

Postpartum urinary incontinence: Longitudinal risk factors and trajectories in Singapore

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Dear Editor,

Postpartum urinary incontinence is common and continues to negatively impact quality of life. Few studies have provided longitudinal data on postpartum urinary incontinence and its risk factors are not well understood. Majority of existing evidence concentrates on Caucasian populations,¹ not representing our Southeast Asian counterparts. This study aims to describe the time course and severity of postpartum urinary incontinence and identify its risk factors in women in Singapore.

This study recruited women who delivered from December 2017 to February 2018 at Singapore General Hospital (SGH). Exclusion criteria were women who were under the age of 21, unable to read and understand English and who declined to provide informed consent. Of the remaining 222, 187 women who attended at least 1 follow-up assessment were included in the study. Ethics approval was obtained from SingHealth Centralised Institutional Review Board 2017/2848).

Data collected included continence status in pregnancy, maternal age, pre-pregnancy body mass index (BMI), parity, birth weight and mode of delivery (normal vaginal delivery, forceps delivery, vacuum delivery or Caesarean delivery). Given the limited numbers in the vacuum delivery category (n=12), normal vaginal delivery and vacuum delivery were combined on the basis of their similar maternal and neonatal injury rates as compared with forceps delivery² to optimise statistical power.

At 3, 8 and 12 months post-delivery, patients self-reported volume and frequency of urinary leakage with the universally validated severity index International Consultation on Incontinence Questionnaire-Urinary Incontinence-Short Form.³ Incontinence severity was analysed as an ordinal variable with an ordinal 10-level scale. Continuous variables were summarised with mean and standard deviations, and categorical variables as percentages and frequencies. Risk

factors of incontinence severity over time were identified using proportional odds mixed-effects regression modelling.

Mean age in our cohort was 32 years (standard deviation [SD]=5), mean pre-pregnancy BMI was 24.2 (SD=6), mean parity was 1.8 and mean birth weight was 3.2 kg (SD=0.7). Around half of the women (52%) had urinary incontinence in pregnancy. In addition, 39% of the women delivered via caesarean delivery, 48% via normal vaginal delivery and 13% with instrumentation. At the final follow-up timepoint (month 12), about 15%, 6% and 3% of women had mild, moderate and severe incontinence severity, respectively. Among women who provided responses at 3 and 12 months postnatally, more than half who were categorised as severe at 3 months improved to none or mild at the end of follow-up, whereas approximately 30% of women categorised as having no incontinence at the 3-month timepoint were in the mild or moderate categories at the end of follow-up. The presence of pre-delivery incontinence was most strongly associated with greater incontinence severity during post-delivery follow-up. Other baseline characteristics that were independently associated with greater incontinence severity included baby weight and delivery mode. Women with a pre-pregnancy BMI of 27 kg/m² had 2.1 (95% confidence interval [CI] 0.9–4.7) times the odds of greater post-delivery incontinence severity compared with women with a pre-pregnancy BMI of 21 kg/m², but this association did not achieve statistical significance.

In this longitudinal study of 187 women, we found that almost a quarter of women reported having urinary incontinence 1 year post-delivery. Risk factors associated with greater incontinence severity over time were incontinence in pregnancy, birth weight, mode of delivery and pre-pregnancy BMI. In our study, the prevalence of postpartum urinary incontinence was 34% at 3 months and 24% at 1 year post-delivery, consistent with results from previous studies.^{4,5} Our finding that the odds for urinary incontinence reduced

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Table 1. Patient characteristics, incontinence severity and factors associated with incontinence severity.

Participants (n=187)				
Continuous variables	25th percentile	50th percentile	75th percentile	Mean ± SD
Maternal age, years	29.0	32.0	35.5	32.1 ± 4.8
Weight, kg	51.0	58.0	68.0	61.0 ± 15.0
BMI, kg/m2	20.3	22.6	26.9	24.2 ± 5.7
Parity, no. of previous deliveries	1.0	2.0	2.0	1.8 ± 0.9
Birth weight, kg	2.8	3.1	3.5	3.1 ± 0.7
Categorical variables	No. (%)			
Pre-delivery incontinence	98 (52)			
Delivery mode				
Caesarean	72 (39)			
Normal	90 (48)			
Vacuum	12 (6)			
Forceps	13 (7)			
Incontinence post-delivery	3 months (n=122)	8 months (n=75)	12 months (n=155)	
Mean incontinence severity ± SD	1.0 ± 2.0	0.7 ± 1.5	0.9 ± 1.9	
Incontinence severity category	No. (%)			
None	81 (66)	54 (72)	118 (76)	
Mild	33 (27)	17 (23)	24 (15)	
Moderate	1 (1)	2 (3)	9 (6)	
Severe	7 (6)	2 (3)	4 (3)	
Comparison	OR (95% CI)		P value	
Time since delivery 3 months versus (vs) 12 months	1.9 (1.1–3.1)		0.01	
Maternal age, years 39 vs 29	0.8 (0.4–1.6)		0.60	
Pre-delivery incontinence Present vs absent	6.3 (2.5–16.2)		<0.001	
BMI, kg/m2 27 vs 20	2.1 (0.9–4.7)		0.12	
Participants (n=187)				
Parity 1 vs 3 previous deliveries	1.8 (0.6–5.1)		0.58	
Birth weight, kg 3.5 vs 2.8	2.2 (1.3–3.6)		<0.01	
Delivery mode Forceps vs caesarean section	2.4 (0.4–14.3)		0.35	
Normal/vacuum vs caesarean section	3.1 (1.2–7.9)		0.02	

BMI: body mass index; CI: confidence interval; OR: odds ratio; SD: standard deviation

Results shown are from proportional odds mixed-effects regression models. Adjusted ORs (95% CI) estimate the odds of greater post-delivery incontinence severity at the 75th vs the 25th percentile values for time since delivery, maternal BMI and baby weight. For example, other variables being equal, mothers with the baby weighing 3.5 kg (75th percentile) had, on average, 2.2 times (95% CI 1.3–3.6 times) the odds of having greater incontinence severity relative to mothers with the baby weighing 2.8 kg (25th percentile). For count and categorical variables, comparisons are made at distinct variable levels. For example, other variables being equal, mothers with pre-delivery incontinence had, on average, 6.3 times (95% CI 2.5–16.2 times) the odds of having greater incontinence severity relative to mothers without pre-delivery incontinence.

over time may be attributed to the reduction of pressure onto the pelvic floor post-delivery and the months after with gradual reduction in bodyweight with recovery. Despite this reduction, almost a quarter of women had persistent urinary incontinence 1 year postnatally, with previous studies having the same consensus.^{6,7}

Importantly, we found that incontinence severity is not static and may fluctuate over time. Around a quarter who were continent at 3 months reported incontinence symptoms of varying severity at 1 year. Our findings highlight the need for early education and identification of at-risk women, especially when women with postpartum incontinence have been shown to be resistant against independently seeking help as they (1) have poor understanding of the condition and (2) misbelieve that their symptoms will resolve with time.⁸

The presence of incontinence in pregnancy was the strongest risk factor for incontinence over time, concurring with previous studies.^{6,9} This emphasises the importance of integrating urinary incontinence screening into routine antenatal and postnatal consults. The presented positive association between birth weight and incontinence severity may be explained by the increased stretch of structures within the pelvis in pregnancy.

Although not statistically significant, the positive association between higher pre-pregnancy BMI and greater odds of incontinence severity was consistent with that of previous studies.¹⁰ The association was also consistent with and with our current physiological understanding that increased downward pressure within the pelvis caused by increased bodyweight can overwhelm structures supporting the bladder neck with increased intra-abdominal pressure, resulting in urinary incontinence.

In conclusion, around 1 in 4 women continue to experience urinary incontinence 1 year after delivery and it is possible for symptoms of incontinence to develop only after their postnatal follow-up at 6 weeks. Given that women with incontinence in pregnancy and those who deliver babies with higher birth weight have substantially higher odds of incontinence, they may form clinically important subgroups for close monitoring. An important implication drawn from this study is the significant usefulness of clinical intervention studies such as education and supervised pelvic floor training programmes integrated into national maternal health programmes before delivery. Education in the form of public outreach to raise awareness and inform the public can prove to be beneficial. Such studies, if undertaken in patient cohorts with the aforementioned identified risk factors, can aid in investigating whether early intervention strategies can mitigate the severity and possible persistence of

postpartum urinary incontinence, reducing postpartum symptoms and their sequelae. Guidelines in the prevention and management of postpartum urinary incontinence can then be formulated, addressing the lack in recommendations for antenatal and postnatal urinary incontinence screening in Singapore.

Ethics statement

This study was approved by the SingHealth Centralised Institutional Review Board (2017/2848).

Declaration

The authors declare they have no affiliations or financial involvement with any commercial organisation with a direct financial interest in the subject or materials discussed in the manuscript.

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