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Evaluating Risk Factors for Urinary Tract Infections in Postmenopausal Women: Insights and Implications

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ABSTRACT

Background: Urinary tract infections (UTIs) are a significant health concern among older women, particularly due to anatomical differences and hormonal changes associated with aging. Postmenopausal women are particularly vulnerable, experiencing higher susceptibility to recurrent UTIs.

Objectives: This study aimed to identify risk factors for recurrent UTIs in postmenopausal women and evaluate the organisms responsible for causing urinary tract infections (UTIs).

Methods: A prospective observational study was conducted at KMCT Hospital from December 2022 to May 2023; involving 91 postmenopausal women aged 40 to 75 with clinically suspected UTIs. Ethical approval was obtained, and participants provided informed consent. Urine specimens were collected using the mid-stream "clean-catch" technique, with infection defined by bacterial counts exceeding 10^5 CFU/mL. Data on medical history, sexual activity, and urinary habits were collected through a standardized questionnaire.

Results: The study population predominantly consisted of older women, with 39.56% over 70 years. Risk factors identified included diabetes (72.52%), incontinence (61.5%), and a history of UTIs (41.75%). E. coli was the most common pathogen (48.3%), followed by Klebsiella species (19.8%). Findings were consistent with existing literature indicating a correlation between diabetes, urologic abnormalities, and UTI risk.

Discussion: The results highlight the multifactorial nature of UTI risk in postmenopausal women, emphasizing the need for targeted prevention strategies and careful management of recurrent infections to mitigate antibiotic resistance.

Keywords: Urinary tract infections, postmenopausal women, risk factors, diabetes, antibiotic resistance.

I. INTRODUCTION

"Urinary tract infection" it is becoming a major topic to be discussed in individuals as which is more prone to females than males which is basically due to the anatomical differences in reproductive area. In pregnant females and post-menopausal women are more susceptible, and it can occur at any age. As the risk factor is being one of the concerns to be analyzed in post-menopausal women with recurrent UTI, also locationally due to several factors the risk factor of UTI can be differential in different areas [(1)]

The risk factors for recurrent UTI in elderly women, however, are not well documented. Patient receiving insulin treatment, and a lifetime history of urinary infections were two independent predictors of infection. Kidney stones, asymptomatic bacteriuria at baseline, and a history of vaginal estrogen cream use during the previous month were considered borderline correlations. The probable contribution of estrogen shortage to the emergence of bacteriuria in post-menopausal women is another significant issue.

UTI is one of the mortality cases in elderly women, which is of the most cases are asymptomatic, as after menopause estrogen decreases favors bacteriuria. Mostly which are of asymptomatic bacteriuria should not be treated with antibiotics which can cause resistance to antibiotics. One of the moderate kinds of effective method for curing UTI is having cranberry juice and vit C. [(2)]

The common emerging risk factor for UTI in post-menopausal women are continual intercourse, family history, alter of local bacterial

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flora, vulvovaginal atrophy which occurs as in menopause due to reorient in glycogen production, estrogen, lactobacilli colonization. as in childhood or before menopause occurring of history of UTI. For recurrent UTI non secretor blood type is an upheld risk factor. A preventive primary method to avoid UTI is to complete voiding, as risk increases with catheterization. (1)

Other prevalent risk factors include general health conditions, diabetes, pregnancy. Additional factors contributing to the increased risk of UTI in postmenopausal women include anatomical (cystocele, uterine prolapse), functional (voiding difficulties; urine incontinence), and hormonal (vaginal atrophy brought on by hypoestrogenism) abnormalities. (4)

Bladder emptying interfere with Biological or physiological factors in post-menopausal women were a concern to recurrent UTI (3)

For older adults, polypharmacy is the main risk factor for overactive bladder syndrome. (5)

The infection of Urinary tract is treated with antibiotic as per the organism with correct dosage, time and duration should be minimized according to the type of infection caused in case of symptomatic regardless as asymptomatic not serious cases without antibiotics rather with options probiotics, immunomodulant and behavioral interventions to avoid antibiotic resistance (6)

Outcomes in pts with diabetes is more severe and people with Diabetes, UTI is more common. The risk of UTI increases in diabetes pts with different impairments in immune system, autonomic neuropathy causing in proper bladder emptying, fluctuation in metabolism. The most common organism was found to be E. coli in diabetic patients. (7)

II. METHOD

This prospective observational study took place at KMCT Hospital from December 2022 to May 2023, targeting postmenopausal women aged 40 to 75 who were clinically suspected of having a urinary tract infection (UTI). Prior to the study's initiation, ethical approval was obtained from the institutional review board.A total of 91 patients who met both the inclusion and exclusion criteria were included in the study. The study included postmenopausal women who had been diagnosed with a urinary tract infection (UTI), those with recurrent UTIs, and participants who provided informed consent.while women with psychiatric conditions were excluded.

Urine specimens were collected from participants using the mid-stream "clean-catch" technique and considered positive for infection if bacterial colony counts exceeded 10^5 colony-forming units (CFU) per milliliter.All participants completed a standardized self-administered questionnaire that collected information on their medical and sexual histories, as well as current health behaviors.During the interview, we assessed general health, including chronic conditions like diabetes, obstetric and gynecologic history, sexual activity, and catheterisation. Detailed questions regarding urinary habits, including continence issues,were also included, and documented participants' history of previous UTIs.Additionally,essential data on socio-demographic characteristics, UTI-causing organisms, laboratory values, medical history, and comorbidities were documented for each participant.Data entry and statistical analysis were done using the software SPSS version.A statistical significance level of $p < 0.05$ was considered for analysis.

III. RESULTS

The data related to the age distribution in post-menopause study population illustrates the most patients (36 patients,39.56%) belong to the age group above 70 followed by 29 patients at the age of 61-70 years.

Among the study participants,58% are from rural area and 42 % from urban area.

Majority of study sample is from lower middle (42%) followed by lower class (36%) family.

In our study,66 patients were having diabetic mellitus (66,72.6%) followed by 53 patients with hypertension (53,58.24%) which can be a possible risk factor of UTI in post-menopausal women.

Of the study population,66 patients (72.52%) reported having diabetes and diagnosed with urolithiasis (14.28%), incontinence (61.5%), cystocele (4.3%) and having behavioral factors like holding urine (22.72%).18 patients were catheterized and 7 were immuno compromised.

38 patients had history of UTIs and constipation with 11 ones.

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Table no:1 Categorization based on age

AGE	NO OF PATIENTS	PRECENTAGE
40-50	7	7.69
51-60	19	20.87
61-70	29	31.86
ABOVE 70	36	39.56

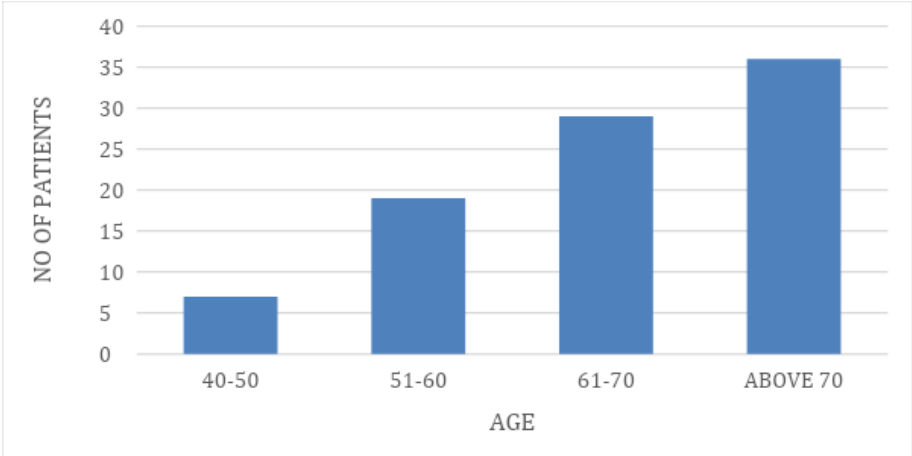

Figure No.1: Age distribution

Table No.2: Categorization based on residence.

RESIDENCE	PERCENTAGE
URBAN	41.8
RURAL	58.2

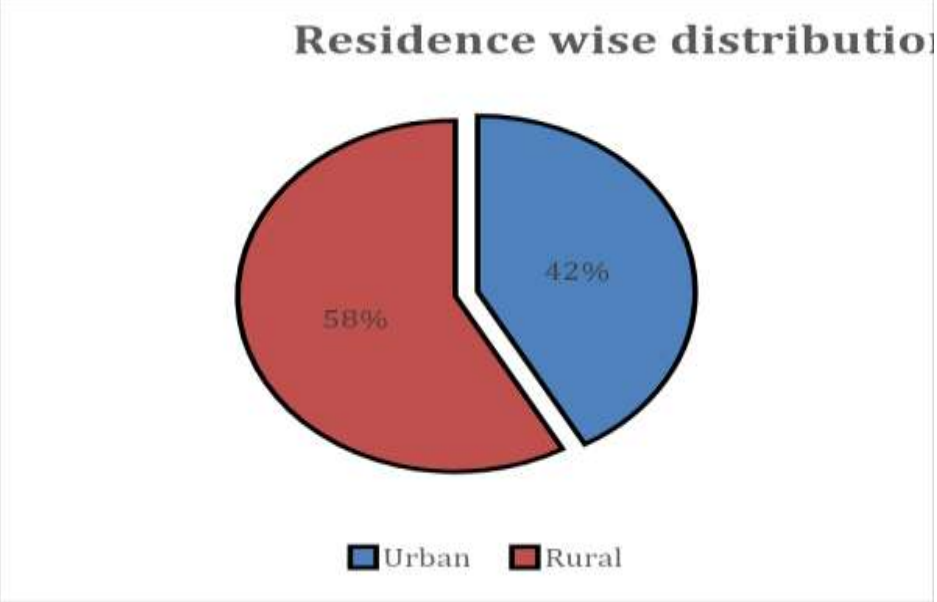

Figure no. 2: Categorization based on residence.

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Socioeconomic status	Frequency	Percentage (%)
UPPER CLASS	7	7.7
UPPER MIDDLE	15	24.2
LOWER MIDDLE	21	60.4
LOWER CLASS	48	52.7

Table No:3. Categorization based on socioeconomic status.

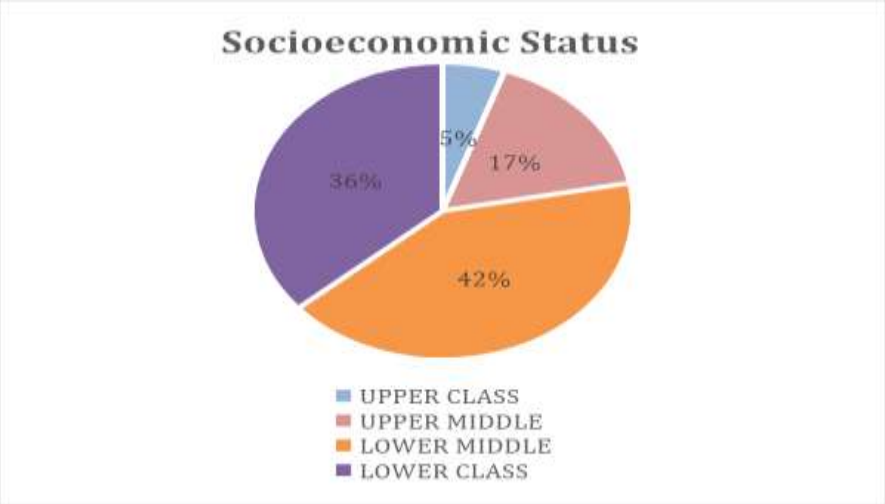

Figure No: 3. Distribution of socioeconomic status among the study population

RISK FACTORS	NO OF POPULATION	PERCENTAGE
RECENT SEXUAL ACTIVITY	8	8.79
HISTORY OF UTI	38	41.75
DM	66	72.52
CATHERISATION	18	19.7
INCONTINENCE	56	61.5
UROLOGIC ABNORMALITIES	8	8.79
VAGINAL ATROPHY	14	15.38
CHRONIC CONSTIPATION	11	12.08
DELAYED VOIDING	7	7.69
IMMUNOCOMPROMISED	7	7.69
DECREASED DRINKING WATER	10	10.9
HOLDING URINE	9	9.89
UTERINE PROLAPSE	5	5.49
UROLITHIASIS	13	14.28
CYSTOCELE	4	4.39
NOSOCOMIAL INFECTION	8	8.79

Table no: 4. Categorization of risk factors among study population

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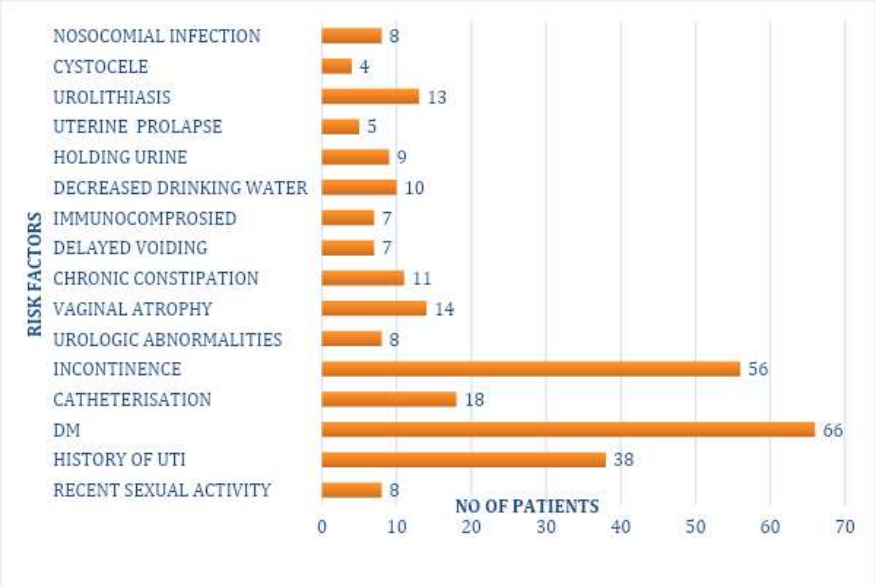

Figure: 4. Distribution of risk factors among study population

IV. DISCUSSION

A prospective observational study was conducted to find the risk factor and to assess the impact of UTI on quality of life and to evaluate the antibiotic resistance pattern in postmenopausal women were admitted to general department.

In this study, about 58 % belong to rural areas, 60 % of patients belong to lower middle class.

In this population we found that the treating DM (72.5%), incontinence (61.5%), history of UTI (41.8%), catheterization (19.7%) was all associated with a higher risk of UTI. These finding agree with the study by **Hu, Kent K., et al.** [8]

This study examined potential risk factors for urinary tract infections (UTIs) in generally healthy women aged 55 to 75 living in the community. Our findings indicate that the factors that increase the risk of UTI in these women are closely linked to their health status as they navigate the transition into older age. In our study population, treated diabetes was associated with a higher risk of acute symptomatic urinary tract infections, which aligns with the findings by the **Hu KK, Boyko EJ, Scholes D, et al.** [9]

The main factors contributing to the risk of urinary tract infections in older women include advancing age, urologic abnormalities, and significant comorbid conditions, which is consistent with findings reported by **Hu KK, Boyko EJ, Scholes D, et al.** [9]

The most common pathogens found in the urine samples collected from the entire sample population were Escherichia coli [E. coli] (48.3%), klebsiella species (19.8%) MDR klebsiella species (16.4%), Acinetobacter Baumanni complex (5.3%), Coagulance negative staphylococcus (4.3%), Candida ssp(3.2%) and Pseudomonas aeruginosa(2.1%).These findings agree with study conducted by **Shaifali, Iram, et al** [10] which have indicated that mostly E. coli and Klebsiella pneumonia, are the most common pathogens isolated in patients with UTI.

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