

## A Cross-Sectional Study of Relationship between Childbearing in Advanced Maternal Age and Pregnancy Outcomes

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### Abstract:

**Background:** Although delayed childbearing has spread around the world, it is still unknown how pregnancy outcomes are related to advanced mother age (AMA  $\geq 35$  years). The purpose of this research is to evaluate the connection between AMA and pregnancy problems.

**Methods:** 891 women who had successive pregnancies and were admitted for delivery to the DMCH's Obstetrics and Gynecology department in Laheriasarai, Bihar between January 2020 and December 2020 were included in this cross-sectional study. After the women were divided into two age groups—those between the ages of 20 and 34 and the AMA group—they were evaluated for late-life complications like preeclampsia, gestational hypertension, and gestational diabetes mellitus (GDM); delivery mode; and five-minute Apgar score. In SPSS version 20, the chi-square test and the Mann-Whitney U test were used to evaluate the data. P values less than 0.05 were deemed statistically significant.

**Results:** In addition to having significantly higher prevalence rates of preeclampsia, gestational hypertension, and GDM ( $p < 0.05$ ), the AMA group also showed lower five-minute Apgar scores. There was a significant difference between the two groups in terms of the quality of prenatal treatment ( $p < 0.001$ ). In terms of delivery mode, the younger group was more likely to have a vaginal delivery, whereas the AMA group was more likely to have a cesarean section ( $p < 0.001$ ).

**Conclusion:** Precise preconception counseling is essential to preparing couples for early childbearing at a younger age, given the tendency of pregnancy in higher mother age and increased pregnancy complications in this demographic.

**Keywords:** Maternal Age, Pregnancy Outcomes, Pregnancy Complications, Delayed Childbearing.

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### Introduction

Women who postpone childbirth up to the age of 35 years or older are classified as having reached advanced maternal age (AMA) and this option is chosen by many women because of educational, social, and economic factors [1].

Accordingly, delayed childbirth has been a globally prevalent phenomenon in the last two to three decades. In the United States, for example, studies reported a four-year delay in the average age of first pregnancies among women [2]. This pattern has become an equally increasing occurrence in developing countries. The Statistical Center of Iran indicated that the mean age of first marriage in the country increased by 4.7 years from 1957 to 2002, thereby also elevating the mean age of first pregnancy [3]. In Shiraz, 2.01% of mothers are 40

years or older [4]-a huge demographic shift that has become an important public health issue in the region. Recent evidence regarding the association between prenatal outcomes and maternal age remains largely clouded by confounding age-related factors [5,6]. This challenge is compounded by debates regarding the extent to which maternal age, rather than age-related comorbidity, is solely responsible for adverse obstetric outcomes [5,7].

Reports from different countries indicated that compared with younger females, women aged  $\geq 35$  years are noticeably more susceptible to pregnancy complications [1,2,8] and preexisting medical conditions, such as diabetes [8], hypertension [8,9], low birth weight, prenatal mortality, preterm birth, and gestational age-related rates of stillbirth

[3,5,7,10]. Some studies, however, confirmed that no important differences exist between young and old mothers in terms of pregnancy complications, maternal and prenatal results, birth weights, and gestational age (4,11). Research has provided controversial data or mixed findings on prenatal and neonatal outcomes [7] -a problem that potentially stems from the lack of clear definitions of AMA despite the volume of investigations devoted to this issue. The studies that focused on the Iranian context also highlighted the higher prevalence of adverse pregnancy complications in AMA than in younger mothers [4,11], but adequate prenatal care may ensure maternal prognosis that are similar to those of younger pregnant women [12-14]. One of the most challenging issues is abnormal placental adhesion which is more prevalent in advanced maternal age; even happening in primigravid older women [15]. Unfortunately, many couples are not educated for the importance of maternal age at the time of pregnancy and thus postpone this important issue for the later years of reproductive age. Moreover, in recent years, childbearing is encouraged by government policies through media, so we encounter many women who want to have another child at age >35 years. On the basis of these considerations, the current research was conducted to assess adverse maternal and neonatal outcomes in women  $\geq 35$  years who had no medical disease before pregnancy and compare these with the outcomes of healthy younger women.

### Material and Methods

This analytical cross-sectional study involved 891 women who had consecutive pregnancies and were admitted to Obstetrics and Gynaecology department of Darbhanga Medical College and Hospital, Laheriasarai, Bihar for delivery from January 2020 to December 2020. Those with diabetes, chronic hypertension, hepatic and nephrotic diseases, heart disease, and autoimmune and thyroid disorders were excluded from the study. The selected participants were divided into two groups: one consisting of 20 to 34 old pregnant women (n=571) and the other comprising pregnant women who were 35 years or older (n=320).

The groups were compared in terms of prenatal care, and maternal and newborn complications,

such as preterm delivery, placental abruption, eclampsia and preeclampsia, gestational diabetes mellitus (GDM), cesarean delivery, maternal mortality, neonatal conditions, admission into the neonatal intensive care unit (NICU), and low birth weight. Regular prenatal care was defined as involving monthly visits from the discovery of pregnancy up to the 28th week of gestation, biweekly visits from the 28th to 36th weeks of pregnancy, and weekly visits from the 36th week of pregnancy up to delivery. Inadequate prenatal care was defined as a prenatal care frequency of, at most, once during pregnancy. The quality of prenatal cares between these two manners; determined as the irregular prenatal care. Laboratory and sonographic evaluation was carried out in accordance with standard protocols. Finally, the pregnancy outcomes of the two groups were compared. The main outcomes were to compare maternal and neonatal complications consist of preeclampsia, eclampsia, gestational hypertension, gestational diabetes, placenta abruption, intra uterine fetal death, low birth weight, low Apgar score and NICU admission.

The final data analysis was conducted using SPSS version 20. The normality of data distribution was verified using the Kolmogorov-Smirnov test. The differences in baseline and clinical characteristics between the groups were analyzed using a chi-square test and the Mann-Whitney U test for normally and non-normally distributed data, respectively. The  $P < 0.05$  was considered statistically significant.

### Results

About 891 women recruited in this study (571 women in 20-34 years group and 320 women in  $\geq 35$  year group). The mean ages of the women were  $27.60 \pm 4.5$  and  $38.50 \pm 2.6$  in the young and AMA groups, respectively, indicating a significant difference in this regard ( $P < 0.001$ ). We examined maternal baseline characteristics, including the past history of third trimester bleeding and history of gestational diabetes and preeclampsia in the previous pregnancies, and found no significant difference between the two groups in terms of these variables (Table 1). Preeclampsia occurred in 21 cases in the AMA group, whereas this condition occurred in 19 cases in the younger group ( $P = 0.025$ ).

**Table 1 : Maternal baseline characteristics**

Characteristics	Maternal age		P-value *
	20-34 N= 571 (%)	$\geq 35$ N=320 (%)	
Maternal age <sup>¶</sup> (years)	$27.60 \pm 4.5$	$38.50 \pm 2.6$	< 0.001
Gestational age (weeks)	$38.00 \pm 5.0$	$37.00 \pm 8.0$	< 0.001
Prenatal care			
• Regular	478 (87.8)	230 (75.1)	
• Irregular	8 (1.5)	5 (1.6)	< 0.001
• Inadequate	58 (10.6)	71 (23.2)	

PMH <sup>1</sup>			
History of Gestational Diabetes	36 (6)	21 (6)	0.880
Preeclampsia	18 (3)	15 (4)	0.244
Third Trimester Bleeding	533 (93)	291 (90)	0.191
Gravidity <sup>§</sup>	2.00 ± 1.2	3.50 ± 1.8	< 0.001

\* P value was evaluated using Chi-square test (P value < 0.05 denotes significance), <sup>1</sup>Data are expressed as mean ± Standard Deviation (SD), <sup>§</sup> Data were analyzed using Mann-Whitney's U-test, <sup>1</sup> PMH: Past Medical History

Gestational hypertension was significantly higher among the AMA subjects (N = 20) than among the younger group (N = 12) (P=0.002). The inferential statistical results showed that the prevalence of gestational diabetes was significantly higher in the AMA group (P = 0.006). As presented in Table 2, the incidence of cesarean sections was noticeably more frequent among the AMA mothers, whereas vaginal delivery was the prevalent delivery mode

for the younger mothers (P < 0.001). The AMA group substantially differed from the younger ones in terms of the quality of prenatal care, which showed that older women had more inadequate and irregular prenatal care than younger group (P < 0.001). The occurrence of a five-minute Apgar scores lower than 7 significantly increased in the AMA group compared with the other group (P < 0.001). More details are provided in Table 2.

**Table 2 : Pregnancy outcomes with association to maternal age**

Outcomes	Maternal age		P-value*
	20–34 N= 571 (%)	≥ 35 N=320 (%)	
Mode of delivery			< 0.001
Vaginal delivery	469 (84.0)	216 (68.5)	
Cesarean section	89 (15.9)	99 (31.4)	
Eclampsia	2 (0.3)	1 (0.3)	0.925
Preeclampsia	19 (3.3)	21 (6.5)	0.025
Gestational hypertension	12 (2.1)	20 (6.2)	0.001
Gestational diabetes	36 (6.3)	37 (11.5)	0.006
Placental abruption	5 (0.8)	4 (1.2)	0.592
Neonatal conditions			0.083
Live birth	544 (96.8)	300 (95.5)	
Stillbirth	11(1.9)	6 (1.9)	
Intrauterine death	4 (0.7)	8 (2.5)	
Birth weight (grams)			0.340
< 2500	107 (18.8)	73 (22.9)	
≥ 2500	457 (80.5)	243 (76.4)	
Apgar score at 5 minutes			< 0.001
< 7	35 (6.1)	46 (14.6)	
> 7	527 (92.7)	269 (85.3)	
NICU admission	72 (13.4)	46 (15.2)	0.451

<sup>1</sup>Data are expressed as mean±Standard Deviation(SD), <sup>§</sup> Data were analysed using Mann-Whitney's U-test, \*P value was evaluate dusing Chi-square and Mann-Whitney's U-test (P value<0.05 denotes significance)

The groups exhibited no substantial difference with respect to NICU admission, eclampsia, and placental abruption. The same absence of significant differences was observed between the groups in terms of the prevalence of mean gestational age and low birth weight (<2500 g).

Furthermore, the difference between the groups in terms of the prevalence of neonatal conditions, including stillbirths, lives births, and intrauterine deaths, was negligible (Table 2). Because no maternal deaths occurred, no related associations could be assessed.

## Discussion

The findings indicated that older women are more likely to have poor prenatal outcomes than younger females, consistent with the results of some previous studies [11,16]. We found lower five-minute Apgar scores of infants and a significantly higher prevalence of preeclampsia, gestational hypertension, GDM, inadequate prenatal care, and cesarean delivery among the AMA subjects than among the younger women. Nevertheless, no significant difference was found between the groups with regard to the prevalence of placental abruption, eclampsia,

neonatal conditions, birth weight, and NICU admission. In our study, the past history of comorbidities like gestational diabetes, preeclampsia, third trimester vaginal bleeding were the same in both groups (table 1), but our findings revealed that AMA was associated with the increased prevalence of preeclampsia ( $P=0.025$ ) which is in line with the results of similar studies [17,18]. This result can be attributed to the fact that aging is accompanied by alterations in carbohydrate metabolism, which increase blood glucose levels and impairment in vessel walls. Age-induced increases in blood pressure are more considerable during pregnancy, in advanced age. Poor uterine vascularization is believed to cause a deficiency in placental perfusion that is probably related to preeclampsia [19].

In line with a study [19], this study showed that the infants of older women exhibited a higher risk of presenting a five-minute Apgar score below 7 ( $P<0.001$ ). Our research also aligns with that of Wen et al., [20] who found a correlation between AMA and low Apgar scores. Contrastingly, a study reported that neonatal outcomes, including birth weight and five-minute Apgar scores lower than 7, were unaffected by maternal age [21].

The difference between the results of this study and our study may be due to no significant differences between the two groups in terms of maternal morbidities which affect the neonatal outcomes. Although the fifth minutes Apgar score was lower in AMA group, but the need for NICU admission and neonatal condition in the first 48 hours of birth was the same; there is a possibility that advanced neonatal resuscitation procedures in delivery room make this advantage. These results were supported by some previous studies [22-24]; but another study showed significant poor neonatal outcomes in terms of preterm delivery, low birth weight and perinatal mortality [21]; these different results may be mainly due to morbidities like preeclampsia or overt diabetes and maternal age  $\geq 40$ .

### Conclusion

Preeclampsia, prenatal hypertension, GDM, and low five-minute Apgar scores were all associated with unfavorable pregnancy outcomes in cases of AMA, suggesting that older women may be less protected from these consequences during their pregnancies. Early marital preconception counseling for all women should address this crucial topic since couples should be informed and motivated to begin having children at a younger age.

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