A Comparison of the Pregnancy and Labour Outcomes between Nulliparous and Grand Multiparous Pregnancies in the Niger Delta

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Original Research Article

ABSTRACT

Objective: A comparative study of the challenges posed by grand multiparous compared to nulliparous women in the antenatal period and in labour.
Study Design: A retrospective comparative study of grand multiparous and nulliparous women at the Niger Delta University, Okolobiri, Nigeria conducted between January 2010 and January 2013.
Results: In the study period 3,125 women delivered in the hospital. The grandmultiparous women were 865 (27.6%) and nulliparas 664 (21.2%) of the total number of deliveries. The mean age for grandmultiparous and nulliparous women was 35.6 ± 3.30 and 26.37 ± 3.86 respectively. The grandmultiparous women were significant of less educational attainment than nulliparous women (X^2=6.39, P= 0.01). Mean gestational age at booking for grandmultiparas was 24.50 ± 6.40 weeks and the nulliparas 20.20 ± 7.80 weeks respectively. Gestational age at delivery for grand multiparas and nulliparas were 38.40 ±2.40 weeks and 38.50 ± 2.40 weeks respectively. The packed cell volume at booking for grandmultiparous and nulliparas was 30.6 ± 3.7% and 32.2%respectively. Anemia at booking was more significantly in grand multiparous women

compared to the nulligravida X^2=7.18, P =0.01). Hypertension was significantly more in grand multiparous than the nulliparous woman X^2 =3.90, P=0.04). Grand multiparous women significantly have more gestational diabetes than nulliparous women X^2= 14.44, P = 0.00). The grandmultiparous woman had more significantly primary postpartum hemorrhage than the nulliparous woman (X^2=5.34, P = 0.00). Cephalopelvic disproportion was significantly more in nulliparous women compared to the grand multiparas (P=0.00). Genital tract injuries were more common in nulliparous than grand multiparous (P= 0.01) Urinary tract infection was more significantly common in nulliparous women compared to grand multiparous women P =0.02). Mean birth weight for grand multiparous and nulliparous was 3.41 ± 0.66 and 3.04 ± 0.59 respectively. The nulliparous woman significantly delivered a low birth weight baby (birth weight < 2500g), (X^2 = 6.72, P =0.01). The stillbirth rate for the study was 22.7/1000 live deliveries. Stillbirth(s) were significantly more in multiparous women compared to the nullipas..

Conclusion: Grand multiparous pregnancies are still plagued with an avalanche of complications even when antenatal care and delivery was supervised in tertiary institutions. Good birth preparedness, diligence on the part of both the physician and antenatal subjects is important to achieve a good antenatal outcome.

1. INTRODUCTION

Parity has been identified as a risk marker, with nulliparous and grand multiparous pregnancies being classified as at high risks of pregnancy complications and hence the need for comparison of both pregnancy forms [1]. In the contemporary world, women tend to delay childbirth because of multifarious reasons including educational pursuit [2]. Other reasons for delayed childbirth are economic uncertainty, the rise of effective contraception, increase in labour participation by women and gender equity. As maternal age advances, so are the risks of medical and obstetric complications in the prospective mother. The complications associated with the primigravid pregnancies include hypertension, abruptio placentae, higher incidence of fibroid with pregnancy, post-term pregnancy, uterine inertia and prolonged labour. Other complications include rigid perineum with an increase in the rate of vaginal operative deliveries and cesarean sections [3]. From studies, after the first pregnancy, the risks associated with the second and third deliveries fall [4]. However, the risks rise slowly from the fourth pregnancy with increasing parity and sharply from the fifth pregnancies and subsequently [5,6], if the prospective mother continues her childbearing career. The term 'the dangerous multipara' was first coined in the obstetric literature by Solomon because of the risks associated with these pregnancies [7]. However, the word 'Grand multiparity' was first defined by the International Federation of Gynaecology and Obstetrics (FIGO) as the delivery of the fifth to the ninth viable pregnancies. A woman who has delivered ten or more times or 18-20 viable births, by the FIGO definition, is considered to be great grand multiparous or of extreme parity respectively [8].

It is not uncommon, for the grand multiparous woman to present with one or more of the following complications in the antenatal period or when in labour, especially, if the pregnancy is not well supervised. The complications usually seen in the grand multiparous woman include anemia, hypertension, diabetes mellitus, pendulous abdomen, unstable lie, malpresentation, malposition. Other complications include prolonged/obstructed labour, uterine rupture, instrumental deliveries/ cesarean sections, fetal macrosomia, post-partum hemorrhage, presenting late to the hospital in labour or when complications arise due to the false sense of security in past coincidental positive pregnancy experience(s). Grand multiparity is an independent risk factor for good maternal and perinatal outcome [2,3]. In developing countries with dearth of equipment and functioning health facilities, non-availability of blood for transfusion, grand multiparity still constitute high-risk pregnancies even in the hands of obstetricians [6]. This is in contrast with developed countries where grand multiparity is managed safely with well-functioning health systems. [6].

A high-risk pregnancy by definition is one in which the mother/foetus or newborn are at risk of morbidity/or mortality during pregnancy, labour and or/ post-partum compared to the general population of pregnant women [3].

Grand multiparous women are more prevalent in developing countries, with a prevalence rate of 10-30% [6,9] compared to developed countries with rates of 3-4% [10]. This discrepancy has been attributed to the better uptake of modern contraceptive methods, readily available skilled providers at childbirth and health facilities in developed countries compared to the former [10]. The grand multiparous woman, posses little or no problem during the antenatal period or in labour, if she receives good antenatal care, delivered by skilled providers and in a health facility. [10].

2. METHODOLOGY

2.1 Study Setting

This study was conducted at The Niger Delta University Teaching Hospital, Okolobiri, The Niger Delta University Teaching Hospital is situated at Okolobiri, a semi-urban town, in Bayelsa state. The hospital trains medical personnel conducts research and renders clinical services to the people of Bayelsa State and to the inhabitants of neighboring Rivers, Abia and Delta states.

2.2 Study Population /Design

It was a three year study of 3125 booked parturient who delivered at the Niger Delta University Teaching Hospital (NDUTH): among the parturient were 865 grandmultiparous and 664 nulliparous women. It was a retrospective, descriptive and comparative study of the pregnancy outcomes between nulliparous and grandmultiparous women who delivered at Niger Delta University Teaching Hospital between January 2010 and January 2013. The study was a retrospective, descriptive, crossectional study.

2.3 Sampling

The whole population of both the nulliparous and grandmultiparous women who delivered within the study period was recruited into the study.

2.4 Eligibility

There was no exclusion criterion.

2.5 Data Collection/Analysis

Clients data was collected from the hospital archives, coded and entered into SPSS 20 version for analysis, using descriptive statistics, cross tabulations, Pearson Chi-square tests, tables odd ratios and confidence intervals. The error margin was set at $P<0.05$. Variables analysed included: demographic characteristics of participants, gestational age at booking/delivery, packed cell volume on the first antenatal visit and 36 weeks, medical and obstetric complications in pregnancy and labour and fetal outcome. The comparison of birth weights including very low birth weights (< 1,500 g), low birth weights (< 2,500 g), normal weights (2,500-3.900 g), macrosomic births (≥400 g) between multiparas and grand multiparas was analyzed.

2.6 Ethical Approval

This study was approved by the ethical committee of the Niger Delta University Teaching Hospital, Okolobiri, Nigeria.

3. RESULTS

Grand multiparous and primigravidae women were 865 (27.6%) and 664 (21.2%) respectively of the deliveries in the study period. The mean maternal age for grand multiparas and primigravidae were 35.90 (S.D 3.30) and) 26.37 (S.D 3,86) years respectively. Grand multiparous women attained significantly less tertiary education than nulliparous women (X^2 6.39, P = 0.01).

The mean gestational age at booking for grand multiparous and primigravidae was 24.50 $\pm$ 6.4 weeks and 20.20 $\pm$ 7.80 weeks respectively. The mean gestational age at delivery for grand multiparous 38.40 $\pm$ 2.40 weeks, and 38.50 $=\pm$ 2.70 weeks respectively.

Significantly more Nulliparous women booked early (≤ 12 weeks) for antenatal care than grand multiparous women P = 0.00. Preterm labour (delivery before 37 weeks) was significantly higher among grand multiparous women than primigravidae. X^2= 8.99, P = 0.00.

The mean PCV at booking for grand multiparous women was 30.6±3.7%, and that for primigravidae was 32.3±2.6%. The mean PCV at 36 weeks for grand multiparous women was 31.4±3.2%, and that for primigravida was 30.1 ± 2.8%.

At booking, anemia in pregnancy (Packed cell volume < 33%) was significantly higher among grand multiparous women than primigravidas

[X^2 = 7.18, P = 0.01. But at 36 weeks, it was significantly higher in primigravidas than grand multiparous women P = 0.00. Anemia was also more likely to be severe among primigravidas. X^2 = 4.97, P = 0.02.

Hypertensive disorders were significantly higher among grand multiparous women than nulliparous women, P = 0.04, and grand multiparous women have significantly more gestational diabetes than nulliparas, X^2 = 14.44, p = 0.00. Nulliparous women were more prone to urinary tract infections, X^2 = 5.04, p = 0.04. Grand multiparous women had more significant primary postpartum hemorrhage than nulliparas, P = 0.00, and cephalopelvic disproportion was significantly more common among nulliparous women than grand multiparas. X^2 = 9.92, p = 0.00. Genital tract injuries were significantly more in nulliparous women compared to multiparas. P -0.01.

There were no statistical significant differences between grandmultiparas and nulliparas on mode of delivery (P=0.51).Grand multiparous women were more significantly to have instrumental vaginal delivery compared to the nulliparas. Table 5 shows the comparison between grandmultiparous women and nulliparas on the mode of delivery.

The mean birth weight for babies delivered by grand multiparous women was 3.41 $\pm$ 0.66 kilogram, while that for nulliparous women was 3.04 $\pm$ 0.59 kilograms. Nulliparous women significantly delivered very low birth weight babies (<1500 grams), X^2 = 6.72, p = 0.01, and grand multiparous women more likely to deliver babies weighing >4000 grams. X^2 = 13.84, p = 0.01. The stillbirth rate was significantly higher among grand multiparous women. P = 0.00.

4. DISCUSSION

Both primigravid and grand multiparous gestations are referred to as high-risk pregnancies. In the study period [1], both primigravid and grand multiparous pregnancies constituted 48.8 % of our obstetric deliveries. The prevalence of high-risk obstetric deliveries places a burden on the resources of health facilities and the stakeholders that sponsor women's health [4].

The mean age for the first childbirth for the primigravidae in the study was 26.3 years; this is at variance with the recent World Factbook data

with a mean age for first childbirth in Nigeria of 20.3 years [11] and that of Bayelsa state data (where this study was conducted), from the Nigeria Demographic and Health Survey for the state with a median age at first childbirth of 19.2 years [12]. Analysing these two reports from national and state data further, the average participant in the study stayed extra 6-7 years before embarking on childbearing. This delay in childbearing in our study institution may have been caused by educational pursuit as 9:10 of our participants had a secondary or tertiary education. The median age of first childbirth increases with education according to the Nigerian health survey [12]. The mean age of the grand multiparous women in the study was 36 years which is similar to a study done in Calabar with a mean age of 37years [4]. Both study sites are located in the South-South geopolitical region of Nigeria with a similar socio-cultural background. Moreover, starting childbearing career late (with reference to the national average for first childbirth), as in this study could also transit to advanced age at grand multiparity, if the prospective mother continues her childbearing career.

Grand multiparous women attained significantly less tertiary education than primigravid women. This is similar to a study in Zimbabwe where grand multiparous women were less educated than low parity women [13]. The time spent having children is the time lost in acquiring education.

The mean gestational age of registering for antenatal care for the nulliparous woman was earlier than the grand multiparas. .However, both primigravida and multiparous women registered late for care as the current WHO guidelines prescribe booking for antenatal care to be before/or at 12 weeks gestation. The early gestational age at registration affords the prospective mother the opportunity of having more contacts with healthcare providers. For this purpose, the current guideline prescribes a minimum of 8 antenatal visits for a positive pregnancy experience [14]. Significantly, from the study, nulliparous women were more likely to register for antenatal care at ≤ 12 weeks than grand multiparous women. This discrepancy may have arisen from the false sense of security by grand multiparous women from previous positive pregnancies experience prompting them to register for care late [2,3]. The mean gestational age at delivery was similar for both primigravid and multiparous pregnancies. These results are

similar to the study in Durham in the United States of America (USA), where the length of human gestation from ovulation to delivery was 268 days (38 weeks, 2 days) [15]. The grand multiparous women were more likely to have a preterm delivery than nulliparous women. This result was similar to a study done in Saudi Arabia where the spontaneous preterm birth was more common among grand multiparous women [16]. The Packed Cell volume (PCV) of grand multiparous women at booking was less than that of the primigravid participants. Anemia was also more prevalent in the grand multiparous woman compared to the nulliparous participants. This discrepancy may have been due to the fact that, most of the grand multiparous women may not have replenished their haemoglobin deficit from the previous pregnancy, before embarking on a new one. However, close to the end of pregnancy as shown by this study, the PCV of the grand multiparous woman was more than that of the nulliparous participants: an effect which may be due to the benefits of the antenatal care received by the former. On the other hand, the prevalence of anaemia in the nulliparous compared to the grand multiparous women in the later part of pregnancy may be due to consequences of early morning sickness and intolerance of iron supplements at the beginning of pregnancy which is a frequent occurrence in the former [17]. This result is similar to the work done in Lusaka, where anaemia was more prevalent in nulliparous women [18].

Hypertensive disorders and Diabetes mellitus in pregnancy were more common in grand multiparous than nulliparous women. This is because these diseases except gestational hypertension usually complicate pregnancies in women at advanced maternal age. The mean age of our grand multiparous women in our study was at an advanced age of 36 years. This result was similar to works done in Kano where the incidence of both medical conditions was higher in grand multiparous women [6]. In this study, nulliparous women were more prone to urinary tract infection than multiparous women. This result was similar to a study in Thailand and in Sagamu, Nigeria where nulliparous women were more susceptible to urinary tract infections [19, 20]. Grand multiparous women were more likely to have postpartum hemorrhage compared to nulliparous women in the study. These results were comparable to the research done in South Sudan where grand multiparity was a risk factor for postpartum haemorrhage [21]. Repeated childbirth in grand multiparous women lead to reduced strength of uterine muscle contractility immediately after delivery and consequently leading to postpartum haemorrhage.

Table 1. The demographic characteristics of participants with odds ratio and P-values

Bio-data	Grand multiparous (n=865)	Primigravida (n=664)	Total (1529)	P value
Maternal age				
<19 years	nil	16(2.4)	16(0.1)	
19 – 24 years	nil	152(22.9)	152(9.9)	
25 – 29 years	35(4.0)	344(51.8)	379(24.8)	
30 – 34 years	215(14.1)	144(21.7)	359(23.5)	
≥35 years	615(70.1)	8(1.2)	623(40.7)	
Parity				
Para0	664(100)	664(43.4)		
≥para5	865(100.0)	Nil	865(55.6)	
Tribe				
Ijaw	320(36.9)	364(54.8)	684(44.7)	0.00
Igbo	260(30.0)	192(28.9)	452(29.6)	
Yoruba	55(6.36)	30(4.5)	85(5.6)	
Hausa	31(3.6)	12(1.8)	43(2.8)	
Other tribes	199(22.9)	66(8.4)	96(6.3)	
Educational Level				
Non formal	-	-	-	
Primary	55(6.4)	32(4.8)	87(5.7)	
Secondary	575(66.5)	412 (62.0)	987(64.6)	0.01
Tertiary	**235(27.1)**	**220(33.1)**		

Table 2. Booking and delivery parameters

Variable	Grand Multiparous (n=865)	Primigravida (n=664)	Total (1529)	P value
Gestational age at booking				
≤12 weeks	65(7.5)	80(12.0)	145(9.5)	0.00
13 – 28 weeks	550(63.5)	488(73.5)	1038(67.9)	
29 – 36 weeks	240(27.9)	80(12.0)	320(20.9)	
37 – 42 weeks	10(1.1)	16(2.4)	26(1.7)	
Gestational age at delivery				
28-36 weeks	130(15.0)	60(9.1)	190(12.4)	0.00
37-42 weeks	730(84.4)	604(90.9)	1334(87.2)	
>42 weeks	5(0.6)	nil	5(0.3)	
PCV at booking				
≥ 33% (normal)	230(26.6)	228(34.3)	458(29.5)	0.01
27-32% (mild anemia)	570(65.9)	354(53.3)	924(60.4)	
19-26%(moderate anemia)	35(4.0)	50(7.6)	85(5.6)	
≤ 18% (severe anemia)	30(3.5)	32(5.4)	62(4.1)	
PCV at 36 weeks				
≥ 33% (normal)	565(65.3)	404(60.8)	969(63.4)	
27-32% (mild anemia)	265(30.6)	218(32.8)	483(31.6)	
19-26% (moderate anemia)	25(3.2)	24(3.6)	49(3.2)	
≤ 18% (severe anemia)	10(1.2)	18(2.7)	28(1.8)	0.02

Table 3. Complications during the antenatal period

Complications	Grand multiparous (n=865)	Primigravida (n=664)	Total (n = 1529)	P value
No complications	360(41.6)	414(62.3)	774(50.6)	
Two or more previous c/s	70(8.1)	nil	70(4.5)	0.01
Abnormal lie at term	52(6.0)	28(4.2)	80(5.2)	0.11
Severe anaemia	10(1.2)	18(2.7)	28(1.8)	0.0
Antepartum haemorrhage	35(4.0)	24(3.6)	59(3.6)	0.66
Breach presentation at term	40(4.6)	20(3.0)	60(39.2)	0.10
Hypertensive disorders	155(17.9)	94(14.2)	249(16.3)	0.04
Gestational diabetes mellitus	40(4.6)	8(1.2)	48(3.1)	0.00
Retroviral disease (PMTCT)	18(5.2)	12(1.8)	30(1.9)	0.70
Prolonged pregnancy	30(3.5)	16(2.4)	46(3.0)	0.22
Multiple gestation	35(4.0)	16(2.4)	51(3.3)	0.07
Congenital abnormality	5(0.6)	2(0.3)	7(0.5)	0.95
Premature rupture of membranes	5(0.6)	nil	5(0.3)	
Urinary tract infection	5(0.6)	12(1.8)	17(1.1)	0.02
Cardiac disease in pregnancy	3(0.3)	nil	3(0.2)	
Polyhydranois	2(0.1)	nil	2(0.1)	

The mean birth weight for babies born to grand multiparas was higher than nulliparous women in the study. By nature and from studies, nulliparous women deliver low birth weight babies compared to the multiparous women [22]. These results are similar to that of the Nigerian Demographic and Health Survey where fetal weight increases from second through to sixth birth but at variance with the results of a large cohort study in Bethesda where birth weight increases linearly from the second to the fourth pregnancies and then, the birth weight start to fall [22]. As the prospective mother ages, so does the birth weight also increase, as shown by the higher incidence of macrosomic births in grand muliparous women in this study [12,22].

The stillbirth rate for the Niger Delta University Teaching Hospital was 22.7/1000 live births. The grand multiparous significantly delivered a stillbirth than nulliparous women. These results were also similar to a study done in Calabar

where grand multiparous women were more likely to provide a stillbirth compared to nulliparous women. However, it differed from the Calabar study for having a higher stillbirth rate of 48.4/1000 live births [23]. The grandmultiparous women had more stillbirth because of their advanced age and therefore more prone to chronic medical disorders as evidenced by this data.

From the study, grandmultiparous women suffered more complications than their nulliparous counterparts.

Table 4. Mode of delivery

Mode of delivery	Grand multiparous (n=865)	Primigravida (n=664)	Total (n = 1529)	P value
Spontaneous vaginal delivery	526(60.8)	436(65.6)	962(62.9)	0.51
Instrumental vaginal delivery	52(5.8)	12(1.8)	64(4.2)	0.0003
Assisted vaginal breach delivery	30(3.4)	nil	30(3.4)	
Elective caesarean section	107(12.4)	77(11.6)	184(12.0)	0.70
Emergency caesarean section	150(17.2)	139(16.1)	288(18.8)	0.02
Destructive operation	4(0.3)	nil	4(0.3)	

Table 5. Labour complications

Complications	Grand multiparous (n=865)	Primigravida (n=664)	Total (n = 1529)	P value
No complication	553(63.9)	319(48.0)	872(57.0)	
Primary postpartum hemorrhage	60(6.9)	68(10.2)	128(8.4)	0.02
Cephalopelvic disproportion (CPD)	55(6.3)	82(12.3)	137(8.9)	0.001
Fetal distress	50(5.7)	52(7.8)	102(6.7)	0.11
Breach presentation in labour	35(4.1)	40(6.0)	75(4.9)	0.07
Genital tract injuries	44(5.1)	56(8.4)	100(6.5)	0.008
Failed induction of labour	30 (3.5)	25(3.8)	55(3.6)	0.75
Retained placenta	25(2.9)	16(2.4)	41(2.7)	0.56
Obstructed labour	2(0.2)	4(0.6)	6(0.4)	0.24
Precipitate labour	10(1.2)	nil	10(1.2)	
Retained second twin	3(1.2)	2(0.3)	5(0.3)	0.87

Table 6. Mode of delivery

Variable	Grand multiparous (n=865	Primigravida (n=664)	Total (n = 1529)	P value
Mode of Delivery				
Spontaneous vaginal delivery	526(60.8)	436(65.6)	962(62.9)	0.51
Instrumental vaginal delivery	52(5.8)	12(1.8)	64(4.2)	0.0003
Elective caesarean section	107(12.4)	77(11.6)	184(12.0)	0.64
Emergency caesarean section	150(17.2	139(16.1)	288(18.8)	0.02

Table 7. Baby's parameters at birth and sex

Variable	Grand multiparous (n=865	Primigravida (n=664)	Total (n = 1529)	Odds Ratio	P value
Birth weight					
<1500 grams	10(1.2)	20(3.0)	30(1.9)	0.37	0.009
1500 – 2500 grams	85(9.8)	80(12.0)	165(10.8)	0.16	
2501 – 4000 grams	670(76.9)	524(83.1)	1194(78.1)	0.49	
>4000 grams	100(12.7)	40(6.0)	140(9.2)	2.03	0.0001
Total	865(56.6)	664(43.4)	1529(100)		

Variable	Grand multiparous (n=865	Primigravida (n=664)	Total (n = 1529)	Odds Ratio	P value
Fetal sex					
Male	450(52.1)	352(47.0)	802(52.5)		
Female	415(47.1)	312(53.0)	727(47.5)	0.74	
Total	865(56.6)	664(43.4)	1529(100)		
Fetal status					
Baby alive	810(93.6)	648(97.6)	1458(95.4)		
Fresh still birth	55(6.36)	16(2.4)	71(4.6)	1.75	0.00
Total	865(56.6)	664(43.4)	1529(100)		

5. CONCLUSION

Our results in this study were comparable to similar studies, both from local institutions, the national survey and internationally, all highlighting the challenges posed by the management of the grandmultiparous and nulliparous women in pregnancy especially in the former. Vigilance on the part of the Obstetrician on birth plan preparedness for the grand multipaous and nulliparous woman in pregnancy is advocated.

CONSENT

It is not applicable.

ETHICAL APPROVAL

As per international standard or university standard, written approval of Ethics committee has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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