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Original Research Article

Asymptomatic Bacteriuria in School Aged Girls

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Abstract:

Introduction: Asymptomatic bacteriuria (ASB) is the presence of significant bacteriuria without UTI symptoms, commonly affecting school-aged girls due to anatomical and hygiene factors. This study aims to assess ASB prevalence, risk factors, and microbial profile, and evaluate the need for routine screening and management in this pediatric population.

Methods: A prospective observational study was conducted at government Medical College, Bhadradri Kothagudem (Feb–May 2025) among asymptomatic girls aged 6–12 years. Clean-catch urine samples were cultured on CLED agar. Significant bacteriuria was $\geq 10^5$ CFU/mL. Isolates underwent biochemical identification and antibiotic susceptibility testing. Risk factors were assessed via structured questionnaires.

Results: Among 92 school-aged girls, ASB was found in 13%. *E. coli* was the most common isolate. Nitrofurantoin showed highest sensitivity (83.3%), while Cotrimoxazole had high resistance. ASB was significantly associated with poor perineal hygiene, infrequent voiding, and family history of UTI, indicating key preventable risk factors.

Conclusion: The study found a 13% ASB prevalence among schoolgirls, with poor hygiene, infrequent voiding, and family UTI history as significant risk factors. *E. coli* predominated among isolates. Nitrofurantoin was the most effective antibiotic. Promoting hygiene and targeted screening may help reduce ASB-related complications and limit unnecessary antibiotic use.

Keywords: Asymptomatic Bacteriuria, School-Aged Girls, Urine Culture, Risk Factors.

Introduction

Asymptomatic bacteriuria (ASB) is defined as the presence of significant bacteriuria in the absence of symptoms suggestive of urinary tract infection (UTI). It is a common yet often under-recognized condition among school-aged girls, with reported prevalence ranging between 1% and 5% in healthy pediatric populations [1]. The higher incidence in girls is attributed to anatomical and behavioral factors, such as a shorter urethra, poor perineal hygiene, and infrequent voiding habits [2].

Although ASB is typically benign and does not cause overt clinical symptoms, it may act as a reservoir for potential uropathogens and has been associated with adverse renal outcomes in certain populations. Persistent bacteriuria, if left undetected and untreated, can rarely lead to renal scarring, particularly in those with underlying vesicoureteral reflux [3]. However, routine screening and treatment in healthy, asymptomatic children remain controversial due to the risk of promoting antibiotic resistance and disturbing the natural microbial flora. Accurate identification through urine culture remains the gold standard for diagnosis, with colony counts $\geq 10^5$ CFU/mL considered significant. Studies suggest that treatment should be reserved for selected cases, such as those with immunosuppression or upcoming urologic procedures [4]. Understanding the epidemiology, risk factors, and natural course of ASB is essential to guide appropriate screening and management strategies in school-aged girls. The aim of the present study is to assess the prevalence, associated risk factors, and microbial profile of asymptomatic bacteriuria among school-aged girls, and to evaluate the need for routine screening and management strategies in this population.

Methods

It was a prospective observational study, conducted in government Medical College, Bhadradri Kothagudem, from February to May 2025. Prior to data collection, necessary approvals were obtained. Permission was also secured from school

authorities, and informed written consent was obtained from parents or legal guardians.

Female children aged 6 to 12 years who were attending selected government and private schools in the Rajahmundry urban region without clinical symptoms suggestive of UTI were included in the research. Children were excluded if they had received antibiotic therapy within the past two weeks, had known congenital urinary tract anomalies or chronic kidney disease, or had a history of symptomatic UTI in the past three months.

Clean-catch, midstream urine samples were carefully collected from each participant in sterile, leak-proof containers under the supervision of trained healthcare personnel to ensure proper technique and avoid contamination. The samples were labeled and immediately transported to the microbiology laboratory. All specimens were processed within one hour of collection using standard microbiological protocols. Quantitative urine culture was performed on cysteine lactose electrolyte deficient (CLED) agar to isolate and identify uropathogens. Bacteriuria was considered significant if a single bacterial species was isolated in quantities equal to or exceeding 10^5 CFU per ml of urine. Bacterial isolates were identified using conventional biochemical tests, including catalase, oxidase, indole, citrate, urease, and triple sugar iron (TSI) reactions as per the literature [5]. Antimicrobial susceptibility testing was carried out using the Kirby-Bauer disk diffusion method, interpreted according to Clinical and Laboratory Standards Institute (CLSI) guidelines. Additionally, a pretested structured questionnaire captured demographic details, socioeconomic status, hygiene practices, toilet habits, and family history of UTIs for each participant.

Statistical Analysis: Data were entered in Microsoft Excel and analyzed using SPSS version 21. Descriptive statistics were used to calculate the prevalence of ASB. Associations between risk factors and ASB were evaluated using the Chi-square test. A p-value of <0.05 was considered statistically significant.

Results

Among the 92 school-aged girls studied, the majority were aged 8–9 years (30.4%), followed by 10–11 years (27.2%), 6–7 years (21.7%), and 12 years (20.7%). ASB was detected in 12 girls (13.0%) based on urine cultures, while 80 (87.0%) tested negative. Among the 12 positive cases, Escherichia coli was the most frequently isolate (50%), followed by Klebsiella pneumoniae (25%), Proteus mirabilis (16.7%), and Enterococcus faecalis (8.3%). Antimicrobial sensitivity testing revealed that Nitrofurantoin was the most effective antibiotic, showing 83.3% sensitivity. Amoxicillin-Clavulanate was effective in 66.7% of isolates, while Ciprofloxacin showed equal sensitivity and resistance (50% each). Cotrimoxazole demonstrated poor efficacy, with only 33.3% sensitivity and a high resistance rate of 66.7%, indicating rising concerns about antibiotic resistance in ASB. Poor perineal hygiene was significantly associated with ASB, present in 8 of the 12 ASB cases and 20 of the 80 ASB-negative children ($P < 0.001$). Infrequent voiding was reported in 7 ASB-positive and 18 ASB-negative participants ($P = 0.002$). A family history of UTI was noted in 5 ASB cases and 15 non-ASB cases ($P = 0.01$).

Table 1: Association between risk factors and ASB among the study members

Risk Factor	ASB			P value
	Present	Absent	Total	
Poor perineal hygiene	8	20	28	<0.001
Infrequent voiding	7	18	25	0.002
History of UTI in family	5	15	20	0.01

Discussion

ASB is a prevalent yet frequently overlooked condition in school-aged girls. In the present study involving 92 participants, a notable 13% tested positive for ASB, which aligns with previous reports indicating prevalence rates between 1% and 13% in similar age groups [6, 7]. The majority of participants were aged 8–9 years, consistent with the age range typically associated with increased independence in hygiene practices and increased exposure to environmental risk factors [8]. The relatively high prevalence of ASB observed in this study underscores the importance of screening in selected populations, especially where predisposing conditions such as poor perineal hygiene or infrequent voiding exist.

Microbiological analysis revealed Escherichia coli as the most commonly isolated organism (50%) in urine cultures, followed by Klebsiella pneumoniae (25%), Proteus mirabilis (16.7%), and Enterococcus faecalis (8.3%). These findings are in concordance with global studies, where E. coli has consistently been identified as the primary uropathogen in both symptomatic and asymptomatic urinary infections [9]. The presence of other Enterobacteriaceae such as Klebsiella and Proteus suggests the influence of hygiene and environmental conditions on microbial colonization. These organisms are known to possess virulence factors that enable them to adhere to the

urothelium, promoting colonization even in the absence of symptoms [10].

The antimicrobial sensitivity patterns revealed Nitrofurantoin as the most effective agent, with 83.3% sensitivity among the isolates. This aligns with current guidelines recommending Nitrofurantoin as a first-line treatment for uncomplicated urinary infections [11]. Amoxicillin-Clavulanate showed moderate effectiveness (66.7%), while Ciprofloxacin demonstrated equal sensitivity and resistance (50%), indicating emerging resistance to fluoroquinolones. Cotrimoxazole, once a widely used first-line drug, showed the poorest sensitivity (33.3%), highlighting growing antimicrobial resistance concerns. These trends mirror other regional studies and emphasize the importance of local antibiogram surveillance for appropriate empirical therapy [7, 11]. The results reinforce the need for judicious use of antibiotics in asymptomatic cases, particularly considering the self-limiting nature of ASB in most healthy children. Selective screening and treatment should be considered only in high-risk groups to prevent unnecessary antibiotic exposure and resistance development.

The present study revealed a significant association between specific behavioral and familial risk factors and the presence of asymptomatic bacteriuria (ASB) among school-aged girls. Poor perineal hygiene was the most strongly associated factor, present in 66.7% of ASB-positive participants compared to only 25% among those without ASB ($P < 0.001$). Inadequate hygiene in children, particularly girls, facilitates bacterial colonization from the perineal area to the urethra, predisposing them to subclinical infections [12]. This is particularly important in young girls due to their shorter urethra and proximity of the urethral opening to the anal region. Hygiene education and awareness in schools and at home could therefore play a pivotal role in prevention strategies. Similarly, infrequent voiding was observed in 58.3% of ASB-positive cases and only 22.5% of ASB-negative participants, showing a statistically significant relationship ($P = 0.002$). Holding urine for extended periods can result in bacterial proliferation within the bladder, leading to colonization and infection without overt symptoms [13].

A family history of UTIs was noted in 41.7% of ASB-positive girls and 18.8% of those without ASB, with a statistically significant association ($P = 0.01$). This finding supports the hypothesis that genetic, environmental, and behavioral factors within families contribute to the risk of urinary infections. Shared household hygiene practices, anatomical predispositions, and maternal history of UTIs may influence colonization patterns in children [14]. Previous studies have similarly reported familial clustering of urinary infections among children, suggesting the role of inherited susceptibility and shared risk exposures [15]. Taken together, these findings highlight the need for targeted health education focused on perineal hygiene, frequent voiding habits, and family counseling in preventing ASB. Such interventions could reduce long-term complications like renal scarring in children at risk, especially in resource-limited settings where routine screening may not be feasible.

Conclusion

This study highlights a 13% prevalence of asymptomatic bacteriuria among school-aged girls, with Escherichia coli being the most common isolate. Significant associations were found between ASB and poor perineal hygiene, infrequent voiding, and family history of urinary tract infections. Nitrofurantoin demonstrated the highest antibiotic sensitivity, while Cotrimoxazole showed high resistance. These findings emphasize the importance of targeted screening in high-risk children and promoting proper hygiene practices to prevent subclinical infections. Judicious antibiotic use is essential to avoid resistance. Early identification and education can help mitigate long-term complications such as renal scarring and recurrent UTIs.

References

1. Afoakwa P, Domfeh SA, Afranie BO, Owusu DO, et al. Asymptomatic Bacteriuria and Anti-Microbial susceptibility patterns among women of reproductive age. A cross-sectional study in primary Ccare, Ghana. Med Sci (Basel). 2018; 6(4):118.
2. Baimakhanova B, Sadanov A, Trenozhnikova L, Balgimbaeva A, et al. Understanding the Burden and Management of Urinary Tract Infections in Women. Diseases. 2025; 13(2): 59.
3. Arvind Bagga, Pankaj Hari. Vesicoureteric Reflux and Reflux Nephropathy. Indian Pediatrics 1998; 35:1197 – 1209.
4. Nelson Z, Aslan AT, Beahm NP, et al. Guidelines for the Prevention, Diagnosis, and Management of Urinary Tract Infections in Pediatrics and Adults: A Wiki Guidelines Group Consensus Statement. JAMA Netw Open. 2024; 7(11): e2444495.
5. Sasanka Pakalapati, T Jaya Chandra. Molecular typing of Carbapenem Resistant Klebsiella pneumoniae isolates among the suspected urinary tract infection. International Journal of Current Pharmaceutical Review and Research 2025; 17(5); 162 – 5.
6. Shaikh N, Morone NE, Lopez J, Chianese J, et al. Does this child have a urinary tract infection? JAMA. 2007; 298(24): 2895 – 904.
7. Nicolle LE. Asymptomatic bacteriuria: when to screen and when to treat. Infect Dis Clin North Am. 2003; 17(2): 367 – 94.

8. Bhat RG, Katy TA, Place FC. Pediatric urinary tract infections. Emerg Med Clin North Am. 2011; 29(3): 637 – 53.
9. Hoberman A, Wald ER, Hickey RW, Baskin M, et al. Oral versus initial intravenous therapy for urinary tract infections in young febrile children. Pediatrics. 1999; 104: 79 – 86.
10. Foxman B. Epidemiology of urinary tract infections: incidence, morbidity, and economic costs. Am J Med. 2002; 113: 5S – 13S.
11. Gupta K, Hooton TM, Naber KG, Wullt B, et al. International clinical practice guidelines for the treatment of acute uncomplicated cystitis and pyelonephritis in women: A 2010 update. Clin Infect Dis. 2011; 52(5): e103 – 20.
12. Wang J, He L, Sha J, Zhu H, Huang L, et al. Etiology and antimicrobial resistance patterns in pediatric urinary tract infection. Pediatr Int. 2018; 60(5):418 – 22.
13. Tullus K, Shaikh N. Urinary tract infections in children. Lancet. 2020; 395(10237): 1659 – 68.
14. Conway PH, Cnaan A, Zaoutis T, et al. Recurrent urinary tract infections in children: risk factors and association with prophylactic antimicrobials. JAMA. 2007; 298(2): 179 – 186.
15. Shaikh N, Hoberman A, Keren R, Gotman N, et al. Recurrent Urinary Tract Infections in Children With Bladder and Bowel Dysfunction. Pediatrics. 2016; 137(1): e20152982.