Prevalence of urinary incontinence and related risk factors in community-dwelling elderly

Salime Mucuk[1], Sibel Çoban Arguvanli[2], Mustafa Mümtaz Mazicioğlu[3], Elif Deniz Şafak[3], Şemsinnur Göççer[4], Sibelakin[5], Ahmet Öztürk[6]

[1]Department of Nursing, Faculty of Health Sciences, Erciyes University, Kayseri, Turkey, [2]Department of Nursing, Psychiatric and Mental Health Nurse, Kayseri, Turkey, [3]Department of Family Medicine, Erciyes University, School of Medicine, Kayseri, Turkey, [4]Ministry of Health, Hacılar Public Health Center, Kayseri, Turkey, [5]Department of Internal Medicine Erciyes University, School of Medicine, Division of Geriatrics, Kayseri, Turkey, [6]Department of Biostatistics, Erciyes University, School of Medicine, Kayseri, Turkey

ABSTRACT

Introduction: Urinary incontinence (UI) is the involuntary loss of urine. The prevalence of UI increases with age. **Objectives:** The aim of this study was to determine the prevalence of UI among elderly of both the genders and related factors in community-dwelling elderly. **Materials and Methods:** We performed a cross-sectional study of 967 elderly to determine the prevalence of UI among them using personal information form and the urogenital distress inventory-6 (UDI-6), incontinence impact questionnaire-7 (IIQ-7), geriatric depression scale (GDS), and the World Health Organization quality of life instrument-older adults modules. **Results:** UI was found to be more prevalent in women (63.3%) than in men (45.1%) ($P < 0.001$). The UDI-6 median score was 6/18 for women and 5/18 for men ($P < 0.05$). The IIQ-7 median score was 4/21 for women and 3/21 for men ($P > 0.05$). The prevalence of depressive mood was greater in women (34.2%) than in men (15.9%) ($P < 0.001$). Significant positive correlation was noted among the UDI-6, IIQ-7, and GDS scores in both genders ($P < 0.01$). In uni-multivariate analysis, depressive mood in both genders was the significant determinant of UI. Coronary heart disease and hyperlipidemia in women were significant independent risk factors, whereas high blood pressure in man. **Conclusion:** The prevalence of self-reported UI and its subtypes was found to be common in both the genders of elderly, with much greater prevalence in women; some of our results were even greater than those reported at the local and international levels for both the genders.

Key words: Depression, elderly, quality of life, urinary incontinence

INTRODUCTION

Urinary incontinence (UI) is the involuntary loss of urine, and its prevalence increases with the age of an individual.[1] The global elderly population is expected to account for 20% of the entire world population by 2050.[2] At present, 8.2% of the Turkish population is of ≥65 years of age,[3] which comprises 9.3% women and 7.2% men. The steady increase in the life expectancy of the elderly has prompted health-care providers to promote and maintain the functional independency in elderly for as long as possible with an acceptable level of quality of life (QOL). UI is an important and a common health-care issue that affects the QOL of individuals at advanced age. Moreover, UI may lead to psychological and social complications in a patient, such as depression, anxiety, embarrassment, low self-esteem, and social isolation. Overall, UI is primarily associated with poor QOL for the elderly.[4-8] On the other hand, cultural factors and ignorance of UI symptoms may prevent the elderly from accessing adequate social support and medical care.[9] UI is at least 2–3 times greater in women.[2] This predominance in females may be attributed to various anatomic, genetic, physiological, lifestyle, and reproductive factors.[10] However, UI is not solely a female issue, it is, in fact, a significant problem in the male gender as well. By concentrating on the most serious prevalent problems in any one gender, we often ignore its presence in the other gender, despite similarity in the severity in both. Gender-based inequalities should not cause ignorance of a less prevalent situation in any gender. Studies about the prevalence in different populations have provided different estimates, probably because of the type of UI and the data collection method employed.[9-11] The aim of this study was to determine the prevalence of UI among elderly of both the genders and related factors in community-dwelling elderly.

MATERIALS AND METHODS

This was a cross-sectional study. The Kayseri Elderly Health Study was used between August 2013 and December 2013 to recruit at least 1% of the community-dwelling elderly (totaling 89,303 individuals) in the Kayseri city, Turkey. All participants were invited to health centers by their family physicians for face-to-face interviews. Elderly with hearing and visual afflictions, communication issues, and unwillingness to participate in this study were excluded from the study.

The data were collected using personal information form, the World Health Organization QOL instrument-older adults (WHOQOL-OLD) module, and the urogenital distress inventory-6

(UDI-6), incontinence impact questionnaire (IIQ-7), and geriatric depression scale (GDS). The personal information form included questions on baseline demographics such as the age, education, marital status, employment status, presence of a living partner, income, gravida, parity, and number of vaginal deliveries of the participants. The most frequent self-reported chronic diseases (hypertension, diabetes mellitus, coronary heart disease, cerebrovascular disease, and chronic renal failure) and current UI were noted.

The height and weight of the subjects were measured by the BC-532 Body Composition Monitor (Tanita, Tokyo), with the participants wearing light clothing and no shoes; their body mass index was calculated from the weight and height (kg/m^2).

The WHOQOL-OLD module consisted of 24 items assigned to six facets (sensory abilities, autonomy, past, present, and future activities, social participation, death and dying, and intimacy). Turkish validity and reliability were tested as per the method of Eser *et al.*[12] A Likert-type scale (indicative points: 1=Never, 2=low, 3=moderate, 4=too much, and 5=extreme) was also used. In each facet, 4 to 20 points could be assigned to the subject, with the highest possible total score of 120. A high score indicated increased QOL.

We adopted the combination of the shorter versions UDI-6 and IIQ-7 scales containing 7 and 6 questions, respectively, to measure the urogenital distress and the impact of incontinence on the subject's QOL.[13] The UDI-6 and IIQ-7 are Likert scales (with indicative points: 0=None, 1=mild, 2=moderate, and 3=very much). The Turkish validity and reliability studies of the UDI-6 and IIQ-7 were conducted by Cam *et al.*[14] The highest scores for the UDI-6 and IIQ-7 scales were 18 and 21, respectively. The greater the scores of these scales more were the level of distress and impact of UI and lower was the QOL.

The GDS was developed by Yesevag *et al.*, in 1983.[15] The reliability and validity for Turkish language were tested by Ertan *et al.*, in 1997.[16] All positive responses could garner a maximum of 30 points, with a cut-off point set at 14. Higher scores indicated increased risk for depression.

Categorical data were compared by Chi-square test for gender. Independent *t*-test and the Mann–Whitney U-test were used to determine the mean and median score differences between the genders. Spearman correlation analyses were performed to determine the correlations among the WHOQOL-OLD, GDS, UDI-6, and IIQ-7 scores for both the genders. Uni and multivariate logistic regression analyses were conducted to find possible independent risk factors for UI. Backward Wald stepwise rotation method was used in multivariate analysis.

Ethical approval was obtained from the Institutional Review Board of Erciyes University to conduct this study (2013/441). All patients were informed about the study protocol, and their written and oral consents were obtained.

RESULTS

The mean ages of female and male subjects were 71.5 (5.3) and 72.3 (5.6) years, respectively. Of these, 73.2% of the elderly women and 66.1% of the elderly men were aged 65–74 years.

The proportion of married men was almost twice that of the women. In addition, 55.3% of the women and 9.2% of the men were single, divorced, or widowed ($P < 0.001$). Men were more educated than women ($P < 0.001$). The proportion of subjects with primary education (>8 years) was 15.5% and 2.7%, respectively, for men and women. Almost all men were retired and >94% of the women were housewives. The proportion of subjects living alone was 6 times greater in women than in men (24.5% and 3.7% for women and men, respectively). More than three-quarters of the elderly participants (75.7% of women and 96.3% of men) were living with their relatives, spouse, or children ($P < 0.001$). Female subjects were more obese than male subjects (68.9% vs. 34.4%). High blood pressure and hyperlipidemia were more common in females (68.8% vs. 48.4% and 17 % vs. 7.1%) ($P < 0.001$) [Table 1]. The mean numbers of pregnancies were 6.2 (3.2) and 5.1 (2.6), and the mean number of deliveries was 5.4 (2.9).

UI was more common in women ($p < 0.001$), with more than half of the women (63.3%) population and 45.1% of the men population having UI. Stress and the urge and mixed UI (urge and stress incontinence together) rates were 42%, 53%, and 36.9%, respectively, in the women, whereas they were 11.3%, 28.3%, and 9.9%, respectively, in the men [$P < 0.001$; Table 2].

The UDI-6 median score was 6/18 in women and 5/18 in men ($p < 0.05$). The IIQ-7 median score was 4/21 in women and 3/21 in men [$P > 0.05$; Table 3]. According to the GDS, the prevalence of depressive mood was more prevalent in the women (34.2% vs. 15.9 %) ($P < 0.001$). No significant difference was noted between the genders in terms of the WHOQOL-OLD total score [Table 3].

Significant positive correlation was noted between the UDI-6 and IIQ-7 scores for both the genders ($r = 0.58$; $P < 0.01$). A low but significant negative correlation could be detected between the GDS and the WHOQOL-OLD scores for both the genders. Moreover, the correlation of GDS score with that of UDI-6 or IIQ-7 was low and positive [Table 4].

Uni and multivariate logistic regression analyses were used to evaluate the association of UI and independent risk factors for UI (demographic characteristics, prevalent chronic diseases in Turkish population, and QOL assessment score). Independent variables detected to be related with UI in univariate analysis are used to reveal if they are related with UI in multivariate setting again (depressive mood, coronary heart disease, hyperlipidemia, and high blood pressure) inserted into the multivariate analyze [Table 5]. In univariate analyses, depressive mood, coronary heart disease, and hyperlipidemia were found as significant independent variables in the female gender for UI. Depressive mood and high blood pressure were the significant independent variables in the male gender. Depressive mood was found as the significant determinant of UI in multivariate analyses where the odds of depressive mood were 1.87 and 2.83, respectively, for females and males. Other than depressive mood, coronary heart disease, and hyperlipidemia were found as significant independent variables for UI in females and in males high blood pressure were found as significant independent variables [Table 5].

DISCUSSION

The present study was designed to determine the prevalence of UI among elderly of both the genders and related risk factors

Table 1: Demographic characteristics of subjects aged 65 years

Characteristics	Women *n*=436 (%)	Men *n*=436 (%)	Comparison
Age (years)*			
65–74	319 (73.2)	288 (66.1)	χ^2=5.244
75–84	109 (25.0)	137 (31.4)	P=0.073
>85	8 (1.8)	11 (2.5)	
Marital status*			
Married	195 (44.7)	396 (90.8)	χ^2=212.136
Others (single, divorced, widowed)	241 (55.3)	40 (9.2)	P<0.001
Education*			
Illiterate	254 (58.3)	49 (11.2)	χ^2=273.080
Literate	89 (20.4)	63 (14.4)	P<0.001
1–8 years	81 (18.6)	257 (58.9)	
>8 years	12 (2.7)	67 (15.5)	
Employment*			
Retired	24 (5.7)	403 (100)	χ^2=732.357
Housewife	396 (94.3)	0 (0.0)	P<0.001
Living with*			
Alone	105 (24.5)	16 (3.7)	χ^2=75.898
Relatives, spouse, child	327 (75.7)	415 (96.3)	P<0.001
Income*			
Good	81 (19.0)	101 (23.3)	χ^2=4.987
Average	211 (49.4)	222 (51.3)	P=0.083
Poor	135 (31.6)	110 (25.4)	
BMI (kg/m²)*			
Underweight (<18.5)	1 (0.2)	8 (1.9)	χ^2=93.916
Normal (18.5–24.9)	40 (9.3)	87 (20.2)	P<0.001
Overweight (25–29.9)	93 (21.6)	179 (65.8)	
Obese (≥30.0)	297 (68.9)	156 (34.4)	
BMI (mean±SD)**	32.49±5.35	28.55±4.53	t=11.668
			P<0.001
Diabetes			
Yes	114 (26.1)	91 (20.9)	χ^2=3.374
No	322 (73.9)	345 (79.1)	P=0.079
Coronary heart disease*			
Yes	56 (12.8)	75 (17.2)	χ^2=3.243
No	380 (87.2)	361 (82.8)	P=0.088
High blood pressure*			
Yes	300 (68.8)	211 (48.4)	χ^2=37.443
No	136 (31.2)	225 (51.6)	P<0.001
Cerebrovascular disease*			
Yes	7 (1.6)	10 (2.3)	χ^2=0.540
No	429 (98.4)	426 (97.7)	P=0.626
Chronic renal failure*			
Yes	7 (1.6)	8 (1.8)	χ^2=0.068
No	429 (98.4)	428 (98.2)	P=1.000
Hyperlipidemia*			
Yes	74 (17.0)	31 (7.1)	χ^2=20.020
No	362 (83.0)	405 (92.9)	P<0.001

*Pearson Chi-square test, **independent samples t-test, missing data not included in the analysis. SD: Standard deviation, BMI: Body mass index
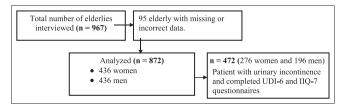

Figure 1: Participants

in community-dwelling elderly. The overall prevalence of UI was found to be 63.3% in women and 45.1% in men [Table 2], which is not consistent with other previous reports.[17,18] The UI prevalence for both women and men was slightly greater in our study than that reported in other recent studies.[17,18] In these previous studies, the prevalence of overall UI in the elderly was 43%–59.8% in women and 20.9%–34.3% in men.[17,18] In countries other than Turkey, the UI has been reported in almost half of the elderly women population, with the rate of incidence greater in women than in men.[19,20] Theprevalence of UI in women and men has been reported to be 67.0% and 44.9%, respectively, in the United States; 69% and 50.5%, respectively, in the United Kingdom; and 67.1% and 39.4%, respectively, in Sweden.[19] On the other hand, the prevalence of UI in the elderly Latino population has been reported to be 29.5% in women and 18.3% in men.[6] A population-based study conducted in Southern Sweden

Table 2: The prevalence rates of UI and UI types of subjects aged 65 years

Prevalence	Women n=436 (%)	Men n=435 (%)	Comparison*
UI			
Yes	276 (63.3)	196 (45.1)	χ^2=29.200
No	160 (36.7)	239 (54.9)	P<0.001
Stress incontinence			
Yes	183 (42.0)	49 (11.3)	χ^2=105.078
No	253 (58.0)	386 (88.7)	P<0.001
Urge incontinence			
Yes	231 (53.0)	123 (28.3)	χ^2=55.093
No	205 (47.0)	312 (71.7)	P<0.001
Mixed incontinence			
Yes	161 (36.9)	43 (9.9)	χ^2=88.777
No	275 (63.1)	392 (90.1)	P<0.001
Dripping			
Yes	65 (14.9)	57 (13.1)	χ^2=0.589
No	371 (85.1)	378 (86.9)	P=0.495

UI: Urinary incontinence

Table 3: The distribution of UDI-6, IIQ-7, GDS, and the WHOQOL-OLD scores

Variables	Women	Men	Comparison
UDI-6 score median (min–max)[2]	6 (0–18)	5 (0–18)	U=24.641 P=0.025
IIQ-7 score median (min–max)[2]	4 (0–21)	3 (0–21)	U=25.969 P=0.109
GDS (mean±SD)[1]	11.39 (6.54)	7.60 (5.64)	t=9.138 P<0.001
WHOQOL-OLD subscale (mean±SD)[1]	72.3 (8.3)	72.3 (8.8)	t=−0.011 P=0.992

[1]Independent samples *t*-test, [2]Mann–Whitney U-test. UDI-6: Urogenital distress inventory-6, IIQ-7: Incontinence impact questionnaire-7, GDS: Geriatric depression scale, WHOQOL-OLD: World Health Organization quality of life instrument-older adults, SD: Standard deviation

Table 4: The correlations among the WHOQOL-OLD, GDS, UDI-6, and IIQ-7 scores

Variables	Women			Men		
	GDS	UDI-6	IIQ-7	GDS	UDI-6	IIQ-7
UDI-6	0.263**	-		0.296**	-	
IIQ-7	0.239**	0.582**	-	0.193**	0.586**	-
WHOQOL-OLD	−0.289**	−0.072	−0.052	−0.317**	−0.065	−0.124

Spearman's rho **P<0.01 *P<0.05. UDI-6: Urogenital distress inventory-6, IIQ-7: Incontinence impact questionnaire-7, GDS: Geriatric depression scale, WHOQOL-OLD: World Health Organization quality of life instrument-older adults

showed that the prevalence of UI was 39% (including 34.8% men and 41.6% women).[10]

We calculated the prevalence of UI and its subtypes and compared them between both the genders. The relative gender difference for each UI type was about 4 times greater in stress incontinence, 2 times greater in urge incontinence, and 4 times greater in mixed incontinence, all of which were in favor of the female gender. We considered that this significant and high difference may be attributed to aging, short urinary tract, obesity, and increased delivery frequency (primarily ≥3 delivery). We found the delivery frequency to be 5.4 (2.9), obesity to be 68.9%, and the mean age to be 71.5 years, as shown in Table 1.

Using the UDI-6 scale, the symptom severity of UI was found to be predominant in women (6/18) compared with men (5/18). This finding is supported by a relatively high QOL score in women (IIQ-7 score 4/21 vs. 3/21) [Table 3], which can be explained by the higher UI prevalence in women. The incidence of both incontinence and depressive mood was greater in women. However, as incontinence may affect the depressive mood or increase the prevalence of depressive mood (in 34.2% women vs. in 15.9% men), which may lead to the overestimation of the UI symptom severity. On the other hand, women expressed their complaints more easily than men. At the same time, in both the genders, a significant and positive correlation was noted between the IIQ-7 and UDI-6 scores [Table 4]. This finding indicates that increasing severity of the UI symptom reduced the QOL in both men and women.

There was a low, but significant positive correlation among the GDS, IIQ-7, and UDI-6 scores in both the genders [Table 4], which suggests that increased depressive mood may have a significant effect on UI-related QOL and UI symptom severity or vice versa. Psychosocial difficulties including low self-esteem, sexual dysfunction, social isolation, and loneliness can all result in UI, which can, in turn, increase the occurrence of depressive mood. This observation is supported by those of other previous studies where in elderly suffering from UI were reported to feel more depressed and experience a lower QOL.[6,7,21-23] Several studies have stated that UI leads to increased depressive mood,[4,20,24] whereas some others assert no relationship between them after the patient becomes used to the effects of urogenital symptoms.[25] These conflicting results suggest that it is in the best interest that UI symptoms be considered as a routine life event.

The WHOQOL-OLD total score was not statistically significant between women and men [Table 3]. However, statistically significant correlation was noted between the WHOQOL-OLD total score and depressive mood in both the genders, suggesting that depressive mood may affect the QOL in elderly [Table 4].

Depressive mood was detected as an independent risk factor for UI in both genders in that in both uni and multivariate analysis. On the other hand, coronary heart disease and hyperlipidemia were independent risk factors for UI in women. High blood pressure was detected as independent risk factors for increased UI in the man [Table 5]. UI may lead to depressive mood or the altered neurotransmitter function associated with depression may affect the bladder function leading to UI. This must be taken into account in elderly care. Coronary heart disease, hyperlipidemia in female, and high blood pressure in male were independent risk factors for increased UI. This might be explained by this chronic diseases induced pelvic ischemia and bladder dysfunction.

The prevalence of self-reported UI and its subtypes was found to be common in both the genders of elderly, with much greater prevalence in women; some of our results were even greater than those reported at the local and international levels for both the genders. Symptom severity of UI with UDI-6 was predominant in women, as evidenced by the relatively low QOL (IIQ-7). In addition, the incidence of depressive mood was higher in women. Incontinence, therefore, seems to affect a depressive mood. Depressive mood in both genders, coronary heart disease and hyperlipidemia in the female gender, and high blood pressure in the male gender were found as significant independent risk

Table 5: The results of the univariate and multivariate analyses for UI

Variables	Univariate analysis		Multivariate analysis	
	Female	Male	Female	Male
	OR (CI)	OR (CI)	OR (CI)	OR (CI)
Depressive symptoms				
No	1.0	1.0	1.0	1.0
Yes	1.93 (1.25–2.97)	3.15 (1.82–5.45)	1.87 (1.21–2.91)	2.83 (1.62–4.93)
WHOQOL	0.97 (0.95–1.00)	0.98 (0.96–1.00)	-	-
BMI	1.02 (0.98–1.06)	1.03 (0.99–1.08)	-	-
Age	0.99 (0.95–1.02)	1.04 (1.00–1.07)	-	-
Marital status				
Married	1.0	1.0	-	-
Others	0.83 (0.56–1.23)	1.94 (1.00–3.77)	-	-
Education				
Illiterate	1.0	1.0		-
Literate	0.91 (0.55–1.51)	0.60 (0.28–1.27)	-	-
1–8 years	0.78 (0.47–1.31)	0.59 (0.32–1.10)	-	-
>8 years	0.75 (0.23–2.44)	0.48 (0.23–1.03)	-	-
Income				
Good	1.0	1.0	-	-
Average	1.43 (0.85–2.42)	0.79 (0.49–1.27)	-	-
Poor	1.29 (0.73–2.26)	1.10 (0.64–1.89)	-	-
Living with				
Alone	1.0	1.0	-	-
Relatives, spouse, child	1.19 (0.76–1.87)	0.48 (0.17–1.35)	-	-
Diabetes				
No	1.0	1.0		
Yes	1.51 (0.95–2.39)	1.32 (0.83–2.10)	-	-
High blood pressure				
No	1.0	1.0	-	1.0
Yes	1.44 (0.95–2.18)	1.62 (1.10–2.37)	-	1.54 (1.03–2.28)
Coronary heart disease				
No	1.0	1.0	-	-
Yes	2.08 (1.08–4.01)	1.31 (0.79–1.16)	2.07 (1.07–4.04)	-
Cerebrovascular disease				
No	1.0	1.0	-	-
Yes	3.53 (0.42–29.6)	1.22 (0.35–4.29)	-	-
Chronic renal failure				
No	1.0	1.0	-	-
Yes	1.45 (0.28–7.60)	0.72 (0.17–3.08)	-	-
Hyperlipidemia				
No	1.0	1.0	1.0	-
Yes	2.18 (1.22–3.91)	1.00 (0.48–2.09)	2.14 (1.18–3.86)	-

OR: Odds ratio, CI: Confidence interval, UI: Urinary incontinence, WHOQOL: World Health Organization quality of life, BMI: Body mass index:

factors for UI in uni-multivariate analyses. Incontinence is a symptom that alters the QOL of elderly and should, therefore, be monitored with reference to other risk factors for UI in elderly. Awareness must be raised among elderly and their caregivers that UI is a frequent disorder with possibly relieving interventions and is not an inevitable consequence of aging.

CONCLUSION

The prevalence of self-reported UI and its subtypes is common in both genders of elderly, and it is much more prevalent in women these figures higher than local and some of the international figures in both genders. Symptom severity of UI with UDI-6 was predominant in women, and this finding was supported by a relatively low QOL (IIQ-7). Incontinence is a frequent symptom which alters the QOL of elderly so it has to be checked with related risk factors for elderly care.

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