

A study to evaluate the maternal and fetal outcome in advanced maternal age

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Abstract

Background: The present study is aimed (a) To evaluate the association between advanced maternal age at birth and caesarean section (CS) (b) To study the perinatal outcome in pregnancy with advanced maternal age. **Materials and Methods:** This retrospective study was conducted to evaluate maternal and fetal complications associated with maternal age of pregnancies at ≥ 30 years was carried out in the Department of Obstetrics and Gynecology, Sri Devaraj Urs Medical College, attached to RL Jalappa Hospital and Research Centre, Kolar between Jan 2019 and December 2019, after fulfilling all the inclusion and exclusion criteria. Data of 200 women were collected from the parturition register. The major maternal parameters studied were age at the time of delivery, parity, gestational age, booking status, mode of delivery. The obstetric complications like preeclampsia, gestational diabetes mellitus, postpartum hemorrhage, PROM, and hypothyroidism. Fetal parameters studied were fetal distress, thick meconium-stained liquor, macrosomia, perinatal asphyxia and fetal growth restriction. **Results:** In this study, out of 200 women, 166 (83%) were in the age group of 30-34 years. Out of 200 women, 90 (45%) patients required caesarean section whereas 104 (52%) women had full term normal deliveries and operative vaginal delivery in 6 (3%). Among all the women, who underwent caesarean section (90), indication for caesarean section was thick meconium-stained liquor with poor bishop score in 26 (13%) subjects. Severe oligohydramnios was observed in 13 (6.5%) cases, followed by isolated fetal distress in 15 (7.5%) cases. Maternal and obstetric complications have been observed in 84 women. The maternal complications such as preeclampsia was observed in 40 (20%), gestational diabetes mellitus in 11 (5.5%), followed by hypothyroidism in 10 (5%). Concerned with the fetal outcome, 170 (85%) babies were shifted to mother side, while 30 (15%) babies were admitted to NICU due to various fetal complications. Fetal complications, such as fetal distress was seen in 10 (5%) babies and thick meconium-stained liquor in 7 (3.5%) babies followed by 5 (2.5%) babies were FGR. However, no neonatal deaths were recorded in this study. **Conclusion:** The present study results may conclude the evidence that caesarean section rates increase with advancing maternal age. Maternal age ≥ 30 years older had a higher overall prevalence of obstetrical complications such as preeclampsia, gestational diabetes mellitus, and hypothyroidism. The fetal complications such as fetal distress, thick meconium-stained liquor and FGR. Need for neonatal care also to be considered in pregnancies with advanced maternal age. The possible benefits of elective caesarean section may include pelvic floor protection, convenience, reduced fear of childbirth and the reduced risk of some fetal injuries.

Keywords: Advanced maternal age, Fetal outcome, caesarean section, NICU admissions.

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Received Date: 04/11/2020 Revised Date: 14/12/2020 Accepted Date: 07/01/2021

DOI: <https://doi.org/10.26611/10121722>

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Quick Response Code:	Website: www.medpulse.in
	Accessed Date: 12 February 2021

Maternal age at childbearing has become increasingly common in the past decades. Recent years have seen significant growth in mean maternal age at first childbirth as well as in number of pregnancies at advanced maternal age. There are various reasons for delayed childbearing, among them, the most common one seems to be assisted reproductive technologies (ART) (e.g. in vitro fertilisation, oocyte donation). Advanced maternal age, considered as one of the risk factor for pregnancy complications.¹⁻³ Women 30 years of age and older who become pregnant are at increased risk of developing hypertension, diabetes,

How to cite this article: Mandem Sadana Reddy, Munikrishna M, Sheela S R. A study to evaluate the maternal and fetal outcome in advanced maternal age. *MedPulse International Journal of Gynaecology*. February 2021; 17(2): 15-19.

<http://medpulse.in/Gynaecology/index.php>

placenta previa, operative deliveries, caesarean section (CS) and maternal death has been documented in the reported literature.⁴⁻⁶ In addition to maternal complications, advanced maternal age is associated with fetal complications such as low Apgar score, NICU admission, preterm birth,^{7,8} low birth weight,⁹ birth defects, chromosomal abnormalities, and perinatal death.^{10,11} As a result, mothers of advanced age will undoubtedly require additional health care services. Increase in caesarean section rate is multifactorial, but existing literature suggests that the increase is predominantly a result of advanced maternal age, particularly in nulliparous women.¹² In most of the industrialized world social, educational and demographic changes have led to an increasing number of women postponing their pregnancies until late in their fertile life. The question, 'Does maternal age affect pregnancy outcome?' It remains, nevertheless, a question of consequence because it addresses issues of considerable biological and clinical importance.¹³ Studies have found advanced maternal age to be a risk factor for delivery by caesarean section but it is not clear whether this is due to an independent association between advanced maternal age and CS or as a result of confounding factors.¹² Waldenstrom *et al.*, found a doubled risk of labor dystocia in 35–39-year-old nulliparous women compared to women younger than 25 years. This tendency was consistent even stratified by the women's first, second and third birth.¹⁴ Studies concerned with advanced maternal age and associated obstetric outcome were reported from western population, and very few studies were reported in Indian subjects. However, in this study we considered maternal age of ≥ 30 years as advanced maternal age group as the study is conducted in rural population where pregnant women with above 35 years are very less. Hence, the present study is aimed (a) To evaluate the association between advanced maternal age at birth and caesarean section (CS) (b) To study the perinatal outcome in pregnancy with advanced maternal age.

MATERIALS AND METHODS

This retrospective study was conducted at Department of Obstetrics and Gynaecology, Sri Devaraj URS Medical

College, attached to RL Jalappa Hospital and Research Centre, a constituent of Sri Devaraj URS Academy of Higher Education and Research (SDUAHER), Kolar, Karnataka. The study has been approved by the Institutional Ethics Committee. Data of 200 women 30 years and above were collected from the parturition register of RL Jalappa Hospital and Research Centre, Tamaka, Kolar from Jan 2019 to December 2019. The major maternal parameters studied were age at the time of delivery, parity, gestational age, booking status, mode of delivery. The obstetric complications studied were such as preeclampsia, gestational diabetes mellitus, postpartum haemorrhage, PROM and hypothyroidism. Fetal parameters studied were fetal distress, thick meconium-stained liquor, macrosomia, perinatal asphyxia, and fetal growth restriction. All data were cross-referenced with the birth records, and verified. Data were analysed by looking at the number of women ≥ 30 years at booking for antenatal care and comparing the rates of caesarean section in this group who delivered in our hospital. The inclusion criteria of the subjects as follows: Advanced maternal age in the study was 30 years or older, pregnant women 37 weeks to 42 weeks gestation with an uncomplicated pregnancy, singleton pregnancy, cephalic presentation, mild preeclampsia, gestational diabetes mellitus was treated with diet alone and mild fetal growth restriction without abnormal doppler. The study subjects with multiple pregnancy, pregnancies complicated with medical disorders, abnormal placentation were excluded from the study.

RESULTS

In the present study, out of 200 women, 168 (84%) belongs to 30 – 35 years of age group, 30 (15%) women were in the age group of 36 – 40 years. Gestational age 37 – 40 weeks was observed in 180 (90%) subjects, and 20 (10%) had gestational age of 40 – 42 weeks. Majority of the women were multigravida 118 (59%) and 82 (41%) were primigravida. Among the multigravida women, 20 women had a history of previous pregnancy at age equal to or more than 30 years. Out of 200 women, 120 (60%) were unregistered and 80 (40%) were registered with us for regular antenatal check-up as represented in the table 1.

Table 1: Distribution of participants according to their demographic data

Demographic Data	No. of Participants (n=200)	Percentage (%)
Age (years)		
30-34	166	83%
35-39	32	16%
40 years and above	2	1%
Gestational age (weeks)		
37-40	180	90%
40 -42	15	7%
Parity		

Primigravida	82	41%
Multigravida	118	59%
Booking status		
Booked	80	40%
Unbooked	120	60%

In this study, out of 200 women, 104 (52%) had full term normal delivery (FTND), in this, 34 (17%) were induced and delivered vaginally and 70 patients (35%) had spontaneous onset of labour. 90 (45%) women underwent caesarean section and 6 (3%) had operative vaginal delivery. Among all the patients who needed operative vaginal delivery majority of cases 4 (2%) was delivered by Vacuum assisted vaginal delivery and 2 patients (1 %) had forceps delivery as shown in Table 2.

Table 2: Distribution of participants based on their Clinical Parameter

Mode of delivery	Number of participants (n=200)	Percentage (%)
Full term normal delivery	104	52%
Cesarean section	90	45%
Operative vaginal delivery	6	3%
Operative Vaginal Delivery		
Forceps Assisted	2	1%
Vacuum Delivery	4	2%

Among all the women, 90 (45%) women underwent caesarean section, indication for caesarean section was thick meconium-stained liquor with poor bishop score in 26 (13%) subjects. Severe oligohydramnios was observed in 13 (6.5%) cases, followed by isolated fetal distress in 15 (7.5%) cases and CPD in 7 (3.5%) cases. 10 (5%) cases underwent caesarean section in view of previous LSCS and 5 (2.5%) cases due to non-progression of labour, 8 (4%) patients also underwent section due to failed induction and another 6 (3%) due to obstructed labour as presented in table 3.

Table 3: Distribution of participants based on indication for C section

Cesarean delivery indications	Number of participants underwent caesarean section (n=90)	Percentage (%)
Meconium-stained liquor	26	13%
Severe oligohydramnios	13	6.5%
Fetal distress	15	7.5%
CPD	7	3.5%
Previous LSCS	10	5%
Non progression	5	2.5%
Failed induction	8	4%
Obstructed labor	6	3%
TOTAL	90	45%

In this study, maternal and obstetric complications have been observed in 84 (42%) women. The maternal complications such as preeclampsia was observed in 40 (20%), gestational diabetes mellitus in 11 (5.5%), hypothyroidism in 10 (5%), followed by RH negative pregnancy in 8 (4%) etc. as shown in table 4.

Table 4: Distribution of participants based on maternal complications

Maternal complications	Number of participants (n=84)	Percentage (%)
Post-partum hemorrhage	4	2%
Perineal tears	2	1%
Obstructed Labor	6	3%
Pre-eclampsia	40	20%
GDM	11	5.5%
PROM	3	1.5%
Hypothyroidism	10	5%
RH Negative Pregnancy	8	4%
Total	84	42%

Concerned with the fetal outcome, 170 (85%) babies were shifted to mother side, while 30 (15%) babies were admitted to NICU due to various fetal complications as shown in table 5.

Table 5: Distribution of participants based on the fetal Outcome

Fetal outcome	Number of participants (n=200)	Percentage (%)
Mother side	170	85%
NICU Admission	30	15%

In this study, fetal complications, such as fetal distress was seen in 10 (5%) babies and thick meconium-stained liquor in 7 (3.5%) babies followed by 5 (2.5%) babies were FGR, perinatal asphyxia seen in 4 (2%) babies and macrosomia was observed in 4 (2%) babies as shown in Table 6. However, no neonatal deaths were recorded in this study.

Table 6: Distribution of participants based on cause for NICU admission of the baby

Cause of NICU admission	Number of NICU admissions (30)	Percentage (%)
Fetal distress	10	5%
Thick meconium-stained liquor	7	3.5%
Macrosomia	4	2%
Perinatal asphyxia	4	2%
FGR	5	2.5%
Total	30	15%

166 women were in the age group of 30-34 years, in which LSCS was observed in 77(38.5%) cases and NICU admissions were in 26(13%) babies. 32(16%) women were in 35-39 years age group, LSCS was observed in 14(7%) cases and NICU admissions were seen in 4(2%) babies. In 30-34 years of age group, maternal complications were seen in 67(33.5%) women, in which gestational hypertension in 31(15%) and gestational diabetes mellitus in 14(7%) women. In 35-39 years, age group, maternal complications were seen in 16(8%) women, and gestational hypertension in 10(5%) women. Indicating overall, maternal age ≥ 30 years also suggesting increased maternal and fetal complications as shown in table 7.

Table 7: Distribution of participants based on age group

Age (years)	No. of participants	LSCS	FTND	Operative Delivery	Primi	Multi	Maternal complications	PIH	GDM	NICU Admissions
30-34	166(83%)	77	84	5	68	98	67	31	14	26
35-39	32(16%)	14	17	1	13	19	16	10	0	4
≥ 40	2 (1%)	0	2	0	1	1	1	0	0	0

LSCS: lower segment Caesarean section, FTND: Full term normal delivery, PIH: Pregnancy induced hypertension, GDM: Gestational diabetes mellitus, NICU: Neonatal Intensive care unit

DISCUSSION

The current study is done to evaluate the maternal and fetal complications associated with advanced maternal age, as it is associated with pregnancy complications. In this study, we observed that women having their first childbirth and aged ≥ 30 years are more likely to develop maternal hypertension and higher risk of caesarean delivery. In this study 90 (45%) women with maternal age ≥ 30 years underwent caesarean section. Consistent with the current study results, Khalil *et al.*, demonstrated that caesarean section, preeclampsia, SGA and GDM were more common in advanced maternal age pregnancy.¹² Yet another study by Ihab *et al.*, also showed that maternal age ≥ 35 years is associated with high-risk pregnancy.^{12,13} Similarly, studies conducted by Amarin *et al.*, Goldman *et al.*, Bobrowski *et al.* and Joseph *et al.*^{9, 14-16} However, study conducted by EK Moore *et al.*, reported that the overall caesarean section rate in women ≥ 40 years is increased from 34.6% in 2006 to 53.7% in 2011, comprising of an increase in both elective and emergency caesarean sections.¹² A study conducted by GhayathJanoudi *et al.*, reported that the rates of Caesarean section increased with advancing maternal age; in women aged 20 to 34, 35 to 40, and over 40, the

rates were 26.2%, 35.9%, and 43.1% respectively.¹⁵ Yet, another study by SY Kim *et al.*, reported caesarean section rate 15.4%.¹⁶ In this study instrumental delivery was reported to be 3% in women ≥ 30 years. In contrast to present study, a study conducted by L Dunn *et al.*, reported that 13% instrumental delivery.¹⁷ In present study maternal complications were reported to be in 84 women. In which preeclampsia was observed in 40 (20%) women and gestational diabetes mellitus was in 11 (5.5%). This was supported by a study conducted by Verma S *et al.*, reported that hypertensive disorders of pregnancy were observed in 13.3% women and gestational diabetes mellitus was in 8.7% women with advanced maternal age.¹⁸ Hypertensive disorders of pregnancy may be due to the fact that as pregnancy progresses maternal adaptation (resulting in high flow, low resistance circulation and decrease in mean blood pressure) is impaired in older women leading to development of preeclampsia and chronic hypertension.¹⁹ Gestational diabetes mellitus may be due to reduced insulin sensitivity with advancing age by progressive deterioration of β -cell function.²⁰ Advanced maternal age is associated with adverse fetal outcomes. In this study, adverse outcomes were reported to be in 30

babies. Out of which, fetal distress in 10 (5%), thick meconium-stained liquor is in 7 (3.5%) followed by FGR in 5 (2.5%). A study conducted by Odibo *et al.*, reported a positive association between advanced maternal age, FGR and fetal distress may be due to reduced oxygen exchange.²¹ Any group of reproductively older women will include more individuals with chronic diseases such as obesity, diabetes, hypertension, or cardiac or renal disease than an otherwise comparable group of younger women. They will also have had more potential exposure to environmental toxins and radiation, although the consequences of such exposures are not completely understood. In addition, certain complications develop during gestation more commonly among older women such as pre-eclampsia, placenta praevia and gestational diabetes.¹³ The possible benefits of elective caesarean section may include pelvic floor protection, convenience, reduced fear of childbirth and the reduced risk of some fetal injuries. The relative safety of elective caesarean section compared to emergency caesarean section, along with the perceived advantages of low-risk caesarean delivery seems to have driven the widespread acceptance of elective caesarean delivery for non medical and non obstetrical reasons, although the potential risks of maternal and neonatal morbidities between caesarean and vaginal deliveries are still being debated.¹⁷

CONCLUSION

The present study results may conclude the evidence that CS rates increase with advancing maternal age. Maternal age ≥ 30 years older had a higher overall prevalence of obstetrical complications such as preeclampsia, gestational diabetes mellitus, and hypothyroidism. The fetal complications such as fetal distress, thick meconium-stained liquor and FGR. Maternal health conditions and obstetrical complications associated with increased caesarean section rates with advancing maternal age were previous caesarean section, primiparity, assisted reproductive technology, chronic hypertension, gestational diabetes, preeclampsia, placenta previa. Need for neonatal care also to be considered in pregnancies with advanced maternal age. The possible benefits of elective caesarean section may include pelvic floor protection, convenience, reduced fear of childbirth and the reduced risk of some fetal injuries.

Conflict of interest: Nil

Funding: Nil

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Source of Support: None Declared
Conflict of Interest: None Declared

