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## OBSTETRICS

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# Prevalence of Urinary Incontinence in 6-week Postpartum Women

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### ABSTRACT

**Objective:** To determine the prevalence of and potential risk factors for postpartum urinary incontinence (UI) in Thai women.

**Materials and Methods:** Total of 363 women delivered in University Hospital and attended 6-week postpartum check-up visits were recruited. Self-administered questionnaires and structural interviews were used to collect data. Logistic regression was used to test the independence of variables.

**Results:** The prevalence of UI in 6-week postpartum women was 17.1% (95% confidence interval [CI] 13.19- 20.97). They were classified into three groups; stress incontinence in 12.1%, urgency incontinence in 0.6%, and mixed incontinence in 4.4%. The risk for postpartum UI rose significantly among pre-pregnancy body mass index (BMI) of more than 30 (OR 3.75; 95%CI 1.47-9.58). Risk for postpartum UI was significantly lower among those who performed pelvic floor muscle exercise (OR 0.005; 95%CI 0.001-0.028).

**Conclusion:** Urinary incontinence was prevalent at 6 weeks, postpartum, in Thai women. The significant independent predictors were pre-pregnancy BMI and practice of pelvic floor muscle exercise.

**Keywords:** urinary incontinence, postpartum, stress incontinence, urgency incontinence

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### Introduction

Urinary incontinence (UI) is a storage symptom and generally defined as the complaint of any

involuntary loss of urine. In 2009 ICS Recommendations of the International Scientific Committee on the evaluation and treatment of the urinary incontinence,

pelvic organ prolapse, and fecal incontinence, the definition of UI is an involuntary loss of urine that is a social or hygienic problem<sup>(1)</sup>. UI could be further categorized according to the patient's symptoms including urgency incontinence, stress incontinence, nocturnal enuresis, post-micturition dribble, and mixed type<sup>(1)</sup>. In a study of Melville et al<sup>(2)</sup>, the population-based prevalence of UI was approximately 45% in US women. There were few previous studies reported some adverse impacts of UI on function and quality of life (QOL) in affected women<sup>(2-4)</sup>.

UI is noted to be a common problem occurs in postpartum period<sup>(5-9)</sup>. Prevalence of postpartum UI varies widely from 11% to 38%<sup>(5-8)</sup>. This wide variation across previous studies may be due to the differences in definitions used, study designs, methods of assessing, and population surveyed. Based on these findings, obtaining the data specific to individual setting is of utmost important. Accordingly, the present study was conducted to determine the prevalence of and potential risk factors for postpartum UI in Thai women.

## Materials and Methods

Based on a prevalence of postpartum UI in previous study was 38%<sup>(5)</sup>, a total of 363 participants were needed in this study. This prospective study recruited 363 women who had delivered in Srinagarind Hospital and attended a 6-week-postpartum check-up visit at Family Planning Clinic. The exclusion criteria were; urinary incontinence before pregnancy, symptom of acute lower urinary tract infection, and history of urological surgery. This study was conducted from July, 2012 to February, 2013. All participants signed a consent form before enrolment in the study. This study was approved by the Khon Kaen University Ethics Committee for Human Research (KKUEC).

UI is defined according to the 2009 ICS Recommendations of the International Scientific Committee on the evaluation and treatment of the urinary incontinence, pelvic organ prolapse, and fecal incontinence<sup>(1)</sup>. Self-administered questionnaires and structural interview were used to collect the data. Stress urinary incontinence was defined as a complaint of involuntary loss of urine on sneezing or coughing (activity-related incontinence), frequency as more than

seven voids per day. Urgency urinary incontinence was defined as a complaint of involuntary loss of urine associated with urgency.

All subjects were asked about symptoms of postpartum UI. The questions were: 'Have you ever experienced involuntary loss of urine during physical exertion?' and 'Have you ever leak urine urgency?' The frequency of these symptoms was also concerned. The information acquired included demographic data, obstetrics and gynecologic history, current medication usage, smoking and drinking habits, pre-pregnancy body mass index (BMI, calculated as weight in kilograms divided by the square of height in meters), infant outcomes (newborn weight and head circumference) and performance of pelvic floor muscle exercises (PFME). In Srinagarind hospital, health care providers suggest all women who came to antenatal care clinic and family planning clinic to perform PFME at least ten times per day. Additionally, Urine analysis was used to determine the urinary tract infection in the women affected by postpartum UI. These participants, whose urinary tract infection was detected, were excluded from this study.

Statistical analyses were performed using the SPSS (IBM, Armonk, NY, USA). Descriptive statistics were used for reporting of baseline characteristics. Each potential risk factors were first analyzed to calculate odd ratio (OR) and 95% confidence interval (CI) on the basis of univariate analysis. In multivariate analysis, variables potentially associated with urinary incontinence including age, parity, pre-pregnancy body mass index (BMI), route of delivery, drinking habits, baby head circumference, and performance of pelvic floor muscle exercise were included if  $p < 0.20$  in the univariate analysis. Stepwise logistic regression analysis was then done to determine which, if any, were jointly important in predicting UI at a 6-week-postpartum visit. An adjusted OR and 95%CI were also calculated to demonstrate the magnitude and the precision of the results.

## Results

The total 363 of 6-week-postpartum women were recruited. Mean age was 28.1 years (range 15-44 years). The majority (82.6%) of participants were younger than

35-year-old. Thirty percent (112/363) had completed college or an advanced degree. Two-hundred and eighteen (60.1%) participants were primiparous. Parity

number among the remaining multiparous women ranged from 1 to 4 births. Table 1 displays the characteristics of the studied participants.

**Table 1.** Baseline characteristics

Variables	N (Total = 363)	%
Maternal age (years)		
< 35	300	82.6
≥ 35	63	17.4
Level of formal education:		
< college	251	69.1
college or advanced degree	112	30.9
Parity number:		
1	218	60.1
2	115	31.7
3	17	4.7
4	13	3.6
Modes of delivery		
Normal delivery	262	72.2
Cesarean section	62	17.1
Vacuum extraction	35	9.6
Forceps extraction	4	1.1
Pre-pregnancy body mass index (kg/m <sup>2</sup> )		
< 30	313	86.2
≥ 30	50	13.8
Child's head circumference (cm)		
< 35	274	75.5
≥ 35	89	24.5
Child's birth weight (gm)		
< 2500	49	13.5
2500-3500	237	65.3
> 3500	77	21.2
Drinking water (glass per day):		
< 8	212	58.4
≥ 8	151	41.6
Drinking coffee (cup per day):		
No	317	87.3
≥ 1	46	12.7
Drinking alcohol (glass per day):		
No	350	96.4
≥ 1	13	3.6
Performing pelvic floor muscle exercise:		
Yes	259	71.3
No	104	28.7

At 6-weeks postpartum, seventy five participants reported symptoms indicating UI which accounted for 17.1% (95%CI 13.19-20.97%). The most

common type of UI was stress incontinence. Table 2 shows the frequency of each types of UI in the present study.

**Table 2.** Types of urinary incontinence

Types of UI	N = 363	%
Over-all	62	17.1
Stress incontinence	44	12.1
Urge incontinence	2	0.6
Mixed incontinence	16	4.4

UI, urinary incontinence

**Table 3.** Predictors for 6-week postpartum urinary incontinence, analyzed by logistic regression

Variable	Total no. of women	% of urinary incontinence	Univariate analysis p-value	Multivariate analysis	
				Adjusted OR (95% CI)	P
PFME					
No	102	60 (57.7)		Reference	
Perform	261	2 (0.8)	< 0.001	0.005 (0.001-0.028)	< 0.001
BMI (kg/m <sup>2</sup> )					
< 30	313	34 (10.9)		Reference	
≥ 30	50	28 (56.0)	< 0.001	3.75 (1.47-9.58)	0.006
HC (cm)					
< 35	274	37 (13.5)		Reference	
≥ 35	89	25 (28.1)	0.002	1.79 (0.75-4.27)	0.190
Coffee drinking <sup>1</sup>					
no	317	46 (14.5)		Reference	
≥ 1	46	16 (34.8)	< 0.001	2.83 (0.88-9.10)	0.081
Alcohol drinking <sup>2</sup>					
no	350	57 (16.3)		Reference	
≥ 1	13	5 (38.5)	0.037	7.13 (0.96-52.70)	0.054

PFME, pelvic floor muscle exercise; BMI, Pre-pregnancy body mass index; HC, head circumference of the index child; CI, confidence interval; OR, odds ratio

<sup>1</sup> glass per day

<sup>1</sup> Glass per day

<sup>2</sup> Glass per day

Univariate analysis was used to test variables potentially associated with postpartum UI including participants' age, parity status, pre-pregnancy BMI, drinking habits, baby head circumference, baby birth weight, and performance of pelvic floor muscle exercise. Factors with a p-value of less than 0.2---namely, age ( $\leq 35$  vs.  $> 35$  years), baby head circumference ( $< 35$  vs.  $\geq 35$  cm<sup>(10)</sup>) pre-pregnancy BMI ( $< 30$  vs.  $\geq 30$  kg/m<sup>2</sup>), coffee drinking (yes vs. no), alcohol drinking (yes vs. no), and performance of PFME (yes vs. no)---were subsequently included in a multivariate logistic regression analysis. This analysis identified two significant independent factors predicting postpartum UI at 6-week visit including pre-pregnancy BMI and performance of pelvic floor muscle exercise (Table 3). The risk of postpartum UI rose significantly among women with pre-pregnancy BMI of more than 30 (OR 3.75; 95%CI 1.47-9.58). Risk for postpartum UI was significantly lower among those with performance of PFME (OR 0.005; 95%CI 0.001-0.028) (Table 3).

## Discussion

In the present study, prevalence of UI at 6-week-postpartum visit was 17.1%. In assessing potential risk factors for postpartum UI in the present study, two significant factors were noted to have an independent impact on postpartum UI, including pre-pregnancy BMI and performance of PFME. These findings can pave the way in managing the postpartum UI problems in our setting.

As mentioned above, the prevalence of postpartum UI varies widely among the previous published data<sup>(5-8)</sup>. Therefore, direct comparisons across these publications should be cautiously viewed. Some authors proposed that one should obtain accurate data those are specific to a particular setting before dealing with the UI problems<sup>(9)</sup>. In this study, prevalence of UI among women attended 6-week-postpartum visit was unexpectedly high and confirmed what we have known that the prevalence of postpartum UI is usually underestimated.

In recent systematic review conducted to determine the efficacy of PFME for preventing UI in postpartum women, pregnant women without prior UI

who were randomized to receive intensive antenatal PFME were significantly less likely than women randomized to no PFME or usual antenatal care in having UI up to six months after delivery (risk ratio [RR] 0.71, 95%CI 0.54-0.95)<sup>(11)</sup>. In addition, the authors also suggested that the more intensive PFME program resulted in the greater efficacy<sup>(11)</sup>. In this study, women who reported to perform pelvic floor muscle exercise carried a notably lower risk of UI compared to those who reported never performed PFME (adjusted OR, 0.005; 95%CI, 0.001-0.028). This finding would also support the efficacy of PFME for preventing postpartum UI. PFME, therefore, should be incorporated to antenatal care program particularly in women at high risk of developing postpartum UI.

BMI has been consistently reported as a predictor of UI in women across various settings<sup>(2,3,7,8,12)</sup>. For example, in a population-based study conducted by Melville, et al<sup>(2)</sup> which included 6000 US women aged between 30 and 90 years, women with BMI of 30 or greater were 3 times more likely to develop UI than women with lower BMI. In a population-based study conducted to investigate UI problems among 5300 Chinese women aged 20 years or older, prevalence of UI was positively correlated with BMI<sup>(3)</sup>. Obese women had 1.4 times risk for having UI compared to those with normal BMI<sup>(3)</sup>. Burgio, et al<sup>(7)</sup> also demonstrated that pregnant women with high pre-pregnancy BMI increased the likelihood of having UI during postpartum period. In this study, pre-pregnancy BMI was significantly associated with increased likelihood of postpartum UI. Women with pre-pregnancy BMI of 30 or greater were approximately 3 times more likely to be incontinent at 6-weeks postpartum. Thus, development of intervention targeting at obese women for preventing UI is warranted and merits for further investigation.

Some obstetric risk factors have been proposed as significant independent factors for UI during postpartum period<sup>(3,9,12)</sup>. Zhu, et al<sup>(3)</sup> noted that women who had had multiple vaginal deliveries carried 2 times more likely to develop UI. In a study of Pizzoferrato, et al<sup>(12)</sup>, first child's weight was an independent factor predicting UI during the 12 years after first delivery. In the recent study conducted in

Australian nulliparous cohort, prolong second stage labor was associated with increased likelihood of postpartum UI<sup>(9)</sup>.

Many previous studies showed that mode of delivery had significant impact on the risk of postpartum UI<sup>(3, 6-9,13)</sup>. Relative to normal delivery, women undergoing operative vaginal delivery had an increased likelihood of postpartum UI<sup>(3,7,9)</sup>. Farrell, et al<sup>(6)</sup> reported that cesarean delivery reduce the likelihood of UI compared to those who delivered vaginally. Interestingly, Chin, et al<sup>(13)</sup> highlighted that only cesarean section carried out prior to labor pain could reduce the likelihood of postpartum UI. These findings, however, could not be reaffirmed in this study because of small samples derived from either cesarean section or operative vaginal delivery groups.

This study has some limitations. The diagnosis of UI was solely based on self-reported symptoms obtained from a structured interview which might be different from those obtained by clinical assessing method i.e. pad test. However, interviewing UI symptoms is clinically feasible for all healthcare setting to be an initial method for including women to be assessed by a more objective measurement. Because this study focused on postpartum women who attended a 6-week-postpartum check-up visit at Family Planning Clinic, the participants who were affected by severe symptoms might not be included. Additionally, this cross-sectional study design did not permitted us to examine the long-term natural course of postpartum UI, as previous study noted that the majority of women with UI identified at 6-weeks postpartum still complained of UI at 12 months after childbirth<sup>(6)</sup>. Determination of UI at 6-weeks postpartum may be helpful for early identification of high-risk women which allows the healthcare providers to manage them in a timely fashion. Despite these limitations, the study has highlighted significant predictors of postpartum UI, which might help healthcare providers to identify the groups of women who are at higher risk for UI in the future.

In conclusion, UI at 6-weeks postpartum in this study was relatively prevalent (17.1%) in Thai women. The significant independent predictors were

pre-pregnancy BMI and practice of pelvic floor muscle exercise. Development of intervention targeting at high-risk women for preventing UI is warranted and merits for further investigation.

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## ภาวะกลั้นปัสสาวะไม่อยู่ในสตรีหลังคลอด 6 สัปดาห์

จิตตรินทร์ ศรีระอัมพข, ธีระยุทธ เต็มธนะกิจไพศาล, ประนอม บุพศิริ, บัณฑิต ชุมวรฐายี, โฉมพิลาศ จงสมชัย, สุกรี สุนทรามา, ศรีนารี แก้วฤดี,

**วัตถุประสงค์:** เพื่อศึกษาความชุก และปัจจัยเสี่ยงของภาวะกลั้นปัสสาวะไม่อยู่ในสตรีไทยหลังคลอด 6 สัปดาห์

**วัสดุและวิธีการ:** ทำการศึกษาในสตรีหลังคลอด 6 สัปดาห์ จำนวน 363 คน ที่ห้องตรวจวางแผนครอบครัว โดยใช้แบบสอบถาม และการสัมภาษณ์ เพื่อประเมินความชุกของภาวะกลั้นปัสสาวะไม่อยู่ นำข้อมูลที่ได้มาวิเคราะห์ทางสถิติ โดยใช้ Logistic regression

**ผลการศึกษา:** ความชุกของภาวะกลั้นปัสสาวะไม่อยู่ คิดเป็นร้อยละ 17.1 (ช่วงความเชื่อมั่นร้อยละ 95, 13.19-20.97) โดยแบ่งเป็นภาวะไอจามปัสสาวะเล็ดร้อยละ 12.1 ภาวะปัสสาวะปวดกลั้นร้อยละ 0.6 ทั้งสองภาวะร่วมกันร้อยละ 4.4 ปัจจัยที่ส่งผลกระทบต่อการเพิ่มภาวะดังกล่าวคือ ดัชนีมวลกายก่อนตั้งครรภ์ของมารดาที่มากกว่า 30 (OR 3.75; 95%CI 1.47-9.58) จากการศึกษาพบว่าการบริหารกล้ามเนื้ออุ้งเชิงกรานสามารถลดภาวะกลั้นปัสสาวะไม่อยู่ในสตรีหลังคลอดได้ (OR 0.005; 95%CI 0.001-0.028)

**สรุป:** ภาวะกลั้นปัสสาวะไม่อยู่สามารถพบได้บ่อยในสตรีหลังคลอด 6 สัปดาห์โดยมีปัจจัยที่ส่งผลกระทบต่อภาวะดังกล่าว ได้แก่ ดัชนีมวลกายก่อนตั้งครรภ์มารดา และการบริหารกล้ามเนื้ออุ้งเชิงกราน

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