

**EPIDEMIOLOGICAL STUDY OF ASYMPTOMATIC BACTERIURIA
AMONG NURSERY SCHOOL CHILDREN IN AHVAZ, IRAN**

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This study was undertaken to determine the prevalence of asymptomatic bacteriuria in preschool children of different age and sex groups and to isolate the organisms responsible for asymptomatic bacteriuria and determine their antimicrobial susceptibility pattern. A total of 475 children from 17 nurseries in Ahvaz city, Iran were screened by collecting mid-stream urine samples for the presence of causative organisms. Asymptomatic bacteriuria was observed in 16 cases (3.36%). The isolated pathogens included *Escherichia coli* (50%), *Proteus mirabilis* (25%) and coagulase negative staphylococcus (25%). The antibiograms indicated that Gentamicin (100%), Nalidixic acid (100%), Amikacin (75%), Kanamycin (75%), Nitrofurantoin (62.5%), Tobramycin (62.5%), Tetracycline (50%) and Chloramphenicol (37.5%), were in that order the most effective of the antibiotics tested against *E. coli* isolates. *Proteus mirabilis* showed 100% sensitivity to Amikacin, Gentamicin, Kanamycin, Nalidixic acid and Tobramycin followed by Nitrofurantoin (75%), Cephalotin (50%) and Chloramphenicol (50%). Similarly, antibiogram of coagulase negative staphylococcus showed 75% sensitivity to both Nalidixic acid and Kanamycin. This result indicated a significant rise in the frequency of *Escherichia coli* in asymptomatic bacteriuria.

Key words: Asymptomatic bacteriuria, children, urinary tract infections

INTRODUCTION

The presence of significant number of bacteria in the urine of asymptomatic patient has been the subject of several long-term studies in the preschool aged children (1-4). Many patients with asymptomatic bacteriuria will declare symptoms of urinary tract infection when questioned closely; many will have intermittent episodes of symptomatic bacteriuria (5-6).

Screening for asymptomatic bacteriuria was undertaken with the belief that early detection of infection and identification of structural abnormalities coupled with appropriate management might lead to prevention of pyelonephritis and renal damage. It is not known how frequently these infections lead to kidney damage (7) or whether their eradication can prevent this outcome, it would be necessary to screen the preschool children of a particular age group. This would be a tedious task unless a simple and economical screening procedure can be

used which will be acceptable to the children, parents, school health authorities and clinical microbiologists.

The present study was performed by analyzing urine samples collected from preschool children (age groups, 3-7 years) to determine the incidence of asymptomatic bacteriuria in this group, isolate the responsible organisms and determine their antimicrobial susceptibility pattern.

MATERIALS AND METHOD**Culture media**

Blood and MacConkey agar were used for isolation of pathogens. Diagnostic media used for further characterization of pathogens were Triple Sugar Iron (TSI) agar, Oxidation Fermentation (OF) medium, Lysine Iron agar, SIM medium, Simon Citrate agar, Urea agar, Malonnet broth and Triple sugar Iron media. All culture media and reagents were purchased from Biomrieux; France.

Method

A total of 475 preschool children aged 3 to 7 years from 13 different nursery schools in Ahvaz, Iran, were screened during 2001-2002 for asymptomatic bacteriuria. The study group comprised of 230 boys and 245 girls. Care was taken to notify the Head Masters/Mistress and other staff about the investigation to be carried out. As the collection of urine sample from the children was difficult, the instruction to the parents on the collection of mid-stream urine sample was typed on a paper and copies were distributed to the children along with sterile wide mouth bottles.

The mid-stream urine samples collected from all the children were transported to the laboratories in ice pack within one hour. In the laboratory, the specimens were examined microscopically for the presence of pus cells, red blood cells and casts.

A standard wire loop (0.01ml capacity) was used to place urine on MacConkey and Blood agar media. The plates were examined after overnight incubation aerobically at 37°C, to quantify the organisms present. All the plates with significant colony growth were examined and colonies identified using the procedures described by Baron and Finegold (8).

Antibiogram

Susceptibility testing was carried out on the identified microorganisms using the disk diffusion procedure as described by Jacques and Goldstein (9).

RESULTS

Amongst the 475 urine samples, 16 (3.36%) were positive for asymptomatic significant bacteriuria. The frequency of *E. coli* was found to be (50 %) which was followed by *Proteus mirabilis* and

coagulase negative staphylococci (25%) (Table 1).

Table 1; Percent of bacterial isolates among asymptomatic bacteriuria in preschool children

Organisms isolated	Percent (%)
<i>Escherichia coli</i>	50
<i>Proteus mirabilis</i>	25
Coagulase-negative staphylococci	25

Table 2 revealed antibiotic sensitivity pattern of various isolates. Gentamicin was the most effective against *E. coli* isolates and Amikacin was a close second. These isolates were 62.5 % sensitive to Nitrofurantoin and almost less than 50% were sensitive to other antibiotics tested. The *P. mirabilis* isolates were 100 % sensitive to Amikacin, Gentamicin, Kanamycin, Nalidixic acid and Tobramycin. These isolates were 50 and 75% sensitive to Cefalotin, Chloramphenicol and Nitrofurantoin respectively. Similarly, coagulase negative staphylococci were 25% sensitive to Ampicillin, Amoxicillin, Cefalotin and Penicillin G. However, these isolates were 100 % sensitive to Vancomycin.

Table 2: Percentage antibiotic resistance of isolates

Antibiotic	<i>E. coli</i>	<i>P. mirabilis</i>	Coagulase-negative staphylococci
Gentamicin	25	0.0	-
Amikacin	25	0.0	-
Ampicillin	100	100	75
Cephalotin	75	50	75
Ampicillin	100	100	75
Nalidixic acid	0.0	0.0	25
Nitrofurantoin	37.5	25	-
Tobramycin	37.5	0.0	-
Streptomycin	45	-	100
Chloramphenicol	62.5	50	50
Tetracycline	50	100	50
Kanamycin	25	0.0	25
Amoxicillin	75	-	75
Penicillin G	75	-	75

DISCUSSION

Although, symptomatic and asymptomatic bacteriuria during infancy

is generally characterized by a benign outcome, this phenomenon amongst preschool children rarely leads to end stage renal failure, however, it can not be ignored. It may be the first clue to the important underlying anatomical abnormalities in some patients and can pose a major risk to a child's well being. However, in some children episodes of renal damage have been reported (10).

Although a variety of pathogens have been identified as causing urinary tract infection (11-12), enterobacteriaceae are usually the cause of initial uncomplicated lower tract infections. The organisms most frequently isolated in asymptomatic bacteriuria and urinary tract infection includes species of enterobacteriaceae especially *E. coli* and

other Gram-negative bacteria (13). Microbiological culture examination of urine samples from preschool children resulted in the isolation of eight *E. coli* (50 %), four *P. mirabilis* (25 %) and four coagulase negative staphylococci (25 %) bacterial species. Our finding is consistent with earlier reports (2, 12). Several well-documented clinical studies on asymptomatic bacteriuria among school children have reported the prevalence of significant bacteriuria of approximately 0.7 to 3.2% (11, 13).

Our results show the rate for asymptomatic significant bacteriuria to be 3.36%. Therefore, screening infants, toddlers and preschool children for significant bacteriuria might be beneficial in preventing renal damage and other abnormalities.

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