Original Research Article

To Evaluate the Impact of Maternal Age on the Occurrence of Preterm Birth: An Institutional Based Study

Varsha Gangwar[1], Manisha Jain Jindal[1*], Sumit Jeena[2]

[1]Assistant Professor, Department of Obstetrics & Gynaecology, Rajshree Medical Research Institute & Hospital, Bareilly, Uttar Pradesh, India

[2]Assistant Professor, Department of Paediatrics, Rajshree Medical Research Institute & Hospital, Bareilly, Uttar Pradesh, India

Received: 06-11-2020 / Revised: 20-12-2020 / Accepted: 17-01-2021

Abstract

Background: Gestational age is the second-best prognostic factor, after baby weight, for the outcome of pregnancy. Targeting maternal risk factors for preterm birth in epidemiological studies might provide clues to the mechanisms leading to preterm birth, and help to identify women at risk. Hence; the present study was undertaken for evaluating the impact of maternal age on the occurrence of preterm birth.**Materials & Methods:**The present study was conducted with the aim of assessing and evaluating the impact of maternal age on the occurrence of preterm birth. A total of three maternal age range categories were made as follows: 20 to 29 years, 30 to 39 years, and 40 years and older. Complete demographic, clinical and medical details of all the subjects were obtained. Pre-term birth was defined as birth before 37 weeks of gestation, while birth before 32 weeks was defined as very preterm. Calculation of odd ratios for preterm and very preterm birth was done for different age groups. **Results:**Preterm birth was seen in 0.8 percent, 1.27 percent and 1.53 percent of the subjects of thematernal age range of 20 to 29 years, 30 to 39 years and 40 years and older. Very preterm birth was seen in 3.67 percent, 4.67 percent and 5.07 percent of the subjects of thematernal age range of 20 to 29 years, 30 to 39 years and 40 years and older. While analyzing the odd ratios, it was observed that increasing maternal age significantly increased the risk of very preterm birth.**Conclusion:**Elder maternal age group is significantly associated with higher incidence of preterm and very preterm delivery.

Keywords: Maternal age, Preterm, Birth.

Introduction

Gestational age is the second-best prognostic factor, after baby weight, for the outcome of pregnancy. Apart from pathological conditions, several factors associated with a preterm delivery have been extensively investigated since the 1950s. On average, a lower gestational age is observed among male compared with female babies. It has been suggested that a preterm delivery may be induced by fetal gender. These workers reported an excess of males among preterm babies, in agreement with previous findings, suggesting that male fetal gender, hormonally involved in the control of labour onset, might be responsible for the shortened duration of pregnancy[1-3].So far, it has not been possible to prevent preterm birth, mostly because the specific causes are complex and difficult to establish in individual patients. Spontaneous preterm birth is regarded as a syndrome initiated by multiple mechanisms, such as infection and inflame-mation, uteroplacental ischaemia and haemorrhage, uterine overdistension, cervical insufficiency, hormonal disorders, stress, or other immunologically mediated processes. Targeting maternal risk factors for preterm birth in epidemiological studies might provide clues to the mechanisms leading to preterm birth, and help to identify women at risk[4-6]. Hence; the present study was undertaken for evaluating the impact of maternal age on the occurrence of preterm birth.

Materials & methods

The present study was conducted in the Department of Obstetrics & Gynaecology, Rajshree Medical Research Institute & Hospital, Bareilly, Uttar Pradesh (India) with the aim of assessing and evaluating the impact of maternal age on the occurrence of preterm birth. Ethical approval was obtained before the starting of the study.

Inclusion criteria included:

- Birth at or after 24 gestational weeks.
- Fetus weighing more than 500 grams.
- Maternal age of more than 20 years.

Subjects with multiple pregnancies, fetal malformations and intra-uterine fetal demise were excluded from the present study. A total of three maternal age range categories were made as follows:

- 20 to 29 years,
- 30 to 39 years, and
- 40 years and older.

Complete demographic, clinical and medical details of all the subjects were obtained. Pre-term birth was defined as birth before 37 weeks of gestation, while birth before 32 weeks was defined as very preterm. Calculation of odd ratios for preterm and very preterm birth was done for different age groups. All the results were recorded and analyzed using SPSS software. Chi-square test and odd ratios analysis were used for evaluation of level of significance.

Results

In the present study, a total of 4500 subjects were analyzed. Among these subjects, 1500 subjects each had maternal age range of 20 to 29 years, 30 to 39 years and 40 years and older. Preterm birth was seen in 0.8 percent, 1.27 percent and 1.53 percent of the subjects of thematernal age range of 20 to 29 years, 30 to 39 years and 40 years and older. Very preterm birth was seen in 3.67 percent, 4.67 percent and 5.07 percent of the subjects of thematernal age range of 20 to 29 years, 30 to 39 years and 40 years and older. While analyzing the odd

**Correspondence*

Dr. Manisha Jain Jindal

Assistant Professor, Department of Obstetrics & Gynaecology, Rajshree Medical Research Institute & Hospital, Bareilly, Uttar Pradesh, India.

E-mail: rishimanisha@gmail.com

ratios, it was observed that increasing maternal age significantly increased the risk of very preterm birth.

Table 1: Different study groups

Maternal age range	Number of subjects	Percentage
20 to 29 years	1500	33.33
30 to 39 years	1500	33.33
40 years and older	1500	33.33
Total	4500	100

Table 2: Odd ratios for risk of preterm birth and very preterm birth according to maternal age

Variable		20 to 29 years	30 to 39 years	40 years and older
Preterm birth	**Number**	12	19	23
	Percentage	0.8	1.27	1.53
	Adjusted odd ratios	0.99 (0.92-1.05)	1.13 (1.05-1.21)	1.21 (1.15-1.27)
Very preterm birth	**Number**	55	67	76
	Percentage	3.67	4.67	5.07
	Adjusted odd ratios	1.05 (0.95-1.15)	1.16 (1.06-1.26)	1.23 (1.13-1.33)

Discussion

Pregnancy complications such as placenta praevia, intra-uterine growth restriction or fetal demise, gestational diabetes, hypertensive disorders of pregnancy, and caesarean delivery are well known to be more common in older pregnant women. Therefore, guidelines have emerged for the management of pregnancy in patient with advanced maternal age[6-8].Preterm birth is the most important factor determining neonatal morbidity and mortality, and has a major impact on it. However, in literature, the association between prematurity and advanced maternal age remains controversial[7-9].Hence; the present study was undertaken for evaluating the impact of maternal age on the occurrence of preterm birth.In the present study, a total of 4500 subjects were analyzed. Among these subjects, 1500 subjects each had maternal age range of 20 to 29 years, 30 to 39 years and 40 years and older. Preterm birth was seen in 0.8 percent, 1.27 percent and 1.53 percent of the subjects of thematernal age range of 20 to 29 years, 30 to 39 years and 40 years and older. Fuchs F et al evaluated the impact of maternal age on the occurrence of preterm birth after controlling for multiple known confounders in a large birth cohort. 165,282 births were included in the study. Chronic hypertension, assisted reproduction techniques, pre-gestational diabetes, invasive procedure in pregnancy, gestational diabetes and placenta praevia were linearly associated with increasing maternal age whereas hypertensive disorders of pregnancy followed a "U" shaped distribution according to maternal age. Confounders found to have the greatest impact were placenta praevia, hypertensive complications, and maternal medical history.Even after adjustment for confounders, advanced maternal age (40 years and over) was associated with preterm birth. A maternal age of 30–34 years was associated with the lowest risk of prematurity[10].In the present study, very preterm birth was seen in 3.67 percent, 4.67 percent and 5.07 percent of the subjects of thematernal age range of 20 to 29 years, 30 to 39 years and 40 years and older. While analyzing the odd ratios, it was observed that increasing maternal age significantly increased the risk of very preterm birth. Although the increased risk of childhood health complications after preterm or early term delivery is well established, few large, population-based studies have investigated the long-term health consequences for the full spectrum of gestational age in populations from the Indian subcontinent. Previous studies have analysed relatively small samples with broad categories of gestational age, focused on narrow health outcomes, or analysed data from older cohorts. Thus, results of those studies might not be generalisable to babies born in settings with more advanced medical care or reflect increases in survival rates over the past 30 years for extremely preterm babies. In addition, evidence suggests that the association between gestational age and hospital admission rates ameliorates over time[8-10].Carolan M examined the evidence in relation to very advanced maternal age (≥45 years) and maternal and perinatal outcomes in high-income countries. Established health databases including SCOPUS, MEDLINE, CINAHL, EMBASE and Maternity and Infant Care were searched for journal papers, published 2001-2011, that examined very advanced maternal age (VAMA) and maternal and perinatal outcomes. Data were extracted and organised under the following headings: maternal age ≥45 years; maternal characteristics such as parity and use of artificial reproductive technology (ART); and pre-existing maternal conditions, such as diabetes and hypertension. They concluded that increased rates of stillbirth, perinatal death, preterm birth and low birth weight among women ≥45 years[11].

Conclusion

From the above results, the authors concluded that elder maternal age group is significantly associated with higher incidence of preterm and very preterm delivery.

References

1. Jacobsson B, Ladfors L, Milsom I. Advanced maternal age and adverse perinatal outcome. Obstetrics and gynecology. 2004;104(4):727–33.
2. Tough SC, Newburn-Cook C, Johnston DW, Svenson LW, Rose S, Belik J. Delayed childbearing and its impact on population rate changes in lower birth weight, multiple birth, and preterm delivery. Pediatrics. 2002;109(3):399–403.
3. Iacobelli S, Combier E, Roussot A, Cottenet J, Gouyon J-B, Quantin C. Gestational age and 1-year hospital admission or mortality: a nation-wide population-based study. BMC Pediatr 2017;17:28.
4. Lain SJ, Nassar N, Bowen JR, Roberts CL. Risk factors and costs of hospital admissions in first year of life: a population-based study. J Pediatr2013;163:1014-9.
5. Stephens AS, Lain SJ, Roberts CL, Bowen JR, Simpson JM, Nassar N. Hospitalisations from 1 to 6 years of age: effects of gestational age and severe neonatal morbidity. Paediatr Perinat Epidemiol 2015;29:241-9.
6. Salem Yaniv S, Levy A, Wiznitzer A, Holcberg G, Mazor M, Sheiner E. A significant linear association exists between advanced maternal age and adverse perinatal outcome. Archives of gynecology and obstetrics. 2011;283(4):755–9.
7. Althubaiti A. Information bias in health research: definition, pitfalls, and adjustment methods. J Multidiscip Healthc 2016;9:211-7.
8. Davidson R, Roberts SE, Wotton CJ, Goldacre MJ. Influence of maternal and perinatal factors on subsequent hospitalisation for

asthma in children: evidence from the Oxford record linkage study. BMC Pulm Med 2010;10:14.
9. Johnson J-AT, Suzanne. Delayed Child-Bearing. Journal of obstetrics and gynaecology Canada: JOGC = Journal d'obstetrique et gynecologie du Canada: JOGC. 2012;34(1):80–93.
10. Fuchs F, Monet B, Ducruet T, Chaillet N, Audibert F. Effect of maternal age on the risk of preterm birth: A large cohort study. PLoS One. 2018;13(1):e0191002.
11. Carolan M Maternal age ≥45 years and maternal and perinatal outcomes: a review of the evidence. Midwifery. 2013 ;29(5):479-89.

Conflict of Interest: Nil
Source of support:Nil