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Original Research Article

THE RELATIONSHIP BETWEEN MATERNAL AGE AND PREGNANCY COMPLICATIONS

KHEL SH, KHATTAK S*, KHAN F, NAJEEHA

Department of Obstetrics & Gynaecology, Lady Reading Hospital, Peshawar, Pakistan
**Corresponding author email address:* dr_saima_79@yahoo.com

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ABSTRACT

Background: *Advanced maternal age (AMA) is increasingly common worldwide and is associated with a higher risk of adverse maternal and fetal outcomes. Understanding these risks is important for improving antenatal care and counseling.* ***Objective:*** *To assess the relationship between maternal age and pregnancy complications.* ***Study Design:*** *Case-control study.* ***Setting:*** *Department of Obstetrics & Gynaecology, Lady Reading Hospital, Peshawar, Pakistan.* ***Duration of Study:*** *From 01-10-2024 to 01-04-2025.* ***Methods:*** *A total of 74 pregnant women were included and categorized into two groups: advanced maternal age (≥35 years) and younger controls (18–34 years). Maternal and fetal complications were compared between the two groups, including cesarean section, gestational diabetes, preeclampsia, postpartum hemorrhage, anemia, preterm birth, and fetal distress. Statistical analysis was conducted using appropriate comparative tests, with $p < 0.05$ as the significance threshold.* ***Results:*** *The mean age of the AMA group was 42.78 ± 3.98 years, compared with 26.14 ± 4.37 years in the control group. The AMA group showed significantly higher rates of cesarean delivery (64.9% vs. 29.7%; $p = 0.002$), gestational diabetes (37.8% vs. 16.2%; $p = 0.03$), preeclampsia (48.6% vs. 21.6%; $p = 0.01$), postpartum hemorrhage (29.7% vs. 10.8%; $p = 0.04$), preterm birth (24.3% vs. 5.4%; $p = 0.02$), and fetal distress (32.4% vs. 8.1%; $p = 0.009$).* ***Conclusion:*** *Advanced maternal age was associated with a significantly increased risk of major maternal and fetal complications, including cesarean section, postpartum hemorrhage, gestational diabetes, preeclampsia, preterm birth, and fetal distress. These findings highlight the importance of risk stratification and enhanced antenatal surveillance in older pregnant women.*

Keywords: Advanced Maternal Age, Pregnancy Complications, Cesarean Delivery, Gestational Diabetes

INTRODUCTION

Advanced maternal age (AMA) is usually characterized as 35 years or older, a factor related to significant adverse outcomes during pregnancy (1, 2). A study conducted across 29 countries indicated that the overall incidence of AMA among pregnant women was 12.3% (3). Another study showed that the average age of women at first birth has steadily increased over the past four decades, with the birth rate among women aged 40–44 years exceeding twofold from 1990 to 2012 (4). A comparative study indicated that the incidence of AMA was 17.5%. AMA corresponds with numerous economic, social, and medical complications for both the mother and the fetus (5, 6).

Research indicates that AMA has a significant connection with pregnancy-induced hypertension, maternal near-miss events, diabetes mellitus, higher rates of C-section, malpresentation, and maternal mortality (7, 8). Additionally, AMA has been linked with neonatal complications, including low Apgar scores, preterm deliveries, congenital disabilities, low birth weights, chromosomal abnormalities, and perinatal mortality (9, 10).

Women's fertility starts to decline in their early thirties, with a more rapid decrease taking place in mid to late thirties. Women of advanced age typically exhibit a decreased likelihood of achieving pregnancy in a brief timeframe. The possibility of having a pregnancy in a single menstrual cycle, known as fecundability, diminishes in these age groups (11-13).

The relationship between maternal age and pregnancy complications is a critical area of research due to the increasing trend of delayed childbearing worldwide. Analyzing the influence of maternal age on pregnancy outcomes is crucial for directing clinical practices, which helps in shaping public health policies and enhancing maternal-fetal health interventions. Exploring this relationship enables healthcare providers to anticipate risks and implement age-specific strategies to optimize pregnancy outcomes among various maternal age groups.

METHODOLOGY

This study employed a case-control design which was conducted at Lady Reading Hospital, Peshawar from 01-10-2024 to 01-04-2025 in the department of Obs and Gynae after taking ethical certificate from the hospital, we selected 74 patients for this study, in group A patients had age > 35 years with singleton pregnancy while in group B patients had age 18 to 35 years with similar parameters as group B, those women having multiple gestations were not included, the sample was selected based on previous research indicating a cesarean section frequency of 61.9% in advanced maternal age (AMA) patients compared to 30% in younger controls (14), with a power of 80% and 95% confidence interval. Patients gave their consent to participate in the study. We collected data for demographics such as age, parity, socioeconomic status, education, and residence. We observed and compared complications in both groups, such as caesarean section, gestational diabetes, preeclampsia, postpartum hemorrhage, anemia, preterm birth, and fetal distress.

The collected data were analyzed with SPSS 24. Age, BMI, and gestational age were reported as means and SDs, while residence, socioeconomic status, education, and complications were reported as frequencies and percentages. The chi-square test was used to compare complications between the two groups, with a P value set at < 0.05.

RESULTS

We studied two groups: group A, which included patients aged> 35 years, and group B, which included patients aged 18 to 35 years. Group A and Group B had mean ages of 42.78±3.98 and 26.14±4.379 years, respectively. Gestational age at delivery was 36.81±2.44 weeks in Group A and 38±1.76 weeks in Group B. Body mass index (BMI)

was 26.13±1.24 kg/m² in Group A and 25.82±1.01 kg/m² in Group B. Parity distribution is shown in Figure 1; the majority of the women in Group A had parity > 3. The demographics of the patients in both groups are presented in Table 1.

Table 1: Demographics

Demographics		Groups			
		Group A		Group B	
		N	%	N	%
Parity	1 to 3	9	24.3%	25	67.6%
	> 3	28	75.7%	12	32.4%
Socioeconomic status	Low	8	21.6%	9	24.3%
	Middle	25	67.6%	21	56.8%
	High	4	10.8%	7	18.9%
Residence	Urban	16	43.2%	19	51.4%
	Rural	21	56.8%	18	48.6%
Education	Educated	18	48.6%	21	56.8%
	Uneducated	19	51.4%	16	43.2%

Pregnancy complications exhibited notable disparities. Cesarean delivery rates were 24 (64.9%) in Group A and 11 (29.7%) in Group B (p=0.002). Gestational diabetes affected 14 (37.8%) in Group A and 6 (16.2%) in Group B (p=0.03). Preeclampsia was more prevalent in Group A (18, 48.6%) than in Group B (8, 21.6%; p=0.01). Anemia occurred in 7 (18.9%) in Group A and only 1 (2.7%) in Group B (p=0.02). Postpartum hemorrhage was observed in 11 (29.7%) in Group A and 4 (10.8%) in Group B (p=0.04). Fetal distress was reported in 12 (32.4%) in Group A and 3 (8.1%) in Group B (p=0.009). Preterm birth rates were 9 (24.3%) in Group A and 2 (5.4%) in Group B (p=0.02) (Table 2).

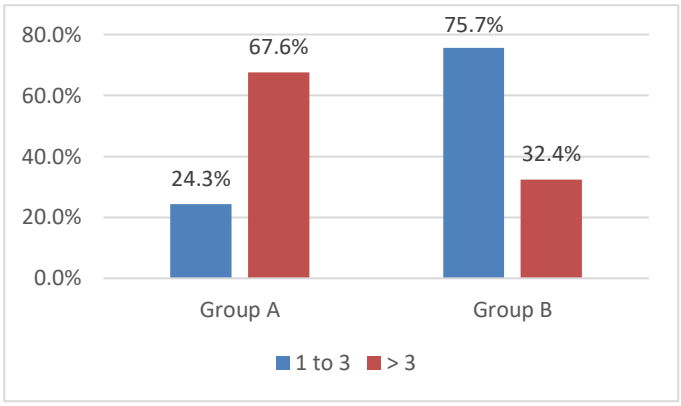

Figure 1: Parity distribution

Table 2: Comparison of pregnancy complications between the two groups

Pregnancy complications		GROUPS				P value
		Group A		Group B		
		N	%	N	%	
C section	Yes	24	64.9%	11	29.7%	0.002
	No	13	35.1%	26	70.3%	
Gestation diabetes	Yes	14	37.8%	6	16.2%	0.03
	No	23	62.2%	31	83.8%	
Preeclampsia	Yes	18	48.6%	8	21.6%	0.01
	No	19	51.4%	29	78.4%	
Anemia	Yes	7	18.9%	1	2.7%	0.02
	No	30	81.1%	36	97.3%	
Postpartum hemorrhage	Yes	11	29.7%	4	10.8%	0.04
	No	26	70.3%	33	89.2%	
Fetal distress	Yes	12	32.4%	3	8.1%	0.009
	No	25	67.6%	34	91.9%	
Preterm birth	Yes	9	24.3%	2	5.4%	0.02
	No	28	75.7%	35	94.6%	

DISCUSSION

The findings of our study highlight noteworthy differences in pregnancy outcomes between women aged 35+ (Group A) and those aged 18–35 (Group B). The results align with existing literature on advanced maternal age (AMA) pregnancies

One of the most striking observations in our study was the higher cesarean delivery rate in Group A (64.9%) compared to Group B (29.7%). This finding is consistent with Ramachandran et al., who reported a 61.9% cesarean rate among women aged ≥35 years, nearly double that of their younger counterparts (30%) (14). Zhou et al. also observed a similar trend, noting that the caesarean section rate was higher among women aged 45 years or older (15). The consistency of these results underscores the heightened risks for older women, likely due to age-related physiological changes, such as decreased vascular compliance and increased insulin resistance.

However, our study adds a critical layer of complexity: although Group A had a higher cesarean rate, the difference cannot be attributed solely to age. Instead, parity emerged as a crucial factor, with 75.7% of Group A having more than three pregnancies compared to only 32.4% in Group B. Multiparity is often associated with an increased likelihood of prior cesarean deliveries, uterine scarring, and labor complications, which may explain the elevated surgical intervention rates in Group A. This challenges the constructed view that age is the primary determinant of cesarean risk and instead suggests that obstetric history plays a more crucial role.

Metabolic complications such as gestational diabetes (GDM) and preeclampsia were markedly higher in Group A (37.8% and 48.6% respectively). These findings corroborate those of Zhou et al., who reported GDM in 44.3% of women aged ≥45 years (16). Cavazos-Rehg et al. reported higher rates for severe preeclampsia (16).

Anemia and postpartum hemorrhage (PPH) were also more frequent in Group A (18.9% and 29.7% respectively). The anemia rate in our study mirrors that reported by Ramachandran et al., who found elevated anemia rates in AMA women (14). Apart from the age factor, multiparous women like those in Group A are at higher risk of iron deficiency due to repeated pregnancies, particularly in resource-limited settings. The elevated PPH rate in Group A (29.7%) further supports this notion as anemia impairs uterine contractility, increasing hemorrhage risk. Zhang et al. documented a similar trend with PPH rates being high in advanced maternal age pregnancies (17).

Preterm birth and fetal distress were significantly more common in Group A (24.3% and 32.4% respectively). Zhou et al. showed that

preterm birth was higher in women aged >45 years, which aligns well with our findings (15). Zhang et al. in their study also documented a similar trend; they reported that fetal distress was more common in the AMA group (17).

The mechanisms underlying these age-related risks are multifaceted. Advanced maternal age is linked with declining oocyte quality, increased oxidative stress, and a higher prevalence of chronic conditions like hypertension and diabetes; these factors can adversely affect pregnancy outcomes.

CONCLUSION

We concluded that advanced maternal age was notably related to complications such as increased frequency of caesarean section, postpartum hemorrhage, anemia, gestational diabetes, along with adverse fetal outcomes such as preterm birth and fetal distress. We recommend age-specific prenatal care to mitigate risks and improve maternal and fetal health. Healthcare providers should prioritize tailored interventions based on maternal age to ensure safer pregnancies and better outcomes.

DECLARATIONS

Data Availability Statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department Concerned. (IRB-Ref#600/LRH/MTI)

Consent for publication

Approved

Funding

Not applicable

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTION

SIDRA HASSAN KHEL (Trainee Medical Officer)
Data Collection, Manuscript revisions, Critical input. Data entry, Data analysis, and article drafting.

SAIMA KHATTAK (Assistant Professor)
Conception of Study, Development of Research Methodology Design, Study Design, and final approval of manuscript.

FARYAL KHAN (Trainee Medical Officer)
Study Design and review of literature.

NAJEEHA (Trainee Medical Officer)
Review of Literature, and final approval of manuscript.

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