Maternal Age and Its Influence on Pregnancy and Neonatal Outcomes: A Prospective Study

Sunita Balara[1], Somveer Punia[2], Sandip Balara[3]

[1]SMO, Obstetrics and Gynecology, CHC Bap, Phalodi, Rajasthan, India
[2]MD, Pulmonary Medicine, DBH, Churu, Rajasthan, India
[3]MBBS, Medical Officer, AAM, Dholabala, Phalodi, Rajasthan, India

Abstract

Introduction: Maternal age has long been considered an important factor affecting pregnancy outcomes. In India, especially in regions like Rajasthan, where early marriages and pregnancies are still prevalent, maternal age plays a crucial role in determining the health of both the mother and the baby. Globally, advanced maternal age (AMA) is linked to an increased risk of complications such as gestational diabetes, hypertension, preterm delivery, and fetal growth restriction. However, there is limited research on how maternal age specifically influences pregnancy outcomes in Rajasthan, where socio-economic factors, healthcare access, and nutritional status vary widely.

Objectives: This study aims to explore the impact of maternal age on pregnancy outcomes in Rajasthan, focusing on conditions like gestational hypertension, gestational diabetes, preeclampsia, preterm birth, low birth weight, and neonatal morbidity. It also examines how socio-economic and healthcare-related factors contribute to these outcomes in different maternal age groups.

Methods: A retrospective study of 102 women in Rajasthan assessed the effect of maternal age on pregnancy and neonatal outcomes, including complications, birth weight, and NICU admissions.

Results: Out of 102 women, 58.8% were aged 20–35 years, 17.6% were <20 years, and 23.6% were >35 years. Overall, 66.7% underwent cesarean delivery, while 33.3% had vaginal delivery. Vaginal delivery was more common in women <20 years (55.6%), whereas cesarean section was higher in women >35 years (75.0%). Advanced maternal age was associated with increased gestational hypertension (25.0%) and preeclampsia (12.5%). Neonatal outcomes such as low birth weight (16.7%) and NICU admission (12.7%) were more frequent among older mothers.

Conclusion: Advanced maternal age is linked to higher cesarean rates, maternal complications, and adverse neonatal outcomes, while younger women more often have vaginal deliveries, possibly influenced by clinical and psychosocial factors such as concern over scarring and body image. Age-specific antenatal care and counselling are recommended to optimize maternal and neonatal outcomes.

Keywords: Maternal Age, Pregnancy Outcomes, Gestational Hypertension, Gestational Diabetes, Preeclampsia, Preterm Birth, Low Birth Weight, Neonatal Care, Rajasthan, India.

Introduction

Maternal age is an important factor influencing pregnancy outcomes. In India, pregnancies occur across a wide age range due to differences in education, socio-economic status, cultural practices, and access to healthcare. Early age at marriage and childbearing is still commonly observed in several parts of the country, while pregnancies at an advanced maternal age are also increasing as more women delay childbirth for education and employment opportunities. [1] National data indicate that pregnancies occurring at younger reproductive ages are often associated with adverse outcomes such as maternal anaemia, preterm birth and low birth weight, largely due to poor nutritional status and inadequate antenatal care.[2] At the other end of the spectrum, advanced maternal age, usually defined as 35 years and above, is linked with a higher risk of complications such as gestational hypertension, gestational diabetes, preeclampsia, operative deliveries and neonatal morbidity .[3] In Rajasthan, early age at marriage and first pregnancy remains relatively common, particularly in rural areas, despite ongoing maternal and child health programmes.[1] At the same time, an increasing number of women are conceiving at a later age, especially in urban

regions. These contrasting maternal age patterns make Rajasthan an important region for studying the impact of maternal age on pregnancy outcomes. However, there is limited region-specific literature addressing this issue.

Understanding the influence of maternal age on pregnancy outcomes is essential for identifying high-risk pregnancies and planning appropriate antenatal and intrapartum care. This study aims to evaluate the association between maternal age and pregnancy outcomes in Rajasthan, with particular emphasis on gestational hypertension, gestational diabetes, preeclampsia, preterm birth, low birth weight and neonatal morbidity.

Aim and Objectives

Aim: To study the influence of maternal age on pregnancy outcomes in women delivering in Rajasthan.

Objectives:

1. To assess the association between maternal age and maternal complications such as gestational hypertension, gestational diabetes, and preeclampsia.
2. To evaluate the effect of maternal age on fetal and neonatal outcomes including preterm birth, low birth weight, and neonatal morbidity.
3. To compare pregnancy outcomes among different maternal age groups.

Study Design and Setting: A retrospective observational cohort study conducted in the Department of Obstetrics and Gynaecology at Medical College Churu, in Rajasthan, India.

Study Duration: The study was carried out over a period of 10 months, from August 2022 to June 2023.

Study Population: The study population included pregnant women who delivered at Medical College Churu during the study period. Initially, 123 women were identified from hospital records. After excluding 22 women due to incomplete records, the final analysis was performed on 102 women.

Inclusion Criteria: Pregnant women who delivered at Medical College Churu during the study period and willing to participate in the study

Exclusion Criteria:

- Multiple pregnancies (twins or higher order gestations)
- Women with pre-existing diabetes mellitus or chronic hypertension
- Women with incomplete or missing medical records

Sampling Method: Consecutive sampling was used.

Study Tools: Data was collected using a pre-designed and pre-tested semi-structured proforma. The proforma included details of maternal age, demographic profile, antenatal complications (gestational hypertension, gestational diabetes, preeclampsia), and fetal and neonatal outcomes (preterm birth, low birth weight, NICU admission).

Procedure of Data Collection: Pregnant women who delivered during the study period and met the inclusion criteria were approached after delivery, and after explaining the study in the local language, written informed consent was obtained, following which data were collected through face-to-face interviews using a pre-designed and pre-tested semi-structured proforma

Ethics: approval was obtained from the Institutional Ethical Committee. Confidentiality of patient data was maintained throughout the study.

Data Analysis: Data were entered into Microsoft Excel and analyzed using SPSS software. Descriptive statistics were used to summarize data. Associations between maternal age groups and pregnancy outcomes were assessed using appropriate statistical tests. A p-value of <0.05 was considered statistically significant.

Table 1: Frequency Distribution of Maternal and Obstetric Characteristics (n = 102)

Variable	Category	Frequency (n)	Percentage (%)
Age group (years)	< 20	18	17.6
	20–35	60	58.8
	> 35	24	23.6
Gravidity	Primigravida	48	47.1
	Multigravida	54	52.9
Pregnancy planning	Planned	33	32.4
	Unplanned	69	67.6
Gestational age at delivery	Preterm (<37 weeks)	12	11.8
	Term (≥37 weeks)	90	88.2
Mode of delivery	Vaginal	34	33.3
	LSCS	68	66.7
Gestational hypertension	Present	12	11.8
	Absent	90	88.2

Gestational diabetes	Present	9	8.8
	Absent	93	91.2
Preeclampsia	Present	4	3.9
	Absent	98	96.1
Low birth weight	Present	17	16.7
	Absent	85	83.3
NICU admission	Required	13	12.7
	Not required	89	87.3

Table 2: Maternal Characteristics, Obstetric Profile, and Pregnancy Outcomes According to Maternal Age (n = 102)

Variable	Category	< 20 years (n = 18)	20–35 years (n = 60)	> 35 years (n = 24)	Total (n = 102)	P value
Gravidity	Primigravida	14 (77.8%)	28 (46.7%)	6 (25.0%)	48 (47.1%)	0.0031
	Multigravida	4 (22.2%)	32 (53.3%)	18 (75.0%)	54 (52.9%)	
Pregnancy planned	Yes	4 (22.2%)	22 (36.7%)	17(29.2%)	33 (32.4%)	0.002
	No	14 (77.8%)	38 (63.3%)	7 (70.8%)	69 (67.6%)	
Gestational age at delivery	Preterm (<37 weeks)	3 (16.7%)	5 (8.3%)	4 (16.7%)	12 (11.8%)	0.048
	Term (≥37 weeks)	15 (83.3%)	55 (91.7%)	20 (83.3%)	90 (88.2%)	
Mode of delivery	Vaginal	10 (55.6%)	18 (30.0%)	6 (25.0%)	34 (33.3%)	0.08
	LSCS	8 (44.4%)	42 (70.0%)	18 (75.0%)	68 (66.7%)	
Maternal complications	Gestational hypertension	2 (11.1%)	4 (6.7%)	6 (25.0%)	12 (11.8%)	0.07
	Gestational diabetes	1 (5.6%)	3 (5.0%)	5 (20.8%)	9 (8.8%)	0.598
	Preeclampsia	0 (0%)	1 (1.7%)	3 (12.5%)	4 (3.9%)	0.04
Neonatal outcomes	Low birth weight	4 (22.2%)	7 (11.7%)	6 (25.0%)	17 (16.7%)	0.26
	NICU admission	2 (11.1%)	4 (6.7%)	7 (29.2%)	13 (12.7%)	0.019

Results

A total of 102 patients were included in the study. The majority of participants were aged 20–35 years, comprising 58.8% of the sample, followed by those aged >35 years (23.6%) and <20 years (17.6%). Regarding gravidity, primigravida women made up 47.1%, while multigravida women accounted for 52.9%. In terms of pregnancy planning, most pregnancies were unplanned (67.6%), with only 32.4% of pregnancies being planned. The gestational age at delivery revealed that 88.2% of patients delivered at term (≥37 weeks), while 11.8% delivered preterm (<37 weeks). When looking at mode of delivery, 33.3% of women delivered vaginally, while the majority (66.7%) had cesarean deliveries (LSCS). Notably, 55.6% of women under 20 years had vaginal deliveries, in contrast to 25.0% of women over 35 years. This suggests that younger women may prefer vaginal delivery, potentially influenced by factors such as body image and concerns about scarring associated with cesarean sections. Maternal complications were relatively low, with 11.8% of women experiencing gestational hypertension, 8.8% gestational diabetes, and 3.9% preeclampsia. Neonatal outcomes showed that

16.7% of infants had low birth weight, and 12.7% required NICU admission, with the highest percentage of NICU admissions (29.2%) observed in the >35 years age group.

Discussion

This study Shows that maternal age significantly influenced obstetric outcomes, with the majority of women aged 20–35 years (58.8%) and an overall cesarean section rate of 66.7%, while younger women (<20 years) showed a higher rate of vaginal delivery (55.6%), consistent with the studies reporting same findings increased surgical delivery and complications with advancing maternal age Sharma p et al.[4] and Anusuya R et al.[5] found higher rates of hypertensive disorders, gestational diabetes, and increased cesarean deliveries in older women compared with younger age group Ritu et al.[6] reported significantly higher hypertensive disorders and cesarean section rates in women >35 years compared to those 20–34 years, Pisal et al.[7] also observed elevated obstetric complications including postpartum hemorrhage and perinatal risk with increase in maternal age and the sharma shweta et al.[8] also showed a significantly higher incidence of hypertensive

diseases and antenatal complications in elderly primigravida, underscoring that older maternal age correlates with adverse pregnancy outcomes, whereas younger women more often had favorable outcomes and greater tendency toward vaginal birth, potentially influenced by clinical risk profiles as well as psychosocial factors such as body image and concern over scarring.

Conclusion

The findings indicate that a large proportion of pregnancies in this study were unplanned (67.6%), with a notable trend towards vaginal delivery among younger mothers. Specifically, 55.6% of women under 20 chose vaginal delivery, potentially due to concerns over scarring and body image, as cesarean delivery often leads to visible scars.

While the majority of women delivered at term, the incidence of preterm births was higher in younger and older mothers, emphasizing the need for targeted prenatal care. Despite maternal complications like hypertension and diabetes, neonatal outcomes were generally favorable, with only 16.7% of infants having low birth weight and 12.7% requiring NICU admission. These findings highlight the importance of understanding maternal preferences, particularly in delivery mode, and the potential impact of age on pregnancy outcomes.

Strengths and Limitations: The strengths of this study include its prospective design, a detailed assessment of maternal and neonatal outcomes, and a clear comparison across different maternal age groups. The limitations of the study are its single-center setting, relatively small sample size, and the lack of long-term follow-up.

Conclusion

Advanced maternal age is associated with higher cesarean rates and complications, while younger women more often have vaginal deliveries, possibly influenced by body image and scarring concerns. Individualized care and counselling based on maternal age are recommended to improve outcomes.

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