

## The Prevalence Rate and Risk Factors for Preterm Delivery in Tehran, Iran

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ARTICLE INFO	ABSTRACT
<p><i>Article type:</i> Original article</p>	<p><b>Background &amp; aim:</b> Preterm delivery is one of the most important problems in pregnancy, as it is the primary cause of 75% of prenatal mortality and morbidities. This study aimed to determine the prevalence rate and risk factors for preterm delivery in Tehran, Iran.</p> <p><b>Methods:</b> In this cross-sectional study performed in eight random hospitals from five different regions of Tehran (North, South, West, East, and center), the prevalence rate of preterm delivery was appraised and the most frequent risk factors were identified. Samples were divided into preterm delivery (n=140) and term delivery (n=100) groups. Questionnaires were completed through interviews with mothers and using patient records. To analyze the data, Chi-square test was run, using SPSS version 16.</p> <p><b>Results:</b> About 13,281 deliveries were included in the study. The highest and lowest prevalence rates of preterm delivery were 6.30% and 0.77% in the North and East regions of Tehran, respectively. The overall prevalence rate of preterm delivery was 1.52% in Tehran. In the preterm group, age <math>\geq 35</math> years, pre-mature rupture of membranes, bleeding, gestational hypertension, history of preterm delivery and abortion, multiple pregnancy, and preeclampsia were significantly more frequent than the term delivery group.</p> <p><b>Conclusion:</b> The overall prevalence rate of preterm delivery was 1.52% in Tehran. Spontaneous preterm birth was one of the major causes of maternal and neonatal morbidity; therefore, identification of its risk factors would be beneficial.</p>
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### Introduction

As a primary cause of neonatal mortality, preterm birth (childbirth <37 weeks) presents a major public health problem, since 15 million annual births or 11% of all births worldwide are preterm (1). Approximately 90% of preterm births occur in developing countries, with 11 million (85%) in Africa and Asia, and 0.9 million in Latin America and the Caribbean.

Prematurity is the leading cause of neonatal deaths and short- or long-term morbidities, implicating adverse consequences for not only individuals, but also their families, health agencies, facilities, and societies. The highest preterm birth rates occur in low-income settings, where the majority of preterm deliveries are caused by spontaneous labor (2).

Maternal complications such as infectious diseases and hypertension are the most common direct causes of preterm delivery (1). The prevalence of preterm delivery in Iran was reported to range between 5.6% and 13.4% (3).

Preterm delivery is the cardinal cause of fetal mortality and morbidities such as cerebral palsy, severe brain injury, retinopathy, necrotizing enterocolitis, and respiratory disorders (4). Compared to normal children, the risk of motor sensory disorders, learning disabilities, and behavioral complications is higher in premature children (5). A multitude of factors can contribute to this condition including low levels of maternal hemoglobin, gestational weight gain (6-8), biological and genetic factors,

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and some other maternal or fetal medical conditions some of remain unknown. With respect to the global importance of preterm delivery and considering the cultural and lifestyle differences among populations, determining the risk factors of this condition is essential (7).

Preterm birth is a pathological outcome of pregnancy and a major global health problem. Therefore, identification of its prevalence rate and its risk factors would be beneficial. Thus, this study aimed to determine the prevalence rate and factors affecting preterm delivery in eight hospitals located in five different regions of Tehran, Iran.

## Materials and Methods

In this cross-sectional study performed in eight random hospitals located in five different regions of Tehran, Iran, 2015, the prevalence rate of preterm delivery was calculated. Sampling was performed in three steps; at the first step, Tehran was divided into five regions of North, South, East, West, and center. At the second step, in each of the areas, hospitals were selected randomly using cluster sampling method, eight hospitals from North (1 hospital), South (2 hospitals), East (1 hospital), West (2 hospitals), and center (2 hospitals) were selected. At the third step, in each hospital, the total numbers of births and preterm births were recorded, and then the prevalence rates were appraised.

In the pilot study conducted in Taleghani and Shohada hospitals of Tehran, the prevalence rate of preterm delivery was reported to be 6.0%, which was in line with former international reports (7). According to this pilot study, the standard sample size for identification of the risk factors for preterm delivery was calculated to be 87 for each group; however, the sample size was slightly extended to achieve higher accuracy in results. The samples were divided into two groups of preterm delivery (n=140) and term delivery (n=100).

The number of samples from each hospital was determined. The participants from each hospital were randomly chosen through convenience sampling. We investigated the risk factors for preterm delivery in 140 women who delivered preterm and 100 women who

experienced term uncomplicated delivery.

The inclusion criteria in the case group included aged between 15 and 45 years and diagnosis of preterm delivery (with gestational age 28-36 weeks), and in the control group the inclusion criterion was term uncomplicated delivery (with gestational age 38-42 weeks). The two groups were matched in terms of maternal age and occupation.

The exclusion criteria comprised of aged below 15 and above 45 years and incomplete medical records. Similar to former studies, we defined prematurity with respect to gestational age (childbirth prior to 37 weeks of gestation) (9).

The self-made questionnaire was completed through interviews with mothers and using hospital records. The face and content validities of the data collection instrument were confirmed by 10 faculty members of Tarbiat Modarres University of Tehran. Test-retest reliability in the pilot study, which was performed in 15 women experiencing preterm delivery (they were not included in the samples) with a two-week interval, was found to be 0.87.

The internal consistency reliability of the questionnaire was calculated by Cronbach's alpha coefficient. The overall Cronbach's alpha coefficient of the questionnaire was  $\alpha=0.91$ . Written consent was obtained from all the samples. The study protocol was approved by the Ethics committee of Tarbiat Modarres University of Tehran, Iran, and was conducted according to the Declaration of Helsinki (Good Clinical Practice Guidelines).

Continuous and categorical variables were presented as mean $\pm$ standard deviation and percentiles. To analyze the data, Chi-square test was run using SPSS version 16. P-value less than 0.05 was considered statistically significant.

## Results

Kolmogorov-Smirnov test demonstrated normal distribution of the mean scores of the samples in all the subscales ( $P<0.05$ ). This descriptive, analytical, and cross-sectional study was conducted in 13,281 deliveries to determine the prevalence of preterm labor in Tehran, Iran, 2013. The results indicated that the prevalence rate of preterm delivery was 6.30% in North, 1.30% in South, 0.77% in East,

4.19% in West, and 1.11% at the center of Tehran. The overall prevalence rate of preterm

delivery was 1.52% (Table 1).

**Table 1.** Prevalence rate of preterm birth in Tehran, Iran

Region	Total No. of deliveries	No. of preterm deliveries	Percent of preterm deliveries
North	714	45	6.30
South	6727	88	1.30
West	525	22	4.19
East	3519	27	0.77
Center	1796	20	1.11
Total	13281	202	1.52

In this study, 140 preterm deliveries and 100 term deliveries in eight hospitals were compared. The results indicated that 13.5% and 2% of the mothers in the two groups were aged above 35 years, respectively; the difference between the two groups was significant ( $P=0.04$ ). In the preterm and term delivery groups, the rates of premature rupture of membranes (PROM) were 37.8% and 3.0% ( $P=0.005$ ), the rates of vaginal bleeding

secondary to placental problems were 19.3% and 3% ( $P=0.008$ ), the rates of gestational hypertension were 17.1% and 5%, the rates of preterm history were 9.3% and 4%, the rates of abortion history were 22.8% and 8%, the rates of multiple pregnancy were 7.1% and 2%, and the rates of preeclampsia were 5.7% and 1%, respectively. The two groups were significantly different in terms of the mentioned parameters ( $P<0.05$ ; Table 2).

**Table 2.** Comparison of the risk factors of preterm birth in the samples

Variable	Preterm delivery	Term delivery	P-value
	(n=140)	(n=100)	
	No.(%)	No.(%)	
Maternal age $\geq$ 35	19(13.5)	2 (2.0)	0.04
PROM*	53(37.8)	3(3.0)	0.005
Vaginal bleeding	27(19.3)	3(3.0)	0.008
Gestational hypertension (130/90mmHg)	24(17.1)	5(5.0)	0.01
Preterm history	13(9.3)	4(4.0)	0.03
Abortion history	32(22.8)	8(8.0)	0.02
Multiple pregnancy	10(7.1)	2(2.0)	0.01
Preeclampsia	8(5.7)	1(1.0)	0.02

\* Premature rupture of membranes

## Discussion

Despite the substantial advancement in care of premature infants, prevalence of preterm birth has not diminished (10). The prevalence rate of preterm delivery in the European and other developed countries lies between 5% and 9% (11). The occurrence of preterm birth in East Asian and Hispanic women is low. However, the incidence of preterm birth is on a growing trend.

In the current study, the prevalence of preterm delivery in the five regions of Tehran were different with the highest and lowest rates reported from North (6.30%) and East (0.77%) of Tehran, respectively.

The prevalence of preterm delivery in women aged over 35 years was significantly higher. Several studies examined the relationship between preterm delivery and advancing maternal age as well as vaginal infection (12-15). Shrim et al. (2011) reported that advanced maternal age was an important risk factor for adverse pregnancy outcome, particularly for preterm births (16). Accordingly, Schempf et al. described high risk of preterm birth among older primiparous women in the USA, and to a lesser extent among older multiparous women (17). These findings were consistent with those of the present study.

Our results indicated that the frequency of

preterm birth in mothers with PROM was significantly higher, which is in line with results of other studies (12). Other studies reported that, 20-25% of preterm births were related to PROM, and PROM was associated with preterm delivery in 40-45% of the cases. PROM together with spontaneous preterm labor accounts for almost 75% of all cases of preterm birth (18). Ifoma et al. also reported that the prevalence of preterm birth in mothers with PROM was higher (18).

In the current study, the frequency of vaginal bleeding in preterm births was significantly higher. Another study revealed that vaginal bleeding in early pregnancy was an independent risk factor for preterm delivery. A former study reflected a two-fold increase in the risk of preterm birth in mothers who had bleeding in the first trimester of pregnancy compared to mothers with no vaginal bleeding (19). Even women with only light vaginal bleeding were at a significantly increased risk of preterm birth (20).

The results of a study by Morisaki *et al.* (21) demonstrated that the risk of preterm labor in mothers suffering from preeclampsia or chronic hypertension was higher than in others. Our findings indicated higher frequency of gestational hypertension and preeclampsia in mothers with preterm birth. History of preterm birth was the strongest risk factor for recurrent preterm birth, and recurrences often occur at a similar gestational age. Small for gestational age and preterm births in singleton pregnancies are highly probable to recur in subsequent pregnancies (22).

In the present study, the risk of preterm birth was higher in women with history of preterm birth and abortion. These results were supported by other studies (23, 24). In the present study, the relationship between multiple pregnancy and preterm labor was found to be significant, which is consistent with the results of other similar studies (17, 18, 25-27).

The overall prevalence rate of preterm delivery was 1.52% in Tehran, Iran. Spontaneous preterm birth is a major cause of maternal and neonatal morbidity. Thus, identification of maternal risk factors, promoting awareness, and implementing medical interventions to diminish the rate of

preterm delivery would be beneficial. The main limitations of the present study were the small sample size of the study groups and some incomplete hospital records.

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### Conflicts of Interest

The authors declare no conflicts of interest.

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