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Original Article

Labour, Delivery and Perinatal Outcomes of Women with Advanced Maternal Age: A Comparative Study

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ABSTRACT

Background: *Although advanced maternal age (AMA) has been identified as a risk factor for adverse obstetric outcomes, research efforts continue to gather evidence to describe the relationship.* ***Methods:*** *This was a comparative study conducted at a tertiary health facility. Participants were pregnant women who delivered after viability (28 weeks gestation) at the facility over a ten year period categorized into those with advanced maternal age (>35 years) and younger women (≤35 years). The source of data was the hospital delivery records; data analysis was performed with SPSS version 21.0 while p-value <0.05 was significant.* ***Results:*** *The prevalence of AMA was 8.8% (761/8645), 18 (2.4%) were nulliparous, 351 (46.1%) had tertiary education, 196 (25.8%) had inter-pregnancy interval >24 months while 66 (8.7%) had preterm delivery. AMA was associated with significantly higher occurrence of obstructed labour (204 vs. 129; p0.001) and primary postpartum haemorrhage (208 vs. 123; p0.001). Onset of labour (OR 95%CI [0.470, 0.063-3.493]; p0.450), augmentation of labour (OR 95%CI [0.969, 0.830-1.132]; p0.695) and need for episiotomy (OR 95%CI [1.116, 0.955-1.303]; p0.166) were not statistically different for AMA compared to younger women. The caesarean section rates were 40.0% for AMA and 23.7% for younger women while perinatal mortality rates were 391/1,000 for AMA and 110/1,000 live births for younger women.* ***Conclusion:*** *Pregnancy outcome in women with AMA was poorer with about twice the caesarean section rate and thrice the perinatal mortality rate compared to younger women. Therefore, efforts should be made to limit pregnancy in women with AMA.*

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INTRODUCTION

In the recent years women have been delaying pregnancy until the fourth or fifth decades of life due to desire for higher education, career advancement, late marriages, contraception and assisted reproductive technology [1,2]. Historically, advance maternal age (AMA) had been defined as age over 35 years although some authors use 40 years of age [1,3] as the cut-off. However, irrespective of the differences in definition, pregnancies occurring after 35years are categorized as high risk [1]. According to the Royal College of Obstetricians and Gynaecologists, the optimum period for child bearing is between 20 to 35years of age [4]. AMA has been reported to be associated with increased risk of adverse obstetric outcomes including abnormalities like Down syndrome, stillbirth and increased risk of maternal mortality [5,6]. The increased maternal mortality is explained by the increased co-morbidities and coexisting medical conditions like metabolic syndrome, cardiovascular, renal and autoimmune disorders which are commoner in older pregnant women [4]. Other sequelae of AMA include labour complications, higher risk for caesarean deliveries, preterm birth, low birth weight, neonatal intensive care admissions, low Apgar scores and perinatal deaths [7-9].

Although publications on effect of AMA on pregnancy outcome abound, majority are of small sample size while contributions from low-income countries are minimal. Therefore, AMA continues to attract attention to add to the available evidence on its effect on pregnancy outcome. This study is aimed at determining pregnancy outcome among women with AMA compared to outcome among younger women in a low-income country.

METHODS

Study design and setting

The study was a retrospective comparative study conducted at the Obstetrics and Gynaecology Department of the University of Ilorin Teaching Hospital, Ilorin, Nigeria.

Data collection procedure

The study was a total population study and participants were women who delivered at the study site from 2008 to 2017 categorized into those aged >35 years (advanced maternal age) and those ≤35 years (younger women). The inclusion criteria were delivery after ≥28weeks gestational at the study centre and availability of the delivery record. Women who delivered before arrival at the health facility were excluded from the study. The study was a total population study and all women who delivered during the study period were eligible for participation. The list of all women who delivered at the study site during the study period was obtained from the institution daily delivery records; this was screened to determine the eligibility of each participant. Thereafter the data of eligible women was retrieved; these included maternal demography, booking status, parity, gestational age at delivery, inter-pregnancy interval, history about the labour, time of presentation, mode of delivery, maternal complications, birth weight, Apgar scores, neonatal intensive care unit (NICU) admission and perinatal mortality. The institutional ethical approval was obtained from the Research and Ethics committee of the hospital before commencement of the study. The data obtained were analyzed using Statistical Package for Social Sciences (SPSS) version 21.0 (SPSS Inc. Chicago, Illinois, USA). The results were presented in tables with frequency and percentages. Continuous variables were categorized and compared among study groups using Pearson's chi-square test while $p< 0.05$ was considered significant.

RESULTS

A total of 8645 pregnant women were recruited into the study, 761 were >35years old giving the prevalence of advance maternal age (AMA) of 8.8%. Table 1 shows that among women with AMA, 18(2.4%) were nulliparous, 46(6.0%) were grandmultiparous (parity ≥5), 351(46.1%) had tertiary level of education while 472(62.0%) booked at the study site. The gestational age at delivery was term in 693(91.1%), 66(8.7%) had preterm delivery while 2(0.2%) were post-term. However, parity ($p<0.001$), gestational age at delivery ($p<0.001$), level of education ($p<0.001$), inter-pregnancy interval ($p<0.001$) and booking status were all statistically different between women with AMA and younger women.

Table 1: Maternal characteristics of women with advanced maternal age and controls

Parameter	≤ 35years old	>35 years old	χ^2	P value
	n= 7884	n= 761		
Parity				
0	3978 (50.5)	18 (2.4)	18.32	0.001
1	2195 (27.8)	57 (7.5)		
2	813 (10.4)	265 (34.8)		
3	404 (5.1)	98 (12.9)		
4	405 (5.1)	277 (36.4)		
≥5	89 (1.1)	46 (6.0)		
Parity				
0	3978 (50.5)	18 (2.4)	645.72	0.000
≥1	3906 (49.5)	743 (97.6)		

Gestational Age				
<37	1086 (13.8)	66 (8.7)	23.48	0.000
37-42	6689 (84.8)	693 (91.1)		
>42	109 (1.4)	2 (0.2)		
Education				
Primary	1381 (17.5)	64 (8.4)	43.59	0.000
Secondary	3042 (38.6)	346 (45.5)		
Tertiary	3461 (43.9)	351 (46.1)		
Inter-pregnancy interval				
<24	1576 (20.0)	198 (26.0)		
≥24	0 (0.0)	196 (25.8)	870.600	<0.001
Not available	6308((80.0)	367(48.2		
Booking status				
Booked at study site	5370 (68.1)	472 (62.0)		
Booked at other facility	2514 (31.9)	289 (38.0)	11.744	0.001

Table 2 shows that among women with AMA, 760(99.9%) had spontaneous onset of labour, 405(53.3%) had received some treatment before presentation among which 271(35.6%) received care at private hospitals. Also, 318(41.8%) presented in advanced labour, 272(35.7%) had augmentation of labour, 304(40.0%) had caesarean delivery, 270(35.5%) had episiotomy, 55(7.2%) had perineal laceration. There was statistical significant difference in pre-admission treatment (p0.001), mode of delivery (p0.001) and occurrence of maternal complications (p0.001) between women with AMA and younger women. Obstructed labour (204 vs. 129; p0.001) and primary PPH (208 vs. 123; p0.001) were higher in women with AMA compared to younger women

Table 2: Delivery outcome of women with advanced maternal age and controls

Parameter	≤ 35years old n=7884	>35 years old n=761	χ^2	P value
Onset of labour				
Spontaneous	7862 (99.7)	760 (99.9)		
IOL	22 (0.3)	1 (0.1)	0.570	0.450
Pre-admission treatment				
None	3861 (49.0)	355 (46.7)	213.41	0.001
TBA	645 (8.2)	32 (4.2)		
PHC	2117 (26.8)	103 (13.5)		
Private hospital	1261 (16.0)	271 (35.6)		
Time of presentation in labour				
Early (cervix ≤8cm)	5366 (68.1)	443 (58.2)		
Late (cervix >8cm)	2518 (31.9)	318 (41.8)	30.540	<0.001
Augmentation of labour				
Yes	2762 (35.0)	272 (35.7)		
No	5122 (65.0)	489 (64.3)	0.153	0.695
Mode of delivery				
SVD	5953 (75.5)	452 (59.4)	98.74	0.001
Assisted breach	46 (0.6)	4 (0.5)		
Ventouse	10 (0.1)	1 (0.1)		
Forceps	10 (0.1)	0 (0.0)		
CS	1865 (23.7)	304 (40.0)		

Episiotomy				
Yes	2998 (38.0)	270 (35.5)		
No	4886 (62.0)	491 (64.5)	1.914	0.166
Maternal complications				
None	5918 (75.1)	259 (34.0)	2.503	0.001
PET	1080 (13.7)	53 (7.0)		
APH	634 (8.0)	37 (4.9)		
Obstructed Labour	129 (1.6)	204 (26.8)		
PPH	123 (1.6)	208 (27.3)		
Perineal laceration	1243 (15.8)	55 (7.2)		

Table 3 shows that among women with AMA, 14(1.8%) had babies weighing >4000g, 51(6.7%) weighed <2500g, 522(68.6%) had low first minute APGAR scores, 247(32.5%) had low fifth minute APGAR scores, 68(8.9%) had neonatal intensive care admission, 214(28.1%) were stillborn. There were statistically significant difference in birth weight (p0.001), first (p0.001) and fifth (p0.001) minute APGAR scores, NICU admission (p<0.001) and stillbirth rate (p<0.001) between women with AMA and younger women. Perinatal mortality rate was 391/1,000 live birth for women with AMA compared to 110/1,000 live birth for younger women.

Table 3: Neonatal outcomes of women with advanced age and controls

Parameter	≤35 years old n=7884	>35 years old n=761	χ^2	P value
Birth weight				
<2500	744 (9.4)	51 (6.7)	22.18	0.001
2500-4000	7095 (90.0)	696 (91.5)		
>4000	45 (0.6)	14 (1.8)		
1st Minute APGAR score				
<4	1488 (18.9)	251 (33.0)	321.36	0.001
4-6	1333 (16.9)	271 (35.6)		
≥7	5063 (64.2)	239 (31.4)		
5th Minute APGAR score				
<4	768 (9.7)	228 (30.0)	291.69	0.001
4-6	611 (7.8)	19 (2.5)		
≥7	6505 (82.5)	514 (67.5)		
NICU Admission				
Yes	1219 (15.5)	68 (8.9)		
No	6665 (84.5)	693 (91.1)	23.327	<0.001
Final Neonatal Outcome				
Live birth	7103 (90.1)	547 (71.9)	193.658	<0.001
Stillborn	781 (9.9)	214 (28.1)	0.269	0.604
Perinatal mortality rate(per 1,000 live birth)	110/1,000	391/1,000		

DISCUSSION

The prevalence of advance maternal age (AMA) was 8.8%, almost half had tertiary education, parity, gestational age at delivery, level of education and inter-pregnancy interval were statistically different between women with AMA and younger women. AMA was associated with high risk for caesarean section, obstructed labour, primary PPH, stillborn and perinatal mortality compared to younger women.

The prevalence of AMA in this study was higher than 4.9% from Jordan [10], but lower than 14.1% from Uganda [11], 11.4% in Taiwan [12] and 33.5% in Norway [13] while a multi-country survey involving 29 countries reported 12.3% [9].

This suggests that while AMA is increasing globally, it appear to be commoner in high-income countries although reports from low-income countries are sparse. In high income countries, low fertility has been associated with AMA such that these women were usually of low parity [14]; this is different from the report of this study where only 2.4% of participants were nulliparous and 55.3% had at least two children alive. In addition, women's priority on education and career development encourages AMA as reflected in the level of tertiary education in this and similar previous reports [9-11,14].
In addition, AMA has been associated with preterm delivery [9-11,14] although the level of significance varies across reports possibly due to differences in characteristics such as parity, social class, nutritional factors and health system efficiency across countries. The high caesarean section rate among women with AMA corroborates previous reports which reported higher odds for caesarean delivery [11,13,15-18]. Possible explanations include increased risk of co-morbidities such as chronic hypertension and diabetes mellitus coupled with the labeling of women with AMA as high risk by birth attendants [19,20] with early recourse to CS. Also, the gradual decrease in myometrial function with advancing maternal age which may lead to ineffective uterine contractions has been associated with a number of the intrapartum and postpartum complications of AMA including CS [16]. These complications include primary PPH, higher risk for blood transfusion and prolonged hospital stay [11,13] especially after CS.
Poor fetal outcomes have been associated with AMA; this include low first and fifth minutes Apgar scores [9,11,21] and higher stillbirth and perinatal mortality. These may be attributed to the contribution of preterm delivery with increased odds for intrauterine fetal death, stillbirth and early neonatal deaths [9,11,13,22,23]. Although the mechanism of the increased risks are yet to be fully understood [24], the severity and statistical significance of these adverse pregnancy outcomes are varied, a higher association with AMA seems to be a common report which deserves further evaluation as well as use for counselling. An additional drawback in the interpretation of reports on AMA is the difference in its definition which included 35, 36, 40 and 45years respectively. Therefore it is important to establish a generally acceptable definition to allow for comparisons.

CONCLUSION

The prevalence of AMA in this study was 8.8% and it was associated with significant maternal complications at delivery as well as significant perinatal mortality. Therefore, pre-pregnancy counselling of such women should emphasize these probable complications while their care should be a multidisciplinary team care.

Disclaimer

The article has not been previously presented or published, and is not part of a thesis project.

Conflict of Interest

There are no financial, personal, or professional conflicts of interest to declare.

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