Urinary incontinence among Saudi women: prevalence, risk factors, and impact on quality of life

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Abstract. – **OBJECTIVE:** This study was done to determine UI prevalence among women in Saudi Arabia and identify the associated risk factors.

PATIENTS AND METHODS: This cross-sectional study was conducted from January 2020 to September 2020 in Saudi women who came to the Urology Department at King Khalid Hospital, Majmaah, Saudi Arabia. In the age group of 20 to 50 years, Saudi women who are not seriously ill or pregnant or in the postnatal period or diagnosed with pelvic organ prolapse were included as participants. A semi-structured questionnaire modified from the International Consultation Incontinence Questionnaire-Short Form was used to collect data on frequency, the severity, consequences, and impact of UI on quality of life. Data were analyzed by SPSS 23 (IBM, Armonk, NY, USA) with the calculation of mean and standard deviation for quantitative variables. Logistic regression analyses were applied to determine the predictors of UI.

RESULTS: A total of 451 participants were included in the final analysis. The mean age of the study population was 42.52 years (SD 11.75). Among risk factors, 45 (10%) had diabetes, 56 (12.4%) had hypertension, 36 (8%) had asthma, 80 (17.7%) had UTI/STDs. Out of 451 participants, 188 (41.7%) had urinary incontinence (UI). Sociodemographic characteristics and risk factors like family income, urinary and genital infections (UTI/STDs), pelvic/uterine prolapse, any other disease, and cough were found to have a statistically significant association with urinary incontinence (*p*-value <0.05).

CONCLUSIONS: The prevalence of UI was 41.7% among the study population. The various risk factors associated with UI are older age, parity, multiple vaginal deliveries, hypertension, history of asthma, and chronic cough. Poor health-seeking behavior was observed. Creating awareness and the need for early diagnosis with timely intervention is recommended.

Key Words:
Urinary incontinence, Risk factors, Women, Cough, Urinary tract infections.

Introduction

Urinary incontinence (UI) is a common and frequently underreported condition that can cause a significant impact on quality of life (QoL). As defined by the International Continence Society, UI is a "complaint of any involuntary leakage of urine and which is a social or hygienic problem"[1]. UI symptoms are considered a stigma in many population[2]. The condition occurs in both males and females but is more common among females. Incontinence among women is attributed to bladder dysfunction and pelvic floor muscle weakening[3]. These arise due to pregnancy and childbirth or during menopause. There are two types of UI viz stress incontinency and urge incontinence. Per the International Urogynecological Association (IUGA) and the International Continence Society (ICS) definition, urine leakage associated with coughing, sneezing, or another exertion is termed stress incontinence. Sudden urge to void urine, which is challenging to retain, is termed urgency incontinence[4]. They often coexist and are termed as mixed incontinence. The symptoms caused due

to incontinence are highly common and have a significant impact on life quality and are related to personal and social expenditure[5-8].

Often UI is neglected as a disease and considered a normal aging process and as a natural effect of childbirth[9]. Also, women often delay seeking health care professionals, and even if they do, only a small population receives effective therapy[10,11]. The estimated disease burden is more than 200 million worldwide and more common in females[12]. Many studies[13-15] from European and North American populations have reported a prevalence of 8.5% to 58%. In previous studies[16,17] done among Saudi women, the prevalence of UI ranged from 30 to 41.4%. Various risk factors are associated with UI. Among those significant ones is women age more than 35 years, obesity, and high parity[18]. Cigarette smoking, diabetes mellitus, long-term coughing, and increased dietary caffeine are other recognizable risk factors for UI[19,20].

Saudi women's population contrasts with Western women both culturally as well as behavior-wise. Thus, there is a need to study the prevalence of UI and various factors that play a role in this specific population. In addition, even though few of the risk factors for incontinence have been studied in the past, there are many other vital predictors of incontinence, which remain un-investigated. Hence, this study was done to determine UI prevalence among women in Saudi Arabia and identify the associated risk factors.

Patients and Methods

A cross-sectional study was done at the Department of Urology, King Khalid Hospital, Majmaah, Saudi Arabia, between January 2020 to September 2020. Healthy non-pregnant women of 20-50 years of age seeking care for other ailments were invited for the study participation. Informed written consent was obtained, and data confidentiality was maintained. This study was approved by the Institutional Review Board at King Fahad Medical City (IRB Log No. 20-226E). Postnatal women and women with severe morbidities were excluded from the study. In a study center, a trained investigator identified women patients who fulfilled the inclusion criteria. After getting consent, the participants were asked to complete a self-administered semi-structured questionnaire. The questionnaire collected data related to sociode-

mographic profile, smoking status, history of constipation more than one month or cough, and other risk factors such as diabetes mellitus, systemic hypertension, bronchial asthma, or recurrent urinary tract infections. The obstetric data section contained details regarding women's age at first birth, the total number of pregnancies, and several spontaneous or assisted vaginal and cesarean section (CS) deliveries in their lifetime. The second part of the questionnaire had questions regarding health-seeking behavior.

Statistical Analysis

Urinary incontinence was considered as the primary outcome variable. The risk factor was regarded as the primary explanatory variable. Frequency and proportion were done for categorical variables. Mean, and standard deviation was calculated for some of the quantitative variables. The Chi-square test was used to test statistical significance. Both univariate and multivariate logistic regression analyses were performed to determine the predictors for the primary outcome variable. Crude and adjusted odds ratio along with 95% CI was presented. Statistical significance was considered when p-value <0.05. Data were analyzed by SPSS 23, (IBM, Armonk, NY, USA)[21].

Results

A total of 451 participants were included in the final analysis. The mean age of the study population was 42.52 years (SD 11.75), of which the majority were married (83.1%), graduates (63.2%), and with family income >10000 R (69.0%). Among risk factors, 45 (10%) had diabetes, 56 (12.4%) had hypertension, 36 (8%) had asthma, 80 (17.7%) had UTI/STDs, 46 (10.2%) had pelvic and uterine prolapse, 118 (26.2%) had any other diseases, 110 (24.4%) had constipation lasting for more than one month, 52 (11.5%) had a cough lasting more than a month, and 14 (3.1%) were smokers.

The mean number of pregnancies was 5.61 (SD 2.92) among the women who had previously been pregnant in the study population. 41 (10.3%) of the study population had been pregnant for ≥10 times. The mean age at first pregnancy was 23.36 years (SD 4.46). 42 (10.5%) had ≥7 vaginal deliveries, 23 (5.8%) had ≥4 caesarean sections and 19 (4.8%) had ≥4 abortions. Out of 400 participants,

226 (56.5%) had an episiotomy during the last delivery, and 80 (20%) had a labor that persisted for >24 hours.

Out of 451 participants, 188 (41.7%) had urinary incontinence (UI). Of the women who had previously been pregnant, 169 (42.25%) had UI. Among women with UI, 49.5% had a small leakage, 18.1% had a medium amount of leakage, and 4.3% had leakage in large quantities. Most of the participants who had urinary leakage mentioned that urinary leakage mostly occurs when you cough or sneeze (37.2%) (Table I).

Sociodemographic characteristics and risk factors like age (in years), marital status, educational level, occupation, diabetes, pelvic/uterine prolapse, smoking, and constipation were found to have no statistically significant association with urinary incontinence (p-value >0.05). Sociodemographic characteristics and risk factors like family income, urinary and genital infections (UTI/STDs), pelvic/uterine prolapse, any other disease, and cough were found to have a statistically significant association with urinary incontinence (p-value <0.05) (Table II).

Obstetric characteristics like years since last pregnancy, age at first pregnancy (in a year), number of pregnancies, number of abortions, number of cesarean sections, episiotomy during last delivery, labor persisted for >24 hours, and weight for largest baby (in kg) was found to have no statistically significant association with urinary incontinence (p-value >0.05). There was a statistically significant association between the number of normal vaginal deliveries and urinary incontinence (p-value <0.05). Women with normal deliveries ≥7 were found to have a higher proportion of urinary incontinence (Table III).

Table IV shows binary logistic regression for urinary incontinence in the study population. Both univariate and multivariable binary logistic regression was used to examine the sociodemographic and risk factors associated with urinary incontinence. Both univariate and multivariable models showed that occupation, urinary and genital infections (UTI / STDs), pelvic/uterine prolapse, and any other disease were significant predictors of urinary incontinence. In univariate analysis, family income and cough were also found to be significant.

From the multivariable model, salaried women and teachers were 2.31 times (aOR 2.31, 95% CI 1.01-5.28) and 2.13 times (aOR 2.13, 95% CI 1.08-4.21) respectively more likely to develop urinary

Table I. Prevalence of urinary incontinence and characteristics of urinary leakage.

Characteristics	Frequency	Percentage
Urinary Incontinence (UI) present? (451)		
Yes	188	41.7%
No	263	58.3%
UI present in women who had previously been pregnant? (400)		
Yes	169	42.25%
No	231	57.75%
Frequency of UI (188)		
About once a week or less.	61	32.4%
From two to three times a week	43	22.9%
About once a day	47	25.0%
Several times a day	25	13.3%
At all times	12	6.4%
Amount of leakage (188)		
None	53	28.2%
Small amount	93	49.5%
Medium amount	34	18.1%
Large quantity	8	4.3%
When does urinary leakage occur? * (188)		
Before reaching the bathroom.	69	36.7%
When you cough or sneeze.	70	37.2%
During sleep.	5	2.7%
With vigorous physical movement and during exercise	36	19.1%
After urinating and wearing clothes.	11	5.9%
For no apparent reason.	13	6.9%
All the time.	11	5.9%

*Multiple response variables

Table II. Association of urinary incontinence with socio-demographic characteristics/risk factors (N = 451).

Characteristics/Risk factors		UI present (n = 188)	UI absent (n = 263)	p-value
Age group	<=30 years	37 (43.5%)	48 (56.5%)	0.707
	31 to 40 years	49 (37.4%)	82 (62.6%)	
	41 to 50 years	60 (43.5%)	78 (56.5%)	
	> 50 years	42 (43.3%)	55 (56.7%)	
Marital status	Married	154 (41.1%)	221 (58.9%)	0.435
	Single	14 (36.8%)	24 (63.2%)	
	Divorced	9 (47.4%)	10 (52.6%)	
	Widow	11 (57.9%)	8 (42.1%)	
Educational level	Primary	20 (52.6%)	18 (47.4%)	0.319
	Secondary	48 (45.7%)	57 (54.3%)	
	Graduate	111 (38.9%)	174 (61.1%)	
	Postgraduate	9 (39.1%)	14 (60.9%)	
Occupation	Housewife	26 (32.1%)	55 (67.9%)	0.180
	Salaried	23 (50.0%)	23 (50.0%)	
	Teacher profession	53 (44.5%)	66 (55.5%)	
	Unemployed	55 (45.5%)	66 (54.5%)	
	Other	31 (36.9%)	53 (63.1%)	
Family income	< 5000 R	31 (52.5%)	28 (47.5%)	**0.031***
	5000-10000 R	40 (49.4%)	41 (50.6%)	
	> 10000 R	117 (37.6%)	194 (73.8%)	
Diabetes	Yes	20 (44.4%)	25 (55.6%)	0.692
	No	168 (41.4%)	238 (58.6%)	
Hypertension	Yes	21 (37.5%)	35 (62.5%)	0.497
	No	167 (42.3%)	228 (57.7%)	
Asthma	Yes	17 (47.2%)	19 (52.8%)	0.482
	No	171 (41.2%)	244 (58.8%)	
Urinary and genital infections (UTI / STDs)	Yes	53 (66.3%)	27 (33.8%)	**0.000***
	No	135 (36.4%)	236 (63.6%)	
Pelvic/uterine prolapse	Yes	30 (65.2%)	16 (34.8%)	**0.001***
	No	158 (39.0%)	247 (61.0%)	
Any other diseases	Yes	59 (50.0%)	59 (50.0%)	**0.033***
	No	129 (38.7%)	204 (61.3%)	
Smoking	Yes	6 (42.9%)	8 (57.1%)	0.928
	No	182 (41.6%)	255 (58.4%)	
Cough lasting more than a month	Yes	29 (55.8%)	23 (44.2%)	**0.029***
	No	159 (39.8%)	240 (60.2%)	
Constipation lasting for more than one month	Yes	50 (45.5%)	60 (54.5%)	0.356
	No	138 (40.5%)	203 (59.5%)	

*Statistically significant at $p < 0.05$

incontinence as compared to housewives. In addition, women with urinary and genital infections (UTI/STDs) were 3.99 times (aOR 3.99, 95% CI 2.25-7.07) more likely to develop urinary incontinence as compared to those without urinary and genital infections (UTI/STDs). In addition, women with pelvic/uterine prolapse were 3.21 times (aOR 3.21, 95% CI 1.56-6.59) more likely to develop urinary incontinence than those without pelvic/uterine prolapse. Finally, women with any other disease were 2.22 times (aOR 2.22, 95% CI 1.39-3.55) more likely to develop urinary incontinence than those without any other disease.

Out of 188 participants, 90 (20%) had taken medical advice for the problem. Out of these 90 participants, 49 (54.4%) had taken drugs, 27 (30%) had done Kegel exercises, and 14 (15.6%) had undergone surgery. Among people who did not seek medical advice for UI, 24 (24.5%) considered urinary incontinence a common disease and affects most women. There is no need to worry; 15 (15.3%) felt embarrassed to go to the doctor, 39(39.8%) expected to recover automatically, 20(20.4%) thought there was no cure for urinary incontinence (Table V).

Discussion

The study's findings showed that the mean age of women affected with UI was 42.52 ± 11.75. The prevalence of UI among the study partici-

Table III. Association of urinary incontinence with obstetric characteristics among Omani women who had previously been pregnant (N=400).

Characteristics		UI present (n = 169)	UI absent (n = 231)	*p*-value
Number of pregnancy	<=3	39 (38.6%)	62 (61.4%)	0.596
	4 to 6	64 (40.8%)	93 (59.2%)	
	7 to 9	48 (47.5%)	53 (52.5%)	
	> = 10	18 (43.9%)	23 (56.1%)	
Age at first pregnancy	< =20 years	54 (47.8%)	59 (52.2%)	0.348
	21 to 30 years	107 (40.4%)	158 (59.6%)	
	> = 31 years	8 (36.4%)	14 (63.6%)	
Number of normal vaginal deliveries	0	22 (47.8%)	24 (52.2%)	**0.022***
	1 to 3	45 (32.6%)	93 (67.4%)	
	4 to 6	79 (45.1%)	96 (54.9%)	
	> = 7	23 (56.1%)	18 (43.9%)	
Number of caesarean sections	0	101 (43.0%)	134 (57.0%)	0.498
	1 to 3	61 (43.0%)	81 (57.0%)	
	> = 4	7 (30.4%)	16 (69.6%)	
Years since last pregnancy	Currently Pregnant	10 (45.5%)	12 (54.5%)	0.987
	1 year	17 (41.5%)	24 (58.5%)	
	2 years	33 (41.3%)	47 (58.8%)	
	> 5 years	109 (42.4%)	148 (57.6%)	
Number of abortions	0	73 (39.5%)	112 (60.5%)	0.634
	1	46 (43.4%)	60 (56.6%)	
	2	28 (45.2%)	34 (54.8%)	
	3	15 (53.6%)	13 (46.4%)	
	> = 4	7 (36.8%)	12 (63.2%)	
Weight of largest baby in kg	< 4 Kg	147 (42.5%)	199 (57.5%)	0.809
	> = 4 Kg	22 (40.7%)	32 (59.3%)	
Episiotomy during last delivery	Yes	94 (41.6%)	132 (58.4%)	0.762
	No	75 (43.1%)	99 (56.9%)	
Labour persisted for >24 hours	Yes	35 (43.75%)	45 (56.25%)	0.761
	No	134 (41.9%)	186 (58.1%)	

*Statistically significant at *p* < 0.05

pants was 41.7%. The common risk factors were hypertension, asthma, urinary and genital infections (UTI/STDs), chronic cough. Among women with UI, 49.5% had a small leakage, and poor health-seeking behavior was observed among the study participants.

In this current study, the prevalence of UI was 41.7%. In previously done studies with the same definition and among women, the prevalence ranged from 35-37%[22,23]. In the current study, there was a statistically significant association between the number of vaginal deliveries and UI. This trend suggests the cumulative effect of vaginal delivery leading onto UI, and similar results were observed by Swash et al[24], where injury to the innervation of pelvic floor muscles increased in successive deliveries. Similar observations were made in other studies where women with more vaginal deliveries had a high risk of developing UI[16,18-20]. A similar observation was seen by Al-Badr et al[16] in a study among Saudi women. The study found the

prevalence of urinary incontinence was 41.4%, which was almost equal to the prevalence in the current study[16]. Various reports have been done among Saudi Arabia women; a cross-sectional study by Altaweel et al[25] showed that increasing age, parity, large baby, vaginal delivery, and diabetes were the various risk factors. A study by Ghafouri et al[26] showed that asthma was a significant risk factor for UI. Urinary leakage was the major complaint that affected their quality of life.

The current study showed that women with hypertension, asthma, urinary and genital infections (UTI/STDs), chronic cough were at higher odds of developing UI than women without morbidities. All these conditions cause a sudden and repeated increase in intraabdominal pressure, which leads to exhaustion of the pelvic floor muscles causing UI.

There was poor health-seeking behavior among the study population, and the most common reasons given were that it is a self-limiting, common

Table IV. Determinants of urinary incontinence (N=451).

Characteristics	Univariate model		Multivariable modell	
	cOR (95% CI)	*p*-value	aOR (95% CI)	*p*-value
Age group 31 to 40 years	0.78 (0.44-1.35)	0.369	0.76 (0.40-1.45)	0.413
Age group 41 to 50 years	1.00 (0.58-1.72)	0.994	0.81 (0.41-1.61)	0.551
Age group > 50 years	0.99 (0.55-1.78)	0.975	0.79 (0.35-1.74)	0.552
Marital status Single	0.84 (0.42-1.67)	0.614	0.64 (0.28-1.46)	0.289
Marital status Divorced	1.29 (0.51-3.25)	0.587	1.17 (0.43-3.18)	0.763
Marital status Widow	1.97 (0.78-5.02)	0.154	1.70 (0.59-4.89)	0.325
Educational level Secondary	0.76 (0.36-1.59)	0.465	1.20 (0.50-2.88)	0.679
Educational level Graduates	0.57 (0.29-1.13)	0.110	0.86 (0.36-2.02)	0.726
Educational level Postgraduate	0.58 (0.20-1.66)	0.308	0.97 (0.27-3.53)	0.968
Occupation Salaried	2.12 (1.01-4.45)	0.048*	2.31 (1.01-5.28)	0.046*
Occupation Teacher profession	1.70 (0.94-3.06)	0.078	2.13 (1.08-4.21)	0.030*
Occupation Unemployed	1.76 (0.98-3.17)	0.059	1.91 (0.98-3.72)	0.056
Occupation Other	1.24 (0.65-2.35)	0.517	1.23 (0.59-2.57)	0.578
Family Income 5000-10000 R	0.88 (0.45-1.72)	0.712	0.98 (0.46-2.10)	0.960
Family Income > 10000 R	0.54 (0.31-0.95)	0.034*	0.57 (0.29-1.14)	0.113
Diabetes	1.13 (0.61-2.11)	0.692	1.40 (0.62-3.20)	0.421
Hypertension	0.82 (0.46-1.46)	0.498	0.60 (0.28-1.27)	0.183
Asthma	1.28 (0.64-2.53)	0.483	1.19 (0.54-2.62)	0.670
Urinary and genital infections (UTI/STDs)	3.43 (2.06-5.71)	0.000*	3.99 (2.25-7.07)	0.000*
Pelvic/uterine prolapse	2.93 (1.55-5.55)	0.001*	3.21 (1.56-6.59)	0.002*
Any other diseases	1.58 (1.04-2.41)	0.034*	2.22 (1.39-3.55)	0.001*
Smoking	1.05 (0.36-3.08)	0.928	1.27 (0.39-4.18)	0.695
Cough lasting more than a month	1.90 (1.06-3.41)	0.030*	1.76 (0.91-3.42)	0.094
Constipation lasting for more than one month	1.23 (0.79-1.89)	0.357	1.29 (0.79-2.09)	0.309

Note: *Statistically significant at *p* < 0.05; cOR: Crude Odds Ratio; aOR: Adjusted Odds Ratio; < =30 years, Married, Primary level, Housewife and < 5000 R were taken as the reference category for the variables Age group, Marital status, Educational level, Occupation, and Family Income respectively.

condition that occurs to all women. This poor health-seeking behavior is attributed to the stigma associated with the disease. Successful prevention of UI depends on the early identification of risk factors in women. It is still unclear whether any genetic or environmental predisposition exists; however, recognizing this predisposition allows early intervention. In multi-parous women, the number of vaginal deliveries is a major modifiable risk factor for urinary incontinence, with traumatic delivery unmasking incontinence in predisposed women.

Table V. Medical advice-seeking behavior among Omani women with urinary incontinence.

Characteristics	Frequency	Percentage
Did you seek medical advice for your problem? (n=188)		
No	98	52.1%
Yes	90	47.9%
Treatment offered among those who sought medical advice for their UI (n = 90)		
Drugs	49	54.4%
Kegel exercises	27	30.0%
Surgery	14	15.6%
Reasons for not seeking medical advice for UI (n =98)		
Urinary incontinence is a common disease and affects most women; . there is no need to worry	24	24.5%
I feel embarrassed to go to the doctor	15	15.3%
I expect to recover automatically	39	39.8%
I think there is no cure for urinary incontinence	20	20.4%

The limitation of this study is a questionnaire-based study with no physical examination. Therefore, large-scale community-based studies are recommended in the future to find out the hidden portion of the iceberg.

Conclusions

The current study showed a 41.7% prevalence of urine incontinence among Saudi women. The associated risk factors of UI were older age, parity, multiple vaginal deliveries, hypertension, history of asthma, and chronic cough.

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