# The Effect of Paternal Age on Preterm Births; a Survey of 281 Cases

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**Abstract**

**Objective:** To determine the effect of paternal age on preterm births in Iranian neonates.

**Materials and methods:** From January 2005 to January 2006, two hundred eighty one preterm neonates born in Mirza Kuchakkhan Hospital enrolled in this cross-sectional study. A structured questionnaire was applied for recording following data: birth weight, sex, gestational age, maternal age and paternal age. The study was limited to neonates whose maternal age was between 20 and 30 years to eliminate its confounding effect.

**Results:** Near 50% of fathers were between 30-39 years old and more than half of neonates had gestational age between 35-37 weeks. There were no relation between either paternal age (p= 0.1) or birth weight (p=0.5) and neonatal gestational age. In women with parity one, there was not significant difference between gestational age among different paternal age levels ( p= 0.6) as well as women with parity two and three (p=0.2, p=0.3).

**Conclusion:** Paternal age has no effect on gestational age and birth.

**Keywords:** paternal age, gestational birth, preterm birth, Iran

## Introduction

Preterm delivery, defined as delivery before 37 weeks of gestation is one of the most and important causes of perinatal mortality and morbidity.

All premature babies are at risk for health problems like Respiratory distress syndrome (RDS), Intraventricular hemorrhage (IVH), Patent ductus arteriosis (PDA) and Retinopathy of prematurity (ROP) (1).

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Previous studies suggest very premature babies may be at increased risk of developing problems in adulthood, such as diabetes, high blood pressure and heart disease (2).

Preterm birth has many leading causes such as social factors, stress, infections, pregnancy due to ART (assisted reproductive technologies) methods (3). Maternal factors like maternal smoking, genetic, underlying diseases, occupation, parity, race and age are established risk factors for duration of pregnancy (4). On the other hand, fathers play as equal as mothers in genetic formation of fetus but little is known about paternal role in pregnancy outcome and fetus well-being. Father's birth weight has been believed as a predictive factor for fetus birth weight

which suggested having correlation with paternal height (5). Sharing HLA by parents and influence of environmental factors on paternal germ cells may have roles in pregnancy outcomes such as preterm delivery (6). Advanced paternal age has been believed as a predisposing factor of congenital anomalies in addition to increased risk of heart defects, tracheoesophageal

fistula, Esophageal atresia and Down's syndrome (7). Also, previous studies showed that fetal death, first trimester abortion, pre-eclampsia, dyslexia, acute lymphatic leukemia and schizophrenia are associated with older age of fathers (8-14).

The goal of this study was to determine effect of paternal age on preterm births.

## Materials and methods

From January 2005 to January 2006, all preterm neonates born in Mirza Kuchakkhan Hospital, Tehran, Iran were enrolled in this cross-sectional study.

Exclusion criteria were: maternal age less than 20 or more than 30 years, previous history of preterm delivery, multiple pregnancies, PROM ( premature rupture of membranes), maternal diabetes or cardiac diseases and neonates with congenital malformations (All included neonates were examined right after the birth by a pediatrician).

All parents were asked to fill informed consent before entrance to study. The study protocol had been approved by ethics committee of Tehran University of medical sciences. Structured questionnaire was applied for recording following data: birth weight, sex, gestational age, maternal age and paternal age.

We limited our study to neonates whose maternal age was between 20 and 30 years to eliminate maternal age confounding effect.

At the end, two hundred seventy four neonates were enrolled in this study.

### *Statistical analysis*

Data are presented as mean ± SDs, frequencies, and percentages. ANOVA was test used for continuous variables and the Pearson $X^2$ test with Fisher's exact test was applied for categorical variables.

P-value < 0.05 was considered statistically significant.

## Results

Two hundred seventy four neonates were enrolled in this study. One hundred seventy four were male and one hundred were females (M/F=1.7)

Most enrolled neonates had gestational age between 35 and 37 weeks (61.9%) (table 1).

**Table1:** gestational age of neonates.

| Gestational age (weeks) | Frequency (%) |
|---|---|
| 35-37 | 170(62%) |
| 33-34 | 49(17.8%) |
| 31-32 | 26(9.4%) |
| Less than 31 | 29(10.5%) |

Most cases had birth weight more than 2500 gr (table 2).

**Table2:** birth weight of neonates

| Birth weight(gr) | Frequency (%) |
|---|---|
| Less than 1000 | 17(6.2%) |
| 1000-1500 | 19(6.3%) |
| 1500-2000 | 42(15.3%) |
| 2000-2500 | 71(25.9%) |
| More than 2500 | 125(45.6%) |

More than fifty percent of fathers were between 30-39 years of age (table 3).

**Table 3:** paternal age groups.

| Paternal age (years) | Frequency (%) |
|---|---|
| 20-29 | 126(45.9%) |
| 30-39 | 138(50.3%) |
| More than 40 | 10(3.6%) |

There were no relation between paternal age and neonatal gestational age (table4) or birth weight (table 5).

**Table 2:** paternal age and neonatal gestational age

| gestational (week) / Paternal age(year) | 35-37 | 33-34 | 31-32 | Less than 31 | P value |
|---|---|---|---|---|---|
| 20-29 | 72 | 22 | 14 | 18 | |
| 30-39 | 92 | 24 | 11 | 11 | 0.1 |
| More than 40 | 6 | 3 | 1 | 0 | |

**Table 5:** paternal age and neonatal birth weight

| birth weight (gr) / Paternal age (year) | Less than 1000 | 1000-1500 | 1500-2000 | 2000-2500 | More than 2500 | P value |
|---|---|---|---|---|---|---|
| 20-29 | 10 | 10 | 24 | 34 | 47 | |
| 30-39 | 7 | 8 | 16 | 36 | 72 | 0.5 |
| More than 40 | 0 | 1 | 2 | 1 | 6 | |

In women with parity one, there was not significant difference between gestational age among different paternal age levels (p= 0.6) as well as women with parity two and three (p= 0.2 and 0.3 respectively).

## Discussion

Our study indicated that paternal age by itself is not an independent factor for birth outcomes in neonates.

We limited our study to singleton infants whose maternal age was between 20 and 30 to eliminate maternal age and multi-births confounding effects. Higher maternal age and multiple pregnancies are associated with preterm deliveries, low birth weight for age and low apgar scores. Preterm birth is a situation in which a lot of factors such as maternal, environmental and social factors have been decided as leading causes (4). It is a condition which should be consider due to its consequences for both mothers and neonates. Over the past years, its incidence in developed countries estimated between 5-12% (1).

Studies showed that preterm babies suffer from longer hospitalization, more need for mechanical ventilation, respiratory distress syndrome, neurological impairment and more perinatal death (1). In this case, considering factors which associated with higher rate of preterm delivery should be identified.

In most clinical settings, maternal factors are known as the most important factors for neonatal well-being and paternal information is being missed. Nowadays, paternal factors have

been focused by most researchers as predisposing factors of pregnancy and birth outcomes. For example gene mutations of sperms may lead to problems in placentation in order to dependence of placenta formation on paternal gene expression (15, 16).

Our results show that paternal age is not associated with preterm delivery or with birth weight which confirms previous findings by Tough et al and Basso (17, 18).

In a survey done by Astolfi et al in Italy, increased paternal age associated with preterm birth delivery. They restricted their study to neonates whose mothers were between 20 and 29 years old and found higher Odds Ratio for very preterm birth than preterm birth among 45- to 49-year-old fathers (19). On the other hand, Chen et al, Olshan et al and Abel et al suggested that younger paternal age is a risk factor for adverse birth outcomes such as low birth weight and preterm deliveries while advanced paternal age did not have any association with pregnancy outcomes (20-22). In the current study, we did not find any association between younger paternal age and birth outcomes.

In a Danish study, Zhu et al investigated advanced paternal age as a predisposing factor for very preterm birth. They reported higher rate of very preterm deliveries in paternal age of 40–44 years than in fathers between 20–24 years (23).

By evaluation singleton babies delivered during seven years in Italy, Astolfi et al discovered that maternal age more than 29 years and paternal age more than 39 are important risk factors for preterm births. (OR = 1.32[1.28-1.36] for maternal age between 30-34 years and OR=1.97 [1.88-2.07] in mothers more than 35 years old, OR = 1.40 [1.33-1.47] in fathers older than 39years, respectively) (19).

By adjusting modifiable factors we can reduce risk of preterm delivery and its consequences. Although our results show no effect of paternal age on birth weight and age, paternal genetic has been recognized as a low risk factor for preterm birth and low birth weight (24). Study by Basso et al showed partner change by fathers was related to pregnancy outcome like gestational age, while paternal change had been related with lower impact on pregnancy outcomes like gestational age and weight (25). Against birth weight which correlates over generation, birth age only correlates with the characteristics of the same mother that may show non-genetic determinants.

This study had some limitations. First, this study was a single center study and second it held in a tertiary hospital in Tehran so, results of this study can

not be indicatives of effect of paternal age on neonatal outcome in Iran. Large multi-center studies in different cities should be held.

## Conclusions

It is indicated that paternal age is not a risk factor for preterm birth.

## Acknowledgement

There is no conflict of interest to declare.

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