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**Dr. A Raghuram Bhargavi**  
Assistant Professor,  
Department of General  
Medicine, Mahavir institute of  
medical sciences, Vikarabad,  
Telangana, India

**Dr. Nagjere Shirisha**  
Assistant Professor,  
Department of General  
Medicine, Mahavir institute of  
medical sciences, Vikarabad,  
Telangana, India

**Dr. Veera Mohan Kumar**  
Assistant Professor,  
Department of General  
Medicine, Mahavir institute of  
medical sciences, Vikarabad,  
Telangana, India

**Dr. M Gopinath**  
Professor, Department of  
General Medicine, Mahavir  
institute of medical sciences,  
Vikarabad, Telangana, India

**Corresponding Author:**  
**Dr. Nagjere Shirisha**  
Assistant Professor,  
Department of General  
Medicine, Mahavir institute of  
medical sciences, Vikarabad,  
Telangana, India

## Study of prevalence of asymptomatic bacteriuria and its associated risk factors in rural elderly female patients

**Dr. A Raghuram Bhargavi, Dr. Nagjere Shirisha, Dr. Veera Mohan Kumar and Dr. M Gopinath**

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### Abstract

**Background:** Urinary tract infection is one of the most frequent bacterial infections in the elderly population occurring both in the community and in the long term care settings. Asymptomatic bacteriuria is common among the same elderly population which should be differentiated from obvious urinary tract infections.

**Objectives:** To identify the prevalence of asymptomatic bacteriuria (ASB) in elderly females from rural background and to examine associated risk factors

**Methods:** In this prospective observational cross sectional study a total of 100 elderly female patients aged 60 years and above from rural background in whom routine urine examination revealed bacteria or pus cells without symptoms of urinary tract infection are studied.

**Results:** Out of the 100 elderly female patients, 68 patients were found to have Asymptomatic Bacteriuria (ASB). Risk factors associated with asymptomatic bacteriuria are Diabetes mellitus, catheterisation, urinary incontinence and structural urinary tract abnormalities. E.coli was the most common organism isolated in asymptomatic bacteriuria patients.

**Conclusion:** The prevalence of Asymptomatic bacteriuria was significantly high in rural elderly female patients and it should be correlated with the clinical features of CUE findings of pus cells or bacteriuria and also the risk factors associated with UTI, so that patient with Asymptomatic bacteriuria are segregated from patients with UTI who require antimicrobial therapy.

**Keywords:** Asymptomatic bacteriuria, pyelonephritis, uro-pathogens, UTI, CUE

### Introduction

The term asymptomatic bacteriuria refers to isolation of bacteria in an appropriately collected urine specimen from an individual without symptoms of urinary tract infection (UTI). Asymptomatic bacteriuria (ASB) is prevalent in elderly patients and even more prevalent in residents of long-term care facilities [1]. Furthermore, because more and more people are reaching advanced age and the need for care increases with age, ASB is becoming increasingly important. There are several definitions for ASB, all of which require positive urine cultures and place little or no importance on accompanying pyuria. The Prevalence of ASB for women aged 80 and over are between 20% and 40%, the highest figures being for those in institutional living [2]. Most ASB is associated with complicating factors, as might be found in complicated urinary tract infections (UTIs). Thus, the bacterial spectrum associated with ASB is comparable to that seen in complicated UTIs [3]. A variety of complicating factors are more frequently found in elderly patients with ASB, such as hormonal factors (e.g. estrogen decrease), certain anatomical factors (e.g. uterine prolapse), metabolic factors (e.g. diabetes mellitus), functional alteration of the urinary bladder, immunological changes and a high rate of indwelling-catheter use [4].

Screening for ASB in elderly people is limited to those undergoing invasive urological procedures and surgical procedures with implant material [5]. Although ASB is apparently a benign condition, prevention in elderly people is important. The degree of pathogenicity of bacteria causing ASB has not yet been satisfactorily elucidated. Therefore, until the implications of the bacteria involved in ASB are fully understood, implementing the same hygienic precautions as are used in individuals with symptomatic UTIs should at least be undertaken. This study is undertaken to find prevalence of asymptomatic bacteriuria among the elderly rural population and its associated risk factors.

## Materials and Methods

**Study type:** Prospective observational study

**Study Setting:** It was conducted in the Department of General Medicine, Mahavir institute of medical sciences, Vikarabad.

**Study Duration:** August 2020 to January 2021.

**Sample size:** The study included 100 female patients aged 60yrs and above in whom routine urine examination revealed bacteria and/ pus cells without urinary tract infection symptoms. A detailed history of every patient regarding urinary symptoms, history of previous catheterization, history of urinary incontinence, history of any structural bladder/urethral abnormalities diagnosed, cognitive disability is recorded.

### Inclusion criteria

- Patient Age  $\geq$  60 years
- Female patients

### Exclusion criteria

- Male patients
- <60 yrs female patients
- Patients who are not willing for participating in this study.

Patients were instructed to clean genital region with plain water prior to micturition and collect midstream 5-10ml of urine into clean wide mouth sterile bottle patients whose CUE sample showed bacteria or pus cells  $>5$  cells/cu mm were advised for urine culture & sensitivity. All the relevant basic investigations which were required like complete blood count, renal function tests, Blood glucose, USG abdomen, Urine culture and so on were to rule out symptomatic UTI.

**Statistical Methods:** The SPSS 22 software was used to analyze the statistical analysis. The data was presented in the form of tables with percentages.

## Observation and Results

**Table 1:** Distribution based on Asymptomatic and symptomatic bacteriuria

Types of UTI	No. of patients	% of cases
Asymptomatic	68	68%
Symptomatic	32	32%

The present study showed that, asymptomatic bacteriuria was present in 68 patients and 32 patients had Symptomatic bacteriuria.

**Table 2:** Distribution of patients according to Age

Age in years	No of patients with ASB	Percentage
60-69yrs	16	23.5%
70-79yrs	28	41%
80-89yrs	24	35.2 %

Majority belonged to the age group of 60-69 years (23.5%) followed by 70-79years (41%) and 80-89years (35.2%).

**Table 3:** Frequency of risk factors in elderly people with ASB

Risk factor	Frequency	Percentage
Diabetes mellitus	42	61.7%
Catheterization	6	8.8%
Urinary incontinence	14	20%
Recurrent UTI with cognitive impairment	4	5.8%
Structural/Functional abnormalities	2	2.9%

This study recorded the high prevalence of ASB in elderly diabetic (61.7%) patients. It was the most important risk factor. Catheterized patients were (8.8%). Nosocomial UTI among newly catheterized patients was frequently asymptomatic (90%) and the risk of UTI increasing with duration of catheterization.

ASB was the most common presentation of catheter associated UTI. Other risk factors included urinary incontinence (20%). While the recurrent UTI and structural/functional anomaly was noted in 5.8% and 2.9% respectively.

**Table 4:** Distribution based on Urine Culture Outcome

Urine Culture	Frequency	Percentage
Culture Positive	36	36%
Culture Negative	64	64%

Out of 100 samples subjected for urine cultures, 36 samples were culture positive and 64 samples were culture negative.

**Table 5:** Distribution based on Organism isolated

Organism Isolated	Frequency	Percentage
Escherichia coli	19	52.77%
Klebsiella	5	13.88%
Polymicrobes	3	8.3%
Pseudomonas	2	5.55%

Escherichia coli was the predominant organism isolated from positive urine cultures (52.77%) and klebsiella constituted 13.88%, while poly microbes and pseudomonas accounted for 8.3% and 5.55% respectively.

## Discussion

Asymptomatic bacteriuria management is difficult and necessitates clinical acumen. An multi-professional approach is recommended when dealing with such patients. The majority of patients with asymptomatic bacteriuria do not develop symptomatic urinary tract infections and have no adverse effects from asymptomatic bacteriuria [6].

Elderly institutionalized subjects have a wide variety of organisms isolated E.coli remains the single most common organism isolated from women [7]. E.coli strains isolated from ASB are characterized by fewer virulence characteristics than those isolated from symptomatic infection. Other frequently isolated organisms included Enterobacteriaceae (such as Klebsiella pneumoniae) and other organisms (coagulase-negative staphylococci, Enterococcus species). Among prolonged stay patients, P. mirabilis was most frequently isolated and for patients with long term urinary catheters, polymicrobial bacteriuria is common often including pseudomonas aeruginosa [8]. Comorbid conditions such as Alzheimer dementia, Parkinson disease and cerebrovascular disease may also

potentially predispose to ASB through their adverse effects on bladder motility and continence<sup>[9]</sup>. Diabetic mellitus also increases the risk of ASB by potentially causing neurogenic bladder, Diabetic microangiopathy and impaired immune system from hyperglycemia. The presence of an indwelling catheter, especially long term has been shown to independently increase risk of ASB, with a prevalence of 9-23% in short term and 100% in long term catheterization (>30%)<sup>[10]</sup>.

Pyuria is present with ASB in 90% of elderly prolonged stay patients, No bacteriuria is found in 52% of elderly ambulating women with pyuria. Thus, by itself, the presence of pyuria does not differentiate symptomatic from asymptomatic urinary infection. The presence or absence of odorous or cloudy urine alone should not be used to differentiate CA-ASB from CA-UTI or as an indication for urine culture or antimicrobial therapy.

Our observation in an older patient is often complicated by lack of typical symptoms and they are unable to give a reliable history. Other signs of infection such as fever and leukocytosis is found less commonly in elderly patients, therefore the absence of leukocytosis does not reliably exclude the presence of infection. Urine dipstick is not a good diagnostic test for ASB or cystitis. Rodhe *et al.* found measurement of leukocyte esterase has 88% sensitivity and 79% specificity. This however needs to be confirmed in larger trials and is not widely available<sup>[11]</sup>.

### Recommendations<sup>[12]</sup>

- Avoidance of long term indwelling catheters, insertion of catheter with sterile technique, good catheter care including early detection of blockage and prevention of constipation and oral laxative is also recommended.

### Conclusion

Asymptomatic bacteriuria is common, especially in elderly patients with multiple medical comorbidities. The high prevalence of comorbidities, asymptomatic pyuria, and asymptomatic bacteriuria in the geriatric population offers diagnostic and therapeutic challenge. Asymptomatic bacteriuria should be correlated with the clinical features of CUE findings of pus cells or bacteriuria and also the risk factors associated with UTI, so that patient with Asymptomatic bacteriuria are segregated from patients with UTI who require antimicrobial therapy.

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