# Prevalence, risk factors and types of urinary incontinence among females: A cross sectional study

**Amena Ali** (1)
**Nouf Abdullah Saleh Almasabi** (1)
**Shrooq Thaiban Alkhaldi** (1)
**Amaal Mastour Altowairqi** (1)
**Sahar Rajaallah Aljumayi** (1)
**Ahmed Salah Eldalo** (1,2)
**Abuzer Ali (**1)

(1) College of Pharmacy, Taif University, P.O. Box 11099, Taif, 21944, Saudi Arabia
(2) College of Medicine and Health Sciences, University of Palestine, Palestine

**Correspondence:**
Amena Ali
College of Pharmacy,
Taif University, P.O. Box 11099, Taif, 21944,
Saudi Arabia
Phone: +966592899232
**Email:** amrathore@tu.edu.sa

## Abstract

**Background:** To determine the prevalence and risk factors associated with urinary incontinence (UI) and its subtypes among females, moreover, to assess UI management among affected females and its impact on their quality of life.

**Study method:** A cross sectional study was carried out among females aged 18 years and above in Taif city, Saudi Arabia. A total of 500 females participated in the study.

**Results:** The prevalence of UI among participating women was 16.8% (84/500). The results revealed that there was a statistically significant relationship between UI prevalence and age, body mass index, social status, and education (p<0.001). Among participants who reported UI, approximately 44% stated they had urge UI, 41.7% confirmed mixed UI, while 14.3% experienced stress UI.

**Conclusion:** Age, education level, multiple pregnancies, constipation, and non-use of some chronic medications were associated risk factors for UI subtypes. The highest frequency of urine leakage was 'once or more daily'. The study showed that UI, irrespective of the types had affected negatively the quality of women's life. The prevalence of UI is expected to increase in females with increase in age which may put a burden on health-care services in the future.

**Key words:** Urinary incontinence, urge UI, mixed UI, stress UI

## Introducttion

International Continence Society defined Urinary Incontinence (UI) as "the complaint of any involuntary leakage of urine" (1). Urinary incontinence is a worldwide problem that affects both males and females but the prevalence in females is higher. It impairs their quality of life and restricts social activity (2, 3). Globally, 200 million people suffer from UI (4). Many studies have been conducted in different countries dealing with UI among females. A study conducted by Ghafouri et al. 2014, reported 21% UI in investigated women in Qatar (5). However, 49.3% UI was reported in Kuwait in the same year (6). In Saudi Arabia, studies demonstrated that the prevalence of UI among females is higher in Jeddah (41.4%) and lower in Riyadh (29%) (7, 8). UI is categorized into 3 subtypes; stress urinary incontinence (SUI), urge urinary incontinence (UUI), and mixed urinary incontinence (MUI). The SUI is a complaint of involuntary leakage of urine by exertional activities such as laughing, coughing, sneezing, running, and lifting. The UUI includes urgency with or without leakage, or when bladder muscle is overactive. The MUI has more than one form of UI (9, 10).

The magnitude of the problem varies by geographical locations and culture. In Sweden, China, and Saudi Arabia, SUI was the most prevalent type among all UI subtypes (7, 8, 11, 12). Among women in Kuwait, Turkey and the United Arab Emirates; the most common type was UUI (6, 13, 14). However, MUI was more common in women with diabetes mellitus (DM) in Kuwait and Egypt (15, 16). Several variables have been identified as being possible risk factors for UI. Previous studies showed that eldery people (12, 13, 17), obese (12, 13, 18), diabetic (8, 14, 17), hypertensive (3, 12), postmenopausal (3, 18), pregnant (19, 20), and nursing women (3) experienced higher rates of UI. In addition, bronchial asthma (5), UTI (13), constipation (3, 12, 13), chronic cough (17) displayed an assoociation with greater incidence of UI. Further, lack of exercise (12), parity (13, 17), number of abortions (13), vaginal delievery (11, 18), and chronic pelvic pain (12) have an increased risk of developing UI. Various drugs could theoretically induce UI such as alpha-receptor antagonists, antipsychotics, benzodiazepines, antidepressants, and hormone replacement therapy in postmenopausal women (21). Although UI is not a life threatining condition, prior studies have raised concerns as to how UI affected negatively women's quality of life. It troubled their daily work and marital relationship, limitated their social activities, and made it difficult doing housework and praying. They had to avoid coughing and restrict fluid intake to avoid such problems (8, 11-13, 16, 22).

Despite experiencing a sense of shame, the majority of affected women did not look for health consultation for this problem (3, 8, 22, 23). Barriers that prevent Middle Eastern women from seeking medical consultation mostly include the misconceptions about the causes of UI and the availability of treatment options, and embarrassment (24). Due to variation of prevalence, risk factors, and unawareness regarding UI; physicians find it difficult to perform early diagnosis and treat¬ment. Therefore, the purpose of the study is to determine the prevalence and risk factors associated with UI and its types among females in Taif City, Saudi Arabia, moreover, to assess the management of UI among affected women and its impact on the quality of life.

## Materials and Methods

**Study design**
A cross sectional study was conducted among females in Al-Hada Hospital for Armed Forces, King Faisal Hospital, Prince Mansour Armed Forces Hospital and Prince Sultan Hospital for Armed Forces, Taif, Saudi Arabia. The target population were female aged 18 years or above, irrespective of their nationality. A total of 500 females agreed to participate in the study. The sample size was calculated by using survey system and Rasoft program. Simple random sampling technique was adopted for distribution selection.

**Inclusion criteria**
The study enrolled females visiting hospitals in the period of study in Taif city, aged 18 years old or above, regardless of nationality.

**Exclusion criteria**
The study excluded females less than 18 years old, not living in Taif city, critically ill, and any female patient who had undergone surgery in the urinary systemprior.

**Data collection**
An inclusive pretested self-administered questionnaire was used to elicit female's answers on different variables to address study objectives. The questionnaire was developed in English and translated to Arabic language. The questionnaire consisted of five sections: The first section included demographic information. The second section contained risk factors associated with UI such as pregnancy, number and mode of delivery, smoking, caffeine consumption, fluid intake, chronic diseases, and medications. The third section comprised questions on severity and type of UI. The fourth section dealt with management of UI among female participants. The last section included the impact of UI on their quality of life. The questionnaire was tested for internal consistency and then piloted on a random convenient sample of women in Taif city. The piloted data is not included in the study sample.

**Ethical considerations**
During the research activities, each participant was informed about the study topic and objectives with confidentiality of the collected data and sample results, and gave verbal consent to be included in the study. The study was approved by the ethical approval committee, Taif University (No. 40-35-0138), Research Ethics Committee of Armed Forces Hospitals, and Research and Studies Department in Directorate of Health Affairs, Taif, Saudi Arabia.

Statistical analysis

The collected data were entered, processed, and analyzed using Statistical Package for Social Sciences program (IBM SPSS) version 22. Frequencies and percentages were computed for discrete variables, mean, and standard deviation for continuous variables. The chi-square and Fisher's exact tests were used to test the association between UI and study variables. The 0.05% level of significance was taken to test the significance of results.

## Results

**Demographics data and prevalence of UI among participants**

Demographic data of participants in correlation to UI prevalence are presented in Table 1. The prevalence of UI among participating females was 16.8% (84/500). The results of the study revealed that there was a statistically significant relationship between UI prevalence and age, BMI, social status, and education (p<0.001). The highest percentage of UI was experienced by female participants aged above 50 years (66.6%). None of the underweight females reported UI. However, the prevalence of UI increased with increase in BMI. The prevalence rate of UI was less among unmarried females 5 (4.1%).

Among participants who reported UI, approximately 44.0% stated to have UUI, 41.70% confirmed MUI, while 14.30% experienced SUI (Figure 1). By analyzing the correlation between demographics and all UI subtypes, participants with age less than 50 years had more SUI, while those aged above 50 years experienced more MUI (p<0.001). SUI was reported more in the participants with BMI ≥25. Half of the participants with UUI were overweight, while two-thirds of participants with MUI were overweight and obese. However, there was not a statistically significant difference between BMI and all subtypes (P>0.197). Similarly, social status showed no significant correlation with all UI types (p>0.05). All married female participants had the highest rate of all types of UI. Approximately 60% of the participants with SUI were graduates, while those with MUI were illiterate (p<0.05).

**Relationship between risk factors associated with each type of UI**

The relationship between each UI subtype and the risk factors associated with it was analyzed; there was a significant difference between all types of UI and age, education level, multiple pregnancies, constipation, and nonuse of chronic medications (P<0.05). There was not any statistically significant relationship between UI subtypes and the other risk factors such as BMI, mode of delivery, smoking, caffeine consumption, daily fluid intake and comorbidities (P>0.05) (Table 2). Regarding usage of any drug that could induce UI such as neurological medications, loop diuretics, alpha-receptor agonist, alpha-blockers, angiotensin-converting enzyme (ACE) inhibitors, or sedative-hypnotics; Approximately 23% (33/84) of the affected participants were taking medications. Out of them, 20.2% (17/84) of the participants were taking medications for neurological diseases, 6% (5/84) were taking

furosemide, and 1.2% (1/84) were on other medications like doxazosin, prazosin and terazosin.

**Severity of UI**

Eighty-two percent of the participants experienced symptoms of UI for more than 3 months. The highest rate of daily frequency of urine leakage was reported in all UI subtypes (range from 50% to 71%). Further, the observed amount of urine leakage was a few drops in all UI subtypes (range from 37.8% to 58.3%). Results revealed that there was a significant association between UI subtypes and duration of symptoms, frequency of urine leakage and amount of urine leakage. (Table 3).

**Attitude of participants towards UI**

Most of the participants did not smoke (95%) and half of them consumed only 1 to 2 cups of coffee daily (54.8%, p>0.05). Among the participants, 51% of them did not visit a physician to discuss UI problems. A total of 39.3% of the participants believed that this type of problem does not require any treatment, 29.8% of them did not visit a physician due to shyness, while the remaining assumed that no treatment is available for UI. However, the majority of UI patients were taking medications according to physician's prescription (94.4%). The majority of participants (77.4%) preferred to use medicines for a long period, rather than surgery. On the other hand, the level of education had a significant impact on the choice of UI medication prescriber, preferences of UI management, and awareness of exercise benefits in UI. A total of 63.1% of the participants reported that they have no idea about special types of exercise for UI problems and the difference was statistically significant (p<0.001). Regarding medications to treat UI, 19% (16/84) of the participants stated that they have not taken any medication, while the remaining participants were on medications.

**Impact of UI on the quality of life**

It was observed that UI had an impact on the quality of participants' lives. Less than 20% of participants always tried to avoid coughing, sneezing, laughing in public, or reduced fluid intake. A total of 8 (9.5%) participants reported that they always experienced decrease in abilities to do household duties, 31 (36.9%) stated sometimes, while 45 (53.6%) of them never had any difficulty. However, in travelling 18 (21.4%) of the participants reported facing a problem always, 40 (47.6%) described having difficulty occasionally, while 26 (31%) participants never had any difficulty in travelling. Almost 42.9% of the participants faced difficulty in sleeping, 34.5% experienced it every so often, while 22.6% of the participants never observed difficulty in sleeping. Approximately, 44% of the participants reported they had normal physical activities, 47% faced difficulty occasionally, while 8% of females experienced a decrease in physical activities. A total 11.9% of the participants always faced difficulty in social performance, 42.9% observed it from time to time, while 45.2% of participants has good social functioning.

**Table 1. Demographic data of participants and UI prevalence**

| Characteristic | | UI | | Total | p value |
|---|---|---|---|---|---|
| | | No (n=416) | Yes (n=84) | | |
| Age | 18-30 | 213 (94.2%) | 13 (5.8%) | 226 | <0.001 |
| | 31-40 | 79 (84%) | 15 (16%) | 94 | |
| | 41-50 | 54 (72%) | 21 (28%) | 75 | |
| | 51-60 | 44 (66.7%) | 22 (33.3%) | 66 | |
| | > 60 | 26 (66.7%) | 13 (33.3%) | 39 | |
| BMI | Underweight (< 18.5) | 27 (100%) | 0 (0%) | 27 | <0.001 |
| | Normal (18.5-24.9) | 130 (92.9%) | 10 (7.1%) | 140 | |
| | Overweight (25-29.9) | 110 (76.9%) | 33 (23.1%) | 143 | |
| | Obese (30-34.9) | 103 (79.2%) | 27 (20.8%) | 130 | |
| | Severely obese (35-39.9) | 29 (69%) | 13 (31%) | 42 | |
| | Morbidly obese (≥40) | 17 (94.4%) | 1 (5.6%) | 18 | |
| Social status | Married | 273 (79.6%) | 70 (20.4%) | 343 | <0.001 |
| | Divorced | 7 (70%) | 3 (30%) | 10 | |
| | Widow | 20 (76.9%) | 6 (23.1%) | 26 | |
| | Unmarried | 116 (95.9%) | 5 (4.1%) | 121 | |
| Education | Illiterate | 78 (69.6%) | 34 (30.4%) | 112 | <0.001 |
| | Primary school | 39 (67.2%) | 19 (32.8%) | 58 | |
| | Middle school | 8 (72.7%) | 3 (27.3%) | 11 | |
| | High school | 90 (91.8%) | 8 (8.2%) | 98 | |
| | University | 194 (91.1%) | 19 (8.9%) | 213 | |
| | Postgraduate | 7 (87.5%) | 1 (12.5%) | 8 | |

**Figure 1. Distribution of different types of UI among female participants.**
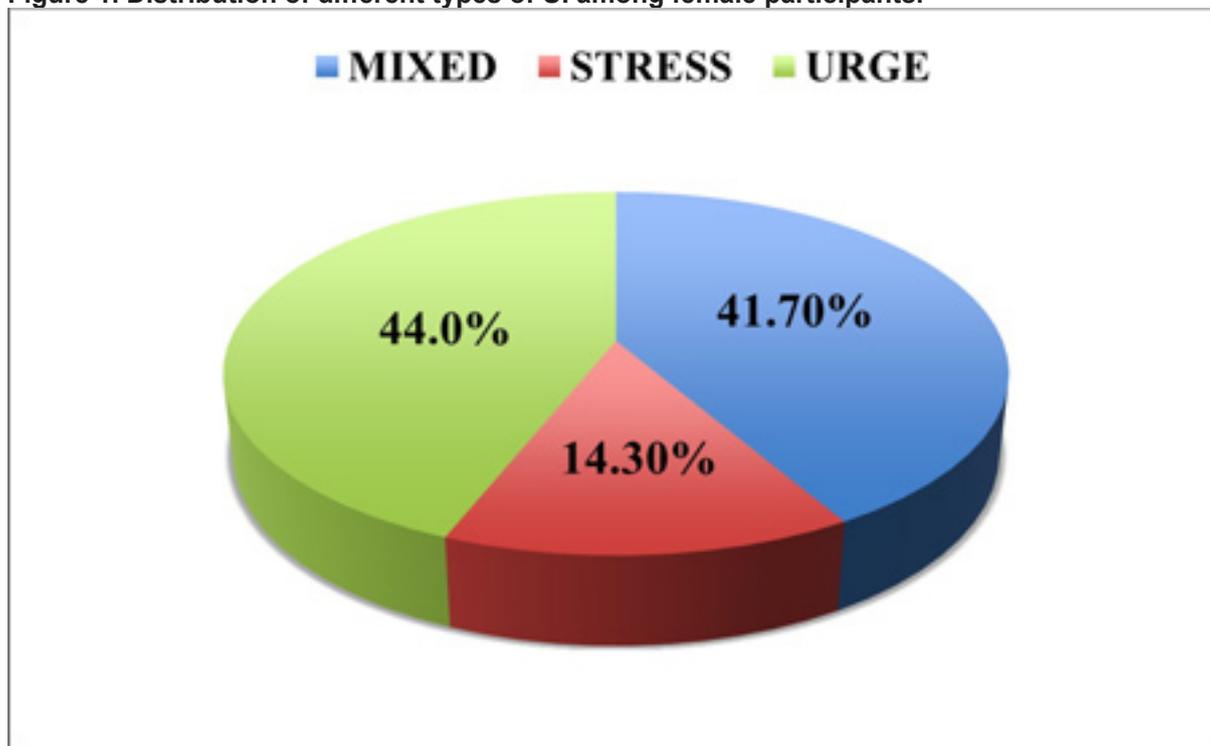
**Table 2. Risk factors associated with each UI subtype**

| Risk factors | | SUI | | UUI | | MUI | |
|---|---|---|---|---|---|---|---|
| | | n=12 (%) | p value | n=37 (%) | p value | n=35 (%) | p value |
| Age | 18-30 years | 3 (25.0%) | | 6 (16.2%) | | 4 (11.4%) | |
| | 31-40 years | 5 (41.7%) | | 3 (8.1%) | | 7 (20.0%) | |
| | 41-50 years | 3 (25.0%) | <0.05 | 15 (40.5%) | <0.05 | 3 (8.6%) | <0.05 |
| | 51-60 years | 1 (8.3%) | | 13 (35.1%) | | 8 (22.9%) | |
| | >60 years | 0 (0%) | | 0 (0%) | | 13 (37.1%) | |
| BMI | Normal | 1 (8.3%) | | 4 (10.8%) | | 5 (14.3%) | |
| | Overweight | 2 (16.7%) | | 20 (54.1%) | | 11 (31.4%) | |
| | Obese | 5 (41.7%) | >0.05 | 8 (21.6%) | 0.021 | 4 (40.0%) | >0.05 |
| | Severely obese | 4 (33.3%) | | 4 (10.8%) | | 5 (14.3%) | |
| | Morbidly obese | 0 (0%) | | 1 (2.7%) | | 0 (0%) | |
| Mode of delivery | Normal | 6 (50.0%) | | 20 (54.1%) | | 24 (68.6%) | |
| | Caesarian | 1 (8.3%) | >0.05 | 2 (5.4%) | >0.05 | 0 (0%) | >0.05 |
| | Both | 5 (41.7%) | | 12 (32.4%) | | 9 (25.7%) | |
| | Never | 0 (0%) | | 3 (8.1%) | | 2 (5.7%) | |
| Education | Illiterate | 0 (0%) | | 12 (32.4%) | | 22 (62.9%) | |
| | Primary | 4 (33.3%) | | 11 (29.7%) | | 4 (11.4%) | |
| | Middle school | 0 (0%) | <0.001 | 3 (8.1%) | <0.05 | 0 (0%) | <0.001 |
| | High school | 1 (8.3%) | | 4 (10.8%) | | 3 (8.6%) | |
| | University | 7 (58.6%) | | 6 (16.2%) | | 6 (17.1%) | |
| | Postgraduate | 0 (0%) | | 1 (2.7%) | | 0 (0%) | |
| Number of pregnancies | Never | 0 (0%) | | 3 (8.1%) | | 2 (5.7%) | |
| | 1-2 | 3 (25.0%) | 0.002 | 6 (16.2%) | <0.001 | 1 (2.9%) | 0.003 |
| | 3-4 | 4 (33.3%) | | 4 (10.8%) | | 0 (0%) | |
| | > 4 | 5 (41.7%) | | 24 (64.9%) | | 32 (91.4%) | |
| Constipation | Yes | 1 (8.3%) | | 8 (21.6%) | | 16 (45.7%) | |
| | No | 6 (50.0%) | 0.021 | 21 (56.8%) | 0.012 | 10 (28.6%) | 0.034 |
| | Sometimes | 5 (41.7%) | | 8 (21.6%) | | 9 (25.7%) | |
| Asthma | Yes | 3 (25.0%) | >0.05 | 5 (13.5%) | >0.05 | 11 (31.4%) | >0.05 |
| | No | 9 (75.0%) | | 32 (86.5%) | | 24 (68.6%) | |
| Diabetes mellitus | Yes | 3 (25.0%) | >0.05 | 12 (32.4%) | >0.05 | 19 (54.3%) | >0.05 |
| | No | 9 (75.0%) | | 25 (67.6%) | | 16 (45.7%) | |
| UTI | Yes | 6 (50.0%) | >0.05 | 12 (32.4%) | >0.05 | 11 (31.4%) | >0.05 |
| | No | 6 (50.0%) | | 25 (67.6%) | | 24 (68.6%) | |
| Smoking status | Yes | 0 (0%) | >0.05 | 2 (5.4%) | >0.05 | 2 (5.7%) | >0.05 |
| | No | 12 (100%) | | 35 (94.6%) | | 33 (94.3%) | |
| Caffeine consumption | Neither | 4 (33.3%) | | 5 (13.5%) | | 6 (17.1%) | |
| | 1-2 cups | 6 (50%) | >0.05 | 23 (62.2%) | >0.05 | 17 (48.6%) | >0.05 |
| | >=3 cups | 2 (16.7%) | | 9 (24.3%) | | 12 (34.3%) | |
| Fluid intake per day | <10 cups | 10 (83.3%) | >0.05 | 33 (89.2%) | >0.05 | 26 (74.3%) | >0.05 |
| | >=10 cups | 2 (16.7%) | | 4 (10.8%) | | 9 (25.7%) | |
| Depression | Yes | 2 (16.2%) | >0.05 | 6 (16.2%) | >0.05 | 4 (11.4%) | >0.05 |
| | No | 10 (83.3%) | | 31 (83.8%) | | 31 (88.6%) | |
| Hypertension | Yes | 1 (8.3%) | >0.05 | 11 (29.7%) | >0.05 | 12 (34.3%) | >0.05 |
| | No | 11 (91.75) | | 26 (70.3%) | | 23 (65.7%) | |
| Neurological diseases | Yes | 0 (0%) | >0.05 | 0 (0%) | >0.05 | 2 (5.7%) | >0.05 |
| | No | 12 (100%) | | 37 (100%) | | 33 (94.3%) | |
| Chronic medications | Yes | 1 (8.3%) | <0.05 | 4 (10.8%) | <0.05 | 12 (34.3%) | <0.05 |
| | No | 11 (91.7%) | | 33 (89.2%) | | 23 (65.7%) | |

UTI: Urinary tract infection

**Table 3. Severity of UI based on UI subtypes**

| UI symptoms | | Types of UI n=84 | | | Total n=84 (%) | p value |
|---|---|---|---|---|---|---|
| | | SUI n=12(%) | UUI n=37 (%) | MUI n=35 (%) | | |
| Duration of UI symptoms | ≤ 3 months | 4 (33.3%) | 8 (21.6%) | 3 (8.6%) | 15 (17.9%) | >0.05 |
| | > 3 months | 8 (66.7%) | 29 (78.4%) | 32 (91.4%) | 69 (82.1%) | |
| Frequency of urine leakage | Once or more weekly | 5 (41.7%) | 7 (18.9%) | 5 (14.3%) | 17 (20.2%) | >0.05 |
| | 2-3 times weekly | 0 (0%) | 7 (18.9%) | 5 (14.3%) | 12 (14.3%) | |
| | 3-5 times weekly | 1 (8.3%) | 0 (0%) | 0 (0%) | 1 (1.2%) | |
| | Once or more daily | 6 (50%) | 23 (62.2%) | 25 (71.4%) | 54 (64.3%) | |
| Amount of urine leakage | Never | 0 (0%) | 10 (27%) | 2 (5.7%) | 12 (14.3%) | <0.05 |
| | Few drops | 7 (58.3%) | 14 (37.8%) | 14 (40.0%) | 35 (41.7%) | |
| | Moderate amount | 2 (16.7%) | 11 (29.7%) | 9 (25.7%) | 22 (26.2%) | |
| | Large amount | 3 (25%) | 2 (5.4%) | 10 (28.6%) | 15 (17.9%) | |

## Discussion

This cross-sectional study was designed to determine the prevalence and risk factors of UI and its subtypes among females in Taif City. The results showed that the prevalence of UI among participating females was 16.8%. The prevalence rate was increased with increase in the age of participants. The study results showed a lower UI prevalance rate than other similar studies conducted in Riyadh (41.4%) and Jeddah (29%) cities of Saudi Arbia (7, 8). The highest rate of UI was observed in the age above 50 years. The increased incidence of UI with a higher age group may be due to the fact that these females may experience gradual loss of muscle tone, reduction in contractility, hormonal changes, and could also be due to repeated injuries during vaginal deliveries of child birth (25). It was also noted that UI was comparatively higher in females with increased BMI. These findings were in accordance with several studies conducted in different countries where they reported a positive association with increased BMI (12, 13, 18, 26).

The study results further exhibited that there was an association between marital status and the incidence of UI. Married females had more possibity of getting UI than unmarried ones. This is similar to the data reported by earlier findings (27, 28). This may be due to the reason that married females experience urogenital changes because of hormonal deficiency which might lead to vaginal dryness, reduced libido, dyspareunia and vaginal itching, and all of these changes could lead to involuntary urinary muscular control (29-31). In the present study, the most common type of UI was reported as UUI (44%). Our results were in accordance with the findings of studies conducted in Kuwait (18.7%) and the Emirates (59.4%) (6, 14), whereas, SUI accounted for the highest rate of UI in Riyadh (50%) and in Jeddah (36.4%) cities of Saudi Arabia (7, 8).

In the current study, the incidence of all types of UI was assosiated with age, pregnancy, and use of medications. The association of UI with age is well characterized. A meta-analysis study reported that the age specific incidence was less than 2/1,000 person-years before age 40 years and it increased thereafter (32). In prior studies, pregnant females stated a significant association with UI (19, 20). It occurred due to pressure on bladder by coughing, sneezing, laughing, exercising, or lifting heavy objects (33). In the current study, the frequency of involuntary urine loss was 'more than once daily' in the majority of participants. This finding is in accordance with the study conducted by Deffieux et al (34). About two-thirds of the participants reported that they had at least one or more daily urine leak. Similar results were reported by studies conducted in Europe and the USA (35, 36). Excessive diurnal frequency of excretion (more than eight times per day) was reported in a study conducted by Swithinbank et al (37). Most of the females did not seek medical help because of shyness or other personal reasons. Some of the females stated that there is no treatment available for UI; some believed that UI does not need a treatment. These findings are similar to reports by other studies (38, 39). In the current study, 19% of females used different medications to manage UI symptoms. On the other hand, the study results indicated that UI had a negative impact on the quality of females' lives and effects on emotional, socio-demographic, and lifestyle domains. The majority of females experienced anxiety, difficulty in coughing, or sneezing in public. It also decreased their physical recreation and social activities. These results are in accordance with the earlier findings that UI significantly reduced the quality of life in females and had a major impact on their mental and social determinants of health (8, 11-13, 16, 22).

## Conclusion

UI was prevalent among females in Taif city, with a higher rate of UUI and had a negative impact on the quality of life. Higher age, lower education level, marriage, multiple pregnancies, constipation, and use of some chronic medications are associated risk factors for UI subtypes. Most of the females in the study preferred to use medicines than surgery to manage UI. The prevalence of UI is expected to increase in females with increase in age which may put a burden on health-care services in the future. In order to limit the burden, physicians must be updated and aware of screening, diagnosis and management of UI conditions to improve the quality of life of females.

**Limitations of the study**
Further research is needed to extend the generalizability of the present findings to reduce any potential bias. Specific information about exercise and sexual behavior is also required. The study relied on patient reporting of symptoms only, not on the clinical data.

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