

# Advanced Maternal Age and Pregnancy Outcome at Manipal Teaching Hospital: Cross-sectional Analytical study

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## ABSTRACT

**Introduction:** Advanced and very advanced maternal age are associated with several adverse maternal and fetal outcome. The objective of this study was to find out the possible association between advanced maternal age and adverse pregnancy outcomes at Manipal Teaching Hospital.

**Methods:** A cross sectional analytical study conducted at department of Obstetrics and Gynecology, Manipal Teaching Hospital, Pokhara, Nepal. A total of 198 patients who were  $\geq 30$  years and  $>24$  weeks pregnant admitted in obstetric ward were selected. These patients were divided into three groups according to their age (30-34, 35-39 and  $\geq 40$  years). We compared the incidence of adverse maternal and perinatal outcome among these groups. We also calculated odds ratio of maternal and perinatal outcomes in 35-39 years and  $\geq 40$  years women, compared with women aged 30-34 years.

**Results:** Comparison of the three age groups revealed that advanced maternal age constitute a predisposing factor for malpresentation, gestational diabetes mellitus, placenta previa, fetal distress and caesarean section. Whereas, risk of non progress of labour, preterm birth, postpartum hemorrhage, perinatal death and congenital anomalies were increased in very advanced maternal age group. From these, statistical significance was reached in case of greater risk of malpresentation ( $p=0.01$ , OR=6.66), fetal distress ( $p=0.04$ , OR=2.6) and caesarean section ( $p=0.02$ , OR=2.06) in advanced age group when compared to the patients aged 30-34. Furthermore, very advanced age group were higher risk of postpartum hemorrhage ( $p=0.03$ , OR=2.47) and congenital anomalies, which were statistically significant ( $p=0.04$ , OR=29.57) when compared to the 30-34 years.

**Conclusion:** Advanced and very advanced maternal age is associated with several adverse maternal and perinatal outcome. The risk of perinatal complication begin to increase after the age of 35 but significantly increased after 40 years.

**Keywords:** Advanced; Age; Maternal; Perinatal; Outcome

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## INTRODUCTION

Pregnancy at an advanced age has become more common in both developed and developing countries over the last decades.<sup>1</sup> Advanced maternal age is defined as 35 or more years at the time of delivery, whereas very advanced maternal age is defined as 40 or more at the time of delivery.<sup>2</sup> Fertility declines with advancing age and women who conceive are at greater risk of pregnancy complications.<sup>3</sup> These increased risks appeared to be independent of maternal co-morbidities.<sup>4-6</sup> A study done in 29 countries revealed that the overall prevalence of advanced maternal age was 12.3%, ranging from 2.8% in Nepal to 31.1% in Japan.<sup>7</sup>

Few types of research have been conducted to identify the association of adverse maternal and perinatal outcome with advanced maternal age in this area.

Hence, we aimed to find out the association of maternal and perinatal outcomes with advanced and very advanced maternal age.

## METHODS

It was a cross sectional analytical study carried out on pregnant women admitted in obstetric ward after 24 weeks of gestational age at Manipal Teaching Hospital during the study period of six months from September 2019 to February 2020. This study was conducted after approval of institutional review committee (MEMG/IRC/266/GA) and consent of patient. The sample size was calculated by standard formula i.e.  $n = Z\alpha^2pq/d^2$ .<sup>8</sup> Where, n = sample size, p = prevalence (i.e. 46%=0.46) of pregnancy complication among advanced maternal age.<sup>9</sup> q= 1-p, d= margin of error (10%), z = 1.96 at 95% CI. From the calculation;  $n = 1.96^2 \times (0.46 \times 0.54) / 0.01 = 95$ .

A total of 198 pregnant women of age 30 years and older were selected. Exclusion criteria were all pregnant woman admission below the age of 30 years, patients less than 24 weeks of gestation, multiple pregnancy, patients with choric disease such as, chronic renal failure, severe cardiac disease, chronic liver disease and chronic lung disease.

All patients were analyzed for maternal

outcome such as, pregnancy induced hypertension, diabetes mellitus, anemia, antepartum hemorrhage, PROM (premature rupture of membrane), malpresentation and oligohydramnios. Perinatal outcome such as, preterm birth, IUGR (intra uterine growth restriction), Apgar score at 5 min, birth weight, IUFD (intra uterine fetal death), still birth and NICU (neonatal intensive care unit) admissions. Information related to patient's general characteristics (age at the time of delivery, gravida, parity and gestational age), complication during pregnancy, mode of delivery, intrapartum complication and neonatal outcome was recorded in a predesigned proforma.

These patient were divided into three main groups according to their age: 30-34 years (control group), 35-39 years (advance age),  $\geq 40$  years (very advance age). The groups were compared about maternal and fetal outcomes. The recorded data were analyzed statistically using statistical package for social sciences (SPSS) version 16. Frequencies and percentage were calculated by cross tabulation of these three groups. Percentage of outcomes were calculated with age groups. p value below 0.05 was considered significant. Odds ratio (OR) and 95% confidence intervals (CI) were calculated.

## RESULTS

A total of 1,222 women had delivered at the Department of Obstetrics and Gynecology of Manipal Teaching Hospital during the study period of six months (September 2019 to February 2020). Among them 198 cases were included in the study. Out of them 52% were of 30 – 34 years age group and 42.4% were of advanced maternal age (35-39 years) group and only 5.6% were of very advanced age group ( $\geq 40$  years).

We observed that majority of the population in the age group of 30-34 years and 35-39 years were multigravida (81.55% and 67.85% respectively) where as in age group of  $\geq 40$  years majority were grand multigravida (54.54%). (Table 1)

**Table 1: Pregnancy characteristics in relation with maternal age**

General characteristics	Maternal age group		
	30-34(n=103)	35-39(n=84)	≥40(n=11)
<b>Gravida</b>			
Primigravida	14(13.59%)	16(19.04%)	1(9.09%)
Multigravida	84(81.55%)	57(67.85%)	4(36.36%)
Grandmultigravida	5(4.85%)	11(13.09%)	6(54.54%)
<b>Period of gestation at delivery (in weeks)</b>			
<37	22(21.35%)	15(17.85%)	3(27.27%)
≥37	81(78.64%)	61(72.62%)	8(72.72%)

**Table 2: Maternal complication and mode of delivery in relation with maternal age**

Maternal complication	Maternal age group		
	30-34(n=103)	35-39(n=84)	≥40(n=11)
Pregnancy induced hypertension	13(12.62%)	8(9.52%)	1(9.09%)
GDM	0	4(4.76%)	0
Malpresentation	3(2.91%)	14(16.66%)	1(9.09%)
Anemia	5(4.85%)	0	0
Placenta previa	2(1.94%)	4(4.76%)	0
Non progress of labour	3(2.91%)	1(1.19%)	1(9.09%)
Postpartum hemorrhage	4(3.88%)	3(3.57%)	1(9.09%)

GDM=Gestational diabetes mellitus

As shown in table number two incidence of pregnancy induced hypertension (12.62%) and anemia (4.85%) were increased in age group of 30-34 years compared with age group of 35-36 years and ≥40 years. Increased incidence of gestational diabetes mellitus (4.76%), malpresentation (16.66%) and placenta previa (4.76%) were seen in the age group of 35-39 years compared with very advanced age group and control group. It was observed, that non-progress of labor (9.09%) and postpartum hemorrhage (9.09%) were significantly increased in the age group of ≥40 years as compared to age group of 35-39 years and 30-34 years. We found higher rate of caesarean section (66%) than vaginal delivery (33%) in all three groups. Among them, age group of 35-39 years had increased risk of caesarean section (75%).(Table 3)

**Table 3. Mode of delivery in relation with maternal age**

Mode of delivery	Maternal age group		
	30-34(n=103)	35-39(n=84)	≥40(n=11)
Vaginal delivery	42(40.77%)	20(23.81%)	4(36.36%)
Caesarean section	61(59.22%)	63(75.00%)	7(63.63%)

As shown in Table 4., we observed increased risk of IUGR(18.18%), preterm labor (27.27%), perinatal death (18.18%), need of NICU admission (18.18%) and congenital anomalies(9.09%) in the age group of ≥40 years.

**Table 4: Neonatal outcome in relation with maternal age**

Fetal outcome	Maternal age group		
	30-34(n=103)	35-39(n=84)	≥40(n=11)
Fetal distress	6(5.82%)	12(14.28%)	0
IUGR	9(8.73%)	3(3.57%)	2(18.18%)
Preterm birth	22(21.35%)	15(17.85%)	3(27.27%)
APGAR score <7 at 5 min	4(3.88%)	3(3.57%)	0
Birth weight <2.4 kg	21(20.38%)	8(9.52%)	1(9.09%)
Birth weight 2.5 kg - 3.5 kg	75(72.81%)	73(86.90%)	10(90.90%)
Birth weight >3.5 kg	7(6.79%)	3(3.57%)	0
NICU admission	8(7.76%)	6(7.14%)	2(18.18%)
Perinatal death	5(4.85%)	1(1.19%)	2(18.18%)
Congenital anomalies	0	1(1.19%)	1(9.09%)

As shown in Table 5, We found that malpresentation and fetal distress were significantly higher in advance maternal age group compared to 30-34years age group ( $p=0.01$ ,  $OR=6.66$  and  $p=0.04$ ,  $OR=2.6$  respectively). We observed that risk of caesarean section is significantly increased in advanced age. We also observed that there were increased association of non progress of labour ( $p=0.35$ ,  $OR=3.03$ ), postpartum hemorrhage ( $p=0.03$ ,  $OR=2.47$ ) and preterm birth ( $p=0.65$ ,  $OR=1.38$ ) in  $\geq 40$  years group. Further analysis revealed that with increasing age risk of perinatal death ( $p=0.10$ ,  $OR=4.35$ ) and congenital abnormalities ( $p=0.04$ ,  $OR=29.57$ ) increases, which is significantly higher in very advance maternal age when compared with 30-34 years age group. However statistical significant was reached in cases of increased risk of congenital anomalies in very advanced age group.

**Table 5: Odds Ratio for maternal and neonatal outcome at advance and very advance maternal age groups compared with 30-34 years group**

Adverse Outcome	35-39 years group		≥40 years group	
	p-value	OR (95% CI)	p-value	OR (95% CI)
Gestational diabetes mellitus	0.10	11.5(0.61-218.07)	-	-
Malpresentation	0.01	6.66(1.84-24.06)	0.35	3.03(0.29-31.69)
Non progress of labour	0.43	0.4(0.04-3.9)	0.35	3.03(0.28-31.6)
Fetal distress	0.049	2.6(0.96-7.5)	-	-
Preterm birth	0.55	0.8(0.38-1.66)	0.65	1.38(0.34-5.64)
Postpartum hemorrhage	0.91	0.91(0.19-4.21)	0.03	2.47(0.25-24.33)
Perinatal death	0.19	0.23(0.02-0.61)	0.10	4.35(0.73-25.73)
Congenital anomalies	0.42	3.71(0.14-92.47)	0.04	29.57(1.13-772.64)
Caesarean section	0.024	2.06(1.09-3.88)	0.77	1.20(0.33-4.37)

## DISCUSSION

In our study we observed that majority of cases in the advance age group were multigravida where as in the age group of very advance age group majority (57%) cases were grand multigravida. This result was comparable to the study done by Rajput N et al.<sup>9</sup> where 71% were multigravida

in advance maternal age group. This may be because of lack of utilization of contraception and want of male baby in developing country like ours.

Contrary to study done by Ates S et al.<sup>4</sup> our study showed decreased incidence of pregnancy induced hypertension in advanced and very advanced age group compared to age group of 30-34 years. Whereas, studies done by Radon-Pokracka et al.<sup>10</sup> reported decrease in PIH with advanced age which was similar to our study. This result might confirm the immunological hypothesis of PIH which decreases with subsequent pregnancy. GDM was shown to be increased only in advanced age group but not in very advanced age group which was different to study done by Kavehic et al. which revealed greater incidence of GDM in age group of  $\geq 45$  years.<sup>2</sup>

In our study cesarean section was increased in all the groups and reason for this could be that our center is a tertiary center. On further comparison with different age we observed that there were increased risk of cesarean section even more in advance and very advanced maternal age group compared to age group of 30-34 years (75% and 63.63% vs 59%, respectively). Similar result has been shown in study done by Ates S et al.<sup>4</sup> where rate of cesarean section was 66% in advanced maternal age.

Our analysis revealed increased association of postpartum hemorrhage with very advanced maternal age. Our result was similar to different studies where risk of postpartum hemorrhage was significantly higher in very advanced maternal age group.<sup>10,11</sup> Lower contraction potential and decreased oxytocin receptor of uterus in elderly women might be the result of non-progress of labour and PPH. Study done by Pawde et al.<sup>11</sup> reported incidence of preterm birth increase in advance and very advance age group (17%), which was similar to our study. Maternal complication such as oligohydramnios and PPRM were significantly higher in very advanced maternal age group can be the causes of preterm birth. In contrary to the study by Radon-Pokracka et al.<sup>10</sup> we failed to observe higher incidence

of low birth weight and macrosomia in both advanced and very advanced maternal age group but instead we observed incidence of low birth weight was higher in age group of 30-34 years.

We also observed that there were increased association of congenital abnormalities in very advanced maternal age. Our result were similar to studies done by Kavehic et al.<sup>2</sup> and Radon-Pokracka et al.<sup>11</sup> Preterm birth and congenital anomalies can be the main reason for the perinatal death.

The main limitation of our study was single center population and small size of very advance age group ( $\geq 40$  years) being only 11 and lack of data on race /ethnicity, socioeconomic status and BMI. Which also contribute to adverse pregnancy outcome. Our study failed to collect information about reason for advanced maternal age. This failure to examine the population of different center and reason for advanced maternal age may be addressed in future studies.

## CONCLUSION

Advanced maternal age constitute a predisposing factor for malpresentation, gestational diabetes mellitus, placenta previa, fetal distress and increased risk of caesarean section. Whereas, risk of non progress of labour, preterm birth, postpartum hemorrhage, perinatal death and congenital anomalies were increased in very advanced maternal age group.

More than pregnancy complication increasing maternal age has high risk of perinatal complication. Therefore, they should be advised to adhere to frequent antenatal visits and should be kept under the close supervision of a senior Obstetrician also increased fetal surveillance should be done for better perinatal outcome

## CONFLICT OF INTEREST

None

## SOURCES OF FUNDING

None

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