

IS NULLIPARITY A RISK FACTOR FOR POOR OBSTETRICAL AND NEONATAL OUTCOMES IN RWANDAN DISTRICT HOSPITALS ? A PROSPECTIVE OBSERVATIONAL STUDY AT MUHIMA DISTRICT HOSPITAL

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ABSTRACT

Introduction: Nulliparity and multiparity are associated with different obstetrical and neonatal outcomes. The latter are well documented in the literature. What is not yet documented is whether such findings apply to Rwandan parturients.

Objectives: The aim of this study was to determine whether the established differences in obstetrical and neonatal outcomes between nulliparas and non-nulliparas apply to Rwandan parturients.

Methodology: It was a prospective, cross-sectional, analytical and case control study.

Data were systematically collected from 608 parturients (300 nulliparas as study group and 308 multiparas as control; gestational age \geq 28 weeks) at Muhima district hospital (Kigali City) from April 13th 2009 up to July 13th 2009. X2 test was used to compare observed proportions, and Student's t test to compare means.

Results: The rate of spontaneous labour was significantly higher in multiparas than in nulliparas (96,7 % vs 91,7 %; $p = 0,008$), and nulliparas had a significantly higher rate of induction of labour (8,2 % vs 3,2 %; $p = 0,008$).

The rate of cesarean delivery (28% vs 10,7%; $p < 0,001$) and the one of assisted vaginal delivery (1,6 % versus 0,3 %; $p < 0,001$) were significantly higher in nulliparas than in multiparas.

Among indications of cesarean delivery, cephalo-pelvic disproportion (7% versus 0,6%; $p = 0,037$) and failure of descent (4,3% versus 0,3%; $p = 0,037$) were significantly higher in nulliparas.

The rate of episiotomy was significantly higher in nulliparas than in multiparas (80,1% vs 19,9%; $p < 0,001$).

Minor perineal tear rate was significantly higher in multiparas than in nulliparas (23,7% vs 10,4%; $p < 0,001$).

Newborn of nulliparous mothers were more likely to be transferred to neonatal care unit compared to newborn of multiparous mothers (6,4% vs 2,6%; $p = 0,025$).

Conclusion: Nulliparity is associated with a higher rate of induction of labor, cephalo-pelvic disproportion, cesarean delivery, routine episiotomy and newborn transfer to neonatal care unit.

Interventional studies allowing the control of some of these morbidity factors are needed.

Keywords: Parity - Delivery - Neonate – Outcomes - Rwanda

RESUME

Introduction : Nulliparité et multiparité sont associées à des degrés divers aux complications aussi bien maternelles que fœtales. Cette notion bien documentée dans la littérature s'applique-t-elle aux parturientes rwandaises dans le contexte d'un hôpital de district ?

Objectifs : Contribuer à la détermination du profil à l'accouchement de la nullipare rwandaise en milieu urbain, en déterminant et en comparant les paramètres anthropométriques et obstétricaux ainsi que l'état des nouveau-nés chez les nullipares et les multipares.

Méthodologie : Etude prospective, transversale, analytique et cas témoin.

Les données analysées provenaient d'un échantillon de 608 parturientes (300 nullipares constituant le groupe d'étude et 308 non nullipares constituant le groupe témoin) remplissant nos critères d'inclusion et reçues à la maternité de l'hôpital de Muhima du 13/04/2009 au 13/07/2009.

Résultats : La fréquence du travail spontané était significativement plus élevée chez les multipares que chez les nullipares (96,7% vs 91,7% ; $p = 0,008$), qui avaient présenté un taux de déclenchement artificiel du travail significativement plus élevé (8,2% versus 3,2% ; $p = 0,008$).

Le taux de césarienne (28% vs 10,7% ; $p < 0,001$) et celui d'accouchement instrumental (1,6% vs 0,3% ; $p < 0,001$) étaient significativement plus élevés chez les nullipares que chez les multipares.

La disproportion foeto pelvienne (7% vs 0,6% ; $p = 0,037$) et le défaut d'engagement (4,3% vs 0,3% ; $p = 0,037$) avaient une fréquence significativement plus élevée chez les nullipares que chez les multipares.

Les nouveaux nés des mères nullipares étaient plus transférés en néonatalogie que ceux des mères multipares (6,4% vs 2,6% ; $p = 0,025$).

L'épisiotomie était significativement plus pratiquée chez les nullipares que chez les multipares (80,1% vs 19,9% ; $p < 0,001$).

La déchirure du périnée était significativement plus observée chez les multipares que chez les nullipares (23,7% vs 10,4% ; $p < 0,001$).

Conclusion : La nulliparité était associée à un taux élevé de césarienne, l'épisiotomie quasi systématique et un taux élevé de transfert des nouveau-nés en néonatalogie.

Nous recommandons l'initiation des études de type interventionnel permettant de contrôler certains des facteurs de morbidité observés dans cette étude.

Mots-clés: Parité – Accouchement – Nouveau - né – Issues

INTRODUCTION

Child birth is commonly a happy event for the family and the society in general. It can however sometimes be source of complications for either the mother or the baby

as well as for both of them. The fear of obstetrical and neonatal complications is higher in nulliparous women as well.

Due to this, some authors suggest the use of preventive labor induction [1], while others suggest avoiding it [2].

Other studies have shown that nulliparous term singleton vertex cesarean delivery rates have institutional and individual predictors [3]. Level of care to the mother affects

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the frequency of admission to neonatal care unit even for babies of low-risk nulliparas [4]. No previous study has been done in Rwanda for this purpose; therefore the aim of this study was to scrutinize the picture in a Rwandan district hospital.

METHODS

This was a prospective, cross-sectional, analytical and case-control study. The study was designed to examine whether or not nulliparity is associated with poor obstetrical and neonatal outcomes in our setting.

The required sample was calculated using the formula $N = Z^2 pq / d^2$: $1,96^2 \times 0,25 \times 0,75 / 0,052^2 = 288,12$ (with $p = 25\%$, i.e. nulliparity prevalence in our environment).

We therefore collected data from 608 parturients (300 nulliparas as study group and 308 multiparas, i.e. pregnant women with 1 or more previous deliveries as controls) at Muhima hospital from April 13th 2009 up to July 13th 2009. Muhima district hospital has an average of 10000 deliveries per year and is located in Kigali city.

For the study group, all consecutive nulliparas who came with gestational age ≥ 28 weeks of amenorrhea during the study period were included. The control group consisted of all multiparas with a gestational age ≥ 28 weeks of amenorrhea without a previous uterine scar each admitted following a nulliparous woman in the study group.

The following informations were extracted from the medical records: identification, weight, height, obstetrical history, blood pressure, gestational age, pathological history during pregnancy, HIV status, type of labour, mode of delivery, episiotomy, perineal tear, APGAR score at birth and at 5 minutes, transfer to neonatal care unit, maternal complications, mode of placenta expulsion, post partum complications, and length of hospitalization.

All analyses were performed using the Statistical Package for Social Sciences 14.0. Chi square test and Student's t test were used to compare categorical and continuous clinical predictors. Statistical significance was set at the $p < 0,05$ level.

RESULTS

Table 1 shows that nulliparous parturients were younger than multiparous ones ($p < 0,001$), and multiparas were heavier than nulliparas ($p=0,016$). Multiparous parturients were more affected by HIV infection than nulliparas ($p = 0,026$) while nulliparas were the most affected by malaria during pregnancy ($p = 0,031$)

Table 1. General characteristics and obstetrical history of parturients

Variables	Nulliparas (N=300) Means(SD)	Multiparas	p
Age (years) (n=608)	23,62±4,02	28,78±5,52	<0,001
Weight (kg)	64,00±8,75	65,96±11,08	0,016
Height (cm)	158,32±6,43	159,03±6,79	0,187
G.A (Weeks) (n=384)	40,03±1,97 (n=208)	40,09±1,77 (n=176)	
Pathologies while pregnant (%)	Nulliparas n (%)	Multiparas n p	
High blood pressure	3 (1%)	2 (0,6%)	0,627
HIV	15 (5%)	30 (9,7%)	0,026
Malaria	14 (4,6%)	5 (1,6%)	0,031
Urinary tract infection	3 (1%)	6 (1,9%)	0,505

Table 2 shows that the rate of induction of labour was significantly higher in nulliparous parturients than in multiparas ($p=0,008$). The rate of cesarean delivery was also higher in nulliparas than in multiparas ($p<0,001$). Among indications of cesarean delivery, the rate of cephalo-pelvic disproportion, foetal distress and failure of descent was significantly higher in nulliparas than in multiparas ($p=0,037$).

The rate of episiotomy was significantly higher in nulliparas than in multiparas while the one of minor perineal tears was significantly higher in multiparas ($p<0,001$).

Table 2. Characteristics of labour and delivery

Variables	Nulliparas n (%) N	Multiparas n (%) N	p
Premature delivery (n=20)	11(5,2%) N=208	9(5,1%) N=176	0,978
Induction of labour (n=34)	24(8,3%) N=291	10(3,2%) N=307	0,008
Spontaneous vaginal delivery			
Mode of delivery	Nulliparas N=300	Multiparas N=308	P
Spontaneous (n=482)	211(70,3%)	274(88,9%)	<0,001
Assisted (n=6)	5(1,6%)	1(0,3%)	<0,001
Cesarean (n=115)	84(28%)	33(10,7%)	<0,001
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Cesarean (n=115)	84(28%)	33(10,7%)	<0,001
Variables	Nulliparas N=300	Multiparas N=308	p
Cesarean section indications			
Foetal distress	12(4%)	7(2,2%)	0,037
CPD	21(7%)	2(0,6%)	0,037
Failure of descent	13(4,3%)	1(0,3%)	0,037
Episiotomy	169(80,1%) N=211	19(6,9%) N=274	<0,001
Minor perineal tear	22(10,4%) N=211	65(23,7%) N=274	<0,001

CPD: cephalo-pelvic disproportion

Table 3 shows that there was no difference in APGAR score at 1 minute between newborn of nulliparous and those of multiparous mothers ($p=0,646$). However, the rate of transfer to neonatal care unit was higher among the first group ($p=0,025$).

The average birth weight was higher in multiparous than in nulliparous women ($p<0,001$), but there was no difference between the two groups about either the rate of low birth weight or major obstetrical complications (placenta praevia, hemorrhage and uterine rupture).

Table 3. Neonatal outcomes and obstetrical complications

Variables	Nulliparas N=300	Multiparas N=308	p
APGAR score at 1 min			
0	5(1,6%)	8(2,5%)	0,646
1-6	11(3,6%)	9(2,9%)	0,646
≥ 7	284(94,6%)	291(94,4%)	0,646
Transfer to NCU	19(6,4%)	8(2,6%)	0,025
BW Means \pm SD	3127,70 \pm 458,046 g	3274,19 \pm 454,286 g	<0,001
LBW N=31	18(58%)	13(52%)	0,253
PPH	3(1%)	3(0,9%)	0,350
Uterine rupture	0(0%)	1(0,3%)	0,350

NCU: Neonatal Care Unit

BW: Birth Weight

LBW: Low Birth Weight

PPH: Post Partum Hemorrhage

DISCUSSION

Our study shows that nulliparous parturients were younger than multiparas. They were also younger than the ones of developed countries [5,6]. This reflects the trend towards early motherhood, especially after the 1994 genocide in the country.

The prevalence of HIV infection was higher in multiparous than in nulliparous parturients. This finding is consistent with an observation made in Tanzania [7]. On the other hand, the prevalence of malaria was higher in nulliparas. Primigravidas are reported to have a highest risk of malaria in pregnancy due to their lack of specific immunity to placental malaria that is acquired from exposure to malaria parasites during pregnancy [8-10].

The mean of the length of pregnancy was relatively shorter in nulliparas, however nulliparity was not associated with preterm delivery. Similar results were found in other studies [11-13].

In this study, the rate of induction of labour was higher in nulliparas than in multiparas as it has been shown elsewhere [14-16].

Nulliparity was associated with a higher rate of assisted vaginal delivery. Besides, cesarean delivery rate was higher in nulliparas than in multiparas. Previous other studies in different parts of the world have shown increasing rates of cesarean delivery in general and especially

among nulliparous women [3,14,17,18]. The overall rate of cesarean delivery in this study (19,2 %) was slightly higher than the World Health Organization recommended rate [19].

The rate of episiotomy was higher in nulliparas than in multiparas. Several other studies have shown similar results [20-23]. Nevertheless, these findings are in contradiction with the current recommendations which suggest avoiding of routine episiotomy for nulliparas [24-27].

The rate of transfer to neonatal care unit is higher in newborn of nulliparas in our study; this is consistent with results found by Sally K. Tracy et al in Austria [28].

CONCLUSION

Nulliparity is associated with a higher rate of induction of labor, cephalo-pelvic disproportion, cesarean delivery, routine episiotomy and newborn transfer to neonatal care unit.

We maintain that the main strength of this study was that it describes actual clinical practices in a Rwandan setting. It was however an observational study. An interventional study controlling the morbidity factors such as rates of induction of labour, operative delivery, episiotomy, and others is needed to determine whether or not they can be reduced through intervention in a similar setting.

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