

Urinary Incontinence Among Omani Women

Prevalence, risk factors and impact on quality of life

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سلس البول لدى النساء العمانيات مدي انتشاره وعوامل الخطر والتأثير على جودة الحياة

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ABSTRACT: Objectives: Urinary incontinence (UI) in women is a common health problem which can have a negative impact on quality of life (QOL). This study aimed to determine the prevalence, risk factors and impact of UI on the QOL of Omani women attending primary healthcare centres in Muscat, Oman. **Methods:** This cross-sectional study was conducted at three primary healthcare centres in Muscat from April to August 2018. Women who were 20–50 years of age, not pregnant, not in the six-month postnatal period, not seriously ill and not diagnosed with pelvic organ prolapse were included. A self-administered questionnaire using the International Consultation Incontinence Questionnaire-Short Form was used to evaluate the frequency, severity and impact of UI on QOL. **Results:** A total of 1,070 women were included in this study (response rate = 92.5%). The mean age was 31.39 ± 7.64 years. UI was reported by 369 (34.5%) women, of whom 182 (49.3%) had stress UI, 97 (26.3%) had urgency UI, 88 (23.8%) had mixed UI and two (0.5%) had other UI. Age, body mass index (BMI), having been married or employed, hypertension, cough, constipation and vaginal or assisted vaginal delivery during the previous birth were significant risk factors for UI. Only 41 (11.1%) out of the 369 women with UI had ever sought medical advice despite the fact that more than two thirds of the women with UI reported negative effects on their QOL. **Conclusion:** UI is a common medical problem in Oman. Several risk factors, including age and BMI, were identified. Despite its negative consequences for QOL, women were found to be reluctant to seek medical attention for the condition.

Keywords: Urinary Incontinence; Prevalence; Risk Factors; Quality of Life; Oman.

المخلص: الهدف: يعد سلس البول لدى النساء مشكلة صحية شائعة يمكن أن يكون لها تأثير سلبي على جودة الحياة تهدف هذه الدراسة إلى تحديد مدى انتشار سلس البول وأسبابه ومدى تأثيره على جودة الحياة لدى النساء العمانيات المترددات على مراكز الرعاية الصحية الأولية في محافظة مسقط في سلطنة عمان. **الطريقة:** أجريت هذه الدراسة المستعرضة في ثلاثة مراكز للرعاية الصحية الأولية في مسقط من أبريل إلى أغسطس 2018 وشملت النساء اللواتي تتراوح أعمارهن بين 20 و 50 عامًا، ولسن حوامل، أو في فترة ستة أشهر ما بعد الولادة، أو مصابات بأمراض خطيرة أو يعانين من مرض هبوط الحوض. الدراسة استخدمت النسخة العربية المعبأة ذاتيا للنموذج الدولي لسلس البول لجمع البيانات. **النتائج:** شاركت في الدراسة 1,070 امرأة (بمعدل استجابة = 92.5%) وبمتوسط عمر 31.39 ± 7.6 سنة حيث أظهرت الدراسة أن 369 امرأة يعانين من سلس البول بنسبة (34.5%)، منهن 182 امرأة بنسبة (49.3%) يعانين من سلس البول الإجهادي (stress UI)، و 97 لديهن سلس البول الإلحاحي (urge UI) أي بنسبة (26.3%)، بينما 88 امرأة بنسبة (23.8%) يعانين من النوع المختلط mixed IU و 2 امرأة بنسبة (0.5%) لديهن سلس البول لأسباب أخرى. وتشير الدراسة بأن العمر ومؤشر كتلة الجسم (BMI) وارتفاع ضغط الدم والسعال والإمساك والولادة المهبلية وكون المرأة متزوجة أو موظفة أو استخدام أدوات مساعدة خلال اخر ولادة من العوامل الخطرة للإصابة بمرض سلس البول. كما أشارت الدراسة أن 41 امرأة فقط بنسبة (11.1%) من أصل 369 امرأة ممن يعانين من سلس البول قد طلبن المشورة الطبية على الرغم من أن أكثر من ثلثي النساء ذكرن وجود آثار سلبية على حياتهن. الخلاصة: سلس البول مشكلة طبية شائعة في سلطنة عمان لها العديد من المسببات أهمها العمر ومؤشر كتلة الجسم، وعلى الرغم من عواقبها السلبية على جودة الحياة إلا أن أغلب النساء يترددن في طلب المشورة الطبية.

الكلمات المفتاحية: سلس البول؛ ح انتشار؛ عوامل الخطر؛ جودة الحياة؛ سلطنة عمان.

ADVANCES IN KNOWLEDGE

- As this study is the first of its type conducted in Oman, it will increase women's awareness of urinary incontinence (UI).
- This study will enhance knowledge of the detrimental effects of UI on quality of life (QOL).
- This study will elaborate on the health-seeking behaviour for UI to detect any misconceptions and myths about the condition.

APPLICATION TO PATIENT CARE

- In light of the finding that so few women with UI seek medical help for the condition, a screening programme for UI in women with risk factors should be implemented at the primary care level. Those with UI should be offered proper treatment that corresponds to the severity of their condition. In this way, the detrimental effects of UI on QOL might be attenuated by early detection and treatment.
- Misconceptions about UI found by this study should be addressed at the primary care level, which will lead to better QOL.

URINARY INCONTINENCE (UI) IS DEFINED as any involuntary loss of urine.¹ It is a common problem but is underreported, underdiagnosed and undertreated.² More than 250 million women are affected worldwide and this number is expected to increase to more than 300 million over the coming years.³ The prevalence of UI varies by country, ranging from 4.8–58.4% with a median prevalence of 27.6%.⁴ Studies conducted in the other Gulf Cooperative Council countries (i.e. Qatar, Saudi Arabia and Kuwait) revealed UI prevalence rates of 20.7%, 41.4% and 54.5%, respectively.^{5–7} This wide variation in the estimate of prevalence could be attributed to differences in the research methodologies used. The burden of UI has increased over time and is expected to increase more in the developing regions of Africa, South America and Asia than in other regions of the world.³

Studies have identified increasing age, body mass index (BMI) and the number of deliveries as significant risk factors for developing UI.⁸ Despite the positive association between age and UI, studies have shown that UI is also common in middle-aged and younger groups.^{9,10}

UI has been reported to have negative effects on QOL.¹¹ A study conducted in Turkey revealed that 87.2% of women with UI stated that it had a negative impact on their QOL.¹¹ Surprisingly, only a small percentage of women with this condition seek medical help or advice.⁶ This finding might be related to common misunderstandings towards UI such as the belief that “there is no treatment available” and that it is “a common problem that everyone woman faces”.¹²

To the best of the authors’ knowledge, no previously published studies have examined the prevalence of and risk factors associated with UI in Oman. Hence, this study aimed to determine the prevalence of UI and identify its subtypes. In addition to identifying associated risk factors, this study assessed the impact of UI on QOL in women in Oman.

Methods

This cross-sectional study was conducted at three primary healthcare centres (PHCs; Al Mabeela, Al Mawaleh and Al Khodh Health Centres) located in Al Seeb Wilayat, Muscat, Oman, between April and August 2018. All healthy non-pregnant females between 20–50 years of age who were able to read and write and were attending the health centres for any reason were invited to participate in the study. Subjects were excluded if they were in the postnatal period (i.e. delivered in the past six months), required

a wheelchair for basic mobility, were attending the PHC for emergency services or had been diagnosed with pelvic organ prolapse. This study constitutes the first phase of a two phase research project.

Individuals of this age group was specifically targeted for two reasons. First, consenting women in this age group were expected to be more willing to enrol in phase two of the study, which involved measuring the effects of home-based pelvic floor muscle exercise training on decreasing symptoms of UI, improving QOL and strengthening pelvic floor muscles. Second, women in this age group were expected to have enough education to independently complete the self-administered questionnaire. A consecutive sampling methodology was used for recruiting subjects. The sample size was calculated with an absolute precision of 3% and a 95% confidence interval (CI). Based on an anticipated prevalence of 40%, the ideal sample size was estimated at 1,024 participants.⁶

At each PHC, a trained staff nurse identified all consecutive female patients who fulfilled the inclusion criteria, explained the purpose of the study and invited them to participate. The subjects were enrolled by allocating each participant a unique number in chronological order at each study site. Weights and heights were measured by the staff nurse. In addition, the nurse kept a record of those who chose not to participate and the reasons for not participating.

The participants were asked to complete a self-administered questionnaire. The first part of the questionnaire collected data related to age, educational background, marital status, occupation, monthly income, smoking status, history of constipation or cough and history of conditions such as diabetes mellitus, hypertension, asthma or recurrent urinary tract infections. Obstetric data included maternal age at first birth, number of pregnancies, number of spontaneous or assisted vaginal and Caesarean section (CS) deliveries, weight of the largest baby delivered, history of episiotomy during last delivery and the duration of last delivery.

The second part of the questionnaire consisted of a validated Arabic-version of the International Consultation Incontinence Questionnaire-Short Form (ICIQ-SF), which is a brief and psychometrically robust instrument for evaluating the frequency, severity and impact of UI on QOL.¹³ The ICIQ-SF asks participants to report frequency of UI, amount of leakage, overall impact of UI on QOL and the situation surrounding the leakage. The ICIQ-SF is scored from 0–21 with higher scores indicating increased severity. The survey was first validated in the UK and has been translated into 35 languages. It is widely used and the Arabic-

version has been validated in Egypt, Syria and Saudi Arabia.^{13–15} Women are classified as having stress UI (SUI) if they answer 'yes' to either or both of the following statements: (1) urine leaks occur during coughing or sneezing and/or (2) urine leaks occur when physically active/exercising. A woman is diagnosed with urgency UI (UUI) if urine leakage occurs before she can get to a toilet. Women are diagnosed with mixed UI (MUI) if they have features of both SUI and UUI. A classification of other UI is used for those who answer 'yes' to the following statements: urine leaks occur (1) during sleep, (2) when finished urinating and dressed, (3) for no obvious reason or (4) all the time.

Women with SUI were interviewed by the principal and co-principal investigators and were invited to participate in phase two of the study, which was concurrently nested within phase one. Women who were diagnosed with UUI, MUI or other UI were offered proper medical advice and consultation in their allocated PHC.

The third part of the questionnaire included four statements about medical advice-seeking behaviour and were answered as either 'yes' or 'no'. If answered with 'yes', then further questions about the type of treatment offered were answered. If the answer was 'no', the participant was asked to select a reason for not seeking medical advice. The four choices given were 'leakage of urine affects all women and there is no need to worry about it', 'I feel embarrassed to disclose this issue to a doctor', 'I hope to have spontaneous recovery from leakage' and 'leakage of urine is incurable'.

The prevalence estimates of types of UI were reported as numbers and percentages. The baseline characteristics and risk factors were compared between subjects having UI and those not having UI. The obstetric characteristics of the two groups were analysed in the subsample of women who had given birth; it would not have been appropriate to include those who had not given birth. The analysis was done using an unpaired Student's *t*-test or Chi-squared test as appropriate. Binary logistic regression analysis was done for the total sample and subsample of women who had ever given birth to determine the likelihood of having UI using the significant variables on chi-square testing as predictor variables. Seeking medical advice and QOL among those having UI was described in numbers, central tendencies and cumulative proportions as appropriate. A *P* value of <0.05 was considered significant.

Ethical approval was granted by the Directorate General of Planning and Studies of the Ministry of Health, Muscat, Oman (MOH/CSR/17/6555). Written informed consent was obtained from each participant.

Results

A total of 1,070 women were included in this study (response rate = 92.5%); 87 women chose not to participate, stating lack of time as the main reason. Sociodemographic characteristics of non-participants were similar to the women who were recruited. The mean age of the participants was 31.39 ± 7.64 years. Most participants (60.2%) were overweight or obese. The proportion of various risk factors for UI considered in this study ranged from 1.0–10.5% [Table 1]. The majority of women had had normal vaginal deliveries during their last childbirth (73.2%) and their last pregnancy had been within five years of participating in the study (62.8%). In total, 300 women (43.7%) had an episiotomy during their last delivery [Table 2].

A total of 369 respondents (34.5%) suffered from UI of which most suffered from SUI (49.3%) followed by UUI (26.3%), MUI (23.8%) and other UI (0.5%). Based on the overall scores of the ICIQ-SF, 332 out of 369 participants (90%) had mild to moderate UI. In the subgroup of women who had given birth, the prevalence of UI increased to 41.5% and a marginal increase in the prevalence of SUI and MUI were also noted. Most women with UI reported a mild to moderate effect of UI on their QOL (62%) [Table 3].

A significant association ($P \leq 0.001$) was found between UI and age, marital status, BMI, employment status, monthly income of the family, hypertension, cough, constipation and mode of delivery during last birth (i.e. normal vaginal delivery and vacuum- or forceps-assisted vaginal delivery). No significant association was found between UI and age at first birth and the remaining characteristics [Table 4].

A logistic regression analysis was performed to study the effects of significant variables on the likelihood that participants would develop UI; the model was found to be statistically significant (χ^2 [15 degrees of freedom] = 120.284; $P < 0.001$). Being married (odds ratio [OR] = 2.26, 95% CI: 1.58–3.23; $P < 0.001$) or divorced (OR = 2.48, 95% CI: 1.28–4.82; $P = 0.007$) were significantly associated with an increase in the likelihood of exhibiting UI compared to those who were single. Participants who were employed (OR = 1.46, 95% CI: 1.09–1.94; $P = 0.009$), had hypertension (OR = 1.73, 95% CI: 1.00–2.98; $P = 0.049$), a cough for more than one month (OR = 2.73, 95% CI: 1.77–4.20; $P < 0.001$), constipation lasting for more than one month (OR = 2.18, 95% CI: 1.40–3.40; $P = 0.001$), delivering a baby via normal vaginal delivery (OR = 2.18, 95% CI: 1.24–3.83; $P = 0.006$) or vacuum- or forceps-assisted vaginal delivery (OR = 5.04, 95%

Table 1: Baseline characteristics and risk factors of urinary incontinence among Omani women (N = 1,070)

Characteristic	n (%)
Age in years	
20–30	546 (51.0)
31–40	367 (34.3)
41–50	157 (14.7)
Mean ± SD	31.39 ± 7.64
Body mass index category	
Underweight	78 (7.3)
Normal	348 (32.5)
Overweight	284 (26.5)
Obese	360 (33.6)
Mean ± SD	27.51 ± 6.81
Marital status	
Single	302 (28.2)
Married	705 (65.9)
Widowed	9 (0.8)
Divorced	54 (5.0)
Educational level	
None	7 (0.7)
Up to preparatory*	115 (10.7)
Secondary and higher	948 (88.6)
Employment status	
Not employed	616 (57.6)
Employed	454 (42.4)
Monthly income of family in OMR	
<500	340 (31.8)
500–1000	505 (47.2)
>1000	225 (21.0)
Risk factors for urinary incontinence	
Diabetes mellitus	
Yes	46 (4.3)
No	1024 (95.7)
Hypertension	
Yes	70 (6.5)
No	1000 (93.5)
Asthma	
Yes	39 (3.6)
No	1031 (96.4)
Recurrent urogenital infection	
Yes	106 (9.9)
No	964 (90.1)
Smoking	
Yes	11 (1.0)
No	1059 (99.0)
Cough lasting for more than one month	
Yes	112 (10.5)
No	958 (89.5)
Constipation lasting for more than one month	
Yes	104 (9.7)
No	966 (90.3)

SD = standard deviation; OMR = Omani Rials. *Includes grades 1–9.

Table 2: Distribution of obstetric- and urinary incontinence-related characteristics among Omani women who have given birth (n = 686)

Characteristic	n (%)
Number of pregnancies	
≤3	413 (60.2)
4–6	218 (31.8)
7–9	43 (6.3)
≥10	12 (1.7)
Age at first birth in years	
14–17	31 (4.5)
18–21	158 (23.0)
22–25	300 (43.7)
26–29	110 (16.0)
30–33	63 (9.2)
≥34	24 (3.5)
Mean ± SD	24 ± 4.5
Number of normal vaginal deliveries	
0	102 (14.9)
1–3	410 (59.8)
4–6	149 (21.7)
7–9	25 (3.6)
Number of Caesarean sections	
0	475 (69.2)
1–3	190 (27.7)
4–6	21 (3.1)
Years since last pregnancy	
<5	431 (62.8)
5–10	173 (25.2)
11–15	55 (8.0)
>15	27 (3.9)
Number of abortions	
0	514 (74.9)
1	105 (15.3)
2	45 (6.6)
3	11 (1.6)
≥4	11 (1.6)
Mode of delivery during last birth	
Normal vaginal	502 (73.2)
Assisted vaginal (with vacuum or forceps)	22 (3.2)
Caesarean section	162 (23.6)
Episiotomy during last delivery	
Yes	300 (43.7)
No	386 (56.3)
Labour persisted for >24 hours	
Yes	177 (25.8)
No	509 (74.2)
Weight of largest baby in kg	
≥4	83 (12.1)
<4	603 (87.9)

SD = standard deviation.

Table 3: Prevalence of urinary incontinence and characteristics of urinary leakage according to the International Consultation Incontinence Questionnaire-Short Form among Omani women (N = 1,070)

Characteristic	n (%)
UI	
Yes	369 (34.5)
No	701 (65.5)
Type of UI (n = 369)	
UUI	97 (26.3)
SUI	182 (49.3)
MUI	88 (23.8)
Other UI	2 (0.5)
Women who have given birth (n = 686)	
UI present	
Yes	285 (41.5)
No	401 (58.5)
Type of UI (n = 285)	
UUI	65 (22.8)
SUI	149 (52.3)
MUI	70 (25.6)
Other UI	1 (0.4)
ICIQ-SF item	
Frequency of UI (N = 1,070)	
Never	701 (65.5)
About once a week or less often	258 (24.1)
Two to three times a week	48 (4.5)
About once a day	21 (2.0)
Several times a day	35 (3.3)
All the time	7 (0.7)
Amount of leakage (N = 1,070)	
None	701 (65.5)
A small amount	318 (29.7)
A moderate amount	45 (4.2)
A large amount	6 (0.6)
QOL interference from UI (n = 369)	
None	98 (26.6)
Mild	166 (45.0)
Moderate	63 (17.0)
Severe	23 (6.2)
Very Severe	19 (5.1)
ICIQ categories (n = 369)	
Mild	210 (56.9)
Moderate	122 (33.1)
Severe	34 (9.2)
Very Severe	3 (0.8)

UI = urinary incontinence; UUI = urgency urinary incontinence; SUI = stress urinary incontinence; MUI = mixed urinary incontinence; ICIQ-SF = International Consultation Incontinence Questionnaire-Short Form; QOL = quality of life.

Table 4: Comparison of baseline and obstetric characteristics and risk factors among Omani women with or without urinary incontinence (N = 1,070)

Characteristic	n (%)		P value*
	UI present (n = 369)	UI absent (n = 701)	
Age in years			
20–30	161 (43.6)	385 (54.9)	
31–40	134 (36.3)	233 (33.2)	<0.001
41–50	74 (20.1)	83 (11.8)	
Marital status			
Single	63 (17.1)	239 (34.1)	
Married	278 (75.3)	427 (60.9)	<0.001
Widowed	3 (0.8)	6 (0.9)	
Divorced	25 (6.8)	29 (4.1)	
Body mass index category[†]			
Underweight	17 (4.7)	55 (8.0)	
Normal	101 (27.7)	239 (34.7)	<0.001
Overweight	92 (25.2)	190 (27.6)	
Obese	155 (42.5)	205 (29.8)	
Educational level			
None	2 (0.5)	5 (0.7)	
Up to preparatory [‡]	36 (9.8)	79 (11.3)	≥0.05
Secondary and higher	331 (89.7)	617 (88.0)	
Employment status			
Unemployed	183 (49.6)	433 (61.8)	<0.001
Employed	186 (50.4)	268 (38.2)	
Monthly income of family in OMR			
<500	118 (32.0)	222 (31.7)	
500–1000	152 (41.2)	353 (50.4)	0.001
>1000	99 (26.8)	126 (18.0)	
Diabetes mellitus			
Yes	18 (4.9)	28 (4.0)	≥0.05
No	351 (95.1)	673 (96.0)	
Hypertension			
Yes	37 (10.1)	33 (4.7)	0.001
No	332 (90.0)	670 (95.4)	
Asthma			
Yes	17 (4.6)	22 (3.1)	≥0.05
No	352 (95.4)	679 (96.9)	
Recurrent urogenital infection			
Yes	63 (17.1)	43 (6.1)	≥0.05
No	306 (82.9)	658 (93.9)	
Smoking			
Yes	6 (1.6)	5 (0.7)	≥0.05
No	363 (98.4)	696 (99.3)	
Cough lasting more than one month			
Yes	68 (18.4)	44 (6.3)	<0.001
No	301 (81.6)	657 (93.7)	
Constipation lasting more than one month			
Yes	58 (15.7)	46 (6.6)	<0.001
No	311 (84.3)	655 (93.4)	

UI = urinary incontinence; OMR = Omani Rials. [†]There was some missing data; n = 365 for those with UI and n = 689 for those without UI. [‡]Includes grades 1–9. [§]Percentages are out of women who had given birth who had urinary incontinence (n = 285) and those who did not (n = 401).

Table 4 (cont'd): Comparison of baseline and obstetric characteristics and risk factors among Omani women with or without urinary incontinence (N = 1,070)

Characteristic	n (%)		P value*
	UI present (n = 369)	UI absent (n = 701)	
Years since last pregnancy[§]			
<5	166 (58.2)	265 (66.1)	≥0.05
5–10	82 (28.8)	91 (22.7)	
11–15	22 (7.7)	33 (8.2)	
>15	15 (5.3)	12 (3.0)	
Age at first birth in years[†]			
14–17	11 (3.8)	20 (5.0)	≥0.05
18–21	75 (26.1)	84 (20.8)	
22–25	115 (40.4)	183 (45.6)	
26–29	44 (15.3)	66 (16.4)	
30–33	27 (9.4)	36 (8.9)	
≥34	13 (4.5)	12 (3.0)	
Number of pregnancies[†]			
≤3	171 (60.0)	242 (60.3)	≥0.05
4–6	87 (30.5)	131 (32.7)	
7–9	21 (7.4)	22 (5.5)	
≥10	6 (2.1)	6 (1.5)	
Number of abortions[†]			
0	206 (72.3)	308 (76.8)	≥0.05
1	47 (16.5)	58 (14.5)	
2	23 (8.1)	22 (5.5)	
3	5 (1.8)	6 (1.5)	
≥4	4 (1.4)	7 (1.7)	
Number of vaginal deliveries[†]			
0	40 (14.0)	62 (15.5)	≥0.05
1–3	166 (58.2)	244 (60.8)	
4–6	68 (23.9)	81 (20.2)	
7–9	11 (3.9)	14 (3.5)	
Number of Caesarean sections[†]			
0	200 (70.2)	275 (68.6)	≥0.05
1–3	80 (28.1)	110 (27.4)	
4–6	5 (1.8)	16 (4.0)	
Mode of delivery during last birth[†]			
Normal vaginal	210 (73.7)	292 (72.8)	0.001
Assisted vaginal	15 (5.3)	7 (1.8)	
Caesarean section	60 (21)	102 (25.5)	
Episiotomy during last delivery[†]			
Yes	136 (47.7)	164 (40.9)	≥0.05
No	149 (52.3)	237 (59.1)	
Labour persisted for >24 hours[†]			
Yes	79 (27.7)	98 (24.4)	≥0.05
No	206 (72.3)	303 (75.6)	
Weight of largest baby in kg[†]			
<4	250 (87.7)	353 (88.0)	≥0.05
≥4	35 (12.3)	48 (12.0)	

UI = urinary incontinence; OMR = Omani Rials. [†]There was some missing data; n = 365 for those with UI and n = 689 for those without UI. [‡]Includes grades 1–9. [§]Percentages are out of women who had given birth who had urinary incontinence (n = 285) and those who did not (n = 401).

Table 5: Logistic regression analysis to determine the likelihood that women with risk factors have urinary incontinence

Risk factor	OR (95% CI)	P value
Marital status (married)	2.26 (1.58–3.23)	<0.001
Marital status (divorced)	2.48 (1.28–4.82)	0.007
Employed	1.46 (1.09–1.94)	0.009
Hypertension	1.73 (1.00–2.98)	0.049
Cough lasting more than one month	2.73 (1.77–4.20)	<0.001
Constipation lasting more than one month	2.18 (1.40–3.40)	0.001
Normal vaginal delivery	2.18 (1.24–3.83)	0.006
Vacuum- or forceps-assisted vaginal delivery	5.04 (1.68–15.06)	0.004

OR = odds ratio; CI = confidence interval.

Table 6: Medical advice-seeking behaviour among Omani women with urinary incontinence (n = 362)*

Question and response	n (%)
Did you seek medical advice for your problem?	
Yes	41 (11.3)
No	321 (88.7)
Treatment offered among those who sought medical advice for their UI (n = 41)	
Pelvic floor exercises (i.e. Kegel exercises)	16 (39.0)
Medication(s)	21 (51.2)
Surgery	4 (9.8)
Reasons for not seeking medical advice for UI (n = 315)[†]	
Leakage of urine affects all women and there is no need to worry about it	91 (28.9)
I feel embarrassed to disclose this issue to a doctor	27 (8.6)
I hope to have spontaneous recovery from leakage	135 (42.9)
Leakage of urine is incurable	62 (19.7)

UI = urinary incontinence. *Some women did not respond (n = 7). [†]Some women did not complete this section (n = 6).

CI: 1.68–15.06; P = 0.004) were significantly more likely to experience UI [Table 5].

Only 41 (11.1%) out of 369 women with UI had ever sought medical advice about their condition. For those who sought medical advice the following treatments were offered: pelvic floor exercises (39.0%), medication (51.2%) and surgery (9.8%). Of the 315 women who gave reasons for not seeking medical advice for UI, the most commonly given reason was “I hope to have spontaneous recovery from leakage” (42.9%), followed by “leakage of urine affects all women and there is no need to worry about it” (28.9%), “leakage of urine is incurable” (19.7%) and “I feel embarrassed to disclose this issue to a doctor” (8.6%) [Table 6].

Discussion

This study revealed that UI is a common condition among Omani women. Increasing age, obesity, cough or constipation and vaginal or assisted vaginal delivery during the last birth were found to be significant predictors of UI. The prevalence of UI among Omani women in this study was 34.5%, which is lower than the reported percentage in several other studies.^{6,7,16} A study of UI conducted in Germany and Denmark found that the prevalence of UI was 48.3% and 46.4%, respectively.¹⁶ Similarly, higher prevalence rates than the current study were reported in Saudi Arabia and Kuwait (41.4% and 54.5%, respectively).^{6,7} On the other hand, prevalence rates in Qatar and Turkey were lower than in the current study (20.7% and 23.9%, respectively).^{5,11} The variation in the prevalence rates of UI across different studies could be explained by differences in the UI definitions used, sampling methods and age groups included.¹⁷ Moreover, the tendency to report a higher prevalence of UI was noted in studies using in-person interviews compared with self-administered questionnaires.¹⁸

SUI was the most common type of UI in this study, which is consistent with multiple studies conducted worldwide.^{4-6,8,10,19,20} Fewer studies identified MUI as the most common type of UI.^{7,11,21} Within the age groups in the current study, older women were more likely to have UI than not have UI compared to the other age groups; subgroup age analyses revealed that almost half of the women aged between 41–50 had UI. Furthermore, 161 (43.6%) women between 20–30 years had UI. The higher prevalence of UI in women in the younger age group could be explained by the lower marriage and childbirth ages in Oman; a study revealed that about three-quarters of women were already married by the age of 20 in Oman.²² Additionally, lack of awareness about the importance of pelvic floor muscle exercises during the antenatal and postnatal periods could have also contributed to this high prevalence.⁵

Similar to the findings of previous studies, this study demonstrated a positive association between BMI and UI.^{7-9,16,21} The underlying reasons for this strong relationship are still unknown. One theory suggests that increased weight leads to increased intra-abdominal pressure, urethral mobility and detrusor instability, which eventually results in UI.²³ While women who are/were married were at a higher risk of developing UI compared to single women, such an association is to be expected, especially because such women tend to be older and age was found to be a significant risk factor for UI in the current study.

This study revealed a significant association between employment status and UI. Being more aware of UI symptoms and their possible impact on work performance, and especially the worry of unintentional urination, might be reasons for this finding.²⁴

Hypertension was identified as a significant risk factor for UI in the current study. A similar finding has been reported in other larger studies.^{11,25} The underlying mechanism for this finding is not well understood and additional studies are required.

The current study did not show a significant association between asthma and UI. However, it revealed that cough and constipation are significant risk factors for UI. These findings are consistent with those from previous studies and might be explained by the increased intra-abdominal pressure due to long-standing cough and constipation.^{6,9} Both cough and constipation might lead to excessive loading on the *arcus tendineus fasciae* of the pelvis.²⁶

This study showed that normal or assisted vaginal delivery during a woman's last birth was strongly associated with UI. Damage to the innervation of the pelvic floor muscles during vaginal delivery has been proposed as a cause of UI.²⁷ Nevertheless, the current study showed that neither the number of vaginal deliveries nor CSs during previous deliveries were a significant predictor of UI. Evidence indicates that the process of pregnancy rather than childbirth itself, is strongly associated with UI.²⁸

Contrary to what has been reported in the literature, no significant association between parity and UI was found in this study.^{6-9,12,19,29} Low parity, which is defined by the World Health Organization as less than five pregnancies, was reported by more than two-thirds of participants in this study.³⁰ Low parity, therefore, might be the main reason for this finding.

Some studies have found that women who are 28 years or older at their first delivery are 1.82 times more likely to develop SUI than other women.³¹ However, the current study did not reveal such a correlation which might be due to the younger age (mean = 24 ± 4.5 years) at first birth in the majority of the participants in this study.

This study showed that QOL was negatively affected in the majority of women with UI. This finding is consistent with other studies conducted worldwide.^{4,5,8,11,20} This effect is well understood and to be expected in Muslim countries where being dry is considered a prerequisite for the five daily prayers. The negative impact of UI on QOL may extend to social-emotional relationships, exercise and sport, employment, travel and sleep.²⁴ Feelings of stigmatisation, humiliation and fear of becoming

incontinent in public situations may lead to social and recreational withdrawal. Similarly, the feeling of embarrassment during sexual activities in women with UI and its consequences for low self-esteem and anxiety might seriously affect relationships.^{8,20,24,32,33} Evidence has suggested that women with UI perceive the condition as a barrier to exercise and are forced to give up enjoyable activities such as swimming and long walks.^{34,35}

This study highlights the importance of early detection of UI to prevent its negative consequences on QOL. Healthcare providers should be more vigilant and proactive in cases of UI. PHC physicians should screen female patients routinely for symptoms suggestive of UI, particularly targeting those at higher risk for this condition. Furthermore, myths about UI among Omani women should be properly addressed through media and health awareness campaigns.

This study had some limitations. It was based on a self-reported questionnaire and no objective measures such as clinical assessment or urodynamic studies were performed. However, the ICIQ-SF has been found to be a reliable and well-validated tool which correlates well with objective measures. As some information collected in this study was based on the ability to remember past events, there is a possibility of recall bias. Additionally, this study followed a cross-sectional design which does not imply a causal relationship. Moreover, setting an age limit for the study's participants might have resulted in an underestimation of the true prevalence of UI in Oman. Finally, this study did not include a voiding diary (bladder diary) to assess the severity of UI; doing so would have increased the reliability of the information presented by the study's participants.

Conclusion

Based on this study's findings, UI is a common condition among Omani women and SUI is the most common type. Age, BMI, having been married or employed, cough, constipation and vaginal or assisted vaginal delivery during the previous birth were identified as significant risk factors for UI in Omani women. Despite its negative consequences on QOL, only a small proportion of participants had sought medical advice for the condition because of misconceptions about UI. Future longitudinal studies utilising objective assessment tools are needed to confirm the current findings.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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References

1. Abrams P, Andersson KE, Apostolidis A, Birder L, Bliss D, Brubaker L, et al. 6th International Consultation on Incontinence. Recommendations of the International Scientific Committee: Evaluation and treatment of urinary incontinence, pelvic organ prolapse and faecal incontinence. *Neurourol Urodyn* 2018; 37:2271–2. <https://doi.org/10.1002/nau.23551>.
2. Muller N. What Americans understand about how they are affected by bladder control problems: Highlights of recent nationwide consumer research. *Urol Nurs* 2005; 25:109–15.
3. Irwin DE, Kopp ZS, Agatep B, Milsom I, Abrams P. Worldwide prevalence estimates of lower urinary tract symptoms, overactive bladder, urinary incontinence and bladder outlet obstruction. *BJU Int* 2011; 108:1132–8. <https://doi.org/10.1111/j.1464-410X.2010.09993.x>.
4. Minassian VA, Drutz HP, Al-Badr A. Urinary incontinence as a worldwide problem. *Int J Gynaecol Obstet* 2003; 82:327–38. [https://doi.org/10.1016/s0020-7292\(03\)00220-0](https://doi.org/10.1016/s0020-7292(03)00220-0).
5. Ghafouri A, Alnaimi AR, Alhothi HM, Alroubi I, Alrayashi M, Molhim NA, et al. Urinary incontinence in Qatar: A study of the prevalence, risk factors and impact on quality of life. *Arab J Urol* 2014; 12:269–74. <https://doi.org/10.1016/j.aju.2014.08.002>.
6. Al-Badr A, Brasha H, Al-Raddadi R, Noorwali F, Ross S. Prevalence of urinary incontinence among Saudi women. *Int J Gynaecol Obstet* 2012; 117:160–3. <https://doi.org/10.1016/j.ijgo.2011.12.014>.
7. Al-Sayegh NA, Al-Batool L, Al-Qallaf A, Al-Fadhli H, Al-Sharrah S. Urinary incontinence in Kuwait: Prevalence and risk factors of men and women. *Int J Health Sci* 2014; 2:47–57. <https://doi.org/10.15640/ijhs.v2n4a4>.
8. Lasserre A, Pelat C, Guérout V, Hanslik T, Chartier-Kastler E, Blanchon T, et al. Urinary incontinence in French women: Prevalence, risk factors, and impact on quality of life. *Eur Urol* 2009; 56:177–83. <https://doi.org/10.1016/j.eururo.2009.04.006>.
9. Chiarelli P, Brown W, McElduff P. Leaking urine: Prevalence and associated factors in Australian women. *Neurourol Urodyn* 1999; 18:567–77. [https://doi.org/10.1002/\(sici\)1520-6777\(1999\)18:6<567::aid-nau7>3.0.co;2-f](https://doi.org/10.1002/(sici)1520-6777(1999)18:6<567::aid-nau7>3.0.co;2-f).
10. Hannestad YS, Rortveit G, Sandvik H, Hunskaar S; Norwegian EPINCONT study. Epidemiology of Incontinence in the County of Nord-Trøndelag. A community-based epidemiological survey of female urinary incontinence: The Norwegian EPINCONT study. Epidemiology of Incontinence in the County of Nord-Trøndelag. *J Clin Epidemiol* 2000; 53:1150–7. [https://doi.org/10.1016/s0895-4356\(00\)00232-8](https://doi.org/10.1016/s0895-4356(00)00232-8).

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. <https://doi.org/10.1016/j.eururo.2005.04.017>.
12. Seshan V, Muliira JK. Self-reported urinary incontinence and factors associated with symptom severity in community dwelling adult women: Implications for women's health promotion. *BMC Womens Health* 2013; 13:16. <https://doi.org/10.1186/1472-6874-13-16>.
13. Avery K, Donovan J, Peters TJ, Shaw C, Gotoh M, Abrams P. ICIQ: A brief and robust measure for evaluating the symptoms and impact of urinary incontinence. *NeuroUrol Urodyn* 2004; 23:322–30. <https://doi.org/10.1002/nau.20041>.
14. Hashim H, Avery K, Mourad MS, Chamssuddin A, Ghoniem G, Abrams P. The Arabic ICIQ-UI SF: An alternative language version of the English ICIQ-UI SF. *NeuroUrol Urodyn* 2006; 25:277–82. <https://doi.org/10.1002/nau.20212>.
15. Al-Shaikh G, Al-Badr A, Al Maarik A, Cotterill N, Al-Mandeeel H. Reliability of Arabic ICIQ-UI short form in Saudi Arabia. *Urol Ann* 2013; 5:34–8. <https://doi.org/10.4103/0974-7796.106964>.
16. Schreiber Pedersen L, Lose G, Høybye MT, Elsnér S, Waldmann A, Rudnicki M. Prevalence of urinary incontinence among women and analysis of potential risk factors in Germany and Denmark. *Acta Obstet Gynecol Scand* 2017; 96:939–48. <https://doi.org/10.1111/aogs.13149>.
17. Bedretdinova D, Fritel X, Panjo H, Ringa V. Prevalence of female urinary incontinence in the general population according to different definitions and study designs. *Eur Urol* 2016; 69:256–64. <https://doi.org/10.1016/j.eururo.2015.07.043>.
18. Thom D. Variation in estimates of urinary incontinence prevalence in the community: Effects of differences in definition, population characteristics, and study type. *J Am Geriatr Soc* 1998; 46:473–80. <https://doi.org/10.1111/j.1532-5415.1998.tb02469.x>.
19. Kılıç M. Incidence and risk factors of urinary incontinence in women visiting family health centers. *Springerplus* 2016; 5:1331. <https://doi.org/10.1186/s40064-016-2965-z>.
20. Barghouti FF, Yasein NA, Jaber RM, Hatamleh LN, Takruri AH. Prevalence and risk factors of urinary incontinence among Jordanian women: Impact on their life. *Health Care Women Int* 2013; 34:1015–23. <https://doi.org/10.1080/07399332.2011.646372>.
21. Melville JL, Katon W, Delaney K, Newton K. Urinary incontinence in US women: A population-based study. *Arch Intern Med* 2005; 165:537–42. <https://doi.org/10.1001/archinte.165.5.537>.
22. Islam MM, Dorvlo AS, Al-Qasbi AM. The pattern of female nuptiality in Oman. *Sultan Qaboos Univ Med J* 2013; 13:32–42.
23. Subak LL, Richter HE, Hunskaar S. Obesity and urinary incontinence: Epidemiology and clinical research update. *J Urol* 2009; 182:S2–7. <https://doi.org/10.1016/j.juro.2009.08.071>.
24. Sinclair AJ, Ramsy IN. The psychosocial impact of urinary incontinence in women. *Obstet Gynaecol* 2011; 13:143–8. <https://doi.org/10.1576/toag.13.3.143.27665>.
25. 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 J Obstet Gynecol* 2008; 47:197–202. [https://doi.org/10.1016/S1028-4559\(08\)60080-7](https://doi.org/10.1016/S1028-4559(08)60080-7).
26. Aoki Y, Brown HW, Brubaker L, Cornu JN, Daly JO, Cartwright R. Urinary incontinence in women. *Nat Rev Dis Primers* 2017; 3:17042. <https://doi.org/10.1038/nrdp.2017.42>.
27. Snooks SJ, Setchell M, Swash M, Henry MM. Injury to innervation of pelvic floor sphincter musculature in childbirth. *Lancet* 1984; 2:546–50. [https://doi.org/10.1016/s0140-6736\(84\)90766-9](https://doi.org/10.1016/s0140-6736(84)90766-9).
28. Foldspang A, Mommsen S, Djurhuus J. Prevalent urinary incontinence as a correlate of pregnancy, vaginal childbirth, and obstetric techniques. *Am J Public Health* 1999; 89:209–12. <https://doi.org/10.2105/ajph.89.2.209>.
29. Zhou HH, Shu B, Liu TZ, Wang XH, Yang ZH, Guo YL. Association between parity and the risk for urinary incontinence in women: A meta-analysis of case-control and cohort studies. *Medicine (Baltimore)* 2018; 97:e11443. <https://doi.org/10.1097/MD.00000000000011443>.
30. Aliyu MH, Jolly PE, Ehiri JE, Saliu HM. High parity and adverse birth outcomes: Exploring the maze. *Birth* 2005; 32:45–59. <https://doi.org/10.1111/j.0730-7659.2005.00344.x>.
31. Masue T, Wada K, Nagata C, Deguchi T, Hayashi M, Takeda N, et al. Lifestyle and health factors associated with stress urinary incontinence in Japanese women. *Maturitas* 2010; 66:305–9. <https://doi.org/10.1016/j.maturitas.2010.04.002>.
32. Nilsson M, Lalos A, Lalos O. The impact of female urinary incontinence and urgency on quality of life and partner relationship. *NeuroUrol Urodyn* 2009; 28:976–81. <https://doi.org/10.1002/nau.20709>.
33. Illiano E, Mahfouz W, Giannitsas K, Kocjancic E, Vittorio B, Athanasopoulos A, et al. Coital incontinence in women with urinary incontinence: An international study. *J Sex Med* 2018; 15:1456–62. <https://doi.org/10.1016/j.jsxm.2018.08.009>.
34. Brown WJ, Miller YD. Too wet to exercise? Leaking urine as a barrier to physical activity in women. *J Sci Med Sport* 2001; 4:373–8. [https://doi.org/10.1016/s1440-2440\(01\)80046-3](https://doi.org/10.1016/s1440-2440(01)80046-3).
35. Nygaard I, Thom DH, Calhoun EA. Urinary incontinence in women. In: Litwin MS, Saigal CS, Eds. *Urologic diseases in America*. Washington DC, USA: US Government Printing Office, 2004. Pp. 71–106.