

**MATERNAL AND PERINATAL OUTCOME IN ADVANCED MATERNAL AGE
(≥35 YEARS) – A PROSPECTIVE OBSERVATIONAL STUDY AT AN INDIAN
TERTIARY CARE CENTER.**

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Introduction

Pregnancy and childbirth are normal physiological processes and the maternal and neonatal outcomes of most of the pregnancies are good. In India, women of childbearing age consist of 19% of the population. Data suggests that approximately 40% of all women develop some kind of complication.¹ One of the risk factors for such complication is elderly pregnancy, which leads to many complications during pregnancy, labor and also for the baby. Advanced maternal age is usually considered to signify age after 35 years at the time of delivery. It is the term which implies reduced fertility as well as raised risk.² A significant number of women are choosing to postpone their pregnancy well late beyond the third decade of life, even into the fourth and fifth decades in few cases.³ The reason for delayed pregnancy could be classified in to those in urban regions and those in rural areas. Changes in the structure of family with more late marriages or remarriages, women's chase of higher education, career advancement, and advances in assisted reproductive technique along with availability of effective and safe contraceptives are urban reasons, while the cultural reasons and illiteracy being the main causes in rural areas.^{3,4}

Pregnancy after the age of 35 years can be challenging due to the maternal and fetal risk involved. Chronic hypertension, diabetes mellitus, miscarriage, subfertility, ectopic pregnancy, antepartum hemorrhage, anemia, malpresentation, postpartum hemorrhage all lead to augmented incidence of instrumental deliveries as well as cesarean sections. Fetal along with neonatal risk is also augmented because of raised incidence of chromosomal abnormalities (mainly Down's syndrome), IUGR, multiple pregnancy, prematurity leading to greater number of NICU admission. Perinatal morbidity as well as mortality is raised in these pregnant women.⁵ Hence, it is not wrong to say that advanced maternal age is related with poor maternal and fetal outcomes according to scientific evidence published.

An extensive literature search revealed that though there is a plethora of evidence from western countries with regards to the maternal and fetal outcomes of advanced maternal age, such scientific data from India is scarce. There is a definitive increase expected in the number of women in this group, both in developed and developing countries, thus necessitating an in-depth review, and updating of knowledge in the management of this category of women.

Hence, this study was conducted to evaluate the maternal and perinatal outcomes of pregnancies in advanced maternal age.

Material and Methods

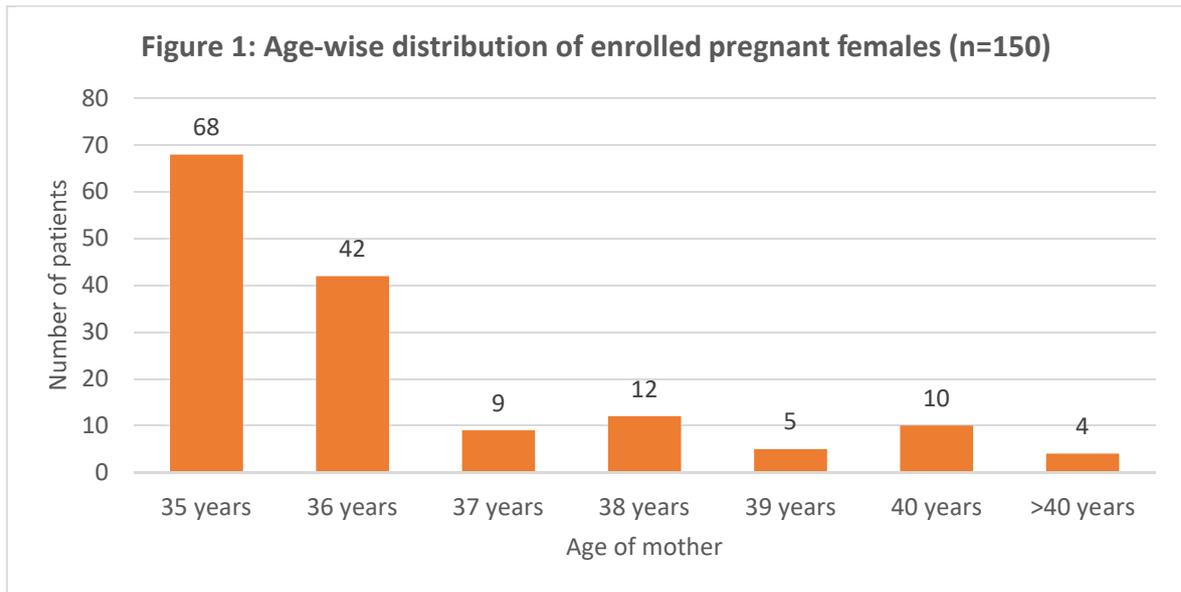
A hospital-based, prospective, observational study was conducted in the department of Obstetrics and Gynecology at Government Medical College and Hospital, Aurangabad, Maharashtra. The study population was composed of pregnant women presenting to the hospital, age ≥ 35 years, and fulfilling all the inclusion and exclusion criteria of the study. The inclusion criteria included age of pregnant female greater than or equal to 35 years, either primigravida or multi gravida, single or multiple pregnancy, conceived either spontaneously or after treatment, irrespective of any comorbidity and willing to participate in the study. Pregnant females with anomalous baby, women who delivered outside the hospital and referred for further management, or those not ready to sign informed consent were excluded from the study. After obtain permission and after written informed consent, eligible women were enrolled in the study. The study period was between October 2019 to September 2021. As soon as woman was admitted to labor room of the study center, age of the woman was noted as per Aadhar Card. After enrollment, sociodemographic parameters were noted which included age, religion, socioeconomic status, occupation of women, causes for delay in pregnancy. History and examination were noted including the findings of obstetric examination. High risk factor and co-morbidities like hypertension, diabetes was identified and documented. Routine and if required special investigations were noted. Maternal and perinatal outcome was noted.

After data collection, data entry was done in a Microsoft Excel sheet. Data analysis was done with the help of statistical software Graphpad InStat.v3.0. Data were presented in tables as well as figures, wherever needed. Descriptive statistics were used to note down the distribution of pregnant women based on age, gender, pregnant women history details, and other findings. Quantitative data, viz. the laboratory parameters, weight of newborn etc. were presented with the help of Mean and Standard deviation. P value of less than 0.05 was considered significant, wherever statistical tests were applied.

Results:

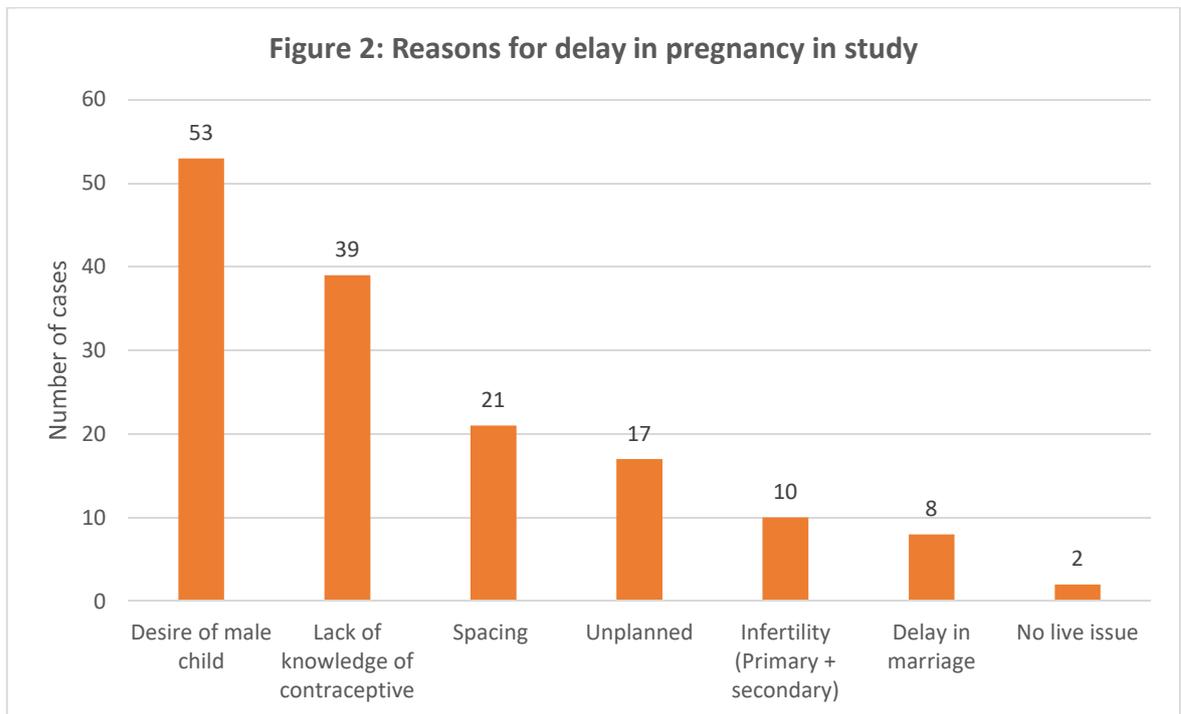
Sociodemographic details:

Majority of the enrolled pregnant women were of age 35 years (45.33%), followed by 36 years (28%) and 38 years (8%) (Figure 1). Most of the enrolled women were from rural area (54.76%). Majority (36%) of women in the study belonged to upper lower social economic status, followed by lower class (34%), lower middle class (26.67%), upper middle (2%), and 2 pregnant women (1.33%) were from upper class. Around 87 of the expectant mothers were unbooked at hospital (58%) while remaining 63 were booked (42%). Around 52% elderly pregnant women had parity between P2-P4, 24% females were P1, 19.33% enrolled females were $\geq P5$, while 4.67% females were P0.



Reasons for delayed pregnancy

The commonest reason for delayed pregnancy in the study was desire for male child (35.33%), followed by lack of knowledge about contraception (26%), and spacing (14%). (Figure 2)



Risk factors associated with pregnancy in study participants

Out of the 150 enrolled pregnant women, 20 pregnant women (13.33%) had anemia, 12 pregnant women (8%) had previous history of LSCS, 8 pregnant women had gestational diabetes mellitus (DM), 6 pregnant women had hypothyroidism, while 3 pregnant women had previous history of two LSCS and remaining complications. (Table 1)

<i>Comorbidities/LSCS History</i>	<i>Number of patients</i>	<i>Percentage</i>
Anemia (moderate + severe)	20	13.33%
Previous 1 LSCS	12	8.0%
Gestational DM	8	5.33%
Hypothyroidism	6	4.00%
Previous 2 LSCS	3	2.00%
Gestational HTN	3	2.00%
Severe Preeclampsia	6	4.00%
UTI	2	1.33%
COVID-19	1	0.67%
Eclampsia	1	0.67%
Multiple gestation	2	1.33%
Large posterior wall fibroid	1	0.67%

*One pregnant woman had more than one associated risk factors.

Gestational age at time of delivery

Majority (70%) of the enrolled pregnant women had gestational age between 37.1 weeks to 40 weeks. 25 pregnant women (16.67%) had gestational age between 32.1-37 weeks. 12 women (8%) had gestational age between 28-32 weeks, while 8 women (5.33%) had a gestational age of above 40 weeks.

Mode of conception

Around 140 of the enrolled pregnant women (93.33%) conceived spontaneously while 7 pregnant women (4.67%) underwent ovulation induction and 3 pregnant women (2%) had history of ART.

Mode of delivery

Majority of the deliveries in the study (75.63%) were vaginal. Around 18% of the deliveries in the study were noted to be LSCS. (Table 4) Of the total pregnant women who had LSCS, 20 pregnant women underwent emergency LSCS while 7 pregnant women had elective LSCS. The commonest indication for LSCS was previous history of LSCS (37%), followed by maternal request (11.11%). (Table 2)

		Frequency	Percentage
<i>Mode of delivery</i>			
Vaginal (n=119)	FTND	90	75.63
	PTVgD	29	24.36
Operative vaginal delivery		04	2.67
LSCS (n=27)	PTLSCS	8	29.63
	FTLSCS	19	70.37
<i>LSCS Indications (n=27)</i>			

Fetal Distress	1	3.70%
Twin Gestation (First by non-cephalic presentation)	1	3.70%
Placenta Previa	2	7.40%
Failure to Progress	2	7.40%
Deep Transverse Arrest	1	3.70%
Maternal Request	3	11.11%
Previous LSCS	10	37.03%
Severe Oligohydromnios	1	3.70%
Severe Preeclampsia with Early DIC with Unfavourable Cervix	1	3.70%
Abruptio Placentae	2	7.40%
Antepartum Eclampsia with Unfavourable Cervix	1	3.70%
CPD in Labor	1	3.70%
Cord Presentation	1	3.70%

Antepartum complications of pregnancy

Of the total 150 enrolled pregnant women, 29 pregnant women had preterm labor. 10 of the pregnant women had gestational hypertension, 20 had anemia, 8 pregnant women had prolonged pregnancy and gestational DM each.(Table 3).

<i>Antepartum complication</i>	<i>Number of patients (n=90)</i>	<i>Percentage</i>
Hypertensive Disorder of Pregnancy Includes Gestational Hypertension Severe Preeclampsia Eclampsia	10	6.67%
Anemia (moderate+severe)	20	13.33%
Intra Uterine Growth Restriction	2	1.33%
Prolonged Pregnancy	8	5.33%
Polyhydramnios	4	2.67%
Oligohydromnios	3	2%
Placenta Previa	2	1.33%
Placenta accreta spectrum	1	0.67%
Abruptio Placentae	3	2%
Gestational Diabetes Mellitus	8	5.33%
Preterm Labour	29	19.33%

*Enrolled pregnant women had multiple complications as well

Intrapartum complications

Commonest noted intrapartum complication was premature rupture of membranes, noted in 25 pregnant women (16.67%). 4 pregnant women suffered from malpresentation (n=4, 2.67%), followed by failure to progress in 2 pregnant women.(Table 4).

<i>Intrapartum complication</i>	<i>Number of patients</i>	<i>Percentage</i>
Fetal Distress	1	0.67%
Failure To Progress	2	1.33%
Deep Transverse Arrest	1	0.67%
Premature Rupture of Membranes	25	16.67%
Cord Prolapse	1	0.67%
Cephalopelvic Disproportion	1	0.67%
Malpresentation	4	2.67%

Postpartum complications

19 pregnant women (68.42%) were found to suffer from postpartum hemorrhage and 2 surgical site wound infection (1.33%). Out of these, 14 pregnant women with postpartum hemorrhage were managed medically, 3 required cervico-vaginal exploration, 1 underwent uterine repair and one landed in obstetric hysterectomy.

Maternal outcomes of pregnancy

Out of the enrolled pregnant women, 98% were discharged from hospital after delivery. 3 pregnant women died (2%). The cause of death was pre-eclampsia in 2 cases and septic shock in the remaining case.

Neonatal characteristics**a. Birth weight:**

Majority of neonates had birth weight >2.5 kilograms (n=80, 53.33%), while 35 neonates had birth weight of between 2-2.5 kilograms (23.34%). Around 18 neonates (12%) had birthweight of 1.5-2 kilograms, while 17 neonates (11.33%) had birthweight of less than 1.5 kilograms.

b. APGAR score:

Around 86.47% of the born neonates to enrolled pregnant women in study were having APGAR score between 7-10, while 13.53% neonates had APGAR below 7, at 5 minutes.

c. Neonatal outcomes:

Of total 150 neonates born, 133 of the neonates were live. 17 neonates were still births, with 7 cases of IUD (FSB) and 10 cases of IUD (MSB) respectively. Of 133 live neonates, 35 neonates (26.13%) required NICU admission. The most common cause of NICU admission was low birth weight noted in 24 neonates, followed by 3 cases of perinatal asphyxia and meconium aspiration syndrome each. One case each of hyperbilirubinemia, macrosomia, and gross congenital anomaly were admitted in NICU.(Table 5). The 3 early neonates died within 7 days of birth and the cause of death

was ARDS due to prematurity(1 case), sepsis (1 case) hypoxic ischemic encephalopathy (1 case).

CAUSES	FREQUENCY
Low Birth Weight	24
Perinatal Asphyxia	3
Meconium Aspiration Syndrome	3
Hyperbilirubinemia	1
Macrosomia	1
Neonates born to GDM	8
Gross Congenital Anomaly	1
TOTAL	41

*Some of the 35 neonates had more than 1 complication causing NICU admission.

Discussion

Scientific literature and clinical experience amongst obstetricians have shown that advanced maternal age is challenging and is associated with poor maternal and fetal outcomes. As very few studies have been conducted on this topic in India, the obstetric and preconceptional monitoring of these patients is not yet standardized. Hence this study would provide us with important evidence to see the maternal as well as fetal outcome in this subset of cases in India.

In the present study, median age was found to be 36 years (range: 35-44 years). Majority of the enrolled pregnant women were of age 35 years (45.33%), followed by 36 years (28%) and 38 years (8%).Majority of the enrolled pregnant women in the study were from rural area (54.67%), and most belonged to lower social economic status (56.67%).This was an expected finding as the government hospitals cater more to the rural areas, where most of the families are of lower to middle socioeconomic status. In the similar study by Rajput et al., 89.93% females were between 35-39 years' age⁵and rest of sociodemographic parameters were comparable to other studies.^{6,7}

Around 52% elderly pregnant women had parity between P2-P4. Overall, 28.67% cases in our study were primiparous while 71.33% were multiparous. In the study by Chan et al., 24.9% cases in our study were primiparous while 75.1% were multiparous.^{8,9}

The commonest reason for delayed pregnancy in the study was desire for male child (35.33%), followed by lack of knowledge about contraception (26%), and spacing (14%). In the study by Rajput et al., commonest known reasons for advanced maternal age were preference for male child (23.95%), unawareness (21.52%), and infertility (6.59%).⁵

Majority of the enrolled pregnant women (93.33%) conceived spontaneously while 7 pregnant women (4.67%) underwent ovulation induction and 3 pregnant women (2%) had history of ART. In the study by Pawde et al., 12% of the enrolled females with advanced maternal age had assisted conception.¹¹

Out of total 150 enrolled pregnant women, 20 cases (13.33%) had anemia,hypertensive disorder of pregnancy, 8 cases had gestational diabetes mellitus (DM), 6 cases had

hypothyroidism. In the study by Dixit et al., thyroid disorder was noted in 10% females, HTN was noted in 3.3% females while DM was noted in 6.67% females.¹²

Majority of the enrolled cases (70%) were at term, 24.67% were preterm, while 5.33% cases were post term (>40weeks). In the study by Thatal et al., 3% of females had <37 weeks' gestational age, 37-40 weeks was noted in 93.4%, >40 weeks was noted in 3.6%.⁷ In the study by Anozie et al., 20.51% of females had <37 weeks' gestational age, 37-40 weeks was noted in 71.79%, >40 weeks was noted in 7.6%.⁶

Majority of the deliveries in the study (79.33%) were vaginal and LSCS (18%, 70% of these being emergency). The commonest indication for LSCS was previous history of LSCS (37%), followed by cesarean section on maternal request (11.11%). In the study by Thatal et al., 32.5% females had vaginal delivery while 67.5% females underwent LSCS. Most common reason for LSCS in that study were CPD (62.5%) followed by oligohydramnios (8.9%) and breech presentation (7.1%).⁷ Cesarean section rate in our study was found to be much lower compared to other studies; this may be due to practices like various birthing positions, birth companion and avoiding unindicated cesarean sections in our institute.

In the present study, 27 cases had preterm labour. 10 of the pregnant women had gestational hypertension, 20 had anemia, 8 cases had prolonged pregnancy and gestational DM cases each. 4 cases also suffered from polyhydramnios, 3 cases had oligohydramnios, while another 3 females suffered from abruption placenta. Commonest noted intrapartum complication was premature rupture of membranes, noted in 24 cases (16%). In postpartum period, 32 cases (21.33%) suffered from postpartum hemorrhage while other common complications were vaginal lacerations and tear (18%). 3 (2%) pregnant women died in the study.

In present study, majority of neonates had >2.5 kilograms of birthweight (53.33%), while 17 neonates had birthweight of <1.5kg. 86.47% of the born neonates to enrolled females in study were having APGAR score between 7-10 indicating positive fetal outcome. 17 cases of still births were noted, along with 7 cases of IUD (FSB) and 10 cases of IUD (MSB) respectively. 35 cases were of NICU admissions. The most common cause of NICU admission was low birth weight noted in 24 neonates, followed by 3 cases of perinatal asphyxia and meconium aspiration syndrome each. The possible reason for disparity in the weight of neonates is noted as there is lack of awareness for proper antenatal care amongst pregnant women with advanced maternal age.

The study had a few limitations. The sample size was limited, and it was a single arm study where-in comparison with a control group was not done. Future studies with a larger sample size, multi-center study design and comparative study with non-elderly group can help validate our study findings in a better way.

Conclusion

Women with advanced maternal age are at great risk of antepartum, intrapartum, and postpartum complications and should be provided close supervision for better pregnancy outcome. The fetal outcomes can be jeopardized by higher rates of low birth weight, lower APGAR score at 5 minutes and other complications like sepsis, pneumonia, and asphyxia in neonates of mother with advanced maternal age. Such neonatal complications may necessitate NICU admissions for some babies. However, with adequate care and timely referrals to tertiary care centers, the maternal and perinatal outcomes can be promising despite more chances of complications.

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