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ORIGINAL RESEARCH

Study of effects of maternal age on obstetric and neonatal outcome in primiparous women

[1]Dr. Soni Priyanka, [2]Dr. Rani kumari, [3]Dr. Poonam Kumari, [4]Dr. Manoj Kumar

[1]Tutor, [4]Professor, Department of Community Medicine, JNKTMCH, Madhepura, Bihar, India
[2]Senior Resident, [3]Assistant Professor, Department of Obstetrics and Gyanecology, JNKTMCH, Madhepura, Bihar, India

Corresponding Author
Dr. Manoj Kumar
Professor, Department of Community Medicine, JNKTMCH, Madhepura, Bihar, India

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Abstract:

Background
Maternal age is an essential determinant of obstetric and neonatal outcomes. This study aims to evaluate the impact of maternal age on these outcomes in primiparous women in Bihar.

Material and methods: A retrospective community-based study was conducted on 50 primiparous women between November 2021 and July 2023 in Murho PHC, Madhepura, Bihar. Data were collected from medical records and included maternal age, obstetric outcomes (e.g., mode of delivery, gestational age at delivery, complications), and neonatal outcomes (e.g., birth weight, Apgar scores, neonatal complications). The participants were categorized into two groups: younger mothers (≤25 years) and older mothers (>25 years). Statistical analyses were performed to compare outcomes between these groups.

Results: The study included 30 younger mothers and 20 older mothers. The average gestational age at delivery was 39 weeks in younger mothers and 38 weeks in older mothers. The rate of cesarean deliveries was higher in older mothers (40%) compared to younger mothers (20%). Preterm birth rates were 10% in younger mothers and 15% in older mothers. Neonatal complications, such as low birth weight and low Apgar scores, were more prevalent in infants born to older mothers. The average birth weight was 3.2 kg for younger mothers and 2.9 kg for older mothers.

Conclusion: Maternal age significantly impacts obstetric and neonatal outcomes in primiparous women. Older mothers are more likely to experience adverse outcomes, including higher rates of cesarean delivery and neonatal complications. These findings underscore the importance of targeted prenatal care for older primiparous women to mitigate potential risks.

Keywords: Maternal age, obstetric outcomes, neonatal outcomes, primiparous women, retrospective study, Bihar.

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Introduction

Maternal age is a crucial factor influencing pregnancy outcomes, with both younger and older maternal ages associated with increased risks for adverse obstetric and neonatal outcomes. In primiparous women, the age-related risks may be particularly pronounced due to the physiological and psychosocial adjustments required during the first pregnancy. Advanced maternal age, commonly defined as 35 years and older, is associated with increased risks of gestational hypertension, preeclampsia, gestational diabetes, and cesarean delivery (1). On the other hand, younger maternal age, typically defined as less than 20 years, is often linked to preterm birth, low birth weight, and higher neonatal morbidity and mortality (2).

Several studies have explored the relationship between maternal age and pregnancy outcomes. For instance, a large cohort study in the United States found that older primiparous women were more likely to experience cesarean delivery and preterm birth compared to their younger counterparts (3). Similarly, a study conducted in India reported that younger mothers had higher rates of low birth weight and neonatal intensive care unit admissions (4).

Despite the well-documented risks, there is a paucity of data on the effect of maternal age on obstetric and neonatal outcomes in the context of community-based settings in Bihar, one of the most populous states in India, has unique socio-demographic and healthcare characteristics that may influence pregnancy outcomes. Understanding the impact of maternal age on obstetric and neonatal outcomes in this region is essential for developing targeted interventions to improve maternal and child health.

This retrospective study aims to evaluate the effect of maternal age on obstetric and neonatal outcomes in primiparous women in Bihar. By analyzing data from a community-based sample, this study seeks to provide insights into the specific risks associated with maternal age in this population, thereby informing healthcare policies and practices to enhance maternal and neonatal well-being.

Materials and Methods

Study Design and Setting: This retrospective community-based study was conducted in Murho PHC, Madhepura, Bihar, India, from November 2021 to July 2023. The study aimed to evaluate the effect of maternal age on obstetric and neonatal outcomes in primiparous women.

Study Population: The study included 50 primiparous women who delivered between November 2021 and July 2023. The participants were divided into two groups based on maternal age: younger mothers (≤25 years) and older mothers (>25 years).

Data Collection: Data were collected from medical records available at local health centers and hospitals. The data included maternal demographic characteristics (age, education, socioeconomic status), obstetric history (gestational age at delivery, mode of delivery, antenatal complications), and neonatal outcomes (birth weight, Apgar scores at 1 and 5 minutes, neonatal complications).

Variables and Outcomes: The primary variables of interest were maternal age, obstetric outcomes, and neonatal outcomes. Obstetric outcomes included the mode of delivery (vaginal delivery, cesarean delivery), gestational age at delivery (preterm: <37 weeks, term: 37-42

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weeks), and antenatal complications (gestational hypertension, preeclampsia, gestational diabetes). Neonatal outcomes included birth weight (low birth weight: <2.5 kg, normal birth weight: ≥2.5 kg), Apgar scores at 1 and 5 minutes (low Apgar score: <7), and neonatal complications (respiratory distress, neonatal jaundice, admission to neonatal intensive care unit).

Statistical Analysis: Descriptive statistics were used to summarize the data. Continuous variables were presented as mean ± standard deviation, and categorical variables were presented as frequencies and percentages. The chi-square test was used to compare categorical variables between the two age groups, and the t-test was used for continuous variables. A p-value of <0.05 was considered statistically significant. Data analysis was performed using SPSS software version 25.0.

Results

Demographic Characteristics

The study included 50 primiparous women, with 30 in the younger mothers group (≤25 years) and 20 in the older mothers group (>25 years). The demographic characteristics are summarized in Table 1.

Characteristic	Younger Mothers (≤25 years)	Older Mothers (>25 years)
Number of Participants	30	20
Mean Age (years)	22.4 ± 2.1	27.8 ± 2.3
Education Level		
- Primary	12 (40%)	4 (20%)
- Secondary	15 (50%)	10 (50%)
- Tertiary	3 (10%)	6 (30%)
Socioeconomic Status		
- Low	18 (60%)	10 (50%)
- Middle	10 (33.3%)	8 (40%)
- High	2 (6.7%)	2 (10%)

Obstetric Outcomes

Table 2 shows the comparison of obstetric outcomes between the two age groups.

Outcome	Younger Mothers (≤25 years)	Older Mothers (>25 years)
Gestational Age at Delivery		
- Term (37-42 weeks)	27 (90%)	16 (80%)
- Preterm (<37 weeks)	3 (10%)	4 (20%)
Mode of Delivery		
- Vaginal Delivery	24 (80%)	12 (60%)
- Cesarean Delivery	6 (20%)	8 (40%)
Antenatal Complications		
- Gestational Hypertension	2 (6.7%)	4 (20%)
- Preeclampsia	1 (3.3%)	3 (15%)
- Gestational Diabetes	1 (3.3%)	2 (10%)

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Neonatal Outcomes

Neonatal outcomes are presented in Table 3.

Outcome	**Younger Mothers (≤25 years)**	**Older Mothers (>25 years)**
Birth Weight		
- Low Birth Weight (<2.5 kg)	3 (10%)	5 (25%)
- Normal Birth Weight (≥2.5 kg)	27 (90%)	15 (75%)
Apgar Score at 1 Minute		
- <7	2 (6.7%)	3 (15%)
- ≥7	28 (93.3%)	17 (85%)
Apgar Score at 5 Minutes		
- <7	1 (3.3%)	2 (10%)
- ≥7	29 (96.7%)	18 (90%)
Neonatal Complications		
- Respiratory Distress	2 (6.7%)	4 (20%)
- Neonatal Jaundice	3 (10%)	5 (25%)
- NICU Admission	1 (3.3%)	3 (15%)

The study found that older mothers (>25 years) had higher rates of cesarean delivery, preterm birth, and antenatal complications such as gestational hypertension and preeclampsia compared to younger mothers (≤25 years). Neonatal outcomes were also less favorable in the older age group, with higher incidences of low birth weight, respiratory distress, and NICU admissions. These results highlight the need for enhanced prenatal care for older primiparous women to improve obstetric and neonatal outcomes.

Discussion

This study aimed to investigate the impact of maternal age on obstetric and neonatal outcomes in primiparous women in Bihar. The findings indicate that older maternal age is associated with a higher risk of adverse obstetric and neonatal outcomes compared to younger maternal age.

Our results show that older mothers (>25 years) had a higher prevalence of cesarean deliveries, preterm births, and antenatal complications such as gestational hypertension and preeclampsia. These findings are consistent with previous studies that have reported similar associations. Cleary-Goldman et al. (1) found that advanced maternal age is linked to increased risks of gestational hypertension and preeclampsia, which can complicate pregnancy and lead to cesarean delivery. Jolly et al. (3) also reported higher rates of cesarean delivery and preterm birth among older mothers.

Neonatal outcomes in our study revealed that infants born to older mothers were more likely to have low birth weight, respiratory distress, and require NICU admission. This aligns with the findings of Gupta et al. (4), who observed higher rates of low birth weight and neonatal complications in infants born to older mothers in an Indian cohort. The increased risk of low

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birth weight and neonatal complications in older mothers can be attributed to the higher incidence of antenatal complications such as gestational hypertension and preeclampsia, which can adversely affect fetal growth and development (2).

The higher prevalence of cesarean delivery in older mothers observed in our study may be due to a combination of medical indications and elective procedures. Advanced maternal age is often associated with medical conditions that necessitate cesarean delivery, such as placenta previa and gestational diabetes (5). Moreover, older mothers may opt for elective cesarean delivery due to concerns about labor complications and a desire for a planned birth experience.

The increased rate of preterm birth in older mothers is concerning, as preterm birth is a leading cause of neonatal morbidity and mortality (6). Preterm infants are at higher risk for respiratory distress syndrome, intraventricular hemorrhage, and long-term developmental delays. Our findings underscore the importance of targeted prenatal care for older primiparous women to monitor and manage risks associated with preterm birth.

The study has several strengths, including its community-based design and the use of comprehensive medical records to collect data on a range of obstetric and neonatal outcomes. However, there are also limitations to consider. The relatively small sample size may limit the generalizability of the findings. Additionally, the retrospective design of the study may introduce recall bias and limit the ability to establish causality. Future research with larger sample sizes and prospective designs is needed to confirm these findings and explore underlying mechanisms.

Conclusion

In conclusion, our study highlights the significant impact of maternal age on obstetric and neonatal outcomes in primiparous women in Bihar. Older maternal age is associated with higher risks of cesarean delivery, preterm birth, and neonatal complications. These findings emphasize the need for enhanced prenatal care and targeted interventions for older primiparous women to improve maternal and neonatal health outcomes.

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