

## Original Research Article

# Urinary Tract Infection and Associated Risk Factors in Post-Menopausal Women

Samreen Khan\*, M. Athar Ansari<sup>1</sup>, Shaista M. Vasenwala<sup>2</sup> and Zehra Mohsin<sup>3</sup>

<sup>1</sup>Department of Community Medicine, J.N.Medical College, A.M.U., Aligarh, India

<sup>2</sup>Department of Pathology, J.N.Medical College, A.M.U., Aligarh, India

<sup>3</sup>Department of Obstetrics & Gynaecology, J.N.Medical College, A.M.U., Aligarh, India

\*Corresponding author

## ABSTRACT

### Keywords

Urinary tract infection,  
Postmenopausal women,  
Urinary incontinence,  
Uterine prolapsed,  
Smoking

The aim of this study was to determine the prevalence of urinary tract infection (UTI) and its associated risk factors in post menopausal women. It was a community based cross-sectional study conducted in the registered field practice areas of the Department of Community Medicine, J.N. Medical College and Hospital, Aligarh from June, 2012 to May, 2013. A total of 530 post-menopausal women, 265 each from the rural and urban areas were approached with study tools comprising of pre-structured proforma, clinical, laboratory, and microbiological examinations. Data was analyzed using the SPSS version 20.0. In the present study, the prevalence of UTIs was found to be 15.7% and a significant association was found with urinary incontinence, Uterine prolapse, Chronic diseases such as Diabetes Mellitus, Hypertension, cardiovascular diseases and smoking. UTI was found to be a common clinical condition affecting the ageing women.

## Introduction

Atrophic changes of the vagina, vulva, and urinary tract have a large impact on quality of life of an elderly woman, the symptoms being progressive in nature and worsening with time. Common symptoms of urogenital atrophy include irritation, and itching; vaginal dryness, pain during sexual intercourse; and recurrent urinary tract infection (UTI). Observational studies have confirmed the high prevalence of urogenital atrophy, reporting its occurrence in 27%–59% of peri- and postmenopausal women. Vaginal dryness is similarly frequent, occurring in up to one-half of

postmenopausal women; its prevalence increases exponentially with amount of time since menopause (Wysocki, 2009). Urinary Tract Infection, commonly known as UTI, affects as many as 50% women at least once during their lifetime. Women are more susceptible to UTI because of two major reasons. One, a woman's urethra is short, allowing quick access of bacteria to the bladder. Second, a woman's urethral opening is near sources of bacteria from the anus and vagina (Chaudhuri *et al.*, 2008). Urinary tract infection is defined as the presence of microbial pathogens in the

urinary tract with associated symptoms (Hotchandani and Aggarwal, 2012). Because of physiologic changes related to aging and co-morbid illnesses, asymptomatic bacteriuria (ASB) is a common occurrence in older adults. For an asymptomatic woman, bacteriuria is defined as two consecutive voided urine specimens with isolation of the same bacterial strain in quantitative counts  $\geq 10^5$  colony forming units (cfu)/ml (Hotchandani and Aggarwal, 2012).

### **Problem Statement**

Young women have a prevalence of ASB of 1 to 2%. For women 65 to 90 yr of age, the prevalence of ASB ranges from 6 to 16%. The prevalence is highest for women over the age of 90, ranging from 22 to 43%. The prevalence is highest among those most severely disabled. Up to 90% of institutionalized adults also have asymptomatic pyuria (*i.e.*, white blood cells in the urine in the absence of urinary tract-specific symptoms). The diagnosis of UTI in community-dwelling older adults follows a similar paradigm to the diagnosis of UTI in younger adults, requiring significant bacteriuria ( $\geq 10^5$  cfu/ml) associated with genitourinary symptoms (Juthani-Mehta, 2009). The present study was therefore undertaken to determine the prevalence of urinary tract infection (UTI) and its associated risk factors in post menopausal women.

### **Etiology**

One of the most common pathogens is *Escherichia coli* followed by *Staphylococcus saprophyticus*. Other common pathogens which are seen frequently especially in older women are *Proteus mirabilis*, *Klebsiella pneumoniae* and *Enterobacter*. In connection with UTI, the most common

presenting urinary symptoms are frequency, urgency, pain or burning during urination, suprapubic discomfort and inability to empty the bladder completely (Eriksson, 2011). The characteristic symptoms of UTI in the adult are primarily dysuria with irritating voiding symptoms like urinary urgency, frequency, nocturia, painful voiding, bladder discomfort or strangury which greatly distress the patient. Rates of infection are high in postmenopausal women because of bladder or uterine prolapse causing incomplete bladder emptying; loss of estrogen with attendant changes in vaginal flora (notably, loss of lactobacilli), which allows peri-urethral colonization with gram-negative aerobes, such as *Escherichia coli*; and higher likelihood of concomitant medical illness, such as diabetes. *E. coli* is by far the commonest cause of uncomplicated community-acquired UTIs in both outpatient and inpatient settings. Other common uropathogens are *Enterococcus faecalis*, *Enterobacter* species, *Staphylococcus saprophyticus*, *Klebsiella pneumoniae*, *Proteus mirabilis* and *Pseudomonas* species (Hotchandani and Aggarwal, 2012).

### **Material and Methods**

It was a community based cross sectional study. All the households registered under UHTC and RHTC, Department of Community Medicine, JNMCH, Aligarh was taken under the sampling frame. All postmenopausal women who are residents of the study areas of UHTC and RHTC were included. The study period was one year *i.e.* from June, 2012 to May, 2013.

**Inclusion criteria:** Women who had attained menopause.

**Exclusion criteria:** Women who did not give consent, those who had not attained

menopause, those who were receiving hormone replacement therapy (HRT).

Systematic random sampling and proportionate to population size method (PPS) followed. The sample size was taken according to the study conducted by Puri *et al.* (2008), in the urban and slum areas of Chandigarh where out of 71.4% of the total females who had attained menopause at the time of study, 42.7% had vaginal irritation/discharge, which is used for calculating the sample size for this study. The total sample size was calculated according to the formula  $N = z^2pq/L^2$  where p stands for prevalence (42.7%),  $q = 100 - p$ ,  $L =$  relative error = 15% of p, the corrected sample size was 262. Considering design effect and taking similar sample size from rural as well as urban areas, a total of 530 postmenopausal women were approached with study tool comprising of pre-tested and pre-structured proforma consisting of personal details including the name, age, address, marital status and religion, occupation, educational status, total family income, type of family, place of residence, locality etc and detailed history of uro-gynaecological complains if present. The presence of UTI was confirmed by urine routine and microscopic examinations. Various parameters of relevance along with socio-demographic profile of patients were studied. Data was analyzed using the SPSS version 20. Standard error of difference between the two proportions, Chi-square test and logistic regression analysis was applied wherever applicable. The value of  $p < 0.05$  was considered as significant for this study.

Ethical issues that were considered are as follows:

- Informed verbal consent was taken from each subject before interview. The nature and purpose of the survey were explained to them.

- Confidentiality and privacy during examinations were assured.
- Interviews were conducted in a non hostile and non judgmental manner.
- Local cultural values and ideas were respected.
- Health education and counselling regarding the risk factors for development of different problems were provided to all the respondents.

Permission from the Institutional Ethics Committee, Faculty of Medicine, AMU, Aligarh was taken. Management or referral of the patients was done at the respective centres wherever needed as per requirement.

## **Results and Discussion**

The mean age of the study population is 58.14 years ( $\pm 8.45$  S.D.). Median age was 57.0 years and mode was 50.0 years. Maximum number of respondents (29.6%) belonged to 56-60 years age group. The prevalence of UTI was found to be 15.7% (10.2% in rural areas and 21.2% in the urban areas). If stratified according to age, as shown by figure 1, the total prevalence is found to be 16.7%, 20.2%, 7.1%, 14.6% and 18.8% in the age groups 41-45, 46-50, 51-55, 56-60 and >60 respectively. There is no significant difference found in the prevalence of UTI over the age groups ( $p > 0.05$ ) but higher values are found with increasing age.

## **Associated gynaecological co-morbidities**

A highly significant relation was found between UTI and Uterine prolapse ( $p < 0.001$ ) as shown by the table 1 shows that UTI was found in 34.9% of the subjects having uterine prolapse. Table 2 shows a highly significant relation between UTI and

Urinary Incontinence (UI) ( $p < 0.001$ ). UTI was found in 92.8% cases of UI in the present study.

**Chronic diseases**

53.0% of the subjects with some chronic disease (figure 2) were diagnosed with UTI. It was found in 6.0% cases having Diabetes Mellitus (DM), 38.6% cases having Hypertension (HTN) and 9.6% cases having other problems such as cardio-vascular or respiratory illness. This was found to be highly significant ( $p < 0.001$ ).

**Smoking**

A significant association was found between smoking and UTI ( $p < 0.01$ ). On univariate logistic regression analysis study subjects who were smokers were found to have an odd's ratio of 3.232 (95% CI 1.960-5.331) (Table 3) compared to the non smoker study subjects.

Sherburn *et al.* (2001) reported UI in subjects who report urinary tract infections (OR 4.75, 95% CI 2.28–9.90). One thing which was observed during the present study was that most women complained of urinary problems and prolapse was an incidental finding on examination. So it can be explained that chronic skin and mucosal changes harbouring micro-organisms could have led to UTIs. Eriksson (2011) documented that among old women living in the community, UTI is associated with diabetes, hip fracture surgery and delirium. In the present study, UTI was found to be a common clinical condition affecting the ageing women. It showed a significant association between UTI and UI, uterine prolapse, chronic diseases which are treatable. An association was also found between UTI and smoking which is a modifiable risk factor. Health education and cessation programs can play an important role in prevention of UTI.

**Table.1** Association of UTI with uterine prolapsed

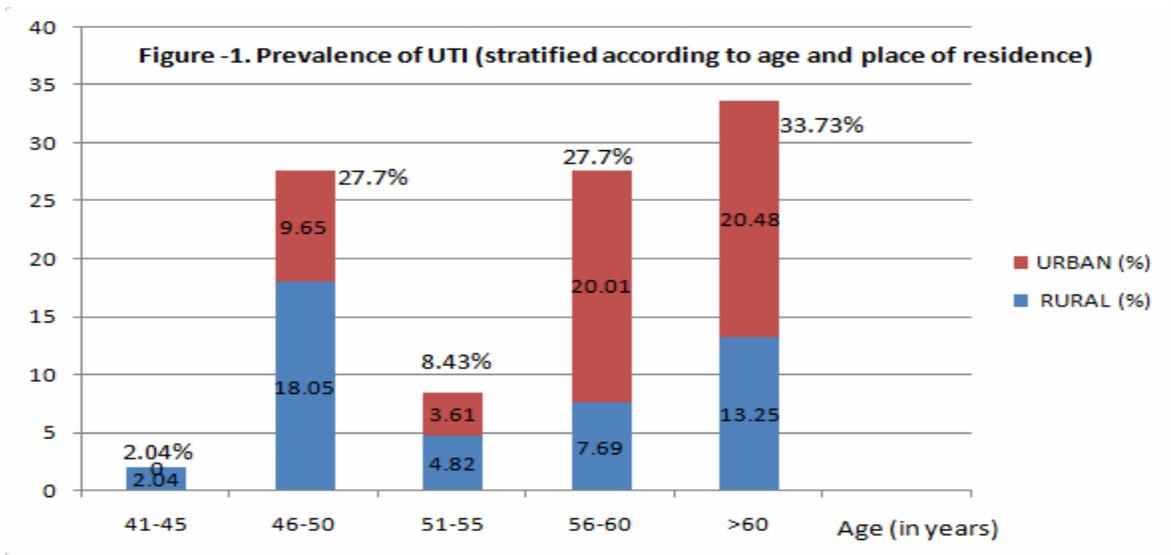
Uterine Prolapse	UTI		Total N (%)
	Absent N (%)	Present N (%)	
Absent	374 (83.7)	54 (65.1)	428 (80.8)
Present	73 (16.3)	29 (34.9)	102 (19.2)
Total	447 (100.0)	83 (100.0)	530 (100.0)
$\chi^2=15.597, d.f.=1, p=0.000$			

**Table.2** Association of UTI with UI

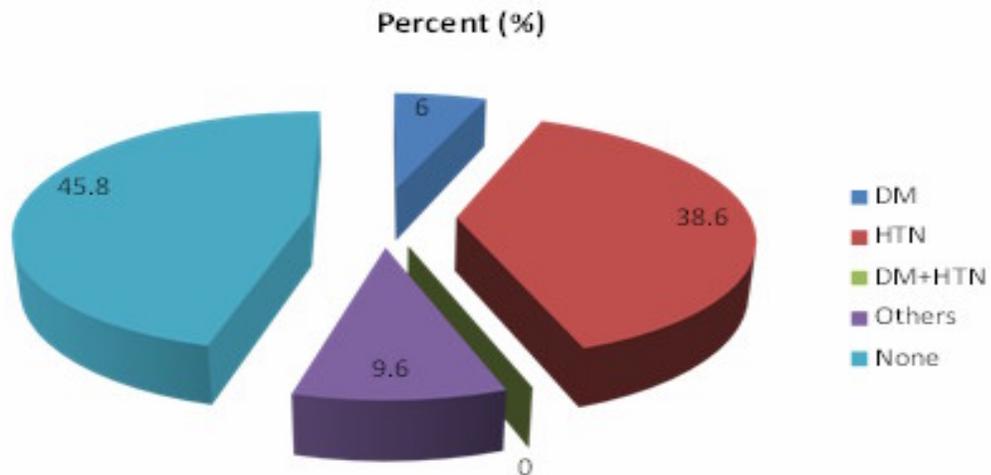
UI	UTI		Total N (%)
	Absent N (%)	Present N (%)	
Absent	305 (68.2)	6 (7.2)	311 (58.7)
Present	142 (31.8)	77 (92.8)	219 (41.3)
Total	447 (100.0)	83 (100.0)	530 (100.0)
$\chi^2=107.441, d.f.=1, p=0.000$			

**Table.3** Association of UTI with smoking

Smoking	UTI		Total N (%)	On univariate logistic regression		
	Absent N (%)	Present N (%)		OR	95% C.I.	
					Lower	Upper
Absent	368 (82.3)	49 (59.0)	417 (78.7)	1.000		
Present	79 (17.7)	34 (41.0)	113 (21.3)	3.232	1.960	5.331
Total	447(100.0)	83 (100.0)	530 (100.0)			
$\chi^2=22.636, d.f.=1, p=0.000$						



**Figure.2** Association of UTI with chronic diseases



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## References

- Chaudhuri, S., Thakur, A., Nandy, P., Samanta, S. 2008. Urinary tract infection-a survey of local population. *Am. J. Infect. Dis.*, 4(2): 117–23.
- Eriksson, K. 2011. Bacterial vaginosis. Sweden: Linköping University Medical Dissertations No. 1246, Obstetrics and Gynaecology and Clinical Microbiology, Department of Clinical and Experimental Medicine, Linköping University; 2011. Available from: <http://www.diva-portal.org/smash/get/diva2:421197/FULLTEXT01.pdf> (Date of access: 24 Nov 2013).
- Hotchandani, R., Aggarwal, K.K. 2012. Urinary tract infections in women. *Indian J. Clin. Pract.*, 23(4): 187–92.
- Juthani-Mehta, M. 2009. Urinary tract infections in elderly persons. American Society of Nephrology, Chapt. 32.
- Puri, S., Bhatia, V., Mangat, C. 2007. Perceptions of menopause and postmenopausal bleeding in women of Chandigarh, India. *Inter. J. Family Pract.*, [Internet]. 6(2): [about 1p.]. Available from: <http://ispub.com/IJFP/6/2/11408> (Date of access: 25 Nov 2013).
- Sherburn, M., Guthrie, J.R., Dudley, E.C., O'Connell, H.E., Dennerstein, L. 2001. Is incontinence associated with menopause? *Obstetr. Gynecol.*, 98(4): 628–33.

Wysocki, S. 2009. Targeting the urogenital health of postmenopausal women: A spotlight on vaginal atrophy. *Vaginal Atrophy Supplement*; Autumn 2009:1. Available at: <http://www.paobgyn.org/docs/Vaginal-Atrophy-Supplement> (Date of access: 23 Nov 2013).