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AWARENESS AND PREVALENCE OF URINARY TRACT INFECTION IN NON-PREGNANT FEMALES IN SAUDI ARABIA PREGNANT AND

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Abstract

Introduction
Urinary tract infections (UTIs) are common, particularly among women, with Escherichia coli being the primary causative agent. Susceptibility to the condition is heightened by anatomical differences and pregnancy. Despite the high occurrence of UTIs, awareness of risk factors and complications remains low among women, as indicated by recent studies. This study aimed to assess the level of knowledge and prevalence of UTIs among pregnant and non-pregnant Saudi women.

Methodology
This was a cross-sectional study involving 157 female participants from Saudi Arabia, aged 17 and above. Data were collected using an online questionnaire assessing UTI prevalence, symptoms, knowledge, and sociodemographic factors. Data were cleaned in Excel and analyzed via IBM SPSS.

Results
Our study included 157 participants, mostly Saudi nationals (139, 88.5%), with a majority from the Western region (111, 70.7%). Most of them had a Bachelor's degree (120, 76.4%), and 65 of them (41.4%) were employed. UTI prevalence was 17.8% (n = 28). Among non-pregnant participants, 17.6% (n = 27) were diagnosed with a UTI, compared to 25% (n = 1) among pregnant participants. Significant UTI prevalence was observed among housewives (42.9%, $p = 0.015$), divorced/widowed participants (42.9%, $p = 0.013$), and those with chronic diseases (38.5%, $p = 0.009$). UTI knowledge varied significantly by region (Eastern region: 10.0 ± 0.0, $p = 0.003$), education (Master's/PhD: 7.5 ± 1.8, $p = 0.004$), and marital status (married: 6.8 ± 1.7, $p < 0.001$). Nationality ($p = 1.000$) and pregnancy status ($p = 1.000$) showed no significant associations with UTI prevalence.

Conclusion
Our study identified significant associations between UTI prevalence and factors such as employment status, marital status, and the presence of chronic diseases. UTI knowledge was influenced by region, education, and marital status. However, pregnancy status and nationality did not demonstrate a significant impact on UTI prevalence.

Keywords: Urinary Tract Infection, Pregnant Women, Non-Pregnant Women, Saudi Arabia, Awareness Levels, Prevalence Study, Socioeconomic Factors, Health Education, Chronic Diseases, Escherichia coli

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Background for Research Based on Existing Literature:

Urinary tract infections (UTIs) are defined as the presence of microbial organisms in any anatomical part of the urinary tract. UTIs affecting the bladder and urethra are considered lower UTIs; hence, if the ureters or kidneys are affected, an infection is considered to be an upper UTI [1,2]. Uncomplicated UTIs typically affect women, children, and elderly patients who are otherwise healthy. Complicated UTIs are usually associated with indwelling catheters, urinary tract abnormalities, immunosuppression, or exposure to antibiotics [3]. UTIs are mostly caused by bacteria, with Escherichia coli being the most common organism for both complicated and uncomplicated UTIs [3]. UTIs are among the most prevalent health problems prompting medical care, particularly affecting women due to anatomical factors. More than 10% of adult women report at least one UTI episode every year [4,5]. UTIs can be symptomatic or asymptomatic, complicating diagnosis. Many patients experience asymptomatic bacteriuria, requires treatment to avoid complications like acute pyelonephritis, low birth weight, and preterm labor [6]. UTIs have typically been treated with broad-spectrum antibiotics; however, treatment often begins without consideration of bacterial culture or antimicrobial sensitivity patterns, leading to increased antimicrobial resistance and multidrug-resistant (MDR) bacteria [7].
Women's anatomical features, such as the absence of prostatic secretions, a shorter urethra, and the proximity of the urethra to the rectum and vagina, render them more susceptible to UTIs [8]. Other susceptibility factors include sexual intercourse, changes in bacterial flora, a history of UTIs during childhood, and pregnancy [10]. During pregnancy, women experience ureteral dilation and increased bladder tone, resulting in urinary stasis and increased infection risk. Up to 70% of pregnant women may develop glycosuria, encouraging bacterial growth [11]. Due to these anatomical and hormonal changes, pregnant women are more susceptible to UTIs, accounting for 20% of obstetric ward admissions [13]. The World Health Organization (WHO) estimates that 50% of women experience a UTI at some point in their lives [14]. Despite the high prevalence of UTIs, awareness levels remain low; a study conducted in the Asir region in 2021 found that women's knowledge regarding UTI risk factors and complications was lacking [15].

Rationale

The WHO has reported that an estimated 50% of women experience a UTI at some point in their lives [14)]. Although the prevalence is high, awareness levels are poor. A study conducted in the Asir region in 2021 regarding the awareness of UTIs among Saudi women revealed that women's knowledge and awareness regarding UTI risk factors, clinical presentation, and complications are poor, slightly higher among younger and educated females [15].

Study location

This study was conducted at King Abdul-Aziz University Hospital, Jeddah, Saudi Arabia.

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Objectives/Aims:

This study aimed to assess the existing level of knowledge regarding UTIs among Saudi pregnant and non-pregnant women and their prevalence.

Study design

Study Design

Cross-sectional

Participant selection and withdrawal

Source of Participants

Females from the general population of Saudi Arabia

Inclusion Criteria

Females above the age of 17 years living in Saudi Arabia

Exclusion Criteria

Females under 17 years of age

Participant Recruitment

Online questionnaire.

Procedures for Obtaining Informed Consent

A note was attached at the beginning of the questionnaire informing participants that the information given will be used in this research and will only be reviewed by the authors.

Statistical Analysis

A comprehensive statistical analysis was conducted on the dataset, encompassing both descriptive and inferential methodologies. A descriptive analysis was conducted to summarize the demographic characteristics of participants, which included age, nationality, and other features. Moreover, Chi-squared test and Fisher's exact test were used to identify associations between categorical variables.

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Subsequently, independent t tests and analysis of variance were used to detect differences between continuous variables. All statistical analyses were executed using IBM SPSS Software, v.29.0.0.

Results

Our study included 157 participants, of which the majority were Saudi nationals (139, 88.5%), while 18 (11.5%) were non-Saudis ***(Table 1)***. The largest proportion of participants resided in the Western region (111, 70.7%), followed by the Central region (28, 17.8%), Southern region (14, 8.9%), Northern region (3, 1.9%), and Eastern region (1, 0.6%). Most participants had a Bachelor's degree (120, 76.4%), while 24 (15.3%) had completed secondary education, 10 (6.4%) had a Master's/PhD, and 3 (1.9%) had received only a primary education. Employment status of the participants varied, with 65 (41.4%) being employed, 55 (35.0%) students, 21 (13.4%) housewives, and 16 (10.2%) unemployed or retired. The majority of the participants were single (96, 61.1%), followed by those who were married (54, 34.4%), and those who were divorced or widowed (7, 4.5%). Additionally, 130 participants (82.8%) had no chronic diseases, while 26 (16.6%) reported having a chronic disease.

Table 1: - ***Sociodemographic and other parameters of participants (n = 157)***

		Frequency N (%)
Nationality	Non-Saudi	18 (11.5%)
	Saudi	139 (88.5%)
Regions	Western	111 (70.7%)
	Central	28 (17.8%)
	Southern	14 (8.9%)
	Northern	3 (1.9%)
	Eastern	1 (0.6%)
Educational Level	Primary Education	3 (1.9%)
	Secondary/High School	24 (15.3%)
	Bachelor's Education	120 (76.4%)
	Master's/PhD	10 (6.4%)
Job Status	Unemployed/Retired	16 (10.2%)
	Housewife	21 (13.4%)
	Student	55 (35.0%)
	Employee/Worker/Freelancers	65 (41.4%)
Marital Status	Single	96 (61.1%)
	Married	54 (34.4%)
	Divorced/Widow	7 (4.5%)
Chronic Disease	No	130 (82.8%)
	Yes	26 (16.6%)

Figure 1 shows the different comorbidities among participants with UTI (n = 26). Diabetes, hypertension (HTN), and hypothyroidism were the most common comorbidities, each affecting 5

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(19.2%) participants. Asthma, Crohn's disease, and multiple sclerosis were reported by 2 participants each (7.7%). Other conditions such as gastroesophageal reflux disease (GERD), heart diseases, kidney problems, sickle cell anemia, and ulcerative colitis were less prevalent, each reported by 1 participant (3.8%).

Figure 1: - ***Different comorbidities among participants (n = 26)***

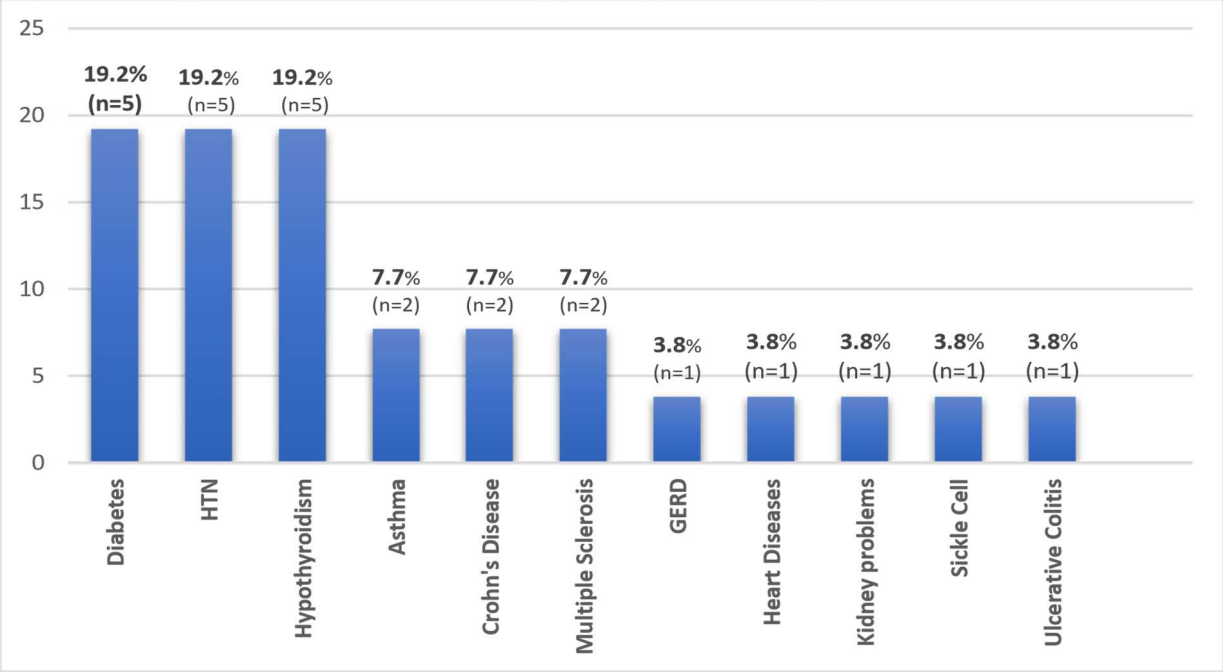

Table 2 shows different features of pregnancy and prevalence of UTI among participants. Notably, the majority were not pregnant (153, 97.5%), while 4 (2.5%) were pregnant. Of the pregnant participants, 2 (1.3%) were in their first trimester, and 2 (1.3%) were in the last trimester. Previous pregnancies varied, with 21 (13.4%) reporting 1-3 pregnancies, 13 (8.3%) having 4-6, and 5 (3.2%) having 7 or more. Regarding delivery methods, 28 (17.8%) had SVD, 10 (6.4%) had C-sections, and 1 (0.6%) had both. UTI was diagnosed in 28 (17.8%) participants, and 16 participants (10.2%) had one UTI per year. Most of them (18, 11.5%) were diagnosed between the ages of 20-39. UTIs were diagnosed mainly by doctors (28, 17.8%), with urine analysis being the most common method (19, 12.1%). UTI during pregnancy was reported by 6 (3.8%), participants, whereas its occurrence was reported in the first trimester by 2 (1.3%) and in the last trimester by 4 (2.5%). Post-childbirth complications were noted in 3 (1.9%), with each case reporting suprapubic and groin pain, leg and foot edema, and incontinence with recurrent infections (1, 0.6% each). UTI duration was < 1 week in 18 (11.5%) cases, 1 week to 1 month in 9 (5.7%), and > 1 month in 4 (2.5%). Pain intensity varied, with 8 (5.1%) experiencing intense pain and 10 (6.4%) reporting moderate pain. UTI was primarily treated through antibiotics (19, 12.1%), with Amoxicillin, Augmentin, and Fosfomycin being commonly prescribed.

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Table 2: - ***Different features of Pregnancy and prevalence of UTI among participants (n = 157)***

		Frequency N (%)
Pregnancy	No	153 (97.5%)
	Yes	4 (2.5%)
If Yes, Gestational Age	1st 3 Months	2 (1.3%)
	Last 3 Months	2 (1.3%)
Number of Pregnancies previously		21 (13.4%)
		5 (3.2%)
Method of Delivery	SVD	28 (17.8%)
	C-Section	10 (6.4%)
	Both	1 (0.6%)
Diagnosed with UTI	No	129 (82.2%)
	Yes	28 (17.8%)
UTI Occurrences/Year	Once	16 (10.2%)
	Twice	7 (4.5%)
	Thrice or more	2 (1.3%)
Age at UTI Diagnosis	<20 Years	8 (5.1%)
	20-39 Years	18 (11.5%)
	40-60 Years	5 (3.2%)
Who Diagnosed Cystitis	Myself	3 (1.9%)
	Doctor	28 (17.8%)
Diagnosis Method for Cystitis	Symptoms	5 (3.2%)
	Urine Sample Culture	7 (4.5%)
	Urine Analysis	19 (12.1%)
13 (8.3%)	1-3	
	4-6	
	≥7	
Prevalence of UTI During Pregnancy	No	10 (6.4%)
	Yes	6 (3.8%)
Time for UTI Occurrence in Pregnancy	1st 3 Months	2 (1.3%)
	Last 3 Months	4 (2.5%)
Complications During/After Childbirth	No	8 (5.1%)
	Yes	3 (1.9%)
Type of Complications	Suprapubic and Groin Pain	1 (0.6%)
	Edema of leg and foot	1 (0.6%)

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	Incontinence and recurrent infections	1 (0.6%)
UTI Duration	Less than 1 Week	18 (11.5%)
	1 Week - 1 Month	9 (5.7%)
	> 1 Month	4 (2.5%)
Pain Intensity	Intense	5 (3.2%)
	Light	8 (5.1%)
	Middle	10 (6.4%)
	Intense	8 (5.1%)
UTI Treatment	Antibiotics	19 (12.1%)
	Effervescent Sol	6 (3.8%)
	Drinking Water	6 (3.8%)
Antibiotic Name	Amoxicillin	2 (1.3%)
	Augmentin	3 (1.9%)
	Fosfomycin	1 (0.6%)

Figure 2 shows UTI symptoms among participants (n = 28). Notably, the most common symptom experienced was painful urination, reported by 18 participants (64.3%). Frequent urination was noted by 16 participants (57.1%), while 15 (53.6%) reported feeling the urgency to urinate. Groin and pubis pain were each reported by 10 participants (35.7%). Urinary incontinence was experienced by 6 participants (21.4%), and 5 (17.9%) reported blood in their urine. Fever was the least common symptom, noted by 2 participants (7.1%).

Figure 2: - ***Symptoms of UTI among participants (n = 28)***

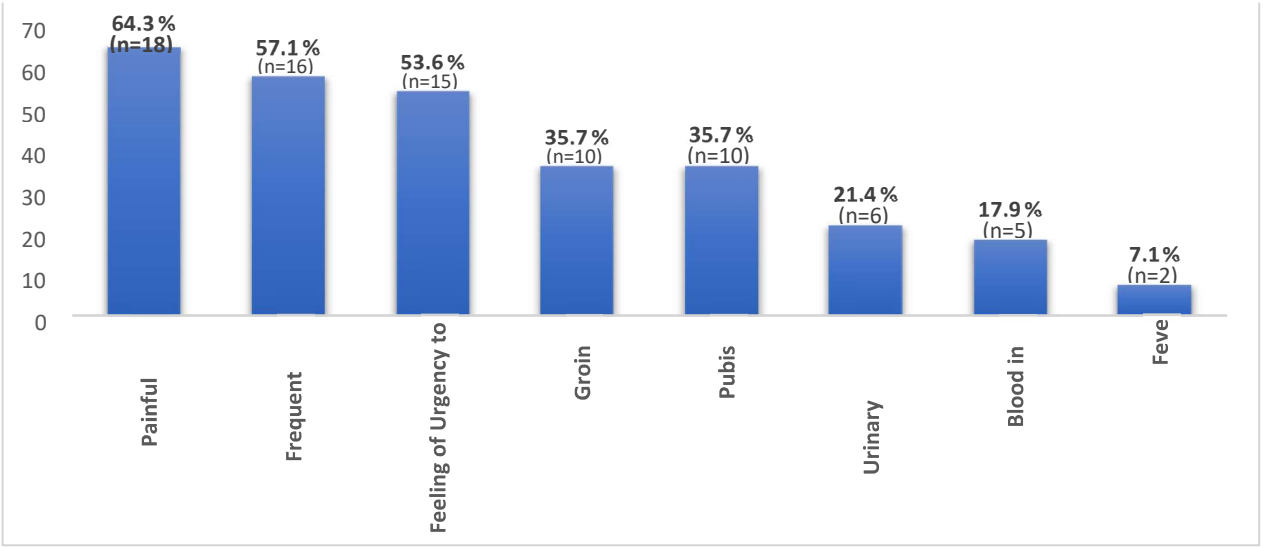

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Table 3 shows the assessment of participants' knowledge regarding UTIs which revealed that only 1 (0.6%) reported progression of their UTI to a kidney infection. A majority (118, 75.2%) had not discussed preventive measures with their doctor, although 39 (24.8%) had. Most participants (118, 75.2%) recognized that drinking more water can prevent cystitis. Additionally, 20 participants (12.7%) observed that cystitis appeared after sexual intercourse, and 52 (33.1%) reported emptying their bladder afterward. Notably, 104 (66.2%) were aware that untreated UTIs can lead to kidney infections, while 43 (27.4%) knew that untreated UTIs can be life-threatening. Furthermore, 140 (89.2%) agreed that simple check-ups can prevent complications, and 142 (90.4%) knew that not emptying the bladder can increase UTI risk. Awareness of a cystitis-preventing vaccine was low, with only 6 (3.8%) being aware.

Table 3: - ***Assessment of participants knowledge regarding UTI (n = 157)***

		Frequency N (%)
Did your UTI progress to kidney infection after the onset?	No	30 (19.1%)
	Yes	1 (0.6%)
Your doctor talked to you about preventive measures of bladder and kidney infections?	No	118 (75.2%)
	Yes	39 (24.8%)
Can drinking more water prevent cystitis?	No	39 (24.8%)
	Yes	118 (75.2%)
Have you noticed that cystitis appears after sexual intercourse?	No	60 (38.2%)
	Yes	20 (12.7%)
Do you empty your bladder after intercourse?	No	29 (18.5%)
	Yes	52 (33.1%)
Do you seek medical advice with every case of UTI?	No	78 (49.7%)
	Yes	38 (24.2%)
Did you know that untreated UTI can lead to kidney infection?	No	53 (33.8%)
	Yes	104 (66.2%)
Untreated UTIs is life-threatening events?	No	114 (72.6%)
	Yes	43 (27.4%)
A simple check-up and urine or blood test prevent complications?	No	17 (10.8%)
	Yes	140 (89.2%)
Holding urine and not emptying the bladder completely can increase the risk of UTI?	No	15 (9.6%)
	Yes	142 (90.4%)

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Do you empty your bladder frequently when it is full?	No	39 (24.8%)
	Yes	118 (75.2%)
Do you eat a lot of salty and spicy foods?	No	70 (44.6%)
	Yes	87 (55.4%)
Have you heard of a vaccine to prevent cystitis?	No	151 (96.2%)
	Yes	6 (3.8%)

Figure 3 shows overall knowledge level concerning UTI among participants (n = 157). Notably, a majority of participants (78.3%, n = 123) demonstrated high knowledge regarding UTIs (> 50th percentile). Moderate knowledge (25th-50th percentile) was observed in 31 participants (19.7%), while only 3 participants (1.9%) fell into the low knowledge category (< 25th percentile).

Figure 3: - ***Overall knowledge level regarding UTI among participates (n = 157)***

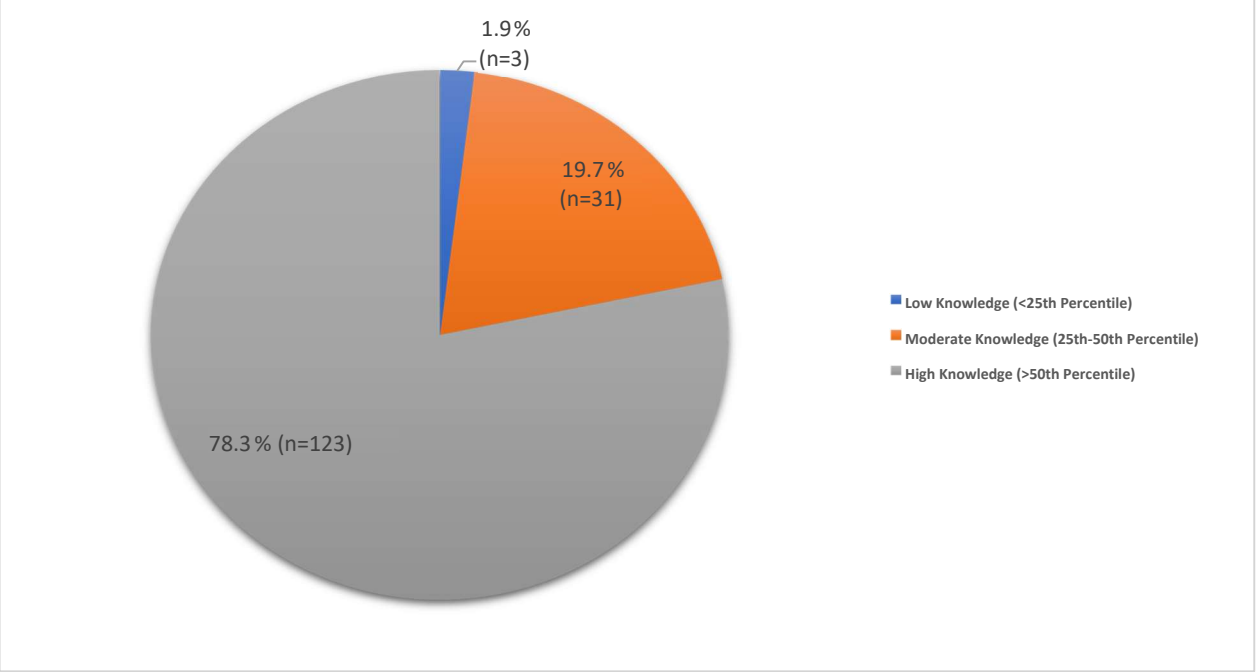

Table 4 shows the association between participants' knowledge regarding UTIs and various sociodemographic factors. Significant differences were found across regions, with Eastern region participants scoring the highest (10.0 ± 0.0, p = 0.003). Educational level was also a significant factor (p = 0.004), with those holding a Master's/PhD having the highest knowledge scores (7.5 ± 1.8). Marital status showed a strong association (p < 0.001), with married participants demonstrating higher knowledge (6.8 ± 1.7). Job status was significant as well (p = 0.037), with housewives scoring the highest (6.8 ± 1.9). Additionally, participants diagnosed with cystitis had significantly better knowledge (6.7 ± 1.8, p = 0.003). In contrast, nationality (p = 0.214), pregnancy status (p = 0.970), chronic disease (p = 0.766), and complications during/after childbirth (p = 0.788) were not

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significantly involved in differences in knowledge.

Table 4: - ***Association between participant's knowledge regarding UTI and different factors (n = 157)***

		Mean (SD)	Median	Sig. Value
Nationality	Non-Saudi	6.3 (2.0)	6	0.214 [a]
	Saudi	5.7 (1.8)	6	
Regions	Western	5.6 (1.7)	5	***0.003*** [b]
	Central	6.7 (1.7)	7	
	Southern	5.3 (2.1)	6	
	Northern	5.7 (1.5)	6	
	Eastern	10.0 (.0)	10	
Educational Level	Primary Education	6.7 (1.5)	7	***0.004*** [b]
	Secondary/High School	6.2 (1.7)	6	
	Bachelor's Education	5.5 (1.7)	6	
	Master's/PhD	7.5 (1.8)	7.5	
Job Status	Unemployed/Retired	5.2 (1.7)	5	***0.037*** [b]
	Housewife	6.8 (1.9)	7	
	Student	5.7 (1.9)	6	
	Employee/Worker/Freelancers	5.7 (1.6)	6	
Marital Status	Divorced/Widow	6.0 (1.6)	5	***<0.001*** [b]
	Single	5.2 (1.6)	5	
	Married	6.8 (1.7)	7	
Pregnancy	No	5.8 (1.8)	6	0.970 [a]
	Yes	5.8 (0.5)	6	
Chronic Disease	No	5.8 (1.8)	6	0.766 [a]
	Yes	5.7 (2.0)	5.5	
Diagnosed with Cystitis	No	5.6 (1.7)	6	***0.003*** [a]
	Yes	6.7 (1.8)	7	
Cystitis During Pregnancy	No	6.8 (2.2)	7	0.681 [a]
	Yes	6.3 (2.1)	5	
Complications During/After Childbirth	No	6.6 (2.0)	6	0.788[a]
	Yes	7.0 (2.0)	7	

(a) Independent Sample T Test, (b) ANOVA

Table 5 shows the association between the prevalence of UTIs and various sociodemographic and pregnancy-related factors. Significant associations were found with job status (p = 0.015), where housewives had the highest prevalence of UTIs (42.9%), and marital status (p = 0.013), with divorced/widowed participants reporting a higher prevalence (42.9%). Chronic disease also had a significant association (p = 0.009), with those having chronic diseases showing a higher prevalence of UTIs (38.5%). No significant associations were found with nationality (p = 1.000), pregnancy status (p = 1.000), educational level (p = 0.742), number of pregnancies (p = 0.894), or method of delivery (p = 0.509). The region showed a near-significant trend (p = 0.086), with participants from

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the Southern region having a higher prevalence of UTIs (35.7%).

Table 5: - ***Association between Prevalence of UTI and different sociodemographic and pregnancy related factors***

		UTI Presence		[a] Sig. Values
		No (N, %)	Yes (N, %)	
Nationality	Non-Saudi	15 (83.3%)	3 (16.7%)	1.000
	Saudi	114 (82.0%)	25 (18.0%)	
Regions	Western	92 (82.9%)	19 (17.1%)	0.086
	Central	25 (89.3%)	3 (10.7%)	
	Southern	9 (64.3%)	5 (35.7%)	
	Northern	3 (100.0%)	0 (0.0%)	
	Eastern	0 (0.0%)	1 (100.0%)	
Educational Level	Primary Education	3 (100.0%)	0 (0.0%)	0.742
	Secondary/High School	18 (75.0%)	6 (25.0%)	
	Bachelor's Education	99 (82.5%)	21 (17.5%)	
	Master's/PhD	9 (90.0%)	1 (10.0%)	
Job Status	Unemployed/Retired	13 (81.3%)	3 (18.8%)	***0.015***
	Housewife	12 (57.1%)	9 (42.9%)	
	Student	46 (83.6%)	9 (16.4%)	
	Employee/Worker/Freelancers	58 (89.2%)	7 (10.8%)	
Marital Status		4 (57.1%)	3 (42.9%)	***0.013***
	Single	85 (88.5%)	11 (11.5%)	
	Married	40 (74.1%)	14 (25.9%)	
Chronic Disease	No	112 (86.2%)	18 (13.8%)	***0.009***
	Yes	16 (61.5%)	10 (38.5%)	
Pregnancy	No	125 (81.7%)	28 (18.3%)	1.000
	Yes	4 (100.0%)	0 (0.0%)	
Number of Pregnancies	1-3	15 (71.4%)	6 (28.6%)	0.894
	4-6	9 (69.2%)	4 (30.8%)	
	≥&	3 (60.0%)	2 (40.0%)	
Method of Delivery	SVD	19 (67.9%)	9 (32.1%)	0.509
	C-Section	7 (70.0%)	3 (30.0%)	
	Both	0 (0.0%)	1 (100.0%)	
Divorced/Widow				

(a) Fisher's Exact Test

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Discussion

UTIs are a common type of infection, mostly caused by E. coli and affect parts of the urinary tract [16]. Zagaglia et al. (2023) showed that UTIs represent one of the most common bacterial infections, affecting one million people annually and accounting for 24% of nosocomial cases [17]. UTIs are classified as uncomplicated or complicated, the latter often associated with medical devices or conditions that compromise the immune system [18]. UTIs pose a greater risk to women due to anatomical differences [19], and are particularly problematic during pregnancy due to physiological changes that favor bacterial growth. During pregnancy, UTI can lead to serious complications, including preeclampsia, preterm birth, and poor outcomes [20]. Antibiotic mismanagement has caused significant MDR, increasing the risk of serious complications such as pyelonephritis, sepsis, and renal abscesses [21]. Awareness surrounding UTIs remains low among women, highlighting the need for better educational efforts. This study assessed UTI awareness and prevalence among Saudi women, analyzing knowledge, comorbidities, and pregnancy related factors in relation to findings.

Notably, the overall prevalence of UTIs among our participants was 17.8%, which is low compared to global and regional statistics reported in literature. However, Barnawi et al. (2024) showed that UTIs are common, affecting 50-60% of women, with a higher prevalence in pregnant women compared to non-pregnant women [22]. Moreover, Ahmed et al. (2023) showed that UTI prevalence among females in KSA was 39.3%, with burning sensation upon urination and abdominal pain being common symptoms [23]. The most affected age group in our study was between 20 and 39, aligning with global reports that women of childbearing age are at higher risk due to hormonal changes and sexual activity. Similarly, Rowe et al. (2013) showed that UTI incidence is higher in young. sexually active women aged 18-24 which is 0.5-0.7 per person-year, decreasing in middle age but rising in older adults [24].

Certain sociodemographic factors significantly influenced the prevalence of UTIs. Housewives (42.9%) and divorced/widowed participants (42.9%) had the highest prevalence rates. These findings could be linked to lifestyle factors, where limited physical activity and altered urinary habits among housewives may contribute to a higher risk of UTI. Almukhtar et al. (2018) found the highest proportion of UTIs among housewives as compared to working women [25]. Additionally, divorced or widowed participants may experience psychological stress or changes in sexual activity, which could predispose them to higher UTI risk. Similarly, Gao et al. (2022) showed that chronic psychological stress can affect urinary function and exacerbate lower urinary tract (LUT) dysfunction (LUTD) [26]. Our study also revealed a significant association between chronic diseases and UTI prevalence, where participants with conditions such as diabetes, hypertension, and hypothyroidism reported a higher prevalence of UTI. This finding aligns with a report by Barber et al. (2013), showing that chronic diseases increase UTI susceptibility due to weakened immunity and impaired urinary function [27].

Regarding awareness and knowledge of UTIs, our study found a the majority of participants (78.3%) had a high level of knowledge, while 19.7% demonstrated moderate knowledge and only 1.9% had low knowledge. Similarly, Almaghlouth et al. (2023) showed that 70.1% of their participants were aware of and had good knowledge of UTIs [28].

However, despite the high overall knowledge level, certain misconceptions persisted. For instance, only 3.8% of participants were aware of a cystitis-preventing vaccine, suggesting a gap in knowledge about preventive measures.

Moreover, educational level played a significant role in UTI awareness, with participants holding a Master's or PhD scoring the highest (7.5 ± 1.8, $p = 0.004$). This is consistent with findings from

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previous studies, which noted that higher educational attainment correlated with increased health literacy and awareness concerning UTIs. Similarly, Alshahrani et al. (2022) showed that 78.9% of women with postgraduate education had good UTI knowledge, compared to 33.3% with lower education levels ($p = 0.002$) [29]. In contrast, participants with lower educational levels, such as those with primary education only, demonstrated significantly lower awareness. This reinforces the need for targeted educational campaigns that cater to individuals with lower educational backgrounds in order to improve UTI prevention and management.

Our study found no significant difference in UTI prevalence between pregnant and non-pregnant participants, contrasting with previous research (Habak et al., 2019) suggesting that pregnancy increases UTI risk due to hormonal and anatomical changes [30]. However, our results may have been influenced by the small number of pregnant participants ($n = 4$), making it difficult to draw definitive conclusions. Previous studies have shown that UTIs during pregnancy can lead to serious complications such as anemia, preterm birth, fetal growth restriction, preterm labor, and low birth weight [31]. This underscores the importance of regular screening for UTIs during pregnancy, even though the prevalence was low in our sample.

The most frequently reported symptoms of UTI in our study were painful urination (64.3%), frequent urination (57.1%), and urgency (53.6%), which are typical of lower UTIs, as noted in previous research. This is consistent with the clinical presentation of UTIs described by Suzanne [32]. Antibiotics, especially Amoxicillin, Augmentin, and Fosfomycin, are commonly used for UTIs. However, rising antimicrobial resistance necessitates careful monitoring and stricter diagnostic protocols to prevent the spread of MDR bacteria, as noted by Paterson et al. [33]. In our study, 12.1% of participants reported being treated with antibiotics without prior urine culture, a practice that can contribute to antimicrobial resistance. This emphasizes the need for healthcare providers to ensure that treatment is guided by bacterial culture and sensitivity testing to avoid unnecessary use of broad-spectrum antibiotics.

Limitations

This study had certain limitations. Its cross-sectional design restricted causality conclusions between sociodemographic factors and UTI prevalence. The study sample mainly consisted of urban women, limiting generalizability to rural populations. The small number of pregnant participants hampered insights into the impact of pregnancy on UTI prevalence. Additionally, reliance on selfreported data introduced potential recall bias. Lastly, the use of an online questionnaire may have excluded individuals with less digital literacy, highlighting the need for diverse data collection methods in future research.

Clinical Implications and Future Directions

There is a need for targeted public health interventions for women with chronic diseases and for housewives, emphasizing routine screening and preventive advice such as hydration and hygiene practices. Increased awareness about preventive measures, including vaccines, is essential for reducing UTI recurrence and complications. Future research should focus on a more diverse sample across geographic and demographic lines, including rural areas and pregnant women, and employ longitudinal designs to clarify risk factors. Additionally, investigating antimicrobial resistance and exploring alternative treatments, such as probiotics, will be crucial for effective UTI management.

Conclusion

Our study found that UTI prevalence was higher among housewives, divorced/widowed individuals, and participants with chronic diseases. Significant associations were identified between UTI prevalence and factors such as job status, marital status, and chronic health conditions. Overall knowledge of UTIs was high, especially among educated and married participants, although gaps in awareness concerning preventive measures were noted. These findings highlight the need for targeted public health interventions to enhance UTI prevention, particularly among high-risk groups such as housewives and individuals with chronic health conditions.

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Conflict of interests

The authors declare no conflict of interest.

Informed consent:

Written informed consent was acquired from each individual study participant.

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