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ORIGINAL RESEARCH

Comparative analysis of pregnancy and labour outcome among booked nullipara and primipara women in Sagamu, Nigeria

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Abstract

Background: Pregnancy and childbirth are normal physiological processes. The best outcomes of most pregnancies are possible if adequate care is provided during pregnancy. Parity is one of the major determinants of pregnancy outcome.
Objectives: To compare the pregnancy, labour and foetal outcomes of booked nulliparous and primiparous women.
Methods: This is a retrospective, cross-sectional study conducted in the Department of Obstetrics and Gynaecology, Olabisi Onabanjo Teaching Hospital, Sagamu, Ogun State Nigeria from January 2014 to December 2016.
Results: There was a significant difference between the mean age at booking of the nulliparous (Para 0) (26.7±4.4 years) and primiparous (Para 1) women (29.1±4.1 years) (p <0.001). The estimated gestational age (in weeks) at delivery was 38.1±4.8 in the Para 0 group and 38.2±3.9 in the Para 1 group. The mean duration of the first stage of labour was 11.3 ±5.7 hours in the Para 0 but 9.5 ± 5.3 hours in the Para 1 group and the difference was statistically significant (P<0.001). The maternal outcome was favourable in both groups of women even though two unavoidable deaths were recorded in the Para 1 group. The foetal outcomes in the two groups were comparable and both the Crude Odd Ratio and the Adjusted Odd Ratio differences in the two groups did not reach a significant level.
Conclusion: Delivery outcomes in both groups were favourable and comparable. This can be attributed to the standard antenatal care received by both groups and well-supervised deliveries.

Keywords: Adjusted Odd Ratio, Booked pregnancy, Estimated Gestational Age, Nulliparity, Pregnancy Outcome, Primiparity.

Introduction

Pregnancy and childbirth are normal physiological processes hence the outcomes of most pregnancies are good. [1] Parity is one of the major determinants of pregnancy outcome in women of the reproductive age group. Nulliparous women have increased risk of

hypertensive disorders, dysfunctional labour, prolonged labour, operative delivery and delivery of low birth weight infants as compared to women of high parity with no previous complications in pregnancy, who were at low risk of developing complications in their current pregnancy state. [1,2] Primiparous women have a significant increase in the risk of developing antepartum haemorrhage and glucose intolerance, especially among the elderly primipara compared to nulliparous women. [3] Adverse delivery outcomes have also been linked to extremes of age in both nullipara and primipara. Therefore, antenatal and intrapartum care need to be planned accordingly in booked patients. [4] Since both nullipara and primipara are exposed to a variety of complications in pregnancy, there is a need for prompt and adequate attention during antenatal visits to forestall perinatal and maternal morbidity and mortality. [5] Intrapartum risk is based mainly on past obstetric history which is lacking in all nullipara. Indeed, primigravidae and multigravidae perform differently in labour. [2] The most distinctive feature of first labour is the duration, being much longer than any subsequent labours. [1, 2]

Studies have identified different factors responsible for pregnancy outcomes in both primipara and nullipara; these factors range from age, lack of awareness regarding the provision of antenatal care, lack of health education, negligence, financial constraints, environmental and cultural prejudices to the poor nutritional status of young women. [6-9] However, there is a paucity of studies comparing the pregnancy and labour outcomes among booked Para 0 and Para 1. The present study was designed to compare the pregnancy, labour and foetal outcomes of booked nulliparous and primiparous women.

Methods

Study design: A cross-sectional study was conducted.

Study Location: Olabisi Onabanjo University Teaching Hospital (OOUTH), Sagamu, is a tertiary health care facility in the eastern part of Ogun State, southwest Nigeria.

Inclusion criteria: Booked Para 0 and Para 1 women who accessed OOUTH within the study period for antenatal and delivery services. Women who required elective Caesarean sections were excluded from the study.

Sample size and sampling technique: The antenatal care and delivery records of all booked Para 0 and Para 1 women who attended the Department of Obstetrics and Gynaecology, Olabisi Onabanjo Teaching Hospital, Sagamu, Ogun State Nigeria (OOUTH) from 1st of January 2014 to 31st of December 2016 were reviewed. The data of women with incomplete records were also included in the analysis.

Outcome variables: The main outcome variables included the mode of delivery, maternal morbidity after delivery, foetal and maternal outcome. Other outcomes included APGAR scores at 1 minute and 5 minutes, birth weight, gestational age at delivery and the duration of the first and second stages of labour.

Study Procedure: A proforma was used to capture socio-demographic, antenatal and delivery details such as age, occupation, educational status, religion and tribe of the participants. Also, the gestational age at booking and delivery, maternal weight and height at booking, durations of the first and second stages of labour, and the maternal and neonatal outcomes were captured on the proforma.

Definition of operational variables: In this study, booked patients are groups of women with records of at least two antenatal visits. Nulliparous women (Para 0) are women who have never carried any pregnancy to the age of viability (28 weeks) while primiparous women have carried one pregnancy beyond the age of viability irrespective of the outcome.

Statistical analysis

The data were analysed using the Statistical Package for Social sciences (SPSS) IBM version 22. Percentages, means and standard deviation of numerical variables and percentages for categorical variables were determined. The Student's t-test was used to compare the mean values of two independent continuous variables while the Chi-Squared test was used to compare the proportions of categorical variables. The foetal and maternal outcomes of the nulliparous and primiparous women were compared using the Crude Odd Ratio (from bivariate analysis) and Adjusted Odd Ratio (using logistic regression analysis) after adjusting for the age and height. The 95% Confidence Interval was applied to all statistical tests and *p* values < 0.05 were adjudged to be statistically significant.

Results

A total of 380 Para 0 and 300 Para 1 women were recruited into the study. The mean age of Para 1 women was significantly higher (29.1±4.1 years) than the mean age of Para 0 women (26.7±4.4 years) (p<0.001). The majority of women in both groups were aged between 25 and 29 years. There was no significant difference in the occupation, educational status and tribe of women in both groups ((p = 0.087, 0.402, 0.274 respectively). However, a majority of women in both groups were skilled, had tertiary education and were of the Yoruba tribe. (Table I)

Table II shows the clinical parameters of Para 0 and Para 1 groups. The mean estimated gestational age at booking was 21.9±8.8 weeks and 22.3±8.8weeks for the Para 0 and Para 1 group respectively (p = 0.606). There was no significant difference in the mean height (1.6±0.07m vs 1.6±0.08m) and the mean weight (62.0±12.5kg vs 64.0±13.0kg) of the Para 0 and Para 1 women at booking (p = 0.189, 0.057 respectively). The mean estimated gestational age at delivery of Para 0 women (38.2±3.9 weeks) was not significantly different from that of the Para 1 women (38.2±3.9 weeks) (p = 0.697).

The mean duration of the first stage of labour was higher among the Para 0 group (11.3±5.7 hours) compared to the Para 1 group (9.5±5.3 hours) (p = 0.001). There was no difference in the mean duration of the second stage of labour between the Para 0 group (14.7± 22.1 minutes) and the Para 1 group (13.4±29.2 minutes) (p = 0.578). There was also no difference in the proportions of women in the Para 0 group and Para 1 group respectively who had a spontaneous vaginal delivery (75.7% vs 72.0%; p = 0.243). On the contrary, more women in the Para 0 group (6%) had assisted vaginal delivery than women in the Para 1 group (1%) while 27% of the Para 1 group compared to 18.3% of the Para 0 group had Caesarean section (p = 0.007) (Table III).

Table IV shows the foetal outcome of the women in the Para 0 and Para 1 groups. The mean first-minute APGAR score was higher in the babies of the Para 1 group (7.1±1.8) than the mean score for the babies of the Para 0 group (6.8±1.9) (p = 0.048). The mean fifth minute APGAR score and the mean birth weights were not significantly different in both groups. (p = 0.001).

Logistic regression analysis of the foetal and maternal outcomes is shown in Table V. There was no difference in the maternal outcome, maternal morbidity and foetal outcome before and after adjusting for age and height of women. The odds of undergoing Caesarean section before the adjustment for age and height was 60% higher among Para 1 than Para 0 groups (COR = 1.6; 95%CI 1.1–2.3). However, after adjusting for age and height, the odds of undergoing Caesarean section were reduced to 20% (AOR 1.2 95%CI 0.8 – 1.8) but this association was not significant (p = 0.459).

Table I: Socio-demographic characteristics of booked Para 0 and Para 1 Women.

Variables	*Para 0 n (%)*	*Para 1 n (%)*	*Test value*	*P value*
Age group(yrs)				
<20	19 (5.2)	1 (0.3)		
20 – 24	84 (22.9)	30(10.5)		
25 – 29	175 (47.7)	127 (44.4)		
30 – 34	69 (18.8)	99 (34.6)		
>35	20 (5.4)	29 (10.1)		
Mean±SD	26.7±4.4	29.1±4.1	6.970**	<0.001
Total	367	286		
Occupation				
Unskilled	102 (28.3)	65 (22.3)	6.569*	0.087
Semi-Skilled	72 (19.9)	78 (26.8)		
Skilled	109 (30.2)	78 (26.8)		
Professional	78(21.6)	70 (24.1)		
Total	361	291		
Educational status				
Informal	10 (3.0)	14 (5.1)	2.932*	0.402
Primary	25 (7.5)	19 (7.0)		
Secondary	90 (26.9)	82 (30.1)		
Tertiary	209 (62.6)	157 (57.7)		
Total	334	272		
Tribe				
Yoruba	303 (79.7)	247 (82.3)	3.883*	0.274
Igbo	36 (9.5)	29 (9.7)		
Hausa	2 (0.5)	4 (1.3)		
Others	39 (10.3)	20 (6.7)		
Total	380	300		

***Chi-Squared test; ** Student's t-test**

Discussion

Positive Pregnancy outcome has been attributed to the level of care and supports a pregnant woman receives during antenatal care and labour. This study compared the pregnancy outcomes among booked nullipara and primipara women who attended Olabisi Onabanjo University Teaching Hospital, Sagamu, south-west Nigeria. In this study, the majority of the pregnant women were within the age group of 25 to 34 years and this is consistent with the findings in a previous study, as this coincides with the active reproductive age of women. [10] Skilled and professional women constituted the bulk of the women in both groups and studies have shown that the more economically empowered the pregnant women are, the higher the likelihood of utilizing antenatal care facilities. [11] More than 62% of the women in the Para 0 group and 57.7% of the women in the Para 1 group, had tertiary education. This is similar to the findings in some studies, where women who had tertiary education were reported to be more likely to register for antenatal care. [11, 12]

In the present study, the Para 0 group booked for antenatal care at an earlier gestation age than the Para 1 group (21.9±9.8weeks vs 22.3±8.8weeks) but the difference was not

significant. This observation was contrary to the expectation that the women booked earlier than this given their high educational attainment and employment status.

Table II: Clinical parameters of the women in the Para 0 and Para 1 groups at Antenatal Booking.

Variable	*Para 0 n (%)*	*Para 1 n (%)*	*Test value*	*P-value*
Gestational Age at booking (weeks)				
<13	55 (16.4)	47 (18.3)		
14-26	180 (53.6)	131 (51.0)		
27 – 40	98 (29.2)	77 (30.0)		
>40	3 (0.9)	2 (0.8)		
Mean±SD	21.9±8.8	22.3±8.8	0.516**	0.606
Total	336	257		
Height (cm)				
<140	1 (0.3)	3 (1.1)		
141 – 150	13 (3.8)	13 (4.8)		
151 – 160	157 (45.4)	127 (46.5)		
161 – 170	146 (42.2)	107 (39.2)		
171 – 180	29 (8.4)	23 (8.4)		
Mean±SD	1.61±0.07	1.60±0.08	1.315**	0.189
Total	346	273		
Weight (kg)				
<45	18 (5.3)	13(4.9)		
46-55	94 (27.6)	64 (24.0)		
56-65	119 (34.9)	88 (33.0)		
66 – 75	67 (19.6)	57 (21.3)		
76 – 85	28 (8.2)	28 (10.5)		
86 – 95	12(3.5)	11 (4.1)		
>95	3(0.9)	6 (2.2)		
Mean±SD	62.0±12.5	64.0±13.0	1.905**	0.057
Total	341	267		

*** Chi-Squared test; ** Student's t-test**

Less than one-quarter of the population in both groups of women booked at a gestational age of 13 weeks. This trend of late booking for antenatal care is a deviation from the first-trimester booking advocated by the WHO. [13] Early booking for antenatal care has been shown to enhance efficient management, ensure adequate screening, as well as give room for suitable and timely preventive and treatment interventions during the antenatal period. This finding is consistent with the findings in other studies from other centres. [14 - 16]

In the present study, Para 1 women had significantly lower mean duration of the first stage of labour (9.5±5.3 hours) compared with the Para 0 group (11.3±5.7 hours). This difference is likely due to the better sensitivity and response of the primiparous uteri to both endogenous and exogenous oxytocin, [17] which results in early response and culminating in more intense uterine contractions, with its attendant faster and regulated cervical dilatation and early delivery. [17]

Labour that has been actively managed is not expected to go beyond 12 hours. [18] From the findings in this study, it can be seen that 31.9% of the Para 0 group had prolonged labour when compared to 21.6% of the Para 1 group.

This finding was consistent with the findings in other studies carried out in other centres. [2, 17] The present study did not record any significant difference in the duration of the second stage of labour in both groups of patients.

Table III: Labour outcomes in booked Para 0 and Para 1 Women.

Variable	*Para 0 n (%)*	*Para 1 n (%)*	*Test value*	*P-value*
Gestational age at delivery (weeks)				
<36	45 (14.1)	29 (12.2)		
37 – 40	200 (62.5)	174 (73.1)		
>40	75 (23.4)	35 (14.7)		
Mean±SD	38.1±4.8	38.2±3.9	0.389**	0.697
Total	320	238		
First stage of labour (hours)				
<2 hours	1 (0.4)	4 (2.1)		
2 - 12 hours	179 (67.8)	149 (76.4)		
13 - 18 hours	54 (20.5)	30 (15.4)		
>18 hours	30 (11.4)	12 (6.2)		
Mean±SD	11.3±5.7	9.5±5.3	3.424**	0.001
Total	264	195		
Second stage of labour (minutes)				
<30	243 (91.7)	188(95.9)		
31 – 60	19 (7.2)	6(3.1)		
61 – 120	1 (0.4)	0(0.0)		
>120	2 (0.8)	2 (1.0)		
Mean±SD	14.7±22.1	13.4±29.2	0.556**	0.578
Total	265	196		
Mode of delivery				
Spontaneous vertex delivery	278 (75.7)	213 (72.0)	1.365	0.243
Forceps/Vacuum	21 (6.0)	3 (1.0)	10.453	0.002
Caesarean Section	67(18.3)	80 (27.0)	7.205	0.007
Total	367	296		

*** Chi-Squared test; ** Student 's t-test**

The frequency of spontaneous vertex delivery between the two groups of patients was not significantly different. The difference in the frequency of instrumental delivery reached a significant level among a nulliparous group of patients. In similar studies, increased use of instrumental vaginal delivery in nulliparous women was reported when compared to other parities. [2, 9]

In the first minute of life, the babies of the women in the Para 1 group had a significantly higher mean APGAR score than the babies of the women in the Para 0 group. This difference can be due to the longer duration of labour noticed among nulliparous women. Other possible causes of significant difference in the first minute APGAR score can be the inherent risks that are associated mostly with nulliparous women such as hypertensive disorders in pregnancy, dysfunctional labour resulting in the use of uterotonics and prolonged labour. This finding was also similar to the findings in a study carried out in

Ethiopia, where it was noted that babies delivered to primigravida women were three times at risk of developing birth asphyxia. [19] However, by the fifth minute of life, babies in both groups had achieved better APGAR scores, even though with the babies of the Para 1 still maintaining a non-significant better mean APGAR score. The mean birth weights of the babies in the two groups were comparable and this was consistent with the findings in a study done at the same centre about nine years ago. [20]

Table IV: Foetal outcome among booked Para 0 and Para 1 participants

Variable	*Para 0* *n (%)*	*Para 1* *n (%)*	*t-test value*	*P-value*
APGAR score at 1 minute				
0	9 (2.4)	6 (2.0)		
1-4	27 (7.2)	19 (6.5)		
5-7	168 (45.0)	101 (34.4)		
8-10	169 (45.3)	168 (57.1)		
Mean±SD	6.8±1.9	7.1±1.8	1.985	0.048
Total	373	294		
APGAR score at 5 minutes				
0	8 (2.2)	6 (2.0)		
1-4	8 (2.2)	3 (1.0)		
5-7	35 (9.4)	9 (3.1)		
8-10	321 (86.3)	276 (93.9)		
Mean±SD	8.7±1.8	8.9±1.6	1.455	0.146
Total	372	294		
Birth weight (kg)				
<2.0	22 (5.9)	8 (2.7)		
2.1- 2.4	22 (5.9)	14 (4.7)		
2.5 - 3.9	313 (84.4)	259 (87.5)		
4.0 - 4.5	12 (3.2)	12 (4.1)		
>4.5	2 (0.5)	3 (1.0)		
Mean±SD	3.1±1.7	3.1±0.5	0.528	0.598
Total	371	296		

Over 99% of the subjects in both groups had good maternal outcomes with little or no associated morbidity. This can be ascribed to the effective utilization of antenatal care services and well-conducted deliveries. We observed an appreciable reduction in the maternal mortality rate, even though there were two maternal deaths in the Para 1 group. These mortalities were due to primary postpartum haemorrhage. This finding was a significant improvement when compared to a previous study at the same centre which reported a higher proportion of maternal mortality as a result of unbooked status or referred status of the majority of the patients. [21] The foetal outcome was comparable in both groups in this study, possibly because both groups of women received the same level of health care and attention at our facility. When the two groups of women were controlled for age and height, the frequency of Caesarean section, maternal morbidity, maternal mortality and foetal deaths were comparable

The retrospective design of this study is acknowledged as a limitation as some variables were missing from the patients' hospital records. This might have influenced

the statistical associations between the women in the Para 0 and Para 1 groups.

Table V: Association of the mode of delivery, maternal outcome, foetal outcome and maternal mortality with Parity after controlling for age and height

Variables	*Para 0 n (%)*	*Para 1 n (%)*	*COR (95%CI), p*	*AOR (95%CI),p*
Mode of delivery				
Caesarean	67 (19.4)	80 (27.3)	1.6 (1.1-2.3), 0.618	1.2 (0.8-1.18), 0.459
SVD	278 (80.6)	213 (72.7)	1	
Total	345	293		
Maternal outcome				
Dead	0 (0.0)	2 (0.7)	Undefined, 1.000*	Undefined
Alive	373 (100.0)	288 (99.3)	1	
Total	373	290		
Maternal morbidity				
Yes	12 (3.2)	5 (1.7)	0.5 (0.2-1.6), 0.233	1.6 (0.2-2.0), 0.431
No	361 (96.8)	283 (98.3)	1	
Total	373	288		
Foetal outcome				
Dead	9 (4.1)	9 (6.0)	1.5 (0.6-3.9), 0.394	1.5 (0.5-4.6), 0.492
Alive	211 (95.9)	140 (93.9)	1	
Total	220	149		

COR = Crude odds ratio
AOR = Adjusted odds ratio (odds ratio after adjusting for height and Age)
*** Fishers' Exact *P*-value**

Conclusion

This comparative analysis of two groups of women did not show any domineering tendency of adverse outcomes by one group over the other, even though a significant increase in Caesarean section rate was observed in the booked Para 1 group when compared with the booked Para 0 group, which was mainly due to the Caesarean section during the previous pregnancy.

In essence, the outcome in the two groups may be attributed to appropriate, adequate and affordable health care services extended to the women in the two groups during their antenatal booking, subsequent antenatal care visits, and delivery. Therefore, having one parous experience may not confer many advantages, in respect of pregnancy outcome, when compared with a nulliparous woman, in as much as both have their regular antenatal visits and labour is well supervised by skilled attendants.

Authors' Contributions: SAO conceived and designed the study. AAK and EOM participated in data collection while JEO and AAO did data analysis and interpretation. SAO, JEO, APO, and AAK did the literature search and SAO, APO, AAO, and AAK review the draft of the manuscript.
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