



Survey on disease insight and prevalence of urinary incontinence in women

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Purpose: With a rapidly aging population in Korea, the number of patients with lower urinary tract symptoms is increasing. Therefore, it is important to determine the current extent of incontinence among Korean women to establish future plans. We attempted to create reference materials for organizing public relations and educational activities by investigating the effect of age on incontinence and quality of life in women.

Materials and Methods: The participants comprised women aged 30 years and older who visited a tertiary center for health screening from September 1 to October 31, 2016. The survey included a questionnaire consisting of 12 questions that took approximately 10 minutes to complete. We analyzed the responses and assessed the prevalence of the disease and its rate of recognition.

Results: A total of 509 women completed the survey. Irrespective of age, 76.8% of all respondents were aware of urinary incontinence (UI) and 57.4% of the women exhibited lower urinary tract symptoms. The most prevalent symptom was UI (45.8%), and the incidence rates of stress and urge UI were identified as 33.6% and 12.2%, respectively. Only 8.0% of the women had visited a hospital; 38.3% had awaited spontaneous symptom improvement. Many participants (61.2%) answered that a urology clinic is suitable for treating UI, while 58.9% chose a gynecology clinic.

Conclusions: Our study showed that more than 75% of women are aware of UI, but their perception of the disease mechanism and treatment options was low. We suggest that continuous education and publicity are necessary.

Keywords: Awareness; Lower urinary tract symptoms; Quality of life; Urinary incontinence

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INTRODUCTION

With a rapidly aging population in Korea, the number of patients with lower urinary tract symptoms (LUTS) is increasing, and many studies have been conducted on the prevalence of LUTS among women [1,2]. In addition, various studies have provided plenty of evidence that LUTS can cause harmful effects on mental health and lead to issues such as anxiety, depression, and an impaired quality of life

[3-5].

Among various LUTS, urinary incontinence (UI) is one of the biggest factors that can hamper social life [6]. The prevalence rate of UI is known to be 25% to 45% worldwide [7,8]. UI increases with age, and more than 40% of women in their 70s are reported to have symptoms [9]. These symptoms of UI result in high socioeconomic costs, which act as great burdens in the life of older adults [10].

The demand to treat incontinence has emerged as a

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major issue following the need for active social interaction among women. We believe that many patients do not receive appropriate care owing to misconceptions. However, research about the recognition of incontinence is still insufficient. Therefore, it is important to determine the extent of incontinence currently detected among Korean women to establish future plans.

We attempted to create reference materials for organizing public relations and educational activities by investigating the effect of age on incontinence and quality of life in women.

MATERIALS AND METHODS

This study was conducted in accordance with the principles laid down in the Declaration of Helsinki and was approved by the Institutional Review Board of Ajou University Hospital (approval number: AJIRB-MED-SUR-16-209). From September 1, 2016, to October 31, 2016, a study was conducted among women aged 30 years and older who visited a tertiary health center for the purpose of health screening. During this time, all women who provided informed consent to participate in the study were surveyed.

The survey included a questionnaire consisting of 12 questions (Fig. 1), which took approximately 10 minutes to

Q1. Have you ever suffered from any of the following? (Answer all that apply to you.)

1. Frequent urination that interferes with the quality of your life
2. Leaking urine with an uncontrollable urge to urinate
3. Being awakened more than 2 times to go to bathroom while sleeping at night.
4. Pain during urination
5. Urine leakage after coughing, sneezing, or exercising
6. Experiencing other symptoms related to urination
7. Nothing applies to me

Q2. What did you do when you had those symptoms?

Q3. What was the reason that you did not visit a doctor?

Q4. Do you know about Urinary incontinence?

Q5. Where do you go for treatment of Urinary incontinence? (Multiple responses are allowed)

Q6. Urinary incontinence is any uncontrollable leakage of urine. If you have this symptom, how would you feel about following questions?

- 6-1. Urinary incontinence is a common problem in the elderly and after giving birth.
- 6-2. I feel embarrassed and ashamed of having Urinary incontinence.
- 6-3. Living with Urinary incontinence makes social activity difficult.
- 6-4. A surgical treatment should be required for underlying Urinary incontinence.
- 6-5. A problem in the bladder can cause Urinary incontinence.
- 6-6. Urge incontinence should be also treated by surgical treatment.
- 6-7. I would avoid sexual activity due to a fear of leakage.

Fig. 1. The survey questionnaire.

Table 1. Prevalence of lower urinary tract symptoms (multiple responses were possible)

| Symptom | Age (y) | | | | |
|------------|---------------|-------------|-------------|-------------|-----------------|
| | Total (n=509) | 30s (n=110) | 40s (n=209) | 50s (n=137) | Over 60s (n=53) |
| Frequency | 11.8 | 10.9 | 9.1 | 13.1 | 20.8 |
| UUI | 12.2 | 7.3 | 12.9 | 14.6 | 13.2 |
| Nocturia | 18.5 | 8.2 | 11.5 | 25.5 | 49.1 |
| Dysuria | 3.5 | 5.5 | 3.3 | 3.6 | 0.0 |
| SUI | 33.6 | 28.2 | 30.1 | 41.6 | 37.7 |
| Other | 3.9 | 4.5 | 3.8 | 2.9 | 5.7 |
| No symptom | 42.6 | 54.5 | 45.5 | 36.5 | 22.6 |

Values are presented as percentage only.
UUI, urge urinary incontinence; SUI, stress urinary incontinence.

Table 2. Prevalence of urinary symptoms according to age

| Variable | Age (y) | | | | |
|--------------------|---------------|-------------|-------------|-------------|-----------------|
| | Total (n=509) | 30s (n=110) | 40s (n=209) | 50s (n=137) | Over 60s (n=53) |
| Hospital | 8.0 | 10.0 | 6.2 | 6.6 | 15.1 |
| Internet | 1.2 | 0.0 | 1.4 | 2.2 | 0.0 |
| Family | 1.6 | 0.9 | 2.4 | 0.7 | 1.9 |
| Observation | 38.3 | 33.6 | 36.9 | 42.3 | 43.4 |
| Other ^a | 50.9 | 55.5 | 53.1 | 48.2 | 39.6 |

Values are presented as percentage only.
^a:If women had no symptoms, they were instructed to check “other.”

complete. We analyzed the responses and then classified them on the basis of the respondents’ age and symptoms, and assessed the prevalence of the disease and its recognition rate. The chi-square test was used to confirm statistical differences among the patient subgroups with use of SPSS ver. 19.0 (IBM Corp, Armonk, NY, USA), and a 2-tailed p-value <0.05 was determined to indicate statistical significance.

RESULTS

Of the 531 questionnaires we assessed, 22 questionnaires with incomplete responses were discarded, leaving 509 questionnaires for the final analysis. The results for each question follow.

Table 1 shows the prevalence of LUTS among the respondents. Because multiple responses were possible, the relative distribution of symptoms according to age was confirmed. The prevalence of “no discomfort” was 54.5% among women in their 30s but gradually declined with age to 22.6% among those in their 60s and older. The most prevalent symptom was UI (45.8%), and the rates of stress urinary incontinence (SUI) and urge urinary incontinence (UUI) were 33.6% and 12.2%, respectively. Nocturia (Q3) gradually increased with age and was experienced by 49.1% of patients over 60 years. In addition, dysuria (Q4) was experienced by

5.5% of women in their 30s, but gradually decreased with age, and no one over 60 years reported symptoms of dysuria. In conclusion, the most frequent symptom was SUI and the prevalence was comparable by age. In addition, the frequency of nocturia increased with age, but that of dysuria decreased.

Table 2 shows the prevalence of symptoms in the women according to age. For all age groups combined, the percentage of patients who visited a hospital was 8.0%. This was found to be about one-fifth the response rate of 38.3% for “waiting for symptoms to improve without any special treatment” (i.e., observation). There were no significant differences between the age groups in any response rate (p=0.181). The highest percentage of responses was for “other,” accounting for 50.9% of the total response rate. Of these, only 7.3% of the respondents who responded with “other” gave additional comments. The more than 90% of respondents who did not provide any special comments were estimated to have no symptoms. Of the additional comments, 12 of 19 women mentioned doing pelvic exercises, including Kegel exercises. In addition, some women reported using nonhospital medical services such as pharmacies or medical equipment purchases and going to the bathroom more often.

Table 3 lists the reasons patients did not visit the hospital. Similar to the responses to the second question, the ma-

Table 3. Reasons for not visiting the hospital

| Variable | Age (y) | | | | |
|-----------------------------------|---------------|-------------|-------------|-------------|-----------------|
| | Total (n=509) | 30s (n=110) | 40s (n=209) | 50s (n=137) | Over 60s (n=53) |
| Not a serious disease | 24.8 | 20.0 | 26.8 | 23.4 | 32.1 |
| Economically burdened | 0.4 | 0.0 | 0.5 | 0.0 | 1.9 |
| Ashamed | 5.5 | 1.8 | 4.8 | 10.9 | 3.8 |
| Not knowing which clinic to visit | 1.8 | 0.9 | 1.9 | 1.5 | 5.7 |
| Other ^a | 67.5 | 77.3 | 66.0 | 64.2 | 56.6 |

Values are presented as percentage only.

^a:If women had no symptoms, they were instructed to check "other."

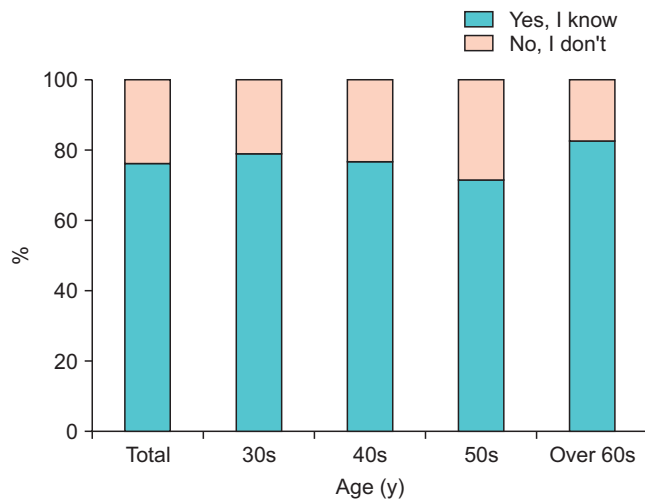


Fig. 2. Respondents' awareness of urinary incontinence according to age group.

majority of the respondents (67.5%) answered "other." Of these, 46 respondents wrote additional comments. Respondents who did not have any further comments were considered to have no symptoms. We confirmed that the majority of additional respondents did not visit the hospital because they were not very uncomfortable during their daily life. According to the contents of the answered questions, the most common reason was that the women felt it was not a disease that required a visit to the hospital. Among women aged over 60, 32.1% had a similar response and the percentage decreased as the age range decreased. Among women in their 30s, the same response was elicited in 20.0% ($p=0.020$); patients in their 50s (10.9%) did not undergo treatment because they were ashamed to visit the hospital.

As shown in Fig. 2, women of all ages, from 71.5% to 83% (mean 76.8%), were aware of UI. There were no significant differences in this response among the various age groups ($p=0.310$).

Fig. 3 shows the departments visited by the patients in the hospital for treatment of UI. Most women visited the urology clinic (61.2%) or gynecology clinic (58.9%). Among

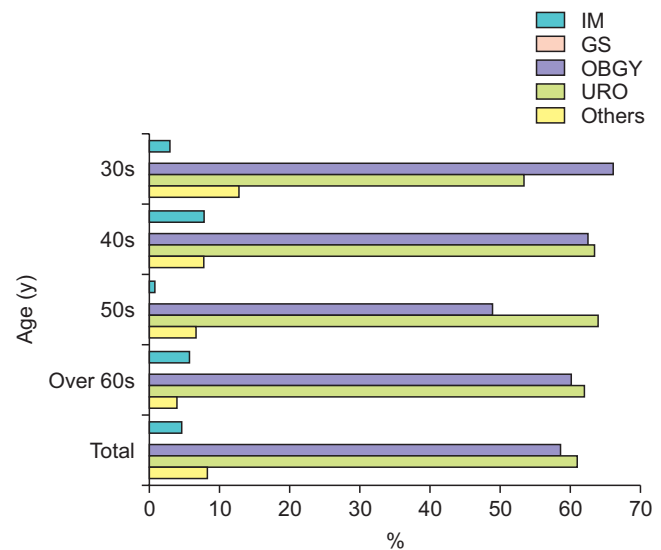


Fig. 3. The department visited by patients during hospital visits for the treatment of urinary incontinence (multiple responses were possible). IM, internal medicine; GS, general surgery; OBGY, obstetrics and gynecology; URO, urology.

women in their 30s, visits to the gynecologist were higher (66.4%) than visits to the urologist (53.6%) ($p=0.003$).

Table 4 shows the results for general knowledge of UI and the extent of discomfort in daily life. In response to the question "Urinary incontinence is a natural symptom that anyone can experience if they get older or give birth," most women agreed that UI was natural in older women and in those who had given birth. However, there was no statistically significant difference in the different age groups ($p=0.115$), despite 10.9% to 21.2% of women not agreeing with the above point. Among women in their 30s, 46.4% found it embarrassing to have incontinence. However, as the age increased the incidence of this response decreased, with only 34.0% of respondents older than their 60s finding it embarrassing. This was not statistically significant in the various age groups ($p=0.372$). Half of the respondents in all age groups felt that social activity was difficult if incontinence existed. Many women in their 40s felt that UI should be treated surgi-

Table 4. General knowledge about urinary incontinence and the extent of discomfort in daily life

| Question | Age (y) | | | | |
|--|---------------|-------------|-------------|-------------|-----------------|
| | Total (n=509) | 30s (n=110) | 40s (n=209) | 50s (n=137) | Over 60s (n=53) |
| Q6-1. Urinary incontinence is a natural symptom that anyone can experience if they get older or give birth | | | | | |
| Yes | 73.3 | 78.2 | 77.0 | 64.9 | 69.8 |
| No | 16.3 | 10.9 | 15.8 | 21.2 | 17.0 |
| No idea | 10.4 | 10.9 | 7.2 | 13.9 | 13.2 |
| Q6-2. Honestly, it's embarrassing to have incontinence | | | | | |
| Yes | 39.9 | 46.4 | 39.7 | 37.2 | 34.0 |
| No | 45.8 | 38.2 | 44.5 | 53.3 | 47.1 |
| No idea | 14.3 | 15.4 | 15.8 | 9.5 | 18.9 |
| Q6-3. If you have incontinence, social activity is difficult | | | | | |
| Yes | 49.5 | 50.0 | 53.1 | 43.8 | 49.1 |
| No | 37.1 | 31.8 | 36.9 | 43.8 | 32.0 |
| No idea | 13.4 | 18.2 | 10.0 | 12.4 | 18.9 |
| Q6-4. Urinary incontinence should be treated surgically | | | | | |
| Yes | 25.3 | 16.4 | 24.9 | 34.3 | 22.6 |
| No | 34.6 | 35.4 | 40.2 | 27.7 | 28.3 |
| No idea | 40.1 | 48.2 | 34.9 | 38.0 | 49.1 |
| Q6-5. Urinary incontinence can be caused by bladder problems | | | | | |
| Yes | 48.5 | 48.2 | 50.2 | 46.0 | 49.1 |
| No | 15.9 | 17.3 | 18.7 | 14.6 | 5.6 |
| No idea | 35.6 | 34.5 | 31.1 | 39.4 | 45.3 |
| Q6-6. Urinary incontinence that cannot be tolerated should be treated surgically | | | | | |
| Yes | 24.9 | 20.0 | 24.4 | 26.3 | 34.0 |
| No | 28.3 | 27.3 | 36.8 | 21.2 | 15.1 |
| No idea | 46.8 | 52.7 | 38.8 | 52.5 | 50.9 |
| Q6-7. If I have urinary incontinence, I might be reluctant to have sexual activity | | | | | |
| Yes | 41.8 | 44.6 | 45.9 | 36.5 | 34.0 |
| No | 22.4 | 21.8 | 23.9 | 19.7 | 24.5 |
| No idea | 35.8 | 33.6 | 30.2 | 43.8 | 41.5 |

Values are presented as percentage only.

cally, although some did not know. The responses suggest that few women were likely aware that UUI is treated with drugs rather than surgery ($p=0.031$). The majority of women (46.0%–50.2%) considered that UI was caused by bladder problems, with no statistically significant difference in this response between the age groups ($p=0.226$). Except for those in their 40s, more than 50% of respondents said they did not know if surgical treatment was required for UI. However, the percentage of women who misunderstood the question increased with age, reaching 20.0% in their 30s, and 34.0% in their 60s or more ($p=0.004$). In all age groups, close to 40% of the respondents believed that they would be reluctant to indulge in sexual activity. This response shows that UI affects not only social activities but also personal aspects of life.

DISCUSSION

UI is a serious but underappreciated disease that directly affects the patient's quality of life by causing not only physical but also psychological and social problems [11,12]. In the Korean EPIC study published in 2011 [13], 68.9% of women experienced LUTS, and the prevalence increased with age. The most prevalent symptom in women was nocturia (48.2%), and the second most prevalent was incontinence (28.4%). According to an EPIC study published in 2006 [8], the prevalence of LUTS reached 64.3%, and incontinence was reported by 13.1%. Choi et al. [14] reported the results of a similar survey in Korea. Those authors reported that 23.8% of the female respondents experienced incontinence. In other studies, the prevalence of incontinence was 53.7% in Japanese women over 40 years old [15] and 27.7% in Taiwanese women over 65 years old [16]. In the present study, the prevalence of

LUTS in women over 30 years old was 57.4%, and the most common symptom was SUI (33.6%). Although direct comparison among studies is impossible owing to the use of different questionnaires and the different study populations, the reported rate of incontinence in the present study appears comparable with previous studies.

Despite reporting symptoms, the percentage of patients who visited the hospital and received care was found to be very low at 7.8% or less. When we first analyzed the results of the survey, of the patients who responded with symptoms, the proportion of hospital visitors was too small for interpretation of the results. It is difficult to determine the exact cause of this finding as no additional surveys have been conducted, but we think that women are most likely to have relatively mild symptoms of LUTS. The best way to identify this would be to have the respondents complete a questionnaire such as the overactive bladder symptom score in the process of filling out the study questionnaire. However, we thought that participants might feel uncomfortable with a long questionnaire. In addition, the purpose of this study was not to directly assess patients with UI, but to assess perceptions of incontinence in a healthy population. In future studies related to the treatment of patients with UI, we expect that meaningful results could be derived if the above-mentioned contents are investigated together and the results analyzed.

In some studies, various media outlets, such as television, radio, and the internet, were sources of information about diseases, of which television occupied the highest position. Most women in their 30s received information about UI from the internet, whereas those in their 50s and 60s gathered information from their friends [14]. Similarly, in this study, we confirmed that information was acquired through these mass media avenues in a large proportion of patients (38.5%). Therefore, it is expected that education and informational activities through mass media campaigns would be of great help in improving patients' awareness in the future. Access to the internet is more widespread than it was at the time of the survey, and hence public relations about UI are likely to be more effective than in the past. However, an appropriate public relations plan will be needed for non-internet-using groups.

The women's reason for not visiting the hospital seemed to be a false perception that they did not need to. Thus, low recognition of and knowledge about treatment needs for LUTS were prevalent. Approximately 10% of the respondents did not know which department they should visit; in this regard, public relations could be of help in bridging the knowledge gap.

The results of the present survey suggest that patients had better awareness of UI than in the past, but their level of knowledge was still low. In all age groups surveyed, UI was recognized as a symptom of aging or childbirth. The respondents also thought that incontinence was embarrassing, led to restriction in social activities, and led to avoidance of sexual intercourse. If the questionnaire contained contents that could evaluate the severity of LUTS and the degree of discomfort in daily life, and the degree of influence of the severity of LUTS on daily life could be confirmed, the results would be much more useful. However, as mentioned above, since this study aimed to assess the degree of simple recognition, we expect that our findings will prove valuable if the results can be confirmed by including the above contents in a subsequent study.

Concerning the treatment of UI, responses differed slightly in the different age groups. In the younger age group, less than 20% of women misunderstood how incontinence should be treated. However, about half of the respondents had no idea, which still indicates that the women's knowledge about the treatment of incontinence was inadequate.

In this study, most women were aware of the condition called UI. However, in choosing a clinic to treat UI, the women selected gynecology and urology equally. To correct this problem, distinguishing the cause is paramount. This survey did not provide a question about the reason for visiting one department over the other. This remains a limitation of the survey. Younger women were more likely to choose gynecology. Hence, it is necessary to analyze the outcomes of the response and appropriately underscore the role of urology in the management of such patients.

CONCLUSIONS

A cognitive survey of UI confirmed that many women are aware of UI. However, the level of awareness about mechanisms and treatments still needs to change, and we believe that better public educational strategies are needed.

CONFLICTS OF INTEREST

The authors have nothing to disclose.

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AUTHORS' CONTRIBUTIONS

Research conception and design: Jong Bo Choi. Data acquisition: Hee Jae Yoo. Statistical analysis: Kang Hee Shim. Data analysis and interpretation: Kang Hee Shim. Drafting of the manuscript: Kang Hee Shim. Critical revision of the manuscript: Sung Gon Park and Seol Ho Choo. Obtaining funding: Jong Bo Choi. Administrative, technical, or material support: Seol Ho Choo. Supervision: Seol Ho Choo and Jong Bo Choi. Approval of the final manuscript: Jong Bo Choi.

REFERENCES

1. Choo MS, Ku JH, Oh SJ, Lee KS, Paick JS, Seo JT, et al. Prevalence of urinary incontinence in Korean women: an epidemiologic survey. *Int Urogynecol J Pelvic Floor Dysfunct* 2007;18:1309-15.
2. Choo MS, Ku JH, Park CH, Lee YS, Lee KS, Lee JG, et al. Prevalence of nocturia in a Korean population aged 40 to 89 years. *Neurourol Urodyn* 2008;27:60-4.
3. Jeong WS, Choi HY, Nam JW, Kim SA, Choi BY, Moon HS, et al. Men with severe lower urinary tract symptoms are at increased risk of depression. *Int Neurourol J* 2015;19:286-92.
4. Kim TH, Han DH, Ryu DS, Lee KS. The impact of lower urinary tract symptoms on quality of life, work productivity, depressive symptoms, and sexuality in Korean men aged 40 years and older: a population-based survey. *Int Neurourol J* 2015;19:120-9.
5. Lee KS, Choo MS, Seo JT, Oh SJ, Kim HG, Ng K, et al. Impact of overactive bladder on quality of life and resource use: results from Korean Burden of Incontinence Study (KOBIS). *Health Qual Life Outcomes* 2015;13:89.
6. Yoo TK, Lee KS, Sumarsono B, Kim ST, Kim HJ, Lee HC, et al. The prevalence of lower urinary tract symptoms in population aged 40 years or over, in South Korea. *Investig Clin Urol* 2018;59:166-76.
7. Stewart WF, Van Rooyen JB, Cundiff GW, Abrams P, Herzog AR, Corey R, et al. Prevalence and burden of overactive bladder in the United States. *World J Urol* 2003;20:327-36.
8. Irwin DE, Milsom I, Hunskaar S, Reilly K, Kopp Z, Herschorn S, et al. Population-based survey of urinary incontinence, overactive bladder, and other lower urinary tract symptoms in five countries: results of the EPIC study. *Eur Urol* 2006;50:1306-14; discussion 1314-5.
9. Milsom I, Gyhagen M. The prevalence of urinary incontinence. *Climacteric* 2019;22:217-22.
10. Hu TW, Wagner TH, Bentkover JD, LeBlanc K, Piantentini A, Stewart WF, et al. Estimated economic costs of overactive bladder in the United States. *Urology* 2003;61:1123-8.
11. Kocak I, Okyay P, Dundar M, Erol H, Beser E. Female urinary incontinence in the west of Turkey: prevalence, risk factors and impact on quality of life. *Eur Urol* 2005;48:634-41.
12. Melotti IGR, Juliato CRT, Tanaka M, Riccetto CLZ. Severe depression and anxiety in women with overactive bladder. *Neurourol Urodyn* 2018;37:223-8.
13. Lee YS, Lee KS, Jung JH, Han DH, Oh SJ, Seo JT, et al. Prevalence of overactive bladder, urinary incontinence, and lower urinary tract symptoms: results of Korean EPIC study. *World J Urol* 2011;29:185-90.
14. Choi H, Park JY, Yeo JK, Oh MM, Moon du G, Lee JG, et al. Population-based survey on disease insight, quality of life, and health-seeking behavior associated with female urinary incontinence. *Int Neurourol J* 2015;19:39-46.
15. Ueda T, Tamaki M, Kageyama S, Yoshimura N, Yoshida O. Urinary incontinence among community-dwelling people aged 40 years or older in Japan: prevalence, risk factors, knowledge and self-perception. *Int J Urol* 2000;7:95-103.
16. Tseng IJ, Chen YT, Chen MT, Kou HY, Tseng SF. Prevalence of urinary incontinence and intention to seek treatment in the elderly. *J Formos Med Assoc* 2000;99:753-8.