

Contributing factors of preterm delivery in parturient in a University Hospital in Iran

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ABSTRACT

Objective: Preterm labor is one of the common causes of prenatal morbidity and mortality. With considering the importance of preterm labor and lack of sufficient studies about the relationship between preterm labor and some factors such as cigarette smoking and opiate-using, the present study was designed.

Method: We performed this descriptive-analytic study on 988 pregnant women referring to the Delivery Ward of Afzalipour Hospital, Kerman, Iran from February 2005 to September 2006. We analyzed the data using t-test and Chi-square test.

Results: From 988 subjects, 39.4% had preterm labor and 60.6% had term delivery. There was no significant difference between preterm and term groups in regard to their mean age (26.7 ± 5.6 and 26.5 ± 5.7 years), job, gravidity, educational level, abortion history, and periodontal or urinary infection ($p > 0.05$). In preterm group, the rate of previous history of preterm labor (56%) and family history of preterm labor (88%) were significantly more in comparison to term delivery ($p < 0.1$ and $p < 0.001$). In women with a cigarette smoker husband, the rates of preterm labor was 44.6% and term labor was 55.4%, while in the case of both couples being cigarette smoker the rate of preterm labor was 69.2% and term labor was 31.9% ($p < 0.0001$). In couples that were cigarette smoker and substance consumer, the rate of preterm was 77.4% and term labor was 22.6% ($p < 0.0001$).

Conclusion: The results of this study showed that women with personal and family history of preterm labor and women cigarette smokers and opiate-using should be considered as a major risk for preterm labor.

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Preterm labor with the prevalence rate of 5-18.5% is one of the major causes of prenatal morbidity and mortality. The contributing factors of preterm labor have not been identified completely. According to previous studies, maternal ages of <18 and >35 years are associated with a mild increase in the risk of preterm labor.¹⁻⁴ In some studies, low educational level has found to be responsible for two-times increase in the risk of preterm labor.^{2,5} There is a controversy about the effect of working out on the rate of preterm labor and in some studies stressful jobs and jobs with long working hours or those requiring standing position and walking for a long time had been associated with increased rate of preterm labor.^{1,2} History of preterm labor in previous pregnancies or in family is among major risk factors and younger gestational age ended to preterm labor is associated with higher probability of preterm labor in the current pregnancy.^{1,6} Periodontal infections have also been considered as effective factors on preterm labor and low birth weight,^{1,7} but this claim requires further studies. There is a controversy about the role of asymptomatic bacteriuria on the rate of preterm labor. Shieve et al¹ in a meta-analysis on 25746 pregnant women with bacteriuria have observed increased risk of low birth weight and preterm labor. Consumption of some substances such as cocaine, marijuana, narcotic drugs and cigarette has been considered as a risk factor for intrauterine growth retardation, low birth weight and preterm labor.⁸⁻¹¹ Recently, substance abuse during reproductive ages and pregnancy is increasing and consumption is rarely confined to only one substance.¹² According to WHO report, the most common consumed substances in Iran are respectively opium and heroine. Since there are no sufficient studies about the prevalence rate of opium consumption in pregnant women and its complications in pregnancy, the present study was aimed to determine the prevalence rate of preterm labor

and the role of its contributing factors with emphasize on opium consumption and cigarette smoking.

Methods. This descriptive-analytic study was carried out to determine the contributing factors of preterm labor. For this purpose, 988 parturient referring to the Delivery Ward of Afzalipour Hospital, Kerman, Iran from February 2005 to September 2006 were enrolled into the study. A checklist was used to record information about age, gravidity, job, educational level, history of abortion or preterm labor in the parturient herself or his family, cigarette smoking and opioid consumption in the parturient and her husband and history of periodontal and urinary infections during pregnancy. Preterm labor was attributed to the start of labor at gestational age of 20-38 weeks³ determined based on last menstrual period or in the absence of LMP based on ultrasonography in the first trimester. Only single pregnancies were included in the study. Data analysis was carried out by central distributional indices, t-test and Chi-square test.

Results. From 988 subjects, 39.4% had preterm and 60.6% term labor. Mean age of preterm subjects was 26.7 ± 5.6 years and that of term subjects were 26.5 ± 5.7 years that shows no significant difference between the 2 groups. Mean gestational age was 34.1 ± 3.3 weeks in preterm subjects and 38.9 ± 0.8 in term subjects that shows significant difference ($p < 0.001$). As it is seen in **Table 1**, 2 groups showed no significant difference in job, educational level and gravidity. Preterm group had higher rate of periodontal and urinary infection in comparison to the term group but the difference was not statistically significant. The prevalence rate of previous preterm labor (56%) and family history of preterm labor (88%) was higher in the preterm group (37.7%) comparing to the term group (38.1%) that both were significant ($p < 0.01$ and $p < 0.001$). In the present study, 3.9% of the subjects were cigarette smoker and 4.7% were narcotic consumer. Among narcotic users, 4 cases used heroine that were not excluded in the statistical analysis. Pregnant women were not the only consumer, in any of the cases that is both couples were either

Table 1 - The frequency distribution of subjects based on demographic features and obstetric history.

Group/materials variables	Preterm labor		Term labor		P value
	n	(%)	n	(%)	
Gravid					>0.05
1	183	(40.9)	264	(59.1)	
>1	203	(37.8)	334	(63.2)	
Job status					>0.05
Housewife	308	(38.3)	496	(61.7)	
Employee	66	(41.5)	93	(58.5)	
Educational level					>0.05
Illiterate	23	(45.1)	28	(54.9)	
Primary school	73	(42.4)	99	(67.6)	
Guidance school	13	(38.2)	21	(61.8)	
High school	66	(37.5)	110	(62.5)	
Diploma	148	(36.9)	253	(63.1)	
University	66	(42.9)	88	(57.1)	
History of preterm labor					<0.01
No	338	(37.7)	559	(62.3)	
Yes	51	(56.0)	40	(44.0)	
History of abortion					>0.05
No	308	(38.3)	497	(61.7)	
Yes	81	(44.3)	102	(55.7)	
History of preterm labor in family					<0.001
No	367	(38.1)	596	(61.9)	
Yes	22	(88.0)	3	(12.0)	
History of periodontal infection					>0.05
No	322	(38.8)	511	(61.3)	
Yes	67	(43.2)	88	(56.8)	
History of urinary infection					-0.51
No	298	(38.0)	486	(62.0)	
Yes	91	(44.6)	113	(55.4)	

smoker/substance consumer or not or just the husband was smoker/substance consumer. As it is shown in **Tables 2 and 3**, for both cigarette smoking and narcotic consumption, the prevalence rate of preterm labor is higher when both woman and her couple are consumers. **Table 4** shows that the highest prevalence rate of preterm labor is in the condition that both couples are smoker or narcotic consumer ($p < 0.0001$).

Discussion. Preterm labor is one of the major causes of prenatal mortality in a way that two-thirds of all prenatal deaths are due to preterm labor. According to WHO, preterm labor is attributed to labor before

37 completed weeks or 259 days of gestation based on LMP.⁶ The prevalence rate of preterm labor varies between 5-18.5% according to different studies.^{6,7,13} In the present study, the prevalence rate of preterm labor was 39.4%. This high rate may be due to high rate of referrals from all parts of the province to this center for its facilities in having neonatal intensive care unit. Two extremes of reproductive age range (>35 and <18 years) are associated with a mild increase in preterm labor rate.^{2,12} Age, itself, cannot be a causing factor and it is the presence of some accompanying factors such as the higher rate of sexual infections in young ages and hypertension or diabetes in old ages that increases

Table 2 - The frequency distribution of cigarette smoking in women and their husbands.

Group/ cigarette smoking	Preterm labor		Term labor	
	n	(%)	n	(%)
Neither the woman nor her husband	218	(34.8)	408	(65.2)
Only husband	144	(44.6)	179	(55.4)
Both the woman and her husband	27	(69.2)	12	(30.8)
$p < 0.001$				

Table 3 - The frequency distribution of narcotic consumption in women and their husbands.

Group/narcotic consumption	Preterm labor		Term labor	
	n	(%)	n	(%)
Neither the woman nor her husband	241	33.9	469	66.1
Only husband	116	50.2	115	49.8
Both the woman and her husband	32	68.1	15	31.9
$p < 0.0001$				

Table 4 - The frequency distribution of cigarette smoking and narcotic consumption in women and their husbands.

Group/cigarette smoking and narcotic consumption	Preterm labor		Term labor	
	n	(%)	n	(%)
Neither the woman nor her husband	209	(34.8)	392	(65.2)
Only husband: smoker	32	(29.4)	77	(70.6)
Only the husband: narcotic consumer	8	(36.4)	14	(63.6)
Only the husband: both smoker and narcotic consumer	106	(52.0)	98	(48.0)
Only the husband: narcotic consumer, both women and husband: smoker	3	(42.9)	4	(57.1)
Only the husband: smoker, both women and husband: narcotic consumer	7	(50.0)	7	(50.0)
Both woman and husband: smoker and narcotic consumer	24	(77.4)	7	(22.6)
$p < 0.0001$				

the probability of preterm labor. In the present study, 92.2% of the subjects were in the age group of 18-35 years, 1.8% in the age group of below 18 years and 6.4% were >35 years and there was no significant relationship between age and preterm labor ($p>0.05$). There is a controversy about the effect of mother's job and physical activity during pregnancy on the rate of preterm labor. In a case-control study on 101 preterm labor and 202 term labor, standing position for more than 2 hours a day and 35 hours a week and stressful jobs have been associated with increased risk of preterm labor (odds ratio = 3.9; 95% confidence interval = 1.53- 9.9),² while such relationship has not been observed in the study carried out in Scotland.¹ In the present study, 83.5% of the subjects were housewives and 16.5% worked out and there was no significant relationship between job and preterm labor rate ($p>0.05$). In some studies, low educational level has been reported to cause a two-fold increase in the rate of preterm labor that can be due to poor prenatal care and substance abuse in this class.^{2,14,15} In our study, no significant relationship was found between educational level and the rate of preterm labor ($p>0.05$). This fact may be related to the lower rate of cigarette smoking or substance abuse for pleasure among our women comparing to women in other societies. Previous history of preterm labor and history of preterm labor in the family increase preterm labor rate and in previous preterm labors with gestational age of 28-35 weeks this relation is more significant in comparison to the cases with gestational age of 36-38 weeks (RR= 2.1, RR=5).⁶ This relation was found in the present study too ($p<0.01$ and $p<0.001$) for previous history of preterm labor in the studied subject herself and in his family. Periodontal infections have been recently reported as the contributing factors of pregnancy complications such as preterm labor, intrauterine growth retardation and preeclampsia, but the involved mechanisms are not well known. In Offenbacher et al⁴ study, the prevalence rate of preterm labor in healthy subjects was 11.2%, while in women with moderate to severe periodontal problems was 28.6%. In our study, the presence of periodontal problems was determined by patients' history and as examination of pregnant women in this regard is not performed routinely, unless they have an acute problem, those with chronic periodontal diseases have been missed. There was no significant relationship between periodontal infections and preterm labor ($p>0.05$). There is no agreement about the role of asymptomatic bacteriuria and pyelonephritis in preterm labor. In a meta-analysis on 25746 pregnancies, Schiehe et al¹ observed an increased risk of low birth weight and preterm labor in these cases. In the present study, relationship between urinary infection and preterm

labor was not significant ($p>0.05$). In a study on 13073 single pregnancies, 25% of the pregnant women had history of cigarette smoking during pregnancy and those who had smoked more than 10 cigarettes a day showed increased rate of preterm labor (odds ratio= 1.35, 95% confidence intervals = 1.04-1.73).¹¹ In another study by Uncu et al¹⁹ on 499 pregnant women, 49.5% of women and 52.5% of husbands were cigarette smokers. The rate of preterm labor in smoker women was 24.5% and in nonsmoker women was 12.3%, while in those who had a smoker husband the rate of preterm labor was 23.3% ($p<0.05$). In the present study, 3.9% of women and 32.6% of husbands were smokers and preterm labor showed a two-fold increase in those couples that both were smokers ($p<0.0001$). Drug abuse during pregnancy is a major problem with an increasing rate and it is associated with a significant decrease in birth weight, gestational age at the time of labor, fetal head circumference and increased rate of placenta abrobtio.^{4,9,16,17} In a study carried out in England, 11% of the pregnant subjects were drug abuser, of whom 90% were in the age range of 15-39 years and multi abuser.^{14,18} In Ludlow study on 25291 pregnancies,⁹¹ cases used narcotics and 40 cases used amphetamine. In narcotic users, 20.6% ($p<0.0001$) and in amphetamine users, 26% ($p<0.001$) had preterm labor.¹⁹ In the present study, 4.7% of pregnant women and 23.3% of husbands used opium and the relationship between opium consumption and preterm labor was significant ($p<0.0001$). In cases that both couples were opium consumer, preterm labor increased 2 times. In cases that both couples were both smoker and opium consumer increase in preterm labor rate was 3.5 times higher that shows the effect of multiconsumption. Considering the obtained results and the importance of preterm labor, taking an exact history in relation to smoking and substance use in prenatal visits and recording them in prenatal care file are highly recommended.

In this way, high-risk cases can be screened for performing more prenatal cares and preventive measures. Although the prevalence rate of smoking and substance use in women is lower in our society comparing to other societies, training programs for women about the harmful effects of substance abuse on pregnancy is necessary. Moreover, further studies about the side effects of consumption of various substances on fetus and pregnancy outcome are recommended.

References

1. Cunningham FG, Leveno KJ, Bloom SL, Heuth JC, Gilstrap III L, Wenstrom KD. Williams Obstetrics. 22th ed. New York: Mc Graw- Hill; 2005. p. 364, 858-861.

2. Moutquin JM. Socio-economic and psychosocial factors in the management and prevention of preterm labour. *BJOG* 2003; 110 Suppl 20: 56-60.
3. Lumley J. Recent work on the epidemiology of preterm birth. *Acta Obstet Gynecol Scand* 2005; 84: 541-542.
4. Offenbacher S, Boggess KA, Murtha AP, Jared HL, Lief S, Mackaig RG, et al. Progressive periodontal disease and risk of very preterm delivery. *Obstet Gynecol* 2006; 107: 29-35.
5. Peacock JL, Bland JM, Anderson HR. Preterm delivery: effects of socio-economic factors, psychological stress, smoking, alcohol and caffeine. *BMJ* 1995; 311: 531-535.
6. Lumley J. Defining the problem: the epidemiology of preterm birth. *BJOG* 2003; 110 Suppl 20: 3-7.
7. Nabet C, Ancel PY, Burguet A, Kaminski M. Smoking during pregnancy and preterm birth according to obstetric history: French national perinatal surveys. *Pediatr Perinat Epidemiol* 2005; 19: 88-96.
8. Fajemirokun-odydeyi O, Sinha C, Tutty S, Pairaudeau P, Armstrong D, Philips T. Pregnancy outcome in women who use opiates. *Eur J Obstet Gynecol Reprod Biol* 2006; 126: 170-175.
9. Pelosi MA, Frattarola M, Apuzzio J, Lang A, Hug CT, Oleske JM, et al. Pregnancy complicated by heroin addiction. *Obstet Gynecol* 1975; 45: 512-515.
10. Uncu Y, Ozcakil A, Ercan I, Bilgel N, Uncu G. Pregnant women quit smoking; what about fathers? Survey study in Bursa Region, Turkey. *Croat Med J* 2005; 46: 832-837.
11. Polanska K, Hanke W. Influence of smoking during pregnancy on children's health –overview of epidemiologic studies. *Przegl Epidemiol* 2005; 59: 117-123.
12. Birnbach DJ, Browne IM, Kim A, Stein DJ, Thys DM. Identification of polysubstance abuse in the parturient. *Br J Anaesth* 2001; 87: 488-490.
13. Scott JR, Gibbs RS, Karlan BY, Haney AF. Danforth's Obstetrics and Gynecology. 9th ed. Philadelphia: Lippincott Williams & Wilkins; 2003. p. 173-177.
14. Morrison C, Siney C. Maternity services for drug misusers in England and Wales: a national survey. *Health Trends* 1995; 27: 15-17.
15. Ventura CS. Pregnancy in maltese drug –abusers: a socio- biology study. *Eur J Obstet Gynecol Reprod Biol* 2004; 115: 161-165.
16. Rayburn WF, Bogenschutz MP. Pharmacotherapy of pregnant women with addictions. *Am J Obstet Gynecol* 2004; 191: 1885-1897.
17. Shankaran S, Das A, Bauer CR, Bada HS, Lester B, Wright LL, et al. Association between patterns of maternal substance use and infant birth weight, length and head circumference. *Pediatrics* 2004; 114: 226-234.
18. Brazelton TB. What we can learn from the status of the newborn. *NIDA Res Monogr* 1991; 114: 93-105.
19. Ludlow JR, Evans SE, Hulse G. Obstetric and perinatal outcomes in pregnancies associated with illicit substance abuse. *Aust NZ J Obstet Gynaecol* 2004; 44: 302-306.