The final version of this paper was published in *The Bulletin of the World Health Organisation* 2013;91(5):350-356

Providing evidence to support obstetric practice change in Vietnam: episiotomy use among Vietnamese-born women living in Australia

Anh T. TRINH,[a] Amina KHAMBALIA,[b] Amanda AMPT,[b] Jonathan M. MORRIS,[b,c] Christine L. ROBERTS[b,c]

a. Hung Vuong Hospital, Ho Chi Min City, Vietnam

b. Clinical and Population Perinatal Health Research, Kolling Institute, University of Sydney, Sydney, Australia

c. Department of Obstetrics and Gynaecology, Royal North Shore Hospital, St Leonards, Australia.

Address for correspondence

Dr Trinh TuyetAnh

Department of Obstetrics and Gynecology

Hung Vuong Hospital,

Ho Chi Min City,

VIETNAM

Phone: International +848 38 558 532 (236)

Email: trinh.anhhvh@gmail.com

Word Count – Abstract 242

Text 2257

Abstract

Objective: To describe the use of episiotomy among Vietnamese-born women giving birth in Australia, including risk factors and pregnancy outcomes associated with episiotomy.

Methods: This is a population-based retrospective cohort study in New South Wales (NSW), Australia 2001-2009 that included all 540,759 singleton, term (≥37 weeks) and vertex-presenting vaginal births. Data were obtained from linked, validated population-level birth and hospitalization datasets. Contingency tables and multivariable analysis were used to compare risk factors and pregnancy outcomes of women with and without an episiotomy. Results are reported as adjusted odds ratios (aOR) and 95% confidence intervals (95%CI).

Findings: The rate of episiotomy among the 11,509 Vietnamese-born women was 29.6% compared with 15.1% among Australian-born women. Compared to Vietnamese-born women who did not have an episiotomy, Vietnamese women with an episiotomy were significantly more likely to be nulliparous, birth in a private hospital, have labour induced and/or an instrumental birth. Among Vietnamese women, having an episiotomy was associated with prolonged hospitalization (aOR=1.53, 95%CI 1.36, 1.73) and, among multiparous women episiotomy was associated with 3rd-4th degree tears (aOR=1.67, 95%CI 1.06, 2.62). In contrast, nulliparous women with an episiotomy had a lower rate of 3rd-4th degree tears compared with those who did not have an episiotomy (aOR=0.41, 95%CI 0.32, 0.52).

Conclusions: Rates of episiotomy are much lower among Vietnamese women giving birth in Australia compared with those giving birth in Vietnam (>85%), without adverse maternal or infant outcomes. Lower episiotomy rates should be achievable in Vietnam.

Introduction

Episiotomy (surgical incision to increase the diameter of the vaginal outlet to facilitate the baby's birth) is one of the most common medical procedures experienced by women in the world.[1] Wide variations in episiotomy practice are reported internationally, ranging from routine use in all births to use only when clinically indicated (known as restrictive or selective use).[1,2] A systematic review of randomised controlled trials shows that policies of restrictive episiotomy have benefits compared to routine episiotomy, including less posterior perineal trauma, less suturing and fewer healing complications.[1] Although an increase in risk for anterior perineal trauma existed among the restrictive approach, severe vaginal or perineal trauma and most pain measures did not differ between the two approaches. As a result the World Health Organization has recommended that episiotomy practice should be limited to strict indications.[3] Despite this evidence and recommendation, episiotomy in Vietnam is routine. As in many but not all Asian countries, over 85% of Vietnamese women with vaginal births, including almost 100% of nullipara, have an episiotomy.[2,4-6] As none of the randomised trials were conducted in Asian and Vietnamese women,[1] Vietnamese clinicians doubt that these trials are generalisable to Vietnamese women.

We hypothesised that a study undertaken among Vietnamese women would assist Vietnamese clinicians in making informed decisions about clinical practice that would result in optimal pregnancy outcomes. Australia has a multicultural population, and Vietnam is the 5th most common country of birth for women having their babies in Australia.[7] The availability of population-based data in Australia provided an opportunity to examine this issue. Furthermore, in Australia episiotomy is used on a restricted basis.[8,9] Therefore the aim of this study was to describe the use of episiotomy among Vietnamese-born women giving birth in Australia. Specific objectives were to examine both risk factors for, and pregnancy outcomes associated with, episiotomy.

Methods

This population-based retrospective cohort study included all births in New South Wales (NSW) between 1 Jan 2001 to 31 Dec 2009 which were singleton, term (≥37 weeks) and vertex-presenting vaginal deliveries. NSW is the most populous Australian State with approximately one third of the population. The data were obtained from two linked, validated population health datasets, the NSW Perinatal Data Collection (PDC) and the NSW Admitted Patients Data Collection (APDC). The PDC (referred to as 'birth records') is a statutory population-based surveillance system of routinely collected perinatal information that includes information on all births ≥20 weeks of gestation or weighing at least 400 g. Information on maternal characteristics, pregnancy, labour, delivery and infant outcomes are collected using a standardized data collection form with check box responses completed by the attending midwife or doctor. The APDC (referred to as 'hospital records') is a census of all NSW inpatient hospital discharges (public and private). Diagnoses and procedures for each hospitalisation are coded from the medical records according to 10th revision of the International Statistical Classification of Diseases and Related Health Problems, Australian Modification and the affiliated Australian Classification of Health Interventions. As Australia does not have a unique registration number for citizens, the separate datasets were linked using probabilistic linkage methods by the Centre for Health Record Linkage (CHeReL).[10,11] This involves a process of blocking and matching combinations of selected variables such as name, date of birth, address and hospital and assigning a probability weight to the match. Linkage was conducted independently of the research. The CHeReL undertakes quality assurance for any data linkage and assesses the linkage quality by manually reviewing personal identifiers for a sample of the records obtained for linkage.[11] For this project, the CHeReL reported the linkage quality as < 1/1,000 missed links and < 2/1,000 false positive links. The researchers were provided with anonymised data. Approval for the record linkage and analysis for this study was obtained from the NSW Population and Health Services Research Ethics Committee.

Explanatory and outcome variables were defined using the two datasets based on available data and previous validation studies.[12-15] Episiotomy was examined as an outcome variable for several risk factors as well as an exposure variable for third or fourth degree perineal tears, postpartum haemorrhage (PPH) and prolonged postnatal hospitalization. Episiotomy was identified from birth or hospital records and this has an ascertainment rate of 91% and positive predictive value (PPV) of 98%.[14] Third or fourth degree perineal tears were identified from either diagnosis or procedure (repair) codes in the hospital records (ascertainment 94%, PPV 100%).[14] PPH was also identified from hospital records (ascertainment 74%, PPV 84%).[15] Maternal postnatal length of hospital stay was defined by the number of days from the date of baby's birth to the discharge date, and prolonged hospitalization was considered >4 days.

Maternal country of birth (Vietnam or Australia) was identified from the birth and/or hospital record. The explanatory variables smoking, type of obstetric care (public or private) and maternal hypertension were identified from either birth or hospital records.[13,15] Information on diabetes was obtained from the hospital data alone.[12] Other explanatory variables were derived solely from the birth record including: maternal age, parity, rural or urban residence, initiation of antenatal care by 12 weeks of gestation, onset of labour, regional analgesia, instrumental birth (forceps or vacuum) and birthweight (<3,800 or≥3,800 g) . Among the Vietnamese-born women giving birth in Australia, 3,800 g birthweight equates to approximately the 90th birthweight percentile for gestational age at term. This same birthweight equates to the 95th percentile in women giving birth in Vietnam. In the absence of information on fetal distress (a potential risk factor for episiotomy) we used Apgar <4 at 1 minute.

Statistical analysis

The analysis was conducted in three stages. First we compared episiotomy rates and trends for Vietnamese and Australian-born women. Second we assessed risk factors for episiotomy. Finally, we explored the association between episiotomy and the outcomes of PPH, prolonged hospitalization and 3^{rd}-4^{th} degree tears. Risk factors for episiotomy were examined using contingency table analysis and multivariate logistic regression to adjust for maternal and pregnancy characteristics for vaginal deliveries with and without episiotomy. Multivariate logistic regression was also used to examine the association between episiotomy and the outcomes of PPH, prolonged hospitalization and 3^{rd}-4^{th} degree tears. The association between episiotomy and 3^{rd} and 4^{th} degree tears differed by parity so nulliparous and multiparous women were modelled separately. All potential risk factors suggested by the univariate analysis and possible confounders were entered in adjusted models using forward-stepwise selection. Few data were missing (<0.1% on any variable) and records with missing data were excluded from all logistic regression models. Results from logistic regression models are presented as odds ratios (OR) and 95% confidence intervals. All analyses were carried out using SAS 9.1 (SAS Institute, Cary, NC, USA).

Results

From 2001 through 2009, among women of all ethnicities giving birth in NSW, there were 540,759 vaginal births of single, vertex-presenting infants at term and of these 90,131 (16.7%) women had an episiotomy. The rate of episiotomy among Australian-born women was 15.1% (57,234/377,848) compared to 29.6% (3,409/11,509) among Vietnamese-born mothers ($p<0.0001$). Different rates by parity were observed for both Australian-born (27% among nulliparae and 7.4% among multiparae) and Vietnamese-born women (48% and 17% respectively).

Among Vietnamese-born mothers, the maternal and labour factors associated with having an episiotomy are shown in Table 1. Multivariate analyses found that women having an episiotomy

were more likely to be nulliparous, receive private obstetric care and to have had an induced labour, forceps or vacuum instrument-assisted delivery. Living in a rural locality and being a smoker during pregnancy were associated with a decreased likelihood of an episiotomy. Birthweight ≥3800 grams was not associated with episiotomy and increasing the cut-point did not change this finding. Only 380 (3.3%) Vietnamese women had infants ≥4000 grams including 28 (0.2%) with infants ≥4500 grams.

The overall rate of PPH, length of hospital stay greater than 4 days and 3rd-4th perineal tears among Vietnamese-born mothers were 8.3%, 14.2% and 3.9%, respectively. Compared to women who did not have an episiotomy, having an episiotomy was associated with prolonged hospitalization (22.6% versus 10.6%) and, among multiparous women episiotomy was associated 3rd-4th degree tears (2.9% versus 1.2%) (Table 2). In contrast, among nulliparous women those with an episiotomy had a lower rate of 3rd-4th degree tears (5.6%) compared with those who did not have an episiotomy (9.1%). This reduced risk persisted after adjustment for other risk factors for 3rd-4th degree perineal tears (Table 2).

Discussion

This study indicates that in Australia, Vietnamese women were managed differently to Australian-born women with regard to episiotomy. The episiotomy rate was double for Vietnamese women compared with Australian-born women (30% versus 15%). Nevertheless, the rates are markedly lower than for women living in Vietnam. In terms of episiotomy and risk of adverse maternal effects, results indicate that in a restrictive episiotomy environment, episiotomy among Vietnames women was associated with increased risk of postpartum haemorrhage and prolonged hospitalization, and provides a benefit against tears only for nulliparous women. If we apply the findings to Vietnam, lower rates of episiotomy should be achievable without adverse outcomes.

The factors influencing the decision-making around episiotomy in a restrictive environment such as Australia may be based on preconceptions about high-risk subgroups as well as clinical indicators or impending perineal trauma. Asian women are reported to be at increased risk for both episiotomy and perineal trauma.[16-18] These risks persist after adjustment for other risk factors such as parity and instrumental delivery.[16-18] A shortened perineal body also increases the risk of episiotomy and perineal trauma.[19,20] Anecdotally, there is a perception that Asian women are more likely to experience severe perineal trauma because of physiological differences such as shorter perineums.[21] However, this perception is not supported by a study from Hong Kong that measured the perineal length of labouring women.[4] Lai and colleagues reported the mean perineal length of Chinese women (38.8±7.9mm), to be comparable to studies using similar methods in other countries including the USA (39±7mm), Israel (40.2±10.7mm) and Turkey (36.6±5.2).[4,19,22,23] However, this does not exclude the possibility of other ethnic differences in functional and morphological characteristics of the pelvic floor.[24,25]

The risk factors for episiotomy among Vietnamese women in our study (nulliparity, private obstetric care, labour induction and instrumental delivery) are consistent with published risk factors.[18,26-29] However, in contrast, infant size (>90th percentile) was not. In Caucasian populations, birthweight ≥4000 and or ≥4500 grams has been identified as a predictive factor for episiotomy.[26-28] Few infants of Vietnamese women reached these sizes and the few that did were no more likely to birth with an episiotomy. Similarly, Apgar <4 at 1 minute was not an independent risk factor for episiotomy suggesting that fetal distress was unlikely to be a major factor in the use of episiotomy in this population.

The impact of episiotomy on severe perineal trauma was complex. The risk of 3rd-4th degree tears associated with episiotomy differed by parity with a decreased risk for nullipara and increased risk for multipara. However the burden of disease was largely among nullipara with 74% of the 3rd-4th degrees tears occurring among women having their first baby. Similar to our study, some previous observational studies have reported fewer 3rd-4th degree tears associated with episiotomy among nulliparous women but not among multiparous women.[30-33] In contrast, a systematic review of randomised trials of restrictive versus routine episiotomy shows a reduced risk of severe perineal trauma for nullipara and multipara, although the effect did not reach statistical significance among multipara.[1] A key difference between observational and experimental studies is the selection of patients and this may explain the observed effects. In Australia, effort is made to avoid episiotomy, especially among multipara where the procedure is only used among women at high risk of 3rd-4th degree tears, to accelerate the birth of a compromised fetus or in the management of impending trauma. In contrast, among nullipara there may be more episiotomies done specifically to prevent perineal tears.[8]

The strength of this population-based study is the availability of reliably collected labour and delivery data.[12-15] However, these data lack detailed clinical information including the type of episiotomy, other clinical risk factors (eg duration of 2nd stage of labour) and outcomes (perineal pain, dyspareunia). Furthermore, Vietnamese-born women birthing in Australia may be different to those birthing in Vietnam and obstetric practices are likely to be different which impacts on the generaliability of the findings for Vietnam. Nevertheless our study suggests that a much lower rate of episiotomy can be achieved in Vietnamese and other Asian women without adverse outcomes.

It is hoped that the results of this study will be a useful step in effecting practice change in Vietnam. A maternity hospital in Hong Kong reported successfully decreasing the episiotomy rate from 73%

in 2003 to 27% in 2008, without increasing 3rd or 4th degree tears, although the strategies implemented to achieve this outcome were not reported.[4] Similarly a randomized controlled trial from South America of a multifaceted intervention (including selection of opinion leaders, interactive workshops, training of manual skills, one-on-one academic detailing visits with hospital birth attendants, reminders and feedback) reduced the episiotomy rate from 41% to 30%.[34] Other activities that are planned for facilitating practice change in Vietnam to achieve a similar end include an audit of current practice and outcomes of episiotomy by delivery room registration of performed episiotomies, a survey of maternity care providers' knowledge and attitudes around episiotomy and an assessment of the health services currently utilized (e.g. staff skilled in the conduct and repair of episiotomies, equipment costs, length of hospitalization). This information will then be used to develop a practice improvement program. In conclusion, as in other populations a more restrictive episiotomy policy among Vietnamese women may provide benefits without increasing harms.

Acknowledgements

We thank the Australian Agency for International Development (AusAID) and the Học Mãi Foundation for supporting this research. We also thank the NSW Ministry of Health for access to the population health data and the NSW Centre for Health Record Linkage for linking the data sets.

Funding

Trinh TuyetAnh commenced this study as a 2011 AusAID Australian Leadership Awards Fellow. Christine Roberts is supported by an Australian National Health and Medical Research Council (NHMRC) Senior Research Fellowship (#APP1021025), and Amina Khambalia and Amanda Apt by a NHMRC Centres for Research Excellence grant (#APP1001066).

Competing Interests

None declared

References

1. Carroli G, Mignini L. Episiotomy for vaginal birth. Cochrane Database of Systematic Reviews 2009; Issue 1. Art. No.: :CD000081. DOI: 10.1002/14651858.CD000081.pub2.

2. Graham ID, Carroli G, Davies C, Medves JM. Episiotomy rates around the world: an update. Birth. 2005 Sep;32(3):219-23.

3. Liljestrand J. Episiotomy for vaginal birth: RHL commentary (last revised: 20 October 2003). The WHO Reproductive Health Library; Geneva: World Health Organization. 2003:http://apps.who.int/rhl/pregnancy_childbirth/childbirth/2nd_stage/jlcom/en/index.html# (accessed Oct 2012).

4. Lai CY, Cheung HW, Hsi Lao TT, Lau TK, Leung TY. Is the policy of restrictive episiotomy generalisable? A prospective observational study. J Mat-Fetal Neonatal Med. 2009;22(12):1116-21.

5. Lam KW, Wong HS, Pun TC. The practice of episiotomy in public hospitals in Hong Kong. Hong Kong Med J. 2006 Apr;12(2):94-8.

6. The SEA-ORCHID Study Group. Use of Evidence-Based Practices in Pregnancy and Childbirth: South East Asia Optimising Reproductive and Child Health in Developing Countries Project. PLoS ONE. 2008;3(7):e2646. doi:10.1371/journal.pone.0002646.

7. Centre for Epidemiology and Research. New South Wales Mothers and Babies 2009. NSW Department of Health. 2010;http://www.health.nsw.gov.au/pubs/2011/mothers_babies_2009.html (accessed Oct 2012).

8. Royal Australian and New Zealand College of Obstetricians and Gynaecologists. Routine intrapartum care in the absence of pregnancy complications.College Statement C-Obs 31:http://www.ranzcog.edu.au/the-ranzcog/policies-and-guidelines/college-statements/688-college-statements-and-guidelines.html (accessed Sept 2012).

9. Roberts CL, Todd AL, Algert CS. Using routinely collected perinatal data to moniitor evidence-based obstetric practice: Restrictive use of episiotomy. Australasian Epidemiol. 2003;10.1:10-4.

10. Bentley J, Ford JB, Taylor L, Irvine K, Roberts CL. Investigating linkage rates among probabilistically linked birth and hospitalisation records. BMC Medical Research Methodology. 2012;12:149.

11. Centre for Health Record Linkage.http://www.cherel.org.au/ (accessed Oct 2012).

12. Bell JC, Ford JB, Cameron CA, Roberts CL. The accuracy of population health data for monitoring trends and outcomes among women with diabetes in pregnancy. Diabetes Res Clin Pract. 2008 Jul;81(1):105-9.

13. Roberts CL, Bell JC, Ford JB, Hadfield RM, Algert CS, Morris JM. The accuracy of reporting of the hypertensive disorders of pregnancy in population health data. Hypertens Pregnancy. 2008;27(3):285-97.

14. Roberts CL, Bell JC, Ford JB, Morris JM. Monitoring the quality of maternity care: how well are labour and delivery events reported in population health data? Paediatr Perinat Epidemiol. 2009;23:144–52.

15. Taylor L, Travis S, Pym M, Olive E, Henderson-Smart DJ. How useful are hospital morbidity data for monitoring conditions occurring in the perinatal period? Aust N Z J Obstet Gynaecol. 2005;45:36-41.

16. Goldberg J, Hyslop T, Tolosa JE, Sultana C. Racial differences in severe perineal lacerations after vaginal delivery. Am J Obstet Gynecol. 2003;188:1063-7.

17. Hopkins LM, Caughey AB, Glidden DV, Laros RK, Jr. Racial/ethnic differences in perineal, vaginal and cervical lacerations. Am J Obstet Gynecol. 2005 Aug;193(2):455-9.

18. Dahlen H, Homer C. Perineal trauma and postpartum perineal morbidity in Asian and non-Asian primiparous women giving birth in Australia. J Obstet Gynecol Neonatal Nurs. 2008 Jul-Aug;37(4):455-63.

19. Deering SH, Carlson N, Stitely M, Allaire AD, Satin AJ. Perineal body length and lacerations at delivery. J Reprod Med. 2004 Apr;49(4):306-10.

20. Rizk DE, Thomas L. Relationship between the length of the perineum and position of the anus and vaginal delivery in primigravidae. Int Urogynecol J Pelvic Floor Dysfunct. 2000;11(2):79-83.

21. Dahlen HG, Ryan M, Homer CS, Cooke M. An Australian prospective cohort study of risk factors for severe perineal trauma during childbirth. Midwifery. 2007 Jun;23(2):196-203.

22. Aytan H, Tapisiz OL, Tuncay G, Avsar FA. Severe perineal lacerations in nulliparous women and episiotomy type. Eur J Obstet Gynecol Reprod Biol. 2005 Jul 1;121(1):46-50.

23. Walfisch A, Hallak M, Harlev S, Mazor M, Shoham-Vardi I. Association of spontaneous perineal stretching during delivery with perineal lacerations. J Reprod Med. 2005 Jan;50(1):23-8.

24. Howard D, Delancey JOL, Tunn R, Ashton-Miller JA. Racial differences in the structure and function of the stress urinary continence mechanism. Obstetrics and Gynecology. 2000 May;95(5):713-7.

25. Schwartz N, Seubert DE, Mierlak J, Arslan AA. Predictors of severe perineal lacerations in Chinese women. J Perinat Med. 2009 Mar;37(2):109-13.

26. Raisanen S, Vehvilainen-Julkunen K, Gisler M, Heinonen S. A population-based register study to determine indications for episiotomy in Finland. Int J□Gynaecol Obstet. 2011 Oct;115(1):26-30.

27. Howden NL, Weber AM, Meyn LA. Episiotomy use among residents and faculty compared with private practitioners. Obstet Gynecol. 2004 Jan;103(1):114-8.

28. Hueston WJ. Factors associated with the use of episiotomy during vaginal delivery. Obstet Gynecol. 1996 Jun;87(6):1001-5.

29. Allen RE, Hanson RW, Jr. Episiotomy in low-risk vaginal deliveries. J Am Board Fam Pract. 2005 Jan-Feb;18(1):8-12.

30. Poen A, Felt-Bersma, JF., Dekker, GA., Devil, SW., Cuesta, MA., Meuwissen, SGM. Third degree obstetric perineal tears: risk factors and the preventive role of mediolateral episiotomy. BJOG. 1997;104:563-6.

31. Raisanen SH, Vehvilainen-Julkunen K, Gissler M, Heinonen S. Lateral episiotomy protects primiparous but not multiparous women from obstetric anal sphincter rupture. Acta Obstet Gynecol Scand. 2009;88(12):1365-72.

32. Shino P, Klebanoff MA, Carey JC. Midline episiotomies: more harm than good? . Obstetrics and Gynecology. 1990;75:765-70.

33. Tincello DG, Williams A, Fowler GE, Adams EJ, Richmond DH, Alfirevic Z. Differences in episiotomy technique between midwives and doctors. BJOG. 2003 Dec;110(12):1041-4.

34. Althabe F, Buekens P, Bergel E, Belizan JM, Campbell MK, Moss N, et al. A behavioral intervention to improve obstetrical care. N Engl J Med. 2008 May 1;358(18):1929-40.

Table 1 Maternal and pregnancy risk factors for episiotomy among Vietnamese-born women who gave birth in NSW, 2001-2009

	Women with episiotomy N=3409 n (%)	**Women without episiotomy** N= 8100 n (%)	**Adjusted* OR (95% CI)**
Maternal age ≥35 years	574 (16.8)	1575 (19.4)	1.10 (0.97, 1.24)
Parity			
Nullipara	2236 (65.6)	2476 (30.6)	3.30 (3.00, 3.63)
Multipara	1171 (34.4)	5606 (69.4)	1.00 (referent)
Rural residence	63 (1.9)	207 (2.6)	0.61 (0.44, 0.84)
Type of health care			
Public	2427 (71.2)	6974 (86.1)	1.00 (referent)
Private	982 (28.8)	1126 (13.9)	2.00 (1.78, 2.24)
Diabetes	425 (12.5)	986 (12.2)	1.04 (0.91, 1.20)
Hypertension	121 (3.6)	185 (2.3)	1.06 (0.81, 1.39)
Smoker during pregnancy	60 (1.8)	200 (2.5)	0.67 (0.49, 0.94)
Induction (vs. spontaneous labour)	685 (20.1)	1028 (12.7)	1.24 (1.09, 1.41)
Antenatal visit by week 12	1616 (48.1)	3338 (41.7)	1.04 (0.94, 1.14)
Mode of delivery			
Forceps	312 (9.2)	75 (0.9)	7.62 (5.83, 9.96)
Vacuum	855 (25.1)	450 (5.6)	3.84 (3.36, 4.38)
Spontaneous vaginal birth	2242 (65.8)	7575 (93.5)	1.00 (referent)
Birthweight ≥ 3800 g	284 (8.3)	675 (8.3)	1.11 (0.94, 1.31)
1 min Apgar <4	55 (1.6)	97 (1.2)	1.05 (0.71, 1.55)

* Odds ratio (OR) is adjusted for all the factors in the table. The referent group is those without the characteristic, unless otherwise stated

Table 2 Maternal outcomes among women with and without episiotomy among Vietnamese-born women who gave birth in NSW, 2001-2009

Maternal outcomes	**Women with episiotomy** N=3409 n (%)	**Women without episiotomy** N=8100 n (%)	**Crude OR (95% CI)**	**Adjusted OR* (95% CI)**
Postpartum haemorrhage (PPH)	353 (10.4)	600 (7.4)	1.44 (1.26, 1.66)	1.16 (0.99, 1.35)
Postnatal hospitalization >4 days	770 (22.6)	861 (10.6)	2.45 (2.20, 2.73)	1.53 (1.36, 1.73)
$3^{rd}/4^{th}$ perineal tear				
Nulliparous	126 (5.6)	224 (9.1)	0.60 (0.48, 0.75)	0.41 (0.32, 0.52)
Multiparous	34 (2.9)	69 (1.2)	2.40 (1.59, 3.64)	1.67 (1.06, 2.62)

* Odds ratio (OR) is adjusted for maternal age, parity (for PPH and postnatal hospitalisation), diabetes, hypertension, labour induction, regional analgesia, mode of delivery and birthweight.