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Epidemiology

Evolution and risk factors of anal incontinence during the first 6 years after first delivery: a prospective cohort study

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Objective To explore changes in prevalence of anal incontinence (AI) from late first pregnancy to 6 years postpartum, and to evaluate possible risk factors for changes in AI during the 6-year period.

Design Prospective longitudinal cohort study.

Setting Two Norwegian health regions.

Population or sample Women with first deliveries between May 2009 and December 2010.

Methods Participants reported AI in late pregnancy, 6 months, 1 and 6 years after first delivery using postal or digital questionnaires. AI prevalence was calculated, and mixed effects Poisson regression analyses with robust variance were applied.

Main outcome measures AI from late pregnancy to 6 years postpartum.

Results Among 1571 participants, 65% had normal vaginal first deliveries, 20% had vaginal deliveries complicated by instrumental intervention and/or obstetric anal sphincter injury (IVD ± OASIS). Nearly 1 in 10 women reported persistent incontinence during the 6 years. The overall AI prevalence was reduced from late pregnancy to 1 year postpartum for all modes of delivery. At 6 years postpartum, women with IVD ± OASIS had a higher AI prevalence (23%; 95% CI 16–30%) compared with women with caesarean section (8%; 95% CI 2–13%) or normal vaginal delivery (12%; 95% CI 9–16%). Moreover, women who were <23 years, ≥34 years, unemployed during first pregnancy, who had active bowel disease (PR: 2.4; 95% CI 2.0–2.7), or bowel evacuation problems during the 6-year period had higher AI prevalence.

Conclusions Mode of first delivery modified AI prevalence during the 6-year period, whereas age, bowel disease and bowel evacuation problems were associated with higher prevalence of AI from late first pregnancy to 6 years postpartum.

Keywords Anal incontinence, long-term, postpartum, risk factors.

Tweetable abstract Complicated vaginal delivery, age and bowel emptying problems increase the risk of long-term anal incontinence.

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Introduction

Among women, childbirth is one of the most persistent and important factors for developing pelvic floor disorders such as anal (AI) and urinary incontinence.[1] Even though incontinence symptoms may occur months and years postpartum,[2] few studies have explored the changes in AI beyond the first year after delivery. Previous findings suggest that women who experience problems with AI in pregnancy or during the first 12 months postpartum, tend to experience a deterioration or persistence rather than an improvement of these symptoms in the long-term.[3,4] Vaginal deliveries complicated by abnormal presentation of the fetus, obstetric anal sphincter injuries (OASIS) and/or instrumental delivery, and forceps deliveries in particular, are obstetric factors found to increase the risk of short-

and long-term postpartum AI.[5–10] However, there is conflicting evidence on how different modes of delivery affect the development of postpartum incontinence and whether elective caesarean delivery may reduce the risk of subsequent incontinence.[8,9,11,12] Moreover, a recent systematic review concluded that there is limited evidence on long-term quality of life among women who experience postpartum AI or undergo subsequent deliveries after sustaining OASIS.[13]

Non-obstetric factors associated with an increased risk of long-term AI include adverse general health[14,15] and active bowel disease involving diarrhoea or constipation.[16–18] In addition, maternal age at first delivery is rising globally. Previous findings suggest that older age at first delivery is associated with an increase in risk of postpartum AI,[4,5,10] and it is estimated that first time mothers in their thirties have a two-fold increase in odds of AI compared with first time mother in their twenties.[3,19]

The primary aim of the present study was to explore the changes in AI prevalence from late first pregnancy to 6 years after first delivery. The secondary aim was to evaluate possible risk factors for changes in AI during the 6-year period. We hypothesised that AI prevalence is associated with mode of first delivery, and that AI is more prevalent among women with first vaginal deliveries complicated by instrumental intervention and/or OASIS compared to those with caesarean sections or normal first vaginal deliveries.

Methods

Norwegian-speaking primiparous women over the age of 18 giving birth to healthy infants in two large hospitals in separate health regions in Norway were invited to participate before discharge home after their first delivery. Details of the inclusion and exclusion criteria, data collection and differences between responders and non-responders at the four time points have been described in previous reports on the short- and long-term outcomes in the same cohort.[10,19] Respondents were given the choice to complete and return the questionnaires about AI either by postal mail using pre-stamped return envelopes or using an online data collection system provided by the University of Oslo.

AI was measured using the St. Mark's incontinence score. The total St. Mark's incontinence score ranges from complete continence (0 points) to complete incontinence (24 points), and is based on self-reported symptoms of AI during the last 4 weeks on a five-point scale (never, rarely, sometimes, weekly and daily). Moreover, it includes three questions with dichotomous scales regarding the use of pads, constipation medicine (no = 0, yes = 2 points) and the ability to defer defecation for 15 minutes (no = 4, yes = 0 points).[20] AI was defined as experiencing faecal incontinence (FI, formed and/or loose stool incontinence) monthly or more and/or flatus incontinence weekly or more, with or without faecal urgency (15 minutes). Demographic data such as age, educational level, marital status, employment status, andbody mass index (BMI) in late pregnancy and obstetric data related to the first delivery such as mode of delivery, episiotomy and OASIS were collected from medical records. Clinically, we had a particular interest in exploring the differences between women with normal vaginal deliveries without any instrumental intervention or OASIS, and women with a history of more complicated deliveries. Thus, mode of delivery was categorised as caesarean section, normal vaginal delivery or vaginal deliveries complicated by instrumental intervention and/or OASIS (IVD ± OASIS). BMI was categorised based on World Health Organization recommendations and dichotomised according to the 90th percentile as obese class II+ (BMI ≥35 kg/m^2) or lower (BMI <35 kg/m^2). Age at first delivery was categorised based on the 10th, 50th and 90th percentiles and rounded off to the nearest whole year. Information about problems with bowel evacuation throughout the time period and bowel disease status at 6 years after first delivery were self-reported, and women classified with 'active bowel disorder' reported Crohn's disease, ulcerative colitis or irritable bowel syndrome. Women who participated at 6 years were both primiparous and multiparous. Unfortunately, data on subsequent deliveries were incomplete and these data were thus not included in our statistical analyses.

Statistical analysis

Descriptive statistics were presented as frequencies, percentages, mean and standard deviation (SD) for the participating women. Some variables were not assessable in all women and 50 multiple imputations were therefore iteratively conducted by chained equations using linear and logistic regression as implemented in the *mi impute* procedure in STATA (StataCorp LLC, College Station, TX, USA). Multiple imputations were performed for BMI, education, employment status, bowel evacuation problems, episiotomy and birthweight. Analysis of complete cases to check the robustness of the main results was thus provided in the supplement.

To explore the association between AI prevalence and background as well as delivery-related characteristics in the period from late first pregnancy to 6 years after delivery, mixed effects Poisson regression analyses with robust variance were applied.[21] Random effects of women were included to take into account the dependency between repeated measurements within each woman. The model included fixed effects for time (four categories; late pregnancy, 6 months, 1 and 6 years postpartum), mode of delivery, hospital affinity, age, BMI, education, employment status in late first pregnancy, episiotomy,

fetal presentation, birthweight and active bowel disease. In addition, experiencing problems with bowel evacuation was included as a time-varying covariate. Due to a particular interest in AI prevalence by mode of delivery during the time course, i.e. studying the interaction effect between mode of delivery and time after first delivery, an interaction term was added to the model. Stepwise backwards selection of the variables with a *P*-value criterion of 0.157 (corresponding to Akaike's information criterion) was performed. Results are presented as prevalence ratios (PR) with 95% confidence intervals (CI). A margins plot was utilised to illustrate graphically the correlation between mode of delivery and time after first delivery. Finally, we repeated the analysis with mode of delivery categorised as caesarean section, normal vaginal delivery or complicated vaginal deliveries, where complicated vaginal deliveries included vaginal deliveries complicated by non-occiput anterior presentation in addition to OASIS and/or instrumental intervention.

A significance level of 5% was used throughout, and all tests were two-tailed. Statistical analyses were performed using STATA version 15 (StataCorp LLC), and SPSS Statistics version 25 (IBM, Armonk, NY, USA).

Core outcome sets

The recommended core outcome set (COS)[22] of evaluating maternal care was not used when designing the present trial during the perod 2014–2015. On the other hand, the main outcome measure, maternal AI, is ranked as number 25 of the final 48 COS selected and suggested for routine reporting of maternity care by Devane et al.[22]

Patient involvement

Participants in our previous studies[10,23] provided feedback on the data collection, their experience with postpartum AI, and being offered pelvic floor muscle training (PFMT) in our intervention study.[23] A patient representative in the national patient organisation provided feedback in the planning of the long-term study. The participants were not involved in obtaining funding or in the analyses of the present study findings.

Results

Among the 1571 women recruited at baseline, 65% (n = 1030) had a normal first vaginal delivery, 20% (n = 309) had IVD ± OASIS and 15% (n = 232) had a caesarean section (Figure 1). In total, 550 (35%) women responded at all four time points from late pregnancy to 6 years after first delivery, 447 (29%) responded at three time points and 293 (19%) responded at baseline only. Nearly one in 25% reported AI in late pregnancy, and 14, 13 and 14% reported AI at 6 months, 1 and 6 years postpartum, respectively (Table 1). Among women participating at two or more time points, 65% (830/1278) remained continent throughout the 6-year period from first delivery, and approximately 4% (52/1278) consistently reported anal incontinence (Table S1).

Results of the variable selection procedure in the regression analyses excluded fetal presentation, birthweight, episiotomy, education and hospital affinity from the final model. Further, late pregnancy BMI was not found to be significantly associated with the prevalence of AI. In the

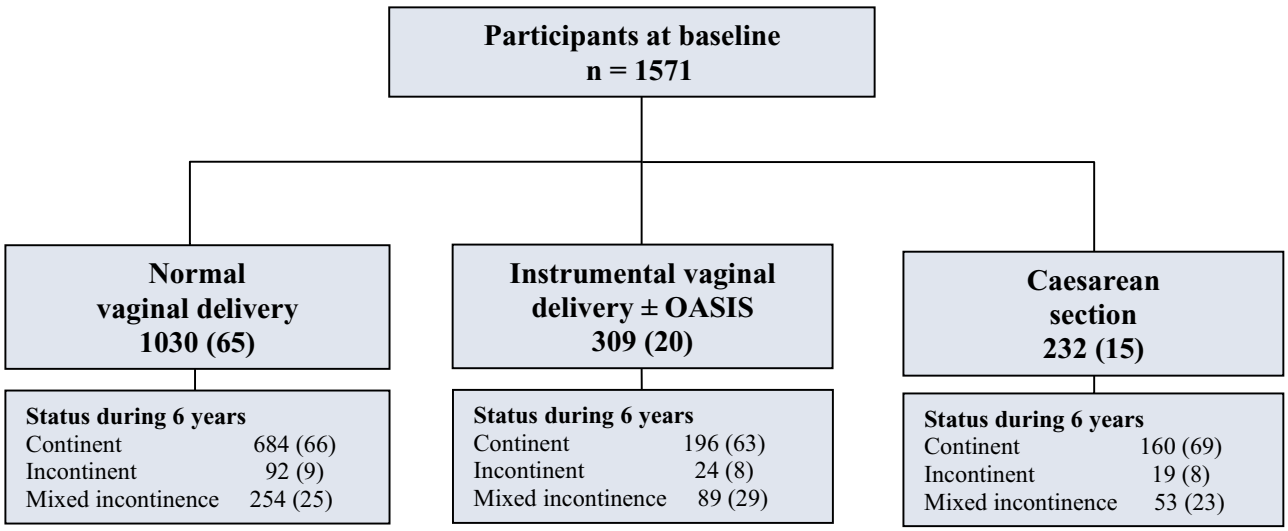

Figure 1. Flow chart showing participants according to mode of delivery and anal incontinence status. Prevalence presented as *n* (%) OASIS, obstetric anal sphincter injury at first delivery. Mixed incontinence: Women reporting anal incontinence and continence at different time points. See Table S1 for detailed information.

Table 1. Demographic and delivery-related characteristics from late pregnancy to 6 years after first delivery (n = 1571)

	Numbers analysed	n (%)*
Late first pregnancy		
Age [years], mean (SD) [range]	1571	28.3 (4.7) [18–46]
18–22 years		209 (13.3)
23–27 years		556 (35.4)
28–33 years		636 (40.5)
≥34 years		170 (10.8)
WHO Obese II+ (BMI ≥35 kg/m^2)	1305	161 (12.3)
Higher education (university/college/PhD)	1512	957 (63.3)
Married/living with partner	1567	1479 (94.4)
Work status—employed	1372	1286 (93.7)
First delivery		
Mode of first delivery	1571	
Normal vaginal delivery (VD)		1030 (65.6)
Normal VD and OASIS**		33 (2.1)
Instrumental delivery		245 (15.5)
Forceps delivery		19 (1.2)
Instrumental delivery and OASIS		31 (2.0)
Caesarean section		232 (14.8)
Abnormal fetal presentation	1566	182 (11.6)
Birthweight [g], mean (SD)	1570	3449 (518)
Head circumference [cm], mean (SD)	1567	34.9 (1.7)
Six years after first delivery		
One or more subsequent deliveries	726	578 (79.6)
AI affecting ADL score (0–10), mean (SD)	673	0.8 (1.7)
Active bowel disease	731	57 (7.8)
Bowel symptoms		
Anal incontinence late pregnancy	1571	361 (23.0)
Anal incontinence 6 months	1069	152 (14.2)
Anal incontinence 1 year	1031	137 (13.3)
Anal incontinence 6 years	725	99 (13.7)
Bowel evacuation problems late pregnancy	1570	316 (20.1)
Bowel evacuation problems 6 months	1069	140 (13.1)
Bowel evacuation problems 1 year	1031	112 (10.9)
Bowel evacuation problems 6 years	722	101 (14.0)
		Mean (SD) [range]
St. Mark's incontinence score		
St. Mark's incontinence score late pregnancy	1571	2.5 (3.1) [0–18]
St. Mark's incontinence score 6 months	1069	1.7 (2.6) [0–16]
St. Mark's incontinence score 1 year	1031	1.6 (2.4) [0–17]
St. Mark's incontinence score 6 years	656	1.4 (2.2) [0–17]

ADL, activities of daily living; BMI, body mass index; OASIS, obstetric anal sphincter injury; SD, standard deviation; WHO, World Health Organization.
Anal incontinence: experiencing formed and/or loose stool incontinence monthly or more and/or flatus incontinence weekly or more, with or without faecal urgency; Abnormal fetal presentation: occiput posterior presentation or other non-occiput anterior presentation; Active bowel disease: ulcerative colitis, irritable bowel syndrome and/or Crohn's disease.
*Numbers are n (%) unless otherwise specified.
**Women with normal vaginal delivery and OASIS were included in the instrumental ± OASIS group for the statistical analyses.

final model, the effect of time was significant, i.e. reduced prevalence of AI was observed at 6 months, 1 and 6 years postpartum compared with first delivery. There were no differences in the prevalence of AI between the different modes at the time of first delivery. However, during the time course, the prevalence of AI differed by mode of delivery; the interaction term between IVD ± OASIS and 6 years showed an additional 60% increase in prevalence of AI (PR 1.6; 95% CI 1.1–2.4; P = 0.03) (Table 2). At 6 years postpartum, the prevalence of AI was higher for women with IVD ± OASIS (23%, 95% CI 16–30%) than for women with normal first vaginal delivery (12%, 95% CI 9–16%) or caesarean section (8%, 95% CI 2–13%), as illustrated in Figure 2.

Both young (<23 years; PR 1.7, 95% CI 1.3, 2.1) and high age (≥34 years; PR 1.3, 95% CI 1.0, 1.8) were associated with higher prevalence of AI compared with women aged between 23 and 27 years at first delivery. Women who were unemployed during pregnancy, who had active bowel disease or reported problems with bowel evacuation during the 6-year period had a higher prevalence of AI than women who were employed during pregnancy, who had no bowel disease or who did not have problems with bowel evacuation (Table 2).

Analyses using data from the subset of women with complete information about all variables (n = 1152) gave similar results for time and mode of delivery. For the other variables, minor modifications in the PR estimates were observed for BMI and active bowel disease. Hospital affinity remained in the model, although it was not significant (Table S2).

Table 2. Prevalence ratios of background and delivery-related characteristics associated with anal incontinence during 6 years after first delivery (n = 1571). Women included as a random effect (P < 0.001)

	Unadjusted* PR (95% CI)	Adjusted** PR (95% CI)	*P*-value
Time			
First delivery	1	**1**	
Six months after first delivery	0.58 (0.47–0.70)	**0.64 (0.52–0.78)**	**<0.001**
One year after first delivery	0.54 (0.44–0.67)	**0.63 (0.51–0.77)**	**<0.001**
Six years after first delivery	0.54 (0.42–0.69)	**0.61 (0.47–0.78)**	**<0.001**
Mode of first delivery			
Normal vaginal delivery (VD)	1	1	
Caesarean section (CS)	0.90 (0.68–1.18)	0.82 (0.63–1.09)	0.17
Instrumental VD (IVD) ± OASIS	0.98 (0.78–1.24)	1.02 (0.81–1.27)	0.88
Interaction terms (Time × Mode of delivery)			
Six months and CS	1.12 (0.70–1.79)	1.24 (0.78–2.00)	0.36
Six months and IVD ± OASIS	1.30 (0.90–1.87)	1.18 (0.82–1.69)	0.38
One year and CS	1.01 (0.62–1.66)	1.09 (0.66–1.79)	0.74
One year and IVD ± OASIS	1.34 (0.91–1.97)	1.18 (0.80–1.73)	0.40
Six years and CS	0.77 (0.38–1.56)	0.79 (0.40–1.58)	0.51
Six years and IVD ± OASIS	1.65 (1.09–2.49)	**1.59 (1.06–2.37)**	**0.03**
Age late first pregnancy			
<23 years	1.99 (1.58–2.50)	**1.65 (1.30–2.08)**	**<0.001**
23–27 years	1	1	
28–33 years	1.11 (0.91–1.35)	1.17 (0.97–1.41)	0.10
≥34 years	1.28 (0.97–1.70)	**1.34 (1.03–1.76)**	**0.03**
Body mass index late pregnancy			
<35 kg/m^2	1	1	
≥35 kg/m^2 (WHO Obese II+)	1.34 (1.05–1.70)	1.22 (0.97–1.54)	0.09
Employment status late pregnancy			
Employed	1	1	
Unemployed	2.05 (1.57–2.67)	**1.61 (1.24–2.09)**	**<0.001**
Bowel disease status 6 years after first delivery			
No active bowel disease	1	1	
Active bowel disease	1.89 (1.32–2.71)	**1.61 (1.14–2.29)**	**<0.01**
Unknown status bowel disease	1.37 (1.16–1.62)	1.11 (0.94–1.31)	0.22
Bowel evacuation problems* **			
No	1	1	
Yes	2.69 (2.33–3.09)	**2.36 (2.04–2.72)**	**<0.001**

CI, confidence interval; OASIS, obstetric anal sphincter injury; PR, prevalence ratio; WHO, World Health Organization.
Bold indicates significant risk factor for experiencing anal incontinence during the 6 years after first delivery.
*Unadjusted results of mixed effects Poisson regression models.
**Final multivariable model after backward selection, presented with *P*-values.
***Time-varying covariate.

Finally, the mixed effects Poisson regression analysis where mode of delivery was categorised into normal vaginal delivery (n = 978), caesarean section (n = 232) or complicated delivery (including OASIS, instrumental intervention and abnormal fetal presentation, n = 361) yielded similar results to the main analysis presented in Table 2 (Table S3).

Discussion

Main findings

In this prospective cohort study, 66% remained continent from late pregnancy to 6 years after first delivery whereas 4% consistently reported AI at all time points. The overall AI prevalence from late pregnancy to 1 year postpartum was reduced for all modes of delivery. Only women with first deliveries complicated by OASIS or instrumental intervention had increased prevalence of postpartum AI at 6 years. Further, age at first delivery and experiencing bowel evacuation problems during the 6-year period were associated with a higher prevalence of AI.

Strengths and limitations

Strengths of the present study were the large sample size, an acceptable response rate at 6 years comparable to similar studies,[14] repeated AI measurements over a 6-year period using a validated measurement tool[20] and conforming to the IUGA/ICS terminology for female anorectal dysfunction.[1] Furthermore, known risk factors such as bowel evacuation problems at all four time points were included in the mixed effects analyses.

Limitations of the study include missing information about incontinence status prior to first pregnancy, and family history of incontinence. We had no data on BMI

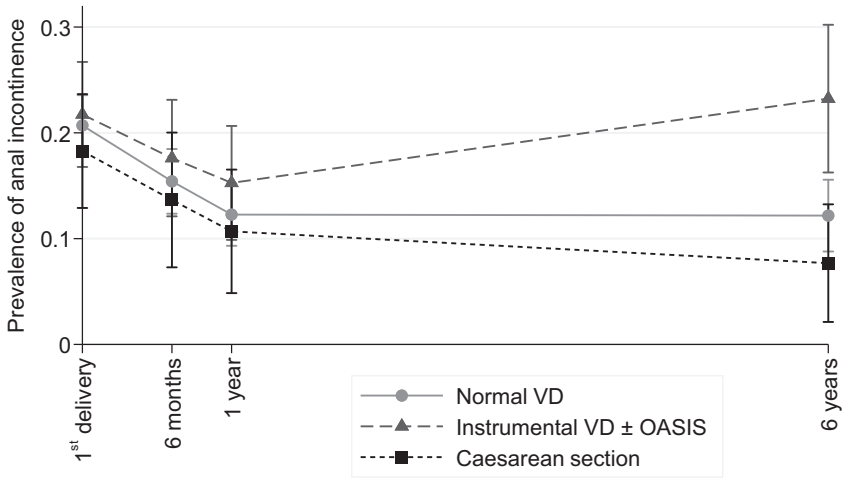

Figure 2. The prevalence of AI symptoms by mode of delivery from late pregnancy to 6 years after first delivery.

after first delivery, instrumental delivery and/or OASIS in subsequent deliveries and thus were unable to include this in the statistical analyses. However, data on subsequent deliveries may only have had an impact on the results at 6 years. Exploring established risk factors for AI in a separate mode of delivery group may be considered a limitation of this study. However, half the women with OASIS in the present study sustained OASIS following instrumental delivery. Therefore, our particular clinical interest was to compare AI among women with complicated deliveries and women with deliveries without such complicating factors. The drop-out rate may represent a potential source of bias in the present study. However, the mixed effects models have included all women in the analyses, independent of the number of responding time points, increasing the generalisability of the results. Furthermore, multiple imputation was undertaken for the women with missing information of one or more of the background and delivery-related characteristics. Sensitivity analysis (Tables S2 and S3) showed supportive results.

Interpretation (in light of other evidence)

In concurrence with previous findings concerning AI experienced 4[4] and 5[3] years after first delivery, 66% of the women in the present study remained continent throughout the 6-year period. Four per cent consistently reported AI symptoms during the 6 years. Similarly, MacArthur et al.[14] found that 4 and 33% reported persistent postpartum FI or flatus incontinence, respectively, at 6 years. In the 12-year follow up by the same group, 6% reported persistent FI, and almost 16% reported persistent flatus incontinence. The association between persistent FI and flatus incontinence was similar.[5] Discrepancies in AI prevalence between studies may partly be explained by differences in measuring tools and definitions. We used the St. Mark's incontinence score to report AI symptoms during the last month. Flatus incontinence was only included in the AI definition if occurring more than weekly, in comparison with flatus incontinence at any frequency in other studies.[5,14]

The association between mode of delivery and postpartum AI has been debated. Previous studies indicate that, compared with vaginal delivery, caesarean section does not preserve postpartum anal continence.[8,24] Estimates show that to avoid one case of AI, 18 caesarean sections need to be performed.[12] However, women with vaginal deliveries complicated by OASIS have increased risk of AI compared with women with caesarean section or vaginal delivery without OASIS.[8,12] Moreover, women with tears involving the internal anal sphincter muscle or anal mucosa (fourth degree tears) have a higher risk of AI and FI than do women with tears involving only the external anal sphincter muscle.[6,25] The role of instrumental delivery in development of postpartum AI is unclear. Some studies report no differences in risk of long-term FI between forceps and vacuum extractions, and that any instrumental delivery increases the risk of FI,[26] whereas other studies show an association between long-term postpartum AI symptoms and forceps, but not vacuum extraction.[5,14,25] In the present study, women with deliveries complicated by OASIS and/or instrumental delivery had a higher prevalence of postpartum AI at 6 years. This was present both in women with vaginal deliveries complicated by OASIS and/or instrumental intervention and in women with complicated deliveries including abnormal presentation of the fetus. This concurs with the findings by Evers et al.[27] However, they found no association between instrumental delivery and AI 5–10 years after delivery among women without OASIS, though they suggest that there is an additive effect of OASIS and instrumental delivery resulting in an increased risk of postpartum AI.[27]

In most studies, the risk of AI increases with increasing age.[17,28] In a Swedish study exploring FI 20 years after one delivery, estimates show that the risk of postpartum AI and FI increases by 4 and 3% yearly, respectively.[12] We found a higher prevalence of postpartum AI among women aged ≥34 years at first delivery. In contrast to most studies, we also found a higher prevalence of AI among the youngest women in all three regression models. A recent cross-sectional study showed that more men and women aged 18–34 reported FI, constipation and co-occurring FI and constipation compared with older respondents. Further, constipated respondents were nearly three times more likely to report FI compared with those with no constipation.[18] Similarly, women reporting bowel evacuation problems in late pregnancy or postpartum in our study had more than twice the prevalence of postpartum AI at 6 years than women without bowel evacuation problems. In addition, van Brummen et al.[29] found that women experiencing constipation in pregnancy were at increased risk of also reporting constipation postpartum. We found a significant association between active bowel disease at 6 years and AI. This concurs with Brochard et al.,[16] who found that one in three women of childbearing age with Crohn's disease reported FI, defined as ≥5 points on the Wexner score. In the same study, parity significantly increased the risk of FI; however, no association between FI and mode of delivery, perineal tears or episiotomy was shown.[16] Unfortunately, the item about active bowel disease was only included in the 6-year follow-up questionnaire, thus we have no data on bowel disease among those not responding at this time point. Other non-obstetric risk factors previously reported to increase the risk of long-term postpartum AI are high BMI and obesity.[3–5,14] In our previous work we found associations between obesity (BMI ≥35) and loose stool incontinence as well as double incontinence at 12 months postpartum.[10,30] The underlying mechanisms between high BMI and incontinence are not fully understood, though studies suggest that these associations may reflect the complex aetiology of AI, and the interaction between weight-related hormonal changes, diet, psychosocial, economic factors and other medical conditions.[4,31] In the present study, an association between high BMI in late pregnancy and long-term postpartum AI was only found in the complete case analysis.

Conclusion

The overall prevalence of AI was reduced from late pregnancy to 6 years postpartum; still, 4% reported persistent symptoms throughout the 6-year period. Women with a first vaginal delivery complicated by OASIS and/or instrumental intervention had a higher prevalence of AI at 6 years compared with women with normal vaginal delivery. Moreover, age and experiencing bowel evacuation problems during the 6-year period were associated with a higher prevalence of AI. Exploring defecatory symptoms among pregnant and postpartum women in general, and especially among those with pre-existing symptoms, or vaginal deliveries complicated by instrumental intervention and/or OASIS,, may be beneficial in reducing the short- and long-term consequences of incontinence and constipation. Further studies on pelvic floor disorders are warranted.

Disclosure of interests

None declared. Completed disclosure of interests forms are available to view online as supporting information.

Contribution to authorship

All authors contributed to drafting of the original study protocol and to the analysis and interpretation of the data. HHJ and RSF drafted the paper. All authors commented and approved the final version.

Details of ethics approval

In accordance with the Declaration of Helsinki, participants received written information about the study and written consent was obtained prior to inclusion in the study. The study was registered at clinicaltrials.gov (NCT02792244) on 6 June 2016 and was approved by the Norwegian Regional Committees for Medical and Health Research Ethics Central (No.2016/280/REK Midt) on 1 April 2016.

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Supporting Information

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Table S1. Detailed description of number (%) of participating women by mode of delivery and anal incontinence status (n = 1571).

Table S2. Complete case analysis (n = 1152).

Table S3. Complicated vaginal delivery analysed with multiple imputation (n = 1571). ■

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