

## ETHNICITY AND SOCIOECONOMIC STATUS ARE SIGNIFICANT INDEPENDENT RISK FACTORS FOR OBSTETRIC ANAL SPHINCTER INJURY

### Hypothesis / aims of study

Assessed using 3D endoanal ultrasound, the incidence of obstetric anal sphincter injury following vaginal delivery is 11% [1]. Rates of recognised injury are lower, and vary widely [2]. The results of primary repair are poor, such that up to two thirds of women with recognised injury will suffer long-term bothersome faecal incontinence [3]. Previous studies of risk have conflicting results, because of heterogeneity between populations and obstetric practices [3]. The aim of this study was to assess socioeconomic, demographic, antenatal, and intrapartum risk factors for obstetric anal sphincter injury in an ethnically diverse UK population.

### Study design, materials and methods

Cross-sectional study of 32,854 completed singleton vaginal deliveries at one maternity unit over the period 1995 to 2008. Data were extracted from a database completed contemporaneously during antenatal, intrapartum, and postpartum care, by maternity care providers, with data quality audited for each delivery against case notes. Maternal BMI (categorised into WHO ranges), maternal age, ethnicity, smoking status, marital status, vaginal parity, duration of 1st stage of labour, duration of 2nd stage of labour, syntocinon augmentation, epidural usage, infant sex, gestation, birthweight, medio-lateral episiotomy, method of delivery, and year of delivery were assessed in relation to risk of third or fourth degree perineal injury. Factors that were associated with injury in univariate analysis ( $p < 0.10$ ) were entered as potential risk factors in a multivariate logistic regression model. Backward stepwise elimination was used to select the final model, with likelihood ratio tests used to determine significance ( $p < 0.05$ ). An additional analysis of the effect of socio-economic class was performed using the same methodology, for the subgroup of women, delivering from 2001 onwards, with recorded occupational data that could be coded for the 8 class simplified National Statistics – Socio-Economic Classification (NS-SEC).

### Results

In the adjusted model the following factors were associated with increased risk: South Asian ethnicity, BMI  $< 18.5$ , being married, longer second stage of labour, increasing birthweight, year of delivery, forceps delivery, and ventouse delivery. The following factors were associated with reduced risk: current smoking, vaginal parity, epidural analgesia in labour, and medio-lateral episiotomy. The full adjusted model of all significant factors is given in Table 1. Based on the absolute risk reduction the number needed to treat with episiotomy was 2.36 for forceps delivery and 19.80 for ventouse. In the subgroup of women coded for NS-SEC, there was an independent protective effect of lower socio-economic class ( $n = 18,550$ ; OR 0.87 95%CI 0.83-0.92 per class,  $p < 0.001$ ), which reduced, but did not eliminate the observed effect of marital status and smoking status.

### Interpretation of results

This study has confirmed suggested associations of obstetric anal sphincter injury, including South Asian ethnicity, forceps delivery, ventouse delivery, mediolateral episiotomy, long second stage of labour, vaginal parity, and birthweight as independent risk factors. Due to the large sample size, and richness of the dataset, the confidence intervals are tightly defined for most risk factors. The analysis has identified low BMI as a possible new risk factor, and in contrast to results of previous meta-analysis suggests epidural analgesia as a protective factor. Women in the highest socio-economic class were more than twice as likely as those in the lowest socio-economic class to suffer sphincter injury even after adjustment for other factors. The strong observed effects of current smoking, marital status, and low socio-economic class all point to a important effect of socioeconomic class that should be explored in future work. In accordance with previous data from national birth registries, ventouse should be used in preference to forceps, in order to minimise the risk of injury.

### Concluding message

In an ethnically diverse population it is important that obstetricians understand the additional risk factors associated with obstetric anal sphincter injury, and should plan mode of delivery accordingly.

Table 1: Full multivariate model of significant risk factors for injury

	OR	95% CI	p value
South Asian Ethnicity (n=7340)*	1.97	1.57-2.47	<0.0001
BMI $< 18.5$ (n=1036) †	1.61	1.10-2.37	0.02
Forceps Delivery (n=1174) ‡	11.96	8.42-17.00	<0.0001
Ventouse Delivery (n=2960) ‡	2.77	2.11-3.64	<0.0001
Episiotomy (n=5343)	0.16	0.12-0.21	<0.0001
Epidural (n=7998)	0.74	0.60-0.91	0.005
Married (n=19020)	1.90	1.48-2.49	<0.0001
Smoking (n=6934)	0.69	0.52-0.90	0.006
Length of second stage / hour	1.12	1.02-1.23	<0.0001
Vaginal parity / delivery	0.24	0.20-0.30	<0.0001
Birthweight / 500g	1.81	1.63-2.00	<0.0001

\* Reference Group Caucasian (n=14998)

† Reference Group BMI 18.5-24.9 (n=15995)

‡ Reference Group Normal Vaginal Delivery (n=23122)

## References

1. Obstet Gynecol. 2001;97:770 –775
2. Acta Obstet Gynecol Scand. 2008;87:209-215
3. Ann Surg. 2008;247:224-237

<i>Specify source of funding or grant</i>	Nil
<i>Is this a clinical trial?</i>	No
<i>What were the subjects in the study?</i>	HUMAN
<i>Was this study approved by an ethics committee?</i>	No
<i>This study did not require ethics committee approval because</i>	<i>Anonymous extract of a pre-existing approved clinical database.</i>
<i>Was the Declaration of Helsinki followed?</i>	Yes
<i>Was informed consent obtained from the patients?</i>	No