

## ORIGINAL ARTICLE

## FREQUENCY OF DIFFERENT RISK FACTORS ASSOCIATED WITH RECURRENT URINARY TRACT INFECTION AMONG POSTMENOPAUSAL WOMEN

Sadia Jameel, Syed Nayer Mahmud

Department Nephrology and Kidney Transplant, Shifa International Hospitals Ltd, Islamabad-Pakistan

**Background:** Urinary Tract Infection is one of the most common infections encountered by women. These infections have the tendency to recur. In order to identify women at risk of recurrence there is a need to identify risk factors associated with it. Among women, factors predisposing to recurrent infections are not much explored. The study was done with an objective to determine different risk factors associated with recurrent UTI among postmenopausal women. **Methods:** This was a cross sectional study conducted at the Out Patient Department of Nephrology in Shifa International Hospital Islamabad over a period of six months, June 6<sup>th</sup> to December 5<sup>th</sup> 2012. Information regarding demographics and risk factors were recorded on a predesigned *pro forma*. A descriptive analysis was done for quantitative variables like age and qualitative variables like marital status and frequency of different risk factors. Stratification of risk factors according to age was also done. **Results:** Hundred females were enrolled into the study after informed consent. The mean age of the study population was 64.4±9.48. 97% of the population was married. Out of 100 patients, 42 had high post-void volume, 35 had urinary incontinence and 17 patients were having cystocele. According to age stratification, most frequently affected age group was between 51–60 years (38%), followed by 61–70 years (36%), then 25% in more than 70 years, whereas only 1% was between 41–50 years. **Conclusion:** Recurrent UTI in postmenopausal females is most frequently associated with high post void volume and most frequently affected age group is between 51–60 years.

**Keywords:** Recurrent UTI, Postmenopausal females, high post-void volume, cystocele, urinary incontinence

J Ayub Med Coll Abbottabad 2016;28(2):353–6

### INTRODUCTION

Urinary tract infection is one of the most common infections experienced by all ages of adult women.<sup>1</sup> It is accounting for approximately 8 million or more visits to doctors annually and approximately 1.5 million visits to emergency room.<sup>2</sup> The annual cost of UTIs in Europe, including both uncomplicated and recurrent UTI, is 3.5 billion dollars.<sup>2,3</sup> Approximately 44% of women who had a UTI subsequently experience recurrence of infection in the following 12 months of observation.<sup>4</sup> 62% this recurrence are caused by re infection with same strain organism.<sup>5</sup> The frequency of re infections in women occur at the rate of approximately 0.13 to 0.22 UTIs monthly (1–2.6 infections annually).<sup>6</sup> According to a recent study UTIs impairs quality of life. Women frequently suffer from pain, restriction of work and bed rest as a consequence of these infections which can increase further cost.<sup>3,7</sup>

The prevalence of UTIs increases with increasing age.<sup>2,7</sup> The incidence of bacteriuria among women aged between 65–70 years is 10–15% and among those >80 years it is 15–20%.<sup>8</sup> Bacteriuria has been revealed as a reason of increased mortality in elderly individuals.<sup>9</sup> Despite the high prevalence of bacteriuria and higher

incidence of symptomatic UTIs among healthy postmenopausal women, still the predisposing factors of UTI in these women have been not been much explored in comparison to either premenopausal women or older institutionalized women.<sup>9</sup>

Risk factors identified to date associated with recurrent UTI in postmenopausal women include 3 urological factors namely urinary incontinence in 41% patients<sup>9–11</sup>, presence of cystocele in 19% patients<sup>9</sup>, high post-voiding residual (PVR) seen in 28% patients<sup>9,12</sup>. Other factors include oestrogen deficiency, urogenital surgery, non-secretor status and prior history of UTI. The risk rises if there is obstruction in the system causing urinary stasis, e.g. urolithiasis, renal cysts or neurogenic bladder. Certain other conditions like Diabetes Mellitus<sup>9,13</sup>, renal transplantation and immunosuppression encourages entry of uropathogens<sup>9</sup>.

Despite the utter simplicity of diagnosis of these risk factors by inspection and ultrasound examination, there is failure of physicians to recognize these conditions.

Recurrent UTI in females is a subject not much studied in Pakistan. Only with better understanding of this process, we can improve our capacity to identify women at risk and reduce morbidity.

**MATERIAL AND METHODS**

This was a cross sectional study, conducted prospectively on patients presenting to Out Patient Department of Nephrology at Shifa International Hospital Islamabad. The duration of study was six months.

From the literature, the frequency of the least common risk factor was 19%.<sup>9</sup> Therefore taking the frequency of 19%, with a bound on error of 0.08 (8%) with a power of 0.80, an alpha significance level of 0.05 with a 95% CIs, a sample size of 100 were taken to achieve the objective of the study. Consecutive n-probability sampling technique was used.

Postmenopausal females with symptomatic UTI, confirmed by urine c/s results, at least twice in 6 months or thrice in a year were included in the study.

Patients on prophylactic antibiotic therapy as per history, congenital abnormalities like Polycystic kidney disease as assessed by ultrasound examination of kidneys, evidence of hydronephrosis as per ultrasound findings either in single or both kidneys irrespective of cause, any history of urological intervention and Post Renal transplant patients were excluded.

After approval from ethical board, all adult postmenopausal females visiting Nephrology clinics at Shifa International hospital with recurrent UTI fulfilling inclusion criteria were included after taking informed consent by the principal investigator. Patient demographic data (medical record number, age, marital status) and different risk factors (high post void volume, cystocele, and urinary incontinence) were documented by the primary investigator on the pre designed *pro forma*.

All analysis was conducted using SPSS-16. A descriptive analysis was done for demographic features and presented as mean±standard deviation for quantitative variables such as age of the patient. Percentages were computed for categorical variables like marital status, frequency of different factors. Stratification of age for each risk factor was done.

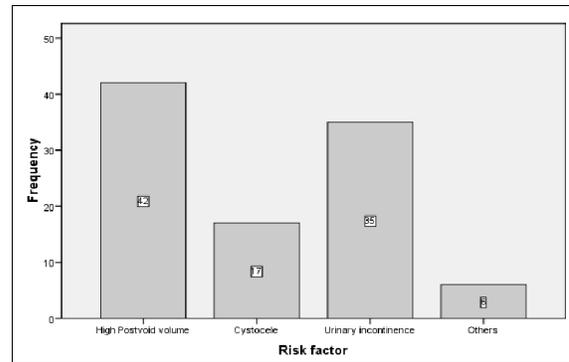
**RESULTS**

A total of 100 postmenopausal women were enrolled in this study. Mean age was 64.4 years with standard deviation of ±9.484. The range of age was from 45–90 years. The distribution of age is presented in table-1.

In this study group, 97% were married. Out of a total of 100 women, high post-void volume was most common followed by urinary incontinence and cystocele. The percentages of these risk factors are presented in figure-1.

Out of the 42 patients who had high post-void volume, maximum percentage 47.6% fall in the age group of 51–60 years, rest of the percentages are presented in table-2.

Among the 35 patients who had urinary incontinence, 40% were between 61–70 years. The percentage of urinary incontinence with respect to age is presented in table-3. Out of 17 patients, 29.4% were >70 years, the rest are presented in table-4.



**Figure-1: Frequency of different risk factors for recurrent UTI in postmenopausal women presented in bars**

**Table-1: Frequency and percentage of recurrent UTI in post-menopausal women stratified by age groups**

| Age          | Number     | Percentage |
|--------------|------------|------------|
| 41–50        | 1          | 1          |
| 51–60        | 38         | 38         |
| 61–70        | 36         | 36         |
| >70          | 25         | 25         |
| <b>Total</b> | <b>100</b> | <b>100</b> |

**Table-2: The frequency and percentage of high post-void volume PVR with respect to age groups**

| Age          | High post-void volume | Percentage |
|--------------|-----------------------|------------|
| 41–50        | 1                     | 2.4        |
| 51–60        | 20                    | 47.6       |
| 61–70        | 13                    | 31         |
| >70          | 8                     | 19         |
| <b>Total</b> | <b>42</b>             | <b>100</b> |

**Table-3: The frequency and percentage of urinary incontinence with respect to age groups.**

| Age          | Urinary incontinence | Percentage |
|--------------|----------------------|------------|
| 41–50        | 0                    | 0          |
| 51–60        | 9                    | 25.7       |
| 61–70        | 14                   | 40         |
| >70          | 12                   | 34.3       |
| <b>Total</b> | <b>35</b>            | <b>100</b> |

**Table-4: The frequency and percentage of presence of cystocele with respect to age groups**

| Age          | Cystocele | Percentage |
|--------------|-----------|------------|
| 41–50        | 0         | 0          |
| 51–60        | 6         | 35.3       |
| 61–70        | 6         | 35.3       |
| >70          | 5         | 29.4       |
| <b>Total</b> | <b>17</b> | <b>100</b> |

## DISCUSSION

UTI is a significant problem in women especially in postmenopausal age. Most of the patients experience recurrent episodes depending on underlying microbial agent properties or certain host factors. The frequency of different risk factors leading to recurrent UTI has been evaluated in past in different countries<sup>9,10</sup>, we lack such data in our population. Moreover postmenopausal group has not been studied extensively as compared to young population despite the high incidence of bacteriuria in them<sup>9</sup>. The main purpose of this study is to identify risk factors in postmenopausal group in order to modify future management of recurrent UTI. Treatment of UTI requires intricate knowledge of the pathogenesis and contribution of host and bacterial factors. Therefore it is the utmost responsibility of the physician to not only prescribe antibiotic for treating infection but to identify and modify any underlying risk factor where ever possible.<sup>14</sup>

The result of the study has shown that mean age was 64.4 years with standard deviation of  $\pm 9.484$ . The distribution of age was from 45 to 90 years. This is near to study conducted in 2000 by Raz and colleagues to determine the risk factors in postmenopausal women, which was  $65.7 \pm 7.2$  years.<sup>7</sup> 97% of the sample was married. Comparison between cohort of married and unmarried patients was not analysed further because the number of patients who were unmarried was very low.

The frequency of different risk factors associated with recurrent UTI were represented in the form of percentages as 42% for high post-void volume, presence of cystocele was 17% and urinary incontinence was present in 35% of study participants. However the frequencies of risk factors in postmenopausal women according to previous study were, high post-void volume seen in 28%<sup>9</sup> patients, presence of cystocele in 19% patients<sup>9</sup> and urinary incontinence in 41% patients<sup>9</sup>. Also, six study participants did not have any of the aforementioned risk factor. The reason for disparity in the frequency of urinary incontinence is probably due to lower incidence of this problem in our population, as mentioned in an Indian study, the incidence of urinary incontinence is 20.74% among postmenopausal women.<sup>15</sup> This is in contrast to western population where it is fairly common among older women, in the range of 17–46% of community-dwelling women >60 years of age.<sup>8</sup>

Our study is unique to find out the most susceptible age group for recurrent UTI among the postmenopausal women to be between 51–60 years, as 38% of study participants fall in this age group. This is followed by 61–70 years 36% then those more

than 70 years are 25%. Such stratification of age has not been done in any other study.

According to the frequency of each risk factor in different age groups, high post-void volume is the most common factor seen in the age group of 51–60 years 47.6%. Urinary incontinence is seen most frequently in the age group of 61–70 years 40%. Whereas there is no difference in the frequency of cystocele between 51–60 and 61–70 years age group 35.3%. This is another finding which has not been looked in previous studies. This study emphasizes the need of pelvic examination in every postmenopausal patient of recurrent UTI so as to identify and modify treatment strategy.

Although the study has provided our local data but it does have some limitations. First this is only a cross sectional study and analytical studies with better strength of evidence are required in the same field to validate the findings of this study. One needs to look at the frequency of these risk factors in normal population of same age group in order to drive any authentic conclusion. The study was done in a tertiary care hospital that may not be adequately representing the prototype Pakistani population. Keeping in view the limitations involved in calculating study sample, there is a need of further studies with larger sample size. Moreover follow up studies to identify any new possible risk factor are required, so as to timely intervene and hence prevent morbidity and decrease financial burden associated with its management.

## CONCLUSION

Recurrent UTI in postmenopausal females is most frequently associated with high post void volume 42% followed by urinary incontinence 35% and presence of cystocele 17%. The most frequently affected age group is between 51–60 years.

## AUTHOR'S CONTRIBUTION

SJ: Data collection, statistical analysis, manuscript writing. SNM: Conceived, proof reading

## REFERENCES

1. Wagenlehner FM, Vahlensieck W, Bauer HW, Weidner W, Piechota HJ, Naber KG. Prevention of recurrent urinary tract infections. *Minerva Urol Nefrol* 2013;65(1):9–20.
2. Mittal R, Aggarwal S, Sharma S, Chhibber S, Harjai K. Urinary tract infections caused by *Pseudomonas aeruginosa*: a minireview. *J Infect Public Health* 2009;2(3):101–11.
3. Renard J, Ballarini S, Mascarenhas T, Zahran M, Quimper E, Choucair J, et al. Recurrent Lower Urinary Tract Infections Have a Detrimental Effect on Patient Quality of Life: a Prospective, Observational Study. *Infect Dis Ther* 2014;4(1):125–35.
4. Beerepoot MA, den Heijer CD, Penders J, Prins JM, Stobberingh EE, Geerlings SE. Predictive value of *Escherichia coli* susceptibility in strains causing asymptomatic bacteriuria for women with recurrent

- symptomatic urinary tract infections receiving prophylaxis. *Clin Microbiol Infect* 2012;18(4):E84–90.
5. Schwartz DJ, Chen SL, Hultgren SJ, Seed PC. Population dynamics and niche distribution of uropathogenic *Escherichia coli* during acute and chronic urinary tract infection. *Infect Immun* 2011;79(10):4250–9.
  6. Nickel JC. Practical management of recurrent urinary tract infections in premenopausal women. *Rev Urol* 2005;7(1):11–7.
  7. Eells SJ, Bharadwa K, McKinnell JA, Miller LG. Recurrent urinary tract infections among women: comparative effectiveness of 5 prevention and management strategies using a Markov chain Monte Carlo model. *Clin Infect Dis* 2014;58(2):147–60.
  8. Raz R, Gennesin Y, Wasser J, Stoler Z, Rosenfeld S, Rottensterich E. Recurrent urinary tract infections in Postmenopausal women. *Clin Infect Dis* 2000;30(1):152–6.
  9. Raz R. Urinary tract infection in postmenopausal women. *Korean J Urol* 2011;52(12):801–8.
  10. Haylen BT, Lee J, Hussenbee S, Law M, Zhou J. Recurrent urinary tract infections in women with symptoms of pelvic floor dysfunction. *Int Urogynecol J Pelvic Floor Dysfunct* 2009;20(7):837–42.
  11. Moore EE, Jackson SL, Boyko EJ, Scholes D, Fihn SD. Urinary incontinence and urinary tract infection: temporal relationships in postmenopausal women. *Obstet Gynecol* 2008;111(2 Pt 1):317–23.
  12. Haylen BT, Lee J, Logan V, Hussenbee S, Zhou J, Law M. Immediate postvoid residual volumes in women with symptoms of pelvic floor dysfunction. *Obstet Gynecol* 2008;111(6):1305–12.
  13. Janifer J, Geethalakshmi S, Satyavani K, Viswanathan K. Prevalence of lower urinary tract infection in South India type 2 diabetic subjects. *Indian J Nephrol* 2009;19(3):107–11.
  14. Hamid R, Losco G. Pelvic Organ Prolapse-Associated Cystitis. *Curr Bladder Dysfunct Rep* 2014;9(3):175–80.
  15. Abha S, Priti A, Nanakram S. Incidence and epidemiology of urinary incontinence in women. *J Obstet Gynaecol India* 2007;57(2):155–7.

---

### Address for Correspondence:

**Dr Sadia Jameel**, House No. 416/A, Street No. 4, Sector G-9/3, Islamabad-Pakistan

**Cell:** +92 321 211 7668

**Email:** jameelsadia@yahoo.com