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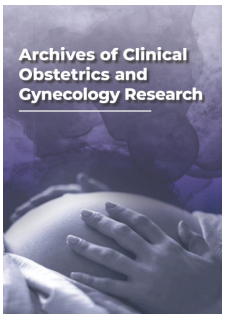

Maternal And Perinatal Adverse Obstetric Outcomes in Grandmultiparity at Mbarara Regional Referral Hospital

Ssemujju A, Mpiima D, Lugobe H,Kayondo M

Department of Obstetrics & Gynecology, Mbarara University of Science and Technology,P.O.BOX 1410,Mbarara Uganda

Correspondence

Ssemujju A

Department of Obstetrics & Gynecology, Mbarara University of Science and Technology,P.O.BOX 1410,Mbarara Uganda

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Abstract

Background: *Grandmultiparity has been found historically and up to date to be associated with maternal and perinatal complications. This association has been reported especially in studies done in developing countries. However recent studies especially in the developed countries find no increased risk for such adverse obstetric outcomes . This difference has been attributed to the quality and availability of obstetric care together with level of socioeconomic status. Because of the controversy surrounding the association of grandmultiparity with adverse obstetric outcomes, it calls for a regional or facility based assessment on the obstetric performance in grandmultiparity. This study aimed at determining the association of adverse obstetric outcomes (i.e maternal and perinatal) with grandmultiparity at Mbarara Regional Referral Hospital.*

Methods: *This was a cross sectional study of 562 participants including 281 grandmultiparous and 281 multiparous women during a study period of three and half months. Data was collected on socio-demographics, health system, behavioral, maternal medical conditions, past obstetric and gynecological factors and obstetric outcomes for the current pregnancy including adverse obstetric outcomes of interest. Frequencies of adverse obstetric outcomes were determined and compared between the two groups. Univariate and multivariate logistic regression was done to establish the association of grandmultiparity with adverse obstetric outcomes.*

Results: *Apart from premature/early rupture of membranes and admission of neonates to pediatric ward among grandmultiparous women, the rest of the adverse obstetric outcomes were comparable and not significantly different. After adjusting for potential confounders, there was no adverse obstetric outcome associated with being grandmultiparous. In fact, being grandmultiparous offered some protection against perineal tears. Grandmultiparous women had significantly lower odds of experiencing perineal tears aOR=0.13 (0.063-0.290), p<0.001 compared to multiparous women*

Conclusion: Grandmultiparity at Mbarara Regional Hospital does not carry increased risk for adverse maternal and perinatal outcomes in comparison to low parity multiparous women.

Background

The definition of grandmultiparity has evolved over time, in the 1960s it was referred to as eight deliveries or more. It is currently defined as five deliveries or more by the international federation of obstetrics and gynecology [1].This definition considers the fact that obstetric complications, neonatal morbidity and perinatal deaths increases markedly at fifth or more delivery.

The incidence of grandmultiparity varies from place to place with highest figures reported among developing countries and this is because of cultural, religious as well as differences in the uptake of family planning. With the fertility rate of 5.2 (children per woman) as quoted in Uganda Demographic Health Survey (UDHS) 2016,grandmultiparity remains highly common in Uganda especially in the rural areas [2].In fact previously UDHS reported the fertility rate of Uganda being constant for the last decade.

Several studies have associated grandmultiparity with adverse maternal and perinatal outcomes i.e. the incidence of pregnancy related complications is higher in grandmultiparity compared to women of low parity. Pregnancies after fifth delivery are usually seen with anxiety among obstetricians working in low resource centers for the known background risk of obstetric related complications [3].The adverse obstetric outcomes associated with grandmultiparity are divided into those that occur during antepartum, intrapartum and postpartum [4].The commonly stated antepartum risks include Anemia in pregnancy, antepartum hemorrhage due to placenta abruptio or previa,

Abbreviations: MRRH: Mbarara Regional Referral Hospital; APH: Antepartum Hemorrhage; PPH: Postpartum Hemorrhage; PROM/EROM: Premature/Early rupture of membranes

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preeclampsia. Intrapartum include uterine rupture, malpresentation or obstructed labour, dystocia. The most feared and common postpartum adverse outcome in grandmultiparity is postpartum hemorrhage. Among the adverse fetal outcomes are; low birth weight, prematurity, and perinatal mortality and macrosomia [5].

The association of grandmultiparity with adverse obstetric outcomes remains a big debate globally. This controversy is common most especially among studies done in developed countries. This has been attributed to the quality of health care as well as level of socioeconomic status. In developed countries, the socioeconomic conditions are very good, literacy rates are high and there is access to high quality health care and therefore the risk associated with high parity may not be pronounced [6].

Understanding the association of grandmultiparity with adverse obstetric outcomes based on the available obstetric care in any setting helps to classify a grandmultiparous woman as high risk or low risk, and this can provide a basis for preventative as well as treatment measures. The aim of this study was to establish the association of grandmultiparity with adverse maternal and perinatal outcomes at Mbarara Regional Referral Hospital (MRRH).A grandmultiparous woman in this study was defined as one that had five or more deliveries while multiparous was defined as one that had two to four deliveries.

Methods

Setting and design of the study

This was a cross sectional study of 562 participants done on postnatal ward of MRRH.MRRH is a public regional referral hospital that serves as a teaching hospital for Mbarara University of Science and Technology well. The hospital serves as a referral for the western region of Uganda but also receives so many patients from refugee camps of Rwandese, Congo and Burundi. The hospital offers specialized services, employs eleven obstetricians and 32 midwives together with residents and medical students who perform over 10,000 deliveries annually.

Sampling procedure and data collection

The study population consisted of all women having their second and above delivery between the months of Dec-2016 to march 2017.Inclusion criteria were all women that had delivered their second or above delivery after period of viability (≥28 weeks).Women that delivered twins were excluded on grounds of multiple pregnancy being a risky pregnancy itself. Women who delivered outside the hospital or before arrival were also excluded. On a daily basis mothers having their second or above delivery were identified from the admission and delivery registry on maternity ward. They were then assessed for eligibility. All those eligible were traced on postnatal ward and recruited upon consent. For every grandmultiparous woman, the first multiparous to deliver was recruited until the sample size was attained. The sample size was calculated using Fleiss formula (1981) for cross sectional and cohort studies. An estimated sample size of 510 was calculated and 10% added to cater for potential for missing data giving a total of 562 participants. The ratio of grandmultiparous women to multiparous was 1:1.

Data was collected using a standard interviewer administered questionnaire. The primary outcome variables were adverse obstetric outcomes both maternal and fetal including; antepartum hemorrhage due to placenta abruptio/previa, Preeclampsia/eclampsia, premature/early rupture of membrane, ruptured uterus, perineal tears, obstructed labour, hysterectomy, postpartum hemorrhage, low birth weight, low APGAR score, admission to pediatrics, macrosomia, congenital anomalies, perinatal deaths and congenital anomalies. The questionnaire was administered within 4 hours for normal spontaneous vaginal deliveries while for operative deliveries; it was after the patient was fully awake and coherent.

Table 1. *Baseline characteristics of Multiparous and Grandmultiparous women at Mbarara regional referral hospital (n=562)*

Characteristic	Multiparous (n=281) n (%)	Grandmultiparous (n=281) n (%)	p-value
District			0.407
Mbarara	192 (52.46)	174 (47.54)	
Shema	14 (51.85)	13 (48.15)	
Isingiro	53 (47.32)	59 (52.68)	
Kiruhura	11 (36.67)	19 (63.33)	
Others	11 (42.31)	15 (57.69)	
Residence type			0.098
Urban	88 (45.13)	107 (54.87)	
Rural	192 (52.46)	174 (47.54)	
Age (Mean=29.66±5.33)			<0.001*
19-24	103 (98.10)	2 (1.90)	
25-34	170 (48.99)	177 (51.01)	
35-45	8 (7.27)	102 (92.73)	
Tribe			0.518
Banyankole	196 (51.17)	187 (48.83)	
Baganda	31 (48.44)	33 (51.56)	
Bakiga	32 (52.46)	29 (47.54)	
Others	22 (40.74)	32 (59.26)	
Education			0.728
None	30 (44.78)	37 (55.22)	
Primary	149 (49.67)	151 (50.33)	
Secondary	80 (51.61)	75 (48.39)	
Tertiary	22 (55.00)	18 (45.00)	
Marital status			0.024*
Single	10 (83.33)	2 (16.67)	
Married	261 (49.15)	270 (50.85)	
Separated/Divorced	3 (30.00)	7 (70.00)	
Widow	4 (10.00)	0 (0.00)	
Cohabiting	3 (60.00)	2 (40.00)	
Religion			0.578
Catholic	79 (51.63)	74 (48.37)	
Protestant	132 (47.31)	147 (52.69)	
Islam	29 (49.15)	30 (50.85)	
Pentecostal	31 (56.36)	24 (43.64)	
Seventh day	10 (62.50)	6 (37.50)	

Characteristic	Multiparous (n=281) n (%)	Grandmultiparous (n=281) n (%)	p-value
Occupation			0.016*
Housewife	50 (54.95)	41 (45.05)	
Business woman	99 (51.56)	93 (48.44)	
Peasant farmer	85 (41.67)	119 (58.33)	
Student	3 (75.00)	1 (25.00)	
Professionals	18 (52.94)	16 (47.06)	
Manual laborers	26 (70.27)	11 (29.73)	
Income			0.008*
0-5000	14 (30.43)	32 (69.57)	
7000-50,000	102 (49.51)	104 (50.49)	
60,000-100,000	40 (67.80)	19 (32.20)	
120,000-300,000	74 (50.68)	72 (49.32)	
350,000-600,000	43 (46.74)	49 (53.26)	
700,000-4,000,000	8 (61.54)	5 (38.46)	
Referral			0.041*
No	230 (52.27)	210 (47.73)	
Yes	51 (41.80)	71 (58.20)	
Perceived support			0.16
No	21 (61.76)	13 (38.24)	
Yes	260 (49.34)	267 (50.66)	
Decision maker			0.002*
Partner	87 (40.65)	127 (59.35)	
Both	18 (60.00)	12 (40.00)	
Self	176 (55.52)	141 (44.48)	

Table 2. *Current Obstetric factors among grandmultiparous and multiparous women (n=562)*

Characteristic	Multiparous (n=281) n (%)	Grandmultiparous (n=281) n (%)	p-value
Gestation weeks			0.163
<37	10 (50.00)	10 (50.00)	
>37	204 (52.58)	187 (47.42)	
Not sure	67 (43.51)	87 (56.49)	
ANC Attendance			0.317
Yes	280 (49.91)	281 (50.09)	
No	1 (10.00)	0 (0.00)	
Trimester at 1st ANC visit			<0.001*
1st	117 (63.93)	66 (36.07)	
2nd	145 (44.89)	178 (55.11)	
3rd	19 (33.93)	37 (66.07)	
Inter pregnancy interval (yrs)			0.458
<2	19 (48.72)	20 (51.28)	
>2	70 (42.17)	96 (57.83)	
Patograph use			0.618
Yes	63 (48.09)	68 (51.91)	
No	218 (50.58)	213 (49.42)	
Delivery mode			0.272
Vaginal delivery	195 (49.87)	196 (50.13)	
Primary C-Section	34 (41.46)	48 (58.54)	
Vacuum extraction	1 (100.00)	0 (0.00)	
Repeat C-Section	40 (57.97)	29 (42.03)	
Laparatomy	10 (55.56)	8 (44.44)	

Table 3. *Maternal adverse outcomes among Multiparous and Grandmultiparous women at Mbarara regional referral hospital (n=562)*

Adverse outcome	Multiparous	Grandmultiparous	COR (95%CI)	p-value
	n (%)	n (%)		
Uterine rupture	12 (70.59)	5 (29.41)	0.41 (0.14-1.17)	0.095
Primary PPH	16 (55.17)	13 (44.83)	0.80 (0.38-1.70)	0.568
Hysterectomy	7 (77.78)	2 (22.22)	0.28 (0.06-1.36)	0.115
Premature Rapture of Membranes/Early Rupture of Membranes	5 (21.74)	18 (78.26)	3.77 (1.38-10.32)	0.01*
Obstructed labour	12 (36.36)	21 (63.64)	1.81 (0.87-3.76)	0.11
Preeclampsia/eclampsia	7 (58.33)	5 (41.67)	0.71 (0.22-2.26)	0.561
Perineal tears	87 (87.88)	12 (12.12)	0.09 (0.053-0.187)	<0.001*
Postpartum blood transfusion	12 (54.55)	10 (45.45)	0.83 (0.35-1.94)	0.664
Maternal death	-----	……..	……..	…….
APH due to placenta Abruption	3 (37.50)	5 (62.50)	1.68 (0.39-7.09)	0.481
APH due to placenta Previa	2 (40.00)	3 (60.00)	1.51 (0.25-9.08	0.655

Ethical consideration

Data collection started after ethical approval from faculty review board, institutional ethics review board and Uganda national council for science and technology. Informed consent was got from all participants that were recruited.

Data analysis

Collected data was entered in a database designed using Epi-Info version 7.2.The dataset was exported as Microsoft excel and imported into STATA 13.0 (STATA Corp. LP, College Station, Texas, USA) for analysis. Baseline characteristics were reported as proportions for categorical variables and means with corresponding standard deviations for continuous variables. These were compared across parity using Pearson chi-square and students t-test for categorical and continuous variables respectively.

The association between grandmultiparity and adverse obstetric outcomes was established in a Univariate analysis using Chi-square and logistic regression. The unadjusted odds ratio and corresponding 95% confidence interval was reported. To establish an independent association between grandmultiparity and adverse obstetric outcomes, exploration in a univariate analysis of other potential confounders among socio-demographics, behavioral, medical and past obstetric factors, and current obstetric factors was done. All factors with a p-value of less than 0.1 in univariate analysis were subjected to multivariable logistic regression. The multivariate logistic model was built using a manual back to backward stepwise selection of variables. With this the adjusted odds ratio with corresponding 95% confidence intervals for grandmultiparity was reported. A p-value of less than 0.05 was considered statistically significant.

Results

A total of 1665 deliveries were conducted during the study period, out of which 790 met the inclusion criteria. Among those eligible some were not recruited on grounds of being discharged before the recruitment process started.562 participants were recruited with 281 grandmultiparous women and 281 multiparous women.

Most of the study participants were in the age bracket of 25-35 years with the mean age among grandmultiparous higher than that of multiparous women (33±4.0 vs 26.2±4.1). Most were Banyakole from Mbarara district that had attended at least primary level of education. There were more referrals among grandmultiparous women (25.3% vs 18.2%). For both groups, participants were either married or cohabiting meaning they had some level of social support (Table 1).

The mean parity among grandmultiparity was 5.9±1.2 while that in multiparous group was 2.7±0.8. Most deliveries were at term but also a good number were not sure of their dates. There was good antenatal attendance with later first visits among grandmultiparous women (Table 2)

Apart from premature rupture of membranes/early rupture of membranes and perienal tears the rest of the adverse maternal outcomes were comparable in both groups however multiparous group experienced more maternal adverse outcomes as compared to grandmultiparity (Table 3) .

For the fetal adverse outcomes, apart from admission to pediatrics ward the rest were comparable (Table 4).

At bivariate analysis, the odds of occurrence of the following adverse outcomes were higher in Grandmultiparous women compared to multiparous women; Premature rupture/early rupture of membranes cOR=3.77 (95%CI:1.38-10.32, p=0.01), admission of the newborn to pediatrics cOR=2.32 (95%CI:1.03-5.18, p=0.041)

Still at bivariate analysis, the odds of occurrence of perineal tears were lower in grandmultiparous women compared to multiparous women cOR=0.09 ((95% CI 0.053-0.187, p=<0.001)

We proceeded to do multivariate logistic regression adjusting for confounders by stepwise backward reduction and using the best fit model which included all baseline characteristics and current obstetric factors that were found to be significant at a p-value <0.05, there was no adverse outcome

Table 4. *Fetal adverse outcomes among Multiparous and Grandmultiparous women at Mbarara regional referral hospital (n=562)*

Adverse outcome	Multiparous	Grandmultiparous	COR (95% CI)	p-value
Perinatal death	28 (57.14)	21 (42.86)	0.73 (0.40-1.31)	0.29
Low Birthweight	14 (38.89)	22 (61.11)	1.57 (0.80-3.07)	0.186
Admission to pediatrics	9 (31.03)	20 (68.97)	2.32 (1.03-5.18)	0.041*
Congenital anomalies	2 (66.67)	1 (33.33)	0.48 (0.04-5.38)	0.554
Macrosomia	22 (55.00)	18 (45.00)	0.79 (0.42-1.53)	0.497
Low Apgar score	29 (54.72)	24 (45.28)	0.83 (0.49-1.42)	0.493

Table 3. *Multivariate logistic regression showing the difference in adverse outcomes between Multiparous and grandmultiparous women*

Adverse outcome	aOR (95%CI)	p-value
Premature Rapture of Membranes/Early Rapture of Membranes	2.837 (0.808-9.960)	0.104
Perineal tears	0.13 (0.063-0.290)	<0.001*
Admission to pediatrics	2.322 (0.719-7.493)	0.159

associated with being grandmultiparous. In fact, being grandmultiparous offered some protection against perineal tears. Grandmultiparous women had significantly lower odds of experiencing perineal tears aOR=0.13 (0.063-0.290), p<0.001 compared to multiparous women. Results are shown in the table 5.

Discussion

In the Past, Grandmuliparity has been found a risk for obsteteric complications however in this study no such significant risk was found. The low prevalence of adverse obstetric outcomes in grandmultiparity may be attributed to the good antenatal care attendance as well as quality of obstetric care available at the hospital. The hospital has skilled birth attendants from senior consultants residents to midwives that are readily available to have have timely interventions.

The only significantly different adverse maternal outcome in grandmultiparity compared to multiparity was premature/ early rupture of membranes (p-value 0.006). Premature/ early rupture of membranes was found in 78.3% of grandmultiparous women and 21.7% % in multiparous. No concrete explanation for this significance, however this may be attributed to the higher occurrence of obstructed labour in grandmultiparity. These results are in agreement with another study [10] that found premature rupture of membranes at 16.2% in grandmultiparity versus 4.0% in low parity with a p-value of 0.004. Although retrospective data and a different methodology were used, this study was done in a teaching hospital just like MRRH.

Uterine rupture in grandmultiparity was at 29.41% versus the 70.59% in multiparous women and this was not significantly different. Most of these followed previous C-sections deliveries in both groups. The low prevalence of uterine rupture in grandmultiparity can be explained by fewer previous C-section deliveries since previous uterine surgery increases the risk for rupture.In south Africa [4]and Uganda [9] found comparable results. Historically, Uterine rupture in grandmultiparity has been attributed to progressive thinning of the uterine wall that comes with repetitive deliveries. However with improved and quality intrapartum care the risk for rupture can be greatly reduced.

In this study, multiparous women had a higher number of hysterectomies done i.e.77.78% in comparison to 22.22% in grandmultiparity. All these followed uterine rupture among the multiparous women. In grandmultiparity one followed uterine rupture, while the other was due to uncontrollable intra-operative hemorrhage. In his article [11] on risk factors and trends of peripartum hysterectomy, grandmultiparity was found a significant risk factor (OR = 4.1; 95% CI 2.5–6.6, p < 0.001) which contradicts with the results in this study. This difference may be due to improved obstetric care over time, since this study was conducted on data almost ten years ago.

Among known obstetric risks in grandmultiparity, Postpartum hemorrhage has been identified as one of the commonest [9, 10, 12-14]. In this study postpartum hemorrhage was found at 44.83% in grandmultiparity compared to the 55.17% among multiparous women and this was not significantly different. This low prevalence of postpartum hemorrhage in grandmultiparity may be explained by the vigilance and preparedness midwives and Obstetricians provide while attending to such women. Also the routine use of uterotonics and active management of third stage of labour can explain this. Another study [15] found comparable but higher results ,and this could be attributed to a bigger sample size used. In Nigeria [10] Afolabi and Adeyemi (2013) found it even higher in grandmultiparity at 28.3%,significantly different from the 5.1% among multiparous women.

Antepartum hemorrhage due to placenta previa and abruptio placenta was not found significantly different in both groups. Placenta previa and abruptio placenta in grandmultiparity was found at 60% and 62.5% respectively comparable to the 40.0% and 37.5% in multiparous women. Comparable results were found United Arab Emirates [16]. This may be explained by low rate of other contributory factors to antepartum hemorrhage like smoking in both study populations.

Obstructed labour was found at 63.64% in grandmultiparity, higher than 36.36% in the multiparous group. However no significant difference was seen. In Nigeria [16] it was found slightly lower at 5.2%.Obstructed labour in grandmultiparity has been attributed to mal-presentation that comes with the hyper-lordosis of the lumbar vertebral spine with an increased pelvic inclination [4].

The only significantly different adverse fetal outcome in grandmultiparity was admission to pediatrics ward (p-value of 0.041) and Perineal tears respectively.Among reasons for admission were low APGAR score, low birth weight and congenital anomalies. This difference was noted in other studies [8, 16-18].Perineal tears were less in grandmultiparity and this can be explained by the laxity of perineal muscles that comes with repeat vaginal deliveries

The association of grandmultiparity with adverse obstetric complications had been debated for quite a long time. It's been studied in populations of different socioeconomic status as well as varying levels of obstetric care. In this study grandmultiparity was found not to be associated with increased risk for adverse obstetric outcomes.. A number of other studies subscribe to the same conclusions [7, 8, 19-22]. These results don't concur with the historical view that pregnancies in grandmultiparity should be considered in the high risk category On the other hand, several other studies associated grandmultiparity with poor obstetric outcomes [9, 10, 12-14, 23]

The association of grandmultiparity with adverse obstetric outcomes has been attributed to a number of other confounding factors including old age, high prevalence of chronic medical conditions and quality of obstetric care. Some studies conclude that with good socioeconomic status and quality obstetric care, grandmultiparity per se does not increase risk for obstetric complications [4, 7].When assessing for risk in grandmultiparity, the past and present history should be the basis rather than parity itself [8].

In his article [24] supported the fact that grandmultiparity per se is not a risk to the mother or his fetus in situations with well-trained midwives and consultant obstetrical staff . Mbarara Regional Referral hospital that is a training institution for medical students as well as residents is well-staffed with consultant obstetricians, resident students, and midwives that monitor and follow mothers throughout their pregnancies and therefore risks are identified and timely decisions made. And this may explain well the low prevalence and reduced risk for adverse obstetric outcomes in grandmultiparity.

Conclusion

In this study grandmultiparity is found not associated with an increased risk for adverse maternal and perinatal outcomes in comparison to women of low parity.

Ethics and Consent to participate

Approval to carry out the study was sought from Department of Obstetrics and Gynecology MUST, the Faculty Research Committee (FRC), Institutional Review Committee, Mbarara Regional Referral Hospital and Uganda National Council for Science and Technology (UNCST). Informed written consent was obtained from all respondents and confidentiality was ensured with use of study codes and not their names.

Competing interests

Authors declare that there is no conflict of interest in this study.

Authors' contributions

Mpiima D & Ssemujju concieved the study,collected,analysed the data.

Lugobe H,Kayondo M helped in design of the study and interpreting the results

Ssemujju and Mpiima ,critically analysed and reviewed the manuscript

All authors read and approved the final manuscript.

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