

RETROSPECTIVELY ASSESSING THE IMPACT OF INCREASED MATERNAL AGE ON THE OUTCOMES OF THE PREGNANCY: A CLINICAL STUDY

Dr. Roma Sharma,¹ Dr. Mona Gupta^{2*} DrYash Hada³

¹MS, Senior Resident, Department Of Obstetrics And Gynaecology, Kamla Raja Hospital and Gaja Raja Medical College, Gwalior, Madhya Pradesh. Email id: romasharma2512@gmail.com

^{2*}MS, Senior Resident, Department Of Obstetrics And Gynaecology, subbaiah Institute of Medical Sciences, Shimoga, Karnataka. Email id: mona.sheopur@gmail.com [*corresponding author*]

³DO DNB Resident, Department of ophthalmology, Laxmi Eye Institute Panvel Mumbai . Email Id: dryashhada@gmail.com

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ABSTRACT

Background: There is an increased prevalence of various medical disorders and various neonatal complications including perinatal death, chromosomal abnormalities, birth defects, low birth weight, preterm delivery, admission to NICU, and/or low Apgar scores.

Aims: The present study was conducted to assess and evaluate the effects of advanced maternal age on the pregnancy, and to assess adverse fetal and maternal outcomes in advanced maternal age pregnancy.

Materials and Methods: 131 subjects in the control group and 136 subjects from the study group were categorized into two groups based on the maternal age of >35 years for the study group and 20-35 years for the control group. The primary outcomes assessed were cesarean delivery incidence, gestational hypertension, gestational diabetes incidence, premature membrane rupture, antepartum hemorrhage, and preterm labor were compared between the control group and study group.

Results: 50.73% (n=69) subjects of the study group delivered by LSCS, whereas, vaginal delivery was done in 9.26% (n=67) study females. In LSCS, 56.52% (n=39) LSCS were done as emergency and 43.47% (n=30) were elective LSCS. In control group, LSCS was done in 38.16% (n=50) subjects and vaginal delivery in 61.83% (n=81) subjects. LSCS was done in 34% (n=17) subjects as elective case and in 66% (n=33) as emergency surgery. Low APGAR was seen in 4.47% (n=3), intrauterine death in 2.98% (n=2), and preterm labour in 32.83% (n=22) subjects of advanced maternal age with comorbidity. This difference was statistically significant for preterm labour (p=0.0001) with more preterm labour in advanced maternal age females with comorbidity.

Conclusion: The present study concludes that adverse neonatal and maternal outcomes were higher in females with advanced maternal age compared to young females. These adverse outcomes are reduced significantly with timely pregnancy intervention and proper antenatal care provided to advanced maternal age females.

Keywords: Advanced maternal age, adverse pregnancy outcomes, fetal outcomes, maternal outcomes, pregnancy outcomes,

INTRODUCTION

Childbearing in females of age more than 35 years is defined as advanced maternal age. Advanced maternal age is increasing in developed countries with high income with rapidly increasing evidence. Recently, various literature data has defined the advanced maternal age cut-off to 40 years. The increasing evidence of advanced maternal age is attributed to older primigravid women delaying pregnancy due to subfertility and/or lifestyle choices. This is also seen in multiparous females sustaining childbearing. One of the main factors behind advanced maternal age is advanced reproductive technologies with great success. Previous literature data suggests a prevalence rate of 17.5% in females of South Africa as assessed retrospectively.¹

Various perinatal and obstetrical complications such as SGA (small for gestational age) unlike younger females, cesarean delivery, labor induction, preterm and low-birth-weight, stillbirth, spontaneous and recurrent abortions, ectopic pregnancy, and placenta previa are associated with increase evidence of advanced maternal age and delayed childbearing also these factors are associated with increased risk of congenital disorders. There is also an increased prevalence of various medical disorders in subjects with advanced maternal age such as hypertension, diabetes mellitus. Also, the influence on pregnancy courses like cancer is more in old females with childbearing.²

Various previous literature data depicts that, perinatal complications are higher in older females with childbearing with a higher incidence in females of age more than 35 years, with higher significant complications seen in females of age more than 40 years. Advanced maternal age is also significantly associated with various neonatal complications including perinatal death, chromosomal abnormalities, birth defects, low birth weight, preterm delivery, admission to NICU, and/or low Apgar scores. It has also been reported that in the early thirties, the fertility in females' starts to decrease, whereas, further and faster decrease is seen in females after the mid-thirties and late-thirties.³

In older females with advanced age, the tendency to bear a child and get pregnant in a short period decrease. Also, fecundability, which is the probability of bearing a child in one menstrual cycle, is decreased with an increase in age in females. However, the data assessing the effect of advanced maternal age on the outcomes of the pregnancy are scarce in the literature.⁴ Hence, the present study was conducted to assess and evaluate the effects of advanced maternal age on the pregnancy, and to assess adverse fetal and maternal outcomes in advanced maternal age pregnancy.

MATERIALS AND METHODS

The present retrospective clinical cohort study was conducted to assess and evaluate the effects of advanced maternal age on the pregnancy, and to assess adverse fetal and maternal outcomes in advanced maternal age pregnancy. The study was conducted at Department Of Obstetrics And Gynaecology, KamlaRaja Hospital and Gajara Raja Medical College, Gwalior, Madhya Pradesh, after obtaining clearance from the concerned Ethical committee. The study population was comprised of the subjects visiting the Department of Obstetrics and Gynaecology of the Institute.

The present study included pregnant females of the age 35 years or more and with the gestational age of 28 weeks or more. The control group of the study was comprised of pregnant females within the age range of 20 years to 35 years and the gestational age of 28 weeks or more. The inclusion criteria for the study were females of age 35 years or more as cases and of age 20 years to 35 years as controls who had undergone cesarean sections or vaginal deliveries. The exclusion criteria for the study were subjects with incomplete records and subjects with multiple pregnancies.

The present study included a total of 131 subjects in the control group and 136 subjects from the study group and included subjects were categorized into two groups based on the maternal age where study group had females of the age 35 years or more and with the gestational age of 28 weeks or more, and the control group of the study was comprised of pregnant females within the age range of 20 years to 35 years and the gestational age of 28 weeks or more.

The study data were obtained from the medical records of the Department. The data obtained were fetal outcomes including gestational diabetes mellitus, preterm birth, placental abruption, preeclampsia, NICU admission, SGA, neonatal death, fetal growth restriction, and stillbirths. Also, maternal outcomes as parity, gestational age, birth weight, fetal gender, APGAR score, maternal complications, delivery mode, maternal comorbidities, risk factors, and history of infertility treatment.

The primary outcomes assessed were cesarean delivery incidence, gestational hypertension, gestational diabetes incidence, premature membrane rupture, antepartum haemorrhage, and preterm labor were compared between the control group and study group. The secondary outcomes assessed were low APGAR scores, intrauterine growth restriction, and intrauterine death, and were compared between control and study groups. The collected data were subjected to the statistical evaluation using SPSS software version 21 (Chicago, IL, USA) and one-way ANOVA for results formulation. The data were expressed in percentage and number, and mean and standard deviation. The level of significance was kept at $p < 0.05$.

RESULTS

The present retrospective clinical cohort study was conducted to assess and evaluate the effects of advanced maternal age on the pregnancy, and to assess adverse fetal and maternal outcomes in advanced maternal age pregnancy. The present study included a total of 131 subjects in the control group and 136 subjects from the study group. The demographic characteristics of the study subjects are listed in Table 1. The majority of the subjects from the study group were in the age range of 35-39 years with 92.64% (n=126) subjects, whereas, in the control group, the majority of the subjects were in 25-34 years of age range with 49.61% (n=65) subjects. Concerning gravidity, 77.20% (n=105) females were multi in the study group and 51.14% (n=67) in the control group. The majority of subjects in the study group as well as the control group were in the gestational age of 37-40 weeks with 70.58% (n=96) and 75.57% (n=99) subjects from the study and control group respectively. The fetal presentation was cephalic, breech, and transverse in 94.85% (n=129), 3.67% (n=5), and

1.47% (n=2) subjects respectively from the study group, and was 93.12% (n=122), 6.10% (n=8), and 0.76% (n=1) subject from the control group respectively.

The present study also assessed the mode of delivery in the study group of females in advanced maternal age and the control group. It was seen that 50.73% (n=69) subjects of the

study group delivered by LSCS, whereas, vaginal delivery was done in 9.26% (n=67) study females. In LSCS, 56.52% (n=39) LSCS were done as emergency and 43.47% (n=30) were elective LSCS. In control group, LSCS was done in 38.16% (n=50) subjects and vaginal delivery in 61.83% (n=81) subjects. LSCS was done in 34% (n=17) subjects as elective case and in 66% (n=33) as emergency surgery. In subjects with vaginal delivery, in the study group, 8.95% (n=6) subjects had assisted breech delivery and 4.47% (n=3) with instrumental delivery, whereas, assisted breech and instrumental delivery in control group was done in 1.23% (n=1) and 2.46% (n=2) subjects respectively (Table 2). LSCS was performed commonly in subjects with previous LSCS, infertility, unfavorable cervix, preeclampsia, placenta previa, and fetal distress in the study group and previous LSCS, infertility, breech, cephalopelvic disproportion, oligoamnios and fetal distress in the control group. Medical disorder related complications were seen in subjects with diabetes (gestational/non gestational) and hypertension.

On assessing the study parameters in the subjects with advanced maternal age with associated comorbidity, it was seen that low APGAR was seen in 4.47% (n=3), intrauterine death in 2.98% (n=2), preterm labor in 32.83% (n=22), LSCS in 55.22% (n=37), multi were 80.59% (n=54), and primi 16.41% (n=11) in advanced maternal age subjects with comorbidity. In advanced maternal age females without comorbidities, low APGAR, intrauterine death, preterm labour, LSCS, multi, and primi was seen in 2.89% (n=2), 2.89% (n=2), 14.49% (n=10), 52.17% (n=36), 82.60% (n=57), and 17.39% (n=12) subjects respectively. All these parameters were statistically non-significant between advanced maternal age females with and without comorbidity with p-values of 0.326, 0.522, 0.933, and 0.648 respectively for low APGAR, intrauterine death, LSCS, and gravidity status. This difference was statistically significant for preterm labor (p=0.0001) with more preterm labor in advanced maternal age females with comorbidity (Table 3).

DISCUSSION

The present retrospective clinical study was conducted to assess and evaluate the effects of advanced maternal age on the pregnancy, and to assess adverse fetal and maternal outcomes in advanced maternal age pregnancy. The present study included a total of 131 subjects in the control group and 136 subjects from the study group. The majority of the subjects from the study group were in the age range of 35-39 years with 92.64% (n=126) subjects, whereas, in the control group, the majority of the subjects were in 25-34 years of age range with 49.61% (n=65) subjects. Concerning gravidity, 77.20% (n=105) females were multi in the study group and 51.14% (n=67) in the control group. The majority of subjects in the study group as well as the control group were in the gestational age of 37-40 weeks with 70.58% (n=96) and 75.57% (n=99) subjects from the study and control group respectively. The fetal presentation was cephalic, breech, and transverse in 94.85% (n=129), 3.67% (n=5), and 1.47% (n=2) subjects respectively from the study group, and was 93.12% (n=122), 6.10% (n=8), and

0.76% (n=1) subject from the control group respectively. These demographics were comparable to those by the studies of Bateman BT et al⁵ in 2012 and Herstad L et al⁶ in 2015 where authors assessed the subjects with comparable characteristics.

It was seen that 50.73% (n=69) subjects of the study group delivered by LSCS, whereas, vaginal delivery was done in 9.26% (n=67) study females. In LSCS, 56.52% (n=39) LSCS were done as emergency and 43.47% (n=30) were elective LSCS. In control group, LSCS

was done in 38.16% (n=50) subjects and vaginal delivery in 61.83% (n=81) subjects. LSCS was done in 34% (n=17) subjects as elective case and in 66% (n=33) as emergency surgery. In subjects with vaginal delivery, in the study group, 8.95% (n=6) subjects delivered by assisted breech delivery and 4.47% (n=3) with instrumental delivery, whereas, assisted breech and instrumental delivery in control group was done in 1.23% (n=1) and 2.46% (n=2) subjects respectively. LSCS was performed commonly in subjects with previous LSCS, infertility, unfavorable cervix, preeclampsia, placenta previa, and fetal distress in the study group and previous LSCS, infertility, breech, cephalopelvic disproportion, oligoamnios, and fetal distress in the control group. Medical disorder related complications were seen in subjects with diabetes (gestational/non-gestational) and hypertension. These results were consistent with the findings of Almeida NK et al⁷ in 2015 and Londero AP et al⁸ in 2019 where LSCS was performed in similar cases as in the present study

Concerning the study parameters in the subjects with advanced maternal age with associated comorbidity, it was seen that low APGAR was seen in 4.47% (n=3), intrauterine death in 2.98% (n=2), preterm labor in 32.83% (n=22), LSCS in 55.22% (n=37), multi were 80.59% (n=54), and primi 16.41% (n=11) in advanced maternal age subjects with comorbidity. In advanced maternal age females without comorbidities, low APGAR, intrauterine death, preterm labour, LSCS, multi, and primi was seen in 2.89% (n=2), 2.89% (n=2), 14.49% (n=10), 52.17% (n=36), 82.60% (n=57), and 17.39% (n=12) subjects respectively. All these parameters were statistically non-significant between advanced maternal age females with and without comorbidity with p-values of 0.326, 0.522, 0.933, and 0.648 respectively for low APGAR, intrauterine death, LSCS, and gravidity status. This difference was statistically significant for preterm labor (p=0.0001) with more preterm labor in advanced maternal age females with comorbidity. These parameters were comparable to the results of Kenny LC et al⁹ in 2013 and Oakley L et al¹⁰ in 2016 where a significant difference in preterm labor was seen in females with and without comorbidity.

CONCLUSION

Within its limitations, the present study concludes that neonatal and maternal outcomes were higher in females with advanced maternal age compared to young females. These adverse outcomes are reduced significantly with timely pregnancy intervention and proper antenatal care provided to advanced maternal age females. However, the present study had few limitations including a smaller sample size, geographical area biases, shorter monitoring period and retrospective nature. Hence, further longitudinal studies with a larger sample size and longer monitoring period are required to reach a definitive conclusion.

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TABLES

Characteristics	Subgroups	Study group (n=136)		Control group (n=131)	
		%	N	%	N
Age group(years)	<25	0	0	49.61	65
	25-34	0	0	50.38	66
	35-39	92.64	126	0	0
	40-44	5.88	8	0	0
	45-50	0.73	1	0	0
	50	0.73	1	0	0
Gravidity Status	Primi	16.91	23	48.09	63
	Multi	77.20	105	51.14	67
	Grand multi	5.88	8	0.76	1
Gestational Age(weeks)	<34	12.5	17	7.63	10

	34-37	13.97	19	6.10	8
	37-40	70.58	96	75.57	99
	>40	2.94	4	10.68	14
Fetal Presentation	Cephalic	94.85	129	93.12	122
	Breech	3.67	5	6.10	8
	Transverse	1.47	2	0.76	1

Table 1: Demographic characteristics of the study subjects

Groups	LSCS		Total % (n)	Vaginal		Total % (n)
	Emergency	Elective		Assisted breech	Instrumental	
Study group (n=136)	56.52 (39)	43.47(30)	50.73 (69)	8.95 (6)	4.47 (3)	49.26 (67)
Control group (n=131)	66 (33)	34 (17)	38.16 (50)	1.23 (1)	2.46 (2)	61.83 (81)

Table 2: Mode of Delivery in the study subjects

Parameter	With comorbidities 49.26% (n=67)		Without comorbidities 50.73% (n=69)		p-value
	%	N	%	N	
Low APGAR	4.47	3	2.89	2	0.326
Intrauterine death	2.98	2	2.89	2	0.522
Preterm Labour	32.83	22	14.49	10	0.0001
LSCS	55.22	37	52.17	36	0.933
Multi	80.59	54	82.60	57	
Primi	16.41	11	17.39	12	0.648

Table 3: Assessment of study parameters in advanced maternal age subjects with and without associated comorbidities