Central European Journal of Nursing and Midwifery

Cent Eur J Nurs Midw 2018;9(2):825–831
doi: 10.15452/NM.2018.09.0011

ORIGINAL PAPER

RISK FACTORS FOR URINARY INCONTINENCE AMONG ISTANBUL WOMEN: A HOSPITAL BASED CASE-CONTROL STUDY

Nezihe Kizilkaya Beji[1], İlkay Güngör[2], Güliz Onat[3], Habibe Ayyildiz Erkan[4], Şule Gökyildiz[5], Önay Yalçin[6]

[1]*Department of Nursing, Health Sciences Faculty, Biruni University, Istanbul, Turkey*
[2]*Department of Women's Health and Gynecologic Nursing, Florence Nightingale Nursing Faculty, Istanbul University, Istanbul, Turkey*
[3]*Department of Midwifery, Health Sciences School, KTO Karatay University Konya, Turkey*
[4]*Department of Urogynecology Clinic, Istanbul Medicine Faculty, Istanbul University, Istanbul, Turkey*
[5]*Department of Midwifery, Health Sciences School, Çukurova University, Adana, Turkey*
[6]*Department of Urogynecology Clinic, Istanbul Medicine Faculty, Istanbul University, Istanbul, Turkey*

Received August 20, 2017; Accepted February 25, 2018.

Abstract

Aim: The study aimed to identify risk factors for urinary incontinence in women over 20 years of age in Istanbul. *Design:* The study was designed as a descriptive, retrospective, case control study. *Methods:* The study was conducted in a urogynecological unit at a university hospital in Istanbul. In total, 367 incontinent women who visited the urogynecological unit, and 401 continent women who visited outpatient clinics with other gynecological symptoms were included. Data were gathered via face-to-face interviews, using a questionnaire on risk factors for urinary incontinence. Adjusted odds ratios were given using logistic regression. *Results:* Variables which were found to be significantly different in chi-square analysis for urinary incontinence were age, education, marital status, number of pregnancies, birth and curettage, characteristics of first vaginal delivery (delivery mode, place, interventions), menopause, hormone therapy, history of gynecological operation, pulmonary disease, diabetes mellitus, hypertension, medicine use, constipation, flatus, hemorrhoids, herniated disc/varicose veins, stria during pregnancy, caffeine > 2 cups/day, body mass index (BMI ≥ 25 kg/m^2), weight gain ≥ 10 kg, fecal incontinence, and history of urinary incontinence in childhood, in patients' mothers and relatives. When these variables were assessed in multivariate logistic regression analysis, number of births ("1-birth" OR = 38.8; CI = 2.2–669.5; "2-births" OR = 20.1; CI = 1.2–327.4; "≥ 3-births" OR = 35.0; CI = 1.9–621.8), BMI ≥ 25 kg/m^2 (OR = 7.2; CI = 2.1–24.1), and history of incontinence in mothers (OR = 7.2; CI = 1.3–37.2) were identified as significant risk factors. *Conclusion:* The main risk factors for urinary incontinence in the population under study were identified to be the number of births as an obstetric risk factor, obesity as a lifestyle factor, and 'incontinence in mothers' as a familial factor.

Keywords: pelvic floor, pelvic floor dysfunction, risk factors, urinary incontinence, urogynecology.

Introduction

Urinary incontinence (UI) is a significant health problem with psychological, social and hygienic effects on the lives of both women and their families (Hunskaar et al., 2004). As defined by the International Continence Society (ICS), UI is a complaint involving the involuntary leakage of urine. Urinary incontinence remains a worldwide problem affecting adult women across different cultures and races (Abrams et al., 2003). Prevalence rates vary: between 15–55% complain of lower urinary symptoms (Mota, 2017). There are various factors which can cause incontinence, such as pregnancy, childbirth, obesity, menopause, or just inherent connective-tissue weakness. All of these factors can cause pathophysiological changes in the muscular and fascial structures of the pelvic floor, and lead to pelvic support defects and possibly pelvic floor dysfunction (Menezes, Pereira, Hextall, 2010). From a public health viewpoint, it is important to identify the risk factors for UI that might impair the quality of life of sufferers; identification of the risk factors will help women at risk to modify their lifestyle, which is important in the prevention and treatment of this disorder (Hsieh et al., 2008).

Urinary incontinence is a common and distressing condition which, whilst not life-threatening, is known to cause considerable morbidity. Causation is

Corresponding author: Güliz Onat, Department of Midwifery, Health Sciences School, KTO Karatay University, Fetih Mah. Alaaddin Kap Cad. No: 130 42020 Konya, Turkey; e-mail: gulizonat@hotmail.com

multifactorial, although many risk factors have been identified. According to Kılıç (2016), urinary incontinence has a significant correlation with number of children, genital prolapse, duration of delivery longer than 24 hours, diabetes, and urogenital infection, but not with age at the first and last childbirth, presence of episiotomy, birth weight over four kg, and smoking (Kılıç, 2016). This study attempted to determine the importance of aging, previous gynecological operations, diabetes mellitus (DM), hypertension (HT), body mass index (BMI), and other possible risk factors for urinary incontinence in the population under study, in order to help clinicians make decisions, and to implement preventive strategies to decrease the incontinence rate in the general population.

Aim

The aim of the study was to identify risk factors for urinary incontinence in women over 20 years of age who applied to the outpatient gynecology clinic and urogynecological unit of a university hospital in Istanbul.

Methods

Design

The study was designed as a descriptive, retrospective, case control study.

Sample

The study was conducted at Istanbul University, Faculty of Medicine between 2007 and 2009. 367 incontinent women and 401 continent women were invited to participate in the study. The sample of the study included 367 incontinent women who visited the urogynecological unit, and 401 continent women (control group) who visited outpatient gynecology clinics with other gynecological symptoms during the research period. Since the patients of the urogynecological unit were women who had been referred from gynecological clinics with urinary incontinence symptoms, all women had the clinical diagnosis of urinary incontinence, defined as any leakage or involuntary loss of urine.

Data collection

Data were gathered via face-to-face interviews, using a questionnaire prepared by the researchers according to the literature on risk factors related to urinary incontinence. The questionnaire addressed sociodemographic and obstetrical characteristics of women, gynecological and medical problems, lifestyle factors, and personal/family history of incontinence, as shown in Tables 4 and 5. It was administered to 30 women in the pilot study. After revision, the questionnaires were finalized. Trained interviewers administered the questionnaires to women during visits to the clinic, in a private location.

Data analysis

Data were analyzed in SPSS for Windows using frequency, mean and standard deviation. Chi-square test and adjusted odds ratios (OR) of incontinence were derived using forward stepwise logistic regression analysis.

Results

The mean ages of women in the incontinent and control groups were 47.3 (SD = 10.7) and 42.6 (SD = 13.9) years, respectively, and ranged between 20 and 80 years. Most of the women in both groups were married, housewives, with primary school education or above. Statistically significant differences were found between groups in relation to several demographic characteristics, including age groups (p = 0.000), education (p = 0.000), and marital status (p = 0.010). Comparison of sociodemographic characteristics between groups are presented in Table 1.

Table 1 Comparison of socio demographical characteristics between groups

n = 768		Incontinent group		Control group		χ^2	p
		n	%	n	%		
Age group (years)	20–29	25	6.8	77	19.2		
	30–39	47	12.8	64	16.0		
	40–49	137	37.3	147	36.7	42.085	0.000*
	50–59	111	30.2	62	15.5		
	≥ 60	47	12.8	51	12.7		
Education level	illiterate / uneducated	62	16.9	118	29.4		
	primary education (5–8 years)	199	54.2	164	40.9	20.082	0.000*
	high school and over (> 8 years)	106	28.9	119	29.7		
Marital status	single & widow	32	8.7	60	15.0	7.084	0.010*
	married	335	91.3	341	85.0		

*$p \leq 0.05$; χ^2 – Chi square

The presence of several obstetrical risk factors for UI was compared between the groups (Table 2). Bivariate analysis of the data demonstrated statistically significant differences between incontinent and control groups in relation to number of pregnancies (p = 0.000), parity (p = 0.000), number of births (p = 0.000), number of vaginal births (p = 0.000), number of curettages (p = 0.000), mode of first delivery (p = 0.000), place of first vaginal delivery (p = 0.001), episiotomy in first vaginal delivery (p = 0.004), fundal pressure in first vaginal delivery (p = 0.000), and perineal tears in first vaginal delivery (p = 0.003). However, there was no significant difference between groups regarding vaginal birth with ≥ 4 kg fetus (p = 0.194), pregnancy with ≥ 4 kg fetus (p = 0.250), and number of abortions (p = 0.308).

Assessment of gynecological/medical characteristics between groups demonstrated statistically significant differences in relation to menopause (p = 0.005), hormone replacement therapy (p = 0.021), having gynecological operations (p = 0.001), pulmonary disease (p = 0.004), diabetes mellitus (p = 0.001), hypertension (p = 0.018), medicine use (p = 0.000), constipation (p = 0.017), flatus (p = 0.000), hemorrhoids (p = 0.000), herniated disc / varicose veins (p = 0.000) and stria during pregnancy (p = 0.008) (Table 3). No significant differences were found regarding recurrent vaginal infections (p = 0.800), and recurrent urinary infections (p = 0.630).

Smoking, caffeine consumption > 2 cups/day, body mass index (BMI ≥ 25 kg/m^2) and ≥ 10 kg increase in body weight not due to pregnancy were evaluated as lifestyle factors for UI. The presence of these lifestyle factors differed significantly (p = 0.000) between incontinent and control groups, except for smoking (p = 0.315) (Table 4).

Table 2 Comparison of obstetric characteristics between groups

n = 768		Incontinent group		Control group		χ^2	p
		n	%	n	%		
Number of pregnancy (reached over 8–9months)	0	23	6.3	75	18.7	54.996	0.000*
	1	41	11.2	63	15.7		
	2	111	30.2	70	17.5		
	3	101	27.5	64	16.0		
	≥ 4	91	24.8	129	32.2		
Parity	nulliparous	21	5.7	70	17.5	25.261	0.000*
	parous	346	94.3	331	82.5		
Number of births	0	21	5.7	70	17.5		
	1	36	9.8	61	15.2		
	2	120	32.7	74	18.5	57.373	0.000*
	3	100	27.2	65	16.2		
	≥ 4	90	24.5	131	32.7		
Number of vaginal birth	0	35	9.5	110	27.4		
	1	38	10.4	38	9.5		
	2	120	32.7	67	16.7	64.548	0.000*
	3	90	24.5	63	15.7		
	≥ 4	84	22.9	123	30.7		
Number of curettage	0	180	49.0	304	75.8		
	1	78	21.3	56	14.0	64.829	0.000*
	≥ 2	109	29.7	41	10.2		
Mode of the first delivery (n = 677)[a]	vaginal	329	95.1	289	87.3	12.856	0.000*
	cesarean	17	4.9	42	12.7		
Place of first vaginal delivery (n = 623)[b]	home birth	100	30.1	126	43.3	11.651	0.001*
	hospital birth	232	69.9	165	56.7		
Episiotomy in first vaginal delivery (n = 623)[b]	yes	152	45.8	100	34.4	8.394	0.004*
	no	180	54.2	191	65.6		
Fundal pressure in first vaginal delivery (n = 623)[b]	yes	124	37.3	52	17.9	29.032	0.000*
	no	208	62.7	239	82.1		
Perineal tears in first vaginal delivery (n = 623)[b]	yes	71	21.4	36	12.4	8.858	0.003*
	no	261	78.6	255	87.6		

*[a]among parous women; [b]among women who had at least one vaginal birth; *p ≤ 0.05; χ^2 – Chi square*

Comparison of personal and family history of incontinence between incontinent and control groups revealed statistically significant differences in relation to urinary incontinence in childhood (p = 0.035), presence of fecal incontinence (p = 0.000), history of incontinence in mothers (p = 0.000), and history of incontinence in relatives (sister, aunt, etc) (p = 0.000) (Table 4).

Table 3 Comparison of gynecological/medical characteristics between groups

n = 768		Incontinent group		Control group		χ^2	p
		n	%	n	%		
Menopause	yes	157	42.8	131	32.7	8.358	0.005*
	no	210	57.2	270	67.3		
Hormone replacement therapy (n = 288)	yes	6	3.8	15	11.5	6.148	0.021*
	no	151	96.2	116	88.5		
Gynecological operation	yes	85	23.2	56	14.0	10.811	0.001*
	no	282	76.8	345	86.0		
Pulmonary disease	yes	38	10.4	19	4.7	8.796	0.004*
	no	329	89.6	382	95.3		
Diabetes mellitus	yes	49	13.4	25	6.2	11.148	0.001*
	no	318	86.6	376	93.8		
Hypertension	yes	113	30.8	93	23.2	5.636	0.018*
	no	254	69.2	308	76.8		
Medicine use	yes	183	49.9	136	33.9	20.071	0.000*
	no	184	50.1	265	66.1		
Constipation	yes	122	33.2	101	25.2	6.035	0.017*
	no	245	66.8	300	74.8		
Flatus	yes	159	43.3	109	27.2	21.978	0.000*
	no	208	56.7	292	72.8		
Hemorrhoids	yes	131	35.7	93	23.2	14.499	0.000*
	no	236	64.3	308	76.8		
Herniated disc / varicose veins	yes	102	27.8	49	12.2	29.423	0.000*
	no	265	72.2	352	87.8		
Stria during pregnancy	yes	252	72.8	209	63.1	7.312	0.008*
	no	94	27.2	122	36.9		

$p \leq 0.05$; χ^2 – Chi square

Table 4 Comparison of lifestyle factors and personal/family history of UI between groups

n = 768		Incontinent Group		Control Group		χ^2	p
		n	%	n	%		
Smoking	yes	77	21.0	72	18.0	1.122	0.315
	no	290	79.0	329	82.0		
Caffeine consumption (coffee, tea, cola)	≤ 2 cups/day	47	12.8	198	49.4	117.96	0.000*
	> 2 cups/day	320	87.2	203	50.6		
Body Mass Index	≥ 25 kg/m^2	249	81.1	66	39.8	82.805	0.000*
	< 25 kg/m^2	58	18.9	100	60.2		
≥ 10 kg. increase in body weight except pregnancy	yes	169	46.0	88	21.9	50.003	0.000*
	no	198	54.0	313	78.1		
Urinary incontinence in childhood	yes	60	16.3	44	11.0	4.731	0.035*
	no	307	83.7	357	89.0		
Fecal incontinence	yes	25	6.8	3	0.7	20.058	0.000*
	no	342	93.2	398	99.3		
Incontinence in mother	yes	120	32.7	63	15.7	30.464	0.000*
	no	247	67.3	338	84.3		
Incontinence in relatives (sister, aunt, etc)	yes	99	27.0	56	14.0	20.135	0.000*
	no	268	73.0	345	86.0		

$p \leq 0.05$; χ^2 – Chi square

Among the variables (about socio demographic, obstetrical, gynecological/medical, lifestyle and incontinence history) assessed using bivariate analysis, only the variables that showed significant differences in significance tests (chi square) were included in the model for multivariate logistic regression as potential risk factors for UI. According to the results of forward stepwise logistic regression analysis, number of births ("1-birth" OR = 38.8; CI = 2.2–669.5; "2-births" OR = 20.1; CI = 1.2–327.4; "≥ 3 births" OR = 35.0; CI = 1.9–621.8), body mass index (BMI ≥ 25 kg/m^2; OR = 7.2; CI = 2.1–24.1), and history of incontinence in mothers (OR = 7.2; CI = 1.3–37.2) were identified as the most important risk factors for urinary incontinence in our study group (Table 5).

Table 5 Multivariate logistic regression analysis of risk factors for urinary incontinence

		B	S.E.	Wald	df	Sig.	Exp(B)	95% CI for Exp(B)	
								Lower	Upper
Number of birth*	1 birth	3.659	1.453	6.342	1	0.012	38.821	2.251	669.578
	2 births	3.001	1.424	4.442	1	0.035	20.101	1.234	327.419
	≥ 3 births	3.556	1.468	5.871	1	0.015	35.025	1.973	621.828
Body Mass Index	≥ 25 kg/m^2	1.976	0.618	10.233	1	0.001	7.211	2.149	24.192
History of incontinence in mother		1.975	0.838	5.551	1	0.018	7.205	1.394	37.253

**Reference group for comparing number of birth was having no birth; **p ≤ 0.05; B – Unstandardized Beta; S.E. – Standart Error; df – degrees of freedom; Sig. – significance; Exp. (B) – odds ratio*

Discussion

Urinary incontinence (UI) is highly prevalent in women and stress UI symptoms can impose a significant burden on the women who have them. Multiple predictors such as pregnancy-related factors, menopause, high body mass index, hysterectomy, and age have been found to be associated with UI (Menezes, Pereira, Hextall, 2010). In this case-control study, we examined the risk factors associated with UI in 768 Turkish women between the ages of 20–80 years. Obesity (BMI ≥ 25 kg/m^2) (OR = 7.2; CI = 2.1–24.1), number of births ("1-birth" OR = 38.8; CI = 2.2–669.5; "2-births" OR = 20.1; CI = 1.2–327.4; "≥ 3 births" OR = 35.0; CI = 1.9–621.8), and history of incontinence in mother (OR = 7.2; CI = 1.3–37.2) increased the likelihood of having UI.

Age

Aging has been reported as an important risk factor for developing UI (Norton, 2010). Prevalence of incontinence increases with age, and etiology is multifactorial. Aging causes a number of changes in urinary tract physiology, particularly due to diseases outside the urinary tract, and age-related structural changes in the urinary tract (Menezes, Pereira, Hextall, 2010). In this study, 80.3% of incontinent women were over 40 years of age. The incontinent group were statistically older than the continent group.

Pregnancy and childbirth

For years, pregnancy and childbirth have been considered to be major contributors to UI in female (Menezes, Pereira, Hextall, 2010). Many peripartum factors have also been found to increase the risk of post partum urinary and anal incontinence. These include factors related to obstetric trauma (vaginal delivery, forceps delivery, and episiotomy) (Danforth, 2006; Yu et al., 2009; Menezes, Pereira, Hextall, 2010). In a recent study, Dolan and Hilton (2010) evaluated the relationship between obstetric factors and pelvic floor dysfunction, reporting that UI and fecal incontinence risk were lower after first delivery by cesarean section. The EPINCONT study enrolled 15,307 women, and demonstrated that stress UI symptoms are more frequent after vaginal delivery than after cesarean section (Rortveit et al., 2003). Ham et al. (2009) demonstrated that the association of vaginal delivery with UI risk increased with the number of deliveries: 2.75 and 2.42 of adjusted OR increased risk in women with two, and more than two vaginal deliveries, respectively, compared with women with no or one vaginal delivery (Ham et al., 2009). When the continent and incontinent groups were compared for obstetrical factors in the current study, incontinent women were found to be parous, and had a vaginal delivery in a hospital setting for their first child. In addition, the rates of episiotomy, fundal pressure, and perineal tears in first vaginal delivery were found to be significantly higher in incontinent women. Also, the number

of pregnancies, number of births, number of vaginal births, and number of curettages were statistically higher in incontinent women. According to results of forward stepwise logistic regression analysis, number of births is identified as the most important risk factor for UI in our study group. These findings regarding obstetrical risk factors are compatible with the literature.

Menopause and hormone replacement therapy

The pathophysiology behind menopause and development of urinary incontinence is not well understood. Menezes et al.'s review (2010) article reported that several studies have tried to prove the benefits of hormone replacement therapy for incontinence, yet have concluded that it does not protect against UI. The recent Cochrane Review of thirty-nine trials concluded that local estrogen treatment may improve or cure incontinence. The presence of estrogen receptors has been demonstrated in the lower urinary tract. Lack of estrogen during menopause causes atrophic changes to the mucosa of the urethra, which is likely to weaken the bladder muscles, and is thus thought to be cause of urinary incontinence (Menezes, Pereira, Hextall, 2010). Barlow et al. (1997) found that 48.5% of postmenopausal women had been affected by urogenital symptoms. Similarly, in the current study, the number of menopausal women was higher in the incontinent group, while the number of women receiving hormone replacement therapy was lower.

Gynecological operations and medical conditions

Menezes et al. (2010) reported that altered bladder function is one of the common sequelea following pelvic surgery (Menezes, Pereira, Hextall, 2010). Kocak et al. (2005) found that hypertension is a risk factor for UI among Turkish women. In the current study, the evaluation of continent and incontinent groups in relation to gynecological/medical characteristics demonstrated that the number of women who had a history of gynecological operations, pulmonary disease, diabetes mellitus, hypertension, medicine use, constipation, fecal incontinence, flatus, hemorrhoids, herniated discs/varicose veins, and stria during pregnancy were higher in the incontinent group.

Caffeine consumption and smoking

Smoking and caffeine consumption have been reported to increase urinary symptoms due to the association between smoking and increased abdominal pressure, and the diuretic effects of caffeine consumption, respectively. However, Hsieh et al. (2008) found no relationship between UI and smoking. Similarly, no significant difference was found between groups regarding smoking in the current study. On the other hand, caffeine consumption > 2 cups/day was significantly higher in incontinent women.

Obesity

Obesity is a risk factor for UI. Several cross-sectional studies have demonstrated an association between obesity and UI (Dwyer, Lee, Hay, 1988; Hannestad et al., 2003; Ozerdoğan, Beji, Yalçin, 2004; Danforth et al., 2006; Hsieh et al., 2008; Ham et al., 2009; Yu et al., 2009; Dolan, Hilton, 2010; Thom et al., 2010). Dolan and Hilton (2010) found that obese women were at highest risk and had the most severe symptoms. Similarly, the ratio of BMI ≥ 25 was significantly higher in incontinent women in this study. In addition, according to the results of forward stepwise logistic regression analysis, BMI ≥ 25 was identified as one of the most important risk factors for UI in our study group.

Personal and family history

The history of UI in first-degree relatives has been reported to increase the risk of UI four-six times (Norton, 2010). The current study supports this finding, as the number of women with a history of incontinence in their mothers and relatives (sister, aunt, etc) was found to be significantly higher in the incontinent group. Kocak et al. (2005) found that a history of childhood nocturnal enuresis is a risk factor for UI among Turkish women. Similarly, the number of women with a history of UI in childhood was found to be higher in incontinent Turkish women in this study. In addition, results of forward stepwise logistic regression analysis identified a history of incontinence in patients' mothers as a significant risk factor for UI in our study group.

Conclusion

The most significant risk factors of urinary incontinence in the sample group were identified to be: the number of births as a potential obstetric risk factor, obesity as a lifestyle factor, and "history of incontinence in the mother" as a familial factor.

Identification of the risk factors is essential for clinical decisions and the development of a preventive strategy to decrease the incontinence rate in Turkish women. For example, increased awareness among women at risk may help lifestyle behavior modification and improve women's awareness of the possibility of prevention and treatment.

The current study identified risk factors for urinary incontinence in the sample group. The use of multivariate analysis, in addition to significance

tests comparing case and control groups, is an important strength of this study. However, he results of this hospital-based study provide limited evidence compared to population-based epidemiological studies. Although the sample was recruited from a large tertiary teaching hospital in Istanbul, results are not representative of all women in Turkey, due to the regional differences.

Ethical aspects and conflict of interest

Written ethical approval was obtained from the ethical review board of the hospital. Participants were informed about the aims of the study and their verbal consent was obtained prior to the administration of the questionnaire. No funding was received for this study, and there is no conflict of interest.

Acknowledgements

No funding was received for this study.

Author contribution

Conception and design (NKB, ÖY), data analysis and interpretation (İG, ŞG, HEA), writing the manuscript (GO), critical revision of the manuscript (NKB, İG, GO), final manuscript (GO).

References

Abrams P, Cardozo L, Fall M, Griffiths D, Rosier P, Ulmsten U, Van Kerrebroeck P, Victor A, Wein A; Standardisation Sub-Committee of the International Continence Society. The standardization of terminology in lower urinary tract function: report from the standardization sub-committee of the International Continence Society. *Urology*. 2003;61(1):37–49.

Abrams P, Andersson KE, Birder L et al. *Evaluation and treatment of urinary incontinence, pelvic organ prolapse and faecal incontinence.* 2009 [cited 2018 Jan 10]. Avaliable from: https://www.ics.org/Publications/ICI_4/files-book/recommendation.pdf

Barlow DH, Cardozo LD, Francis RM, Griffin M, Hart DM, Stephens E, Sturdee DW. Urogenital ageing and its effect on sexual health in older British women. *British Journal of Obstetrics and Gynaecology*. 1997;104(1):87–91.

Danforth KN, Townsend MK, Lifford K, Curhan GC, Resnick NM, Grodstein F. Risk factors for urinary incontinence among middle-aged women. *American Journal of Obstetrics and Gynecology*. 2006;194(2):339–345.

Dolan LM, Hilton P. Obstetric risk factors and pelvic floor dysfunction 20 years after first delivery. *International Urogynecology Journal.* 2010;21(5):535–544.

Dwyer PL, Lee ET, Hay DM. Obesity and urinary incontinence in women. *British Journal of Obstetrics and Gynaecology*. 1988;95(1):91–96.

Ham E, Choi H, Seo JT, Kim HG, Palmer MH, Kim I. Risk factors for female urinary incontinence among middle-aged Korean women. *Journal of Women's Health (Larchmt).* 2009;18(11):1801–1806.

Hannestad YS, Rortveit G, Daltveit AK, Hunskaar S. Are smoking and other lifestyle factors associated with female urinary incontinence? The Norwegian EPINCONT Study. *British Journal of Obstetrics and Gynaecology*. 2003;110(3):247–254.

Hsieh CH, Lee MS, Lee MC, Kuo TC, Hsu CS, Chang ST. Risk factors for urinary incontinence in Taiwanese women aged 20-59 years. *Taiwan Journal of Obstetrics and Gynecology*. 2008;47(2):197–202.

Hunskaar S, Lose G, Sykes D, Voss S. The prevalence of urinary incontinence in women in four European countries. *British Journal of Urology International*. 2004;93(3):324–330.

Kılıç M. Incedence and risk factors of urinary incontinence in women visiting Family Health Centers. *Springerplus.* 2016;5(1):1331.

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. *European Urology*. 2005;48(4):634–641.

Menezes M, Pereira M, Hextall A. Predictors of female urinary incontinence at midlife and beyond. *Maturitas.* 2010;65(2):167–171.

Mota RL. Female urinary incontinence and sexuality. *International Brazilian Journal of Urology.* 2017;43(1):20–28.

Norton P. Kadın üriner inkontinans: Epidemiyoloji ve değerlendirme. In: Ayhan A, editor. *Danforth's obstetrics and gynecology.* Istanbul: Güneş Tıp Kitapevi; 2010. p. 453–456. (in Turkish)

Ozerdoğan N, Beji NK, Yalçin O. Urinary incontinence: its prevalence, risk factors and effects on the quality of life of women living in a region of Turkey. *Gynecologic and Obstetric Investigation*. 2004;58(3):145–150.

Rortveit G, Daltveit AK, Hannestad YS, Hunskaar S; Norwegian EPINCONT Study. Urinary incontinence after vaginal delivery or caesarean section. *New England Journal of Medicine*. 2003;348(10):900–907.

Thom DH, Brown JS, Schembri M, Ragins AI, Subak LL, Van Den Eeden SK. Incidence of and risk factors for change in urinary incontinence status in a prospective cohort of middle-aged and older women: The Reproductive Risk of Incontinence Study in Kaiser (RRISK). *Journal of Urology*. 2010;184(4):1394–1401.

Yu PL, Shi J, Liu XR, Xia CW, Liu DF, Wu ZL, Sun ZQ. Study on the prevalence of urinary incontinence and its related factors among elderly in rural areas, Jixian country, Tianjin. *Zhonghua Liu Xing Bing Xue Za Zhi*. 2009;30(8):766–771.

