

Prevalence and Risk Factors of Preterm Labor in Health Educational Centers of Northwest Iran (2009-2010)

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Abstract: Preterm labor is a major cause of infant mortality and morbidity. Complications of preterm labor may be followed by a lifetime disability; also taking care of premature infant needs a wide range of equipment and services. So calculating the prevalence and defining risk factors of preterm labor can lead to develop preventive methods. Therefore aim of this study is calculating the prevalence and defining risk factors of preterm labor. This is a descriptive-analytic study in which 960 pregnant women referred to clinical-educational centers of Ardabil Province were assessed during a 6 months period; 480 of them had preterm labor and 480 of them had full-term labor. The information was gathered through interviews and patient's medical profile. Finally the results were evaluated with SPSS 15, chi square, Mann-whitney U and regression statistical test. Prevalence of preterm labor was 13.4% and there was a statistically Significant relation between preterm labor and predisposing factors such as types of pregnancy (wanted or unwanted), degree of consanguine, education level, history of infertility, drug consumption, pyelonephritis during pregnancy, eclampsia, multiparity, anemia, uterine anomalies, multigravidity, gestational age, cervical defects, neonate's gender, birth weight and disorders of amniotic fluid. But there was no statistically significant relation between preterm labor and factors such as residence condition (rural and urban), smoking, indirect exposure to tobacco smoke, iron and folic acid supplements, weight, height and age of mother, body mass index(BMI), Vaginal bleeding, urinary and uterine infections, duration of work time, history of preterm labor, rupture of membranes, Apgar score, type of present delivery, periodontal problems, mother's occupation, psychological pressure, history of abortion and stillbirth and history of surgeries and diseases. Out of this study's findings, multiparity, multigravidity, anemia, drug consumption, type of pregnancy, consanguine, eclampsia have been defined as risk factors of preterm labor. These risk factors are relatively preventable; they can be reduced with pre-marriage consultation, health care before pregnancy and effective prenatal care.

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Key words: Preterm labor, Prevalence, Risk factors.

1. Introduction:

Birth is one of the crucial and vital stages throughout human life span .During birth procedure we confront physical and emotional pressures. Obviously giving birth to a premature infant as regards lack of essential evolution of physical system, birth process gets more complicated; so preterm labor is one of the most crucial issues in current medical society. Beside premature infants need (equipped tools and a lot of expenses for taking care of them) complication of preterm labor may be followed by a life time disability. (1)

According to reports of “Ministry of Health and Medical Education “ prevalence of preterm labor has been estimated 8%, also Preterm labor is the main reason of infant mortality (75%) and neonatal mortality. Although majority of preterm newborns survive, even late preterm births have a significantly greater risk of mortality than infants born at term. (2)

Many researchers have focused on the relationship between birth weight and growth scale of baby. Although infants with low birth weight have a quick growth through infancy, they can't reach the weight and height of a similar normal new born infant. As a result these infants will be shorter than their peers in adolescence and adulthood (3).

Since other infant mortality reasons like socioeconomic quintiles, diarrheal diseases and etc. have been decreased, this problem hasn't been solved and composes the most important issue in pediatrics (3-6).

Prematurity and low birth weights are the key factors of 35% all of Medicare expenses for infants (4). Preterm Birth is a major economic burden in United States. It's estimated that about 40% (\$6-10 billion per year) of all the expenditures on infant health care is related to pre-maturity. (7-10) even though only about 12-13% of all infants are born preterm.(11)

Respiratory distress syndrome, low blood glucose level, pneumonia, convulsion, apnea and gut necrosis which lead to infant death have a mutual relationship with preterm labor (12).

In the study of ZafarGhandi et al. there was a statistically significant relation between consanguinity marriages and preterm labor (13).

In a study by Weiss et al. there was a statistically significant relation between light vaginal bleeding (spotting) and severe vaginal bleeding (like menstrual bleeding) and miscarriage before 24th week and preterm labor. (14)

In the study of Elsenbruch (2006), smoking increases preterm labor chance as well as low neonatal birth weight (15).

So due to the failure of current remedies to decrease preterm labor new remedies are required and since no familiar studies have been performed about prevalence and risk factors of preterm labor in Ardabil province as well as preventing infant mortalities specially because of prematurity, we decided to perform a study about "Analyzing preterm labor prevalence and its risk factors in clinical-educational centers of Ardabil province". According to results of this study we can plan for preventing preterm labor and improve survival and health condition of pregnant women and infants, also as a result we can reduce premature infant mortality rate.

2. Materials and Method:

This is a descriptive-analytic study performed to determine the level of preterm labor prevalence and risk factors of it in clinical-educational centers of Ardabil province. Study population was consisted of 20-42 weeks pregnant women (20-37 week pregnant women as study group and 37-42 weeks pregnant women as a comparative group) who had attended clinical-educational centers of Ardabil province for 6 months (Jun-Dec 2009). These women were referred to one of the clinical-educational centers of Ardabil province.

In 6 months, 3575 parturitions occurred, which included 480 less than 37 weeks pregnant women (study group). To investigate parental and environmental factors affecting preterm labor, 480 full-term women were chosen as a comparative group. So for each preterm labor case, one full-term woman was considered as a control case. Study inclusion criteria were consisted of:

- 1) Women who had labor birth between 20-42th week (since the last menstruation) or had pregnancy age of 20-42 weeks according to their ultra-sonographic reports in their early pregnancy.
- 2) Willing to participate in this study.
- 3) Giving birth in one of the clinical-educational centers of Ardabil province.

(Alavi Ardabil and Imam Khomeini Khalkhal).

Information was gathered with a check list including 4 sections, personal features (7 questions) social-economy features (3 questions), fertility features (21 questions) and neonate features (8 questions) data were acquired by an interviewer and using patient's profile.

In order to confirm reliability of check list, content validity method was used. So researcher prepared a questionnaire according to the aims of the study and after analyzing various books and publications. After correction and confirmation of check list by consultant professor, it was presented to 8 professors of Nursing and Midwifery faculty of Tabriz University of medical sciences, in order to be evaluated. After reviewing the check list as well as doing required reformations and confirmation by guidance professor, check list was ready to be used.

After describing each group, In order to analyze data, chi square and T test was used to analyze independent groups' relation between Independent variable elements of study and preterm labor incidence. Also, to control confounding factors (bias) logistic Regression model was used.

Among variables, those which were related to preterm labor and had $p < 0.1$ were considered in Regression model. Also odds ratio with confidence interval of 95% was used in order to estimate the risk of each variable. In this study $p < 0.05$ was considered statistically significant.

This study was approved by ethical committee of Tabriz medical Science University.

3. Results:

Preterm labor prevalence in clinical-educational centers was 13.4%. Average pregnancy age was 33 weeks (33 ± 3). In reviewing personal and social conditions of studied population there was a statistically significant relation between degree of consanguinity, pregnancy type (wanted or unwanted) and educational level (table.1). No significant difference was observed between control and study group (method of living, drug consumption, smoking and indirect exposure to tobacco smoke, health care methods during pregnancy and physical stress).

In term of existing sickness or midwifery complications in current labor or patient history, a meaningful relationship between anemia, eclampsia and pyelonephritis and preterm labor was detected. (table.2).

Among all pregnant women, 51.7% of women with preterm labor and 49.8% of full-term women had undergone cesarean procedure. According to statistic Regression test there wasn't any significant difference in delivery type between two groups (table.3).

4. Discussion:

In most of conditions, preterm neonate treatment complications can result in temporary or permanent side effects and it requires spending great deal of time and money. (4) In a study performed by Lotf Ali Zadeh et al. prevalence of preterm labor was 16.4% in Imam Reza Hospital of Mashhad province in 2005.(16)

In our study Effect of mother's occupation in preterm labor was reviewed. 4.6% of preterm labor women had occupation whereas in control group it was 5.8%. So there wasn't any meaningful relation between mother's occupations and preterm labor. In a study by Maria and Santiago et al. there wasn't any relation between preterm labor rate and mother's occupations (17, 18). Similarly in our study there

wasn't any statistically significant relation between mother's occupation and preterm labor.

Analyzing the effect of working hours on preterm labor shows that 6% of study group and 9% of control group had 4-8 working hours (standing and working more than 3 hours) and there wasn't any statistically significant between working hours in these two groups. Some scientists believe that having occupations especially those requiring long-period standing decrease the average pregnancy duration. (15)

In some studies, there was a statistically significant relation between long periods of standing or walking(work demanding physical power and long work hours)and preterm delivery(20,21);unlike our results.

Table.1 Frequency of studied variables (individual and social) sample and control groups in health educating centers in Ardabil Province, 2009.

Variable		Preterm Labor		Term Labor		Chance%	Confidence Distance95%	P
		Percentage	Number	Percentage	Number			
Habitate	City	56.3	270	57.1	274	1.1	0.6-1.8	0.3
	Village	43.8	210	42.9	206			
BMI	Obese	9.8	47	12.3	59	0.9	0.6--1.5	0.3
	Thin	11.7	56	10	48			
	Normal	43.5	209	50.9	240			
	Overweight	22.5	108	20.9	96			
Type of Pregnancy	Planned	79.2	380	88.8	426	3.2	2.1-4.8	<0.002
	Miss time	9.2	44	3.3	16			
	Unwanted	11.7	56	7.9	38			
Occupation	Housekeeping	95.4	458	94.2	452	1.1	0.6-1.8	0.7
	Employed outside house	4	19	5.4	26			
	Employed inside house	0.6	3	0.4	2			
consanguinity	Yes	30.6	147	20.4	98	2.2	1.6-3.3	0.01
	No	69.4	333	79.6	382			
Degree of Consanguinity	1	46.4	68	39.2	38	2.5	1.2-5.2	<0.04
	2	30.8	45	20.6	20			
	3	19.9	20.9	21.6	21			
Level of Education	Illiterate	0.2	25	4.2	20	1.5	0.7-2.8	
	Literate	3.3	16	3.5	17			
	Primary school	27.9	134	22.3	107			
	Guidance school	24.8	119	20.5	98			
	High school	14.2	68	13.3	64			
	Diploma	16	77	21.7	104			
Academic	8.5	41	14.4	69				
		SD±Mean		SD±Mean				
Average Weight		62.2± 10		62.1 ±11		0.94	0.6-1.4	0.6
Average Height		160.1 ±6.2		159.4± 4.9		0.71	0.4-1	0.07
Average Age		26.3 ±6.1		26 ±5.8		1.4	2.4-0.7	0.2

Table 2. Frequency of studied variables based on sample and control groups.

Variable	Preterm Labor	Term Labor	Confidence Distance95%	Chance	P
	(Percentage)Number	(Percentage)Number			
Acquired Diseases	31(6.5)	33(6.9)	0.9-6.5	2.3	0.08
Premature Rupture of Membrane	195(40.6)	5(1)	0.2-8	1.3	0.9
Pregnancy Toxemia	66(13.8)	27(5.6)	1.03-3.2	1.41	<0.001
Uterus Anomaly	8(1.7)	0(0)	1.7-4.9	2.9	0.001
Accute Pylonephritis	10(2.1)	1(0.2)	1.2-2.9	1.6	0.03
Fetal Abnormality	1(0.2)	0(0)	0.6-2.21	1.23	0.9
Anemia	175(9.6)	110(0.4)	1.1-3.95	1.49	<0.001
Twin	46(14.9)	2(0.4)	1.06-3.9	2.3	<0.001
Cervical Insufficiency	20(4.2)	7(1.5)	0.8-1.7	1.6	0.04
Fetal Mortality	33(6.9)	0(0)	0.5-3.01	1.2	0.3
Infectus Disease	214(27.1)	90(15.4)	1.2-7.5	3	0.07
Amniotic Fluid Volume Disorders	21(4.4)	0(0)	1.07-6.3	3.3	<0.001
Bleeding in first stage of pregnancy	128(11.6)	29(1.3)	1.2-4.5	1.5	0.003
Surgeries	5(1)	5(1)	0.1-2.3	1.4	0.1

Table 3. Estimating chance and confidence distance of labor type and outcome based on sample and control groups

Variable	Confidence Distance95%	Chance	P
Type of Pregnancy	0.4-5.1	0.9	0.2
Neonate Abnormalities	0.7-2.8	1.1	0.3
Neonate Gender	0.1-2.2	1.8	0.2
Neonate Weight	1.5-3.8	2.3	<0.001
First Minute Apgar	0.8-1.8	0.93	0.8

In the study of Elsenbruch, smoking increases preterm labor chance as well as low birth weight (19). In a study by Delaram, results show that exposure to tobacco smoke in pregnancy can increase chance of preterm labor (22). In our study however, there

wasn't any statistically significant relation between smoking or indirect exposure to tobacco smoke and raising the chance of preterm labor. Amount of smoking and drug abuse in current research among women with full-term and preterm labor was low

mostly because of religious training and cultural ethics (22).

History of infertility without ovulation stimulating medicine and using reproductive assisting methods can increase preterm labor rates same as the results of our study mentions (23). Irregular care service for term labor was 10.2% and for preterm labor was 2.7%. So, it's higher in full-term labor women. Unlike our study, in some studies there was a statistically significant relation between insufficiency and lack of prenatal care with preterm labor (17, 24, 25). In contrast to our study's result, in the study of Mercer et al., there was a connection between stress and spontaneous preterm labor (26).

Effect of consanguinity on preterm labor was analyzed. there was a statistically significant relation between family rate and its degree with preterm labor (table.1). In the study of ZafarGhandi et al. there was a statistically significant relation between consanguinity marriages and preterm labor (13). In the study of Weiss et al., there was a statistically significant relation between light vaginal bleeding (spotting) and severe vaginal bleeding (like menstrual bleeding) with miscarriage before 24th week and preterm labor (14). In our study there wasn't any statistically significant relation between vaginal bleeding and preterm labor based on Logistic Regression results.

In the study of Creazy, premature rupture of fetal membrane is a reason of preterm labor (40%) (16). In the study of Baurm et.al, eclampsia accompanied by increasing preterm labor risk (16). In our study there was a statistically significant relation between twin pregnancies and preterm labor.

In a study on normal embryos which suffered from oligohydraminus before 37th week of pregnancy, there was a 3-fold increase in preterm labor rates. Change in Amniotic fluid volume (increase or decrease) had statistically significant relation with preterm labor (25); same as our results.

In a study by Lumley et al. about the association between prior spontaneous abortion and prior induced preterm birth, there was a statistically significant relation between abdominal inflammation processes like inflammatory bowel disease, appendicitis, pylonephritis and fetal mortality and preterm labor (27); which is similar to our results.

33.3% of preterm women and 28.1% of full-term women had periodontal problems. According to chi square test, there wasn't any statistically significant relation between two groups; in contrast, in a study by Jeffcoat et al., periodontal problems were accompanied with increase in preterm labor rates in all gestational ages (28).

In our study there was a statistically significant relation between cervical defects and preterm labor which is approved by many medical references.

Unlike our results, Calass et al. concluded that anesthesia and surgeries can increase preterm labor chances (29).

In the study of Astolphy like ours, preterm labor is more common in male sex and there was a statistically significant relation between genders of neonate and preterm labor (30); that is the same as our results. Among these findings labor experience, anemia, consuming drugs in pregnancy, type of pregnancy, consanguinity with spouse and eclampsia were announced as risk factors and they were somehow preventable and can be reduced with premarital counseling, prediction before pregnancy and efficient caring in pregnancy.

It's required to perform further studies with higher population in larger scale.

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