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Episiotomy incidence and decision-making factors: a prospective descriptive study at a maternity hospital in Vietnam

Dung Tuan Dao[1,*], Hang Thi Phan[1], Thuong Chi Bui[2]

[1]*Hung Vuong Hospital, Ho Chi Minh City, Vietnam*
[2]*Department of Obstetric and Gynecology, University of Medicine and Pharmacy, Ho Chi Minh City, Vietnam*

Abstract

Introduction: Episiotomy, a perineal incision performed to expand the birth canal and expedite labor, is typically done based on the birth attendant's assessment. This study aimed to investigate the incidence of episiotomy in vaginal deliveries and to explore the factors that influence clinical decision-making at Hung Vuong Hospital.

Methods: This prospective descriptive study included 384 vaginal delivery cases from labor onset to hospital discharge between March and May 2023. Data on medical history, pregnancy, labor, postpartum details, and neonatal outcomes were collected. Birth attendants were surveyed post-delivery regarding their decision-making. Descriptive statistics summarized participant characteristics. Univariate and multivariate logistic regression models were used to identify factors associated with episiotomy. Statistical analyses were performed using Stata 14, with significance set at $p<0.05$.

Results: Episiotomy was performed in 208 cases (54.2%). The most common reasons for conducting or avoiding episiotomy were perineal elasticity, parity, fetal condition, labor progression, and instrumental vaginal delivery. Episiotomy was strongly associated with a history of vaginal delivery (aOR 0.06; 95% confidence interval [CI] 0.03–0.10), full-term pregnancy (aOR 3.59; 95% CI 1.43–9.03), and deliveries attended by private doctors (aOR 2.38; 95% CI 1.23–4.60). No cases of obstetric anal sphincter injury (OASIS) were recorded. Maternal outcomes included a higher degree of perineal tear (aOR 219.61; 95% CI 81.03–595.20), while neonatal outcomes showed no significant differences ($p>0.05$).

Conclusions: The incidence of episiotomy (54.2%) remained greater than the WHO-recommended rate of 10%. This study outlined the important factors driving episiotomy decisions, emphasizing the need for evidence-based, individualized practice.

Keywords: episiotomy; obstetricians; midwifery; clinical decision-making

1. INTRODUCTION

In 2018, the World Health Organization (WHO) advised against routine episiotomy [1], emphasizing that it should only be performed when there are specific clinical indications, such as abnormal labor progression, fetal distress, instrumental vaginal deliveries (e.g., vacuum or forceps), and shoulder dystocia [2]. Routine episiotomy has been

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*Corresponding author: Dung Tuan Dao. Hung Vuong Hospital, Ho Chi Minh City, Vietnam. E-mail: dtdung.chsanphukhoa21@ump.edu.vn

associated with numerous adverse maternal outcomes. A Cochrane review found that selective episiotomy may reduce the incidence of severe perineal damage by 30% (RR 0.7, 95% confidence interval [CI]: 0.52–0.94) when compared to routine episiotomy, with no evidence of adverse maternal or neonatal outcomes [3]. Similarly, a meta-analysis of 22 trials indicated that episiotomy, particularly median episiotomy, is significantly associated with an elevated risk of severe perineal tears [4]. Prior episiotomy remained a significant risk factor for severe obstetric lacerations in subsequent deliveries [5]. Furthermore, there is no proven link between episiotomy and the prevention of shoulder dystocia or pelvic floor disorders [6,7].

However, recent studies have shown that mediolateral episiotomy, particularly during instrumental vaginal deliveries, protects against obstetric anal sphincter injuries (OASIS) [8]. In nulliparous women, selective episiotomy has been linked to a lower rate of OASIS compared to non-episiotomy cases [9]. These findings emphasize the importance of personalized decisions during labor to improve maternal outcomes.

Despite international recommendations, routine episiotomy remains common in Vietnam. Clinicians often conduct routine episiotomies, assuming that they reduce third- and fourth-degree perineal tears [10]. In 2017, the episiotomy rate at Hung Vuong Hospital, a national-level obstetrics and gynecology hospital in Ho Chi Minh City was 87.12% (316/365 cases) [11], which was greatly above WHO recommendations. Since 2020, initiatives to lower episiotomy rate while ensuring perineal protection have been implemented through specialized training programs, emphasizing non-routine episiotomies and executing only mediolateral or lateral episiotomies when necessary. Additionally, the manual perineal protection technique is applied in all vaginal deliveries to improve perineal outcomes [12]. Since then, these principles have guided all clinical practices in delivery at Hung Vuong Hospital, reducing the episiotomy rate to 56.52% according to our data from a quality improvement report in 2020 [13]. While this is a step forward, the percentage remains high, emphasizing the need for additional adjustments in clinical practice to promote more selective, tailored episiotomy use based on patient characteristics.

Given this context, the purpose of this study was to investigate the present incidence of episiotomy in vaginal deliveries at Hung Vuong Hospital, identify the factors that influence the choice to conduct episiotomy, and assess the mother and newborn outcomes associated with episiotomy practices. We anticipate that this research will provide evidence to help Vietnam's episiotomy practices become more tailored and evidence-based.

2. MATERIALS AND METHODS

2.1. Study design and participants

This study was a descriptive prospective study conducted at the Delivery department and postpartum departments of Hung Vuong Hospital, Ho Chi Minh City, Vietnam, from March 13th, 2023, to May 31st, 2023.

Study subjects included women admitted to Hung Vuong Hospital for labor and monitored for vaginal delivery. Convenience sampling was used, with direct follow-up for each participant. Inclusion criteria encompassed women aged 18 or older, able to communicate in Vietnamese, who provided consent to participate and presented with a cephalic presentation. Exclusion criteria included women indicated for cesarean section during labor monitoring. This study followed the CROSS guidelines to ensure comprehensive and transparent reporting of observational data [14].

2.2. Sample size and sampling

The sample size was calculated based on the primary outcome of the study, which was the episiotomy rate during the study period. The following formula was used to determine the sample size:

$$n = \frac{Z^2_{\left(1-\frac{\alpha}{2}\right)} P(1-P)}{d^2}$$

where n is the minimum sample size, P represents the episiotomy rate (according to our data from a quality improvement report conducted at Hung Vuong Hospital in 2020, the episiotomy rate was 56.52% [13]), d is the margin of error set at 5.00%, and $Z_{\left(1-\frac{\alpha}{2}\right)}$=1.96, the standard normal val-

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ue for a 5% significance level. Based on these parameters, the minimum estimated sample size was calculated to be 378 cases. In practice, a total of 384 cases were included in the study and observed throughout the study period.

To gather comprehensive insights into martenal labor, and outcome factors, data were collected through a combination of medical records, direct observation, and surveys of participants and healthcare professionals. General information such as maternal age, residence, occupation, and body mass index (BMI) at admission, was gathered from medical records and participant interviews. Each participant's medical, surgical and obstetric history (e.g., parity, delivery method history, and previous episiotomy) was documented. Specific details on the current pregnancy, such as gestational age, estimated fetal weight (EFW), and high-risk factors, were also collected. Maternal age was determined using the current year and the patient's year of birth. BMI was calculated using current weight and height. EFW was calculated using a mix of medical data, clinical evaluations, and the most recent ultrasound.

Labor processes were closely monitored, and documented in real-time to ensure accuracy. Variables recorded throughout labor included labor induction, epidural analgesia, oxytocin use, perineal length, and active labor duration (from cervical dilation of 3–4 cm to full dilation, or from admission if dilation exceeded 3–4 cm). A sterile paper ruler was used to measure the perineal length from the posterior commissure to the anus center.

During delivery, factors such as fetal heart rate monitoring within 30 minutes prior to birth (per ACOG 2009 criteria [15]), total vaginal exams since active labor commencement, and duration of the second stage of labor (from full cervical dilation to complete fetal delivery) were recorded. Additional information included the type of birth attendant, delivery method, and whether an episiotomy was performed. Birth attendants were surveyed with a single question to gain insights into their decision-making process regarding episiotomy. The degree of perineal trauma was recorded and classified according to the ACOG (2018), regardless of whether an episiotomy was performed [16]. Total blood loss was measured using calibrated collection bags to assess for postpartum hemorrhage.

Postpartum evaluations covered participants' need for extra pain medication, perineal status in the postpartum department, and length of hospital stay. Pain ratings were measured at 24 hours postpartum using the Wong-Baker Faces Pain Rating Scale, a validated tool that has been used successfully in Vietnam for pain evaluation in similar clinical settings [17,18]. Perineal condition in the postpartum department was established based on clinical assessments documented in postpartum medical records, which classified the perineal area into four conditions: Good recovery (no significant symptoms), perineal swelling (substantial swelling without evidence of infection), infection (swelling, warmth, redness, or discomfort associated with infection), and wound dehiscence (severe disruption of wound healing). Neonatal data, derived from medical records, included Apgar scores at 1 and 5 minutes, birth weight, head circumference, and neonatal hospitalization. This rigorous data collection approach enabled a full investigation of maternal, labor, and neonatal factors linked to episiotomy use and their impact on health outcomes.

2.3. Statistical method

Categorical variables were given as counts and percentages, whereas continuous variables were presented as mean±SD. The data were entered using Epidata 3.1. Statistical analyses were performed using Stata 14, calculating the overall incidence of episiotomy. Descriptive statistics with percentages were used to determine the factors influencing birth attendants' decision-making. To assess episiotomy-related characteristics as well as, maternal and neonatal postpartum outcomes, univariate logistic regressions were used to compare deliveries with and without episiotomy. Candidate variables for the multivariate logistic regression model were selected using a univariate p-value threshold of <0.2. Variables with very small sample sizes or unstable estimates were carefully examined before inclusion to ensure model robustness. Multivariate analysis resulted in adjusted odds ratios (aOR) with 95% CI. Statistical significance was established at $p<0.05$.

2.4. Ethical considerations

All subjects provided informed consent, and the study followed medical research ethics guidelines. The study was authorized by the Institutional Review Board (IRB) of Hung Vuong Hospital, Ho Chi Minh City (IRB-VN02.020), as per Decision No. 531/HĐĐĐ-BVHV, dated February 6th, 2023.

3. RESULTS

Between March 13th, 2023, and May 31st, 2023, a total of 5,811 patients were admitted to the Delivery Department of Hung Vuong Hospital for labor monitoring. Of these, 3,274 cases (56.3%) resulted in vaginal delivery, according to our data. After interviewing 458 eligible cases, 384 cases were tracked for their labor process and postpartum period, removing those who did not volunteer to participate or satisfied exclusion criteria (Fig. 1).

The incidence of episiotomy among participants was 54.2% (208/384 cases). Additionally, in the study sample, all 22 cases of instrumental vaginal delivery involved an episiotomy, accounting for 100%.

3.1. Overview of participant profiles, delivery factors, and outcomes

Table 1 provides an overview of demographic, medical, and labor-related characteristics of the study population. Regarding demographic characteristics, the average age of participants was 29.1±5.3 years. The majority of participants lived in Ho Chi Minh City (42.7%). The most common occupation was office staff (32.8%), followed by housewives (27.6%) and factory workers (22.7%). Over half of the participants (50.5%) had a BMI in the range of 25–29.9 kg/m^2. In terms of medical and surgical history, 13.8% of individuals reported a medical history, while 8.3% had undergone surgical procedures. For obstetric and delivery history, the sample had roughly equal numbers of primiparous (49.5%)

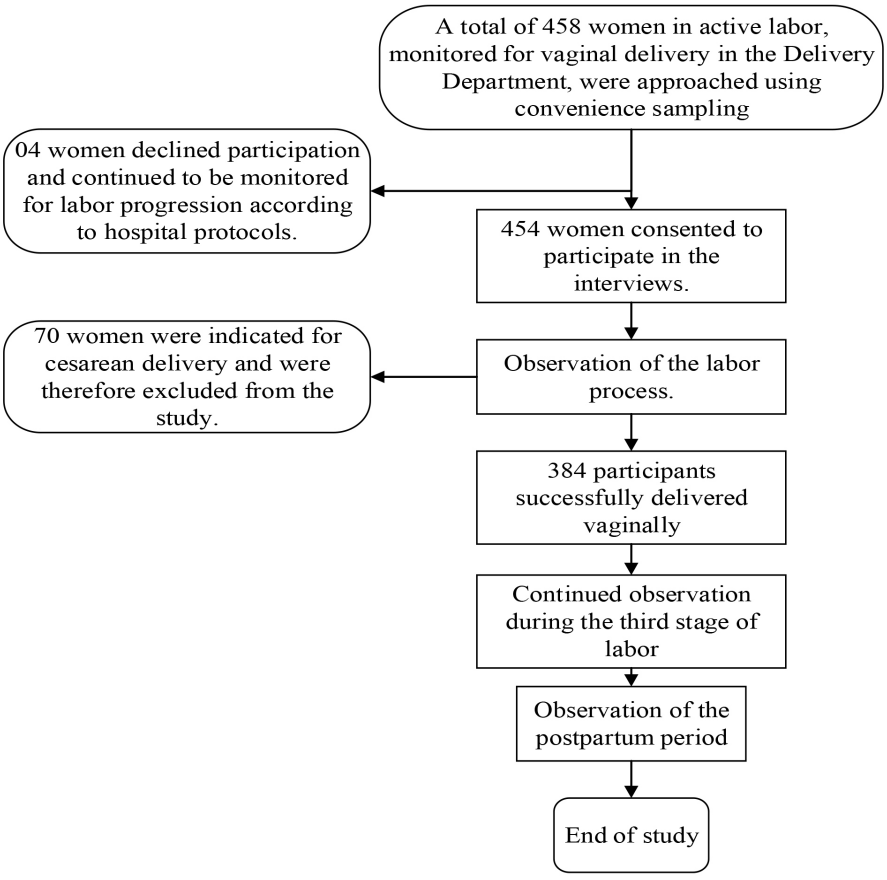

Fig. 1. Study flowchart.

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Table 1. Characteristics of participants (n=384)

Variables	Frequency (%)
Age (mean±SD)	29.1±5.3
Place of residence	
Ho Chi Minh City	164 (42.7)
Other	220 (57.3)
Occupation	
Office staff	126 (32.8)
Housewife	106 (27.6)
Factory worker	87 (22.7)
Vendor	51 (13.3)
Other	14 (3.6)
BMI (kg/m^2)	
17–18.49	2 (0.5)
18.5–24.9	139 (36.2)
25–29.9	194 (50.5)
30–34.9	47 (12.3)
35–39.9	2 (0.5)
Medical history	53 (13.8)
Surgical history	32 (8.3)
Parity	
Primiparity	190 (49.5)
Multiparity	194 (50.5)
Delivery history	
Never	190 (49.5)
Vaginal delivery history	184 (47.9)
C-section history	7 (1.8)
Vaginal birth after caesarean	3 (0.8)
History of episiotomy	177 (46.1)

BMI, body mass index.

Table 2. Pregnancy and labor characteristics (n=384)

Variables	Frequency (%)
Gestational age	
<34 weeks	3 (0.8)
34–37 weeks	32 (8.3)
≥37 weeks	346 (91.1)
Unknown	3 (0.8)
EFW (g) (mean±SD)	3,026.6±373.6
Gestational diabetes	85 (22.1)
Premature rupture of membranes	72 (18.8)
Group B Streptococcus (GBS) positive status	33 (8.6)
Gestational hypertension	11 (2.9)
Intrauterine growth restriction (IUGR)	9 (2.3)
Labor induction	37 (9.6)
Epidural analgesia	229 (59.6)
Oxytocin use in labor	78 (20.3)
Active labor duration (hours) (mean±SD)	3.3±2.4
Perineal length (cm) (mean±SD)	4.0±0.7
Fetal heart rate monitoring	
Category I	229 (59.6)
Category II	152 (39.6)
Not monitored	3 (0.8)
Total vaginal exams (mean±SD)	7.2±2.9
Duration of the second stage of labor (minutes) (mean±SD)	34.5±35.6
Birth attendants	
Midwife	122 (31.8)
Attending doctor	120 (31.3)
Private doctor	115 (29.9)
Trainee	27 (7.0)

EFW, estimated fetal weight.

and multiparous (50.5%) women. Among these, 47.9% had given birth vaginally, and 46.1% had experienced an episiotomy.

Pregnancy and labor characteristics were carefully documented and are presented in Table 2. Most women carried their pregnancy to term with a gestational age of 37 weeks or more (91.1%). Additionally, some high-risk pregnancy conditions were identified in the sample, including gestational diabetes (22.1%), premature rupture of membranes (18.8%), group B Streptococcus positive status (8.6%), gestational hypertension (2.9%), and intrauterine growth restriction (IUGR) (2.3%). The mean EFW was 3,026.6±373.6 grams. Labor induction was conducted in 9.6% of cases, and 59.6% of participants received epidural analgesia. Oxytocin was utilized in 20.3% of cases, with an average active labor duration of 3.3±2.4 hours, and a mean perineal length was 4.0±0.7 cm. Fetal heart rate monitoring during childbirth was classified as category I in 59.6% of cases. On average, participants underwent vaginal exams 7.2±2.9 times throughout labor. The duration of the second stage of labor had a mean of 34.5±35.6 minutes. Birth attendants varied, with midwives present in 31.8% of cases, attending doctors in 31.3%, private doctors in 29.9%, and trainees in 7.0%. Most deliveries were vaginal (94.3%), while vacuum deliveries accounted for 4.2% and forceps deliveries accounted for 1.5%.

Table 3 summarizes the maternal and newborn outcomes observed during this study. There were no cases of OASIS;

Table 3. Maternal and neonatal outcomes (n=384)

Variables	Frequency (%)
Delivery method	
Spontaneous vaginal delivery	362 (94.3)
Instrumental vaginal delivery	22 (5.7)
Vacuum delivery	16 (4.2)
Forceps delivery	6 (1.5)
Episiotomy	208 (54.2)
Degree of perineal injury	
No Injury	35 (9.1)
First-degree tear	124 (32.3)
Second-degree tear	225 (58.6)
Total blood loss	
≤200 mL	299 (77.9)
200–500 mL	79 (20.6)
≥500 mL	6 (1.5)
Pain score (wong-baker faces pain rating scale) 24 hours postpartum	1.6±0.9
Need for additional pain medication in postpartum departments	86 (22.4)
Perineal condition in postpartum departments	
Good recovery	287 (74.7)
Perineal swelling	89 (23.2)
Infection	6 (1.5)
Wound dehiscence	2 (0.5)
Length of hospital stay since delivery (days)	2.4±0.9
Apgar score 1 min≥7	375 (97.7)
Apgar score 5 min≥7	382 (99.5)
Birth weight (g)	3,052.8±367.6
Head circumference	32±1.6
Neonatal admission	27 (7.0)

second-degree perineal tears were the most common (58.6%), followed by first-degree tears (32.3%), while 9.1% of participants experienced no perineal injury. Most participants (77.9%) experienced total blood loss of ≤200 mL. At 24 hours postpartum, pain scores averaged of 1.6±0.9. 22.4% of patients required additional pain medications. Perineal status in the postpartum department showed that 74.7% of participants had good recovery, 23.2% experienced perineal swelling, 1.5% had an infection, and 0.5% had wound dehiscence. The average hospital stay was 2.4±0.9 days. Neonatal outcomes were positive overall. Apgar scores were favorable, with 97.7% of neonates scoring ≥7 at 1 minute and 99.5% scoring ≥7 at 5 minutes. The average birth weight was 3,052.8±367.6 grams, and the mean head circumference was 32±1.6 cm. Neonatal admission was required for 7.0% of cases.

3.2. Factors influencing birth attendants' decision to perform episiotomy

3.2.1. Reasons for episiotomy intervention decisions

For all cases, we conducted brief surveys consisting of a single question posed immediately after birth. The survey asked for the main reason influencing the decision to perform or avoid episiotomy. If multiple reasons existed, the respondents were asked to specify the most significant one. All participating birth attendants had previously signed a consent list, agreeing to contribute to the study in accordance with ethical guidelines. Among the 208 cases where an episiotomy was performed, 15 reasons were recorded. The most common reason was a tight perineum, accounting for 35.6%, followed by primiparity at 15.9%. In the 176 cases where an episiotomy was not performed, most birth attendants assessed the perineum as having good elasticity, accounting for 43.8%. Additionally, roughly 20% of birth attendants reported favorable labor progression as justification for not conducting an episiotomy, and another 20% of citing multiparity (Table 4).

3.2.2. Multivariate regression model of factors associated birth attendants' decision to perform episiotomy

Following univariate logistic regression analysis on independent variables presented prior to the episiotomy procedure (Table 5), we identified 13 variables with a p-value<0.2 for potential inclusion in the multivariate logistic regression model. However, gestational hypertension was not included in the final model due to the small number of cases (n=11), which may have led to unstable estimates. The final multivariate model included 12 variables, namely: medical history, delivery history, gestational age, gestational diabetes, epidural analgesia, oxytocin use during labor, active labor duration, perineal length, fetal heart rate monitoring, total vaginal exams, duration of the second stage of labor, and type of birth attendant. The multivariate analysis revealed three statistically significant factors associated with episioto-

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Table 4. Reasons for episiotomy intervention decisions (n=384)

Variables	Frequency (%)
Episiotomy at delivery	
Yes	208 (54.2)
No	176 (45.8)
Reasons for performing episiotomy (n=208)	
Tight perineum	74 (35.6)
Primiparity	33 (15.9)
Fetal distress, CTG category II	22 (10.6)
Instrumental vaginal delivery	22 (10.6)
Edematous perineum	12 (5.8)
Ineffective maternal pushing	10 (4.8)
Lack of time for observation by the birth attendant	9 (4.3)
Rapid labor	7 (3.4)
History of cesarean section	7 (3.4)
Aesthetic request from the patient	4 (1.9)
Maternal medical conditions	2 (1.0)
Suspected large fetal weight	2 (1.0)
Inexperienced birth attendant	2 (1.0)
Posterior fetal presentation	1 (0.5)
Preterm birth	1 (0.5)
Reasons for not performing episiotomy (n=176)	
Good perineal elasticity	77 (43.8)
Favorable labor progression	39 (22.2)
Multiparity	35 (19.9)
"No reason for episiotomy"	12 (6.8)
Suspected small fetal weight	11 (6.2)
Rapid labor, insufficient time for episiotomy	2 (1.1)

CTG, cardiotocography.

my: vaginal delivery history (aOR 0.06, p<0.001), gestational age>37 weeks (aOR 3.59, p=0.007), and being attended by a private doctor (aOR 2.38, p=0.01) (Table 6).

3.2.3. Maternal and neonatal outcomes during postpartum monitoring at the hospital

To examine maternal outcomes during postpartum surveillance at the hospital, we employed another multivariate regression model. After doing univariate logistic regression analysis on independent variables prior to the episiotomy procedure (Table 5), we chose 6 variables with a p-value<0.2 to include in our multivariate regression model. These variables included severity of perineal injury, total blood loss, pain scores 24-hours postpartum, the requirement for additional pain medication in postpartum departments, perineal condition in postpartum departments, and the length of hospital stay since delivery (days). This analysis revealed that episiotomy was substantially linked with second-degree perineal tears (OR 219.61; 95%CI: 81.03–595.20; p<0.001).

No significant differences were found in Apgar scores, birth weight, head circumference, or neonatal admission incidence (p>0.05 for all outcomes) (Table 5).

4. DISCUSSION

4.1. Principal findings

At Hung Vuong Hospital, episiotomy was performed 54.2% of the time according to our findings. Notably, all instrumental vaginal deliveries in our analysis included episiotomy, reflecting the hospital's protocol to minimize obstetric complications in high-risk scenarios. Three characteristics were shown to be substantially related to episiotomy: history of vaginal delivery, full-term pregnancy, and attendance by a private doctor. According to this analysis, episiotomy was strongly associated with an increased likelihood of second-degree perineal tears. However, no significant changes were found in neonatal outcomes, such as Apgar scores, birth weight, head circumference, or neonatal hospitalization rates (p>0.05 for all outcomes).

4.2. Episiotomy incidence

Episiotomy rates vary by country, with healthcare resources and provider-to-patient ratios playing a significant role. In Norway, a developed country with extensive healthcare infrastructure, the overall episiotomy rate was 21.8% [9], slightly more than the WHO's recommended 10% [1], but significantly lower than in many developing countries. Norway's healthcare providers typically managed fewer cases, allowing for more tailored care. In Ethiopia, a developing country, the episiotomy rate was 44.15% [19].

The rate has decreased from 87.12% in 2017, although it remained comparable to recent years (56.52% in 2020) [11,13] and 54.2% observed in our study. In Cambodia, a study found 94.5% of episiotomies were performed in a large maternity hospital in Phnom Penh, primarily driven

Table 5. Univariate regression model of factors associated with episiotomy

Variables	Total (n=384)	Episiotomy (n=208)	No episiotomy (n=176)	OR	95% CI	p-value
BMI (mean±SD)	26.2±3.3	26.4±3.4	26.1±3.1	1	0.97–1.10	0.33
Medical history	53 (13.8)	27 (13.0)	26 (14.8)	0.61	0.48–1.54	0.09
Surgical history	32 (8.3)	20 (9.6)	12 (6.8)	1.45	0.69–3.10	0.33
Delivery history						
No	190 (49.5)	157 (75.5)	33 (18.7)	Ref		
Vaginal delivery	184 (47.9)	42 (20.2)	142 (86.7)	0.06	0.04–0.10	<0.001
Cesarean section	7 (1.8)	6 (2.9)	1 (0.6)	1.26	0.15–10.82	0.83
Vaginal birth after caesarean	3 (0.8)	3 (1.4)	0 (0.0)	1	-	-
Gestational age						
<34 weeks	3 (0.8)	3 (1.4)	0 (0.0)	-		
34–37 weeks	32 (8.3)	13 (6.3)	19 (10.8)	Ref		
≥37 weeks	346 (90.1)	191 (91.8)	155 (88.1)	1.80	0.86–3.76	0.12
Unknown	3 (0.8)	1 (0.5)	2 (1.1)	0.81	0.06–8.92	0.81
EFW (g) (mean±SD)	3,026.6±373.6	3,026.6±372.8	3,026.8±375.6	1.00	0.99–1.00	1.00
Gestational diabetes	85 (22.1)	40 (19.2)	45 (25.6)	0.69	0.43–1.12	0.14
Premature rupture of membranes	72 (18.8)	43 (20.7)	29 (16.5)	1.32	0.78–2.22	0.30
Group B Streptococcus (GBS) positive status	33 (8.6)	18 (8.7)	15 (8.5)	1.02	0.50–2.08	0.96
Gestational hypertension	11 (2.9)	9 (4.3)	2 (1.1)	3.93	0.84–18.46	0.08
Intrauterine growth restriction (IUGR)	9 (2.3)	6 (2.9)	3 (1.7)	1.71	0.42–6.95	0.45
Labor induction	37 (9.6)	21 (10.1)	16 (9.1)	1.12	0.57–2.23	0.74
Epidural analgesia	229 (59.6)	134 (64.4)	95 (54.0)	1.54	1.02–2.33	0.04
Oxytocin use in labor	78 (20.3)	50 (24.0)	28 (15.9)	1.67	1.00–2.80	0.05
Active labor duration (hours) (mean±SD)	3.3±2.4	3.7±2.4	2.7±2.2	1.23	1.11–1.35	<0.001
Perineal length (cm) (mean±SD)	4.0±0.7	4.0±0.8	3.9±0.5	1.44	1.05–1.98	0.02
Fetal heart rate monitoring						
Category I	229 (59.6)	110 (52.9)	119 (67.6)	0.52	0.34–0.80	0.003
Category II	152 (39.6)	97 (46,6)	55 (31.3)	Ref		
Not monitored	3 (0.8)	1 (0.5)	2 (1.1)	0.28	0.03–3.20	0.31
Total vaginal exams (mean±SD)	7.2±2.9	7.7±2.8	6.6±2.8	1.14	1.06–1.23	<0.001
Duration of the second stage of labor (minutes) (mean±SD)	34.5±35.6	43.4±39.0	23.9±27.7	1.02	1.01–1.03	<0.001
Birth attendants						
Midwife	122 (31.8)	48 (23.1)	74 (42.1)	Ref		
Attending doctor	120 (31.3)	73 (35.1)	47 (26.7)	2.39	1.43–4.01	0.001
Private doctor	115 (29.9)	75 (36.1)	40 (22.7)	2.89	1.70–4.90	<0.001
Trainee	27 (7.0)	12 (5.8)	15 (8.5)	1.23	0.53–2.86	0.63
Delivery method						
Spontaneous vaginal delivery	362 (94.3)	186 (89.42)	176 (100.0)	1	-	-
Vacuum delivery	16 (4.2)	16 (7.7)	0 (0.0)	-	-	-
Forceps delivery	6 (1.5)	6 (2.9)	0 (0.0)	-	-	-
Degree of perineal injury						
No injury	35 (9.1)	0 (0.0)	35 (19.9)	-		
First-degree tear	124 (32.3)	5 (2.4)	119 (67.6)	Ref		
Second-degree tear	225 (58.6)	203 (97.6)	22 (12.5)	219.61	81.03–595.20	<0.001

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Table 5. Continued

Variables	Total (n=384)	Episiotomy (n=208)	No episiotomy (n=176)	OR	95% CI	p-value
Total blood loss						
≤200 mL	299 (77.9)	144 (69.2)	155 (88.1)	Ref		
200–500 mL	79 (20.6)	59 (28.4)	20 (11.4)	3.18	1.82–5.53	<0.001
≥500 mL	6 (1.5)	5 (2.4)	1 (0.5)	5.38	0.62–46.62	0.13
Pain score (Wong-Baker Faces Pain Rating Scale) 24 hours postpartum	1.6±0.9	1.8±0.9	1.2±0.8	2.19	1.69–2.85	<0.001
Need for additional pain medication in postpartum departments	86 (22.4)	61 (29.3)	25 (14.2)	2.51	1.49–4.21	0.001
Perineal condition in postpartum departments						
Good recovery	287 (74.7)	134 (64.4)	153 (86.9)	Ref		
Perineal swelling	89 (23.2)	67 (32.2)	22 (12.5)	3.48	2.04–5.93	<0.001
Infection	6 (1.5)	5 (2.4)	1 (0.6)	5.71	0.66–49.48	0.11
Wound dehiscence	2 (0.5)	2 (1.0)	0 (0.0)	-	-	-
Length of hospital stay since delivery (days)	2.4±0.9	2.5±1.0	2.4±0.8	1.22	0.96–1.55	0.11
Apgar score 1 min≥7	375 (97.7)	201 (96.6)	174 (98.9)	0.33	0.07–1.61	0.17
Apgar score 5 min≥7	382 (99.5)	206 (99.0)	176 (100.0)	-	-	-
Birth weight (g)	3,052.8±367.6	3,030.9±365.1	3,078.8±369.9	1.00	0.99–1.00	0.20
Head circumference	32±1.6	32.1±1.7	31.9±1.6	1.09	0.96–1.23	0.21
Neonatal admission	27 (7.0)	17 (8.17)	10 (5.7)	1.48	0.66–3.32	0.34

OR, odds ratio; CI, confidence interval; BMI, body mass index; EFW, estimated fetal weight.

Table 6. Multivariate regression model of factors associated with decision-making for episiotomy

Variables	Total (n=384)	Episiotomy (n=208)	No episiotomy (n=176)	aOR	95% CI	p-value
Delivery history						
No	190 (49.5)	157 (75.5)	33 (18.7)	Ref		
Vaginal delivery	184 (47.9)	42 (20.2)	142 (86.7)	0.06	0.03–0.10	<0.001
Cesarean section	7 (1.8)	6 (2.9)	1 (0.6)	0.94	0.11–10.35	0.94
Vaginal birth after cesarean	3 (0.8)	3 (1.4)	0 (0.0)	1	-	-
Gestational age						
<34 weeks	3 (0.8)	3 (1.4)	0 (0.0)	-		
34–37 weeks	32 (8.3)	13 (6.3)	19 (10.8)	Ref		
≥37 weeks	346 (90.1)	191 (91.8)	155 (88.1)	3.59	1.43–9.03	0.007
Unknown	3 (0.8)	1 (0.5)	2 (1.1)	3.11	0.06–67.96	0.68
Birth attendants						
Midwife	122 (31.8)	48 (23.1)	74 (42.1)	Ref		
Attending doctor	120 (31.3)	73 (35.1)	47 (26.7)	1.94	1.01–3.74	0.05
Private doctor	115 (29.9)	75 (36.1)	40 (22.7)	2.38	1.23–4.60	0.01
Trainee	27 (7.0)	12 (5.8)	15 (8.5)	0.84	0.30–2.45	0.84

OR, odds ratio; CI, confidence interval.

by systemic pressures such as overcrowded delivery rooms, provider concerns about perineal injuries, and cultural beliefs that this practice results in a tighter and prettier vagina [20]. Similarly, a national study in China highlighted rates of 41.7% among primiparous women and 21.5% among multiparous women, with half of the procedures lacking clear medical indications [21]. Both studies emphasize that high episiotomy rates in resource-constrained or high-volume

settings often reflect efforts to expedite labor, despite the absence of compelling evidence supporting.

Despite efforts to reduce routine episiotomy, the rate remained significantly higher than the WHO-recommended threshold. With an average of over 3,000 deliveries every month, healthcare providers were under enormous pressure. In such high-volume environments, episiotomy may have been perceived as a practical solution to manage labor progression. However, routine episiotomy use remains a concern due to the potential for unnecessary interventions. Healthcare practitioners may have felt compelled to perform episiotomies to reduce the risk of prolonged active second stage of labor.

4.3. Factors associated with episiotomy

The decision-making abilities of birth attendants played a vital role in reducing routine episiotomy rate. According to our findings, there were 15 prevalent reasons for doing episiotomies, compared to only 5 reasons for not to undertake the procedure. The most frequently mentioned reason for doing an episiotomy was tight perineum (35.6%), while the most common reason for avoiding it was good perineal elasticity (43.8%). The ability to detect perineal elasticity may therefore be critical to lowering episiotomy incidence, as it has direct impact on clinical decisions about whether to proceed with the procedure. Unfortunately, there is no quick and simple procedure for this assessment, as current techniques frequently require specialized gear, rendering them impractical for immediate clinical use. Given the considerable importance of perineal elasticity on episiotomy decisions, training programs should prioritize improving birth attendants' ability to make precise perineal assessments during labor. Additionally, supporting non-invasive interventions such as perineal massage and warm compresses during the second stage of labor may help to reduce third-degree and fourth-degree lacerations [16]. This tailored approach, together with enhanced labor management, will support to bring Vietnam's practices in line with WHO recommendations.

Our multivariate regression model identified three factors significantly associated with the decision to perform an episiotomy: a history of vaginal delivery, full-term pregnancy, and treatment by a private doctor. These findings diverged from previous research, which has shown that episiotomy practices vary depending on the situation. For instance, Enyew Woretaw's study in Ethiopia, identified factors such as assisted delivery, maternal age, oxytocin use, the interval between deliveries, and the degree of perineal injury [19], while Habtamu Bekele's study highlighted the number of previous deliveries, 1-minute Apgar score, maternal medical conditions, and induction of labor [22]. These differences may stem from variations in population characteristics, healthcare systems, and obstetric protocols.

The factors identified in our study are closely tied to both clinical and systemic practices in our context. A history of vaginal delivery was discovered as an influential element in the decision-making process. As shown in Table 4, primiparity was cited as a reason for performing episiotomy in 33 cases (15.9%), while multiparity contributed to avoiding episiotomy in 35 cases (19.9%). This implies that birth attendants frequently regarded nulliparity as a higher risk for perineal injuries, necessitating a preventive episiotomy, whereas multiparous women are perceived as lower risk due to previous vaginal deliveries. These findings align with Eggebø et al. [9], who reported higher rates of OASIS in nulliparous women and noted that lateral episiotomy reduced OASIS risk, particularly in instrumental vaginal deliveries.

Full-term pregnancy (≥37 weeks) was significantly associated with the likelihood of performing an episiotomy. This finding may reflect the perception of birth attendants, who often associate full-term pregnancies with larger fetal size, potentially increasing the risk of perineal trauma. While this reflects clinical judgment, it underscores the need for evidence-based guidelines to ensure that episiotomy decisions are based on individual clinical circumstances rather than generalized assumptions about gestational age.

Being attended by a private practitioner was strongly associated with an increased risk of episiotomy. At our research center, a private doctor is defined as a physician personally registered by the patient, who is called in to assist with delivery while working in another department or beyond regular hours. This limited availability may influence their decisions, as reflected in Table 4, where "lack of time for observation

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by the birth attendant" (9 cases, 4.3%) and aesthetic requests from patients (4 cases, 1.9%) were cited as reasons for episiotomy. These systemic and patient-driven factors likely contribute to the higher episiotomy rates observed in deliveries attended by private doctors.

4.4. Maternal and neonatal outcomes during postpartum monitoring

Episiotomy in our study was associated with a higher incidence of second-degree tears, although no cases of third- or fourth-degree tears were recorded, which is a positive outcome. Additionally, perineal swelling was more commonly observed in women who underwent episiotomy. This finding could be attributed to factors such as the indication for the episiotomy, pre-existing perineal conditions, and the overall delivery process.

No significant differences were observed between the episiotomy and non-episiotomy groups regarding Apgar scores, birth weight, head circumference, or neonatal admission rates. This show that episiotomy may not have a significant impact on initial infant health outcomes after delivery.

4.5. Strengths and limitations

This study offers various advantages, including comprehensive follow-up of participants throughout labor and the postpartum period, ensuring detailed and reliable data collection. Furthermore, the sample size was substantial and statistically robust, offering enough power to investigate the relationships between episiotomy and numerous covariates. However, the study also has several limitations. The findings may not be applicable to other situations because they were undertaken at a single tertiary hospital. Furthermore, the study concentrated on immediate outcomes without considering long-term maternal health impacts, and it excluded patient viewpoints, restricting insights into women's experiences and how they perceived the situation given. Finally, self-reported causes for episiotomy may result in observer bias.

5. CONCLUSION

The incidence of episiotomy has decreased but remained substantially high, despite WHO recommendations and several studies demonstrating the hazards and advantages. Effective decision-making regarding episiotomy involves an evidence-based approach that takes into account maternal health, labor progression, and perineal status. Achieving more selective episiotomy use depends on a combination of clinical experience, expertise, and careful case-by-case assessment. To further reduce the frequency of episiotomy, it is vital to conduct ongoing training programs and adhere strictly to evidence-based standards, particularly in high-pressure clinical settings where quick decisions are frequently required.

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Conflict of interest

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ORCID

Dung Tuan Dao
https://orcid.org/0009-0006-1990-532X
Hang Thi Phan
https://orcid.org/0000-0003-1631-9932
Thuong Chi Bui
https://orcid.org/0000-0001-9807-9930

Authors' contributions

Conceptualization: DT Dao.
Data curation: DT Dao.

Formal analysis: DT Dao.
Methodology: DT Dao.
Software: DT Dao.
Validation: DT Dao, HT Phan.
Investigation: DT Dao, HT Phan, TC Bui.
Writing - original draft: DT Dao, HT Phan, TC Bui.
Writing - review & editing: DT Dao, HT Phan, TC Bui.

Availability of data and material

Upon reasonable request, the datasets of this study can be available from the corresponding author.

Ethics approval

All procedures in this study were approved by the Institutional Review Board (IRB) of Hung Vuong Hospital, Ho Chi Minh City (IRB-VN02.020), according to Decision No. 531/HĐĐĐ-BVHV, dated February 6th, 2023. All women who participated in this study had been consulted and provided written informed consent.

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