Project Title

Risk factors and time course of postpartum urinary incontinence: one year longitudinal study

Project Lead and Members

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Organisation(s) Involved

Singapore General Hospital

Project Period

Start date: December 2017

Completed date: December 2019

Aims

(i) Describe the fluctuation of prevalence and severity of urinary incontinence in the year after delivery

(ii) Identify the risk factors of urinary incontinence after delivery

Background

Urinary incontinence is the involuntary loss of urine [1], this is a common condition experienced by women after pregnancy and delivery. As many as 1 in 3 women experience urinary incontinence at 3 months post delivery [2] and the symptoms of urinary incontinence may persist for as long as ten years after delivery. [3,4] Women experiencing urinary incontinence after delivery reported feelings of shame and embarassment. [5,6] In severe cases, women who experienced new symptoms of urinary incontinence after delivery were more likey than women without urinary incontinence to develop new depressive symptoms and use antidepressants. [7] Indeed, a systematic

review concluded that urinary incontinence negatively affects physical, social, and mental quality of life. [8]

To our knowledge, few studies have provided data on how symptoms of urinary incontinence fluctuate in the year post delivery. Furthermore, risk factors for postpartum urinary incontinence are not well understood; hence, consensus is lacking on how best to identify women at risk of persistent postpartum urinary incontinence. Thus, to help address these gaps, we conducted a prospective longitudinal study to (i) describe the time course and severity of urinary incontinence after delivery and to (ii) identify the risk factors of this condition.

Methods

We performed a prospective longitudinal study of 187 women who delivered in Singapore General Hospital from December 2017 to February 2018. At 3, 8, and 12 months post-delivery, incontinence severity was assessed by an ordinal scale based on both self-reported volume and frequency of urinary leakage. Risk factors of incontinence severity over time were identified using proportional odds ordinal mixed-effects modelling.

Level	Volume	Frequency	Classification
0	None	Never	None
1	Small amount	Less than once a month	Mild
2	Small amount	1-2 times a month	Mild
3	Small amount	2-3 times a month	Mild
4	Small amount	About once a week	Mild
5	Small amount	2-3 times a week	Moderate
5	Moderate amount	About once a week	Moderate
5	Large amount	Less than once a month	Moderate
6	Small amount	About once a day	Moderate
7	Small amount	Several times a day	Severe
7	Moderate amount	2-3 times a week	Severe
8	Moderate amount	About once a day	Severe
9	Moderate amount	Several times a day	Severe
10	Moderate amount	All the time	Severe

Appendix 2: Levels of overall incontinence severity. The 10-level ordinal outcome ranged from no incontinence to leaking moderate amounts all the time. Incontinence severity category cut offs are none (level 0), mild (level, 1–4), moderate (level, 5–6), and severe (level, 7-10).

Results

Fluctuation of Incontinence severity

Table 2: Incontinence severity mean level and severity categories at follow-up time-points.

Variables	Month-3 (*n*=122)	Month-8 (*n* =75)	Month-12 (*n* =155)
Mean incontinence severity (SD)	1.02 ± 2.04	0.67 ± 1.49	0.88 ± 1.86
Incontinence severity category			
None	66% (81)	72% (54)	76% (118)
Mild	27% (33)	23% (17)	15% (24)
Moderate	1% (1)	3% (2)	6% (9)
Severe	6% (7)	3% (2)	3% (4)

Categorical variables are summarized as percentages and frequencies (*n*).

Table 2 shows how the severity of urinary incontinence fluctuated at the 3-, 8- and 12-months post delivery. At the 12-month timepoint, 24% of the women experienced urinary incontinence. About 15%, 6%, and 3% of women had mild, moderate, and severe incontinence severity, respectively.

Figure 1 shows the patterns of movement of women across incontinence severity categories assessed at 3 months and 12 months post delivery. Amongst women who provided responses at both timepoints, more than half of the women who reported severe symptoms at 3 months improved and reported mild or no symptoms at the end of follow-up. However, about 1 in 3 women who reported no incontinence at the 3-month timepoint reported mild or moderate symptoms at the end of follow-up.

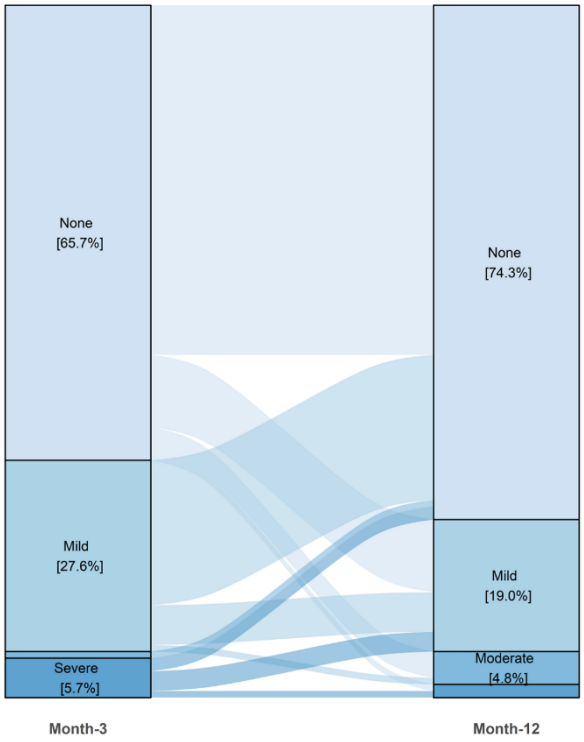

Figure 1: Crossover between categories of incontinence severity assessed at 3 months (left panel) and 12 months post delivery (right panel). Bar height and connecting segments are proportional to the number of patients. Data are shown for all study patients who had non-missing 3-month and 12-month severity scores.

Risk factors of incontinence severity

The presence of incontinence in pregnancy was most strongly associated with greater incontinence severity during post delivery follow-up (OR = 6.3, 95% CI 2.5 to 6.2). Other baseline characteristics that were independently associated with greater incontinence severity included baby weight (adjusted OR comparing baby weight of 3.8 and 2.8kg, 2.2, 95% CI 1.3 to 3.6) and delivery mode (OR = 3.1, 95% CI 1.2 to 7.9 for normal vaginal or vacuum delivery versus Cesarean delivery). Women with a pre-pregnancy BMI of 27kg/m^2 had 2.1 (95% CI 0.9 to 4.7) times the odds of greater post delivery incontinence severity compared with women with a pre-pregnancy BMI of 21kg/m^2, but this association did not achieve statistical significance (*P*=0.12).

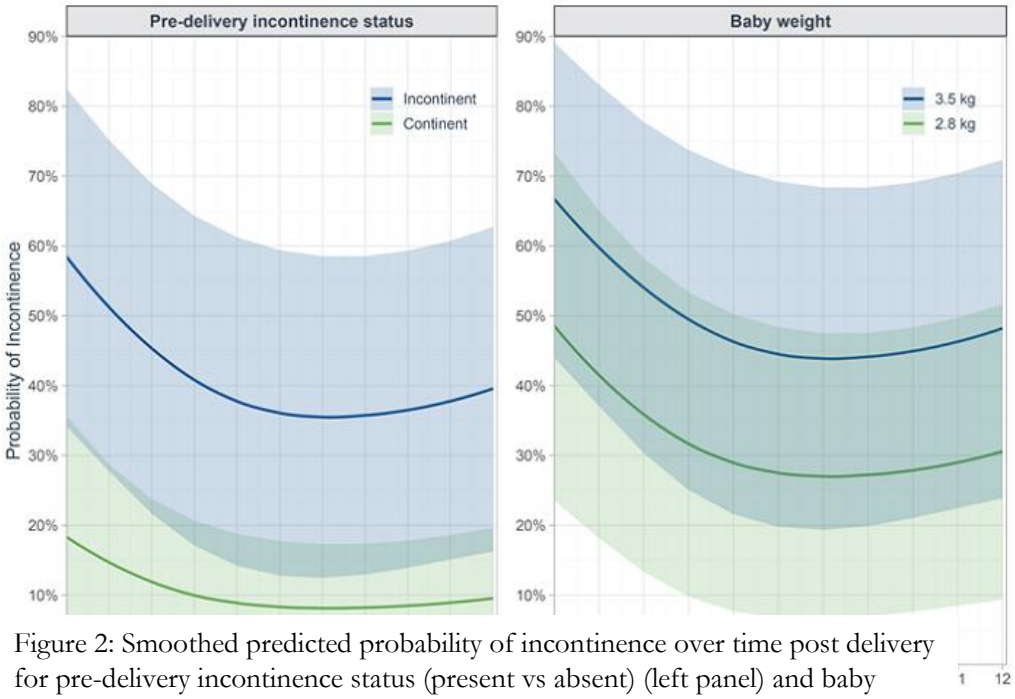

Figure 2: Smoothed predicted probability of incontinence over time post delivery for pre-delivery incontinence status (present vs absent) (left panel) and baby weight (3.5kg vs 2.8kg) (right panel). Predicted probabilities were calculated from proportional odds mixed-effects regression models using restricted cubic splines and adjusted for covariates. Shaded regions represent 95% CIs for the regression estimates.

Lessons Learnt

For accurate analysis, recruitment should continue until there are sufficient number in each subgroup to be analysed. We had insufficient numbers in instrumented delivery group, this resulted in the combination of the vacuum and NVD group, which is not ideal as we understand that mechanical stress applied onto the pelvic floor differs between the 2 types of delivery methods. Ideally we should continue data collection until we achieve sufficient numbers for each subgroup to be analysed on its own.

Participants were given the option to provide either contact number or email address for follow up purposes. To improve the ability to reach participants and reduce dropout rate during follow up period, it might be ideal to take down more than one contact number. Due to handwriting and data entry issues, some of the emails could not be delivered to the participants successfully. So double checking of email addresses and contact numbers will be helpful.

Recruiting in pregnancy will help to reduce recall bias and give better accuracy for BMI and continence monitoring.

Conclusion

A sizable proportion of women experienced urinary incontinence even at 12 months post delivery. 1 in 3 women who were continent at 3 months after delivery developed symptoms at 12 months. Our study has identified risk factors which can potentially give clinicians an opportunity to provide early and targeted preventive and intervention strategies.

Additional Information

Recipient of the Singapore Allied Health Conference (SAHC) 2021 Best Poster award – Health Services Research

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Project Category

Applied Research

Keywords

Applied Research, Allied Health, Nursing, Obstetrics and Gynaecology, Singapore General Hospital, Urinary Incontinence, Postpartum, Pregnancy, Prevalence, Risk Factor

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Time course and risk factors for urinary incontinence 1 year after delivery

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Introduction

Postpartum urinary incontinence is common and negatively impacts quality of life; however, its associated risk factors are not well understood. Because early and accurate identification of at-risk women would better direct resources toward preventive care, this study aimed to examine the time course and risk factors of urinary incontinence post-delivery.

Methods

We performed a prospective longitudinal study of 187 women who delivered in Singapore General Hospital from December 2017 to February 2108. At 3, 8, and 12 months post-delivery, incontinence severity was assessed by an ordinal scale based on both self-reported volume and frequency of urinary leakage.

Results

1 in 2 women reported incontinence in pregnancy

Table 1: Baseline characteristics of study participants.

Characteristics	Participants (*n*=187)
Maternal age (years)	29.0 **32.0** 35.5 (32.1 ± 4.8)
Weight (kg)	51 **58** 68 (61 ±15)
Pre-pregnancy BMI (kg/m^2)	20.3 **22.6** 26.9 (24.2 ± 5.7)
Parity	1 **2** 2 (1.78 ±0.94)
Pre-delivery incontinence	52% (98)
Birthweight (kg)	2.86 **3.14** 3.49 (3.19 ±0.66)
Delivery mode	
Caesarean	39% (72)
Normal	48% (90)
Vacuum	6% (12)
Forceps	7% (13)

Continuous variables are summarized as 25th, **50**th, 75th percentiles (mean ± SD).
Categorical variables are summarized as percentages and frequencies (*n*).

Women who were incontinent in pregnancy were most likely to be incontinent in the year after delivery

Table 2: Factors associated with incontinence severity post delivery

Variables	Comparison	OR (95%CI)	*P*-value
Time since delivery	3 months vs 12 months	1.87 (1.11 - 3.13)	0.01
Maternal age	39yrs vs 29yrs	0.84 (0.44 - 1.63)	0.60
Pre-delivery incontinence	Present vs Absent	6.33 (2.47 - 16.24)	<0.001
Pre-pregnancy BMI	27kg/m^2 vs 20kg/m^2	2.08 (0.91 - 4.74)	0.12
Parity	1 vs 3	1.76 (0.61 - 5.13)	0.58
Birthweight	3.5kg vs 2.8kg	2.15 (1.29 - 3.59)	<0.01
Delivery mode	Forceps vs Caesarean Section	2.35 (0.39 - 14.25)	0.35
	Normal/Vacuum vs Caesarean Section	3.06 (1.18 - 7.91)	0.02

Other factors that were independently associated with greater incontinence severity included baby weight, delivery mode and pre-pregnancy BMI.

Results

1 in 4 women reported incontinence 1 year after delivery

Table 3: Incontinence severity mean level and severity categories at follow-up time-points.

Variables	Month-3 (*n*=122)	Month-8 (*n* =75)	Month-12 (*n* =155)
Mean incontinence severity (SD)	1.02 ± 2.04	0.67 ± 1.49	0.88 ± 1.86
Incontinence severity category			
None	66% (81)	72% (54)	76% (118)
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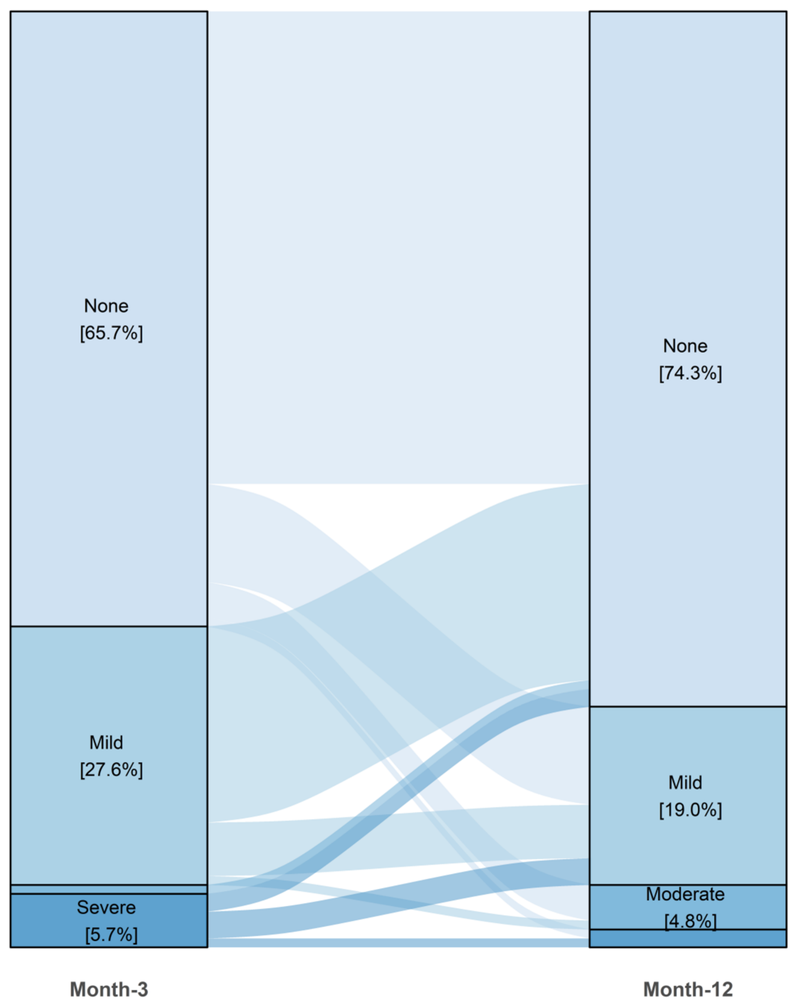
Continence status fluctuates - Being continent 3 months after delivery did not guarantee continence at 1 year



~30% of women who were continent at 3-months post delivery developed mild or moderate incontinence at 1 year.

More than half of the women with severe incontinence at 3 months improved to none or mild incontinence at the end of follow-up.

Discussion

Incontinence fluctuates with time making it difficult to identify a suitable time point for intervention post delivery. This highlights the importance of identifying at-risk women in the antenatal period for targeting education.

Conclusion

A sizable proportion of women had urinary incontinence even at 1 year after delivery. Because incontinence in pregnancy is most strongly associated with persistent urinary incontinence, routine continence screening should be implemented at all antenatal visits. Our study has also identified several risk factors which can potentially give clinicians an opportunity to provide early and targeted preventive and intervention strategies.

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