Association between maternal anaemia and premature birth

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ABSTRACT

Objective: This study was designed to assess the relation between maternal anaemia in the third trimester and premature birth.

Methods: A case-control study was conducted in Prince Hashim hospital and Prince Ali Hospital in the period between August 2015 and July 2016. A total of 200 women were included in the study and divided into two groups. Group A consisted of patients delivered between 24-37 weeks of gestation (case group), while Group B consisted of patients delivered after 37 weeks (control group). Maternal anaemia was defined as haemoglobin level < 11g/dL and preterm delivery was defined as delivery prior to 37 weeks of gestation. Patients with haemoglobinopathies, systemic diseases, Antepartum haemorrhage and multiple gestations were excluded from the analysis.

Results: In Group A, 47 patients were found to be anaemic while 53 patients had normal haemoglobin. In Group B, 29 patients were found to be anaemic while 71 patients had normal haemoglobin.

Conclusion: It was observed that maternal anaemia in the third trimester, at labour, was associated with an increased risk of prematurity.

Key words: Anaemia, Preterm delivery, Prematurity

Introduction

Anaemia is one of the most common nutritional disorders in the world. According to the WHO criteria, anaemia is defined as a blood haemoglobin concentration lower than 12 g/dL for non-pregnant women and lower than 11 g/dL for pregnant women.(1)

Prevalence of anaemia in Jordan is 20%, but among pregnant women this percentage reaches 32% according to a study conducted by the Jordanian Ministry of Health and UNICEF in 2009.(2)(3)

Iron deficiency anaemia comprises the majority of all anaemia seen in pregnancy. Other causes of anaemia include vitamin B12 and folic acid deficiencies, hereditary anaemia, chronic infections and inflammations.(4)(5)

Finding an association between anaemia in pregnancy and pregnancy outcomes has been investigated in many studies. Jain Preeti et al and Levey et al observed that mothers with anaemia have higher rates of preterm deliveries and low birth weight.(6)(7)

The main purpose of the study is to find an association between anaemia and preterm delivery so that pregnant patients at risk are identified and effective management can be taken to prevent and treat anaemia.

Subjects and Methods

Our study was conducted on pregnant women admitted to the labour ward of Prince Hashim Hospital and Prince Ali Hospital between August 2015 and July 2016. The initial sample consisted of 253 patients, from whom we selected all who met the inclusion criteria, i.e. who were followed in outpatient department since early pregnancy, aged between 18-40 years and had a singleton pregnancy. Patients with multiple gestation, chronic illness, antepartum haemorrhage and unbooked patients were excluded and 200 patients remained for analysis. Data were collected from the interviews conducted with the patients and medical records; data were recorded on special forms designed for this purpose.

Information was analysed by using SPSS software.

Blood samples were drawn from patients at admission and haemoglobin level was estimated using a Sysmex KX-21 N machine (Swe Lab).

Anaemia in pregnant patients was defined according to WHO as haemoglobin level below 11g/dL.

Gestational age was calculated using Naegele's rule as the duration of pregnancy in weeks, i.e. from the first day of the last menstrual cycle to the date of delivery, and compared with ultrasound measurements in the first trimester and at admission.

Preterm birth was defined based on the WHO definition as delivery prior to 37 weeks of gestation.

Results

The population of the current study consisted of 200 patients divided into two groups. Group A comprised of preterm (cases) whilst Group B consisted of term (controls). In distribution of patients on the basis of anaemia, it was found that 47 patients (47 %) in group A were anaemic and 53 patients (53%) had normal haemoglobin. In group B, 29 patients (29%) were anaemic while 71 patients (71%) had normal haemoglobin. As Table 1 shows, the mean of haemoglobin in Group A was 10.30 and that of Group B was 11.19 . In distribution of patients on the basis of parity, in Group A there were 37 (37%) patients who were primigravidas and 63 (63%) patients who were multigravidas, while in Group B, 53 (53%) patients were primigravidas and 47 (47%) were multigravidas, as shown in Table 2.

In distribution of patients according to age, in Group A there were 20 patients (20 %) whose ages ranged from 18 to 25 years, 14 patients (14%) in the range of 25-30 years, 37 patients (37 %) in the range of 30-35 years and 29 patients (29%) who were aged between 35 and 40 years . In Group B there were 27 patients whose ages ranged from 18 to 25 years (27 %), 31 patients (31%) aged 25 to 30 years, 19 patients (19 %) in the range of 30-35 years, and 23 patients (23%) in the range of 35-40 years, as shown in Table 2.

In distribution of patients according to iron supplementation during pregnancy, in Group A there were 38 patients (38%) who received iron supplements and 62 patients (62%) who did not receive iron supplements. In Group B, there were 59 patients (59%) who received iron supplements and 41 patients (41%) who did not receive iron supplements, as shown in Table 2.

Discussion

Anaemia is defined as a decrease in the total circulating red cell mass below the normal ranges (8).

During pregnancy, iron deficiency and iron deficiency anaemia are the most common nutritional disorders.

Iron deficiency anaemia comprises 90% of all anaemia seen in pregnancy(WHO92). Malaria, hookworm infection, schistomiasis, chronic inflammations and inherited anaemia are other causes.(1)

Maternal anaemia is associated with premature delivery, low birth weight (9-11), IUGR (intrauterine growth retardation), IUD (intrauterine death), low APGAR score and perinatal death .(12).

In our study, the mean of haemoglobin in preterm group was 10.30 g/dL, which is lower than that in the term group, 11.19 g/dL. It was observed that maternal anaemia evaluated during the third trimester, i.e. at labour, is a risk factor behind prematurity. The effect associated with anaemia remained recognisable even after adjustment for potential confounding factors.

It was also observed that multiparity and older age were associated with an increased risk of preterm delivery.(13)

Our study showed that the percentage of patients who received iron supplements during pregnancy was low in the preterm group (38%), while the percentage in the term group was much higher (59%).

The results of our study were comparable to many previous studies that investigated the mutual relation between maternal anaemia and prematurity. This is exemplified in the study conducted by Scholl and Hedgier (14) that shows that maternal anaemia is associated with a 2-3 fold increased risk of premature delivery.

Conclusion

Based on the results of the current study, it can be concluded that anaemia is the most common nutritional deficiency in pregnancy and it is strongly associated with preterm delivery.

Educational efforts addressing the appropriate use of prenatal and antenatal care should be initiated to educate women about their health and the associated risks during pregnancy, especially anaemia.

Table 1: Distribution of patients according to Hb level

	G A (n = 100)		G B (n = 100)	
	No.	%	No.	%
Hb > 11 g/ dL	53	53%	71	71%
Hb < 11 g/ dL	47	47%	29	29%
Mean + SD	10.30 + 1.60		11.19 + 1.10	

Table 2:. Distribution of patients on the basis of age, parity and iron supplement

	G A (n = 100)		G B (n = 100)	
Age (years)	No.	%	No.	%
18 – 25	20	20 %	27	27 %
25 – 30	14	14 %	31	31 %
30 – 35	37	37 %	19	19 %
35 - 40	29	29 %	23	23 %
Parity				
PG	37	37 %	53	53 %
Multi	63	63 %	47	47 %
Iron supplement during pregnancy	38	38 %	59	59 %

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