



International Journal of Current Research and Academic Review

ISSN: 2347-3215 Volume 3 Number 10 (October-2015) pp. 121-126

www.ijcrar.com



Incidence of Preterm Labor and Its Relevant Risk Factors in Mothers Referring to Health Centers in Ahvaz City during 2011–2013

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KEYWORDS

Preterm labor,
Risk factors,
Incidence

A B S T R A C T

A preterm labor is when a baby is born before 37 completed weeks of pregnancy which is one of the most common causes of infant mortality. The aim of this study is to determine the incidence of some risk factors cause preterm labor. In the first phase, in a cross-sectional study, 843 files about mothers who had delivery in the health houses in the Sugarcane refining area in Ahvaz during from 2011 to 2013 were studied. In the second phase, a case-control study was designed in which 80 mothers who had preterm labor were entered in the study as the cases and 240 mothers who had term labor (after 37 weeks) as controls. Possible risk factors including maternal age, history of preterm labor in previous pregnancies, high blood pressure, urinary tract infection and lack of proper weight gain during pregnancy were evaluated in two groups using a researcher-made questionnaire. In descriptive statistics, frequency and percentage frequency and in analytic statistics, Chi-square test and logistic regression were analyzed using the software SPSS22. The statistical significance level was considered $P < 0.05$. In this study, the incidence of preterm labor was 10.53%. In terms of risk factors of preterm labor including mother's improper weight gain ($P < 0.001$), anemia ($P < 0.001$), high blood pressure ($P < 0.001$), urinary tract infection ($P = 0.002$), and previous preterm labor ($P = 0.003$), no statistical significant difference was observed between two groups ($P > 0.05$). Based on the results of this study, some factors such as improving the quality of prenatal care and follow-up and proper treatment of mothers, and especial cares including controlling the blood pressure, urinary tract infections and maternal weight loss can reduce the incidence of preterm labor.

Introduction

Termination of pregnancy before 37 weeks or before the expiration of 259 days from the first day of your last menstrual period is called preterm labor (Novak and Berek, 2007). The preterm labor is the cause of 70% of all death in neonatal period (Wen *et al.*, 2004; Ward and Beachy, 2003).

The amount of preterm labor in the developed countries is 5–7 percent. But it is estimated that this number in developing countries is more than this (Lawn *et al.*, 2006). In studies performed in Iran, this number had been reported about 8% (Ajami *et al.*, 2014; Davari Tanha Fatemeh *et al.*, 2007).

Various risk factors are involved in preterm labor that among them, medical situation (heart diseases, acute anemia, diabetes, kidney diseases and infections, especially urinary tract infection), obstetric complications (placental insufficiency, premature rupture of membranes, *preeclampsia*, eclampsia, polyhydramnios, oligohydramnios), genetic, environmental, socio-economic factors and malnutrition (Lindsay, 2006) can be noted.

Preterm labor and its complications is a serious problem that causes disabilities (Slattery and Morrison, 2002) including the Respiratory Distress Syndrome (Robertson *et al.*, 2007) brain damages (Wen *et al.*, 2004; Limperopoulos *et al.*, 2007), behavioral disorders later in life (Gray *et al.*, 2004) long-term brain disorders, respiratory dysfunction and eye disorders (Wen *et al.*, 2004). Since preterm labor is accompanied by high infant mortality which affects infant mortality indicator -infant mortality rate (IMR)- which is one of indexes of developed countries, identification of its risk

factors can play an important role in increasing the quality of care services and special care to pregnant mothers.

Materials and Methods

Study type

This study was conducted in two phases: In the first phase, in a cross-sectional study, all files of mothers who had had delivery and were referring to the health-care centers in the Sugarcane refining area in Ahvaz from March 21, 2011 to March 19 were studied using census sampling method. In the second phase, in a case-control study, 80 preterm labors were considered as cases and out of 763 files of mothers who had had term labor (labor after 37 weeks) 240 people were selected randomly and considered as controls.

Data collection tools

The questionnaire of the study was researcher-made by which demographic and medical data and risk factors of preterm labor were collected. Variables including history of urinary infection, maternal age, history of bleeding, urogenital infection (documents of experiments, explanation of examinations by a midwife and an expert), hypertension, anemia (registered documents of experiments), history of preterm labors in previous labors, and lack of proper weight gain during pregnancy were studied.

Sample size and sampling method:

In the cross-sectional study using census sampling, 843 files were examined and in the case-control study using the following formula, 80 cases and 240 controls were selected

$$P_0 = \%25, P_1 = \%10 \quad n = 2 \frac{[(z_{1-\frac{\alpha}{2}} + z_{1-\beta})^2 (P(1-P))]}{(P_0 - P_1)^2}$$

$$\frac{P_1 + P_0}{2} = \%12/5 \cong \%13 \quad n = \frac{2[(\frac{1}{96} + 0/84)^2 (0/13)(0/87)]}{(\%15)^2}$$

$$z_{1-\alpha} = \frac{1}{96} \quad \text{Case: } 79 - 80$$

$$z_{1-\beta} = \frac{0}{84} \quad \text{Control: } 240$$

Data analysis

Data on descriptive statistics (frequency and percentage frequency) and analytical statistics, using chi-square test to determine differences between qualitative variables in two groups of case and control, were analyzed. Logistic regression test was used to remove the confounding effect. The significant level of tests was considered $P < 0.05$.

Results and Discussion

In this study, among 843 mothers who had had labor in sugarcane refining region in Ahvaz in 2011–2013, 80 people had had preterm labor (10.53%) and 763 people (90.51%) had had term labor.

Results showed that 18.75% of subjects in the case group (preterm labor) and 11.25% of subjects in the control group (term labor) were in the pregnancy high risk age (under 18 and above 35) and no significant statistical difference was observed between them. ($P=0.08$) (Table 1).

In the case group 25% and in the control group 10.83% of people had urinary infection during their pregnancy. In terms of history of urogenital infection, there was no significant statistical difference between two groups ($P=0.002$) (Table 1).

In the preterm labor group, history of vaginal bleeding was 1.25% and in the term labor was 0.42%, but in terms of bleeding variable, no significant statistical difference was observed between two groups ($P=0.41$) (Table 1).

Our study showed that hypertension was the strongest risk factor for preterm labor. $OR=8.78$ (2.27–33.96) (Table 1).

Anemia and lack of proper weight gain in the case group were higher than them in the control group and a significant statistical relationship was observed between these two variables and preterm labor.

Using logistic regression test, results showed that in our study, in spite of removing confounding effects, urinary tract infections, lack of proper maternal weight gain and high blood pressure are also risk factors in preterm labors.

In the present study, the incidence of preterm labor had been reported 10.53% which was higher than this number in Ajami's (Ajami *et al.*, 2014) and Davari's (Davari *et al.*, 2007) studies and lower than Chiabi's (Chiabi *et al.*, 2013) study in Cameroon and this perhaps is because of the place in where the study had been performed (a health-care center or a hospital).

In this study, bleeding during pregnancy in the preterm labor was higher than it in the

other group, but no significant statistical relationship was observed which was consistent with Ajami's (Ajami *et al.*, 2014) and Davari's (DavariTanhaFatemeh *et al.*, 2007) studies, but in Yang's (Yang *et al.*, 2004), Hossain's (Hossain *et al.*, 2007) and Lindsay's (Lindsay, 2006) studies, a strong relationship between bleeding and preterm labor was observed.

Percentage frequency of urogenital infection in the case group was higher than it in the control group and in terms of the history of urogenital infection, no significant statistical difference was observed between two groups. This percent in the Bayat Mokhtari's study was higher (Bayat Mokhtari Mojgan *et al.*, 2009), but no significant relationship was obtained, but in the Molina's study (Robertson *et al.*, 2007) it was estimated that asymptomatic bacteriuria was one of the most common causes of preterm labor and the results of Lindsay's study (Lindsay, 2006) showed that urinary infection increased the risk of preterm labor that was consistent with our results.

In this study, pregnancy in high risk age (under 18 and above 35) in the case group was higher than it in the control group, but

no significant statistical difference was observed (P=0.08) which was consistent with Bayat Mokhtari's (Bayat Mokhtari Mojgan *et al.*, 2009) and Mahmoodi's (Mahmoodi *et al.*, 2010) studies, but the results of Namakin's (Namakin *et al.*, 2011) and Ajami's (Ajami *et al.*, 2014) study were not consistent with this finding.

Lindsay (2006) showed that the history of preterm labor led to increasing the possibility of preterm labor in next pregnancies which was consistent with our study's result. But with removing confounding effects, the difference of this variable in two groups was not statistically significant (P>0.05).

Davari Tanha (Davari *et al.*, 2007), Crowther (Crowther and Harding, 2003) and Drakeley (Drakeley *et al.*, 2003) showed that previous preterm labor was a strong predictive factor for experiencing another preterm labor, but in our study, in spite of this fact that more people in the case group had had preterm labor in their previous pregnancies, with removing confounding effects no significant difference was observed.

Table.1 effective factors on preterm labor in two groups of cases and controls

Variable	group				p-value	OR(95%CI)
	case		control			
	Yes No. (%)	No No. (%)	Yes No. (%)	No No. (%)		
lack of proper weight gain	(32.5)26	(67.5)56	(12.08)29	(87.92)211	<0.001	3.50(1.91 - 6.43)
Anemia	(18.75)15	(81.25)65	(8.33)20	(91.67)220	0.01	2.54(1.23 - 5.24)
high blood pressure	(10)8	(90)72	(1.25)3	(98.75)237	<0.001	8.78(2.27 - 33.96)
Urinary tract Infection	(25)20	(75)60	(10.83)26	(89.16)214	0.002	2.74(1.43 - 5.25)
Pregnancy in the high-risk age	(18.75)15	(81.25)65	(11.25)27	(88.75)213	0.08	1.81(0.91 - 3.6)
Previous preterm labor	(3.75)3	(96.25)77	(0)0	(100)240	0.003	0.96(0.92 - 1.00)
Bleeding in the first quarter	(1.25)1	(98.75)79	(0.42)1	(99.58)239	0.41	3.02(0.18 - 48.93)

Table.2 Effective factors on preterm labor with elimination of confounding effect in logistic regression

variable	B	SE	Wald	df	p-value	OR(95% CI)
constant	-55.21	46180	0.000	1	0.99	2.94
lack of proper weight gain	1.08	0.34	10.35	1	0.001	2.94(1.53 - 5.69)
Anemia	0.59	0.42	2.03	1	0.15	1.81(0.80 - 4.09)
high blood pressure	2.24	0.73	9.51	1	0.002	9.44(2.27 - 39.29)
Urinary tract Infection	0.88	0.36	6.01	1	0.01	2.42(1.19 - 4.90)
Pregnancy in the high-risk age	0.26	0.39	0.44	1	0.51	1.30(0.60 - 2.83)
Previous preterm labor	21.81	0.000	0.000	1	0.99	1.96(0.92 - 1.85)
Bleeding	1.60	1.24	1.24	1	0.27	4.96(0.30 - 82.76)

Conclusion

In this study, urinary infection, hypertension and lack of proper weight gain were some factors of a preterm labor that with recognizing and timely treatment of risk factors, decreasing preterm labors and then socio-economic and psychological costs of preterm labor can be achieved.

Acknowledgment

This Research is part of dissertation of MPH in family Physician, which has done under Ahvaz Jundishapur University of Medical Sciences.

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