

AWARENESS OF UTIS AND MATERNAL-FETAL COMPLICATIONS DURING PREGNANCY: KNOWLEDGE AMONG WOMEN AND HEALTHCARE PROVIDERS IN KSA

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Abstract

Introduction: This article discusses the most prevalent disease among pregnant women, which is urinary tract infection (UTI), that linked to difficulties for both mother and fetus. There have been several studies that explore the knowledge, attitudes, and practices of women regarding UTIs in different countries, but no such study has been conducted in the KSA. therefore, in this study, we aim to explore the knowledge, attitudes, and practices of women in the KSA regarding UTIs. **Methodology:** This observational research was carried out at a Saudi Arabian antenatal outpatient clinic from July to December of 2024. The inclusion criteria are all women and healthcare providers from Saudi population who are 18-year-old or older. Excluded are males not a health care providers and women under 18-year-old. The minimum target sample size is 384 was calculated using a Raosoft sample size calculator, 95% confidence level, and 5% acceptable error. **Results:** The study investigated awareness of urinary tract infections (UTIs) and associated maternal-fetal complications among 434 participants in Saudi Arabia. The findings revealed that while 84.8% reported awareness of UTIs, only 68.2% accurately defined them. A significant 44.2% were uncertain about the complications of UTIs during pregnancy. Despite high symptom recognition (e.g., 92.4% identified painful urination), knowledge levels were low, with 42.6% categorized as having low knowledge. Furthermore, 67.5% exhibited poor adherence to UTI management practices. The data also highlighted significant correlations between knowledge, attitudes, and demographic factors such as education and occupation, emphasizing the need for improved

maternal health education. **Conclusion:** In conclusion, the findings of this study underscore a critical need for enhanced educational initiatives aimed at increasing awareness of UTIs and their potential complications among pregnant women and healthcare providers in Saudi Arabia.

Keywords: Knowledge, Awareness, UTI, Women, Saudi Arabia

Introduction:

The most prevalent disease among pregnant women is urinary tract infections (UTIs), which are linked to difficulties for both the mother and the fetus. These infections range from bacteriuria, which is asymptomatic, to acute cystitis, which is symptomatic, and pyelonephritis, which is the deadliest. The incidence of UTIs has been linked to worse pregnancy outcomes [1]. The prevalence of UTIs during pregnancy ranges worldwide, from 13% to 33%. Symptomatic bacteriuria affects 1% to 18% of women, while asymptomatic infections affect 2% to 10% of females. Prevalence has been very stable, with most observational studies (including those from low-income nations) reporting roughly comparable rates [2]. Urinary tract infections (UTIs) can result in significant mortality and expenditures on healthcare. Some may additionally lead to serious complications such as pyelonephritis and septicemia [3]. Nearly 150 million people die each year from urinary tract infections and their related consequences globally [4]. A study was published in 2021 among pregnant and non-pregnant women in Saudi Arabia, 984 was the participants in this study from different regions and about (57.6% were married and (39.2%) unmarried. Their study showed that (42.7%) of women did not have urinary tract infections during pregnancy, while (22.3%) had once (13.3%) had twice and (21.7%) had more than twice during pregnancy [5]. In 2022 study in Saudi Arabia in Asir region included 1662 females with their ages range from 18 to 59 years shows that 282 (17%) females had good awareness about urinary tract infection and its complications during pregnancy while the remaining (83%) had poor awareness level. Those who had good awareness about UTI were highly educated [6]. Another study in 2019 in Benha university, Egypt showed that (69.5%) had dissatisfying knowledge about UTI while the (30.5%) had a satisfying knowledge [7]. There have been several studies that explore the knowledge, attitudes, and practices of women regarding UTIs in different countries, but no such study has been conducted in the KSA. therefore, in this study, we aim to explore the knowledge, attitudes, and practices of women in the KSA regarding UTIs. The results of this importance of genitourinary tract health care for women with UTI, many of these women fail to receive adequate genitourinary tract health awareness. This is particularly important to reduce the risk of future harm to the women health.

Objectives:

The study set out to assess the knowledge and awareness level of UTIs and maternal and fetal complications during pregnancy among women in Saudi Arabia.

Materials and Methods

Study design:

This observational research was carried out at a Saudi Arabian antenatal outpatient clinic from July to December of 2024. During the data collection period, pregnant women with a diagnosis of urinary tract infection attended the aforementioned setting.

Inclusion and Exclusion Criteria:

All women and healthcare providers from Saudi population who are 18-year-old or older were included. However, males not a health care providers and women under 18-year-old were excluded.

Sample size:

Sample size calculation was done using Raosoft sample size calculator, the minimum required size is 384 considering the following assumption: the standard deviation (=1.96) for 95% Confidence interval and the maximum acceptable marginal error 5% (=0.05)

The Sample size was estimated by using this formula:

$n = P(1-P) * Z_{\alpha/2}^2 / d^2$ with a 95% confidence level.

n: Calculated sample size.

Z: The z-value for the selected level of confidence ($1 - \alpha$) = 1.96.

P: An estimated knowledge.

Q: $(1 - 0.50) = 50\%$, i.e., 0.50.

D: The maximum acceptable error = 0.05.

Therefore, the minimum sample size calculation was: $n = (1.96)^2 * 0.50 * 0.50 / (0.05)^2 = 384$.

Method for data collection and instrument (*Data collection Technique and Tools*):

A structured questionnaire was utilized as a research tool. This tool was taken from two relevant studies in Saudi Arabia (9)(10) The final version of the questionnaire consisted of 26 questions divided into 5 sections. Section 1 begins with the consent question and a brief summary of the study. Section 2 contains demographic characteristics including age, place of residence, occupation, level of education, and income. Section 3 and 4 The participants were questioned regarding their knowledge and attitudes of urinary tract infection and familiarity with the symptoms, severity, complication, and which factors contribute to UTI. Section 5 is particularly for the participants who have or had urinary tract infection, how they dealt with it and what symptoms did they experience.

Scoring system:

In all, 26 statements served to assess the participants' knowledge, attitude, and practices. 6 statements for demographics, 11 for knowledge, 5 for attitude, and 5 for practices. One point is given for correct answers, and zero points are given for incorrect answers or "I don't know".

For scoring, we utilized Likert scales (Dichotomous, Three-Point, and Quality Scales) The maximum score was 31 and divided as follows: The original Bloom's cut-off points, 80.0%-100.0%, 60.0%-79%,

and 59.0%, the participants divided into three groups based on their scores.

Knowledge scores varied from 0-26 points and were classified into 3 levels as follows: those with a score of 12 or below were classified as low level of knowledge, those with scores between 13 and 15 as having a moderate level of knowledge, and those with scores 16 and above were classified as high level of knowledge.

Attitude scores varied from 0-8 points and were classified according to levels as follows: those with a score of 4 or below were classified as low level of awareness, those with scores between 5 and 6 as having a moderate level of awareness, and those with scores 7 and above were classified as high level of awareness.

Practices scores varied from 0-8 points and were classified according to levels as follows: those with a score of 4 or below were classified as low level of practicality, those with scores between 5 and 6 as having a moderate level of practicality, and those with scores 7 and above were classified as high level of practicality.

Pilot test:

A total of twenty people receive the questionnaire and be requested to complete its contents. This carried out in order to assess the study's viability as well as the questionnaire's simplicity. The final study data include any of the data from the pilot investigation.

Analyzes and entry method:

On a computer, the collected data was input using the Microsoft Excel (2016) Windows software. After then, data was moved to version 20 of the Statistical Package for Social Science Software (SPSS). to be examined statistically.

Results:

Table (1) displays various demographic parameters of the participants with a total number of (434). The mean age of participants is 31.7 years and a large proportion, 28.1 percent, of them are of age 40 or above — meaning there is relatively large range of age which can impact opinions on various matters. There is a disparity in gender where 90% of the population is female. Marital status distribution unveils that this is mainly a younger demographic of the society (48.8% single). A very good educational indicator that 73.3 has been educated college level education, strong educational ledge among the participant base. Occupation data draws attention to the prevalence of students (35.7%) and one sizable chunk (37.8%) not engaged in work, asking about their economic engagement. Additionally, the geographic distribution (34.8% live in the Western region) has a large relative skew that may have implications for understanding trends and behaviors at a localized scale in this population.

Table (1): Sociodemographic characteristics of participants (n=434)

<i>Parameter</i>		<i>No.</i>	<i>Percent (%)</i>
<i>Age</i> <i>(Mean:31.7, STD:12.1)</i>	22 or less	111	25.6
	23 to 25	97	22.4

	26 to 39	104	24.0
	40 or more	122	28.1
Gender	Female	383	88.2
	Male	51	11.8
Marital status	Single	212	48.8
	Married	194	44.7
	Divorced	16	3.7
	Widowed	12	2.8
Educational level	Middle school	11	2.5
	High school	60	13.8
	College	318	73.3
	Postgraduate	40	9.2
	Uneducated	5	1.2
Occupation	Student	155	35.7
	Health care worker	39	9.0
	Non-health care worker	111	25.6
	Unemployed	98	22.6
	Freelancer	16	3.7
	Retired	15	3.5
Monthly income	5000 or less	118	27.2
	5000 - 15000	115	26.5
	more than 15000	37	8.5
	I don't have a career	164	37.8
Residential region	Northern region	87	20.0
	Southern region	34	7.8
	Central region	96	22.1
	Eastern region	66	15.2
	Western region	151	34.8

As shown in figure 1, Data on how often urinary tract infections (UTIs) are associated with various forms of inflammation found the decrease in the total sample size of 434 individuals to be significant. Belong to them 75 sufferers (approximately 17.3%) con bladder inflammation and 7 sufferers (about 1.6%) for inflammation of the kidney. However, a large proportion of 54 people (12.5%) were also found to have urethral inflammation. In addition, 296 (68.2%) of the participants had inflammation at all three anatomical locations, suggesting that UTIs have a multidimensional basis. From all the specified categories only two patients (0.5%) were classified as having no inflammation.

Figure (1): Illustrates definition of urinary tract infection among participants.

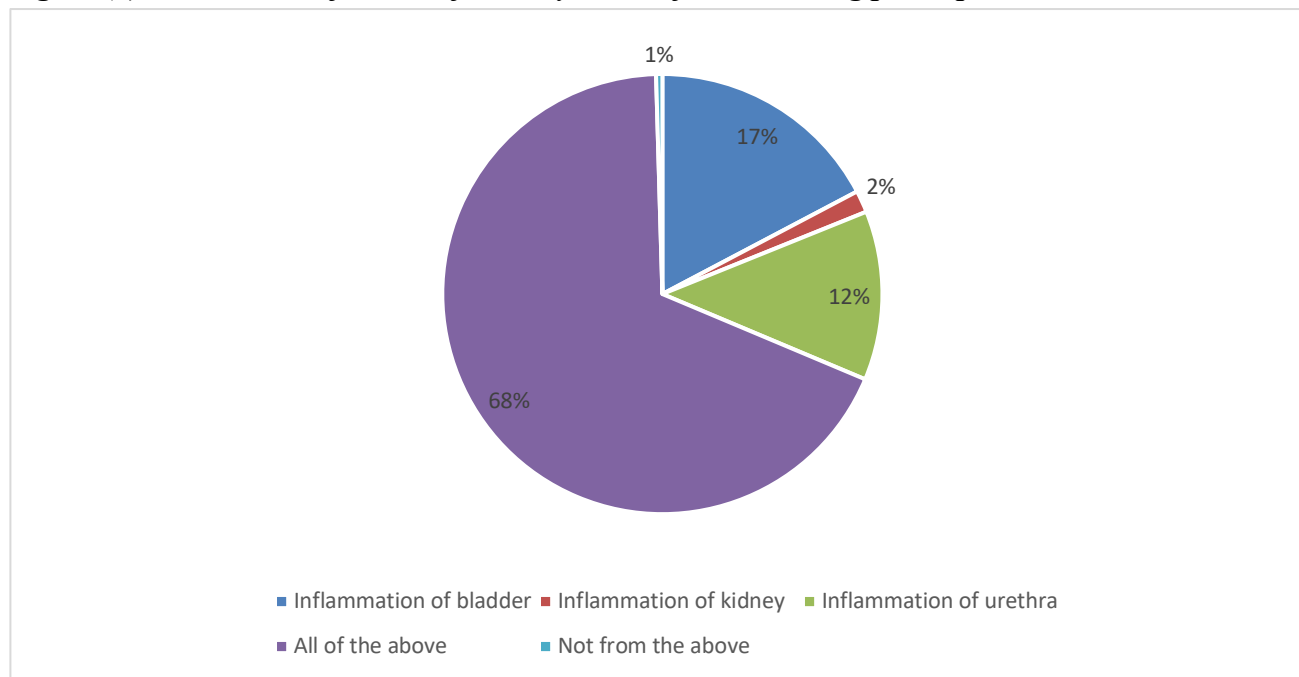


Table 2 provides data on the knowledge and awareness of some of the maternal-fetal complications associated with urinary tract infections (UTIs) during pregnancy of 434 participants. Notably, most of the people state knowledge (84.8%) but only 68.2 percent correctly specify UTIs as inflammation of the bladder, kidney and urethra. Understanding causative factors also indicates predominance of bacterial (55.8%) origins with a substantial number of respondents believing protozoa and fungi to also be contributing agents as well. Notably high is symptom recognition, with pain in urination (92.4%) and red urine (62.9% reflected). Common health education themes always empirically combined with increasing UTI susceptibility, namely inadequate perineal hygiene and fluid intake. Admittedly, awareness of the significance of UTIs in pregnancy is sadly absent with 44.2% unsure of possible complications.

Table (2): Parameters related to knowledge of UTIs and maternal-fetal complications during pregnancy (n=434).

<i>Parameter</i>		<i>No.</i>	<i>Percent (%)</i>
<i>You know what urinary tract infection (UTI) is</i>	No	66	15.2
	Yes	368	84.8
<i>The urinary tract infection (UTI) is:</i>	Inflammation of bladder	75	17.3
	Inflammation of kidney	7	1.6
	Inflammation of urethra	54	12.4

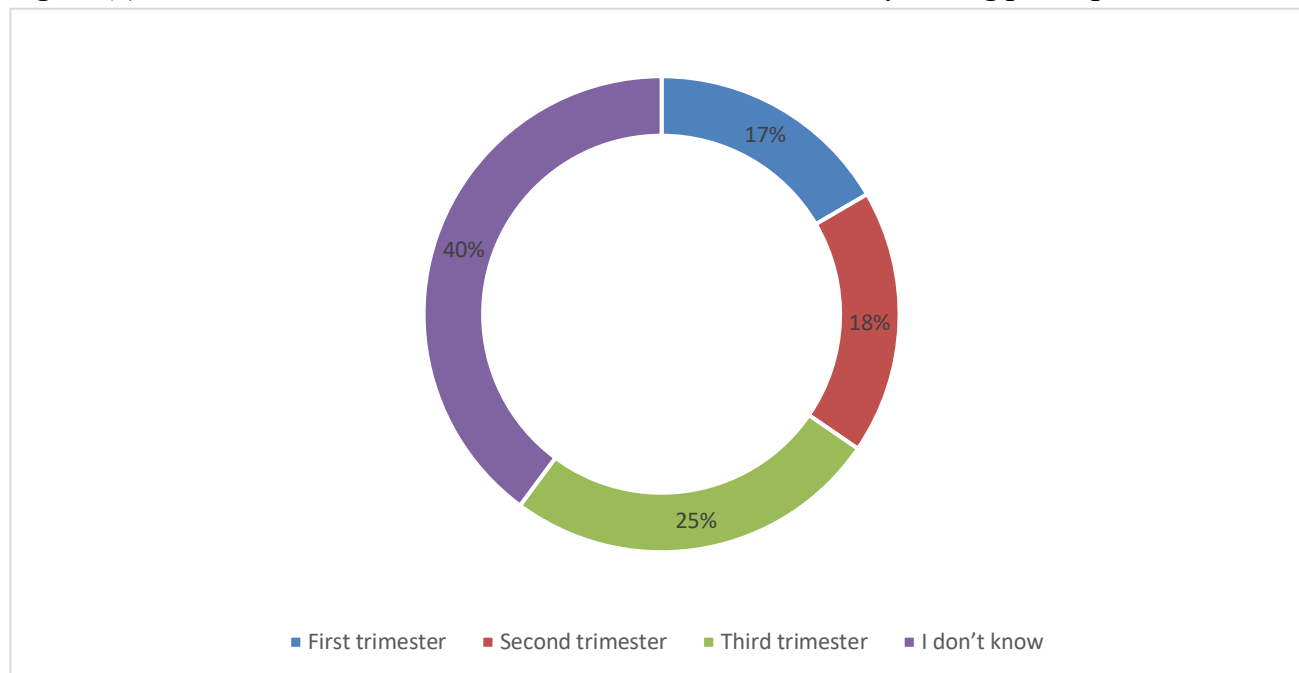
	All of the above	296	68.2
	Not from the above	2	.5
<i>What is the most common cause of urinary tract infection (UTI):</i>	Bacteria	242	55.8
	Protozoa	29	6.7
	Fungi	99	22.8
	Hygiene	51	11.8
	Bad nutrition	13	3.0
<i>Which symptom occurs with urinary tract infection (UTI) *</i>	Pain in urination	401	92.4
	Red urine	273	62.9
	Abdominal pain	180	41.5
	Fever	208	47.9
	Back pain	128	29.5
	Frequent urination	190	43.8
	Sudden desire to go bathroom to urinate	241	55.5
	Constipation	37	8.5
	Leg pain	37	8.5
<i>Which factor that increase chances to have urinary tract infection (UTI) *</i>	Don't care to clean the perineum from front and back	327	75.3
	Urination after eating	11	2.5
	Drink large amount of water	21	4.8
	Drink little amount of water	317	73.0
	Delay to urinate	331	76.3
	Others	7	1.6
<i>which factor that prevent urinary tract infection (UTI)? *</i>	Maximum care to clean the perineum from front and back	13	2.9
	drink plenty amount of water	140	32.3
	Don't hold the urine	13	2.9
	All of the above	313	72.1
	Others	2	0.5
<i>Does pregnancy increase the chance of getting UTI?</i>	No	6	1.4
	Yes	269	62.0
	I don't know	159	36.6
<i>Which of the following factors increases the risk of UTI in pregnant women? *</i>	Prolonged retention of urine	19	4.4
	Hormonal changes during pregnancy	248	5.7
	Previous diagnosis of UTI	190	43.8
	Low level of environmental/personal hygiene	155	35.7
	Diabetes	126	29.0
	Repeat pregnancy and childbirth	61	14.1

	Anatomical changes during pregnancy	139	32.0
	Advanced maternal age	32	7.4
	Sickle cell anemia	25	5.8
	I don't know	122	2.8
<i>Which months of pregnancy do you think are more likely to get UTI?</i>	First trimester	72	16.6
	Second trimester	78	18.0
	Third trimester	111	25.6
	I don't know	173	39.9
<i>Complications for a pregnant woman with a UTI *</i>	Nephritis (inflammation of the kidneys)	179	41.2
	Pre-eclampsia and eclampsia (development of high blood pressure with other symptoms)	103	23.7
	Chorioamnionitis (infection of the membranes surrounding the fetus and the amniotic fluid by bacteria)	122	28.1
	Premature labor	121	27.9
	Hypertension	47	10.8
	Sepsis	76	17.5
	Anemia	13	2.9
	I don't know	192	44.2
	<i>Which of the following are potential complications of a urinary tract infection (UTI) on the fetus? *</i>	Low birth weight	39
Intrauterine death		24	5.5
Intrauterine growth restriction (when the fetus measures small for its gestational age)		55	12.7
I don't know		234	53.9

****Results may overlap***

As shown in figure (2), From the data presented here, months of pregnancy are examined as which are perceived to be more likely to cause urinary tract infections (UTIs) and total sample size: 434 respondents. Approximately 16.6 percent of the respondents (72) indicated the first trimester as the key time for UTI prevalence, second trimester answers totalled 78 (about 18), suggesting that there is a slight increase in suspicion in this period. During the third trimester, the greatest amount of attention (111 respondents, or approximately 25.6 percent) was directed at this risk time for UTIs. On the other hand, 173 persons (nearly 39.9%) out of the sample expressed uncertainty with this matter.

Figure (2): Illustrates which trimester in which a UTI is more likely among participants.



As shown in Table 3, the data presented provides important insights into the attitudes of a sample of 434 participants toward urinary tract infections (UTIs) and perceived maternal-fetal complications during pregnancy. This striking 92.2% of respondents said they would prefer to seek hospital care when confronted with a UTI point to a reliance on professional, medical aid. Additionally, 88.9 % admitted UTI as common health problem and an equal perception among them is UTI as more common among females as strong positive belief of 68 %. A whopping 72.6% of those who knew that UTIs are serious endorsed this. Complications were of concern; 79.3 percent expected recurrent UTIs, and more than half (49.1 percent) feared consequences for pregnancy.

Table (3): participants' attitude of UTIs and maternal-fetal complications during pregnancy (n=434).

<i>Parameter</i>	<i>No.</i>	<i>Percent (%)</i>
<i>What do you think about how to deal with urinary tract infection (UTI)? *</i>	Go to the hospital	400 92.2
	Take rest at home	40 9.2
	Take antibiotics directly	22 5.1
	Take analgesic	50 11.5
	Drink more water	248 57.1
	Take more shower	16 3.7
	No idea	32 7.4
<i>Do you feel urinary tract infection (UTI) is common?</i>	No	48 11.1
	Yes	386 88.9

<i>Do you feel the urinary tract infection (UTI)</i>	Affect females more than males	295	68.0
	Affect male more than female	6	1.4
	Affects both genders equally	35	8.1
	I don't know	98	22.6
<i>Do you feel urinary tract infection (UTI) is serious?</i>	No	119	27.4
	Yes	315	72.6
<i>What are the complications you expected from urinary tract infection (UTI)? *</i>	Lead to recurrent urinary tract infection (UTI)	344	79.3
	It will affect the pregnancy if it come with it	213	49.1
	Affect the quality of life	179	41.2
	Will lead to death	41	9.4
	Decrease the weight	59	13.6
	Others	1	0.2
	I don't know	4	0.9

****Results may overlap***

The data of Table 4 shows important prevalence and management of urinary tract infections (UTI) in a cohort of 434 participants during pregnancy. About 42.2 percent of respondents said they had experienced a UTI, of which over 90.2 percent mentioned experiencing urinary pain as the main one. The discomfort caused by UTIs leads to other symptoms like frequent urination (45.4%) or feeling the sudden desire to urinate (53.6%). On hydration, 43.2% of the respondents reported drinking 3 to 4 bottles of water daily which is important for protecting against UTIs, however there is 28.4% of respondents aware of those fluids that could irritate the urinary bladder. The predominant response to UTI symptoms was to seek hospital care (78.1%) which demonstrates the proactive way women respond in these regards. Nevertheless, the data also indicates that roughly a quarter of all those who took it, untreated, went for antibiotics without consulting a doctor.

Table (4): participants' practice of UTIs and maternal-fetal complications during pregnancy (n=434).

<i>Parameter</i>		<i>No.</i>	<i>Percent (%)</i>
<i>Have you ever experienced urinary tract infection (UTI)?</i>	No	251	57.8
	Yes	183	42.2
<i>What symptoms did you notice (you can choose more than one)? (n=183)</i>	Pain in urination	165	90.2
	Red urine	71	38.8

	Abdominal pain	73	39.9
	Fever	67	36.6
	Back pain	52	28.4
	Frequent urination	83	45.4
	Sudden desire to go bathroom to urinate	98	53.6
	Others	5	2.7
<i>How many times you drink water per day (half riyal water bottle or 330 ml bottle)? (n=183)</i>	1-2 bottle	55	30.1
	3-4 bottle	79	43.2
	5-6 bottle	34	18.6
	More than 6 bottle	15	8.2
<i>Drink fluids that irritate the urinary bladder (n=183)</i>	No	131	71.6
	Yes	52	28.4
<i>When you feel symptoms of urinary tract infection (UTI)? * (n=183)</i>	Go to the hospital	143	78.1
	Take rest at home	25	13.7
	Take antibiotics directly	47	25.7
	Take analgesic	41	22.4
	Drink more water	118	64.5
	Take more showers	4	2.2
	No idea	3	1.6

***Results may overlap**

Table 5 presents the data and shows an overall picture of UTI knowledge and maternal-fetal complications related in pregnancy amongst a sample population. Noteworthy to mention is that a lot of participants, making 42.6 were of low knowledge levels, hence people subjecting the issue of maternal health education. On the other hand, while only 36.2% had a high knowledge level, awareness and understanding are lacking. 21.2% were moderate knowledge participants.

Table (5): Shows knowledge of UTIs and maternal-fetal complications during pregnancy score results.

	Frequency	Percent
High knowledge level	157	36.2
Moderate knowledge	92	21.2
Low knowledge level	185	42.6
Total	434	100.0

Table 6 contains the attitudes around urinary tract infections (UTI's) and maternal and fetal complications during pregnancy displayed by a sample of 434 respondents. In addition noteworthy, a high percentage of population had moderate attitude level with 38.2% that and others had 33.2% high attitude level. On the other hand, 28.6% of respondents showed a low attitude level.

Table (6): Shows attitude of UTIs and maternal-fetal complications during pregnancy score results.

	Frequency	Percent
High attitude level	144	33.2
Moderate attitude	166	38.2
Low attitude level	124	28.6
Total	434	100.0

Table 7 outlines a concerning trend emerges concerning the prevalence of low practice levels among the survey population. For instance, a truly startling 67.5% of our participants had very poor levels of practice, suggesting that there is a huge gaping hole in guideline adherence for the management of UTIs during pregnancy. This is compared with only 10.4% of persons being able to show a high level of practice, and a moderate level of practice found in 22.1% of the population.

Table (7): Shows practice of UTIs and maternal-fetal complications during pregnancy score results.

	Frequency	Percent
High level of practice	45	10.4
Moderate practice	96	22.1
Low practice level	293	67.5
Total	434	100.0

Table (8) shows that knowledge level of UTIs and maternal-fetal complications during pregnancy has statistically significant relation to educational level (P value=0.041), occupation (P value=0.002), and residential region (P value=0.0001). It also shows statistically insignificant relation to gender, age, marital status, and monthly income.

Table (8): Relation between knowledge level of UTIs and maternal-fetal complications during pregnancy and sociodemographic characteristics.

Parameters		Knowledge level		Total (N=434)	P value*
		High or moderate knowledge	Low knowledge level		
Gender	Female	221	162	383	0.704
		88.8%	87.6%	88.2%	
	Male	28	23	51	
		11.2%	12.4%	11.8%	
Age	22 or less	62	49	111	0.814
		24.9%	26.5%	25.6%	
	23 to 25	59	38	97	
		23.7%	20.5%	22.4%	

	26 to 39	61 24.5%	43 23.2%	104 24.0%	
	40 or more	67 26.9%	55 29.7%	122 28.1%	
Marital status	Single	124 49.8%	88 47.6%	212 48.8%	0.121
		115 46.2%	79 42.7%	194 44.7%	
	Married	6 2.4%	10 5.4%	16 3.7%	
		4 1.6%	8 4.3%	12 2.8%	
	Divorced	3 1.2%	8 4.3%	11 2.5%	
		31 12.4%	29 15.7%	60 13.8%	
	College	182 73.1%	136 73.5%	318 73.3%	
		30 12.0%	10 5.4%	40 9.2%	
Postgraduate	3 1.2%	2 1.1%	5 1.2%		
	3 1.2%	2 1.1%	5 1.2%		
Educational level	Uneducated	92 36.9%	63 34.1%	155 35.7%	0.041
		34 13.7%	5 2.7%	39 9.0%	
	Student	55 22.1%	56 30.3%	111 25.6%	
		9 3.6%	7 3.8%	16 3.7%	
	Health care worker	6 2.4%	9 4.9%	15 3.5%	
		53 21.3%	45 24.3%	98 22.6%	
	Non-health care worker	53 21.3%	45 24.3%	98 22.6%	
		6 2.4%	9 4.9%	15 3.5%	
	Freelancer	53 21.3%	45 24.3%	98 22.6%	
		6 2.4%	9 4.9%	15 3.5%	
	Retired	53 21.3%	45 24.3%	98 22.6%	
		6 2.4%	9 4.9%	15 3.5%	
	Unemployed	53 21.3%	45 24.3%	98 22.6%	
		6 2.4%	9 4.9%	15 3.5%	
Occupation	Student	92 36.9%	63 34.1%	155 35.7%	0.002
		34 13.7%	5 2.7%	39 9.0%	
	Health care worker	55 22.1%	56 30.3%	111 25.6%	
		9 3.6%	7 3.8%	16 3.7%	
Non-health care worker	6 2.4%	9 4.9%	15 3.5%		
	53 21.3%	45 24.3%	98 22.6%		
Freelancer	6 2.4%	9 4.9%	15 3.5%		
	53 21.3%	45 24.3%	98 22.6%		
Retired	6 2.4%	9 4.9%	15 3.5%		
	53 21.3%	45 24.3%	98 22.6%		
Unemployed	6 2.4%	9 4.9%	15 3.5%		
	53 21.3%	45 24.3%	98 22.6%		
Monthly income	5000 or less	75 30.1%	43 23.2%	118 27.2%	0.155
		62 24.9%	53 28.6%	115 26.5%	
	5000 - 15000	75 30.1%	43 23.2%	118 27.2%	
		62 24.9%	53 28.6%	115 26.5%	

	more than 15000	25	12	37	
		10.0%	6.5%	8.5%	
	I don't have a career	87	77	164	
		34.9%	41.6%	37.8%	
Residential region	Northern region	37	50	87	0.0001
		14.9%	27.0%	20.0%	
	Southern region	15	19	34	
		6.0%	10.3%	7.8%	
	Central region	55	41	96	
		22.1%	22.2%	22.1%	
	Eastern region	51	15	66	
		20.5%	8.1%	15.2%	
	Western region	91	60	151	
		36.5%	32.4%	34.8%	

**P value was considered significant if ≤ 0.05 .*

Table (9) shows that attitude of UTIs and maternal-fetal complications during pregnancy has statistically significant relation to marital status (P value=0.046), occupation (P value=0.0001), monthly income (P value=0.004), and residential region (P value=0.0001). It also shows statistically insignificant relation to gender, age, and educational level.

Table (9): Attitude of UTIs and maternal-fetal complications during pregnancy in association with sociodemographic characteristics.

Parameters		Attitude level		Total (N=434)	P value*
		High attitude level	Moderate or low attitude		
Gender	Female	124	259	383	0.330
		86.1%	89.3%	88.2%	
	Male	20	31	51	
		13.9%	10.7%	11.8%	
Age	22 or less	39	72	111	0.488
		27.1%	24.8%	25.6%	
	23 to 25	36	61	97	
		25.0%	21.0%	22.4%	
	26 to 39	35	69	104	
		24.3%	23.8%	24.0%	
	40 or more	34	88	122	
		23.6%	30.3%	28.1%	
Marital status	Single	80	132	212	0.046

		55.6%	45.5%	48.8%	
	Married	60	134	194	
		41.7%	46.2%	44.7%	
	Divorced	1	15	16	
		0.7%	5.2%	3.7%	
	Widowed	3	9	12	
		2.1%	3.1%	2.8%	
Educational level	Middle school	0	11	11	0.114
		0.0%	3.8%	2.5%	
	High school	18	42	60	
		12.5%	14.5%	13.8%	
	College	107	211	318	
		74.3%	72.8%	73.3%	
	Postgraduate	17	23	40	
		11.8%	7.9%	9.2%	
Uneducated	2	3	5		
	1.4%	1.0%	1.2%		
Occupation	Student	57	98	155	0.0001
		39.6%	33.8%	35.7%	
	Health care worker	25	14	39	
		17.4%	4.8%	9.0%	
	Non-health care worker	30	81	111	
		20.8%	27.9%	25.6%	
	Freelancer	4	12	16	
		2.8%	4.1%	3.7%	
	Retired	3	12	15	
		2.1%	4.1%	3.5%	
	Unemployed	25	73	98	
		17.4%	25.2%	22.6%	
Monthly income	5000 or less	50	68	118	0.004
		34.7%	23.4%	27.2%	
	5000 - 15000	33	82	115	
		22.9%	28.3%	26.5%	
	more than 15000	18	19	37	
		12.5%	6.6%	8.5%	
	I don't have a career	43	121	164	
		29.9%	41.7%	37.8%	
	Northern region	15	72	87	0.0001

Residential region		10.4%	24.8%	20.0%	
	Southern region	5	29	34	
		3.5%	10.0%	7.8%	
	Central region	36	60	96	
		25.0%	20.7%	22.1%	
	Eastern region	34	32	66	
		23.6%	11.0%	15.2%	
	Western region	54	97	151	
		37.5%	33.4%	34.8%	

***P value was considered significant if ≤ 0.05 .**

Table (10) shows that practice of UTIs and maternal-fetal complications during pregnancy has statistically significant relation to age (P value=0.0001), marital status (P value=0.0001), occupation (P value=0.0001), monthly income (P value=0.003), and residential region (P value=0.035). It also shows statistically insignificant relation to gender and educational level.

Table (10): Relation between practice of UTIs and maternal-fetal complications during pregnancy and sociodemographic characteristics.

Parameters		Practice level		Total (N=434)	P value*
		High or moderate practice	Low practice level		
Gender	Female	126	257	383	0.617
		89.4%	87.7%	88.2%	
	Male	15	36	51	
		10.6%	12.3%	11.8%	
Age	22 or less	18	93	111	0.0001
		12.8%	31.7%	25.6%	
	23 to 25	16	81	97	
		11.3%	27.6%	22.4%	
	26 to 39	38	66	104	
		27.0%	22.5%	24.0%	
	40 or more	69	53	122	
		48.9%	18.1%	28.1%	
Marital status	Single	33	179	212	0.0001
		23.4%	61.1%	48.8%	
	Married	96	98	194	
		68.1%	33.4%	44.7%	
	Divorced	7	9	16	
		5.0%	3.1%	3.7%	

	Widowed	5 3.5%	7 2.4%	12 2.8%					
Educational level	Middle school	3 2.1%	8 2.7%	11 2.5%	0.069				
		High school	18 12.8%	42 14.3%		60 13.8%			
	College		98 69.5%	220 75.1%		318 73.3%			
		Postgraduate	18 12.8%	22 7.5%		40 9.2%			
	Uneducated		4 2.8%	1 0.3%		5 1.2%			
		Occupation	Student	26 18.4%		129 44.0%	155 35.7%	0.0001	
	Health care worker			12 8.5%		27 9.2%	39 9.0%		
			Non-health care worker	52 36.9%		59 20.1%	111 25.6%		
Freelancer	8 5.7%			8 2.7%	16 3.7%				
	Retired		7 5.0%	8 2.7%	15 3.5%				
Unemployed			36 25.5%	62 21.2%	98 22.6%				
	Monthly income		5000 or less	38 27.0%	80 27.3%	118 27.2%	0.003		
5000 - 15000				43 30.5%	72 24.6%	115 26.5%			
			more than 15000	20 14.2%	17 5.8%	37 8.5%			
I don't have a career				40 28.4%	124 42.3%	164 37.8%			
			Residential region	Northern region	27 19.1%	60 20.5%			87 20.0%
Southern region					5 3.5%	29 9.9%			34 7.8%
				Central region	37 26.2%	59 20.1%			96 22.1%

	Eastern region	28	38	66
		19.9%	13.0%	15.2%
	Western region	44	107	151
		31.2%	36.5%	34.8%

**P value was considered significant if ≤ 0.05 .*

Discussion:

The objectives of the present study were to determine women's and healthcare providers' knowledge and awareness regarding UTIs, as well as maternal – fetal complications during pregnancy, in Saudi Arabia. However, self-reported awareness of UTIs was high among participants, but findings indicate a large gap in knowledge related to UTIs. This matches previous research on this pattern observed in other populations. For example, in their study of Nigerian women, Esan et al. reported that half (48.7%) of the women had been tested for UTIs in their current pregnancy, a worrying absence of awareness of the consequences of UTIs for maternal and fetal health similar to what we found ourselves to be lacking with respect to the complications of UTIs during pregnancy [11]. In addition, Liu et al. noted that antepartum UTIs, which represent a common severe complication of pregnancy, carry a significant maternal morbidity, and highlight the need to increase awareness among pregnant women [12].

Although few respondents (10.2%) did not recognize common UTI symptoms like pain while urinating, the majority of the participants (71.2%) either did not know what complications may result from a UTI or were unsure about them. This is consistent with that from Vasconcelos-Pereira et al. who uncovered a link between UTIs and worse outcomes such as preterm labor and allude to such unawareness as a reason for stretched risks during pregnancy [13]. Further, Azami et al. [14] conducted a systematic review on pregnant women and found that asymptomatic bacteriuria has the potential to become severe complications if not treated, and contributed support to the need for improved education about UTIs risks.

In the present study, the knowledge and awareness level of UTIs and their complications with pregnancy was investigated in women and health care providers in Saudi Arabia. Overall, there is a substantial 'knowledge gap' in regards to UTIs, despite a high rate of self-reported awareness. This agrees with previous research which indicates similar patterns in other populations. For example, Esan et al reported that 48.7% of the women studied in Nigeria were tested for UTI during their current pregnancy, echoing our finding of poor knowledge about complications that arises as a result of UTI in pregnancy [11]. Liu and colleagues highlighted that antepartum UTIs are a common severe complication of pregnancy and are of major importance since it results in major maternal morbidity and therefore increase the need to increase the awareness level among pregnant women [12].

Our surprising result was that a large portion of participants (80.7%) knew signs of UTIs like pain when they urinate, but only 44.2% knew complication risks of UTIs. Similarly, the work by Vasconcelos-Pereira et al, which reported that UTIs are strongly associated with adverse outcomes such as preterm labor, supports this hypothesis and could as well explain why UTIs during pregnancy are not recognized [13]. Azami et al. also did a systematic review on the prevalence of asymptomatic bacteriuria in pregnant women, but can cause severe complications if untreated, further supporting the importance of

education around what UTIs are and their risks [14].

Additionally, we found that a large portion of the participants had UTIs as 42.2 percent of them had experienced UTIs that cause urinary pain and other symptoms. This is in concordance with studies deployed in different areas, like the one of Yagel et al., where they observed a high incidence of UTIs in women pregnant [19]. As stated by Taha's research, women who had a history of UTIs are more prone to recurrent infections, and are a potential education and awareness topic in reference to this condition [20]. In addition, we must note the limitations of the present study. It is limited to a cross-sectional design which cannot establish causal relationships between knowledge and attitude as regards UTIs and practice of self-care. Additionally, the use of self-reported data is biased because participants may overestimate their knowledge and awareness. The study was also conducted among a single antenatal clinic population might reduce the ability of the findings to generalize to the entire pregnant women in KSA. Future research should address a more diverse sample and longitudinal designs to better describe how oversight and knowledge of UTIs in pregnancy and in pregnancy more broadly develop.

Conclusion:

At the conclusion, findings from this study stress the need to invest in greater educational efforts to educate women of childbearing age and healthcare providers in Saudi Arabia on UTIs and their complications. The level and magnitude of these knowledge and practice gaps emphasize the need for actions designed to target these deficiencies. Improving education and awareness can reduce the risks of UTIs in pregnancy so that mothers and babies can avoid both UTI and the associated complications with improved maternal and fetal health outcomes.

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Ethical approval:

After fully explaining the study and emphasizing that participation is optional, each participant gave their informed consent. The information gathered was safely stored and utilized exclusively for study.

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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.

Data and materials availability:

All data associated with this study are present in the paper.

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