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Original Article

A national survey of lower urinary tract symptoms in Jordan

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KEYWORDS

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Abstract *Objective:* To determine the prevalence of lower urinary tract symptoms (LUTS) and their severity population in Jordan.

Methods: This cross-sectional survey was conducted using a paper-based survey between August and September in 2019. The study was carried out in the health care centers or hospitals in three different regions of Jordan: North (Irbid and Jarash), Middle (Amman, Madaba, Salt, and Zarqa), and South (Karak and Aqaba).

Results: To estimate the prevalence of LUTS, two definitions were used, including the first definition (presence of any LUTS regardless of the degree of severity) and the second definition (presence of any LUTS that occurs half the time or more). According to the first definition, 1038 (89.9%) reported LUTS (male: 47.3%, female: 52.7%), while 763 (66.1%) reported LUTS according to the second definition (male: 45.6%, female: 54.4%). According to the International Prostate Symptom Score characterization, 73.9% had nocturia and 62.9% reported daytime increased frequency.

Conclusion: LUTS are highly prevalent among the Jordanian population, and more than half of them have nocturia or daytime increased frequency as most frequently reported symptoms.

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1. Introduction

Lower urinary tract symptoms (LUTS) is a term that covers symptoms resulting from conditions and diseases affecting the bladder and the urethral sphincter, which include storage symptoms, voiding symptoms, and post-micturition symptoms. LUTS are highly prevalent in both genders worldwide and are expected to be a significant concern to physicians as it is clearly shown that the prevalence of LUTS increases with age [1]. The term LUTS was first introduced as a replacement for the term prostatism in 1994 [2]. In 2002, the International Continence Society (ICS) classified LUTS into three categories: voiding symptoms, storage symptoms, and post-micturition symptoms [3]. Several studies used the American Urological Association Symptom Index questionnaire or the International Prostate Symptom Score (IPSS), an international version of the American Urological Association Symptom Index; these studies reported a wide range of prevalence of LUTS from 15.8% to 46.2% and demonstrated the association of the prevalence of LUTS with age [4–9].

Until now, little is known about the prevalence of these conditions in the Arab countries in general, especially Jordan. Two publications that came from Saudi Arabia have studied these conditions in specific populations [10,11]. Arafa et al. [10] studied LUTS in Saudi men and found that LUTS were common among over 40-year-old men; the prevalence increases with age; and most of them were displeased because of their urinary symptoms, mainly frequency and incomplete emptying, and poor quality of life (QoL) mainly determined by individual symptoms. Alzammam et al. [11] studied LUTS in young adults, which showed LUTS were highly prevalent among young adults and were reported by 49.3%; urgency (27.8%) was the most common LUTS and bothersome symptom for females, while for males, incomplete emptying (19.4%) was the most common LUTS and bothersome symptom.

The overarching aim of this study was to determine the prevalence of LUTS in Jordan. Further, it aimed to describe the relation of demographic factors as age and gender to LUTS in Jordan. Its objectives were to evaluate the relation between the degree of severity of LUTS with gender and age group, to assess the participants' perception of their urinary symptoms, and to establish a urinary tract symptoms database in Jordan.

2. Patients and methods

2.1. Study design

A cross-sectional survey was designed to collect the required data.

2.2. Study settings

This national survey was conducted using a paper-based and self-administered questionnaire between August and September in 2019. The study was carried out in the health care centers or hospitals in three different regions in Jordan: North (Irbid and Jarash), Middle (Amman, Madaba,

Salt, and Zarqa), and South (Karak and Aqaba) using a standardized protocol under the guidelines of IPSS.

2.3. Study population

The study population included men and women aged between 18 and 65 years old, visiting health care centers or hospitals including patients, visitors, companions, and assistants, and willing to participate in the study from three different regions of Jordan. The study excluded all patients within urological departments. The sample size for each sector was calculated using OpenEpi program (Open Source Epidemiology statistics for Public Health, version 3.03, UK) to be 384 (unknown prevalence of 50%) rounded to 400, with a total of 1200. The pre-determined sample size was allocated to the sub-sectors according to the population density.

2.4. Ethical consideration

The study proposal was approved by the institutional ethics committee (Mu'tah Faculty of Medicine Ethics Committee, reference number 201931) and was performed in compliance with Good Clinical Practice and accordance with the Declaration of Helsinki. Informed consents were provided to all participants.

2.5. Data collection

The survey included questionnaires that were intended to be self-administered by those who can read and write. If any participant could not read or write, the research investigators provided non-directive assistance to those patients. During the study, data collection and digitization were performed by three co-investigators (Albadawi I, Alhawatmeh M, and Murad A), who were supervised by the principal investigator (Sawaqed F), and participant identity was kept confidential. The survey included the sections on demographics, perception of urinary symptoms, and Arabic version of the questionnaires.

The demographic and personal data section had questions regarding age, gender, marital status, weight and height (used to calculate body mass index), and participants' smoking status. For female participants, pre-menopausal (regular or irregular cycle), post-menopausal, and parity were asked. It also had further questions about daily fluid and caffeine intake and voiding habits, such as the preferable position during voiding, availability of toilets at the workplace, and the need to hold urine to avoid urination at the workplace or outside the residence. Here, the increased urine frequency was urinating more than 6–8 times per day. In an asymptomatic person, a median daytime void was every 3–4 h with the correlation of 5.3 voids every day, which is consistent with published normal urinary frequency estimations of 5.5–6.7 voids every day [12]. Therefore, our study used six times per day as a cut-off number [13]. Nocturia is defined as waking up from sleep to urinate, where each micturition is followed by sleep. However, nocturia is clinically meaningful if a patient goes 2–3 times or more to urination.

The participants completed IPSS and the International Consultation on Incontinence Short-Form questionnaire. These questionnaires were validated and translated to the Arabic language [14,15]. The last section on the participants' perception of their urinary symptoms included questions regarding medical consultation about their symptoms, what specialty they consulted, and if they did not look for medical consultation and what were the reasons. The patients' symptoms were categorized based on severity using the IPSS symptoms severity grading system. The relation between IPSS QoL and IPSS symptom severity was also examined. SPSS software (version 25, IBM Corporation, Armonk, NY, USA) was used for the analysis of data. A Chi-square test was used to evaluate the relation between the degree of severity of LUTS with gender and age group. The Spearman correlation was used to test the correlation between urinary incontinence (UI) and obstetric history. The *p*-value of less than 0.05 was considered statistically significant.

3. Results

A total of 1200 participants were recruited for the study. The records of 45 respondents were excluded because of missing data; therefore, a response rate of 96.2% was observed. Consequently, the data of 1155 respondents were included in the study analysis; mean age was 38.09 (standard deviation 14.84) years, 601 (52.0%) females, and 554 (48.0%) males. Descriptive and demographic characteristics are shown in Table 1. In the context of voiding habit, 1083 (93.8%) respondents reported having access to toilets at their workplace. However, 559 (48.4%) had to hold urine and toilet facility was not available at work. Twenty-eight point four percent of the participants were smokers, and 84.2% of the participants preferred sitting positions during voiding (Table 1).

To estimate the prevalence of LUTS, two definitions were used: the first definition (presence of any LUTS regardless of the degree of its severity), and the second definition (presence of any LUTS that occur half the time or more). According to the first definition, 1038 (89.9%) participants (47.3% males and 52.7% females) reported LUTS, while 763 (66.1%) participants (45.6% males and 54.4% females) reported LUTS according to the second definition.

Furthermore, LUTS were categorized according to the ICS classification into storage symptoms (frequency, urgency, nocturia, and incontinence), voiding symptoms (intermittency, weak stream, and hesitancy), and post-voiding symptoms (incomplete emptying, post-micturition dribble, or needing to revoid within a short period of time). According to the ICS classification, 87.4% reported storage symptoms; 52.1% reported voiding symptoms; and 40.3% reported post-voiding symptoms.

The most prevalent LUTS were nocturia and daytime frequency; a total of 73.9% participants reported nocturia, and 62.9% reported daytime frequency; furthermore, the prevalence of incomplete emptying, intermittency, urgency, weak stream, and straining was 40.2%, 38.4%, 43.8%, 33.1%, and 31.3%, respectively (Table 2).

When stratified by gender and age group, LUTS in males were highly prevalent in the age groups of 18–20 years old

Table 1 Descriptive and demographic characteristics.

Variable	Result
Age ^a , year	38.09±14.84
Body mass index ^a , kg/m ²	26.46±5.36
Number of pregnancy ^{a,b}	2.33±2.81
Number of normal vaginal delivery ^{a,b}	1.95±2.72
Number of cesarean section ^{a,b}	0.39±1.07
Caffeine cups per day ^a	2.59±0.85
Region ^c	
Middle	393 (34.0)
North	381 (33.0)
South	381 (33.0)
Age ^c , year	
18–20	105 (9.1)
21–30	362 (31.3)
31–40	218 (18.9)
41–50	220 (19.0)
51–60	162 (14.0)
61–65	88 (7.6)
Gender ^c	
Female	601 (52.0)
Male	554 (48.0)
Marital status ^c	
Single	431 (37.3)
Married	669 (57.9)
Widow	34 (2.9)
Divorce	21 (1.8)
Smoking ^c	
No	827 (71.6)
Yes	328 (28.4)
Daily fluid intake ^c , mL	
<500	178 (15.4)
500–1000	439 (38.0)
1000–2000	349 (30.2)
2000–3000	125 (10.8)
≥3000	64 (5.5)
Position during voiding ^c	
Sitting	972 (84.2)
Standing	183 (15.8)
Toilet at your work ^c	
No	72 (6.2)
Yes	1083 (93.8)
Need to hold urine ^c	
No	596 (51.6)
Yes	559 (48.4)

^a Values are presented as mean±standard deviation.

^b Analysis included females only.

^c Values are presented as *n* (%), and total percentages may not be 100% due to rounding.

and 61–65 years old, while LUTS in females were highly prevalent in the age group of 51–60 years old (Table 3). Concerning the relation between the degree of severity of LUTS with gender and age group, female was significantly associated with the severity of incomplete emptying ($X^2=12.00$, $p=0.034$), daytime frequency ($X^2=22.07$, $p=0.001$), and straining ($X^2=11.55$, $p=0.041$). No significant association was noticed for intermittency, urgency, weak stream, or nocturia with gender ($p>0.05$).

Table 2 Prevalence (%) of lower urinary tract symptoms according to the International Prostate Symptom Score questionnaire.

Gender	Incomplete emptying		Daytime frequency		Intermittency		Urgency		Weak stream		Straining		Nocturia	
	Non-symptomatic	Symptomatic	Non-symptomatic	Symptomatic	Non-symptomatic	Symptomatic	Non-symptomatic	Symptomatic	Non-symptomatic	Symptomatic	Non-symptomatic	Symptomatic	Non-symptomatic	Symptomatic
Female	57.0	42.9	33.1	66.8	60.0	39.9	54.0	45.9	64.0	35.9	67.5	32.4	24.1	75.8
Male	62.6	37.3	41.3	58.6	63.3	36.6	58.4	41.5	70.0	29.9	69.8	30.1	28.1	71.8
Total	59.7	40.2	37.0	62.9	61.6	38.4	56.1	43.8	66.9	33.1	68.6	31.3	26.0	73.9

Furthermore, there was no statistically significant impact of age group on LUTS.

Table 4 presents LUTS prevalence concerning gender. Chi-square analysis was performed to examine the differences between both male and female participants. The findings showed a statistically significant difference between male and female participants regarding frequency ($p=0.001$). However, nocturia was the most common complaint among both male and female patients.

The IPSS was mild in 51.8% of the participants, moderate in 32.0% of the participants, and severe in 5.7% of the participants (Table 5). The QoL was significantly affected by the IPSS category ($X^2=551.7$, $p<0.001$).

Of the total study population, UI was reported by 249 (21.6%) participants (61.8% females and 38.2% males). There was a statistically significant difference between the types of incontinence reported by males and females ($X^2=58.6$, $p<0.001$). Urgency, stress, and mixed incontinence were predominant in females. On the contrary, urgency and post-void UI were predominant in males. Of the females who reported UI, 38.31% of them reported urgency UI, 35.06% reported stress UI, and 14.29% reported mixed UI.

Spearman correlation coefficient was computed to assess the relationship between the responses to the International Consultation on Incontinence Short-Form questionnaire and the obstetric history of female participants. There was a significant correlation between the type and frequency of UI with the number of pregnancies, number of normal vaginal deliveries, and the number of Cesarean sections. Moreover, a significant but weak correlation was found between the amount of urine leakage and the impact of UI on QoL with the number of pregnancies and the number of normal vaginal delivery (Table 6).

Only 295 (25.5%) participants considered their LUTS as a medical problem that warrant medical consultation; 20.7% ($n=61$) visited general practitioners; 10.5% ($n=31$) visited gynecologists; and 56.6% ($n=167$) visited urologists.

On the other hand, the majority of those who did not look for medical consultation considered their complaints as mild symptoms (589 [51.0%]). Other reasons were that symptoms were related to normal aging (9.1%), developed coping and adaptation behaviors toward LUTS (7.8%), symptoms being related to previous medical situation (3.0%), and feeling embarrassed of discussing the symptoms (2.7%). The reason for not looking for medical consultation was significantly affected by age group; those who were younger reported milder symptoms than older ones, and tended to develop more coping and adaptations mechanisms; on the contrary, those who were older tend to consider that their symptoms were normal due to aging or related to previous medical situation ($X^2=541.4$, $p<0.001$).

4. Discussion

This study represents the first population-based survey of LUTS in Jordan; while, previous local epidemiological studies focused on UI [16–18]. The survey used in this study included the IPSS and the International Consultation on Incontinence Questionnaire—Urinary Incontinence Short-Form questionnaires used for similar studies worldwide [19–24]. The results showed that LUTS were highly

Table 3 Lower urinary tract symptoms prevalence (n [%]) stratified by gender and age group.

Characteristic	Age group, year					
	18–20	21–30	31–40	41–50	51–60	61–65
Incomplete emptying						
Male	25 (47.2)	47 (31.1)	45 (42.9)	38 (35.2)	27 (32.1)	25 (47.2)
Female	20 (38.5)	90 (42.7)	51 (45.1)	49 (43.8)	36 (46.2)	12 (34.3)
Frequency						
Male	32 (60.4)	77 (51.0)	65 (61.9)	62 (57.4)	54 (64.3)	35 (66.0)
Female	28 (53.8)	144 (68.2)	74 (65.5)	76 (67.9)	59 (75.6)	21 (60.0)
Urgency						
Male	29 (54.7)	53 (35.1)	44 (41.9)	46 (42.6)	31 (36.9)	27 (50.9)
Female	26 (50.0)	89 (42.2)	52 (46.0)	57 (50.9)	40 (51.3)	12 (34.3)
Intermittency						
Male	21 (39.6)	49 (32.5)	36 (34.3)	39 (36.1)	34 (40.5)	24 (45.3)
Female	17 (32.7)	76 (36.0)	56 (49.6)	40 (35.7)	37 (47.4)	14 (40.0)
Weak stream						
Male	19 (35.8)	42 (27.8)	32 (30.5)	31 (28.7)	23 (27.4)	19 (35.8)
Female	15 (28.8)	56 (26.5)	50 (44.2)	47 (42.0)	38 (48.7)	10 (28.6)
Straining						
Male	23 (43.4)	39 (25.8)	32 (30.5)	32 (29.6)	22 (26.2)	19 (35.8)
Female	13 (25.0)	59 (28.0)	42 (37.2)	42 (37.5)	30 (38.5)	9 (25.7)
Nocturia						
Male	41 (77.4)	105 (69.5)	77 (73.3)	74 (68.5)	58 (69.0)	43 (81.1)
Female	36 (69.2)	161 (76.3)	85 (75.2)	88 (78.6)	59 (75.6)	27 (77.1)

Table 4 Lower urinary tract symptoms prevalence stratified by gender.

Characteristic	Value, n (%)	p-Value
Incomplete emptying		0.034
Female	258 (42.9)	
Male	207 (37.4)	
Frequency		0.001
Female	402 (66.9)	
Male	325 (58.7)	
Intermittency		>0.05
Female	240 (39.9)	
Male	203 (36.6)	
Urgency		>0.05
Female	276 (45.9)	
Male	230 (41.5)	
Weak stream		>0.05
Female	216 (35.9)	
Male	166 (20.9)	
Straining		0.041
Female	195 (32.4)	
Male	167 (30.1)	
Nocturia		>0.05
Female	456 (75.9)	
Male	398 (71.8)	

Table 5 The relation between the severity of the IPSS and QoL.

QoL	IPSS category, n (% within IPSS and QoL)				Total, n
	No symptom	Mild	Moderate	Severe	
Delighted	108 (22.2)	320 (65.7)	54 (11.1)	5 (1.0)	487
Pleased	11 (3.4)	200 (61.5)	108 (33.2)	6 (1.8)	325
Mostly satisfied	1 (0.6)	41 (25.3)	113 (69.8)	7 (4.3)	162
Mixed	1 (1.3)	20 (25.6)	42 (53.8)	15 (19.2)	78
Mostly dissatisfied	0 (0.0)	7 (14.6)	30 (62.5)	11 (22.9)	48
Unhappy	0 (0.0)	4 (12.5)	14 (43.8)	14 (43.8)	32
Terrible	0 (0.0)	6 (26.1)	9 (39.1)	8 (34.8)	23
Total	121 (10.5)	598 (51.8)	370 (32.0)	66 (5.7)	1155

IPSS, International Prostate Symptom Score; QoL, quality of life.

prevalent in the Jordanian population; the presence of at least one-time LUTS regardless of the degree of severity was reported in 89.9%. This prevalence was slightly higher in Jordan compared with studies in other countries (Table 7). In a population-based, cross-sectional survey conducted by Irwin et al. [19] in Canada and four European countries, at least one-time LUTS was reported by 64.3% of the

participants. Our results were similar to a survey conducted in Egypt that 86.0% of the participants had experienced at least one-time LUTS [25]. Alternatively, according to the second definition, 66.1% reported at least one-time LUTS that occurs half the time or more which was equal to the 75.0% reported by Soler et al. [26] in their survey in Brazil. Another study conducted in Turkey, Russia, and the Czech

Table 6 The Spearman correlation between urinary incontinence and obstetric history.

Obstetric history	Urinary incontinence			
	Frequency	Amount	QoL	Type
Pregnancy				
Spearman correlation	0.269**	0.279**	0.266**	0.248**
p-Value	0.000	0.000	0.000	0.000
Normal vaginal delivery				
Spearman correlation	0.226**	0.240**	0.231**	0.210**
p-Value	0.000	0.000	0.000	0.000
Cesarean section				
Spearman correlation	0.110**	0.104*	0.082*	0.088*
p-Value	0.007	0.011	0.045	0.030

QoL, quality of life.

* Correlation is significant at 0.05.

** Correlation is significant at 0.01.

Table 7 Comparison of lower urinary tract symptoms prevalence with previous studies.

Study	Population	Prevalence, %
Current study	Jordan	89.9
Hammad and Kaya [14]	Jordan (women)	58.5
Hashim et al. [15]	Poland	69.8
Yoo et al. [28]	Republic of Korea (>40 years)	68.2
Soler et al. [26]	Brazil	75.0
Irwin et al. [19]	Canada, Germany, Italy, Sweden, and United Kingdom	64.3
Coyne et al. [20]	USA, United Kingdom, and Sweden	59.6, 60.6, and 52.3
Al-Mehaisen et al. [16]	Denmark (one rural and one urban county)	27.8
Liao et al. [31]	China (Taipei)	9.9–44.5
Mourad et al. [25]	Egypt	86.0
Kogan et al. [27]	Turkey, Russia, and Czech Republic	84 (women); 80 (men)

Republic reported a high prevalence of LUTS (84% in women and 80% in men) [27]. One of the contributing factors for the higher prevalence of LUTS among Middle East countries like Jordan, Egypt, and Turkey is that the majority of the population is Muslim, where cultural and religious opinions are related to urination and purity before and during praying essentially. Another factor is the usage of a paper-based and

self-administered questionnaire by those who can read and write. If any participant could not read or write, the research investigators provided non-directive assistance to those patients. Thirdly, the consent by participants to participate in the study also influenced survey results.

LUTS prevalence was slightly higher in females than males (according to both the first and second definitions). A similar gender difference in the prevalence of LUTS was reported in the Epidemiology of LUTS (EpiLUTS) study, which showed that women in the United States, the United Kingdom, and Sweden have at least one-time LUTS sometimes or often [20]. According to the IPSS categorization of LUTS, the storage symptoms were prevalent in both genders, particularly, nocturia (73.9%) and daytime frequency (62.9%) being more prevalent. A similar finding was observed in the European Prospective Investigation into Cancer and Nutrition study [19]; the prevalence of storage LUTS (men, 51.3%; women, 59.2%) was greater than that for voiding (men, 25.7%; women, 19.5%) and post-micturition (men, 16.9%; women, 14.2%) symptoms combined. Furthermore, our study results are in accordance with other epidemiological studies that showed storage symptoms were the most prevalent ICS symptom category in both men and women [20,26,28]. The results of our study demonstrated that sitting position while voiding (84.2%) was preferred. Our study participants adopted this posture because of their cultural and religious opinions stating that voiding in sitting position could prevent the impact of urine spray and hide the private parts of the body. Nonetheless, another study assessed flowmetry differences in various positions among male and female participants, and there were no significant differences in any of the parameters between voiding positions in either group [29]. The mean with standard deviation values for maximum flow rate and average flow rate were obtained in the sitting (24.29 ± 0.73 mL/s and 15.67 ± 0.37 mL/s), crouching (23.28 ± 0.64 mL/s and 15.56 ± 0.33 mL/s), and standing (23.58 ± 0.63 mL/s and 15.81 ± 0.34 mL/s) positions in men. While in women, the mean with standard deviation values for maximum flow rate and average flow rate values were obtained in the sitting (28.09 ± 0.66 mL/s and 18.26 ± 0.36 mL/s) and crouching (27.98 ± 0.59 mL/s and 17.31 ± 0.35 mL/s) positions.

When prevalence of LUTS (including incomplete emptying, frequency, urgency, intermittency, week stream, straining, and nocturia) was stratified according to age and gender, it was found that the prevalence of LUTS was higher in males under the age of 20 years or over the age of 61 years, while it was higher in female aged 51–60 years old. LUTS in children was studied [30], and results showed that 66.7% of the children suffered from combined nighttime and daytime incontinence. Another study observed that age was highly associated with the prevalence of LUTS in the peri-menopausal age group of 40–60 years old [31]. This could be due to increase in age and linear decrease in estrogen levels; however, further study is needed to form any causal relationship. Another study suggested that the prevalence of LUTS is common in women aged 23–62 years who are in employment due to various reasons such as voiding, post-micturition symptoms, availability of toilet facility, and lack of toilet of taking professional help [16]. It further posits that women in employment age have to play various roles which might compromise their health.

Comparatively, in another study men more than 59 years of age had a high prevalence of LUTS compared to that of less than 59 years showing high correlation between age and LUTS in men [6]. It could be due to the high prevalence of benign prostatic enlargement in men or that they perceive LUTS symptoms differently than young males do [6,32]. However, it is a silent public health issue in older men and young women that requires more community preventative measures.

In this study, UI was prevalent in both males and females. However, the types of UI due to urgency, stress, and mixed incontinence were high in women. The type of UI, frequency, amount, and QoL due to UI were correlated with the number of pregnancies, normal vaginal delivery, and Cesarean sections in women. The risk of having UI increases with more pregnancies and deliveries [33]. It was seen that in men with an increase in severity of IPSS, the score of IPSS QoL increased (in feeling terrible and unhappy) or decreased (in feeling delighted or pleased). It could be because the presence of UI is associated with prostate enlargement, prostate cancer, and severe depression [34]. However, the present study did not focus on psychological issues associated with UI.

It was noticed that the prevalence of LUTS was very high in the participants; however, only 25% of them sought medical attention. It is because mostly in young people, they had mild symptoms and better coping and adaptable behavior, which makes it mostly undocumented. Alternatively, the old people considered it a normal phenomenon in aging, a misconception causing behavior of not seeking medical attention. Further, due to the sensitivity of the matter, most people reported being shy or embarrassed to report it. These are consistent reasons of non-reporting identified in other studies [25,35,36]. Therefore, there is need to spread community awareness regarding LUTS in people regardless of age and gender.

It is critical that a large percent of population (89.9%) complained LUTS; however, only 25.5% who reported LUTS were interest in seeking treatment. This raises the question of whether we over-diagnosed overactive bladder and whether we need to review our definition and interpretation of the questionnaire. In addition, a qualitative study of patients with LUTS symptoms who do not seek treatment is recommended, as it may give in-depth insight into the perception regarding LUTS and the reasons for not consulting doctors about symptoms.

4.1. Significance of this research

In Jordan, there is a gap in the literature regarding the data on the prevalence of LUTS. The finding in this study will help in providing those data, and the results can be used as a base for further researches in this field. Further, it draws the physicians' attention to the factors related to LUTS and will help them in its prevention and management.

4.2. Limitation

To make this study as one of the high quality, all measures were taken to prevent biases. However, as this was a multi-center study, chances of potential educational and selection

biases prevail. Further, due to the nature of the subject, the participants might have provided answers that are socially desirable or accepted; therefore, it might have social desirability bias. However, to lower this bias, all participants were provided privacy while filling the form, and they were assured confidentiality and anonymity of their responses. The data were collected from a few hospitals; therefore, future studies with larger sample sizes and more study settings at different regions of Jordan are required to have a clearer picture of prevalence of LUTS in the Jordan population.

5. Conclusion

The study concludes that more than half of the subjects reported at least one-time LUT in more than half of the time. The prevalence of LUT in Jordanian women is slightly higher than that in men, while stored symptoms are common in both sexes. According to the characteristics of ICS, more than half of the population reported nocturia or increased daytime frequency. This requires further research in this field in order to attract more attention to its prevention and management.

Author contributions

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Conflicts of interest

The authors declare no conflict of interest.

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