Title

Childbirth and prolapse: long term associations with the symptoms and objective measurement of pelvic organ prolapse

Running title

Associations between childbirth and pelvic organ prolapse

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ABSTRACT

Objectives:

To investigate prolapse symptoms and objectively measured pelvic organ prolapse 12 years after childbirth and association with delivery mode history.

Design: Twelve year longitudinal study.

Setting: Maternity units in Aberdeen, Birmingham and Dunedin.

Population: Community dwelling women.

Methods: Data from women were collected 12 years after an index birth and women invited for examination. Logistic regression investigated associations between risk factors and prolapse symptoms and signs.

Main outcome measures: Prolapse symptom score (POP-SS); objectively measured prolapse (POP-Q).

Results: Of 7725 continuing women, 3763 (49%) returned questionnaires at 12 years.

Median POP-SS was 2 (interquartile range 0, 4). One or more forceps deliveries (OR 1.20, 95% CI 1.04 to 1.38) and BMI over 25 were associated with higher (worse) POP-SS scores, but age over 25 years at first delivery was associated with lower (better) scores. There was no protective effect if all deliveries were by CS (OR 0.84, 95% CI 0.69 to 1.02).

Objective prolapse was found in 182/762 (24%) women. Women's age over 30 when having their first baby and parity were significantly associated with prolapse. Compared to women whose deliveries were all by SVD, women who had all deliveries by caesarean section (CS) were least likely to have prolapse (OR 0.11, 95% CI 0.03 to 0.38), and there was a reduced risk after forceps or a mixture of SVD and CS.

Conclusions:

These findings are at odds with each other, suggesting that prolapse symptoms and objective prolapse may not be in concordance, or associated with different antecedent factors. Further follow up is planned.

Keywords

Pelvic organ prolapse, childbirth, delivery, urinary incontinence, faecal incontinence

INTRODUCTION

Pelvic organ prolapse affects over half of all women, and some degree of prolapse is nearly ubiquitous in older women (32.2% Stage I, 65.5% Stage II or III).[1] While it often follows childbirth, it only becomes symptomatic later in life: the mean age for surgery for prolapse is 60 years.[2] It has a profound effect on quality of life, including not only the classic symptom of 'something coming down' (bulge or discomfort in the vagina) but often involving bladder, bowel and sexual function. Unlike urinary incontinence, its diagnosis is problematic: there are often discrepancies between the 'objective' measurement of descent of the vaginal walls or apex and the women's own report of prolapse symptoms.[3] Not all women with measurable descent have symptoms, and vice versa.

It is also possible that classic prolapse symptoms are not necessarily due to classic anatomical findings.[3] If so, it may be that the two have different antecedent causes. In either scenario, the need for treatment will be based more on the symptoms than the signs, but curing the 'objective prolapse' may not necessarily cure the symptoms. A fuller understanding of the causes and effect on symptoms may provide guidance to clinicians and women in grappling with the problems posed by pelvic organ prolapse.[4]

We present new data at 12 years after an index delivery from a longitudinal study[5-9] of women after childbirth, including the findings from a subsample examined using the pelvic organ prolapse-quantification (POP-Q) system. The main research question was to investigate the relationship between prolapse and delivery mode history, and with other maternal factors.

METHODS

The population was all women (N=10,989) who delivered over a 12-month period (1993/94) in three maternity units, in Aberdeen (UK), Birmingham (UK) and Dunedin (New Zealand). These deliveries are referred to as 'index births'. The 7883 women who responded to an invitation to participate in the our research at 3 months after this delivery have been followed up during the subsequent 12 years, and from the source population for the current study, excluding those known to have died and those who requested no further contact in the intervening period (N=158). Baseline data on maternal and obstetric characteristics were obtained for all index deliveries to allow comparison of responders and non-responders.

The current study involved a further questionnaire survey of the 7725 women remaining in the cohort, sent around 12 years after their index delivery. Women were also invited to a clinical examination to assess any degree of pelvic organ prolapse using the Pelvic Organ Prolapse – Quantification (POP-Q) system.[10]

Data collection and outcome measures

Outcome measures were women's report of prolapse symptoms measured using the Pelvic Organ Prolapse Symptom Score (POP-SS),[11] and objectively measured prolapse using the Pelvic Organ Prolapse-Quantification (POP-Q)[10] system on a sub-sample of women who agreed to be examined. Obstetric and maternal data relating to the index delivery were obtained from routine hospital casenotes or databases at the time of recruitment. The follow-up questionnaire at 12 years obtained date and mode of delivery from each woman for all her births, which enabled delivery mode history to be obtained. Self-reported height and weight were used to determine body mass index (BMI). A valid weight measurement was given by 96.5% of respondents and a valid height measurement by 99.7%. Where BMI data were missing, mean imputation was used to estimate the BMI.

The POP-SS consists of seven items related to prolapse symptoms.[11] Each item is scored 0 (never) to four (all of the time) and the seven item responses are summed to give a total

score ranging from 0 to 28, where higher scores indicate more frequent symptoms. Other variables reported by women in the postal questionnaire included: urinary incontinence; faecal incontinence; having had a prolapse or continence operation; and ethnic origin (categorised as Indian subcontinent or not).

The POP-Q measurement system measures each prolapse compartment separately (anterior, posterior, and apical).[10] We chose the leading edge to dichotomise Stage 2 prolapse into two categories: up to Stage 2a for measurements above the hymen (<0cm), and Stage 2b for measurements at the hymen or beyond (≥0cm). The latter was also chosen to define objective anterior or posterior vaginal wall prolapse, or apical prolapse.

Research question

The main research question was whether delivery mode history was associated with either prolapse symptoms or prolapse signs at 12 years after the index birth. Predefined questions were what were the relative effects on these associations of: delivering exclusively by caesarean section; ever having a forceps delivery; or (separately) a ventouse delivery; or having both caesarean and spontaneous births. Other potential explanatory variables explored included: maternal age at first birth; parity (total number of births); BMI; prolapse surgery.

Analysis

Ordinal logistic regression was used to assess the independent effects of delivery mode history on symptom outcome, and to adjust for and report on other independent predictors. In all models, adjustment was made for age in years at first birth, total number of births and BMI. Interaction terms were not included due to multicollinearity. All regressor variables were entered into and retained in the models.

The variable *delivery mode history*, created from the reported birth histories, categorised all of a woman's deliveries into: spontaneous vaginal delivery only (reference); caesarean

section only; one or more forceps deliveries; one or more vacuum extraction but no forceps; and the remainder as a combination of only spontaneous vaginal deliveries and caesarean sections. The forceps and vacuum categories could include women who also had spontaneous vaginal deliveries or caesarean sections. Replies with missing values in the mode of delivery history were omitted from the analysis. We were also able to conduct subsidiary regression models to explore two of the individual prolapse symptom questions ('feeling of something coming down' and 'uncomfortable feeling in vagina'), and the effect of removing the women who had already had prolapse surgery.

In a parallel analysis using the same variables, binary logistic regression was used to assess their effects on the presence of objectively measured prolapse (POP-Q Stage 2b, at hymen or beyond). The analysis was based on overall stage (the most severe compartment stage).

RESULTS

This study is one of a series exploring the long term effects of childbirth on pelvic floor dysfunction. At the 12 year follow up, we enquired for the first time about prolapse symptoms using the POP-SS, and examined a sub-sample of women to determine who had evidence of prolapse as measured using the POP-Q system.

Completed questionnaires were returned by 3763/7725 women (response rate 49%). Of these, 1450 women consented to an examination and 762 women (20%) were subsequently examined. Baseline data on maternal and obstetric characteristics were obtained for all index deliveries and used to compare responders and non-responders. They differed in terms of baseline characteristics (Table 1): age (respondents older); ethnic origin (respondents less likely to be of Indian subcontinent ethnicity); parity (more respondents were having their first baby); and delivery mode (fewer respondents had SVDs and more had assisted vaginal deliveries). Onset of labour and length of second stage of index birth were similar. The prevalence of faecal incontinence at 3 months was a little lower among respondents, but the prevalence of urinary incontinence was the same.

Of the respondents at 12 years, the 762 women who were examined differed from those who were not examined in terms of: age (older); parity (fewer children); ethnic origin (less likely to be of Indian subcontinent ethnicity); current prolapse symptoms (higher symptom scores on POP-SS); other current symptoms of pelvic floor dysfunction (more urinary incontinence and faecal incontinence) and mode of delivery history (fewer CS, more forceps) (Table 2). Incontinence surgery was more prevalent in examined women, although not significantly so. They were similar with respect to prolapse surgery and BMI.

Prolapse symptoms (POP-SS)

Respondents' mean symptom score was 2.66 (SD 3.46: score range from 0 to 28: median POP-SS 2, interquartile range (0, 4), N=3763).

Ordinal logistic regression of the prolapse score adjusting for a range of independent antecedent variables showed statistically significant associations: one or more forceps deliveries (OR 1.20, 95% CI 1.04 to 1.38) and BMI greater than 25 (OR 1.31, 95% CI 1.15 to 1.50 for overweight; OR 1.59, 95% CI 1.36 to 1.87 for obese) were associated with higher (worse) POP-SS scores, and age over 25 years at first delivery was associated with lower (better) POP-SS scores for each of the three categories (Table 3).

The findings were substantially unchanged when the analysis was restricted to women who had not previously had prolapse surgery, and if either one of the first two questions of the POP-SS score were used as the dependent variable (for 'a feeling of something coming down'; and for 'vaginal discomfort with standing'). We also explored the associations restricted to women who were examined. The POP-SS in the group as a whole was higher, but the associations were similar with respect to the other confounding factors, particularly age.

Objectively measured prolapse (POP-Q)

Around 20% of the women who responded at 12 years were examined using the POP-Q system to measure prolapse. Of 762 women examined, just under half had no prolapse (Stage 0, n=49, 6.4% or Stage 1, n=286, 37.5%). Stage 2a (leading edge above the hymen) was found in 245, 32.2% of women, and Stage 2b (at the hymen or +1cm) in 170, 22.3%. A further nine (1.2%) and three (0.4%) women had Stage 3 and 4 respectively. Using Stage 2b or greater to identify women with objective prolapse, 182 (24%) of women could be diagnosed as having a prolapse. Of these women, 149 had prolapse in only one compartment, 24 in two compartments and nine had descent in all three compartments.

Multivariate analysis showed that women whose age was over 30 years at first delivery and who had had more than one baby were independently significantly associated with prolapse (Table 4). In addition, delivery history was associated with the presence of prolapse: relative to women who had all their deliveries by SVD, those who had exclusive CS

deliveries were less likely to have prolapse (OR 0.11, 95% CI 0.03 to 0.38), and to a lesser extent so were women who had at least one forceps delivery (OR 0.64, 95% CI 0.42 to 0.96) or at least one each of SVD and CS deliveries (OR 0.48, 95% CI 0.22 to 0.97). Current BMI, however, was not associated with objectively measured prolapse (Table 4).

DISCUSSION

Principal findings

Our primary research question was the relationship between childbirth and subsequent prolapse, both symptoms and signs. The mean symptom score (POP-SS) was low (median 2), as would be expected in a relatively asymptomatic population of community dwelling women. The proportion with a leading edge at the hymen or beyond (24%) was very similar to that in an older population (25.2%, mean age 68.3 years) of 270 women examined at one site of the Women's Health Initiative Hormone Replacement Therapy RCT.[1] In another study, 22% of 1004 women with a mean age of 42 had a prolapse at -0.5 cm or beyond.[12]

For prolapse symptoms, measured in nearly 4000 women using a prolapse symptom score (POP-SS), only BMI over 25 and any forceps delivery, compared to women who had all their deliveries by SVD, were associated with more frequent symptoms (Table 3). While women had fewer symptoms if all their deliveries were by CS, this did not reach statistical significance. The relationship between prolapse symptoms and parity was unclear when other factors were taken into account in multivariate analysis. Women who were under the age of 25 when they had their first birth had significantly more prolapse symptoms (higher POP-SS scores) than women who had their first baby when they were older.

In contrast, in the 762 women who were examined, women were more likely to have Stage 2b prolapse (24%) if they were older (over 30 years) when they had their first birth, if they had more than one baby, and if they had all their deliveries by SVD. While women were less likely to have prolapse if all their deliveries were by CS, this was also true for women who had at least one forceps delivery or mixed SVD and CS deliveries. Surprisingly, current BMI was not associated with prolapse. However, the women who were examined were slightly more likely to have symptoms of pelvic floor dysfunction than those who were not examined in terms of higher POPSS scores; and greater proportions with urinary or faecal incontinence.

Strengths and weaknesses

This large longitudinal cohort is being followed prospectively from the time of an index delivery in 1993-94. The women were recruited from three different centres and represent the largest prospective, longitudinal postpartum cohort with the most detailed data concerning mode of delivery history in the literature.[8] Although causality cannot be assumed from statistical associations, other studies have also identified childbirth and parity as significant antecedent factors.[1;12] While we do not have any nulliparous women in our study, it is well recognised that the rates of pelvic floor dysfunction (while not non-existent) are considerably less amongst this population.[1;13]

We have been able to take account of all the deliveries for each woman, using a classification scheme which was developed at an earlier stage of this research. However, around half the women have dropped out over the 12 year time period. While there are some systematic differences between the responders and non-responders (the latter were younger, were more likely to be multiparous and delivered by SVD when first recruited, with less perineal trauma, and slightly less faecal incontinence), the differences were small and would, if anything, tend to be associated with less risk of subsequent pelvic floor dysfunction. Thus our data might represent at worst a small overestimate of the prevalence of the problems, but this should have little impact on the relationships between variables being examined. Another weakness is that a validated questionnaire was not used to assess urinary or faecal incontinence, but at the time of initial recruitment (1993/94) there were none available. For consistency, we used exactly the same questions at each follow up time-point.

A further discussion of risk of bias is given in our previous publication from this cohort.[9]

While we were only able to examine a relatively small number (762), this is comparable to other similar studies[1;12;14] which involved examining women and recording POP-Qs. In addition we had unique prospective data collection, virtually complete mode of delivery

histories, and extensive symptom data, recorded where possible using validated questionnaires.

Those who came forward to be examined were more likely to be symptomatic than those who did not, in respect of older age, higher POP-SS scores; current urinary and faecal incontinence; parity and mode of delivery history. It is likely that some of these women chose to be examined because they had already started to have symptoms of pelvic floor dysfunction, leading to some selection bias.

Meaning of the study

Our population comprised substantially asymptomatic women living in the community. The mean age of the women was 42 years (range 26 to 58) at this follow up point. Prolapse symptoms normally become severe enough to require treatment after the menopause, so the majority of our women were possibly too young to be symptomatic – nevertheless, just under 2% had already had prolapse or incontinence surgery. However, the findings of our analyses were the same when these women were excluded.

On the whole we feel that these findings raise more questions than they answer. There is clearly a relationship between childbirth and subsequent pelvic floor dysfunction, but this varies subtly depending on the aspect of dysfunction that is of interest. In this paper we have explored separately the effects of a range of confounding variables on both prolapse symptoms and prolapse signs, with some consistent and some conflicting findings. In previous work we have demonstrated similar issues when exploring the antecedents of urinary[5;8] and faecal[6;7;9] incontinence.

There are a number of reasons which may explain the inconsistencies. Our population was largely asymptomatic for prolapse symptoms, as demonstrated by the low POP-SS score (median POP-SS 2 and the interquartile range (0, 4) of a total possible score of 28). The mean age of the women was 42, substantially younger than the age group who seek treatment. Despite that, our estimate of 24% of women having a prolapse at the hymen or

beyond accords well with that in Swift et al's multicentre observational study[12] of 1004 women of a similar age (mean age 42.7 years) having an annual gynaecological examination (22%) and with the 25.2% in Nygaard et al's survey of 270 older women (mean age 68.3) enrolled in an RCT of HRT.[1] Both these studies sub-divided Stage 2 prolapse using the POP-Q method around the hymen in a similar way to our analysis.

Another explanation may be the lack of correlation between measurable prolapse and its symptoms in women.[3] This may explain why different variables are selected by the two models as being associated with the symptoms (Table 3) or the objective measurements (Table 4) of prolapse.

Another inconsistency between the associations of the prolapse symptoms and the objective measures concerned maternal age at first birth. We were surprised to observe that prolapse symptoms were higher in women who were younger when they had their first delivery, while prolapse signs were more prevalent in older women. Further exploratory analyses showed similar trends with current age. We postulated that symptoms might improve with time after delivery as women recovered from the trauma of childbirth. Therefore, we also explored the relationship between prolapse symptoms and the number of years since the last delivery: there was some evidence that symptoms appeared higher only in the women who had started their families at a younger age regardless of time since last delivery. An alternative explanation might be that younger women have higher expectations of their health and hence report minor symptoms more readily than older women. We are unable to explain this finding without further analysis.

Conclusions

Childbirth clearly has an influence on subsequent pelvic floor dysfunction. The association between women's prolapse symptoms and mode of delivery history (more symptoms after at least one forceps delivery) suggests that forceps delivery has an adverse effect on pelvic floor function, while delivering exclusively by CS does not appear to be protective. However,

the lack of association between subjectively reported prolapse symptoms and objectively measured prolapse suggests that this is not necessarily mediated through the mechanical changes of pelvic organ descent.

This study also suggests that if women wish to reduce their risk of developing objective prolapse, they might consider having their first child before the age of 30, and have fewer children. Women who have all their deliveries by CS have a reduced risk of developing prolapse but the effect of different vaginal modes of delivery is less clear.

Unanswered questions and future research

We plan further long term follow up of this cohort when the women reach 20 years after recruitment. We are particularly interested in the fluctuation of symptoms of pelvic floor dysfunction, in women's need to access treatment, and its outcomes.

Disclosure of interest

All authors declare that they have no interests to declare.

Contribution to authorship

CG, CM, DW, RL, PH and AMcD, contributed to design and analysis of the whole ProLong study. AE, GMcP, SH, CB, KR, ND and PT-H joined the study group at 6 or 12 years and contributed to this part of the study. GMcP was responsible for the database design. CG drafted the paper, AE and RL analysed the data, and all authors contributed to writing and commented. A previous member of the ProLong study group was Adrian Grant.

Details of ethics approval

Ethical approval from UK centres for the 12 year follow up was obtained from Multicentre Research Ethics Committee Edinburgh, Ref No RG 819/06, November 2007 and from New Zealand National Ethics Committee, Ref No LRS/05/04/009 March 2005.

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TABLES

Table 1 Baseline characteristics of respondents and nonrespondents at 12 years, and respondent women who were examined, at index delivery

N=7883	**Nonrespondent at 12 years N=4120**	**Respondent at 12 years N=3763**
Died / moved away / withdrew from follow up [1]	158/7883	
Age at index birth Mean (SD)	p<0.001 27.7 (5.4)	 29.2 (4.9)
Parity at index delivery Primiparous Multiparous Not known	p=0.006 1782 (43.6%) 2304 (56.4%) 34	 1760 (46.8%) 2003 (53.2%) 0
Mode of index delivery CS Forceps/breech Vacuum SVD Not known	p=0.020 645 (15.9%) 382 (9.4%) 166 (4.1%) 2867 (70.6%) 60	 600 (16.3%) 392 (10.6%) 190 (5.2%) 2506 (68.0%) 75
Induced at index delivery Yes Not known	p=0.657 695/4048 (17.2%) 72	 646/3675 (17.6%) 88
Second stage [2] $\geq$ 1 hour Not known	p=0.065 986/2818 (35.0%) 597	 1018/2724 (37.4%) 364
UI at 3 months postpartum Incontinent Not known	p=0.654 1386/4120 (33.6%) 0	 1247/3763 (33.1%) 0
FI at 3 months postpartum Incontinent Not known	p=0.038 392/4120 (9.5%) 0	 307/3763 (8.2%) 0

[1] This includes non-responders those who had requested no further contact at 6 years plus 41 women who had died.

[2] Excludes CS

Table 2 Characteristics of women and pelvic floor dysfunction at 12 years after an index delivery

	Respondent at 12 years	Not examined at 12 years	Examined at 12 years
N	**3763**	**3001**	**762**
Centre			
NZ	434 (11.5%)	269 (9.0%)	165 (21.7%)
Birmingham	1490 (39.6%)	1287 (42.9%)	203 (26.6%)
Aberdeen	1839 (48.9%)	1445 (48.2%)	394 (51.7%)
Age at first birth		p=0.001	
Mean (SD)	26.5 (4.9)	26.3 (4.9)	27.2 (4.8)
Number of births		p=0.033	
One	410 (10.9%)	337 (11.2%)	73 (9.6%)
Two	1836 (48.8%)	1428 (47.6%)	408 (53.5%)
Three	1016 (27.0%)	827 (27.6%)	189 (24.8%)
Four or more	500 (13.3%)	408 (13.6%)	92 (12.1%)
Missing	1	1	0
Mode of delivery history		p=0.039	
All SVD	1855 (49.4%)	1481 (49.5%)	374 (49.1%)
All CS	403 (10.7%)	342 (11.4%)	61 (8.0%)
Forceps	956 (25.5%)	739 (24.7%)	217 (28.5%)
Vacuum	248 (6.6%)	197 (6.6%)	51 (6.7%)
SVD+CS	297 (7.8%)	235 (7.8%)	59 (7.7%)
Missing	7	7	0
Current BMI		p=0.587	
Mean (SD)	26.0 (5.4)	26.0 (5.4)	26.1 (5.4)
Ethnic group		p<0.001	
Non-Asian	3600 (95.7%	2845 (94.8%)	755 (99.1%)
Indian subcontinent	163 (4.3%)	156 (5.2%)	7 (0.9%)
POP-SS		p<0.001	
Mean (SD)	2.66 (3.46)	2.41 (3.30)	3.64 (3.88)
Current UI (any)	1983/3763 (52.7%)	p<0.001 1477/3001 (49.2%)	506/762 (66.4%)
Current FI (any)	487/3763 (12.9%)	p<0.001 356/3001 (11.9%)	131/762 (17.2%)
Prolapse operation by 12 years	57/3681 (1.5%)	p<0.054 39/2927 (2.4%)	18/754 (2.4%)
Continence operation by 12 years	52/3591 (1.4%)	p<0.320 38/2857 (1.3%)	14/734 (1.9%)

Table 3 **Ordinal logistic regression of prolapse symptoms measured using POP-SS**

Variable	Number	POP-SS Mean (SD)		OR	[95% CI]	P value
All women	3763	2.7	(3.5)			
Age at first birth						
<25	1279	3.4	(4.1)	Reference		
25-29	1497	2.4	(3.1)	0.68	[0.60 to 0.78)	<0.001
30-34	785	2.2	(2.9)	0.63	[0.53 to 0.74)	<0.001
>=35	197	2.0	(2.7)	0.60	[0.46 to 0.80)	<0.001
Missing	5					
Number of births						
One	410	2.6	(3.2)	Reference		
Two	1836	2.5	(3.2)	0.84	[0.69 to 1.02)	0.075
Three	1016	2.6	(3.6)	0.76	[0.61 to 0.93)	0.010
Four or more	500	3.4	(4.1)	0.92	[0.71 to 1.18)	0.506
Missing	1					
Delivery mode history						
Only SVD	1855	2.7	(3.5)	Reference		
Only CS	403	2.1	(2.8)	0.84	[0.69 to 1.02)	0.076
Any forceps	956	2.9	(3.6)	1.20	[1.04 to 1.38)	0.012
Any vacuum*	248	2.4	(3.2)	0.93	[0.73 to 1.18)	0.547
SVD and CS	297	2.9	(3.5)	1.13	[0.90 to 1.41)	0.282
Missing	7					
Current body mass index						
18.5 - 24.9	1843	2.3	(3.1)	Reference		
<18.5	61	3.3	(4.2)	1.36	[0.84 to 2.21)	0.215
25 to 29.9	1184	2.9	(3.6)	1.31	[1.15 to 1.50)	<0.001
>= 30	675	3.3	(3.9)	1.59	[1.36 to 1.87)	<0.001
Missing	0					

* No forceps

Table 4 **Logistic regression of prolapse staging measured using POP-Q to define leading edge of prolapse (adjusted, Stage 2b or greater, = leading edge at hymen or beyond)**

Variable	Number	Prolapse (%)	OR	[95% CI]	P value
All women	182/762	24%			
Age at first birth		p=0.099			
<= 24	40/207	19%	Reference		
25-29	71/312	23%	1.46	[0.92 to 2.31)	0.108
30-34	56/191	29%	2.49	[1.49 to 4.18)	0.001
35+	15/52	29%	3.08	[1.43 to 6.61)	0.004
Number of births		p=0.048			
One	8/73	11%	Reference		
Two	102/408	25%	3.30	[1.49 to 7.32)	0.003
Three	47/189	25%	3.93	[1.69 to 9.18)	0.002
Four or more	25/92	27%	5.23	[2.04 to 13.39)	0.001
Delivery mode history		p=0.005			
Only SVD	107/374	29%	Reference		
Only CS	3/61	5%	0.11	[0.03 to 0.38)	<0.001
Any forceps	48/217	22%	0.64	[0.42 to 0.96)	0.031
Any vacuum *	13/51	25%	0.71	[0.35 to 1.42)	0.338
SVD and CS	11/59	19%	0.48	[0.22 to 0.97)	0.041
Current BMI		p=0.826			
Normal	81/362	22%	Reference		
Underweight	3/10	30%	1.19	[0.28 to 5.01)	0.812
Overweight	64/248	26%	1.33	[0.90 to 1.96)	0.150
Obese	34/142	24%	1.48	[0.91 to 2.40)	0.111

* No forceps

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