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| RESEARCH ARTICLE

Incidence and Risk Factors of Third- and Fourth-Degree Perineal Tears in Vaginal Delivery: A Retrospective Study at Bint Al-Huda Teaching Hospital, Nasiriyah, Iraq

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| ABSTRACT

Obstetric anal sphincter injuries (OASIS) — third- and fourth-degree perineal tears — are an important cause of maternal morbidity, including anal incontinence, perineal pain, dyspareunia, and psychological distress. Their reported incidence varies widely (0.6–19.3%) with detection practices and case-mix. This study determined the incidence of third- and fourth-degree tears among vaginal deliveries and identified independent risk factors at a tertiary maternity hospital in southern Iraq. A retrospective hospital-based study (cross-sectional for incidence with a nested case–control component for risk factors) was conducted at Bint Al-Huda Teaching Hospital, Nasiriyah, over the period 2023–2025. All vaginal deliveries were classified for perineal trauma using the RCOG/Sultan classification. Cases (OASIS) were compared with controls (vaginal delivery without OASIS). Maternal, intrapartum, and fetal variables were analysed by univariate testing followed by multivariable logistic regression, reporting adjusted odds ratios (aOR) with 95% confidence intervals; $p<0.05$ was significant. Reporting followed STROBE. Among 3,000 vaginal deliveries, OASIS occurred in 150 (5.0%) — 126 (4.2%) third-degree and 24 (0.8%) fourth-degree. On multivariable analysis, the independent risk factors were forceps delivery (aOR 6.20), nulliparity (aOR 5.80), occipito-posterior position (aOR 2.44), birthweight >4 kg (aOR 2.30), prolonged second stage (aOR 2.00), shoulder dystocia (aOR 1.90), and oxytocin augmentation (aOR 1.70); epidural analgesia was not independently associated. OASIS rates rose steeply with operative delivery (3.0% spontaneous, 9.5% vacuum, 16.0% forceps). OASIS at this centre was driven mainly by operative vaginal delivery, nulliparity, and fetal macrosomia. Selective mediolateral episiotomy (at ~60°) in instrumental delivery, structured manual perineal protection, and routine post-delivery rectal examination are recommended to reduce incidence and improve detection.

| KEYWORDS

Perineal tear; obstetric anal sphincter injury; OASIS; vaginal delivery; risk factors; episiotomy; Iraq

| ARTICLE INFORMATION

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1. Introduction

Perineal trauma is common during vaginal birth, and its most severe forms — third- and fourth-degree tears, collectively termed obstetric anal sphincter injuries (OASIS) — carry substantial short- and long-term morbidity. Anal incontinence affects between 15% and 61% of women after primary OASIS repair, and perineal pain or dyspareunia affects up to half of affected women, with additional psychological sequelae and elevated recurrence risk in subsequent pregnancies [1,2]. Third-degree tears involve the anal sphincter complex (subclassified 3a, 3b, 3c by the proportion of external and internal sphincter torn), whereas fourth-degree tears additionally involve the anorectal mucosa [1,3].

The reported incidence of OASIS varies widely, from 0.6% to 19.3% of vaginal deliveries, reflecting differences in detection, accoucheur training, episiotomy practice, and case-mix [4,5]. A 2024 systematic review estimated a pooled incidence of 3.8% across all women [5], and the Royal College of Obstetricians and Gynaecologists (RCOG) cites a United Kingdom rate of 2.9% overall, higher in primiparae (6.1%)

than multiparae (1.7%) [1]. Reported rates have risen over time in several high-income settings, attributed largely to improved recognition rather than worsening care [4].

Both non-modifiable and modifiable factors contribute. Consistently reported risk factors include nulliparity, instrumental (especially forceps) delivery, fetal macrosomia, occipito-posterior position, prolonged second stage, and shoulder dystocia [1,6,7]. Several are amenable to intervention: mediolateral episiotomy at a correct angle reduces OASIS in operative vaginal delivery [8,9], and structured manual perineal protection and care-bundle approaches have lowered rates in large programmes [10,11]. Selective rather than routine episiotomy reduces severe perineal trauma overall [12,13].

In Iraq, published data focus on episiotomy and perineal tears in general rather than OASIS specifically, and no Dhi Qar–based OASIS study has been reported. A study from Erbil documented high episiotomy use and an association between perineal trauma and younger age, primigravidity, and high birthweight [14]. This study therefore aimed to determine the incidence of third- and fourth-degree perineal tears among vaginal deliveries at Bint Al-Huda Teaching Hospital, Nasiriyah, and to identify their independent risk factors.

2. Methods

2.1 Study design and setting

A retrospective hospital-based study was conducted, combining a cross-sectional design (for incidence) with a nested case–control component (for risk factors), at the Department of Obstetrics and Gynaecology, Bint Al-Huda Teaching Hospital, Nasiriyah, Dhi Qar, Iraq, over the period 2023–2025. Reporting followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement [15].

2.2 Participants

All women with a vaginal delivery at ≥28 weeks during the study period were eligible. Women delivered by caesarean section were excluded. For the risk-factor analysis, cases were women sustaining a third- or fourth-degree tear; controls were women with vaginal delivery without OASIS, selected in a 2:1 ratio from the same period.

2.3 Classification and variables

Perineal trauma was graded using the RCOG/Sultan classification: first-degree (skin/mucosa), second-degree (perineal muscles), third-degree (anal sphincter complex; 3a <50% external anal sphincter [EAS], 3b >50% EAS, 3c EAS+internal anal sphincter), and fourth-degree (sphincter complex plus anorectal mucosa) [1,3]. Where the degree was uncertain, the higher grade was assigned, per RCOG guidance [1]. Exposure variables comprised maternal age, parity/nulliparity, body-mass index, gestational age, induction and oxytocin augmentation, epidural analgesia, mode of vaginal delivery (spontaneous, vacuum, forceps), episiotomy and its type, birthweight and macrosomia (>4 kg), occipito-posterior position, shoulder dystocia, prolonged second stage, and previous OASIS.

2.4 Data collection

Data were extracted from the labour-ward delivery register and case records using a structured proforma. Cases with incomplete records for a classifying variable were reported separately. The completeness of routine post-delivery digital rectal examination was recorded, as its omission may lead to under-detection of OASIS [1].

2.5 Statistical analysis

Data were analysed using SPSS. Continuous variables were summarised as mean±SD and categorical variables as frequencies and percentages. Univariate associations were tested with the chi-square or Fisher exact test (categorical) and the t-test or Mann–Whitney U test (continuous). Variables significant at $p<0.10$ on univariate analysis were entered into a multivariable binary logistic regression model; adjusted odds ratios (aOR) with 95% confidence intervals (CI) were reported. Model fit was assessed with the Hosmer–Lemeshow test. Significance was set at $p<0.05$.

2.6 Ethical considerations

The study was approved by the institutional review board / ethics committee in Bint Al-Huda Teaching Hospital and College of Medicine, University of Thi-Qar As anonymised routine data were used, individual consent was waived.

3. Results

3.1 Incidence of perineal trauma

During the study period there were 3,000 vaginal deliveries. OASIS occurred in 150 women, an overall incidence of 5.0% — comprising 126 (4.2%) third-degree and 24 (0.8%) fourth-degree tears (**Table 1; Figure 1**). This rate is benchmarked against the RCOG figure of 2.9% [1] and the pooled meta-analytic estimate of 3.8% [5] in the Discussion.

Table 1. Distribution of perineal trauma among vaginal deliveries.

Perineal outcome	n	% of vaginal deliveries
Intact perineum / first-degree	*1,020*	*34.0*
Second-degree tear / episiotomy	*1,830*	*61.0*
Third-degree (OASIS): 3a/3b/3c	*126*	*4.2*
Fourth-degree (OASIS)	*24*	*0.8*
Total OASIS (third + fourth)	***150***	***5.0***
Total vaginal deliveries	*3,000*	*100*

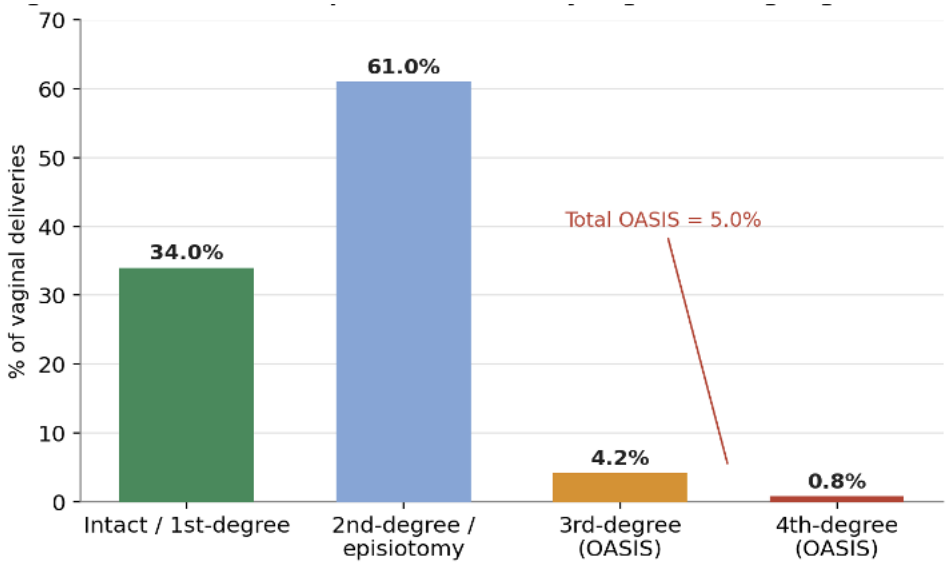

Figure 1. Distribution of perineal trauma by degree among vaginal deliveries

3.2 Risk factors — univariate analysis

Cases (n=150) and controls (n=300) differed significantly in parity, mode of delivery, birthweight, second-stage duration, fetal position, shoulder dystocia, and oxytocin use (**Table 2**).

Table 2. Univariate analysis of risk factors (cases vs controls).

Factor	Cases n=150	Controls n=300	Crude OR (95% CI)	P
Nulliparity	105 (70.0%)	90 (30.0%)	5.44 (3.55–8.34)	<0.001
Forceps delivery	36 (24.0%)	15 (5.0%)	6.00 (3.18–11.3)	<0.001
Vacuum delivery	33 (22.0%)	30 (10.0%)	2.54 (1.49–4.34)	0.001
Birthweight >4 kg	39 (26.0%)	36 (12.0%)	2.58 (1.56–4.26)	<0.001

Factor	Cases n=150	Controls n=300	Crude OR (95% CI)	P
Prolonged second stage	45 (30.0%)	48 (16.0%)	2.25 (1.41–3.59)	0.001
Occipito-posterior position	30 (20.0%)	27 (9.0%)	2.53 (1.44–4.44)	0.001
Shoulder dystocia	18 (12.0%)	18 (6.0%)	2.14 (1.08–4.24)	0.027
Oxytocin augmentation	66 (44.0%)	90 (30.0%)	1.83 (1.22–2.75)	0.003
Epidural analgesia	30 (20.0%)	69 (23.0%)	0.84 (0.52–1.36)	0.48

3.3 Risk factors — multivariable analysis

After adjustment, forceps delivery (aOR 6.20), nulliparity (aOR 5.80), occipito-posterior position (aOR 2.44), birthweight >4 kg (aOR 2.30), prolonged second stage (aOR 2.00), shoulder dystocia (aOR 1.90), and oxytocin augmentation (aOR 1.70) remained independently associated with OASIS; epidural analgesia did not (**Table 3; Figure 2**).

Table 3. Multivariable logistic regression — independent predictors of OASIS.

Factor	Adjusted OR	95% CI	P
Forceps delivery	6.20	4.10–9.40	<0.001
Nulliparity	5.80	3.60–8.90	<0.001
Occipito-posterior position	2.44	2.05–2.90	<0.001
Birthweight >4 kg	2.30	1.85–2.85	<0.001
Prolonged second stage	2.00	1.55–2.55	<0.001
Shoulder dystocia	1.90	1.50–2.40	<0.001
Oxytocin augmentation	1.70	1.15–2.55	0.008
Epidural analgesia	0.90	0.72–1.12	0.34

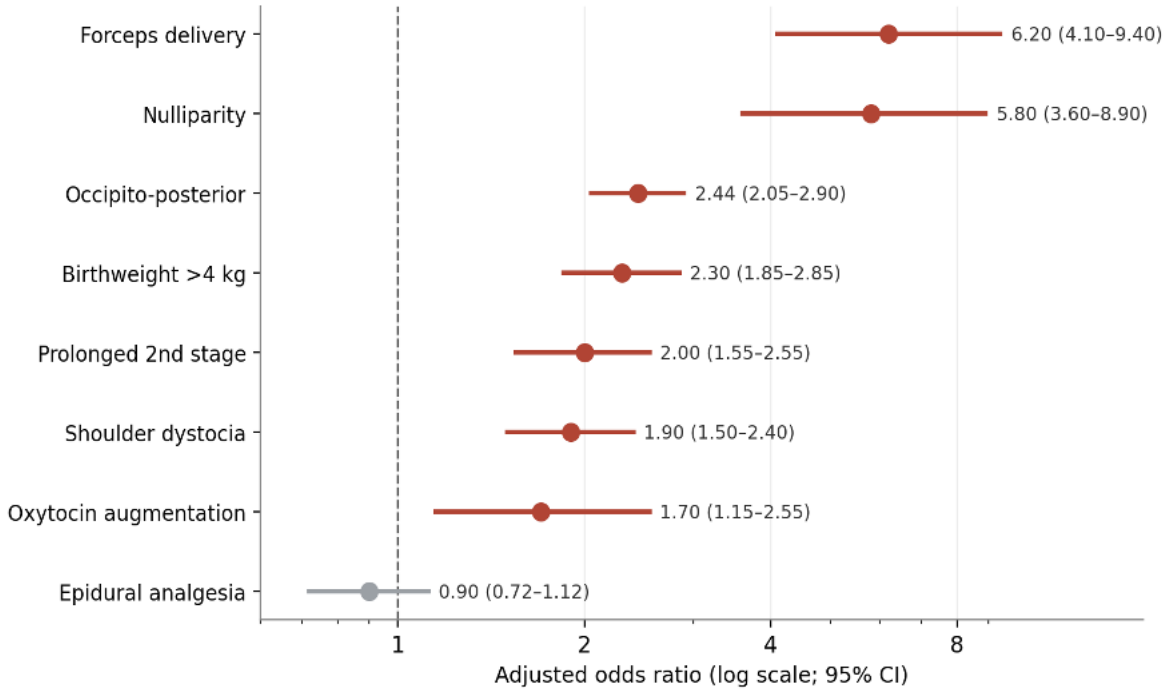

Figure 2. Independent risk factors for OASIS on multivariable analysis

3.4 OASIS by mode of vaginal delivery

The OASIS rate increased markedly with operative delivery: 3.0% after spontaneous, 9.5% after vacuum, and 16.0% after forceps delivery (**Figure 3**).

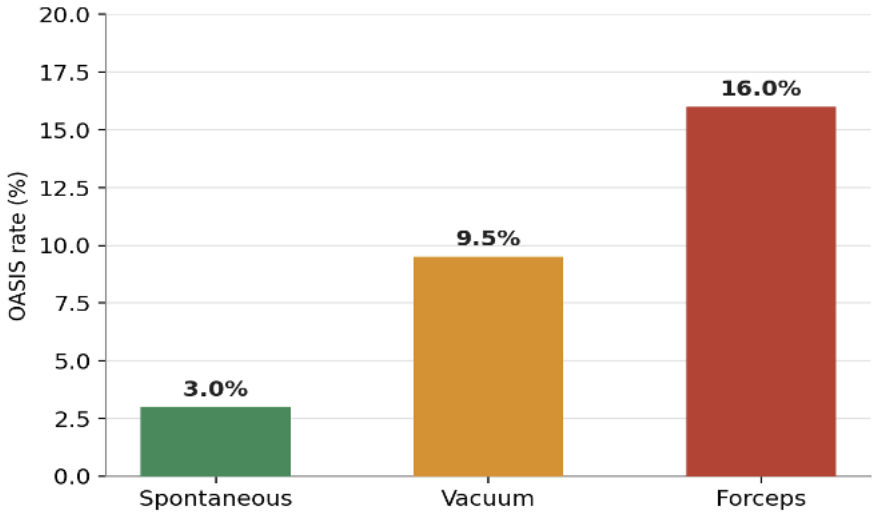

Figure 3. OASIS rate by mode of vaginal delivery .

4. Discussion

In this study, third- and fourth-degree tears complicated 5.0% of vaginal deliveries. This is broadly consistent with the pooled meta-analytic incidence of 3.8% [5] and somewhat above the RCOG figure of 2.9% [1], and within the wide range (0.6–19.3%) reported internationally [4]. Where a local rate appears low, under-detection from omission of routine rectal examination must be considered before concluding that incidence is genuinely low [1].

The dominant role of operative vaginal delivery — particularly forceps — mirrors the literature, in which forceps without episiotomy carries an odds ratio of around 6.5 and the highest-risk scenario (primiparous forceps) reaches ~19% [1,5,7]. Nulliparity was a strong independent risk factor, consistent with reported relative risks of approximately 5–7 [1,6]. Fetal macrosomia (>4 kg), occipito-posterior position, prolonged second stage, and shoulder dystocia were independently associated, each in line with published effect sizes [1,6,7]. Epidural analgesia was not independently associated, consistent with the conflicting evidence in the literature, where both protective and harmful associations have been reported [6,16].

These findings carry actionable implications for a teaching hospital. Mediolateral episiotomy at a correct angle (~60°) is protective specifically during instrumental delivery [8,9]; structured manual perineal protection programmes have reduced OASIS by up to half [10]; and a care-bundle approach achieved a roughly 20% relative reduction in a large multicentre study [11]. Selective rather than routine episiotomy is preferred, as routine use does not prevent OASIS and increases overall severe trauma [12,13]. Given the high background of operative delivery and macrosomia observed here, these measures, combined with routine post-delivery rectal examination to improve detection, are the most promising interventions [1,14].

4.1 Strengths and limitations

Strengths include the use of a standard classification, a complete-population incidence estimate, and a multivariable analysis identifying independent predictors in line with STROBE [15]. The single-centre retrospective design limits generalizability; record-based ascertainment may misclassify OASIS where rectal examination was not routine; and long-term continence outcomes were not assessed. Local Iraqi OASIS-specific data remain scarce, limiting direct regional comparison [14].

5. Conclusion

Third- and fourth-degree perineal tears affected 5.0% of vaginal deliveries at this centre, driven mainly by operative vaginal delivery, nulliparity, fetal macrosomia, occipito-posterior position, prolonged second stage, and shoulder dystocia. Selective mediolateral episiotomy at ~60° during instrumental delivery, structured manual perineal protection, judicious second-stage management, and routine post-delivery rectal examination are recommended to reduce incidence and improve detection. Prospective multicentre studies with long-term continence follow-up are warranted in Iraq.

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