

Original Article**Urinary incontinence: hospital-based prevalence and risk factors***Marzieh Nojomi\**, *Ensieh Bibi Amin\*\**, *Raheleh Bashiri Rad\*\*\****Abstract**

**BACKGROUND:** This study was carried out to determine the prevalence and risk factors of urinary incontinence in women aged 30 to 70 years, who were attending to a gynecologic hospital.

**METHODS:** During 2006, married women (aged 30-70 years) attending to a teaching gynecological hospital were assessed during their visits for any gynecologic diseases. We used a questionnaire with interview for collecting data. The potential risk factors were measured; i.e., the demographics, menopausal status, urinary symptoms (frequency, nocturia and urgency), urinary incontinence, (urgency, stress and mixed), body mass index, medical history (type of delivery, parity, gravidity, chronic illnesses, medication use, pelvic surgery and seeking medical care for their problem).

**RESULTS:** The mean age was 46.5 ( $\pm$  8.4) years. The mean parity was 5.1  $\pm$  1.5. 27% of the participants reported urinary incontinence. Out of 111 women with urinary incontinence, 77 (18.7%, CI: 14.7-22.7%), 17 (4.1%, CI: 2.2-5.8%) and 17 (4.1%, CI: 2.2-5.8%) were classified as having stress, urge and mixed urinary incontinence, respectively. The overall prevalence of urinary incontinence was 18.9% (34 subjects) in women aged 30-44 years, 30.9% (46 subjects) in those aged 45-54 years and 37.8% (31 subjects) in those aged 55 years and older. Out of 117 menopause women, 39 (33.3%) were incontinent. On average, women reported 4.4 ( $\pm$  1.06) diurnal and 0.55 ( $\pm$  0.66) nocturnal voidings in 24 hours. Diurnal and nocturnal frequencies were different between continent and incontinent women. The high parity, excessive birth weight, pelvic trauma, constipation, chronic illnesses (specially diabetes) and gynecologic and other pelvic surgeries were known as risk factors for urinary incontinence.

**CONCLUSIONS:** There was a significant association between urinary incontinence and high parity, excessive birth weight, pelvic trauma, constipation, chronic illnesses (specially diabetes), and gynecologic and other pelvic surgeries.

**KEY WORDS:** Urinary incontinence, prevalence, risk factors, hospital-based.

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Many women experience uncontrollable leakage of urine, which in most instances is the result of an injury sustained during childbirth. Urinary incontinence (UI) is a common, debilitating and costly problem in older women<sup>1</sup>. The prevalence of symptoms of UI increases with age<sup>2</sup>. This problem has detrimental effects on health-related quality of life<sup>3-5</sup>. UI does not lead to death, but it causes substantial debility, social

seclusion, psychologic stress and economic burden<sup>6,7</sup>. Incontinence has been associated with loss of independence and decreased participation in social and domestic activities<sup>8-10</sup>. The prevalence of UI in women aged 60 and older is approximately 30 to 50% for any incontinence and 6 to 14% for daily incontinence<sup>6,11-13</sup>. Stress incontinence accounts for proportionately more incontinence among younger women, while urge incontinence is more

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common after age 60<sup>13-15</sup>. Estimated prevalence of UI is 42 to 57% among women older than 40 years of age in the United States<sup>16,17</sup>. Prevalence estimates differ based on type of UI and country surveyed. There is no study of prevalence of UI and associated risk factors by type between women who attend to hospital for any gynecological problems in our setting. The aim of this hospital-based study was to determine the prevalence and risk factors of UI in women aged 30 years or older attending to one of the largest obstetric and gynecological hospitals in Tehran, Iran.

## Methods

This was a hospital-based, cross-sectional survey of women. During 2006, 411 married women (aged 30-70 years) attending to a teaching gynecological hospital were assessed during their visit for any gynecologic diseases. They were selected by a sequential sampling method during study period. The calculated sample size was 411 based on estimated prevalence of 50% and 5% type one error. These women were gathered from gynecologic clinic of Akbarabadi teaching hospital of Iran University of Medical Sciences. The prevalence of incontinence was described in different age groups (30-44, 45-54, +55). The method of collecting data was interview by a structured questionnaire. All interviews were conducted in waiting room of gynecologic clinic. All interviewers were medical students who underwent standardized training. The aim of the study was explained to women. The questionnaire was developed by a panel of clinical and epidemiologic experts. Pilot interviews were conducted on 10 subjects. Based on the result of these interviews, the questionnaire was revised. All survey participants were asked about demographics, medical history, presence of urinary symptoms and if they were seeking medical care for their problem. Urinary symptoms included frequency, nocturia, urgency, urinary incontinence, (urgency, stress and mixed). A woman was considered as having UI if she replied positively to the following question: "Have you ever experienced urinary

leakage?" We asked for stress and urgency incontinence through the following questions, respectively: "Do you experience urinary leakage in connection with sneezing, coughing or when doing physical activities such as exercising or lifting heavy objects?" and "Do you experience urinary leakage in connection with a sudden compelling desire to urinate?" Mixed UI defined as the association of stress and urge incontinence. Measured potential risk factors for medical history were included parity, gravidity, type of delivery, use of assisted delivery, excessive birth weight, menopausal status, medication use (past hormonal use, diuretics, beta-blockers, angiotensin converting enzymes), pelvic trauma, constipation, chronic illnesses (congestive heart failure, diabetes, hypertension) and gynecologic surgery (hysterectomy or any other pelvic surgery). To study each nominal variable, two groups were identified: those with positive and those with negative potential risk factors. Assisted delivery was defined as using any device for helping delivery (vacuum extraction, use of forceps, and so on). We also measured the weight and the height of subjects. The obesity was defined as body mass index (BMI)  $\geq 25$  and thus, two groups were defined as not obese (BMI < 25) or obese (BMI  $\geq 25$ ). All statistical analyses were performed using SPSS (version 14, SPSS Inc, Chicago, IL). To evaluate the risk factors of urinary incontinence, two samples were defined as women with or without urinary incontinence. The prevalence of UI (stress, urge and mixed) was calculated with 95% confidence interval (CI). The association with each potential risk factor and UI was calculated using the chi-square test. Significant level was considered at  $P < 0.05$ . We estimated odds ratio and 95% CI as a measure of the strength of the association between risk factors and UI. The Kruskal-Wallis test was used for comparing numeric variables between those with and without UI by type. We also used logistic regression for estimating the independent effect of every potential risk factor on UI. Women with UI were compared to those with-

out any UI. Adjusted odds ratio with 95% CI was calculated.

## Results

A total of 411 individuals participated in the study. Demographics for the survey participants are summarized in table 1. Respondents were predominantly between 30 and 44 year-old (43.8%); only 1.5% were high school educated or had higher education, and 92.5% were currently married (data was not shown). The mean age was 46.5 ( $\pm$  8.4) years. The mean parity was 5.1  $\pm$  1.5. 27% of the participants reported UI. Out of 111 women with UI, 77 (18.7%, CI: 14.7-22.7%), 17 (4.1%, CI: 2.2-5.8%) and 17 (4.1%, CI: 2.2-5.8%) were classified as having stress, urge and mixed UI, respectively. The overall prevalence of UI was 18.9 % (34 subjects) in women aged 30-44 years, 30.9% (46 subjects) in those aged 45-54 years, and 37.8% (31 subjects) in those aged 55 years and older. These differences were statistically significant ( $P < 0.002$ ). Out of 117 menopause women, 39 (33.3%) were incontinent (data not shown). On average, women reported 4.4 ( $\pm$  1.06) diurnal and 0.55 ( $\pm$  0.66) nocturnal voidings in 24 hours. Diurnal and nocturnal frequencies were different between continent women and incontinent ones (table 2). Women with urge and mixed incontinence had more diurnal and nocturnal voiding than continent ( $P < 0.0005$ ) or stress-incontinent ( $P < 0.0005$ ) women. Out of those with UI, 104 (93.7%) reported seeking medical care and receiving some form of treatment or advice. Both stress UI and UI were more common in women with high parity and this factor was a significant risk for UI and stress UI. Mean age was significantly different between continent and incontinent women. There was not any significant difference between BMI and incontinence; i.e., obesity was not a risk factor for UI. Both types of UI were more common in women with previous vaginal delivery and it was a significant risk factor for both. The prevalence of both types of UI was high in women with a previous gynecologic surgery and it was a significant risk factor for both ( $P < 0.05$ , table 3). Both

types of UI were associated with the history of pelvic trauma, constipation, assisted delivery, excessive birth weight, gynecologic surgery and chronic illnesses ( $P < 0.05$  for all, table 3). Out of 36 women with gynecologic surgery, 18 had hysterectomy. All variables in table 3 that were significantly associated ( $P < 0.05$ ) with UI

**Table 1.** Baseline characteristics of women in the study (n=411).

Variables	N (%)
<b>Age</b>	
30-44	180 (43.8)
45-54	149 (36.3)
+55	82 (20.0)
<b>Literacy</b>	
Illiterate	240 (58.4)
< High school	165 (40.1)
High school graduate	6 (1.5)
<b>Parity</b>	
<3	86 (20.9)
3-5	181 (44.0)
$\geq$ 5	144 (35.0)
<b>Type of delivery</b>	
Caesarean	41 (10)
Vaginal	370 (90)
<b>Assisted delivery</b>	
Yes	14 (3.4)
No	397 (96.6)
<b>BMI</b>	
< 25	14 (3.4)
$\geq$ 25	397 (96.6)
<b>Gynecologic surgery</b>	
Yes	36 (8.8)
No	375 (91.2)
<b>Medication use</b>	
Yes	68 (16.5)
No	343 (83.5)
<b>Menopausal status</b>	
Yes	117 (28.4)
No	294 (71.5)
<b>Pelvic trauma</b>	
Yes	23 (5.6)
No	388 (94.4)
<b>Constipation</b>	
Yes	96 (23.4)
No	315 (76.6)
<b>Chronic illness</b>	
Yes	68 (16.5)
No	343 (83.5)
<b>Urinary incontinence</b>	
Stress	77(18.7)
Urge	17 (4.1)
Mixed	17 (4.1)
No	300 (73.0)

**Table 2.** Number of voids by type of urinary incontinence.

Variables	None	Stress UI	Urge UI	Mixed UI	P value
<b>Number of voids*</b>					
<b>Diurnal</b>	4.3 ( $\pm$ 0.99)	4.27 ( $\pm$ 0.77)	5.8 ( $\pm$ 0.8 )	5.9 ( $\pm$ 1.3)	0.0005
<b>Nocturnal</b>	0.43 ( $\pm$ 0.62)	0.59 ( $\pm$ 0.51)	1.5 ( $\pm$ 0.5)	1.4 ( $\pm$ 0.5)	0.0005

\* Mean  $\pm$  SD**Table 3.** Comparison of potential risk factors between women with and without incontinence (stress UI and UI).

Variables	Without UI n = 300	With UI n = 111	Stress UI n =77
<b>Age</b> (mean $\pm$ SD)†	45.5 (8.6)	49.0 (7.4)	45.4 (4.4)
<b>BMI</b>			
<25	9 (3.0)	5 (4.5)	5 (6.5)
$\geq$ 25	291 (97.0)	106 (95.5)	72 (93.5)
<b>Delivery*</b>			
Vaginal	259 (86.3)	111 (100)	76 (100)
Non-vaginal	41 (13.7)	0 (0)	0 (0)
<b>Parity</b> (mean $\pm$ SD)*	4.8 (1.6)	6.1(0.91)	5.7 (0.7)
<b>Assisted delivery*</b>			
Yes	5 (1.7)	9 (8.1)	5 (6.5)
No	295 (98.3)	102 (91.9)	72 (93.5)
<b>Birth weight*</b>			
<4 Kg	223 (74.3)	18 (16.2)	15 (19.5)
$\geq$ 4 Kg	77 (25.7)	93 (83.8)	62 (80.5)
<b>Pelvic trauma*</b>			
Yes	6 (2.0)	17 (15.3)	12 (15.6)
No	294 (98)	94 (84.7)	65 (84.4)
<b>Constipation*</b>			
Yes	41 (13.7)	55 (49.5)	38 (49.4)
No	259 (86.3)	56 (50.5)	39 (50.6)
<b>Chronic illnesses*</b>			
Yes	26 (8.7)	42 (37.8)	16 (20.8)
No	274 (91.3)	69 (62.2)	61 (79.2)
<b>Gynecologic surgery*</b>			
Yes	11 (3.7)	25 (22.5)	15 (19.5)
No	289 (96.3)	86 (77.5)	62 (80.5)

\* Significant difference with continent women for both groups

† Significant difference with continent women and with UI

**Table 4.** Potential risk factors for urinary incontinence.

Risk factors	Odds ratio (95% confidence interval)
Age	0.82 (0.76 – 0.88)
Parity	3.8 (2.5 – 5.8)
Excessive birth weight ( $\geq$ 4 Kg)	23.3 (10.2 – 52.9)
Pelvic trauma	10.4 (2.35 – 46.6)
Constipation	6.9 (3.1 – 15.6)
Chronic illnesses	2.05 (1.4 – 2.9)
Gynecologic surgery	11.4 (3.4 – 37.7)

were included in multivariable analysis except, the type of delivery and assisted delivery due to low sample size of non vaginal and assisted delivery subgroups in incontinent women. Table 4 presents the results of multivariable logistic-regression analysis. In multivariable model, all variables were associated with UI. This association was positive for all variables except age.

## Discussion

The overall prevalence of UI in this sample was 27%. It was increasing with age and was highest in women aged 50 years and older (37.8%). It is difficult to compare prevalence rates across studies because of the wide range of methods and definitions used. In most of the previous studies, as in the present one, a questionnaire was used with no clinical examination or laboratory investigation. Vinker et al<sup>18</sup>, in a primary care clinical study found that the prevalence of UI was 36%. Ushiroyama et al<sup>19</sup> in a study of 3026 postmenopausal women consulting the outpatient clinic reported a prevalence of 26.3%. In the present study the prevalence in menopausal women was 33.3%. In women aged 30-40 years, the UI prevalence reported 14-58.4% by Burgio et al and Brocklehurst<sup>20,21</sup>. Peyrat et al reported 47% UI with similar definition in women >55 years<sup>22</sup>. The prevalence of UI was reported 25.8% by Özerdoğan et al<sup>23</sup>. It would appear that the UI prevalence in the current study was comparable to those in other studies where similar inclusion criteria were used. In some studies the reported prevalence was 12-51% and the others reported 10-58.4%<sup>22</sup>. Therefore, the prevalence of UI is very variable according to its definition. In the present study, 18.7%, 4.1% and 4.1% of self-reporting women were classified as having stress, urge and mixed UI, respectively. The present results were almost similar to those reported elsewhere<sup>22,24</sup>. The mean diurnal and nocturnal voidings were 4.3 and 0.43 among continent women, respectively. The frequency of diurnal voiding was similar to that of other studies<sup>1,25</sup> but, the nocturnal frequency was smaller than what reported in

these studies. In our study the mean diurnal and nocturnal voidings in urge and mixed groups were more than those in other groups, and it is supported by another study<sup>1</sup>. Voiding habits of women with stress incontinence did not differ from those in continent women. The most common risk factors for UI have been identified in epidemiologic studies. In the present study, risk factors for UI and stress incontinence were similar. The prevalence increased with age. These results supported by most studies<sup>19,21,22,26</sup>, although few studies did not reveal these findings<sup>27</sup>. One explanation for this difference may be due to various rankings of age groups or considering age as categorical or continuous variable. The association of age in bivariate analysis was positive, but was inverse in regression model. In contrast to some studies, we found that BMI is not a risk factor for incontinence. We used BMI as an index for obesity. Our finding is consistent with Peyrat and et al<sup>22</sup>, but not to many other studies<sup>1,18,23,28</sup>. Most of them used mean weight, but we used the similar definition for obesity (BMI $\geq$ 25) as Peyrat study. It seems that BMI is a better index for obesity than mean weight, although the best explanation for our finding is the small sample size of women in non-obese group. The major predictors of UI were high parity, excessive birth weight ( $\geq$ 4 Kg), pelvic trauma, constipation, gynecologic surgery and chronic illnesses. Most retrospective epidemiologic studies have found vaginal delivery to be a significant risk factor for UI in later life<sup>12,15,26</sup>. In the present study, we found an association between vaginal delivery and UI in bivariate analysis. There is evidence that parity has a long-term impact on pelvic floor function. In consistent with other evidence<sup>26</sup>, we found a significant association between high parity and UI. Use of forceps or vacuum extraction were significant risk factors for UI in bivariate analysis. These factors are associated with pudendal nerve damage following delivery. In our study pelvic trauma and constipation were risk factors for UI, although it seems that we did not use a reliable definition for these two factors. However, these associations

could be expected. Our findings showed that chronic illnesses increase the risk of UI, 2.05 times. More than half of the subjects were diabetic women. This finding was consistent with other studies<sup>1,6,23</sup>, although diabetes is more associated with urge incontinence, which might be an innervation insufficiency of the bladder due to neuropathy. The role of hysterectomy in the development of incontinence is not clear. This association was not confirmed in prospective studies. We found that hysterectomy and other types of pelvic surgeries could be a risk factor for UI. Hysterectomy was recorded in half of the women with past history of gynecologic surgery. Some studies also found this association<sup>22,26,28</sup>. However, hysterectomy may cause nerve damage and can increase the risk of incontinence in later life. Our study participants were women attending to

hospital for any gynecologic problem. So, the prevalence might not be similar to that in women of general population. We were able to estimate a lower prevalence in other groups of women, although the risk factors that we identified were similar to those in other cross-sectional studies in general population of women. We used the definitions of urge UI and stress UI from other studies. So, our data are comparable to them. In conclusion, there was a significant association between UI and high parity, excessive birth weight, pelvic trauma, constipation, chronic illnesses (especially diabetes) and gynecologic and other pelvic surgeries. Obesity, assisted delivery and vaginal delivery remained controversial. Effect of age was inversed as it adjusted with other independent variables.

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