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Impact of advanced maternal age and parity on birth outcome at a tertiary hospital in Nigeria

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ABSTRACT

Objectives: To assess the impact of advanced maternal age (AMA) and parity on birth outcomes.

Material and Methods: This was a three month retrospective observational study conducted at a tertiary hospital in Calabar, Nigeria. It involved hospital and delivery records of parturients who registered for delivery at this centre. They were grouped into those aged 20–34, and ≥35 referred to as AMA. The required data for the selected obstetric and neonatal outcomes were entered in Epi Info version 7.2.3 CDC Atlanta, Georgia statistical software for analysis.

Results: The odds for caesarean delivery were 4.42 with a 95% Confidence interval of 2.35–8.31. There were also increased odds of birth asphyxia, postpartum haemorrhage (PPH), and stillbirths. There were no significant differences in the risks for foetal macrosomia, multiple pregnancy, and prematurity.

Conclusion: AMA women were more likely to have caesarean birth, PPH and stillbirths, while their babies were more likely to have birth asphyxia. There is a need for preventive strategies to ameliorate these risks in this group of parturients.

Keywords: Advanced maternal age, Parity, Birth outcomes

INTRODUCTION

Pregnancies at advanced maternal age (AMA) have become common occurrences in recent times.[1] Maternal age is defined as advanced when a woman's estimated age at delivery is 35 years or older.[2] Pregnancy at AMA has been on the rise in recent times because of several factors, such as preference for a male child, remarrying at an older age or after divorce from a previous marriage, effective use of contraception, and delayed conception to pursue academic or professional career, as well as successful use of assisted reproductive techniques in older women.[2,3]

Studies have revealed that pregnancies at AMA are more hazardous when compared with younger women. There was a threefold increase in miscarriage and an increase in hypertension, preeclampsia and gestational diabetes as well as caesarean deliveries in women at AMA.[1,4] Other risks include congenital anomalies in babies, preterm labour, placenta praevia and placental abruption.[3,5]

Several studies have reported on the prevalence of births among women at AMA, especially the caesarean section rate, the associated disease profiles, and pregnancy outcomes [6], but few have compared birth outcomes with younger women in a comparative design.

We compared the pregnancy outcomes of women aged 35 or older with those aged 20–34 years to determine if there are significant differences in selected obstetric and neonatal outcomes. The information studied included caesarean section, birth asphyxia, postpartum haemorrhage (PPH), foetal macrosomia, multiple pregnancy, prematurity and stillbirth.

The aim of this study was to assess the odds of AMA and parity on the selected outcomes with a view to implementing strategies for prevention.

MATERIAL AND METHODS

This was a three month retrospective study of labour ward records of parturients who delivered in our centre. Data were collected, and obstetric and neonatal outcomes were compared between women aged 35 or older, and women aged 20–34 years.

This study was conducted at the Department of Obstetrics and Gynaecology, University of Calabar Teaching Hospital, from November 1, 2021, to January 31, 2022. University of Calabar Teaching Hospital is a tertiary hospital affiliated with the University of Calabar to render both academic and professional services, located in the city of Calabar, capital of Cross River State. A written ethical exemption was obtained to use the hospital records for this analysis. There was no contact with any of the women.

All women aged 35 years or older were included in the study group. The control was the next parturient aged 20–34 years whose parity was similar to that of the study parturient. All unbooked pregnancies were excluded. All records of parturients who met the inclusion criteria during the study period were extracted.

The outcome measures were caesarean section, birth asphyxia, postpartum haemorrhage (PPH), foetal macrosomia, multiple pregnancy, prematurity, and stillbirth. These outcomes were measured on a binary option, "yes" or "no", where "yes" indicated the presence of the outcome of interest and "no" indicated its absence. Parity of the parturients was recorded from paras 1–6 and more. Epi Info version 7.2.3 CDC Atlanta, Georgia was used to enter each participant's records as separate pages. Analyses commands used were frequency and logistic regression. The results are presented in Tables.

RESULTS

There were 103 parturients aged 35 or older during the study period, 103 parturients of near similar parities were matched for the analyses. There were 600 deliveries from booked parturients in our centre during the study period.

Almost half of AMA women, 51 (49.5%) had a caesarean section. This is in contrast to those aged 20–34 where 19 (18.4%) had caesarean section. Birth asphyxia occurred in 12.6% of babies of parturients aged 35 or older but only in 3.9% of those aged 20–34 years. PPH was present in 7.4% of parturients aged 35 or older but only in 1% of those aged 20–34 years. Similarly, 8.7% of parturients aged 35 or older had stillbirths, whereas only 1.9% of parturients aged 20–34 years had stillbirths [Table 1].

The occurrence of caesarean section was stratified by age group and parity in Table 2. It showed that there were 11 AMA women and 14 aged 20–34 years who were primiparous. Seven (63.6%) AMA women had a caesarean section compared to 2 (14.3%) women aged 20–34 years.

Whereas there were 19 AMA women and 27 women aged 20–34 years who were para 4, six (31.6%) AMA women had a caesarean section compared to 4 (14.8%) women aged 20–34 years. However, among para 5, there were 12 AMA women and 4 women aged 20–34 years. Seven (58.3%) AMA women had a caesarean section while none of those aged 20–34 years had the same. Moreover, among para 6 and above (up to para 12), there were 10 AMA women and 1 woman aged 20–34 years, 5 (50.0%) AMA women had caesarean section while only 1 woman aged 20–34 years who was para 6 had caesarean section. The only mother who was para 12 had a normal delivery.

Logistic regression was done to compare the selected outcomes between AMA women and younger women [Table 3]. Caesarean section was significantly higher among

Table 1: Obstetric and neonatal outcomes between the groups.

Outcome	≥35 (n = 103)		20–34 (n = 103)	
	Frequency	%	Frequency	%
Caesarean section	51	49.5	19	18.4
Birth asphyxia	13	12.6	4	3.9
Postpartum haemorrhage	8	7.4	1	1
Foetal macrosomia	9	8.7	7	6.8
Multiple pregnancy	7	6.8	2	1.9
Prematurity	10	9.7	5	4.9
Stillbirth	9	8.7	2	1.9

Table 2: Caesarean section (CS) stratified by age group and parity.

Parity	35 or older		20–34	
	Parturients	CS (%)	Parturients	CS (%)
1	11	7 (63.6)	14	2 (14.3)
2	16	7 (43.8)	21	4 (19.1)
3	35	19 (54.3)	36	8 (22.2)
4	19	6 (31.6)	27	4 (14.8)
5	12	7 (58.3)	4	Nil
≥6	10	5 (50.0)	1	1 (100)

Table 3: Logistic regression of outcomes.

Outcome	Odds ratio	95%	C.I.	Coefficient	S. E.	Z-statistic	P-value
Caesarean section	4.421	2.3515	8.3119	1.4864	0.3221	4.6145	0.0000
Birth asphyxia	3.8914	1.2214	12.3979	1.3588	0.5912	2.2983	0.0215
Postpartum haemorrhage	8.5879	1.0544	69.9481	2.1504	1.0701	2.0095	0.0445
Foetal macrosomia	1.3416	0.4798	3.7515	0.2939	0.5246	0.5602	0.5754
Multiple pregnancy	3.7197	0.754	18.3501	1.3136	0.8143	1.6132	0.1067
Prematurity	2.1075	0.6943	6.3974	0.7455	0.5665	1.3159	0.1882
Stillbirth	4.8272	1.0177	22.8962	1.5743	0.7943	1.9821	0.0475

Logistic regression of age group (≥35/20–34). $P < 0.05$ was taken as statistically significant. Underlined values: The high values show significant odds for the occurrence of the outcome.

AMA women than those aged 20–34 years OR 4.42, 95% Confidence Interval 2.35–8.31. The other outcomes that were significantly higher in AMA women were birth asphyxia, PPH and stillbirth. There were no differences in outcomes such as foetal macrosomia, multiple pregnancy and prematurity.

DISCUSSION

Our study showed that almost half (49.5%) of AMA women had a caesarean section compared with 18.4% of women aged 20–34 years [Table 1]. This is in keeping with other reports, which have shown that an increase in the age of the mother significantly increased the odds of caesarean birth.[7,8] We matched parity in the control group with that of the study; however, in Table 2, there was a preponderance of caesarean delivery in the AMA group. Some researchers have reported that nulliparity during the first pregnancy may be the most significant factor that increases the risk of AMA women having caesarean delivery.[9] In our study, these women who were initially identified as nulliparous during their pregnancy were recorded as Para1 after delivery because parity was earned after the delivery. It is interesting to note, however, that the only AMA woman in our study, whose parity was 12 had spontaneous vaginal delivery while the only younger woman, whose parity was 6 had caesarean delivery. There is no linear relationship between parity and caesarean section risk.

When logistic regression of the outcomes was done between the age groups, babies of AMA women were more likely to have birth asphyxia. This has been confirmed in reports, which showed that maternal age ≥35 years is a risk factor for birth asphyxia.[10] Also, AMA women were more likely to have PPH and stillbirths. In a study on factors affecting the risk of PPH in pregnant women in Tibet,[11] and Guangzhou, China,[12] AMA was noted to lead to a higher risk of PPH. AMA as an independent risk factor for stillbirths was so concerning that a specific delivery plan was considered to prevent it.[13]

Our study did not find a greater risk of foetal macrosomia, multiple pregnancy and prematurity in older women when compared with younger women. This followed the linear regression as shown in Table 3. A meta-analysis concluded that AMA was a risk factor for foetal macrosomia.[14] Although birthweight increased with maternal age, the relationship was non-linear.[15] Similarly, whereas AMA was a risk factor for multiple pregnancy, our study did not corroborate this finding, agreeing instead that there was no difference when compared with younger women.[2] A study on the role of maternal age on the risk of preterm birth concluded that the risk for preterm birth after adjusting for confounding variables was increased in both AMA and younger women.[16] Our study showed no significant difference between the groups.

Our study limitation was the sample size which was not based on sample size calculation but the observed occurrence of our analyses over a three month period. A study with a larger population would be needed to improve this study.

The strength of the study is the design which gave a fair match of the women under comparison. The findings from our study have been reported in other studies. Also, there is a call for planned prevention strategies in managing AMA pregnancies to avert or ameliorate these risks. These strategies include close monitoring during antenatal care with early recognition of abnormal patterns,[17] and prompt interventions during labour and delivery so as to prevent PPH.[18]

CONCLUSION

AMA women had higher odds of having caesarean delivery, and their babies were more likely to have birth asphyxia than babies of younger women. AMA women were also more likely to have PPH and stillbirths than younger women. However, there were no significant differences in the occurrence of multiple pregnancy, foetal macrosomia and prematurity in babies of AMA women compared with younger women.

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Ethical approval

The research/study is approved by the University of Calabar Teaching Hospital, Calabar, Nigeria, number UCTH/HREC/33/582,dated 14th October 2021.

Declaration of patient consent

Patient's consent not required as patient's identity is not disclosed or compromised.

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Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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