which prevails all over the world. In Pakistan, it is more common in reproductive women. It manifests during pregnancy when the nutritional demand increases. Foetal growth depends on duration of pregnancy and through placenta uptake of nutrients from mother. Maternal anaemia is a risk factor with deleterious effects on foetus resulting in preterm birth, low birth weight and stillbirth.[4-6] Babies are at higher risk of having a low birth weight delivered by anaemic mothers and foetal growth restrictions than babies born to non anaemic mothers.

In this study, 89.37% women are anaemic as compared to study conducted by Kumar et al[1] in which 87% are anaemic. The high incidence may be due to the women belonging to rural areas. Haider et al[12] did a systematic review and meta-analysis on anaemia, risk of adverse pregnancy outcomes and found that cohort studies showed a significant risk of low birth weight and preterm birth with anemia in first or second trimester. Furthermore, a heavy burden of anaemia was present in pregnant women, more so pointing to high prevalence of iron deficiency anaemia, which can be due to the fact that women here enter pregnancy with limited iron stores as well as less haemoglobin concentration thus making them vulnerable to anaemia in pregnancy. This study estimated 89.37% of women to be anaemic which resulted preterm birth, low birth weight and stillbirth so is a matter of concern. It has a vital bearing on iron stores and low birth weight as well as the development of anaemia in babies. Alvarez-Uria et al[13] reported that 73,795 determinations of haemoglobin, 49.5% were female and found anaemia over 50% in women after puberty.

The results also shows that a high incidence of low birth weight, preterm delivery and perinatal mortality. Prematurity was the leading cause of perinatal death. Similar results were found in other studies.[9,14]

Maternal anaemia is a risk factor with deleterious effects on foetus resulting in prematurity, stillbirth and low birth weight.[4-6] Mothers with anaemia delivering babies are at higher risk of having a low birth weight and foetal growth restrictions than babies born to non-anaemic mothers. In a study done by Lone et al[7] reported that the risk of preterm delivery and low birth weight was 4 and 1.9 times higher among anaemic women, respectively. Newborns of anaemic mothers had 1.8 times increased risk of having an Apgar score of <5 at 1 min. and the risk of IUD was 3.7 times higher for anaemic women. There is a direct relationship between maternal haemoglobin and birth weight. In this study, the incidence of low birth weight was 37.5%, 18.18% and 16.16% in severe, moderate and mild anaemic mothers, respectively.

The foetus cannot collect much iron when maternal iron stores are depleted then there is a reduction in foetal iron stores. It has a vital comportment on iron stores and low weight birth as well as the growth of anaemia in the 1st year of life.[8,10] In a study conducted by Al-Hilli and reported that maternal anaemia can be linked

with unfavorable foetal and perinatal outcomes.[15] Cord blood hemoglobin reduce considerably with lessening maternal haemoglobin. There is a linear relationship among maternal and cord blood haemoglobin. In severely anaemic mothers, the newborn babies can develop anaemia. In this study, there is a significant positive correlation between different degrees of maternal haemoglobin levels and cord Hb% similar to study by Debbarmaet al[10] and Adam et al.[16]

CONCLUSION

There is significant correlation between iron deficit mothers and neonatal birth weight. Cord blood haemoglobin percentage is less in babies delivered by anaemic mothers. Iron deficiency is the general as well as common cause of anaemia.

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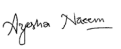
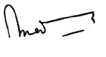
AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Ayesha Naeem	Data collection	
2	Mazhar Nazir Chattha	Writing of manuscript and compiling results.	
3	Abdul Matin Qaisar	Guidance in writing the manuscript.