

SCREENING FOR BACTERIURIA IN MALAYSIAN SCHOOL CHILDREN

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ABSTRACT

Urinary tract infection is the most common of bacterial infections. Screening children for asymptomatic bacteriuria to prevent pyelonephritis and renal scarring is widely recommended.

In Malaysia no such attempt has been made to establish the prevalence of asymptomatic bacteriuria.

Bacteriuria was screened among 44,816 healthy school children from three different districts in Kelantan. There were 23,132 boys and 21,684 girls. The prevalence of bacteriuria was 0.12% after second screening.

Higher prevalence was seen in other reports.

Keywords: screening bacteriuria, school children, Kelantan, Malaysia.

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INTRODUCTION

Urinary tract infections (UTI) are amongst the commonest bacterial infections in mankind. There is a high prevalence of UTI in apparently healthy populations all over the world and the morbidity and mortality of UTI have remained static even though there are many powerful and effective antimicrobial drugs⁽¹⁾.

If this is true then there would be ample scope for prevention by detection and treatment of asymptomatic infections, at the time when treatment of kidney failure by dialysis and transplantation are expensive realities.

The prevalence of asymptomatic bacteriuria in Malaysia is not known. We have taken this opportunity to explore this problem in our community by screening healthy school children. This will further enlighten us in the future management of bacteriuria.

MATERIALS AND METHODS

Urine specimens were obtained from 44,816 children (23,132 boys and 21,684 girls) for examination. They were in standard one to standard six, from 154 schools in three different districts in Kelantan, namely Tumpat, Bachok and Kota Bharu. Their ages ranged from 7-12 years.

Mid-stream urine collection was explained to the students and urine specimens were collected in sterile bottles. Urine collected were examined microscopically and sent for culture.

Two plates of cystine-lactose electrolyte deficient (CLED) agar were inoculated, one with 0.1 ml of undiluted urine and the other with 0.1 ml of 100-fold dilution. After overnight incubation, less than 100 colonies on the plate inoculated with neat urine indicate less than 10^5 organisms/ml.

Children with positive cultures were studied further by plate culture method in the second screening test.

Urinary colony count of over 10^5 organisms per ml urine were read as significant growth or positive. Urinary colony count of less than 10^5 organisms per ml was read as insignificant growth (negative).

RESULTS

During the first screening tests, urine specimens were collected from 44,816 school children (23,132 boys and 21,684 girls). Positive cultures (significant bacteriuria) were detected in 240 (0.54%) school children; 82 (0.19%) of them were boys and 158 (0.35%) were girls.

Mixed growth were detected in 3,988 students (8.90%). While 1,039 (2.32%) students had bacteria in their urine which were less than 10^5 colonies per ml. Both groups of students with mixed growth and colony count $< 10^5$ per ml were considered as negative results.

Second screening tests were performed on students with positive cultures, mixed growth and culture with growth less than 10^5 organisms per ml. Only 3,746 students turned up for the second screening of which 54 students (0.12% of those initially screened) were noted to have positive results. Of these, 16 were male (0.0357%) and 38 were female (0.0847%).

The organisms isolated in the first and second screenings were as tabulated in Tables I and II respectively.

DISCUSSION

From our study it was noted that the prevalence of significant bacteriuria among healthy school children was 0.12% after second screening. It is difficult to compare the results of others using different culture method but this figure seems to be

Table I - Organisms isolated at first screening (n = 240)

	Organism	no.	%
1.	<i>Escherichia coli</i>	69	28.75
2.	<i>Staph. sp.</i>	61	25.42
3.	<i>Klebsiella</i>	45	18.75
4.	<i>Streptococcus sp.</i>	39	16.25
5.	<i>Proteus</i>	15	6.25
6.	Others	11	4.58

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**Table II - Organisms isolated at second screening
(n = 54)**

Organism	no.	%
1. <i>Escherichia coli</i>	28	51.85
2. <i>Klebsiella</i>	10	18.52
3. <i>Staph. sp</i>	9	16.67
4. <i>Proteus</i>	3	5.56
5. <i>Streptococcus sp.</i>	2	3.70
6. Others	2	3.70

lower than those of Kunin and Dodge in the United States who reported 1% to 1.5%^(2,3) as well as those from Iitaka in the Japanese study who reported a prevalence of 0.28%⁽⁴⁾.

Age factors were initially thought to be responsible for the difference in prevalence. However the Japanese study⁽⁴⁾ noted that there was no difference in the prevalence of bacteriuria between primary and junior high school children. Hence age factor could not be used to explain the difference in prevalence of bacteriuria between our study and the rest.

The prevalence of asymptomatic bacteriuria in schoolboys was 0.0357%. This was comparable to other reports as shown on Table III, while that of schoolgirls was 0.0847% which was the lowest reported (Table III).

The prevalence decreased markedly on second screening. This observation was also seen in other studies^(2, 4). This is perhaps due to the treatment taken for intercurrent illness in

between periods of examination⁽¹⁾. The other possibility that needs to be proven later is whether this condition is intermittent or resolves spontaneously without treatment.

The organisms isolated were similar to other studies. *Escherichia coli* was the commonest organism isolated in both screenings. *Klebsiella sp.* and *Staphylococcus sp.* were among the other common organisms isolated.

At this point in time we are still unsure how to deal with those students with persistent bacteriuria. Some authors seriously question the advisability of treating all schoolgirls for asymptomatic bacteriuria⁽⁵⁾ and some state that treatment is not necessary^(6, 7).

We feel that there is a need to determine the natural history of the disease in our patients before we can establish whether treatment is necessary.

We would like to follow up our positive cases further to find out whether they are associated with renal tract anomalies.

CONCLUSION

This study has shown that the prevalence of bacteriuria amongst our school children is the lowest as compared to studies reported so far. The female to male ratio is 2.4:1. *Escherichia coli* is the commonest organism in the two screenings carried out.

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Table III - Prevalence of bacteriuria in school children

Studies	Year	Total (n)	Prevalence of bacteriuria		Method
			Boys %	Girls %	
Kunin	1962 ⁽²⁾	9,878	0.04	1.1	Pour plate
Dodge	1969 ⁽³⁾	8,371	0.05	1.52	Pour plate
Iitaka	1983 ⁽⁴⁾	28,202	0.06	0.54	Pour plate
Zainal	1992	44,816	0.07	0.18	Pour plate