OBSTETRICS

The Incidence and Risk Factors of Obstetrics anal Sphincter Injuries at King Chulalongkorn Memorial Hospital during 2017-2019

Tanapat Manee, M.D.*,
Suvit Bunyavejchevin, M.D., MHS.*,
Purim Ruanphoo, M.D., PhD.*,
Keerati Chiengthong, M.D.*,
Parima Manusook, M.D.*

* Female Pelvic Medicine and Reconstructive Surgery Division, Departments of Obstetrics and Gynecology, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand

ABSTRACT

Objectives: To study the incidence and risk factors of obstetrics anal sphincter injuries (OASIS) during 1 January 2017 to 31 December 2019

Materials and Methods: A retrospective study of all pregnant woman with vaginal delivery (6,714 cases) at King Chulalongkorn Memorial Hospital during 2017-2019 were conducted. We collected the data of all pregnant women who delivered in our hospital since 1 January 2017 to 31 December 2019, using International Classification of Diseases, Tenth Revision (ICD 10) codes for data extraction and review. The case group comprised of pregnant women with an OASIS (third- degree and fourth-degree perineal laceration). The control group comprised of pregnant women delivered vaginally without OASIS.

Results: The incidence of OASIS was 6% (403/6,714). The significant risk factors are nulliparity vs multiparity (adjusted odds ratio (aOR) 3.0, 95% confidence interval (CI) 2.3-4.0, $p < 0.01$), obesity vs normal BMI (aOR 0.5, 95%CI 0.3-0.7, $p < 0.01$), forceps extraction vs spontaneous delivery (aOR 4.5, 95% CI 3.1-6.5, $p < 0.01$), occiput posterior vs occiput anterior position (aOR 2.3, 95%CI 1.2-4.3, $p = 0.01$), median episiotomy vs no episiotomy (aOR 2.3, 95%CI 1.3-4.3, $p = 0.01$), staff vs nurses (aOR 11.1, 95%CI 5.0-25.0, $p < 0.01$), residents vs nurses (aOR 13.3, 95%CI 5.9-30.2, $p < 0.01$), and medical student vs nurses (aOR 3.5, 95%CI 1.3-9.6, $p = 0.01$).

Conclusion: The risk factors of OASIS were nulliparity, occiput posterior postition, forceps extraction, median episiotomy, residents and staffs (as the operators). The protective factors were obesity and nurses. Preventive strategies for these factors are advocated.

Keywords: incidence, median episiotomy, nulliparity, obstetric anal sphincter injuries, risk factors.

Correspondence to: *Suvit Bunyavejchevin, M.D., MHS., Female Pelvic Medicine and Reconstructive Surgery Division, Departments of Obstetrics and Gynecology, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand. E-mail: suvit.b@chula.ac.th*

อุบัติการณ์และปัจจัยเสี่ยงของการบาดเจ็บของหูรูดทวารหนักในสูติศาสตร์ในโรงพยาบาลจุฬาลงกรณ์ปี พ.ศ.2560-2562

ธนพัฒน์ มณี, สุวิทย์ บุณยะเวชชีวิน, ปุริม เรือนภู่, กีรติ เชียงทอง, พริมา มนูสุข

บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาอุบัติการณ์ และปัจจัยเสี่ยงของการเกิดการฉีกขาดของฝีเย็บหลังคลอดระยะที่ 3 และ 4 ในหญิงตั้งครรภ์ (OASIS)

วัสดุและวิธีการ: เก็บรวบรวมข้อมูลของหญิงตั้งครรภ์คลอดธรรมชาติทุกคน (6,714 คน) ที่โรงพยาบาลจุฬาลงกรณ์ระหว่างปี พ.ศ 2560-2562 ผ่านเวชระเบียนอิเล็กทรอนิกส์ ได้ทำการรวบรวมข้อมูลของสตรีตั้งครรภ์ที่คลอดที่โรงพยาบาล ตั้งแต่วันที่ 1 มกราคม พ.ศ. 2560 ถึง 31 ธันวาคม พ.ศ. 2562 โดยใช้รหัส ICD 10 ในการคัดเลือกและทบทวนข้อมูล กำหนดให้กลุ่มที่ต้องการศึกษาได้แก่สตรีที่มีภาวะOASIS(การฉีกขาดของฝีเย็บหลังคลอดระยะที่ 3 และ 4) โดยกลุ่มเปรียบเทียบประกอบด้วยสตรีตั้งครรภ์ที่คลอดโดยไม่มีภาวะ OASIS

ผลการศึกษา: การศึกษาพบว่าอุบัติการณ์ของการเกิดการฉีกขาดของฝีเย็บหลังคลอดระยะที่ 3 และ 4 ในหญิงตั้งครรภ์ (OASIS) จำนวน 403 คนจาก 6,714 คน คิดเป็นร้อยละ 6 โดยพบว่าปัจจัยเสี่ยงที่มีนัยสำคัญทางสถิติได้แก่ สตรีที่ไม่เคยคลอดบุตร [adjusted odds ratio (aOR) 3.0, 95% confidence interval (CI) 2.3-4.0, $p < 0.01$] ภาวะอ้วน (aOR 0.5, 95%CI 0.3-0.7, $p < 0.01$) การช่วยคลอดด้วยคีม (aOR 4.5, 95%CI 3.1-6.5, $p < 0.01$) ศีรษะในท่าท้ายทอยเฉียงหลัง (aOR 2.3, 95%CI 1.2-4.3, $p = 0.01$) การตัดฝีเย็บแนวกลาง (aOR 2.3, 95%CI 1.2-4.3, $p = 0.01$) อาจารย์แพทย์ (aOR 11.1, 95%CI 5.0-25.0, $p < 0.01$) แพทย์ประจำบ้าน (aOR: 13.3, 95%CI 5.9-30.2, $p < 0.01$) และนักศึกษาแพทย์ (aOR: 3.5, 95%CI 1.3-9.6, $p = 0.01$)

สรุป: ในการศึกษานี้พบว่าปัจจัยเสี่ยงของการเกิดการฉีกขาดของฝีเย็บหลังคลอดระยะที่ 3 และ 4 ในหญิงตั้งครรภ์ (OASIS) ได้แก่ สตรีที่ไม่เคยคลอดบุตร ทารกในท่าศีรษะเฉียงหลัง การช่วยคลอดด้วยคีม การตัดฝีเย็บแนวกลาง แพทย์ประจำบ้าน และอาจารย์แพทย์ ส่วนปัจจัยป้องกันได้แก่ ภาวะอ้วนและพยาบาลผู้ทำคลอด ควรหาแนวทางป้องกันในผู้มีปัจจัยเสี่ยงเหล่านี้

คำสำคัญ: อุบัติการณ์, การตัดฝีเย็บแนวกลาง, สตรีที่ไม่เคยคลอดบุตร, การฉีกขาดของฝีเย็บหลังคลอดระยะที่ 3 และ 4, ปัจจัยเสี่ยง

Introduction

Obstetric perineal laceration is one of the most common maternal complications during vaginal delivery and it is classified by Sultan's classification of perineal trauma according to its depth[1]. There are four categories included in the classification: 1st, 2nd, 3rd, and 4th degree laceration. Obstetric anal sphincter injuries (OASIS) are defined as third-degree and fourth-degree perineal laceration[2]. Of all obstetric perineal laceration, OASIS has greater impacts on maternal morbidities such as blood loss, puerperal pain, wound disruption, infection rate, and particularly fecal incontinence in the long term[2]. The incidence of OASIS in the general populations ranges from 0.3 to 4.5%[3-7] and the risk of recurrence is higher and varies between 5.1 to 10.7%[8]. In 2015, Royal college of obstetricians and Gynecologists (RCOG)[9] published the green top guidelines for management of third- and fourth-degree tears and identified the risk factors of OASIS which included Asian ethnicity, nulliparity, birth weight greater than 4 kg, shoulder dystocia, occiput posterior position, prolonged second stage of labor, and instrumental delivery. Since Asian ethnicity is the risk factor for OASIS and there is no published data of the prevalence and risk factors of OASIS in Thai pregnant woman. The aims of this study were to study the incidence and risk factors of OASIS at King Chulalongkorn Memorial Hospital during 2017-2019.

Materials and Methods

After Institutional Review Board (IRB) approval, a retrospective study was conducted at King Chulalongkorn Memorial, a tertiary center in Bangkok, Thailand. We collected the data of all pregnant women who delivered in our hospital since 1 January 2017 to 31 December 2019, using International Classification of Diseases, Tenth Revision (ICD 10) codes for data extraction and chart review. The inclusion criteria were pregnant woman with vaginal delivery in this hospital during 2017-2019, having third- and fourth-degree perineal laceration, singleton pregnancy, pregnancy with more than 22 weeks of age, and birth weight more than 500 g. The exclusion criteria were multiple gestation with vaginal delivery and cases with incomplete data. The case group comprised cases with an OASIS (third- degree and fourth-degree perineal laceration). The degree of perineal laceration was classified according to Sultan's classification of perineal trauma[1]. The control group comprised cases without OASIS. The diagnosis was made immediately following delivery, after exposure of the anal sphincter using digital vaginal and rectal examination. The maternal and obstetric characteristics studied were age, parity, second stage of labor, body weight, height, body mass index, total weight gain during pregnancy, episiotomy type, use of operative vaginal deliveries, degree of perineal laceration, neonatal factors including fetal presentation, birth weight, sex, and level of operator.

Statistical analysis

The descriptive data analysis was represented as mean ± standard deviation (SD) and percentage. The comparative data analysis used chi square for categorical data and student t-test for continuous data to estimate the risk significance ($p < 0.05$) and crude odds ratio. The significant risk factors were analyzed again with multivariate logistic regression model to evaluate the adjusted odds ratio. All data was entered and analyzed using SPSS version for window (version 28.0, SPSS Inc., Armonk, NY, USA).

Results

Of 7,171 cases with vaginal delivery since 1 January 2017 to 31 December 2019 extracted by ICD 10 codes (Fig. 1), 96 women were excluded from the study (67 women had newborn with birth weight less than 500 g or less than 22 weeks of gestational age, 27 women with multiple gestation and 2 women with cesarean delivery), and the total missing or incomplete data of 361 cases were excluded. Of 6,714 cases, 338 cases had third-degree perineal laceration, and 65 cases had fourth degree perineal laceration. The incidence of OASIS was 6.0% (403/6,714).
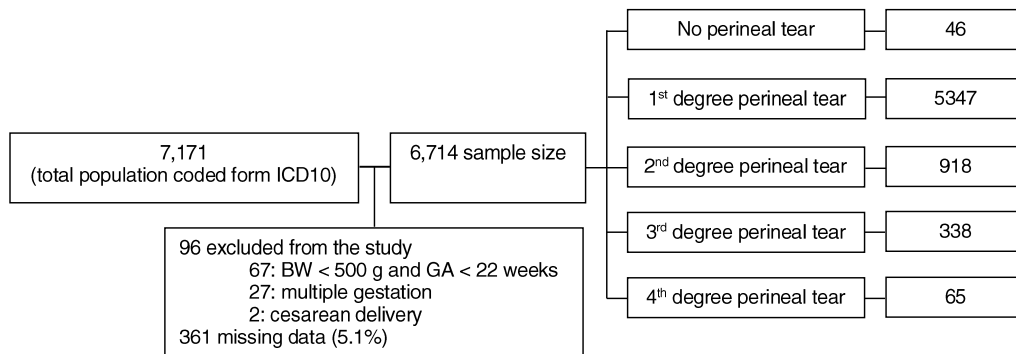
No perineal tear — 46
1st degree perineal tear — 5347
2nd degree perineal tear — 918
3rd degree perineal tear — 338
4th degree perineal tear — 65

7,171 (total population coded form ICD10) → 6,714 sample size

96 excluded from the study
67: BW < 500 g and GA < 22 weeks
27: multiple gestation
2: cesarean delivery
361 missing data (5.1%)

Fig. 1. Population flow.

From the bivariate analyses (Table 1), the OASIS was higher among pregnant women with higher gestational age (38.3 ± 1.4 vs 38.0 ± 1.7 years), higher weight gain (14.0 ± 5.0 vs 13.2 ± 4.8 kgs), nulliparous (80.9% vs 53.2%), lower body mass index (21.0 ± 3.2 vs 21.7 ± 4.1 kg/m^2), occiput posterior (6.7% vs 0.4%), forceps extraction (23.6% vs 2.6%), vacuum extraction (1.7% vs 0.6%), median episiotomy (52.1% vs 21.3%), staffs as operator (24.3% vs 8.5%), residents as operator (71.5% vs 57.2%), and the second stage of labour 60-120 minutes (0.7% vs 0.2%) and > 120 minutes (3% vs 0.4%) (Table 1).

Table 1. Baseline characteristics (n = 6,714).

Variables	No OASIS n = 6,311	OASIS n = 403	p value
Age	29.1 ± 6.0	29.8 ± 5.7	0.68
< 35 years old	5,018 (79.5%)	317 (78.7%)	
≥ 35 years old	1,293 (20.5%)	86 (21.3%)	
Gestational age	38.0 ± 1.7	38.3 ± 1.4	0.01
Birth weight ≥ 4 kg	72 (1.1%)	5 (1.2%)	0.86
Birth weight < 4 kg	6,239 (98.9%)	398 (1.2%)	
Weight gain	13.2 ± 4.8	14.0 ± 5.0	<0.01
Parity			<0.01
Nulliparous (0)	3,358(53.2%)	326(80.9%)	
Multiparous (≥ 1)	2,953(46.8%)	77(19.1%)	
Height	158.8 ± 5.7	158.3 ± 5.5	0.80
< 140 cm	-	-	
≥ 140 cm	6,310 (100%)	403 (100%)	
Body mass index	21.7 ± 4.1	21.0 ± 3.2	< 0.01
< 18.5kg/m^2 (underweight)	1271 (20.1%)	85 (21.1%)	
18.5-22.9 kg/m^2 (normal)	3159 (50.1%)	226 (56.1%)	
23-24.9 kg/m^2 (overweight)	805 (12.8%)	53 (13.2%)	
≥ 25kg/m^2 (obesity)	1,076 (17%)	39 (9.6%)	
Sex			0.42
Male	3,299 (52.3%)	219 (54.3%)	
Female	3, 012 (47.7%)	184 (45.7%)	
Presentation			< 0.01
Cephalic			

Variables	No OASIS n = 6,311	OASIS n = 403	p value
Occiput anterior	6,265 (99.3%)	376 (93.3%)	
Occiput posterior	28 (0.4%)	27 (6.7%)	
Breech	18 (0.3%)	-	
Shoulder dystocia			0.72
No shoulder dystocia	6,309 (100%)	403 (100%)	
Shoulder dystocia	2 (0.0%)	-	
Operative vaginal delivery			< 0.01
Spontaneous labor	6,016 (96.8%)	301 (74.7%)	
Forceps extraction	164 (2.6%)	95 (23.6%)	
Vacuum extraction	41 (0.6%)	7 (1.7%)	
Type of episiotomy			< 0.01
No episiotomy	610 (9.7%)	12 (3%)	
Median episiotomy	1,344 (21.3%)	210 (52.1%)	
Mediolateral episiotomy	4,357 (69.0%)	181 (44.9%)	
Level of operator			< 0.01
Residents	3,607 (57.2%)	288 (71.5%)	
Nurses	1,493 (23.7%)	6 (1.5%)	
Medical student	674 (10.7%)	11 (2.7%)	
Staff	537 (8.5%)	98 (24.3%)	
The second staged labor			
< 60 minutes	6,278 (99.5%)	388 (96.3%)	
60-120 minutes	10 (0.2%)	3 (0.7%)	
>120 minutes	23 (0.4%)	1 2(3%)	

Data presented as mean ± standard deviation, n (%)

By using multiple logistic regression model, the risk factors that associated with OASIS were nulliparity vs multiparity (adjusted OR 3.0, 95%CI 2.3-4.0, p < 0.01), obesity vs normal BMI (adjusted OR 0.5, 95%CI 0.3-0.7, p < 0.01), forceps extraction vs spontaneous delivery (adjusted OR 4.5, 95%CI 3.1-6.5, p < 0.01), occiput posterior vs occiput anterior position (adjusted OR 2.3, 95%CI 1.2-4.3, p = 0.01), median episiotomy vs no episiotomy (adjusted OR 2.3, 95%CI 1.3-4.3, p = 0.01), median episiotomy vs mediolateral episiotomy (adjusted OR 2.0, 95%CI 1.6-2.6, p < 0.01), the levels of operators (staff vs nurses) (adjusted OR 11.1, 95%CI 5.0-25.0, p < 0.01), the levels of operators (staff vs medical student) (adjusted OR 3.3, 95%CI 1.6-6.3, p = 0.01), the levels of operators (residents vs nurses) (adjusted OR 13.3, 95%CI 5.9-30.2, p < 0.01), the levels of operators (residents vs medical student) (adjusted OR 3.8 95% CI 1.3-9.6, p = 0.01), and the levels of operators (medical student vs nurses)(adjusted OR 3.5, 95% CI 1.3-9.6, p = 0.01). (Table 2)

Table 2. Secondary outcomes (n= 6,714).

Variables	Univariate analysis for risk factors of OASIS		Multivariate analysis for risk factors of OASIS	
	p value	Crude OR (95%CI)	p value	Adjusted OR (95%CI)
Gestational age	0.01	1.1 (1.0-1.2)	-	-
Weight gain	< 0.01	1.1 (1.0-1.1)	-	-
Body mass index				
Underweight vs normal	0.61	0.9 (0.7-1.2)	-	-
Overweight vs normal	0.60	0.9 (0.7-1.3)	-	-
Obesity vs normal	< 0.01	0.5 (0.4-0.7)	< 0.01	0.5 (0.3-0.7)
Nulliparity vs multiparity	0.01	3.7 (2.9-4.8)	< 0.01	3.0 (2.3-4.0)
Fetal presentation				
OP vs occiput anterior presentation	< 0.01	16.1 (9.4-27.5)	0.01	2.3 (1.2-4.3)
Breech vs occiput anterior presentation	0.30	0.9 (0.9-1.0)	-	-
OVD				
Forceps extraction vs no OVD	< 0.01	11.8 (8.9-15.5)	< 0.01	4.5 (3.1-6.5)
Vacuum extraction vs no OVD	0.01	3.5 (1.5-7.8)	-	-
Type of episiotomy				
Median vs no episiotomy	< 0.01	7.9 (4.4-14.3)	0.01	2.3 (1.6-4.3)
Mediolateral vs no episiotomy	0.01	2.1 (1.2-3.8)	-	-
Median vs mediolateral episiotomy	< 0.01	3.8 (3.1-4.6)	< 0.01	2.0 (1.6-2.6)
Level of operator				
Staff vs residents	< 0.01	2.3 (1.8-2.9)	-	-
Staff vs nurses	< 0.01	50 (20.0-100.0)	< 0.01	11.1 (5.0-25.0)
Staff vs medical student	< 0.01	22.2 (5.8-20.0)	0.01	3.3 (1.6-6.3)
Residents vs nurses	< 0.01	19.9 (8.8-44.7)	< 0.01	13.3 (5.9-30.2)
Medical student vs nurses	< 0.01	4.1 (1.5-11.0)	0.01	3.5 (1.3-9.6)
Residents vs medical student	< 0.01	4.9 (2.7-9.0)	< 0.01	3.8 (2.1-7.1)
The second staged labor				
60 -119 mins vs < 60 mins	0.01	49 (1.3-17.7)	-	-
> 120 mins vs < 60 mins	< 0.01	8.4 (4.2-17.1)	-	-

OASIS: obstetric anal sphincter injuries, BMI: body mass index, OP: occiput posterior, OVD: operative vaginal delivery, OR: odd ratio, CI: confidence interval.

For nulliparous subgroup analysis, the incidence of OASIS in nulliparous group was 8.8%. The occiput posterior, median episiotomy and staffs and residents as the operator were higher in the OASIS group. The second stage of labor, height and shoulder dystocia were not included in the analysis due to the lack of sample or small sample in the reference group (Table 3).

Table 3. Baseline characteristics for nulliparity.

Variables	No OASIS (n = 3,358)	OASIS (n = 326)	p value
Age	27.4 ± 5.9	29.3 ± 5.6	< 0.01
< 35 years old	3,358 (100%)	326 (100%)	
≥ 35 years old	-	-	
Gestational age	37.9 ± 1.9	38.3 ± 1.4	0.02
Birth weight ≥ 4kg	11 (0.3%)	1 (0.3%)	0.95
Birth weight < 4 kg	3347 (99.7)	325 (99.7%)	
Weight gain	13.3 ± 4.8	14.1 ± 5.0	< 0.01
Height			-
< 140 cm	-	-	
≥ 140 cm	3,358 (100%)	326 (100%)	
Body mass index	21.14 ± 3.8	20.75 ± 3.1	< 0.01
< 18.5kg/m^2 (underweight)	842 (25.1%)	77 (23.6%)	
18.5-22.9 kg/m^2 (normal)	1,703 (50.7%)	184 (51.2%)	
23-24.9 kg/m^2 (overweight)	356 (10.6%)	43 (13.2%)	
≥ 25kg/m^2 (obesity)	457 (13.6%)	22 (6.7%)	
Sex			0.76
Male	1,780 (53.1%)	177 (54.3%)	
Female	1,578 (46.9%)	149 (45.9%)	
Presentation			
Cephalic			
Occiput anterior	3,327 (99.1%)	303 (92.9%)	
Occiput posterior	19 (0.6%)	23 (7.1%)	

Variables	No OASIS (n = 3,358)	OASIS (n = 326)	p value
Breech	12 (0.4%)	-	
Shoulder dystocia			-
No shoulder dystocia	3,357 (100%)	326 (100%)	
Shoulder dystocia	1 (0%)	-	
Operative vaginal delivery			< 0.01
Spontaneous labor	3,196 (95.2%)	233 (93.1%)	
Forceps extraction	128 (3.8%)	86 (5.8%)	
Vacuum extraction	34 (1%)	7 (1.1%)	
Type of episiotomy			< 0.01
No episiotomy	119 (3.5%)	5 (1.5%)	
Median episiotomy	813 (24.2%)	177 (54.3%)	
Mediolateral episiotomy	2,426 (72.3%)	144 (44.2%)	
Level of operators			< 0.01
Residents	2,071 (61.7%)	231 (70.9%)	
Nurses	608 (18.1%)	3 (0.9%)	
Medical student	351 (10.5%)	5 (1.5%)	
Staff	328 (9.8%)	87 (26.7%)	
The second staged labor			-
< 60 minutes	3,358 (100%)	326 (100%)	
60-120 minutes	-	-	
> 120 minutes	-	-	

Data presented as mean ± standard deviation, n (%). OASIS: obstetric anal sphincter injuries

The significant factors of OASIS in nulliparity (Table 4) were included in adjusted analyses by multiple logistic regression model, the factors that associated with OASIS in the nulliparous subgroup were: obesity vs normal body mass index (BMI) (adjusted OR 0.4, 95%CI 0.2-0.6, p < 0.01), occiput posterior postition vs occiput anterior postition (adjusted OR 2.3, 95%CI 1.1-4.7, p = 0.02), forceps extraction vs spontaneous delivery (adjusted OR 4.6, 95%CI 3.2-6.8, p < 0.01), median episiotomy vs mediolateral episiotomy (adjusted OR 2.0, 95%CI 1.5-2.7, p < 0.01), the level of operators (staff vs nurses) (adjusted OR 16.7, 95%CI 5.0-5.00, p < 0.01), the level of operators (staff vs medical student) (adjusted OR 5.6, 95%CI 2.1-14.3, p < 0.01), the level of operators (residents vs nurses) (adjusted OR 17.7, 95%CI 5.6-55.9, p < 0.01) and the level of operators (residents vs medical student) (adjusted OR 4.4, 95%CI 1.6-12.1, p < 0.01).

Table 4. Subgroup analysis for nulliparity.

Variables	Univariate analysis for risk factors of OASIS		Multivariate analysis for risk factors of OASIS	
	p value	Crude OR (95%CI)	p value	Adjusted OR (95%CI)
Gestational age	< 0.01	1.1 (1.0-1.21)	-	-
Weight gain	0.02	1.0 (1.0-1.1)	-	-
BMI				
Underweight vs normal	0.74	1.1 (0.8-1.4)	-	-
Overweight vs normal	0.67	1.0 (0.8-1.6)	-	-
Obesity vs normal	< 0.01	0.5 (0.3-0.7)	< 0.01	0.4 (0.2-0.6)
Fetal presentation				
OP vs occiput anterior presentation	< 0.01	13.3 (7.2-24.8)	0.02	2.3 (1.1-4.7)
Breech vs occiput anterior presentation	0.28	0.9 (0.9-0.9)	-	-
OVD				
Forceps extraction vs no OVD	< 0.01	9.2 (6.8-12.5)	< 0.01	4.6 (3.2-6.8)
Vacuum extraction vs no OVD	0.06	2.15 (0.9-4.9)	-	-
Type of episiotomy				
Median vs no episiotomy	< 0.01	5.2 (2.1-12.9)	-	-
Mediolateral vs no episiotomy	0.46	1.4 (0.6-3.5)	-	-
Median vs mediolateral episiotomy	< 0.01	3.7 (2.9-4.6)	< 0.01	2.0 (1.5-2.7)
Level of operator				
Staff vs residents	< 0.01	2.4 (1.8-3.1)	-	-
Staff vs nurses	< 0.01	50 (16.7-100.0)	< 0.01	16.7 (5.0-50.0)
Staff vs medical student	< 0.01	20.0 (7.7-50.0)	< 0.01	5.6 (2.1-14.3)
Residents vs nurses	< 0.01	22.6 (7.2-70.9)	< 0.01	17.7 (5.6-55.9)
Residents vs medical student	< 0.01	7.8 (3.2-19.1)	< 0.01	4.4 (1.6-12.1)
Medical student vs nurses	0.13	2.9 (0.7-12.2)	-	-

OASIS: obstetric anal sphincter injuries, BMI: body mass index, OP: occiput posterior, OVD: operative vaginal delivery, OR: odd ratio, CI: confidence interval.

Discussion

In this study, the prevalence of OASIS was 6.0%, which was higher than previously reports[3-7]. The incidence of OASIS was 0.32% in Hong Kong[3], 0.34% in Croatia[6], 1.2% in France[7], 2.1% in India[5], and 4.5% in America[4]. This can be explained by the high prevalence of episiotomy and high prevalence of median episiotomy in our center. The incidence of OASIS varies according to the episiotomy protocol (selective/ routine use) of each center and country policy. The risk factors of OASIS in this study were nulliparity, occiput posterior presentation, forceps extraction, median episiotomy, residents and staff (as the operators). The protective factors were obesity and nurses. Our findings were similar to the previous reports4 except for the median episiotomy. The median episiotomy is still utilized in our center because of its advantages such as less perineal pain, less blood loss, quick episiotomy repair, and for cosmetic purposes. Due to the increasing risk of OASIS by median episiotomy, many guidelines suggest avoiding this episiotomy technique[9-11]. Our study confirmed the significance of the median episiotomy as the risk factor of OASIS in both total

population and in nulliparous subgroup. Hospital policy and campaign to avoid median episiotomy is now going at our center after the result of this study was recognized.

In nulliparous subgroup analysis, we found that risk factors of OASIS were occiput posterior postition, forceps extraction, median episiotomy, and staff. In contrast to other studies[3-7], we found that the obese pregnant women were less likely to experience OASIS compared to the normal BMI pregnant women. Due to the degree of obstetric perineal laceration classified by the depth, it could be explained that the obesity was a protective factor for OASIS because obese women posed thicker subcutaneous layer. Moreover, OASIS was more common when the residents and staff were the operators. This could be explained by the fact that they were responsible for more difficult or high-risk cases, compared to the nurses and medical students. Similar to the other studies, nulliparity and operative vaginal deliveries were shown to be the common risk factors[3-7]. Contrary to the study in India[5], shoulder dystocia was not identified as the risk factor of OASIS in our population. This can be explained by the very low incidence of shoulder dystocia (only 2/6,714 cases) at King Chulalongkorn Memorial Hospital.

After nulliparity subgroup analysis, we found the higher incidence of OASIS (8.8%) than the total population (6.0%), which was similar to the other reports[4, 5, 7]. The other risk factors (occiput posterior position, forceps extraction, and median episiotomy) were found to be common in both nulliparous subgroup and in the total population group in this study. The high prevalence of OASIS in our center should be recognized, concerned, and solved. OASIS represents a morbidity encountered after vaginal delivery. This problem should be raised concern by the delivery room personnel. Many intrapartum measures can be taken to decrease the risk of occurrence. The preventive strategies of OASIS such as perineal massage at the antenatal period, Kegel exercise at the antenatal period, intrapartum warm compression, manual protection of perineal during crowning, restrict

episiotomy, and avoid median episiotomy are now being conducted at our center. These OASIS preventive strategies are advocated in every hospital to avoid the short term (infection, wound breakdown, perineal pain, urinary retention, and defecation problems) and long term sequelae (dyspareunia and sexual dysfunction) that can worsen quality of life of women.

The strength of this study

Our study included the total population during 2017-2019. This represents the real prevalence of OASIS. The high percentage of complete data enabled analysis of the multiple risk factors to produce reliable results.

Limitation of this study

Due to the retrospective cohort design, there was lack of some data such as the perineal protection, angle of episiotomy, and subtype of the third-degree laceration. Due to the single hospital study design, the result of this study is unable to represent the other hospitals in different parts of Thailand. The nation-wide study is advocated for further evaluation of OASIS prevalence in Thailand for finding national prevention program for OASIS in the future.

Conclusion

The risk factors of OASIS were nulliparity, occiput posterior position, forceps extraction, median episiotomy, residents and staffs (as the operators). The protective factors were obesity and nurses. Preventive strategies for these factors are advocated.

Potential conflicts of interest

The authors declare no conflicts of interest.

References

1. Sultan AH, Monga A, Lee J, Emmanuel A, Norton C, Santoro G, et al. An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for female anorectal dysfunction. Int Urogynecol J 2017;28:5-31.

2. Fornell EU, Matthiesen L, Sjödahl R, Berg G. Obstetric anal sphincter injury ten years after: subjective and objective long-term effects. BJOG 2005;112:312-6.

3. Tung CW, Cheon WC, Tong WMA, Leung HY. Incidence and risk factors of obstetric anal sphincter injuries after various modes of vaginal deliveries in Chinese women. Chin Med J (Engl) 2015;128: 2420-5.

4. Meister MRL, Cahill AG, Conner SN, Woolfolk CL, Lowder JL. Predicting obstetric anal sphincter injuries in a modern obstetric population. Am J Obstet Gynecol 2016;215:310.e1-7.

5. Gundabattula SR, Surampudi K. Risk factors for obstetric anal sphincter injuries (OASI) at a tertiary centre in south India. Int Urogynecol J 2018;29: 391–6.

6. Djaković I, Ejubović E, Bolanča I, Markuš-Sandrić M, Bečić D, Djaković Ž, et al. Third and fourth degree perineal tear in four-year period at Sestre Milosrdnice University Hospital Center, Zagreb, Croatia. Open Access Maced J Med Sci 2018;6:1067–71.

7. Mahgoub S, Piant H, Gaudineau A, Lefebvre F, Langer B, Koch A. Risk factors for obstetric anal sphincter injuries (OASIS) and the role of episiotomy: A retrospective series of 496 cases. J Gynecol Obstet Hum Reprod 2019;48:657–62.

8. Thubert T, Cardaillac C, Fritel X, Winer N, Dochez V. Definition, epidemiology and risk factors of obstetric anal sphincter injuries: CNGOF Perineal Prevention and Protection in Obstetrics Guidelines. Gynecol Obstet Fertil Senol 2018;46:913–21.

9. Royal College of Obstetricians and Gynecologists (RCOG). The management of third and fourth- degree perineal tears, green-top guideline No.29, June 2015.

10. Hartmann K, Viswanathan M, Palmieri R, Gartlehner G, Thorp J Jr, Lohr KN. Outcomes of routine episiotomy: a systematic review. JAMA 2005;293: 2141-8.