

Full Length Research Paper

Maternal risk factors associated with preterm delivery in Qom province of Iran in 2008

Zohreh Khalajinia¹ and Gholamreza Jandaghi^{2*}

¹Qom Izadi Hospital, Qom University of Medical Sciences, Iran.

²Qom College, University of Tehran, Iran.

Accepted 23 December, 2011

Immaturity is the most important factor of infant mortality. Knowing what group of pregnant women are more at risk of preterm delivery provides opportunities for more accurate care during pregnancy and rapid diagnosis of complications with trying to fix and make them to prevent preterm delivery. The objective of this study is to compare the maternal risk factors in premature infants. In this study, 400 patients were studied (200 preterm labor and 200 term delivery). The required information was gathered by interviewing patients and review records and finally the results were drawn using statistical methods. Between history of preterm delivery, diabetes, infectious diseases, dental disease, anemia and urinary tract infection and preterm delivery, a significant relationship was found. Between age, occupation, body mass index, housing status, mother's underlying disease, preclampsia and the time in medicine and preterm delivery, there was no significant relationship.

Key words: Preterm labor, risk factors, premature infants, mature infant, pregnancy care.

INTRODUCTION

Infant mortality rate is one important indicator of health of each country, and the Americans; since prematurity and complications involved in important causes of neonatal death is based on global statistics immaturity which is the cause of 60 to 80% congenital anomalies (Patrik, 2002). The initial cost of neonatal care in America in 2000 is reported about ten billion dollars over 60% of which is related to infants less than 37 weeks gestational age and 12% spent for 26 to 24 weeks infants care. Short-term complications in preterm neonates born includes hyaline membrane disease, air leak syndrome, remain open arterial duct, bleeding inside the brain ventricles is neonatal necrotizing enterocolitis. If survived, these infants are at risk of disability such as chronic pulmonary disease, visual disturbances and hearing, seizures, neurological and development disorders (Adams et al., 2004). Incidence of premature delivery in different communities is different. Statistics show that 9 to 12% of babies born in America and 5 to 7% in Europe are premature (Patrik, 2002). Another study showed that in

last 15 years, the rate of premature birth has increased two times (Sagot, 1999). A number of factors like maternal and fetal placental are involved in premature delivery. About one third of premature deliveries are due to complications in mother or fetus, preterm delivery which is high blood pressure, bleeding or restrictions intrauterine growth failure, cervical and uterine problems. The remaining two thirds occur as spontaneous preterm labor (Gunningham et al., 2005; Sigh et al., 2007).

In recent years, researchers have had many attempts to detect risk factors of spontaneous preterm delivery including Singh et al. (2005) who found a positive relationship between preterm delivery and urinary and vaginal infections (Sigh et al., 2007). Soren et al. (2004) reported an increased relative risk of preterm delivery for women with more than 42 h per week of work or more than 6 h a day in standing position (Saurel-Cubizolles et al., 2004). Cooper et al. (1996) reported that stress is associated with preterm delivery. To reduce the mortality and disability related to prematurity, it is essential to identify risk factors for preterm delivery. Coleman (1998) argue that if women at risk for premature delivery are to be identified, we will have a better prenatal prognosis (Coleman, 1998), so we decided to do a research on the

*Corresponding author. E-mail: jandaghi@ut.ac.ir.

factors associated with maternal risk of preterm delivery in Qom province in Iran to identify preventable factors and inhibition of preterm delivery to reduce premature deliveries.

MATERIALS AND METHODS

This study is a comparative cross-sectional study to determine the mother risk factors of preterm delivery. The study population included all singleton pregnant women over 28 weeks in all hospital in Qom from April to September 2008. According to the research done, there are several factors affecting the incidence of preterm delivery. With regard to the most common factor (prom) which was 30 to 40% for the case group (preterm delivery) and 8% for the control group (birth reached) and considering the 99% level of confidence and the same amount of power, the sample size was calculated based on the following formula:

$$n = \frac{2 \left(z_{\alpha} - z_{\beta} \right)^2 p (1-p)}{(p_0 - p)^2}$$

154 patients in each group were calculated; therefore, improving the accuracy, the number of the 200 patients in each group increased. Total samples were 400 of which 200 were women who had their pregnancies terminated before 37 weeks was considered as a case and the 200 women were randomly selected from pregnant women as the control group. The sample inclusion criteria were: Iranian, gestational age 28 to 42, live births, and hospital delivery on the first day of last menstrual period or ultrasound precision is below 20 weeks. In this way, the per Preterm birth control come next as it was intended. Exclusion criteria included samples of non-Iranian origin, gestational age less than 28 weeks, dead baby, twin and multiple pregnancies, home birth, placenta previa, alcohol consumption, cigarette smoking, irregular menstruation, forgetting the exact date or the first day of last menstrual following ultrasound 20 weeks pregnant and taking the pill before pregnancy.

Variables examined included age, body mass index, maternal education, partner education, occupation of mother, wife, job, family size, level of enjoyment of social support, residential status recurrent abortions, infertility history, contraceptive methods, congenital anomalies, systemic diseases of mother (diabetes, chronic hypertension, preeclampsia, history of heart disease, renal, infectious, urinary tract infection, oral diseases and anemia), membrane rupture, placental abruption, DT time in history of medicine and history of preterm labor. Tools for gathering data include patients' records and interview. To determine the validity of tools, the content validity was used. Reliability of Interview Form No. 1 (Select Research Unit) and Form No. 2 interview (demographic - family, social protection and health of the mother) was assessed based on the data from 20 people. The reliability coefficients for the two forms were 0.99 and 0.92 respectively. For statistical analysis, the SPSS software was used. Parameters for describing the data mean, standard deviation and frequency tables were used for comparing the groups using Fisher's exact test. Logistic regression tried to remove the effect of confounding variables. All tests were performed at 95% confidence.

RESULTS

During six months from April 2008 until September 2008,

there were 10913 births in all Qom hospitals of which 612 were preterm delivery. The mean gestational age in preterm deliveries was 33 weeks with standard deviation of 2 weeks. Findings showed that most subjects in both groups had ages 24 to 29 years (35% of pre-term group and 41% of the group term) so that the mean age of subjects in the preterm group, 26.28 ± 4.89 , and group term 26.27 ± 4.53 years. According to Chi square test, two study groups regarding age differences were not significantly different. Findings showed that most people (56% of pre-term group and 66% of term group) had normal body mass index (19.8 to 26). In preterm group, 12% and in term group 7%, lean body mass index (below 19.8), while 32% in preterm group and 27% term group were obese with body mass index above 26. Mean BMI (kg/m) in the preterm group 25.35 ± 5.58 and in term group was 24.82 ± 3.97 . Based on Fisher's exact test subjects in two groups were not significantly different in terms of occupation. So that in the preterm group, 92% and term group 90% were housewives. Subjects in two groups were not significantly different depending on the level of enjoyment of social support; so that most people in the preterm group (50%) and term group (56%) had high social support. In terms of education, 23% of cases and 26% control group had high school diploma and 19% of cases and 23% of controls were above high school, 5% of cases and 6% of controls illiterate. So the two groups were not significantly different.

Spouse education level in both groups was homogeneous. In preterm group, 5%, and term group, 6% of the spouses were literate. Most spouses in both groups (30% in the preterm group and 28% in the term) had education tips. According to Chi square test, two study groups were the same in terms of residential status in two groups with previous majority (46% of pre-term group and 41% term group) were less. Findings showed that most subjects in both groups (52% of pre-term group and 49% of term group). Regarding the presence of medical diseases or complications in current pregnancy or history of complications in first degree relatives, we observed that the underlying disease (heart disease, chronic hypertension, kidney), abortion, infertility history, previous hospitalized for congenital anomalies, preeclampsia and recurrent abortion with preterm labor is significant. But history of preterm delivery ($p = 0.000$), diabetes ($p = 0.000$), infectious diseases ($p = 0.000$), oral and dental diseases ($p = 0.01$), anemia ($p = 0.000$), membrane rupture ($p = 0.000$), placental abruption ($p = 0.000$) and urinary tract infection ($p = 0.03$) were statistically significant difference (Table 1). Controlling for confounding variables in term and preterm groups using logistics models (Table 2), results showed that 8% of preterm mothers and 1% of natural mothers had placental abruption with relative risk (odds ratio) about 8. 20% of premature mothers and 6% of natural mothers have a history of preterm delivery. The relative risk (odds ratio or the risk of prematurity in infants with mothers with a history of preterm delivery was 3.48). Results showed

Table 1. Factors related to medical history and midwifery in the study group.

P-value	Term	Preterm	Variable
0.06	4.0	0.0	Congenital anomalies
0.24	0.0	1.0	Heart disease
0.24	0.0	1.0	Chronic hypertension
0.24	0.0	1.0	Kidney diseases
0.31	10.0	12.0	Preeclampsia
0.17	2.0	5.0	Recurrent abortion
0.00	6.0	20.0	History of preterm delivery
0.00	2.0	12.0	Diabetes
0.00	0.0	5.0	Infectious diseases
0.01	6.0	13.0	Oral diseases
0.00	3.0	10.0	Anemia
0.03	21.0	31.0	Urinary tract infection
0.00	21.0	54.0	Membrane rupture

Table 2. Logistic model results for subjects under study.

Variable	Regression coefficient	Sig.	Odds ratio
Social class	0.395	0.04	1.48
PROM	1.33	0.00	3.78
History of preterm delivery	1.34	0.00	3.84
Separating pairs	2.18	0.00	8.88
Anemia	1.30	0.00	3.80
Diabetes	1.84	0.00	6.00

54% of premature mothers and 21% of natural mothers were suffering from 'prom', relative risk (odds ratio or the risk of prematurity in infants whose mothers had 'prom' was 3.78 times the mothers without prom).

64% of preterm mothers and 46% of natural mothers were classified in social class two (low class). The relative risk (odds ratio or the risk of prematurity in infants with mothers in low social class are 1.48 time the high class. 12% of preterm mothers and 2% of natural mothers had diabetes, the relative risk (odds ratio or the risk of prematurity in infants of diabetic mothers was 6 times those without diabetes. 10% of preterm mothers and 3% of natural mothers were suffering from anemia, the relative risk (odds ratio or the risk of prematurity in infants with anemic mothers approximated 2.8 times for those without anemia.

DISCUSSION AND CONCLUSION

Preterm labor is one of the serious complications of Midwifery. Premature birth increases the neonatal death rate in one hand and increases the disability of the other infants on the other hand which causes problems in its treatment and imposes enormous cost to the family and

society. Therefore, to reduce prematurity and mortality and disability related to this complication, it is essential to identify risk factors for preterm delivery. So, comparison between findings of this study with previous studies is informative and helpful. Singh et al. (2007) showed that urinary tract infection during pregnancy increases the risk of preterm delivery which was similar to the results in this study (Sigh et al., 2007). This study like other studies showed that the history of previous preterm delivery is a strong prognostic factor for recurrent preterm delivery, although in many cases unknown etiology is idiopathic (Drakeley et al., 2003). Diabetes before pregnancy is a risk factor of preterm delivery. Sibai et al. (2000) showed that 9% of women with diabetes give spontaneous birth before 35 weeks while the rate for women without diabetes is 4.5% (Sibai, 2000). In our study, diabetes was a risk factor of preterm labor. Anemia, especially in the first trimester of pregnancy was significantly associated with a bad fate pregnancy. Garshasbi and Fallah (2007) in a study showed that the relative risk of preterm birth in anemic mothers is 3.6 times of mothers without anemia which is consistent to our study (Garshasbi and Fallah, 2007). There have been a number of investigations on the relation between preterm delivery and oral disease.

Researchers in a prospective trial on more than 1300

women showed that periodontal disease is associated with increased preterm delivery (Hauth et al., 1998) which is similar to our study. Based on reliable sources, preeclampsia, abortion and congenital anomalies were the frequent causes of premature delivery. While in our study, the rate of preeclampsia (12 versus 10%) and recurrent abortion (5 versus 2%) resulted in a non-significant difference in the two groups which may be due to small sample size. The congenital anomalies were observed only in the control group. Etiology of preterm delivery is one of the most interesting issues in midwifery in the world. Although in many cases, its etiology is unknown, but according to the findings, factors such as history of preterm labor, diabetes, infectious diseases, oral diseases, anemia and urinary tract infections during pregnancy in the Hungarian rising premature birth are involved. A number of these factors such as oral diseases, anemia and urinary tract infection in the mother during pregnancy can be prevented with regular care during pregnancy. Identification of risk factors can prevent premature delivery to reduce their infant mortality and improve health indicators. But a number of risk factors for preterm delivery are not preventable, so, when this complication appears inevitable, it is required to refer the mother to a center with neonatal intensive care unit.

ACKNOWLEDGEMENTS

This study was done by supports from the financial management organization and planning. Thanks are given to the deputy council of respected research and Qom University of Medical Sciences.

REFERENCES

- Adams K, Eschenbach D, Kristina M (2004). The genetic contribution towards preterm delivery. *Seminars in Fetal Neonatal Med.*, 9: 445-452.
- Coleman AC (1998). Fetal fibronectin detection in preterm labor : Evaluation of prototype beside dipstick technique and cervical assessment, *Am. J. Obs. Gyn.*, 179(6): 1553-1558.
- Cooper RL, Goldenberg RL, Das A, Elder N, Swain M, Norman G, Ramsey R, Cotroneo P, Collins BA, Johnson F, Jones P, Meier AM (1996). The preterm prediction study: maternal stress is associated with spontaneous preterm birth at less than thirty-five weeks' gestation. National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network. *Am. J. Obstet. Gynecol.*, 175(5): 1286-1292.
- Drakeley AJ, Robert SD, Alfirevic Z (2003). Cervical cerclage for prevention of preterm delivery : meta -analysis of randomized trials. *Obstet. Gynecol.*, 102: 621-70.
- Garshasbi A, fallah N (2007). Maternal hematocrite level and risk of low birth weight and preterm. *Tehran Univ. Med. J.*, 64(4): 87-94.
- Gunningham FG, Gant NF, Leveno KJ, Gilstrap LC, Tauth JC, Wenstrom KD (2005). *Williams Obstetrics*. 22st ed. New York: MC Graw-Hill, pp. 855-881.
- Hauth JC, Andrews WW, Goldenberg RL (1998). Infection – related risk factors predictive of spontaneous preterm labor and birth . *Prenat. Neonat. Med.*, 3: 36.
- Patrik SR (2002). Obstetric management of prematurity In : Avroy (ed) . *Neonatal perinatal medicine* . Philadelphia , Mosby, p. 287.
- Sagot P (1999). What are the current limits for prematurity. *Press Med.*, 289360: 1993-1998.
- Saurel-Cubizolles MJ, Zeitlin J, Lelong N, Papiernik E, Di Renzo GC, Breart G (2004) Employment, working conditions, and preterm birth: results from the EUROPOP case-control survey. *J. Epidemiol. Commun. Health*, 58: 395-401.
- Sigh U, Singh N, Seth S (2007). A prospective analysis of etiology and outcome of preterm labor . *J. Obstet. Gynecol. India*, 57(1): 48-52.
- Sibai BM, Caritis S, Hauth J (2000). Risks of preeclampsia and adverse neonatal outcomes among women with pregestational diabetes mellitus. *Am. J. Obstet. Gynecol.*, 182: 364.