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Original Article

Awareness and Perception of Urinary Tract Infections among Women in South India: A Cross-Sectional KAP Study

Leena Muppa*, Narmadha Udayakumaran, Balaji Thiyagarajan, Madhumitha Balaji, Lavanya Arumugam

Department of Pharmacy Practice, C.L. Baid Metha College of Pharmacy, Thoraipakkam, Chennai, Tamil Nadu, INDIA.

ABSTRACT

Background: Urinary Tract Infections (UTIs) are among the most common bacterial infections affecting women worldwide, often leading to serious complications if not managed appropriately. **Aim and Objectives:** To evaluate the Knowledge, Attitudes, and Practices (KAP) related to UTIs among women in South India, with a focus on identifying awareness levels and behavioural patterns that influence prevention and management. **Materials and Methods:** A cross-sectional survey was conducted among 250 female participants, assessing their understanding of UTI causes, symptoms, treatment approaches, and hygiene practices. **Results:** Findings revealed that while a moderate level of awareness existed, less than half of the respondents could correctly identify bacteria as the primary cause of UTIs. Although most participants demonstrated positive attitudes toward seeking medical attention and maintaining hydration, gaps in knowledge about preventive measures and transmission persisted. Younger women (aged 15-25) displayed significantly higher knowledge and more favourable attitudes compared to older age groups. Hygienic practices, such as proper menstrual hygiene and drying undergarments in sunlight, were commonly observed, though misconceptions and social stigma limited open discussions in some cases. **Conclusion:** The study underscores the need for targeted health education programs, improved sanitation infrastructure, and open dialogue to bridge knowledge gaps and enhance preventive behaviours related to UTIs in women.

Keywords: Urinary Tract Infections, KAP, Women's Health, South India, Hygiene, Menstrual Hygiene.

Correspondence:
Mrs. Leena Muppa
Assistant Professor, Department of Pharmacy Practice, C.L. Baid Metha College of Pharmacy, Thoraipakkam, Chennai, Tamil Nadu, INDIA.
Email: leenamuppa220@gmail.com

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INTRODUCTION

Urinary Tract Infections (UTIs) are among the most prevalent infectious diseases globally, particularly affecting women due to anatomical and physiological predispositions. Studies estimate that over 50% of all women will experience at least one UTI in their lifetime, with a significant proportion facing recurrent infections. They can range from simple infections such as cystitis to more serious conditions like pyelonephritis if left untreated.[1] UTIs are caused primarily by uropathogenic *Escherichia coli*, but other pathogens may also be involved. Most of women experience recurrent infection within short duration. The most reported a causative bacterium is *E. coli* which responsible for 75-90% of uncomplicated UTIs, and Staphylococcus saprophyticus causes UTI among 5-15% of younger women. Other pathogens such as enterococcus and other gram-negative rods were also identified in some cases.[2]

Female have a higher risk for UTI than most male, probably because of anatomy. The prevalence of Urinary Tract Infections (UTIs) in India is between 21.8% and 31.3%. Approximately 60% of women will experience a UTI in their lifetime with a recurrence risk and a gender disparity that sees women four times more likely than men to develop a UTI. An association between Urinary Tract Infection (UTI) and diabetes mellitus was noted in an autopsy series reported in the 1940s. The urinary tract is the principal site of infection in diabetes. Changes in host defense mechanisms, the presence of diabetic cytopathy and of microvascular disease in the kidneys may play a role in the higher incidence of UTI in diabetic patients.[3]

Patient suffering from a symptomatic UTIs are commonly treated with antibiotics, these treatments can result in long term alteration of the normal microbiota of the vagina and gastro-intestinal tract and in the development of multidrug resistance micro-organisms. The availability of niches that are no longer filled by the alter microbiota can increase the risk of colonization with multidrug resistance uropathogens. Importantly the 'golden era' of antibiotics is waning and the need for rationally designed and alternative treatments is therefore increasing. Recent studies have used RNA sequencing to directly analyse uropathogens from the urine of women experiencing symptomatic UTIs.[4]

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In many Low- and Middle-Income Countries (LMICs) like India, the burden of UTIs is compounded by limited access to healthcare, poor hygiene practices, and a lack of health education. The situation is more critical in rural and semi-urban regions, where health-seeking behaviour is influenced by cultural taboos, gender inequality, and social stigma surrounding discussions of reproductive and urinary health.[5] In South India, despite advancements in healthcare infrastructure, there exists a significant knowledge gap regarding UTIs, particularly among women belonging to lower socioeconomic groups and those with limited education.

A key factor contributing to the persistence and complications of UTIs is the general lack of awareness about their symptoms, risk factors, and preventive strategies. Many women are unable to recognize early symptoms or may misattribute them to other conditions such as dehydration or menstrual discomfort.[6] Furthermore, misconceptions about personal hygiene, overuse or misuse of antibiotics, and reliance on home remedies without professional consultation are prevalent, leading to chronic infections and antibiotic resistance.[7]

Addressing this knowledge gap is crucial, as early identification and treatment of UTIs can prevent serious health consequences, reduce healthcare costs, and improve the quality of life. Awareness campaigns and educational interventions targeting women can significantly reduce the incidence and recurrence of UTIs (WHO, 2019). Assessing the current level of awareness and understanding among women in South India can provide valuable insights into existing deficiencies and guide the development of culturally appropriate, community-based health initiatives.[8]

This study aims to assess the awareness levels of urinary tract infections among women in South India, evaluating their knowledge of causes, symptoms, prevention, and treatment to highlight specific areas where intervention is most needed.

MATERIALS AND METHODS

Study design

This is a cross-sectional descriptive study was conducted among women population to determine the knowledge, attitude, and practice about UTI and to evaluate its relationship with some of the demographic variables. The study was conducted for a period of 6 months from July-December 2024. With an error of α=5%, a population proportion of 80%, the sample size was estimated to be 246 and it was rounded to 250. Female participants of age 15 and above were included in the study. Male participants and incomplete responses were excluded.

Scoring and Analysis

The Bloom's taxonomy cut-off pattern was used to assess the participants responses. High Level (80-100%): Strong knowledge with a positive attitude and good practice towards the topic. Moderate Level (60-79%): Moderate knowledge with a neutral attitude and fair practice towards the topic. Low Level (<60%): Limited knowledge with a negative attitude and poor practice towards the topic.

Data were collected using a semi-structured questionnaire. The questionnaire composed of four sections designed to address demographic characteristics, knowledge, attitude and practices of participants towards the Urinary Tract Infection (UTI). The questionnaire was reviewed and validated by the experts from the Department of Pharmacy Practice at C.L. Baid Metha College of Pharmacy. After validation the questionnaire was distributed to the participants after explaining the purpose of the study and their confidential was ensured. The questionnaire took an average of 10 min to complete and the responses were collected. Bloom's taxonomy cut-off pattern was used to assess the participants' responses.

Descriptive statistics (frequencies, percentages) were used to summarize data. IBM SPSS version 20 was used find statistical significance. Chi-square tests were applied to assess associations between awareness/attitude and variables. p value <0.05 was considered statistically significant.

RESULTS

A total of 250 responses from the study participants were collected and analyzed. The demographic characteristics of the participants are shown in Table 1.

As per Table 1, majority (151, 60.4%) of the respondents were between the age group of 15-25 years. Regarding educational status, half of the participants (50.8%) held a graduate degree, followed by 19.6% who had a postgraduate degree. Only 12% were found to be illiterate.

The results of this study indicate that, there is a moderate level of awareness among women regarding Urinary Tract Infections (UTIs). Though a majority of participants (85.2%) acknowledged

Table 1: Socio-demographic characteristics.

Demographic characteristics	Frequency (*n*=250)	Percentage %
Age in years		
15-25	151	60.4%
25-35	32	12.08%
35-45	23	9.2%
45 & above	44	17.6%
Educational status		
Schooling	44	17.6%
Graduate degree	127	50.8%
Post graduate degree	49	19.6%
Illiterate	30	12%

that UTIs are treatable and 80.8% correctly identified urine analysis as the primary diagnostic method, only 35.2% accurately recognized bacteria as the main cause of the infection.

In terms of symptoms, 42% of respondents correctly identified multiple symptoms such as pain, burning, and fever as common signs of UTIs. More than half of the participants (52.4%) were aware of effective prevention strategies, including drinking plenty of water and avoiding delayed urination. These findings suggest that while there is awareness of how to manage and respond to UTIs, knowledge about their causes and deeper understanding of the condition remains limited. The results of the participants knowledge part are shown in Table 2.

Regarding attitude, majority of the study respondents (171, 68.4%) believed that UTIs are preventable and 64% (160) acknowledged the necessity of visiting a doctor for treatment. Most participants recognized the importance of supportive measures such as staying hydrated (32.8%) and seeking medical care (61.6%) when someone is affected with UTI. 42% of participants agreed that personal hygiene and wearing tight clothing could contribute to UTIs. Only 53.6% correctly reported that UTIs are not contagious. A significant proportion (28.8%) was unsure whether UTIs affect daily activities (Table 3).

As per the Table 4, among 250 participants, most of the respondents reported consuming either 2 L (41.6%) or 3 L (40%) of water daily, indicating generally good hydration habits. Regarding Public toilet usage among participants, 73.6% of participants rarely use them, while 18.4% never use them at all, likely reflecting concerns over cleanliness or accessibility. In terms of drying undergarments, 75.2% of respondents reported drying them under direct sunlight, a practice considered hygienic due to the sun's natural disinfecting properties. Regarding menstrual hygiene, over half of the participants (54.4%) reported changing their sanitary napkin every 4 to 6 hr, while only a small percentage (1.2%) reported wearing them for more than 9 hr. Overall, the data on practice suggested a good hygiene practice, particularly in terms of water intake, drying undergarments, and menstrual health among the study population.

As per the Table 5, among the study participants, a substantial proportion (38%) of participants has experienced urinary tract infection at some point, which suggests UTIs are relatively common among females. Frequent urination was the most commonly reported symptom, in managing symptoms, hydration was the most common method (47.3%), while antibiotic use was relatively lower (14.7%). Most participants preferred to discuss their infection with parents (53.6%), while only about a quarter sought professional advice from doctors (26.3%).

Table 6, clearly reveal a significant association between age group and knowledge level. Younger participant (15-25 years) demonstrated comparatively better knowledge towards urinary tract infections than older participants (45 & above). There is a strong association between knowledge level and attitude. Participants with higher knowledge levels are significantly (p = <0.05) more likely to have a positive or neutral attitude compared to those with low knowledge.

Table 7, shows a clear age-related variation in practice patterns among 95 participants who have experienced UTI at some point. As per the data, 25-35 years group performed the best in terms of good practice behaviors, possibly reflecting a combination of

Table 2: Knowledge of the participants regarding urinary tract infections.

Questions	Frequency (*n*=250)	Percentage%
Urinary tract infection most commonly caused by?		
Bacteria	88	35.2%
Poor hygiene	119	47.6%
Fungi	9	3.6%
Virus	7	2.8%
I don't know	27	10.8%
What is the most common symptom of urinary tract infection?		
Pain during urination	58	23.2%
Fever & chills	10	4%
Burning sensation during urination	72	28.8%
Pelvic and abdomen pain	5	2%
All the above	105	42%
How can we prevent urinary tract infection?		
Drinking more water	82	32.8%
By not controlling from urination	37	14.8%
All the above	131	52.4%
Is there any treatment for urinary tract infection?		
Yes	213	85.2%
No	4	1.6%
May be	23	9.2%
I don't know	10	4%
How urinary tract infection is diagnosed?		
Blood analysis	21	8.4%
Urine analysis	202	80.8%
X-ray scan	0	0%
I don't know	27	10.8%

Table 3: Attitude of the participants regarding urinary tract infections.

Sl. No.	Questions	Frequency (*n*=250)	Percentage (%)
1.	**Do you think urinary tract infection is preventable?**		
	Yes	171	68.4%
	No	9	3.6%
	May be	58	23.2%
	I don't know	12	4.8%
2.	**Whom do you think is more affected by urinary tract infection?**		
	Young children (age less than 14)	18	7.2%
	Young females (age 15-39)	76	30.4%
	Pregnant females = 0	24	9.6%
	Middle aged females (age 40-49)	20	8%
	Elderly females (age 50 and above)	5	2%
	All the above	107	42.8%
3.	**If person from your friends and family is experiencing urinary tract infection, what would be your suggestion**		
	Stay hydrated	82	32.8%
	Go to doctor	154	61.6%
	Leave as it is	8	3.2%
	Nothing	6	2.4%
4.	**Is urinary tract infection is contagious?**		
	Yes	45	18%
	No	134	53.6%
	May be	48	19.2%
	I don't know	23	9.2%
5.	**Do urinary tract infection affect's a patient day to day activity?**		
	Yes	120	48%
	No	42	16.8%
	May be	72	28.8%
	I don't know	16	6.4%
6.	**Do personal hygiene habits and tight fit clothes contributes the cause of urinary tract infection?**		
	Yes	107	42.8%
	No	60	24%
	May be	61	24.4%
	I don't know	22	8.8%
7.	**Is that necessary to visit doctor for urinary tract infection?**		
	Yes	160	64%
	No	11	4.4%
	May be	71	28.4%
	I don't know	8	3.2%

Table 4: Practice of the participants regarding urinary tract infections.

Questions	Frequency (*n*=250)	Percentage%
How many liters of water you drink daily?		
Less than 2 L	25	10%
2 L	104	41.6%
3 L	100	40%
Greater than 4 L	21	8.4%
How often do you use public toilet?		
Most often	20	8%
Rarely	184	73.6%
Never used	46	18.4%
How do you dry your under garments?		
Directly under sunlight	188	75.2%
In shade	45	18%
Under fan	15	6%
Using air dryer	2	0.8%
How long would you keep your napkin during periods?		
Less than 4 hr	81	32.4%
4 to 6 hr	136	54.4%
6 to 8 hr	30	12%
More than 9 hr	3	1.2%

Table 5: Practice of the participants who have experienced urinary tract infections.

Questions	Frequency (*n*=250)	Percentage (%)
Have you ever experienced urinary tract infection any time?		
Yes	95	38%
No	129	51.6%
May be	19	7.6%
I don't know	7	2.8%
What are the symptoms you have experienced?		
Frequent urination	36	37.8%
Headache	9	9.4%
Rashes	28	29.4%
Others	22	23.15%
What have you done to manage your symptoms?		
Painkiller	4	4.2%
Antibiotics	14	14.7%
Hydration	45	47.3%
All the above	32	33.6%
With whom you had discussed when you get urinary tract infection?		
Parents	51	53.6%
Friends	6	6.3%
Doctors	25	26.3%
Nobody	13	13.6%

maturity, better awareness, and proactive health-seeking behavior typical of this life stage.

DISCUSSION

Urinary Tract Infections (UTIs) are a prevalent health issue among females globally and it is one of the most common, challenging diseases that women experience as outpatients. Women's practices, attitudes, and understanding of urinary tract infections are significant variables that can affect, how this illness is managed and prevented. This study aims to bridge this gap by exploring the knowledge, attitudes, and practices on UTIs among women of south India.

Our study highlights a moderate level of awareness among women regarding Urinary Tract Infections (UTIs), with less than half demonstrating good knowledge about their causes and symptoms. Our results regarding the knowledge of the participants are also consistent with another south Indian study conducted by Narain BK, *et al.*, (2002).[9] Though majority of participants in our study were informed about appropriate management strategies, such as seeking medical attention, increasing water intake, and avoiding delayed urination, only a small proportion correctly identified bacteria as the primary cause of UTIs. This misunderstanding highlights a gap between perceived and actual causative factors, which could potentially delay or misguide prevention efforts among the public.

Regarding attitude, the study findings indicate a generally positive and proactive approach among participants towards UTIs. A significant portion of respondents (64%) believed, it is necessary to consult a doctor if someone experiences a UTI, and 61.6% of participants stated they would advise friends or family to see a doctor, showing that medical consultation is recognized as an important step in managing and for preventing complications such as recurrent infections or kidney involvement.

68.4% participants of our study believed UTIs are preventable, 24.4% were unsure whether personal hygiene or tight clothing contributes to UTIs. This reflects gaps in understanding

Table 6: Age versus Knowledge and Attitude.

KAP	Age in Years				
Knowledge	**15-25 *n*=151(%)**	**25-35 *n*=32 (%)**	**35-45 *n*=23 (%)**	**45 & above *n*=44 (%)**	***p*-Value**
High level knowledge	67(44.3%)	10 (31.25%)	6 (26.08%)	5 (11.36%)	0.02
Moderate level knowledge	35(23.1%)	7(21.8%)	8(34.7%)	4(9.09%)	
Low level knowledge	49 (32.4%)	15(46.8%)	9(39.1%)	35(79.5%)	
Attitude					0.07
Positive attitude	35(23.1%)	6(18.75%)	6(26.08%)	3(6.8%)	
Neutral attitude	22(14.5%)	4(12.5%)	6(26.08%)	3(6.8%)	
Negative attitude	94(62.2%)	22(68.75%)	11(47.8%)	38(86.3%)	

p value <0.05 considered statistically significance.

Table 7: Age versus Practice (Experienced UTI - *n*=95).

***n*=95**	**Age in Years**			
Practice	15-25 ***n*=46 (%)**	25-35 ***n*=17 (%)**	35-45 ***n*=13 (%)**	45 & above ***n*=19 (%)**
Good practice	20(43.4)	11(64.7)	5(38.4)	4(21)
Fair practice	18(39.1)	5(29.4)	6(46.1)	12(63.1)
Poor practice	8(17.3)	1(5.8)	2(15.3)	3(15.7)

preventive practices, which could affect behaviour and adherence to hygiene-related preventive measures. Furthermore, the mixed responses to the contagiousness of UTIs, where only 53.6% correctly stated that UTIs are not contagious, indicating misconceptions that might influence how individuals perceive or stigmatize those with the infection.

Overall, participants demonstrated a generally positive attitude toward the seriousness of UTIs and the need for treatment, but there remain notable misconceptions and uncertainty regarding causes and transmission. These findings underscore the importance of continued health education, focusing not just on symptoms and treatment but also on prevention, hygiene, and dispelling myths about UTI transmission. According to the National Academies of Sciences, Engineering, and Medicine, the adequate daily fluid intake is about 2.7 liters for women and 3.7 liters for men, including fluids from food and other beverages.[10] Sufficient water intake is crucial for maintaining urinary tract health and preventing infections such as UTIs, especially in women.

Public toilet hygiene is a major concern in many developing areas. A study by Bharadwaj and Patkar highlights how inadequate sanitation infrastructure can discourage use and negatively affect women's health. A significant proportion of our study respondents (73.6%) reported rarely using public toilets, and 18.4% never use them.[11] This may be influenced by hygiene concerns, fear of infections, or poor maintenance of public restrooms.

As per the study conducted by Tundia *et al.*, (2018) Sunlight drying of undergarments is recommended by health practitioners as it helps reduce the microbial load and prevents infections. Majority (75.2% of the respondents in our study respondents dry undergarments directly under sunlight, which is the most hygienic practice observed.[12]

According to the data, 38% of the participants reported that, they have experienced Urinary Tract Infection (UTI). This aligns with global epidemiological estimates that 40-60% of women experience at least one UTI in their lifetime, making it one of the most common bacterial infections among females.[13]

Among those who experienced UTI, the most common symptom experienced was frequent urination (37.8%), followed by rashes (29.4%) and other symptoms (23.15%). This is mostly in line with clinical literature, which identifies dysuria (painful urination), frequency, urgency, and sometimes abdominal discomfort as the primary symptoms of UTIs. Nearly 47.3% managed their symptoms by increasing hydration, which is a widely recommended first-line approach to help flush out bacteria from the urinary tract.[14] Meanwhile, 33.6% who used all the listed methods show a more comprehensive approach to management, suggesting better awareness or access to care. Though three fourth of the participants discussed their infection with parents, friends and consulted doctors, a small group (13.6%) spoke to no one. This may be influenced by social stigma, embarrassment, or

lack of knowledge, a common barrier often reported in urogenital health topics discussions.

Regarding practice, the overall data reveals generally positive hygiene practices among the respondents, however educating individuals about optimal hygiene practices is essential for improving community health outcomes.

In comparing the demographic variable age with knowledge and attitude, the study data shows a clear trend of decreasing knowledge with increasing age. As per the data, 15-25 age group had the highest proportion of high knowledge (44.3%), while older groups, particularly those above 45 years, showed limited awareness, with almost 80% having low knowledge. This may be attributed to the increased exposure to health education, media, and school-based programs among younger individuals, especially on topics such as menstrual hygiene and sexual health.[15]

CONCLUSION

The survey conducted among 250 participants reveals critical insights into the knowledge, attitude and practices of female population towards urinary tract infections. The study reveals a higherlevel of knowledge and better perception among young aged females. Women practices regarding UTIs were also satisfactory especially for seeking for medical consultation and fluid intake. Though majority of participants possess a basic understanding of urinary tract infections, significant knowledge gaps remain. The overall study results emphasize the critical need for inclusive health education, improved menstrual and sanitation infrastructure, and efforts to normalize conversations around reproductive and urinary health open to combat stigma and lower the risk of infections.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

UTI: Urinary tract infection; **KAP:** Knowledge, attitudes, and practices; **RNA:** Ribonucleic acid; **LMIC:** Low- and middle-income countries.

SUMMARY

This research study was conducted among 250 women population, to determine the knowledge, attitude, and practice about UTIs and to evaluate its relationship with some of the demographic variables. The study was conducted for a period of 6 months. Female participants of age 15 and above were included in this study. A semi-structured questionnaire was used to collect data from the participants. Majority of the respondents (60.4%) in our study were aged between 15-25 years. and most of the participants were graduates (50.8%). Our study highlights a moderate level of awareness among women regarding Urinary Tract Infections (UTIs), its symptoms (42%) and prevention methods (52.4%). Regarding attitude, the study findings indicate a generally positive and proactive approach. At the same time, though 68.4% participants of our study believed UTIs are preventable, 24.4% were unsure whether personal hygiene or tight clothing contributes to UTIs. This reflects gaps in understanding preventive practices, which could affect behaviour and adherence to hygiene-related preventive measures. Younger women (15-25 years) demonstrated higher knowledge and more positive attitudes than older women, likely due to better health education exposure.

The overall study results conclude that, though majority of participants possess a basic understanding of urinary tract infections, significant knowledge gaps remain which highlights the need for the targeted health education to address knowledge gaps and misconceptions

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