Faecal incontinence and mode of first and subsequent delivery: a six-year longitudinal study

Christine MacArthur,a Charis Glazener,b Robert Lancashire,a Peter Herbison,c Don Wilson,c Adrian Grantb

Objective To investigate the prevalence of persistent and long term postpartum faecal incontinence and associations with mode of first and subsequent deliveries.

Design Longitudinal study.

Setting Maternity units in Aberdeen, Birmingham and Dunedin.

Population Four thousand two hundred and fourteen women who returned postal questionnaires three months and six years postpartum.

Methods Symptom data were obtained from both questionnaires and obstetric data from case-notes for the index birth and the second questionnaire for subsequent births. Logistic regression investigated the independent effects of mode of first delivery and delivery history.

Main outcome measures Incontinence to bowel motions three months and six years after index birth. For delivery history, the outcome was incontinence only at six years.

Results The prevalence of persistent faecal incontinence was 3.6%. Almost 90% of these women reported no symptoms before their first birth. The forceps delivery of a first baby was independently predictive of persistent symptoms (OR 2.06, 95% CI 1.40–3.04). A caesarean section first birth was not significantly associated with persistent symptoms (OR 1.07, 95% CI 0.64–1.81). Delivering exclusively by caesarean section also showed no association with subsequent symptoms (OR 1.04, 95% CI 0.72–1.50) but ever having forceps was significantly predictive (OR 1.48, 95% CI 1.18–1.87). Other factors independently associated with persistent faecal incontinence were older maternal age, increasing number of births and Asian ethnic group. Birthweight and long second stage were not significantly associated.

Conclusions The risk of persistent faecal incontinence is significantly higher after a first delivery by forceps. We found no evidence of a lower risk of subsequent faecal incontinence for exclusive caesarean section deliveries.

INTRODUCTION

It is commonly considered that faecal incontinence is related to childbirth.1,2 Forceps delivery has been shown in several studies to be associated with an increased risk of subsequent bowel control symptoms, including incontinence to stool and flatus.3–6 This is consistent with pathophysiological studies that have found mechanical and neurological injury to be more common after forceps delivery.7–10 Delivery by caesarean section on the other hand is generally thought to be associated with reduced risk. Pathophysiological studies have shown that anorectal function is not affected by a caesarean section performed before labour,7,8,11,12 although neurological impairment can occur with a caesarean section after the onset of labour.11–13 Most studies of symptoms following caesarean section delivery have been too small to be conclusive about whether or not there is a reduction in risk.4,11,14,15

Our initial investigation of the large sample recruited to this study showed that first birth by forceps delivery was independently predictive of faecal incontinence at three months postpartum.16 Caesarean section was marginally associated with fewer symptoms and vacuum extraction showed no significant symptom association. Older maternal age and Asian ethnic group were additional independent symptom predictors.16 The literature is sparse on the extent to which faecal incontinence may resolve soon after childbirth or may be persistent. Nor is it known whether the delivery mode of a first birth is predictive of persistent symptoms, and what might be the effect of the mode of subsequent deliveries. The main aim of this longitudinal study was to examine the prevalence of faecal incontinence to at least five years postpartum and to consider the effect of mode of first and subsequent deliveries on long term symptoms.

aUniversity of Birmingham, UK
bUniversity of Aberdeen, UK
cUniversity of Otago, Dunedin, New Zealand

Correspondence: Professor C. MacArthur, Department of Public Health and Epidemiology, University of Birmingham, Birmingham B15 2TT, UK.
METHODS

All women who delivered during one year (1993/1994) in three maternity units, in Aberdeen (Scotland), Birmingham (England) and Dunedin (New Zealand), were sent a postal questionnaire at three months postpartum to assess prevalence of urinary and faecal incontinence. Those with urinary incontinence were eligible to take part in a randomised controlled trial (RCT) of the effects of an intensive pelvic floor exercise programme. Most of the questions therefore were about urinary incontinence but there was one question on faecal incontinence: ‘do you ever lose control of wind or bowel motions from your back passage in between visits to the toilet?’ Optional responses were, ‘no’, ‘rarely’, ‘sometimes’, ‘often’ and ‘always’, separately specified for loss of wind (flatus) and of motions (stool). The questionnaire was designed by the study team since at the time there were no suitable validated questionnaires on incontinence.

Six years after the index birth a second postal questionnaire ascertained later symptoms, using the same questioning. There were, however, some additional questions at six-year follow up in the questionnaires sent to women in the Aberdeen and Birmingham centres (organisational reasons prevented their inclusion in Dunedin). These were whether the symptoms had started prior to the first pregnancy, the occurrence of passive incontinence (bowel leakage without being aware of this until it has happened), recent use of pads and constipating medicines and whether she had had surgical or biofeedback/bowel training treatment for loss of bowel motions. The Hospital Anxiety and Depression (HAD) Scale and a question devised for the study asking ‘how are you feeling generally’ were included at both points. Obstetric and maternal data relevant to the index delivery were obtained from the hospital case-notes. The follow up questionnaire obtained date and mode of all deliveries, which enabled the mode and age of first birth to be determined for the women who had been multiparous at index birth. Information on ethnic origin (from case-notes) was only available in Birmingham. Because it is known that Dunedin and Aberdeen have almost no local Asian population, women in these centres were classed as non-Asian. The initial study and the follow up were approved by ethics committees in the three centres.

The main study research question was whether mode of first delivery predicts persistent faecal incontinence. The primary outcome (persistent faecal incontinence) was defined as loss of control of bowel motions with any degree of frequency reported at both three months and at six years. Secondary outcomes were as follows: ‘more frequent faecal incontinence’, defined as reported with any frequency at three months but occurring ‘always’, ‘often’ or ‘sometimes’ at six years; and persistent flatus incontinence, defined as loss of wind with any frequency at both three months and at six years.

The second research question was to investigate whether delivery mode history was associated with faecal incontinence at six years after the index birth. This question, which was pre-specified based on the three-month findings, had two parts: the effect of any forceps delivery and the effect of delivering exclusively by caesarean section. In investigating delivery mode history, the primary outcome was loss of control of bowel motions at six years: persistent faecal incontinence could not be examined as the outcome for this since many births in the delivery history would have occurred after our first contact.

Multivariate logistic regression was the main tool of analysis to assess the independent effects of delivery mode on symptom outcomes. To investigate the effect of mode of first birth on persistent faecal incontinence, two logistic regression models were utilised. Because detailed obstetric data were only available for index births, the first model was restricted to index primiparae and a range of obstetric and maternal variables were included as potential independent variables. These were as follows: mode of delivery [spontaneous vaginal delivery (SVD)/forceps/vacuum/caesarean section]; maternal age (<25/25–29/30–34/35+); onset of labour (not induced/induced); perineal trauma (intact/episiotomy/laceration); second stage labour duration (under 1 hour/1 hour or more) birthweight (quartiles); prepregnancy body mass index (quartiles and a no response category), non-Asian/Asian ethnic origin and total number of births by follow up (one/two/three/four or more). To expand the number of cases included, the second model added multiparae, and the variables entered were first mode of delivery, age at first birth, total number of births and ethnic origin. Neither this second model, nor those described below, could examine the possible effect of other obstetric variables because these were only available in relation to index births. In all models, cases with missing values were omitted.

To examine delivery mode history, a variable was created from the reported birth histories that categorised all of a woman’s deliveries into the following: one or more forceps birth; caesarean section birth(s) only; and all other birth histories. Logistic regression models investigated the effects of delivery mode history on the outcomes, with age at first birth, number of births and ethnic group also entered.

RESULTS

Ten thousand nine hundred and eighty-nine women had been sent a questionnaire at three months postpartum and 7879 had replied. Excluding known deaths in the intervening years, 7872 follow up questionnaires were sent at six years. Eight hundred and forty-seven were returned as undelivered by the post office and 4214 were completed and returned by the women, a response rate of 54% (4214/7872). Mean duration of follow up was 5.97 years (SD 0.32; range 5.0–7.2) and mean duration from first birth to follow up for the women who had been multiparous at index birth was 10.91 years (SD 3.78; range 5.9–31.6).
Comparisons of the index birth case-note data for the respondents and non-respondents at six years showed some statistically significant differences. More non-respondents were under 25 years at the index birth (31.6% vs 17.8%, $\chi^2$ 177.3, $P < 0.001$) and more were Asian (10.4% vs 4.7%, $\chi^2$ 83.2, $P < 0.001$). Mode of index delivery of non-respondents was similar to respondents (SVD 70.4% vs 68.7%; caesarean section 16.2% vs 15.8%; forceps 9.6% vs 10.1%; vacuum 3.8% vs 5.3%). There was a significantly lower rate of faecal incontinence at three months among respondents (8.7%) compared with non-respondents (10.5%, $\chi^2$ 5.6, $P = 0.017$), which is likely to lead to an under-estimation of the prevalence of persistent symptoms at follow up.

In the three-month questionnaire, 6.7% of women (282/4214) did not answer the question on loss of bowel motions and at six years it was 2.4% (104/4214). Of those who answered at three months, 8.7% (343/3932) reported faecal incontinence, with 3.6% (141/3932) reporting it more often than rarely. In the six-year questionnaire, these proportions were 10.0% (413/4110) and 4.2% (174/4110), respectively. Table 1 shows the prevalence and frequency of faecal incontinence at both three months and six years postpartum; and separately for primiparae at index birth.

The overall prevalence was a little greater at follow up, but there was substantial remission and new onset of symptoms (Table 1). By six years, 58.6% (195/333) of symptoms experienced at three months had resolved; even those that had been experienced more often than rarely were not reported in 48.2% of cases (68/139). Among all women reporting symptoms at six years, 63.8% (243/381) had not reported symptoms in the first questionnaire: 120 of these had not had another birth. Nevertheless, the prevalence of faecal incontinence three months after one delivery and present six years later was 3.6% (138/3857), and for 2.0% (76/3857) of women this was more than a rare occurrence at six years: among the index primiparae, the corresponding prevalence were 3.2% (58/1807) and 1.7% (30/1807). Almost 90% of the women who were symptomatic on both occasions (110/126) reported being non-symptomatic before their first baby.

There was indication of some severe symptoms: 26.6% (33/124) of those reporting persistent faecal incontinence had experienced leakage without being aware of this until it had happened and 9.4% (12/127) reported use of a pad or plug and 8.6% (11/128) use of constipating medicines to protect against leakage. Secondary care treatment of incontinence, however, was rare; only three women with persistent symptoms reported surgery and one reported bowel training/biofeedback.

Persistent faecal incontinence was associated with more adverse general health. In response to the question, ‘how are you feeling generally’, 17.3% (24/138) of those with persistent symptoms said ‘not very well’ or ‘not at all well’, compared with only 4.1% (147/3680) of those without persistent symptoms ($\chi^2$ 52.71, $P < 0.001$). Mean HAD scores at six years were also significantly greater: mean anxiety score was 7.9 in women with persistent faecal incontinence compared with 5.6 (difference = 2.2, 95% CI 1.6–2.8); and mean depression scores were 7.6 and 5.4, respectively (difference = 2.3, 95% CI 1.7–2.9).

Persistent faecal incontinence was examined in relation to the various obstetric and maternal characteristics, showing several differences. The likelihood of persistent symptoms was greater with increasing number of births (OR relative to one birth; 2.07 for two births, 2.80 for three births and 3.38 for four or more births), for older age at first birth (OR relative to <25 years; 0.83 for 25–29 years, 1.23 for 30–34 years and 1.56 for 35 years or more) and among Asian ethnic groups (OR 5.85 relative to non-Asian). For mode of first delivery relative to SVD, symptoms were more common after a forceps first birth (OR 2.10), similar after a caesarean section (OR, 1.12), with numbers for vacuum extraction being too small to be meaningful.

The first logistic regression model, including only primiparae at index birth, examined mode of first delivery and other obstetric and maternal variables. For mode of first delivery, forceps was independently predictive of persistent faecal incontinence. Caesarean section and vacuum extraction delivery showed no statistically significant associations but numbers for these were small. Older age and Asian ethnic group were independently predictive of symptoms and total number of births showed a trend of greater odds of persistent symptoms with increasing births (Table 2). No statistically significant associations were found for induced onset of labour, episiotomy, perineal laceration, birthweight, duration of second stage labour or pre-pregnancy body mass index.

The second model (Table 3), including all women, used mode and age of first delivery from birth histories for index multiparae. The accuracy of the delivery mode histories reported by the women was examined by comparing the case-note data for the index birth and the reported data for the

---

**Table 1.** Prevalence and frequency of faecal incontinence at three months and six years.

<table>
<thead>
<tr>
<th>At 3 months</th>
<th>None</th>
<th>Rarely</th>
<th>More often</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primiparae</td>
<td>1560</td>
<td>66</td>
<td>36</td>
<td>1662</td>
</tr>
<tr>
<td>All births</td>
<td>3281</td>
<td>157</td>
<td>86</td>
<td>3524</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>At 6 years</th>
<th>None</th>
<th>Rarely</th>
<th>More often</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primiparae</td>
<td>1647</td>
<td>94</td>
<td>66</td>
<td>1807</td>
</tr>
<tr>
<td>All births</td>
<td>3476</td>
<td>219</td>
<td>162</td>
<td>3857*</td>
</tr>
</tbody>
</table>

*Total answering question at both times. Total answering at three months = 3932, total answering at five to six years = 4110.
same birth. This showed 98% of reported caesarean sections and 98% of SVD births were consistent with case-notes, and 87% of forceps and 88% of vacuum extraction births. The largest inaccuracies (although still small) were 17/220 vacuum extraction deliveries reported by women as forceps, and 17/445 forceps deliveries reported as spontaneous.

The second model (Table 3), including all women, with mode and age of first birth and number of births entered but no other obstetric variables, showed the same findings as the model restricted to index primiparae (Table 2). There was a significantly increased risk of persistent faecal incontinence following a first forceps delivery. No significant associations were shown for a first delivery by caesarean section or vacuum extraction, but the numbers were relatively small. Older maternal age, increasing number of births and Asian ethnic group all showed significant associations.

The range of delivery modes that a woman has may be important in affecting risk of faecal incontinence. In investigating delivery mode history we could only examine faecal incontinence at the time of our second contact rather than persistent symptoms because some deliveries would not have occurred by our first contact: 48.9% of the sample had had another birth since the index birth. By the time of the six-year follow up, mean total number of births was 2.4 and mean time since last birth was 4.4 years. In relation to delivery history, the logistic regression analysis showed that having at least one forceps delivery was independently predictive of faecal incontinence at six years. There was no statistically significant inverse association for having delivered exclusively by caesarean section (Table 4). Older age at first birth, increasing number of births and Asian ethnic group were independent symptom predictors.

The group of women who had delivered exclusively by caesarean section could be subdivided further into 116 who had only ever had a caesarean section before labour, 16 of whom were symptomatic at six years, and 300 who had one or more caesarean section after the onset of labour, 22 of whom were symptomatic. The former group would be expected to have least opportunity for delivery damage. The logistic regression was run again with these groups entered as separate categories but still no negative associations with symptoms were shown: the OR for the first group was 1.64 (95% CI 0.93–2.87) and for the second the OR was 0.83 (95% CI 0.52–1.31). Data on coexisting bowel disease (available from Aberdeen and Birmingham centres) were examined to consider if this might account for symptoms in the 16 women who were symptomatic following exclusive prelabour caesarean sections. Information was not known for one case, but of the remaining 15 only one woman reported any coexisting bowel disease.

Whether mode of first delivery showed the same associations with faecal incontinence that was persistent and occurred more than rarely (sometimes, often, always) at follow up was examined. This analysis was based on smaller numbers of symptomatic women (n = 76) so showed wider confidence intervals, but the pattern of associations was the same as for persistent symptoms with any frequency. The logistic regression model including all women (comparable with Table 3) showed a positive association for first birth forceps OR = 2.87 (95% CI 1.73–4.78); and no association for first birth caesarean sections OR = 1.64 (95% CI 0.83–3.10). Whether mode of first delivery showed the same associations with faecal incontinence that was persistent and occurred more than rarely (sometimes, often, always) at follow up was examined. This analysis was based on smaller numbers of symptomatic women (n = 76) so showed wider confidence intervals, but the pattern of associations was the same as for persistent symptoms with any frequency. The logistic regression model including all women (comparable with Table 3) showed a positive association for first birth forceps OR = 2.87 (95% CI 1.73–4.78); and no association for first birth caesarean sections OR = 1.64 (95% CI 0.83–3.10).
Table 4. Multiple logistic regression of faecal incontinence at six year follow up and delivery mode history. Number of cases = 4046; number symptomatic = 402.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Total</th>
<th>Symptoms no (%)</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Delivery mode history</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All other histories</td>
<td>2637</td>
<td>235 (8.9)</td>
<td>1.0 Reference</td>
</tr>
<tr>
<td>One or more forceps</td>
<td>993</td>
<td>129 (13.0)</td>
<td>1.48 (1.18–1.87)</td>
</tr>
<tr>
<td>Only Caesarean section(s)</td>
<td>416</td>
<td>38 (9.1)</td>
<td>1.04 (0.72–1.50)</td>
</tr>
<tr>
<td><strong>Maternal age at first birth</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;25</td>
<td>1379</td>
<td>136 (9.9)</td>
<td>1.0 Reference</td>
</tr>
<tr>
<td>25–29</td>
<td>1651</td>
<td>149 (9.0)</td>
<td>1.09 (0.84–1.41)</td>
</tr>
<tr>
<td>30–34</td>
<td>813</td>
<td>93 (11.4)</td>
<td>1.60 (1.18–2.16)</td>
</tr>
<tr>
<td>35+</td>
<td>203</td>
<td>24 (11.8)</td>
<td>1.72 (1.06–2.79)</td>
</tr>
<tr>
<td><strong>Number of births</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One</td>
<td>517</td>
<td>38 (7.4)</td>
<td>1.0 Reference</td>
</tr>
<tr>
<td>Two</td>
<td>2147</td>
<td>193 (9.0)</td>
<td>1.23 (0.85–1.78)</td>
</tr>
<tr>
<td>Three</td>
<td>983</td>
<td>110 (11.2)</td>
<td>1.61 (1.08–2.41)</td>
</tr>
<tr>
<td>Four or more</td>
<td>399</td>
<td>61 (15.3)</td>
<td>2.12 (1.34–3.35)</td>
</tr>
<tr>
<td><strong>Ethnic group</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Asian</td>
<td>3870</td>
<td>355 (9.2)</td>
<td>1.0 Reference</td>
</tr>
<tr>
<td>Asian</td>
<td>176</td>
<td>47 (26.7)</td>
<td>3.42 (2.36–4.94)</td>
</tr>
</tbody>
</table>

0.84–3.19). There were no women with more frequent faecal incontinence who had a vacuum extraction delivery.

The associations between more frequent faecal incontinence at six years and delivery mode history were also examined (comparable with Table 4). Again, the same pattern was shown as for symptoms with any frequency, both in relation to forceps and caesarean section history. For forceps history a significant association with more frequent symptoms at six years was shown (OR = 1.63, 95% CI 1.16–2.29). Caesarean section history again showed no negative association for having delivered exclusively by caesarean section (OR = 1.43, 95% CI 0.85–2.41).

Flatus incontinence is a much more common symptom than faecal incontinence, and persistent flatus incontinence was reported by 32.7% (1357/4147) of women. The logistic regression models examining this secondary outcome showed the same pattern of association with first delivery mode as for persistent faecal incontinence (comparable with Table 3) although the associations were weaker. The model including all women showed an increased risk for a first forceps delivery (OR = 1.58, 95% CI 1.35–1.87), and no significant associations for caesarean section (OR = 1.01, 95% CI 0.84–1.22) or for vacuum extraction (OR = 0.99, 95% CI 0.74–1.33).

Flatus incontinence at six years was reported by 52% (2178/4188) of women. The analyses to examine this showed the same pattern of associations with both forceps and caesarean section history as for faecal incontinence at six years (comparable with Table 4). There was a significantly increased risk for any forceps delivery (OR = 1.33, 95% CI 1.15–1.54) and no significant negative association for having delivered exclusively by caesarean section (OR = 1.15, 95% CI 0.93–1.43).

There were 516 women in this sample who had been participants in our nine-month-long RCT of nurse-led conservative treatment of urinary incontinence, 263 of whom had been allocated to the treatment arm. To consider any possible effects of the trial on the results of the overall longitudinal study population in this paper, the main analyses were repeated excluding trial participants. The prevalence of persistent faecal incontinence was reduced slightly to 3.3% and 1.8% where this was more than a rare occurrence at six years. Among the women who had been in the trial treatment group and had been symptomatic of faecal incontinence at three months, 57.1% (20/35) no longer had symptoms at six years, which was a similar symptom resolution rate to that in the full sample (see earlier). The logistic regression models, which excluded trial participants, were not substantially altered, either in terms of the pattern of associations shown or the odds ratios. For example, the model examining first delivery mode including all women (comparable with Table 3) still showed an increased risk for first forceps delivery (OR 2.02, 95% CI 1.31–3.13) and no significant association for first caesarean sections (OR 1.26, 95% CI 0.73–2.16). Increasing maternal age was still significantly associated and with similar odds ratios, as was increasing number of births and Asian ethnic group. The model examining delivery mode history (comparable with Table 4) still showed an increased risk for one or more forceps (OR 1.52, 95% CI 1.81–1.98) and no association for exclusive caesarean section births (OR 1.10, 95% CI 0.75–1.61). Again, the same pattern was shown for the other variables.

**DISCUSSION**

This longitudinal study has shown that a first birth by forceps delivery is associated with persistent faecal incontinence occurring up to at least five years postpartum, with about a twofold increased risk. The association was consistent for more frequently occurring symptoms and for persistent flatus incontinence and it remained when taking account of subsequent delivery modes. For caesarean sections we found no evidence of a lower risk of subsequent faecal incontinence for a first birth by caesarean section or for exclusive caesarean section births.

The overall prevalence of faecal incontinence experienced both at three months postpartum and at least five years later was 3.6%. Over half of these symptomatic women said that their later symptoms were more than a rare occurrence and about a quarter reported passive incontinence. We did not ask women if they had consulted a doctor about their symptoms, although other studies have found consultation to be uncommon.\(^4,14,19,20\) We did ask, however, whether they had had surgical or biofeedback treatment, and hardly any women reported either. We found that...
postpartum faecal incontinence symptoms can resolve: 57% of the symptoms present at three months were no longer reported at six years. Other small studies have also found that symptoms can be transient.14,21–24

Our finding of an increased risk of faecal incontinence that persists up to at least five years after a first birth by forceps delivery, to our knowledge, has not been shown before. A few previous studies have followed postpartum women on more than one occasion and have assessed anal incontinence.21–23,25 Most were primarily assessing anorectal function so have been small, and even by studying faecal and flatus incontinence as a single symptom entity (on the assumption that flatus is a less severe manifestation of the same injury) were unable to obtain conclusive results on obstetric risk factors. In this study, the analysis of the index primiparae, which allowed investigation of a range of potential obstetric covariates, showed an independent effect for forceps, but the risk estimate was relatively imprecise. Apart from delivery mode, no other obstetric variables were found to show a statistically significant association.

The addition of the index multiparae, with mode of their first delivery from reported birth histories, more than doubled the number of cases and allowed more precision of the difference associated with a first forceps delivery. The increased risk of persistent faecal incontinence following a first forceps birth was consistent across the secondary outcomes of more frequent faecal incontinence and persistent flatus incontinence. It is also consistent with the findings of pathophysiological studies. These have shown that anal sphincter defects are more likely to occur with a forceps delivery13 and that most damage occurs during a first birth.13,22 A multiparous forceps delivery is relatively uncommon so we did not separate out those who had forceps for a subsequent birth after a non-forceps first birth, but our delivery history analysis showed an association between ever having forceps and subsequent faecal incontinence.

It has generally been assumed that caesarean section delivery protects against faecal and flatus incontinence and pathophysiological studies have demonstrated less damage, although neurological function can be affected by caesarean section during labour.7–13 Some small observational studies6,15,26 and a large general population study5 however, have not found a reduction in symptoms associated with caesarean section deliveries. In addition, an RCT of planned caesarean section versus vaginal delivery for term breech found similar rates of flatus incontinence three months later in the caesarean section group.27 In our initial survey of this population16 we had shown a marginal negative association with faecal incontinence occurring at three months postpartum, but for persistent symptoms we found no association. Having delivered exclusively by caesarean section also showed no evidence of a protective effect on faecal incontinence occurring an average of 4.4 years after the last birth. And this lack of association was consistent for more frequent symptoms and for flatus incontinence. Even delivering exclusively before the onset of labour did not show an inverse association with subsequent symptoms, although there were only 116 women in this group. This is counter to findings from neurophysiological and endosonographical studies, where elective caesarean sections have been shown to have no effect on anorectal function.7,8,11,12

Investigations of anal sphincter damage have shown such damage to be less common following vacuum extraction than forceps deliveries.3,28 Our first study of this population found no association between vacuum extraction delivery and faecal incontinence three months after birth. For the less common ‘event’ of persistent faecal incontinence, the numbers were too small to allow further comment on this type of instrumental delivery, although no association was shown for the more common symptom of persistent flatus incontinence.

Asian ethnic group had been shown to be a predictor of symptoms at three months postpartum and this association remained for persistent faecal incontinence. The significantly increased risk was consistently shown in all the logistic regression analyses, but the lower response at follow up for Asian women and correspondingly small numbers rendered confidence intervals wide. Nevertheless, the estimated increase was high, especially for persistent symptoms. We have found nothing in the literature on this and it requires further investigation.

Increasing number of births and older maternal age at first birth were independent predictors of faecal incontinence in this study, even after taking account of delivery mode history. Previous studies have found multiparity to increase the risk of anal incontinence.21,22,29 Increasing maternal age has also been shown to be a risk factor for faecal and anal incontinence both in postpartum30,31,32 and general populations33,34 as well as in pathophysiological studies.33,34 Other studies that have followed women through two or more deliveries have not been large enough to take account of the mode of subsequent deliveries21,22

An important strength was that this was a large longitudinal investigation. Nevertheless, in investigating certain aspects of the research questions posed, in particular those relating to operative delivery history, the exposed groups were still relatively small. There was also loss to follow up over time. Of the 10,989 women who had given birth in the three units and the 7879 followed at three months, only 4214 were followed to six years after the index birth. We have obstetric and maternal data on all women in the original population and know that, although at three months there were slightly more SVDs among respondents, the obstetric characteristics of the respondents at six years were similar. More older women, more primiparae and those who were Caucasian responded on both occasions. These differences are likely to affect symptom prevalence. From the first follow up data we know that the six-year non-respondents had had a higher rate of faecal incontinence at three months so we know that this is likely to have led to an under-estimate of symptom prevalence at six years. It is
difficult, however, to see how differences between respondents and non-responders might affect obstetric associations.

There were 516 women in this population who had been included at three months postpartum in a related RCT of nurse-led conservative management of incontinence, 263 of whom had been in the intervention group and received three home visits over a nine-month period from a nurse to teach and reinforce a pelvic floor muscle exercise regime. Eligibility for the trial was based on the presence of urinary not faecal incontinence at three months postpartum but some of these women—16.3% of the intervention group and 15.1% of controls—had also had faecal incontinence at trial entry. In addition to a significant benefit on urinary incontinence, the intervention was found to be associated with reduced faecal incontinence at 12 months postpartum, although at six years these effects did not persist. It was important that this longitudinal study included all women in the population who were followed up, but to consider possible effects of the trial the analyses were repeated with all trial participants excluded. This showed that the prevalence of persistent symptoms was reduced, although only slightly, but the pattern and size of associations with the obstetric and maternal factors remained substantially unaltered.

To obtain the delivery histories we had to rely on data reported by the women, because we only had hospital records for the index births. There may be some error in women’s recall of the modes of their deliveries, although for deliveries where we had data from both sources the discrepancies were small. For type of caesarean section, however, whether before or after labour onset, we could not compare with hospital records because this was not recorded in the same manner in all three centres. It is possible that women may misrecall whether their caesarean section occurred before or during labour.

CONCLUSIONS

This study has shown that about half of cases of faecal incontinence that occur soon after a first birth persist to at least five years later. A first birth by forceps delivery incurs about a twofold increase in the risk of having persistent faecal incontinence. Increased risk of a similar order to forceps was found for older maternal age and numbers of births and there was a substantially increased risk for Asian ethnic group, although based on relatively small numbers. We found no evidence that exclusive caesarean section deliveries protect against subsequent faecal incontinence.

Acknowledgments

We thank the women who took part in the study and Alison McDonald, Anne-Marie Rennie, Jane Cook and Jane Harvey who provided nursing and administrative support. The original study was supported by Wellbeing and the Health Research Council of New Zealand and the follow up by a grant from the Chief Scientist Office of the Scottish Executive Health Department, which core funds the Health Services Research Unit. However, the views expressed are those of the authors.

References


Accepted 22 April 2005