ORIGINAL ARTICLE

Anaemia: A Risk factor for Preterm Labour

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ABSTRACT

Objective: To determine whether or not anaemia is a risk factor for preterm labour.
Study design: Case control study
Place and duration of study: This study was conducted in the Department of Obstetrics and Gynaecology Unit I, Sir Ganga Ram Hospital/Fatima Jinnah Medical College, Lahore from April 2013 to September 2013.
Patients and methods: Three hundred and forty patients presenting in labour and fulfilling the inclusion criteria were included in this study. Patients were divided into two groups A and B. Each group had 170 patients. Patients with gestational age between 28-36 weeks were assigned to group A (case group) and those with gestation more than 37 weeks assigned to group B (control group). Detailed history was taken from the patients of both groups. In order to check hemoglobin level, venous blood sample from patients of both groups was collected.
Results: Total of 340 patients were enrolled in this study. In group A (cases) 56% and in group B (control) 42.4% were from age group between 18-25 years. The odds of having preterm birth were 1.724 times greater in patients having age between 18-25 years as compared to the patients who were more than 25 years ($p<0.05$). The cases had statistically significantly less mean haemoglobin level as compared to controls(cases=7.50, controls=9.69. P value <0.05).
Conclusion: It is concluded from this study that anaemia is strongly associated with preterm labour.

Key words: Preterm labour, anaemia, risk factor

INTRODUCTION

Preterm labour has multifactorial etiology.[1] Preterm birth is a major cause of perinatal morbidity and mortality worldwide. Preterm births lead to various adverse effects in the form of fetal intrapartum hypoxia and birth trauma. Premature neonates are at greater risk of complications as respiratory distress, hypothermia, hypoglycemia, necrotizing enterocolitis, intracranial hemorrhage, patent ductus arteriosus, retinopathy of prematurity, convulsions, septicemia, jaundice and anaemia.[2] Preterm babies also have an increased risk of lasting disabilities such as mental retardation, learning, behavioral problems, cerebral palsy, vision and hearing loss.[3] Neonates born very prematurely may be at increased risk of certain adult health problems such as diabetes, high blood pressure and heart disease.[4,5]

The incidence of preterm birth is lowest in women in their 20s. The risk is increased in teenagers and in women above 30 years of age. The incidence is highest in first pregnancy and progressively lowers with each successive term birth. [6]

Incidence of preterm delivery of low birth weight babies is 37% of all live births in Pakistan. Contribution of perinatal deaths by prematurity is 8.81% in our country.[7]

These preterm neonates require hospital admissions, thus adding a great burden on health care departments. Prematurity remains the important issue for neonatal mortality accounting for 70-85% of all neonatal deaths. So prevention of all preterm labour is important issue for pregnancy care.[8,9]

Anemia is very prevalent is developing countries like Pakistan (33-75%).[10] Anaemia is a contributing risk factor for preterm labour.[11,12,13] But some studies concluded that anaemia in third trimester is not associated with preterm labour. In third trimester anaemia decreases the risk for preterm labour.[14] Preterm labour can be prevented by identifying the risk factor such as anaemia and treating it on time , this can help us to decrease the problems associated with prematurity.

PATIENTS AND METHODS

Women fulfilling the inclusion criteria were enrolled in this study from department of Obstetrics and Gynaecology Unit I. Cases were all women from 28 to 36 weeks of gestation with diagnosis of preterm labour. Controls were the patients with labour at term.

Informed consent from the patients was obtained for taking part in the study and using their data in the research. Detailed history was taken. Socio demographic data such as age, parity and antenatal care, duration of marriage was gathered. The date of last menstrual period was used to determine gestational age. Venous blood sample from all patients of cases and control groups was collected in sodium EDTA on hospital admission on the basis of hemoglobin level. Anaemia was diagnosed on the basis of hemoglobin level and patients were labeled as anaemic when hemoglobin level was below 11g/dl.

Data was analysis on SSPS (statistical package for social sciences) version 10.0. The frequency, odds ratio and percentages of anaemia among cases and controls was calculated. Odds ratio was calculated to draw inferences. Mean±S.D for age and gestational age was calculated. Odds ratio's was calculated to see association between anaemia and preterm labour. OR>2 was considered as significant. Data was stratified for antenatal care (Yes, No) to address effect modifiers.

RESULTS

A total of 340 patients (170 cases, 170 controls) were enrolled in this study. Fifty six percent of cases and 42.4% controls were aged between 18-25 years (Table 4). More than half of the cases and controls (53.5%, 56.5% respectively) were married since 5 years or more than 5 years.

Most of the cases and controls (58.2%, 56.5% respectively) had 3 or more children. Majority of cases and controls (69.4%, 59.4% respectively) did not receive antenatal care (ANC). All of the cases (100%) were anemic (Hemoglobin <11 g/dl) whereas overwhelming number of controls (91.2%) were also anemic (Hemoglobin <11 g/dl).

A large number of cases (64.7%) had preterm labour at gestational age of more than 32 weeks. Majority of controls 87.1% were at gestational age of 37-40 weeks at the time of delivery.(Table 6).

Table 7 shows the comparison of hemoglobin levels (Hb) among cases and controls. There was a statistically significant difference between cases and controls regarding haemoglobin levels (P-value <0.05).

Table 8 shows the association of various risk factors with preterm delivery.

The cases had statistically significantly less mean age as compared to controls (cases=24.78, controls=26.41 years P-value < 0.05). The mean duration of marriage and mean parity was not statistically significant different in cases and controls (P-value > 0.05). The cases had statistically significant less mean hemoglobin levels as compared to controls (cases=7.50, controls=9.69, P-value < 0.05) as shown in Table 9

Table 5: Frequency Distribution of Various Factors among Cases and Control (n=340)

	Case (n=170)	**Control (n=170)**
Age Group		
18-25 years	55.9%	42.4%
>25 years	44.1%	57.6%
Duration of marriage		
Less than 5 years	46.5%	43.5%
5 years or above	53.5%	56.5%
Parity		
< 3	41.8%	43.5%
3 or more	58.2%	56.5%
Antenatal care (ANC)		
No	69.4%	59.4%
Yes	30.6%	40.6%
Anemia		
Yes (Hb <11)	100.0%	91.2%
No (≥ Hb 11)	0.0%	8.8%

Table 6: Frequency Distribution of Gestational Age of Cases and Controls (n=340).

	Frequency	**Percentage**
Gestational age of cases		
28 - 32 weeks	60	35.3
> 32 weeks	110	64.7
Gestational age of control		
37 - 40 weeks	148	87.1
> 40 weeks	22	12.9

Table 7: Comparison of Hemoglobin Level among Cases and Controls (n=340)

	Case	**Control**
	n (%)	**n (%)**
Hemoglobin level		
≥ 11.0 g/dl	0(0.0)	15(8.8)
9.0-10.99 g/dl	0(0.0)	120(70.6)
7.0-8.99 g/dl	135(79.4)	35(20.6)
< 7.0 g/dl	35(20.6)	0(0.0)
Chi square value= 228.824, P-value= 0.000		

Table 8: Association of Various Risk Factors with Preterm Birth (n=340).

Risk Factor	Odds Ratio	P-value
Age Group (18-25 years)	1.724	0.013
Duration of marriage (< 5 years)	1.126	0.586
Parity (Number of children < 3)	0.930	0.742
Antenatal care (ANC) not received	1.55	0.054
Presence of Anemia (Hb <11)	*	0.000

*Odds ratio was not calculated for anemia status because all the cases were anemic.

Table 9: Comparison of Mean Values of Various Risk Factors among Cases and Controls

Variable	Case n =170	Control n =170	P-value
	Mean±SD	Mean±SD	
Age	24.78±4.363	26.41±4.541	0.001
Duration of marriage	5.23±2.756	5.46±2.925	0.457
Parity	3.18±1.502	3.13±1.579	0.752
Gestational age	32.34±1.81	38.77±0.861	0.000
Hemoglobin level	7.50±.81	9.69±0.861	0.000

DISCUSSION

In our study 340 patients (170 cases and 170 controls) were enrolled. Maternal age (teen age and older age) is associated with increased risk of preterm delivery. In our study women in age group between 18-25 years formed a high proportion of cases that showed increased association with risk of preterm delivery. (55.9% OR 1.72) . In the study of R.I. Anorlu et al risk of preterm delivery was also increased in young age group (20.-29 years) with odds ratio 2.81.[15] Similar results were also observed in case control study of Maputo and Mozambique. [16]

In the study of Amber Tufail[17] conducted in Baqai Medical University, Pakistan in 2009, around fifty seven percent of patients with preterm delivery were from age group less than 25 years. This was comparable with results of our study.

Our results however were not in agreement with study of Chike-Obi U and Hoffman in their study teenage pregnancy was a major etiological factor for preterm delivery.[18]

There was no association found in our study of parity with preterm labour. Our results are comparable with those of R.I. Anorlu, et al[15] who in their study also observed no association of parity with preterm labour. This was in contrast to the findings of Chike-Obi U and Hoffman. HJ[18] who found that primiparity was independently associated with preterm labour. Similar association of preterm delivery and primiparity was also observed in study of Amber Tufail (30.1% ,P<0,01) in 2009.

Women who do not seek prenatal care, regardless of their socioeconomic background are significantly more likely to deliver before term. Antenatal care provides the opportunity to detect and manage some of the factors that can lead to preterm delivery.

In our study lack of antenatal care was strongly associated with increased risk of preterm delivery and thus importance of antenatal care was highlighted (OR 1.55. P=<0.05). Our results are comparable with those of R.I Anrolu et al [15] in their study lack of antenatal care was associated with increased risk of preterm delivery (OR 7.98, P<0.0001), while good antenatal care as is available in a tertiary care institution was associated with decreased risk (OR 0.14, P<0.0001). Our results are also comparable with those of Amber Tufail in whose study majority of patients did not seek antenatal care and thus had preterm labour (91.2% P< 0.01). [17]

In our study mean duration of pregnancy in cases was 32.34±1.81 weeks and in controls was 38.77±0.86 weeks which is comparable with the study conducted by Wood et al.[19] Where mean duration of pregnancy was 29.2±4.2 weeks in preterm group and in control group it was 39.4±1.1 weeks.

In our study there was a high association of anaemia with preterm labour. Our results showed that in all cases presenting with preterm labour anaemia was present (100%) while in control group anaemia was present in 91.2% of patients.(P<0.05). Our result are comparable with the study of Levy A, Fraser D[11] et al; that showed that maternal anemia is an independent risk factor for preterm delivery (OR= 1.2; P<0.001).

The high prevalence of anaemia in both cases and controls can be explained by the facts that most of the patients visiting our hospital are from low socioeconomic group. Therefore patients are

malnourished and do not seek antenatal care and hence do not get resultant benefits.

In the study of Amber Tufail[17] 45.2% of patients with anaemia had preterm labour and among all risk factors under study anaemia was the most common cause of preterm labour.

In the study of Hussein L Kidanto; Ingrid Mogeron at al;[13] anemia was found in 73.8% of patients and results showed that risk of preterm delivery increased significantly with severity of anaemia. The odds ratios were 1.4, 1.4 and 4.1 respectively for mild, moderate and severe anaemia. Our study also showed that association of preterm labour increased with moderate anaemia (Hb= 7.0-8.9), as 79.4% of patients with moderate anaemia had preterm labour.

Interestingly, however in our study association of preterm delivery was not increased in women with severe anaemia and it was only 20.6%.

Malhotra M et al in their study reported significant association of severe anaemia with preterm delivery.[20]

In the study of F.W. Lone, R.N. Qureshi et al the risk of preterm delivery was four times greater in the anaemic women and was statistically significant (95% CI: 2.5-6.3).[21]

In study of Zohreh and Gholamreza results showed that relative risk of preterm birth in anaemic mother was 3.6 times of mothers without anaemia. [22]

Theresa O Scholl et al study showed that anaemic women were at 2.5 fold increased risk of having preterm delivery (OR: 2.66).[23]

The study of R.I. Anorlu, et al; stated that anaemia itself is not an independent risk factor for preterm labour and is dependent on other factors like malaria, low socioeconomic status and poor nutrition which are themselves associated with preterm labour. [15]

In developing countries like ours poverty, gender discrimination and lack of education regarding the importance of balanced and iron rich diet contributes to anaemia. The high prevalence of iron and other micronutrients deficiencies among women before and during pregnancy in developing countries is a global concern. Maternal anaemia is still anunderlying cause of considerable morbidity and mortality.

LIMITATIONS OF STUDY

There may be element of patients selection bias, as all the patients were from same hospital. Majority of patients coming for health care in this hospital (Sir Ganga Ram Hospital) belong to low socioeconomic status, are less educated, have large family size and do not believe in antenatal care.

CONCLUSION

It is concluded from our study that anaemia is strongly associated with preterm labour. Still larger and multicentre studies with greater number of participants are required to show this association.

Health education of young girls regarding balanced and iron rich diet should be promoted and this should start since childhood and emphasized in schools, colleges, universities and places of work. Preconception evaluation, appropriate pregnancy planning and birth spacing is important to decrease incidence of maternal anaemia and its consequences. Women education regarding importance of seeking antenatal care services needs to be give attention and health care facilities should be available close to home. Another area of concern regarding maternal health is provision of family planning services. Media both electronic and print can play a major role in this spread of awareness.Diagnosis and treatment of anaemia in antenatal period is important to minimize perinatal and maternal complications.

We understand that bringing about a change in mindset will remain a challenge in our culture and country, so strategies need to be formulated and then implemented with concentrated effort.

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