

# Prevalence of Preterm Neonates and Risk Factors

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## Abstract

### Introduction

Preterm birth is still a major health problem throughout the world. Preterm birth results in 75% of neonatal mortality. We sought to identify risk factors which cause preterm birth.

### Materials and Methods

This cross-sectional study assessed all preterm neonates born in Asali Hospital in Khorram Abad (either by NVD or C/S) during the first 6 months of 2007. Sampling method was census. Fetal sex, maternal disease, maternal addiction to cigarettes, maternal age, placental problems, number of gravidities, PROM, preeclampsia, multifetal gestation, Apgar score, uterine anomaly were the variables studied in this survey. Questionnaires were used to collect the data and the data was analyzed with SPSS software.

### Results

183 of 2179 live neonates borne in Asali hospital were preterm (8.4%). The most common factors related to preterm birth were: Primigravidity(56.3%), PROM(35.5%), preterm labor pain(33.8%), maternal disease(22.4%), preeclampsia(21.9%), multifetal gestation(19.7%), previous abortion(18.6%), previous preterm delivery(9.8%), high risk maternal age(10.4%) and placental problems(7.7%). Preterm labor pain was significantly more common among multiparus women in comparison with nulipara ones( $x^2=16.5$ ,  $p=0.000049$ ) but occurrence of PROM( $x^2=0.57$ ,  $p=0.45$ ), preeclampsia( $x^2=0.8$ ,  $p=0.37$ ), maternal chronic disease( $x^2=0.55$ ,  $p=0.46$ ) and multifetal gestation( $x^2=0.01$ ,  $p=0.91$ ) was not significantly different among multipara and primipara women.

### Conclusion

Several factors related to preterm birth can be prevented by health modalities. Maternal education and giving advanced information to mothers in prenatal health care visits, preterm birth and its side effects may be reduced.

### Key words

Preterm neonate, preterm birth, premature birth

### Introduction

Preterm birth is defined as delivery before 37 completed weeks (WHO). The issue of preterm birth is still a major health problem in the world; 75% of neonatal mortalities are due to prematurity.<sup>(1,3)</sup> A variety of morbidities are significantly increased in preterm neonates who survive. Morbidity in multiple organs such as respiratory tract, cardiovascular, GI, metabolic, neurological and urinary system is much more common in premature neonates compared with those delivered at ter.<sup>(4)</sup> So, most pediatricians believe, prevention of preterm birth is obviously logical and important, and it seems necessary to diagnose the risk factor of

preterm birth. Approximately half of preterm births occur idiopathically. Other factors responsible for preterm birth are: fetal, uterine and placental factors, maternal chronic disease, PROM, polyhydramnios, social problems such as cigarette, alcohol and maternal emotional or physical stress.<sup>(5)</sup>

In a study by Burke<sup>6</sup> in Ireland (2000), preterm labor, multifetal pregnancies and HTN were the major factors related to preterm birth.

In a study in Latin America (1985-2003) by Barros<sup>7</sup>, PROM was the most common (60%) finding related to 1,700,000 preterm birth.

In a survey by Rawlings<sup>(8)</sup> in USA (1995), the interval between pregnancies, was studied in

1628 white and 298 black women, an interval shorter than 9 months in black women was significantly related with preterm and low birth weight babies (11.6 vs. 4.4% in longer interval) and intervals less than 3 months was significantly associated with preterm birth in white women (11.8 vs. 2.8%).

In another study in USA by Meis<sup>9</sup>, 70% of preterm birth was idiopathic and the rest of preterm deliveries were indicated by situations such as preeclampsia (50%), fetal distress (25%), abruption and IUGR (25%).

A study in Yasouj<sup>10</sup> showed 1425 of 26,902 neonates were LBW (5.3%) and 38.3% of these LBW newborns were premature.

The aim of this study is to determine number and risk factors of premature neonates born in Asali hospital in Khorram-abad city, during the first 6 months of 2007.

### Materials and method

This cross-sectional study assessed all premature neonates born during the first 6 months of 2007 at Asali Hospital (by NVD or C/S). Sampling method was by census. Questionnaires containing variables including sex, maternal disease, maternal age, addiction to cigarettes in mothers, placental problems, PROM, preeclampsia, multifetal gestation, Apgar score, uterine abnormalities, and gravidity, were used to collect the data. The data was analyzed with SPSS software.

### Results

During the first 6 months of 2007, 2179 neonates were born; 183 neonates (8.4%) were preterm who constituted our study community; 19 mothers (10.4%) were younger than 16 or older than 35 years old (high risk) and the other 164 mothers (89.6%) were between 16 to 35 years old; 103 mothers (56.3%) were primigravid, 42(22.9%) mothers were G2 and 38 cases (20.8%) were G3 or more. The risk factors of preterm birth among primigravid women, analyzed separately were: PROM 35.5%, preeclampsia 21.9%, chronic maternal disease 22.4% and multifetal pregnancies 19.7% .

These factors were the most common ones among multiparus women also. Preterm labor pain was significantly more common among multiparus women (Table-2,  $x^2=16.5$ ,  $p=0.0000049$ ) but

there was no significant difference in factors such as PROM, preeclampsia, maternal chronic disease and multifetal pregnancies, in nulipara and multiparus mothers.

There were 41(22.4%) mothers with chronic disease in this study including HTN (12.6%), infection diseases (4.9%), renal disease (2.7%), and cardiovascular disease (2.2%).

Three mothers were addicted to cigarettes (1.6%) and none of the mothers were addicted to alcohol.

In this study, 62(33.9%) of cases of preterm births were idiopathic and the other preterm deliveries were associated with PROM in 65 cases (35.5%), preeclampsia in 40(21.9%) mothers, abruption in 10 cases (5.5%), placenta previa in 4 cases (2.2%) and cervical incompetency in 2 cases (1.1%); 89 of these preterm neonates (48.6%) were delivered by cesarean section and 94 were born by normal vaginal delivery (51.4%).

History of previous abortion and previous preterm labor was seen in 34(18.6%) and 18(9.8%) of mothers respectively.

Thirteen mothers (7.1%) had not registered in any prenatal care center, but the other 92.9% were visited (at least once) in prenatal care programs; 49(26.8%) neonates were born with Apgar score of 7 or lower and 134(73.2%) with score of more than 7; 36(19.7%) neonates were delivered because of preterm labor in multifetal pregnancies; 81 neonates (46.8%) were below 2500 grams; 92(53.2%) had body weight more than 2500grams. The body weight of 10 neonates were not written in the files and were excluded from the study; 8(4.4%) babies were born before 28 weeks of gestational age, and 175(95.6%) were born after 28 weeks; 94 neonates (51.4%) were female and 89 (48.6%) were male, and fetal sex did not have any significant relationship with prematurity.

### Discussion

In our study 8.4% of neonates were born preterm. In 1999, 5.3% of deliveries were preterm in Shiraz<sup>11</sup>. Ten percent of neonates born in Iran are low birth weight and 1/3 of them are preterm<sup>10</sup>. Eight to 10% of deliveries in USA<sup>9</sup> are preterm and preterm birth is two times more common in black women.

In our study, more than half of the mothers (56.3%) were primigravid. PROM and preeclampsia

Frequency distribution of preterm birth and risk factors among primigravid women at Asali Hospital.

Preterm birth and risk factors		No.	%
PROM	+	65	35.5
	-	118	64.5
Preeclampsia	+	40	21.9
	-	143	78.1
Preterm Labor Pain	+	62	33.8
	-	121	62.2
Maternal chronic disease	+	41	22.4
	-	142	77.6
Multifetal pregnancies	+	36	19.7
	-	147	80.3
Maternal age	<16 & >35 years	19	10.4
	16-35 years	164	89.6
Abruption	+	10	5.5
	-	173	94.5
Placenta previa	+	4	2.2
	-	179	97.8
Prenatal care programs	+	170	92.9
	-	13	7.1
Sex	Male	89	48.6
	Female	94	51.4
Route of Delivery	NVD	89	48.6
	C/S	94	51.4
Neonatal Weight	≤2500g	81	46.8
	>2500g	92	53.2
Apgar Score	≤7	49	26.8
	>7	134	73.2

Table 2. Comparison of preterm labor pain between nullipara and multipara women

Preterm Labor Pain	Parity					
	Nullipara		Multipara		Total	
	No.	%	No.	%	No.	%
+	22	21.3	40	50	62	33.8
-	81	78.7	40	50	121	62.2
Total	103	100	80	100	183	100

Table 3. Comparison of PROM between nullipara and multiparus women

PROM	Parity					
	Nullipara		Multipara		Total	
	No.	%	No.	%	No.	%
+	39	37.8	26	32.5	65	35.5
-	64	62.2	54	67.5	118	64.5
Total	103	100	80	100	183	100

were the most common factors related with preterm deliveries among these primigravid mothers. In a similar study in Tehran<sup>(12)</sup>, very young maternal age and primigravidity had a significant relationship with preterm birth.

In our study, PROM was the second most common factor for preterm birth (35.5%) and several studies showed similar conclusions.<sup>(11)</sup>

It is important to mention that PROM occurs in term pregnancies.

Idiopathic preterm labor pain was the third most common factor (33.9%) in preterm babies in our study. Recently, in some studies genetic factors are presumed to have relationship with preterm labor pain. In our study, preterm labor pain was significantly more common among multiparus mothers compared with nullipara ones; 22.4% of mothers suffered from a chronic disease. In another study in Hamedan<sup>(13)</sup>, 18.2% of mothers had a chronic disease which was similar to our findings.

The most common maternal disease, in our study, was HTN which can be associated with superimposed preeclampsia, placental infarction and abruption increasing preterm birth. In

another study in Hamedan<sup>(13)</sup>, the most common maternal disease was HTN which was similar to our findings.

The fifth important factor causing preterm labor was preeclampsia (21.9%). In other studies in Tehran<sup>(12)</sup> and Tabriz<sup>(14)</sup>, preeclampsia was the most common risk factor resulting preterm birth (46 and 24.6%, respectively). In several studies, pregnancies complicated with preeclampsia most often is terminated because of maternal indications.

Multifetal pregnancies (19.7%), was also another risk factor for preterm birth. In our study, preterm labor pain was one of the most common causes of preterm delivery in multifetal pregnancies. In several obstetric references idiopathic preterm labor pain is considered a major factor for prematurity in multifetal pregnancies.<sup>(2)</sup>

History of previous abortion or previous preterm birth was seen in 28.4% of cases in our study. A genetic factor is presumed to be related with recurrent abortion or recurrent preterm labor.<sup>2</sup>

In another study in Hamedan<sup>13</sup>, 19.06% of mothers were in high risk age for preterm birth, and in our study 10.4% of mothers were in high

risk age for preterm birth. The definition of high risk age is different in various studies. In some studies age below 20 and after 35 years is considered high risk<sup>12, 13</sup>, in our study age below 16 and after 35 years old was considered high risk for preterm labor.

In our study, placental factors such as abruption and previa caused preterm pregnancy termination in 7.7% of cases (because of severe bleeding).

In this study, 46.8% of neonates were below 2500gram. So, preterm delivery is a significant factor associated with LBW.

In our study and similarly in another study in Shiraz<sup>11</sup>, Fatal sex had no significant relationship with preterm birth.

In our study 26.8% of preterm neonates were born with Apgar score 7 or less. In another studies in Shiraz<sup>11</sup>, Yasouj<sup>10</sup> and Tehran<sup>12</sup>, 22.5%, 30.2% and 33.8% of preterm neonates were born with Apgar score 7 or less, respectively.

In our study 51.4% of preterm neonates were born by normal vaginal delivery and 48.6% by cesarean section, which there was no significant difference between C/S and NVD. In our study, 7.1% of mothers did not participate in prenatal care programs. In a similar study in Shiraz<sup>11</sup> 49.7% of mothers did not contribute in prenatal care visits.

In our study, mothers who had been visited only once were considered to be under prenatal care programs. In our study, the most common factors related to preterm birth were: Primigravidity, PROM, preterm labor pain, chronic maternal disease, preeclampsia, multifetal pregnancies, previous abortion, previous preterm delivery, high risk maternal age, and placental problems.

### Acknowledgment

We would like to thank the Lorestan University of Medical Sciences for giving us the opportunity to carry out our research activities and the doctors and medical students of Asali Hospital who provided help for this study.

### References

1. Kliegman RM, Behrman RE, Jenson HB, Stanton BF: Nelson Textbook of Pediatrics. 18th ed, Philadelphia, W. B. Saunders Company.2007.pp: 701-710.
2. Cunningham FG, Leveno KJ, Bloom SL, Haut JC, Rouse DJ, Spong CY. William's Obstetrics; 23rd ed; New York. Mc Graw Hill, 2010, pp: 804-831.
3. Gibbs RS, Karlan BY, Haney AF, Nygaard I. Danforth,s

Obstetrics and Gynecology ; 10th ed; Philadelphia, Wolters Kluwer , 2008 ; pp: 165-185.

4. Martin R, Fanaroff A, Walsh M. Fanaroff and Martin's Neonatal-Perinatal Medicine,Diseases of the Fetus and Infant. 9th ed; Philadelphia, Saunders, 2009.

5. Gomella TL, Eyal FG, Zenk KE. Neonatology: Management, Procedures, On-Call Problems, Diseases, and Drugs.5th ed, London; Lange Medical Books, 2004; pp: 120-131.

6. Burke C, Morrison J. Parental factors and preterm delivery in an Irish obstetric population. J perinat Med, 2000; 28 (1); 49-53.

7. Barros FC, Velez MP. Temporal trends of preterm Birth subtypes and neonatal outcome; Pediatrics; 2006; 118; 4: 1566-1573.

8. James S, Rowlings MD , Virginia B. Prevalence of LBW and preterm birth in relation to the interval between pregnancy, NEJM , 332 ; 12, 1995 ; pp (69-74).

9. Meis PJ, Goldenberg RL, Mercer BM, et al : the preterm prediction study : risk factors for indicated preterm births ; Am J obstet Gynecol, 178 : 562 ; 2003.

10. Montaseri Z, Afshoon E, Fararoei M, Pourarian Sh. A study on the rate of low birth weight neonates born in martyr Beheshti Hospital in Yasuj during a ten-year period,1367-76. Armaghane-Danesh, Journal of Yasouj University of Medical 1998; 3(12-11): 9-1.

11. Pourarian Sh., Vafafar A.,Zareh Z: The Incidence of prematurity in the hospital of Shiraz university of medical sciences and health services, 1999, IJS , 9 ; 28, 2002 ; pp 19-26.

12. Mosayyebi Z, Fakhraei SH, Movahediyah AH. Prevalence of LBW neonates and its risk factors in Mahdiyeh hospital(Tehran) during one year. Feyz ; 30, 2004 ; pp 58-67.

13. Eghbalian F: Low birth weight causes survey in neonates. Iran J Pediatr, Vol 17 (Suppl 1), Mar 2007,27-33.

14. Hosseini MB, Heidarzadeh M: Maternal Risk Factors and Immediate Neonatal Outcome in VLBW Infants in Alzakra Hospital of Tabriz. Med J Tbz, Vol 29; 4, 2007; pp 27-30.