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Original Research Article

Risk factors for episiotomy among primiparous women in Madagascar: a retrospective case-control study

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ABSTRACT

Background: Episiotomy remains one of the most frequently performed obstetric procedures worldwide, especially among primiparous women. Despite recommendations promoting restrictive use, the practice remains common in low-resource settings. This study aimed to identify factors associated with episiotomy among primiparous women delivering at the University Hospital of Gynecology and Obstetrics of Befelatanana, Madagascar.
Methods: A retrospective case-control study was conducted at the University Hospital of Gynecology and Obstetrics of Befelatanana from January 2018 to December 2019. Primiparous women who underwent vaginal delivery were included. Cases were women who received episiotomy and controls were women without episiotomy. Data were collected from medical records and analyzed using Epi Info and Microsoft Excel. Odds ratios (OR) with 95% confidence intervals (CI) were calculated.
Results: Among 2,903 primiparous women, the prevalence of episiotomy was 34.51%. A total of 855 cases and 1,710 controls were analyzed. Factors significantly associated with episiotomy were maternal age ≥35 years (OR=2.90; 95% CI: 1.89-4.02), uterine height ≥34 cm (OR=1.48; 95% CI: 1.25-1.76), gestational age >42 weeks (OR=4.10; 95% CI: 1.81-20.39), labor duration ≥12 hours (OR=9.03; 95% CI: 7.48-10.89), prolonged second stage of labor, breech presentation (OR=4.04; 95% CI: 1.51-10.80), instrumental delivery, occipito-sacral delivery, and birth weight >3500 g.
Conclusions: Episiotomy prevalence among primiparous women remains high in Madagascar. Restrictive use of episiotomy, improved intrapartum monitoring, and enhanced antenatal preparation may reduce unnecessary procedures and maternal morbidity.

Keywords: Episiotomy, Madagascar, Obstetrics, Primiparous women, Risk factors, Vaginal delivery

INTRODUCTION

Episiotomy is a surgical incision of the perineum performed during the second stage of labor to enlarge the vaginal outlet and facilitate fetal expulsion.[1] Historically, the procedure was introduced to prevent severe perineal tears, fetal distress, and pelvic floor disorders. During the twentieth century, routine episiotomy became common practice, particularly among primiparous women. However, evidence accumulated over recent decades has challenged the systematic use of episiotomy because of its maternal morbidity and lack of demonstrated neonatal benefit.[2-3] Worldwide prevalence varies considerably according to geographic regions and institutional practices. In developed countries, restrictive episiotomy policies have reduced prevalence rates to below 15% in

many maternity units.[4] In contrast, prevalence remains high in many African and Asian countries. Previous African studies reported rates ranging from 41% to 70%, with primiparity identified as a major risk factor.[5]

Episiotomy may lead to several complications, including postpartum hemorrhage, infection, hematoma, severe perineal tears, dyspareunia, fistula, and urinary or fecal incontinence. These complications can negatively affect women's quality of life and sexual health. Consequently, the World Health Organization and several professional societies recommend restrictive rather than routine episiotomy.[5]

In Madagascar, data regarding episiotomy practices remain limited. The University Hospital of Gynecology and Obstetrics of Befelatanana is a tertiary referral center receiving complicated obstetric cases from Antananarivo and other regions. Understanding factors associated with episiotomy among primiparous women may help improve obstetric care and reduce unnecessary interventions. The objective of this study was to determine the factors associated with episiotomy among primiparous women delivering vaginally at the University Hospital of Gynecology and Obstetrics of Befelatanana.

METHODS

A retrospective monocentric case-control study was conducted at the University Hospital of Gynecology and Obstetrics of Befelatanana in Antananarivo, Madagascar. The study covered a two-year period from January 2018 to December 2019. Ethical approval was obtained from the hospital administration. Confidentiality of patient records was respected throughout the study.

The study population included primiparous women who delivered vaginally during the study period. Cases consisted of primiparous women who underwent episiotomy, whereas controls included primiparous women without episiotomy. Women who underwent cesarean section, multiparous women, and incomplete records were excluded.

Data were collected from delivery records and medical files using a standardized survey form. Variables studied included maternal age, profession, marital status, gestity, history of miscarriage or induced abortion, uterine height, gestational age, duration of labor, duration of the second stage of labor, fetal presentation, mode of delivery, fetal head disengagement, birth weight, and neonatal outcomes. Maternal age was classified into <20 years, 20-34 years, and ≥35 years. Labor duration was categorized into <12 hours and ≥12 hours. Birth weight categories were <2500 g, 2500-3500 g, 3500-4000 g, and >4000 g.

Data analysis was performed using Epi Info and Microsoft Excel. Odds ratios (OR) with 95% confidence intervals (CI) were used to evaluate associations between variables and episiotomy. Statistical significance was defined as $p<0.05$.

RESULTS

Among 2,903 primiparous women who delivered during the study period, 1,002 episiotomies were identified. After exclusion of incomplete files, 855 cases and 1,710 controls were included. The prevalence of episiotomy among primiparous women was 34.51%. The mean maternal age among cases was 21.94±4.66 years, ranging from 14 to 42 years. Women aged ≥35 years had a significantly increased risk of episiotomy (OR=2.90; 95% CI: 1.89-4.02; p=0.0001) (Table 1). No significant association was found for maternal age below 20 years.

Table 1: Characteristics epidemiological of patients.

Variable	Case, n=855 (%)	Controls, n=1710 (%)	OR [IC 95%]	P value
Age in years				
<20	312 (36.49)	618 (36.14)	1.04 [0.92-1.31]	0.262
20-34	526 (61.52)	1080 (63.16)	1	
35 and plus	17 (1.99)	12 (0.70)	2.90 [1.89-4.02]	0.0001
Profession				
Housewife	490 (57.31)	961 (56.20)	1,06 [0.88-1.28]	0.28
Primary	98 (11.46)	190 (11.11)	1,07 [0.80-1.43]	0.34
Secondary	18 (2.11)	41 (2.40)	0,9 [0.51-1.62]	0.44
Tertiary	249 (29.12)	518 (30.29)	1	
Gesture				
Primigest	774 (90.53)	1573 (91.99)	1	
Paucigeste	78 (9.12)	134 (7.83)	1.18 [0.89-1.65]	0.21
Multigesture	3 (0.35)	3 (0.18)	2.03[0.28-14.45]	0.47
FCS				
0	793 (92.75)	1599 (93.51)	1	
1	54 (6.32)	95 (5.56)	1.15 [0.81-1.61]	0.44
≥ 2	8 (0.93)	16 (0.93)	2.01 [0.28-8.34]	0.48

Housewives represented the majority of participants in both groups. Professional activity was not significantly associated with episiotomy.

Regarding obstetric history, primigravida women predominated in both groups. Previous induced abortion and miscarriage were not associated with episiotomy.

Uterine height ≥34 cm was significantly associated with episiotomy (OR=1.48; 95% CI: 1.25-1.76; p=0.000003) (Table 1). Gestational age beyond 42 weeks also increased the likelihood of episiotomy (OR=4.10; 95% CI: 1.81-20.39).

The mean labor duration among cases was 16.20±6.93 hours. Labor duration ≥12 hours was strongly associated with episiotomy (OR=9.03; 95% CI: 7.48-10.89; p=0.0001) (Table 2). Similarly, a prolonged second stage of labor was significantly associated with episiotomy. Women with second-stage duration exceeding 60 minutes had nearly twice the risk of episiotomy compared with those with duration below 30 minutes.

Breech presentation significantly increased the risk of episiotomy (OR=4.04; 95% CI: 1.51-10.80) (Table 2). Instrumental deliveries were also strongly associated with episiotomy. Forceps-assisted delivery had an OR of 24.30, vacuum extraction had an OR of 18.78, and spatula extraction had an OR of 16.02.

Table 2: Obstetric factors associated with episiotomy.

Variable	Case, n=855 (%)	Controls, n=1710 (%)	OR [IC 95%]	P value
Fundal height in cm				
<25	26 (3.04)	260 (15.20)	0.21 [0.14-0.32]	0.00001
25-33	399 (46.67)	840 (49.13)	1	
≥ 34	430 (50.29)	610 (35.67)	1.48 [1.25-1.76]	0.000003
Term of pregnancy				
<37 SA	221 (25.85)	672 (39.30)	1	
37-42 SA	607 (70.99)	1018 (59.53)	1.81 [1.53-2.20]	0.0001
>42 SA	27 (3.16)	20 (1.17)	4.10 [1.81-20.39]	0.003
Duration of labor in hours				
<12	278 (32.51)	1389 (81.23)	1	
≥12	577 (67.49)	321 (18.77)	9.03 [7.48-10.89]	0.0001
Second phase of labor in minute				
<30	299 (34.97)	736 (43.04)	1	
30-60	496 (58.01)	894 (52.28)	1.36 [1.14-1.61]	0.001
>60	60 (7.02)	80 (4.68)	1.86 [1.31-2.63]	0.00001
Presentation breech	12 (1.40)	6 (0.35)	4.04 [1.51-10.80]	0.005
Mode of delivery				
Forceps	11 (1.29)	1 (0.06)	24.30 [6.57-44.52]	0.00001
spatula	58 (6.78)	8 (0.46)	16.02 [11.92-32.5]	0.0001
Suction cup	17 (1.99)	2 (0.12)	18.78 [6.34-36.35]	0.00001
Occipito-sacred clearance	10 (1.17)	4 (0.23)	5.05 [1.21-9.27]	0.019

Table 3: Neonatal factors associated with episiotomy.

Variable	Case, n=855 (%)	Controls, n=1710 (%)	OR [IC 95%]	P value
Weight in gm				
<2500	142 (16.61)	597 (34.91)	0.39 [0.20-0.80]	0.0001
2500-3500	617 (72.16)	1017 (59.43)	1	
3500-4000	94 (10.99)	100 (5.85)	1.55 [1.30-2.10]	0.000001
>4000	2 (0.23)	2 (0.12)	1.65 [1.42-2.59]	0.00001
Neonatal morbidity	14 (1.64)	29 (1.70)	0.89 [0.20-0.95]	0.1
Apgar score 10	831 (97.19)	1539 (90.00)	1	

Occipito-sacral disengagement was associated with episiotomy (OR=5.05; 95% CI: 1.21-9.27). Birth weight above 3500 g significantly increased the risk of episiotomy (Table 3). Neonatal morbidity was not significantly associated with episiotomy (Table 3).

DISCUSSION

This study identified several maternal, obstetric, and neonatal factors associated with episiotomy among primiparous women in Madagascar. Our rate of 34.51% is

still above the limit recommended by the CNGOF, which is 30%, and that of the WHO, which is 10%.[4-5] This shows the non-compliance with the restrictive recommendations of the practice of episiotomy.

Maternal age ≥ 35 years was significantly associated with episiotomy in primiparas, OR = 2.90 [1.89-4.02] and p-value = 0.0001 (table 1). By contrast, the study conducted by Clesse et al in France showed no association between maternal age and the practice of episiotomy, OR=1.00 (95% CI 0.99-1.01) and p value = 0.01.[6] The study carried out by Schermers et al found similar results to that of Clesse et al.[7] Reduced tissue elasticity and increased obstetric complications among older primiparous women may explain this association. in our study, we found a statistically significant association between uterine heights ≥34 cm and the practice of episiotomy in primiparas, p-value = 0.000003 and OR = 1.48 [1.25-1.76]. We did not find any publication studying the correlation between uterine height and the practice of episiotomy in primiparas. Uterine height likely reflects increased fetal size and risk of macrosomia. Fetal macrosomia may contribute to difficult labor progression and increased obstetric intervention.

There was a statistically significant association between the pregnancy term between 37-42 SA and > 42 SA and the practice of episiotomy in primiparas, OR = 1.81 [1.53-2.20] (p-value = 0.0001) and OR = 4.10 [1.81-20.39] (p-value = 0.003) (Table 1), respectively. Our study was similar to the one conducted by Pebolo et al in Uganda in 2019, which found that the average gestational age of ean primiparous was 38.9±1.3 SA and that pregnancies over 37 SA were significantly associated with the practice of episiotomy in primiparas, OR = 2 [1,28-2,34], p value = 0.001.[8]

This could be explained by the fact that during the extension of the pregnancy term, fetal growth is maintained, which results in an increase in birth weight of 10% to 20% between. So, as the gestational age increases in the number of weeks of amenorrhea, the fetal size increases.[9]

Prolonged labor ≥12 hours was significantly associated with the practice of episiotomy in primiparas, OR = 9.03 [7.48-10.89] (p value = 0.0001) (Table 2). The results of our study found that the association between the duration of the second phase of labor between 30 - 60 minutes and >60 minutes and the practice of episiotomy in primiparas was statistically significant, with an OR = 1.36 [1.14-1.61] (p value = 0,001) et OR = 1,86 [1,31-2,63] (p value = 0,00001) respectivement (Table 2). A study conducted in China by Zhang et al in 2018 found that a second stage of labor greater than 60 minutes was significantly associated with the practice of episiotomy in primiparas, with an OR = 2.82 (95% CI 2.39 - 3.32) (p value = 0.001).[10]

Labor can induce perineal edema and tissue fragility, increasing the likelihood of obstetric interventions. In low-resource settings where continuous fetal monitoring is limited, clinicians may perform episiotomy earlier to shorten delivery and prevent fetal compromise.

Our result was similar to the results of other authors, who found a statistically significant association between breech presentation and episiotomy in primiparas. OR = 4.04 [1.51-10.80] (p value = 0.005) (Table 2). A study conducted by Raisanen et al in Finland, reported that the breech presentation is a risk factor for episiotomy in primiparas, OR = 4.37 (95% CI 3.24-5.88) and p value >0.05; and the one performed in France in 2020 by Clesse et al showed an OR association = 1.15 (95% CI 1.13 - 1.18) (p value = 0.01) between breech presentation and episiotomy in primiparous women.[11,6] The occipito-sacral disengagement was significantly associated with episiotomy. These malpresentations increase mechanical resistance during fetal descent and may expose the perineum to severe tears if no intervention is performed. In our study, instrumental extractions were significantly associated with episiotomy in primiparas. L'utilisation du forceps avait un OR = 24,30 [6,57-44,52] (p-value = 0,00001), la spatule OR = 16,02 [11,92-32,54] (p-value = 0,0001), et la ventouse OR = 18,78 [6,34-36,35] (p-value =0,00001) (Table 2). Our result is in agreement with previous studies, which found that instrumental deliveries were risk factors for episiotomy in primiparous women. A study conducted in Poland between 2010 and 2015 by Gebuza et al showed that instrument delivery was significantly associated with the practice of episiotomy in primiparas OR = 3 (95% CI 1.35 - 6.72) (p-value = 0.007).[12]

The study conducted by Raisanen et al in 2007, in Finland, reported that the use of forceps and vacuum or suction cup was significantly associated with episiotomy in primiparas, OR = 22.25 [5.39 - 91.90] and OR = 4.66 [4.32 -5.02] respectively (p-value>0.05).[11] Instrumental delivery showed the strongest association with episiotomy. Although current recommendations discourage routine episiotomy during operative vaginal delivery, clinicians frequently perform it to facilitate extraction and reduce severe perineal trauma.

In our study, the occipito-sacral release was seen in 0.55% primiparous. There was a statistically significant association between occipito-sacral clearance and episiotomy in primiparas, OR = 5.05 [1.21-9.27] (p value = 0.019) (Table 2).

Few authors have studied the correlation between excretion in the occipito-sacred and the practice of episiotomy in primiparas. In 2022, a study in Burgundy conducted by Desplanches showed an occipito-sacred release rate of 1.79% among primiparas. He also reported that among the episiotomy group; 2.1% of primiparas had an occipito-sacral clearance, compared to the non-episiotomy group where 1.6% of primiparas had an occipito-sacral clearance.[13]

Birth weight above 3500 g was another major risk factor. The birth weight between 3500 and 4000 grams had an OR = 1.55 [1.30-2.10] (p-value = 0.000001); and the weight > 4000 grams had an OR = 1.65 [1.42-2.59] (p-value = 0.00001) (Table 2). Larger fetal size increases perineal stretching and the probability of dystocia. Similar associations have been reported in studies from Finland and China.[11,14]

It is also important to strengthen the education of pregnant women on prenatal health, by informing them about the risks of gestational weight gain during antenatal consultations. We must help them to have a balanced diet, especially in the case where gestational diabetes is diagnosed.

Our result is similar to previous studies. In Uganda, Pebolo et al reported that there was no statistically significant association between the Apgar score >7 and the practice of episiotomy in primiparous women, OR = 0.6 (95% CI 0.21-1.97) p-value = 0.445.[8] The study conducted in the Netherlands by Schermers et al also found no association between the Apgar score >7 and the performance of episiotomy, OR = 1.7 (95% CI 0.4-7.4).[7] The study conducted by Shaikh et al in Pakistan showed that 75% of newborns of primiparous women had an Apgar score >7; 20% had neonatal morbidity and 3% were stillborn.[15]

These results corroborate the data from previous studies, according to which the practice of episiotomy did not achieve the neonatal indications attributed to it (prevention of fetal distress).[16] The CNGOF points out that "in cases of non-reassuring FCR during the expulsion phase, it has not been demonstrated that systematic episiotomy improves neonatal status (grade C)".[17] The study did not demonstrate a significant association between episiotomy and neonatal morbidity. This finding supports previous evidence suggesting that routine episiotomy does not necessarily improve neonatal outcomes.

The retrospective nature of this study represents an important limitation. Missing data and selection bias may have influenced some findings. Furthermore, this was a single-center study, limiting generalizability to the entire Malagasy population.

CONCLUSION

Episiotomy prevalence among primiparous women at the University Hospital of Gynecology and Obstetrics of Befelatanana remains high. Advanced maternal age, increased uterine height, post-term pregnancy, prolonged labor, prolonged second stage, breech presentation, instrumental delivery, occipito-sacral disengagement, and fetal macrosomia were significantly associated with episiotomy.

Restrictive episiotomy policies should be reinforced in maternity units. Improved labor monitoring, adequate fetal surveillance, antenatal education, and training of healthcare professionals may reduce unnecessary episiotomies and associated maternal morbidity. Further multicenter prospective studies are needed to better understand episiotomy practices in Madagascar.

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