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ORIGINAL ARTICLE

Reducing obstetric anal sphincter injuries using perineal support: our preliminary experience

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Abstract
Introduction and hypothesis Obstetric anal sphincter injuries (OASIs) are associated with significant short-term and long-term morbidity. Over the past decade, there has been a steady rise in the rate of OASIs. There is therefore a compelling need to identify strategies to minimize OASIs. The objective of this study was to determine if perineal support at the time of vaginal delivery can reduce the incidence and severity of OASIs.
Methods All labour ward staff including midwives and doctors were invited to train in the technique of perineal support during vaginal delivery. Two experts from Norway conducted workshops with practical hands-on training on pelvic models. The midwives and doctors underwent further training with women in labour, and mandatory training was continued within the department. All midwives and doctors were instructed to support the perineum during both spontaneous and assisted vaginal delivery.
Results From April 2011 to November 2014, 11,135 women underwent vaginal delivery. The OASI rate decreased from 4.7 % to 4.1 % ($p = 0.11$). There was a significant reduction (0.9 % to 0.3 %, $p < 0.001$) in 3c third-degree and fourth-degree tears (major OASIs). In a multivariate analysis, perineal support was associated with a significant reduction in the rates of OASIs (23 %; OR 0.77, 95 % CI 0.63 – 0.95, $p = 0.01$]) and major OASIs (71 %; OR 0.34, 95 % CI 0.17 – 0.69, $p = 0.03$).
Conclusions This interventional study showed that perineal support during vaginal delivery can reduce the risk of major OASIs. With sustained reinforcement of this intervention programme, we anticipate a further reduction in OASI rates.

Keywords OASIs · Perineal support · Prevention of OASI · Manual perineal protection

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Introduction

Obstetric anal sphincter Injuries (OASIs) are the most severe form of perineal trauma sustained during childbirth, and can have a dramatic impact on a woman's quality of life. In recent years there has been an increasing trend in the incidence of OASIs globally. In England alone there was a threefold rise in the OASI rate from 2000 to 2011 (1.8 % to 5.9 %) [1]. This increasing trend has also been reported in Wales [2], Australasia [3] and in five Scandinavian countries [4]. While some have attributed this to better recognition, documentation and management of OASIs, others have suggested that it is due to a change in obstetric practice with increasing use of the 'hands-poised' approach at delivery and restrictive episiotomy, and in women's choice of birth position [1].

OASIs are the primary risk factor for the development of anal incontinence. A systematic review has demonstrated a wide variation in the prevalence of anal incontinence in the short term (16 % to 36.7 %), which can get worse over time, and therefore has a significant impact on quality of life [5]. The degree of morbidity is directly related to the severity of perineal trauma. i.e. first-degree and second-degree perineal trauma causes less severe morbidity than OASIs [6]. Similarly, women who sustained major OASIs (3c third-degree and fourth-degree tears) have significantly worse bowel symptoms and anorectal function than women with minor OASIs (3a and 3b third-degree tears) [7]. Women with OASIs are at a fivefold increased risk of recurrence during a subsequent delivery [8]. This highlights the need for preventative strategies to reduce the OASI rate.

In Finland, the rate of OASIs has been consistently lower than in the other Nordic countries. This has been attributed to the technique described by Pirhonen et al. of manual perineal protection at the time of delivery of the head [9]. In 2004, when the National Health Agency in Norway identified an increasing trend in OASIs, a National Advisory Committee was set up to implement a pilot national intervention programme [10]. Following implementation, there was a significant reduction in the rate of OASIs [10]. However, it remains to be established whether implementation of such an interventional programme in obstetric units outside Scandinavia (where obstetric practice may be different) could result in a reduction in OASI rates. Our aim was to evaluate the effect of perineal support at the time of vaginal delivery on the rate and severity of OASIs in our setting in the UK.

Materials and methods

This was a retrospective interventional study looking at the value of perineal support at the time of delivery in our hospital. In February 2013, a consultant obstetrician and a midwife from Norway (Katriina Laine and Wenche Rotvold) were invited to train the obstetric team of midwives and doctors at Croydon University Hospital. In particular, senior midwives (supervisors) and senior doctors were invited so that they could subsequently maintain the training programme. The training consisted of theoretical lectures on the diagnosis of OASIs, the technique of perineal support, the appropriate technique to perform an episiotomy when indicated and practical hands-on training in perineal support on a model. Thereafter, supervised hands-on training was continued on women during the second stage of labour in the delivery room.

The technique [10] consists of placing the nondominant hand on the advancing head to slow down the delivery of the head during the last part of the second stage at crowning. At the same time, the dominant hand is used to support the perineum, using the thumb and index finger to squeeze lateral parts of the perineum towards the midline and the folded middle finger to press against the perineal body to reduce the pressure in the fourchette (Fig. 1). This support is continued during delivery of the head and shoulders. During delivery of the head, the woman is instructed to stop pushing and allow the delivery to progress by uterine contractions with a view to achieving a controlled delivery of the head. The perineal support is then maintained during delivery of the shoulders.

Following this training programme, all midwives and doctors were instructed to provide perineal support during spontaneous vaginal deliveries (SVD; except in water births, and in the squatting and sitting positions) and instrumental assisted vaginal deliveries (AVD). To ensure continuity of training, this programme was included in the routine mandatory training for midwives.

Demographic and obstetric data were prospectively entered into PROTOS (electronic maternity database). All women who had a vaginal delivery of a live baby after 28 weeks gestation were included in this study. Demographic variables (maternal age, parity, body mass index and gestational age) and obstetric variables (induction of labour, analgesia, duration of second stage, mode of delivery, position at delivery, episiotomy, perineal trauma in terms of the rates of both major and minor OASIs, shoulder dystocia, birth weight and head circumference) were collected from PROTOS. Exemption from ethical approval was obtained from the Croydon Research Committee, as this was a quality improvement project.

The data were analysed with SPSS version 21 (IBM Corp., Armonk NY). The chi-squared test was used to compare categorical variables and the unpaired t test was

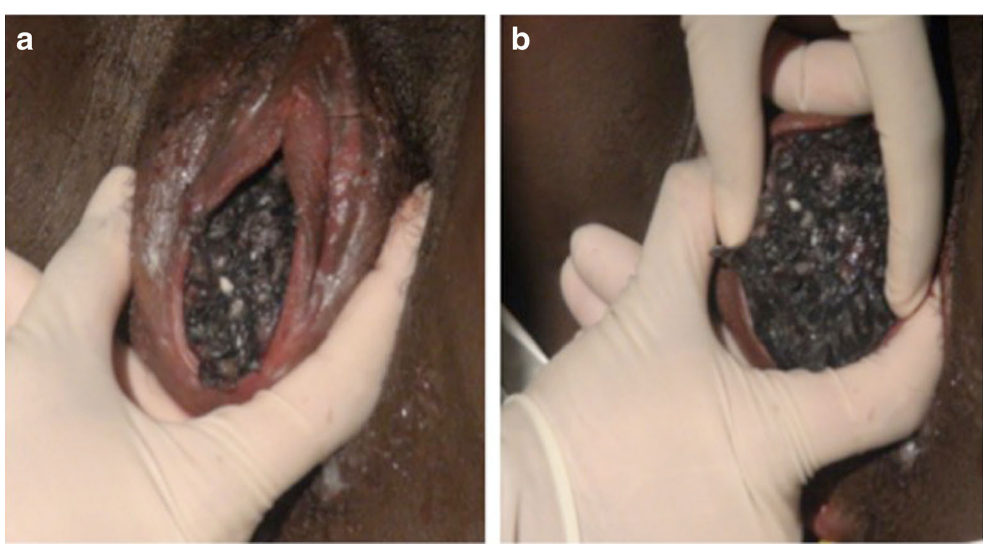

Fig. 1 The technique for manual perineal protection

Table 1 Comparison of demographic, obstetric and fetal factors in women delivering before and after the intervention

Variable	Before intervention ($n = 5,867$)	After intervention ($n = 5,268$)	*p* value	
			Unpaired *t* test	Chi-squared test
Maternal age (years), mean (SD)	29.0 (5.9)	29.3 (5.8)	0.007	
Gestational age (weeks), mean (SD)	39.7 (1.6)	39.7 (1.6)	0.24	
Ethnicity, *n* (%)				
White	2,531 (44.2)	2,209 (45.5)		0.35
Black/mixed black	1,572 (27.5)	1,265 (26)		
Asian/mixed Asian	1,199 (20.9)	1,034 (21.3)		
Mixed/other	425 (4.4)	349 (7.3)		
Body mass index (kg/m^2), *n* (%)				
18.5 – 25 (normal)	2,381 (48.6)	2,036 (48.4)		0.91
16 – 18.5 (underweight)	191 (3.9)	154 (3.7)		
25 – 30 (overweight)	1,450 (29.6)	1,244 (29.6)		
>30 (obese)	882 (18.0)	773 (18.4)		
Parity, *n* (%)				
0	1,922 (33.0)	2,015 (38.9)		<0.001
1	2,032 (34.9)	1,654 (31.7)		
2	1,142 (19.6)	889 (17.1)		
3	428 (7.3)	359 (6.9)		
4+	307 (5.3)	295 (5.7)		
Labour onset, *n* (%)				
Spontaneous	4,610 (79.9)	4,104 (79.3)		0.43
Induced	1,158 (20.1)	1,070 (20.7)		
Epidural analgesia, *n* (%)	1,087 (24.3)	1,089 (26.6)		0.02
Assisted delivery, *n* (%)				
Ventouse + forceps	1,019 (17.4)	1,049 (19.9)		0.001
Ventouse	659 (11.2)	732 (13.9)		<0.001
Forceps	360 (6.1)	317 (6.0)		0.79
Any perineal tear, *n* (%)	3,485 (60.5)	3,274 (62.5)		0.03
Position in second stage labour, *n* (%)				
All fours	102 (3.8)	135 (4.5)		0.15
Kneeling	90 (3.4)	82 (2.8)		
Lateral	110 (4.1)	111 (3.7)		
Semirecumbent	2,080 (77.7)	2,157 (72.6)		
Squatting	41 (1.5)	37 (1.3)		
Lithotomy	0 (0.0)	111 (3.7)		
Active second stage (min), *n* (%)				
<30	3,659 (66.5)	3,112 (65.1)		0.005
30 – 59	918 (16.7)	800 (16.7)		
60 – 119	689 (12.5)	663 (13.9)		
120+	236 (4.3)	205 (4.3)		
Delivered in water, *n* (%)	266 (6.8)	244 (5.8)		0.06
Mediolateral episiotomy, *n* (%)				
Spontaneous + assisted vaginal delivery	1,250 (21.4)	1,145 (21.9)		0.55
Assisted vaginal delivery	852 (84.4)	810 (78)		<0.001
Spontaneous vaginal delivery	290 (8.2)	246 (8)		0.66
Fetal position, *n* (%)				
Occipitoanterior	1,711 (88.3)	1,453 (82.0)		<0.001
Occipitoposterior	145 (7.5)	210 (11.9)		
Occipitotransverse	81 (4.2)	109 (6.2)		

Table 1 (continued)

Variable	Before intervention ($n = 5{,}867$)	After intervention ($n = 5{,}268$)	*p* value	
			Unpaired *t* test	Chi-squared test
Shoulder dystocia, *n* (%)	95 (1.7)	120 (2.4)		0.01
Head circumference (cm), *n* (%)				
<33	765 (13.6)	807 (16.3)		<0.001
33 – 35	3,828 (68.1)	3,283 (66.5)		
>35	1,031 (18.3)	849 (17.2)		
Birth weight (g), *n* (%)				
<3,000	1,477 (25.2)	1,360 (25.8)		0.71
3,000 – 3,499	2,344 (40.0)	2,050 (38.9)		
3,500 – 3,999	1,587 (27.1)	1,447 (27.5)		
4,000+	456 (7.8)	411 (7.8)		

used to compare continuous variables between the two time periods. Using logistic regression, the risk factors associated with OASIs were analysed. Univariate analysis was performed to find risk factors associated with OASIs, and a multivariate analysis was performed on those risk factors with a *p* value <0.2 in the univariate analysis to determine if each risk factors was independently associated with OASIs. Differences between the groups are reported as odds ratios, with the corresponding confidence intervals and *p* values indicating the significance of the differences for each variable.

Results

During the study period (April 2011 to November 2014), 15,235 women delivered, and of these 11,135 (73 %) had a vaginal delivery. Before the intervention programme (April 2011 to January 2013), 8,050 women delivered, and of these 5,867 (73 %) had a vaginal delivery (Table 1). Following the intervention (February 2013 to November 2014), 7,185 women delivered, and of these 5,268 (73 %) had a vaginal delivery. Before the intervention period, 171 midwives and 31 doctors were trained, and this was followed by ongoing mandatory refresher training.

Table 2 Comparison of perineal trauma in women delivering before and after the intervention, and multivariate analysis of the association between perineal support and the OASIs rate and mode of delivery

Variable	Before intervention ($n = 5{,}867$)	After intervention ($n = 5{,}268$)	*p* value[a]	Multivariate analysis		
				Odds ratio	95 % confidence interval	*p* value
All OASIs	270 (4.7 %)	213 (4.1 %)	0.11	0.77	0.63 – 0.95	0.01
Minor OASIs	217 (3.76 %)	195 (3.7 %)	0.34	0.91	0.71 – 1.16	0.43
Major OASIs	53 (0.9 %)	18 (0.3 %)	<0.001	0.29	0.16 – 0.53	<0.001
Spontaneous vaginal delivery						
All OASIs	176 (3.7 %)	125 (3.0 %)	0.07	0.75	0.58 – 0.97	0.03
Minor OASIs	140 (2.92 %)	115 (2.74 %)	0.64	0.88	0.64 – 1.20	0.43
Major OASIs	36 (0.8 %)	10 (0.2 %)	0.001	0.23	0.10 – 0.52	<0.001
Assisted vaginal delivery						
All OASIs	65 (5.95 %)	66 (6.29 %)	0.93	0.84	0.59 – 1.20	0.34
OASIs (forceps)	62 (18.1 %)	50 (15.8 %)	0.49	0.98	0.60 – 1.58	0.92
OASIs (ventouse)	32 (5.1 %)	38 (5.3 %)	0.91	0.91	0.51 – 1.63	0.75
Minor OASIs	77 (7.55 %)	80 (7.62 %)	0.95	0.87	0.60 – 1.24	0.43
Major OASIs	17 (1.66 %)	8 (0.76 %)	0.09	0.43	0.19 – 1.01	0.05
Labial tears	258 (4.4 %)	386 (7.3 %)	<0.001			
Missing OASI data	109 (1.9 %)	32 (0.6 %)	<0.001			

[a] Chi-squared test

Table 3 Univariate analysis for all the risk factors associated with OASIs in the whole population

Variable (p = 11,136)	Category	Odds ratio	95 % confidence interval	p value
Maternal age	<30 years	1	–	0.11
	30 – 34 years	1.23	1.00 – 1.50	
	35+ years	0.98	0.76 – 1.26	
Body mass index	Normal	1	–	0.48
	Underweight	0.99	0.57 – 1.66	
	Overweight	0.90	0.71 – 1.14	
	Obese	0.80	0.60 – 1.07	
Ethnicity	White	1	–	<0.001
	Black	0.69	0.53 – 0.90	
	Asian	1.99	1.60 – 2.46	
	Other	0.81	0.53 – 1.24	
Parity	0	1	–	<0.001
	1	0.53	0.44 – 0.66	
	2/3	0.23	0.17 – 0.31	
	4+	0.02	0.00 – 0.15	
Epidural analgesia	No	1	–	0.05
	Yes	1.26	1.00 – 1.658	
Labour onset	Spontaneous	1	–	0.61
	Induced	0.94	0.75 – 1.19	
Mode of delivery	Spontaneous	1	–	<0.001
	Ventouse	1.58	1.21 – 2.06	
	Forceps	5.92	4.69 – 7.48	
Episiotomy	No	1	–	<0.001
	Yes	2.26	1.87 – 2.73	
Active second stage	<10 min	1	–	<0.001
	10 – 29 min	1.74	1.28 – 2.36	
	30 – 59 min	3.25	2.37 – 4.47	
	60 – 119 min	4.09	2.97 – 5.63	
	120+ min	6.27	4.24 – 9.27	
Position in second stage of labour	All fours	1	–	0.14
	Kneeling	1.58	0.60 – 4.18	
	Lateral	0.39	0.10 – 1.50	
	Semirecumbent	1.15	0.56 – 2.37	
	Squatting	2.38	0.80 – 7.10	
	Lithotomy	2.27	0.83 – 6.21	
	Standing	1.32	0.49 – 3.59	
	Other	1.41	0.61 – 3.26	
Water birth	No	1	–	0.12
	Yes	0.66	0.39 – 1.11	
Fetal position	Occipitoanterior	1	–	0.26
	Occipitoposterior	1.33	0.80 – 2.21	
	Occipitotransverse	1.54	0.81 – 2.90	
Shoulder dystocia	No	1	–	<0.001
	Yes	2.60	1.65 – 4.07	
Birth weight	<3,000 g	1	–	<0.001
	3,000 – 3,499 g	1.56	1.19 – 2.04	
	3,500 – 3,999 g	1.80	1.36 – 2.38	
	4,000+ g	2.86	2.04 – 4.00	
Head circumference	<33 cm	1	–	0.12
	33 – 35 cm	1.06	0.80 – 1.41	
	>35 cm	1.33	0.96 – 1.85	

Table 4 Multivariate analysis for all the risk factors associated with OASIs after vaginal delivery and after exclusion of assisted vaginal delivery in the whole population

Variable	Category	All vaginal deliveries ($n = 11,136$)			Excluding assisted vaginal deliveries ($n = 9,068$)		
		Odds ratio	95 % confidence interval	p value	Odds ratio	95 % confidence interval	p value
Maternal age	<30 years	1	–	0.01	1	–	<0.001
	30 – 34 years	1.39	1.11 – 1.75		1.78	1.34 – 2.35	
	35+ years	1.25	0.94 – 1.67		1.65	1.17 – 2.33	
Ethnicity	White	1	–	<0.001	1	–	<0.001
	Black	1.03	0.77 – 1.38		1.00	0.72 – 1.39	
	Asian	2.30	1.80 – 2.93		2.63	1.95 – 3.54	
	Other	0.96	0.60 – 1.53		1.12	0.66 – 1.89	
Parity	0	1	–	<0.001	1	–	<0.001
	1	0.60	0.48 – 0.76		0.50	0.38 – 0.67	
	2/3	0.26	0.18 – 0.37		0.23	0.15 – 0.34	
	4+	0.03	0.00 – 0.22		0.03	0.00 – 0.22	
Mode of delivery	Spontaneous	1	–	<0.001	–		
	Ventouse	1.23	0.85 – 1.79				
	Forceps	4.23	2.88 – 6.21				
Active second stage	<10 min	1	–	0.002	1	–	0.004
	10 – 29 min	1.30	0.95 – 1.78		1.39	0.97 – 1.98	
	30 – 59 min	1.84	1.31 – 2.58		2.06	1.40 – 3.02	
	60 – 119 min	1.74	1.21 – 2.52		1.90	1.22 – 2.96	
	120+ min	2.11	0.34 – 3.33		1.69	0.69 – 4.10	
Shoulder dystocia	No	1	–	0.04	1	–	0.02
	Yes	1.69	1.01 – 2.83		2.19	1.16 – 4.13	
Birth weight	<3,000 g	1	–	<0.001	1	–	<0.001
	3,000 – 3,499 g	1.55	1.15 – 2.08		1.56	1.08 – 2.24	
	3,500 – 3,999 g	1.77	1.30 – 2.41		1.79	1.22 – 2.62	
	4,000+ g	2.67	1.81 – 3.92		3.11	1.95 – 4.95	

The demographic and obstetric variables were compared between the women delivering before and those delivering after the intervention (Table 1). Body mass index, mean gestational age at delivery and ethnic distribution at booking were similar in the two groups. There were higher proportions of primiparous and older women among those delivering after the intervention. As shown in Table 1, there was no significant difference between induction and spontaneous onset of labour, or episiotomy rates between the groups. However, in the group delivering before the intervention, a significantly higher number of episiotomies were performed among women who underwent AVD. The semirecumbent position was commonly used in both the groups during delivery.

Higher proportions of women delivering after the intervention (Table 1) underwent epidural analgesia, AVD and active second stage of labour of >1 h. Among the fetal factors, the women delivering after the intervention showed a higher incidence of shoulder dystocia, abnormal fetal head position at delivery and smaller head circumference (Table 1). The OASI rate (Table 2) reduced from 4.7 % ($n = 270$) before the intervention to 4.1 % ($n = 213$) after the intervention, but this was not significant ($p = 0.11$). Although there was no decrease (3.7 %) in the 3a and 3b third-degree tears (minor OASIs), there was a significant reduction (0.9 % to 0.3 %, $p < 0.001$) in 3c third-degree and fourth-degree tears (major OASIs). By contrast, there were significantly more first-degree labial tears ($p < 0.001$), but none required suturing.

To evaluate the effectiveness of perineal support in reducing the OASI rate, logistic regression analysis of all the variables that have an effect on OASIs was performed. Following the use of perineal support there was a significant reduction in OASIs by 23 % (OR 0.77, 95 % CI 0.63 – 0.95, $p = 0.01$; multivariate analysis, Table 2). In addition, there was a significant reduction in major OASIs by 71 % (OR 0.29, 95 % CI 0.16 – 0.53, $p < 0.001$), but there was no significant reduction in the rate of minor OASIs (OR 0.91, 95 % CI 0.71 – 1.16, $p = 0.43$). Following the intervention, there was a trend towards a reduction in the OASI rate from 3.7 % to 3.1 % ($p = 0.07$) among women who underwent SVD, but there was no significant difference in OASIs rates (5.95 % vs. 6.29 %, $p = 0.93$)

among those who underwent AVD. The logistic regression analysis (Table 2) demonstrated a 25 % reduction in the OASI rate (OR 0.75, 95 % CI 0.58 – 0.97, $p = 0.03$) among women who underwent SVD and 16 % reduction (OR 0.84, 95 % CI 0.59 – 1.20, $p = 0.43$) among those who underwent AVD.

There was a significant reduction of 77 % in major OASIs among women who underwent SVD (OR 0.23, 95 % CI 0.10 – 0.52, $p < 0.001$; Table 2) and a nonsignificant trend for a reduction in those who underwent AVD (57 %; OR 0.43, 95 % CI 0.19 – 1.01, $p = 0.05$). However, there was no significant reduction in the rate of minor OASIs among women who underwent SVD (12 %; OR 0.88, 95 % CI 0.64 – 1.20, $p = 0.43$) or among those who underwent AVD (13 %; OR 87, 95 % CI 0.60 – 1.24, $p = 0.43$).

In the univariate analysis the following factors (Table 3) were found to be significantly associated with increased risk of OASIs: Asian ethnicity ($p < 0.001$), AVD ($p < 0.001$), mediolateral episiotomy ($p < 0.001$), birth weight >4,000 g ($p < 0.001$), shoulder dystocia ($p < 0.001$), and active second stage of labour >120 min ($p < 0.001$). Higher parity (4+) was associated with a reduction in the OASI rate ($p < 0.001$). In the multivariate analysis (Table 4), maternal age 30 – 34 years ($p = 0.01$), Asian ethnicity ($p < 0.001$), AVD ($p < 0.001$), active second stage of labour >120 min ($p = 0.002$), shoulder dystocia ($p = 0.04$) and birth weight >4,000 g ($p < 0.001$) were significantly associated with OASIs.The following factors were found to be independently associated with OASIs after exclusion of AVD (Table 4): maternal age 30 – 34 years ($p < 0.001$), parity 4+ ($p < 0.001$), active second stage of labour >60 min ($p = 0.004$), shoulder dystocia ($p = 0.02$) and birth weight >4,000 g ($p < 0.001$).

Discussion

This intervention study demonstrated that perineal support using the technique described [11] during the delivery of the head and shoulders reduced the incidence of OASIs by 23 %. Although, Laine et al. found a significant reduction in the incidence of OASIs in a study performed in Norway [11], this is the first study performed in the UK. All obstetric staff were trained on the technique to support the perineum in a standardized fashion and also how to diagnose OASIs using a structured training programme (www.perineum.net).

Although there was a nonsignificant reduction in the rate of OASIs among women who had SVD and AVD, there was a significant reduction in the rate of major OASIs (3c third-degree and fourth-degree tears). This observation is clinically relevant as major OASIs are known to be associated with significant worsening of bowel symptoms and anorectal function [7]. However, we did not observe a reduction in the rate of minor OASIs following this intervention and there was a significant increase in the rate of labial tears, but none of these required suturing. This could possibly have been due to the increased awareness among the midwifery staff of the need to identify and document the type of perineal tear. The factors associated with either increased or decreased risk of OASIs identified in this study are similar to those found in other studies [12]. In this study more women delivering after the intervention who were primiparous, underwent epidural analgesia and ventouse delivery had abnormal vertex positions and shoulder dystocia. It would therefore be expected that these known risk factors would increase OASI rates in the women delivering after the intervention even further.

According to a Cochrane systematic review on the effect of perineal management techniques during the second stage of labour, warm compresses and perineal massage are associated with a significant reduction in OASI rates. However, there was no reduction in the OASI rates with hands-off (or poised) versus hands-on perineal management technique [13]. However, in a large multicentre intervention study involving more than 75,000 women, a significant reduction in the OASI rate was observed following the use of a combination of good communication between the midwife and the mother, appropriate perineal support, adequate visualization of the perineum and performing a mediolateral episiotomy when indicated [14]. Using this intervention, a similar trend was observed in our study but more importantly a significant reduction in the rate of major OASIs was observed. These results are significant considering that our population was very diverse, as shown in Table 1. Although there was an associated increase in labial first-degree tears. as also reported by Laine et al. [10], none required suturing. This could be attributed to the redistribution of pressure of the head and shoulders from the perineum on to the labia.

We found no difference in the episiotomy rates before and after the intervention (21.4 % vs. 21.9 %, $p = 0.55$); Table 1). Although episiotomy was found to be a risk factor for OASIs in the univariate analysis, it was no longer a risk factor in the multivariate analysis. An observational retrospective population-based register study in Finland found that a high episiotomy rate provides protection from OASIs in both primiparous and multiparous women [15], although lateral episiotomies had been performed in the women. However, in a randomized controlled trial, Karbanova et al. found no difference in OASI rates between lateral and mediolateral episiotomy [16].

In this study, AVD was the only modifiable risk factor for OASIs. Among women delivering after the intervention exclusion of those with AVD led to a significant increase in the reduction of OASIs from 23 % to 25 % in the multivariate analysis. The severity of perineal trauma is dependent on the type of instrument used [17]. Despite a significantly higher number of women who underwent AVD and with less use of episiotomy after the intervention, there was a reducing trend in OASIs among women who underwent AVD. There were significantly more ventouse deliveries in women delivering after the intervention, but the use of forceps was not different between the two groups. This supports the use of ventouse as the preferred instrument because it is associated with a lower risk of OASIs. As there is emerging evidence suggesting that a mediolateral episiotomy should be performed in all women who undergo AVD [18], one could speculate that a further reduction in OASIs may have been observed if a mediolateral episiotomy had been performed in all women who underwent AVD.

Perineal support has historically been considered to reduce the severity of perineal trauma and this approach has become standard practice [19]. Following publication of the hands-on or hands-poised (HOOP) study [20], there was a noticeable increase in the use of the hands-off technique, especially by midwives in the UK [21]. However, the HOOP study was misinterpreted as the primary outcome was perineal pain and not perineal trauma. In addition to many other factors, a change in perineal management technique during the second stage of labour could also have contributed to the increased OASI rates.

The role of perineal support as a preventative strategy has re-emerged due to the rising rates of OASIs. In the UK, the National Institute for Health and Care Excellence (NICE) recommends the use of either the hands-on or the poised technique during SVD [22]. There is a trend towards a change in practice of the hands-on technique during delivery, as shown by a survey in Australia among doctors and midwives [23]. There is an ongoing debate as to the protective role of perineal support [24]. However, a Delphi survey among experts in OASIs concluded that the current practice in the UK regarding perineal protection is not based on robust evidence and there is a causal association between OASIs and the hands-poised/hands-off practice. In the absence of randomized trials, 75 % of the experts agreed that hands-on perineal support should be the recommended technique during vaginal delivery [25].

The practice of hands-on is quite varied as described in a recent survey by the Royal College of Midwives, which includes touching the fetal head, supporting the perineum and the fetal head, or supporting either the perineum or the fetal head [26]. Similarly in a survey of London trainees in obstetrics and gynaecology, there was a wide variation in techniques of perineal support and <10 % of the trainees received formal training on how to support the perineum during delivery [27]. Biomechanical evidence by Jansova et al. has shown that appropriately performed manual perineal protection can reduce the tension in the perineal body [28] and thereby contribute to a reduction in OASIs.

We acknowledge the limitations of this study. We could not confirm the consistency in the use of this technique at every vaginal delivery. We also did not assess the impact of perineal support on pain or discomfort experienced by the women before or after this intervention. However, according to the HOOP trial, women who had hands-on perineal support experienced less perineal pain at 7 days after vaginal delivery [20]. In addition, there is a potential bias due to missing data on OASIs (Table 2), which was derived from the PROTOS electronic maternity records, which are filled in by different members of staff. We also acknowledge that we did not formally calculate the sample size, but due to the large sample size we were able to demonstrate relatively small changes in the outcome rates.

In this study we demonstrated that interventions such as perineal support can have a significant impact on major perineal trauma. However, we recognize that perineal support on its own may not have as much impact as a care bundle. A care bundle as defined by the Institute for Healthcare Improvement is a small set of evidence-based interventions for a defined patient segment or population and care setting that, when implemented together, will result in significantly better outcomes than when implemented individually. The suggested care bundle should include communication with the mother, the use of manual perineal protection, the use of episiotomy only when indicated, and accurate diagnosis of perineal trauma after birth. Such a quality improvement project is currently underway in the UK [29].

Conclusion

This interventional study showed that perineal support at the time of vaginal delivery can reduce the severity of perineal trauma. Continuous reinforcement of the intervention programme could potentially improve the OASI rate in the UK to a rate similar to those seen in the Nordic countries.

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Compliance with ethical standards

Conflicts of interest None.

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