COMMUNITY URINE SURVEY 1: ASYMPTOMATIC BACTERIURIA IN SCHOOLGIRLS IN KUMASI

E.H. FRIMPONG, S.C.K. TAY
Department of Clinical Microbiology, School of Medical Sciences, Kwame Nkrumah University of Science and Technology, Kumasi.

Request for reprints: E.H. Frimpong.

SUMMARY
Four hundred and eighty students, 380 (79.2%) females and 100 (20.8%) males, aged 11-16 years, attending two urban, public Junior Secondary Schools (JSS) in Kumasi, without any urinary complaints were screened for asymptomatic bacteriuria.

Five students (4 girls, 1 boy) had bacteriuria, giving a prevalence rate of 1.04%. The rates in the girls and the boys were similar at 1.05% and 1.0% respectively.

The organisms involved were identified and their antibiograms determined and compared with those of hospital urine isolates.

The significance of the study is discussed.

Keywords: urinary tract infection, UTI, asymptomatic bacteriuria, schoolgirls.

INTRODUCTION
Urinary tract infection (UTI) is the presence within the urinary tract of actively multiplying microorganisms. Most subjects with UTI present with urinary symptoms, but some show no symptoms. Symptomless UTI, which is detectable only by laboratory examination is urine is referred to as asymptomatic or covert bacteriuria. It carries the same risk of renal damage as the symptomatic type.

A prevalence rate of around 2% in schoolgirls has been reported from Sweden, UK, and . These studies were undertaken "... in the belief that early detection of infection and identification of structural abnormalities, coupled with appropriate management might lead to prevention of renal damage."

The Swedish and British investigators differed in their opinion on the importance of routine urine screening from that of the American investigators.

In West Africa, Nigerian studies have established prevalence rates of 1.9% and 5%. We do not know of any similar studies in Ghana. However, since 10% of all requests for UTI investigations at the Komfo Anokye Teaching Hospital, Kumasi are from those aged 5-16 years (unpublished data), and 2 studies in Ghana have reported an increasing resistance to many common urinary antibiotics in hospital isolates, we felt justified at looking at the problem at the community level.

Again, though hospital and community urine isolates differ in their distribution and antibiotics resistance patterns, there is a definite relationship to allow comparison. Furthermore, a reduction in the proportion of Escherichia coli (E. coli), the commonest organism in UTI has been reported, and it has usually been replaced by a more antibiotic resistant organism.

This study was therefore undertaken to establish the
prevalence of asymptomatic bacteriuria in schoolgirls in Kumasi; to identify the organisms involved, determine their antimicrobial sensitivities, and compare these with those of reported hospital isolates.

SUBJECTS AND METHODS

Subjects
Girls and boys aged 11-16 years from two urban, centrally located public Junior Secondary Schools (JSS) in Kumasi, with a population of about 800, were screened after obtaining official permission and informed consent. They were all Ghanaians living in different parts of the city, and came from all socio-economic classes, but the majority came from the low-income class.

Using a questionnaire, demographic data and information on previous UTI, treatment, current medication, menstruation and sexual activity were collected confidentially.

Menstruating girls, those on antibiotics, and those who declined participation were excluded; those presenting with UTI symptoms were investigated and treated, but excluded from the study.

Specimen collection and Laboratory processing
With the help of a previously instructed member of staff, the purpose of the study and the mode of collection of data and urine, were carefully explained to the students. Early morning mid-stream urine (MSU) samples were collected in sterile universal bottles and processed at the K.A.T.H., Kumasi, laboratory within an hour. The urine processing was done according to recommended guidelines \(^1,2\).

Samples were plated on Cystine-Lactose-Electrolyte-Deficient (CLED) medium (Oxoid CM423) and incubated at 37°C overnight. Significant bacteriuria was determined using a modified Kass method (quoted from Zhanel et al. \(^2\)). Students with positive urine were screened again. Microscopy was done to detect pus cells and casts, and 50 randomly selected samples were centrifuged and the sediment examined for parasitic ova.

Bacterial isolates were identified by standard methods \(^3\).

Antibiotics sensitivities were determined by a disc diffusion (Kirby-Bauer) method on Mueller Hinton agar. Ten antibiotics were tested: made up of 8, on D.T. multidisc (Biotec, Surrey) ampicillin (AP) 25mcg, colistin sulphate (CO) 10mcg, sulphafurazole (SF) 300mcg, nalidixic acid (NA) 30mcg, nitrofurantoin (NI) 200mcg, streptomycin (S) 25mcg, cotrimoxazole (TS) 25mcg, tetracycline (T) 50mcg, and 2 single discs of cefuroxime (CXM) 30mcg, and pipemidic acid (PI) 20mcg from Oxoid.

Treatment
Those having UTI were treated and followed up for 6 weeks.

RESULTS
Of the 480 students (380 girls, 100 boys) screened, 5 (4 girls, 1 boy) had significant bacteriuria giving a prevalence rate of 1.04% (4/480). The rates in the girls and boys were similar at 1.05% (4/380) and 1.0% (1/100) respectively. Of the 5, 1, a girl, had more than 5 pus cells per high power field (HPF). None of the 5 had past or current UTI symptoms. This is shown in Table 1, and in Table 2, the identification and antimicrobial sensitivities of the isolates.

Three girls of the 5 were 15 years and the other boy and girl, 16. None of the 9 girls (no boy) with current symptoms of UTI had bacteriuria; 6 of the 9 and 14 others (12 girls, 2 boys; excluded from study) had

<table>
<thead>
<tr>
<th>Table 1: Results of Screening 480 School Children for Bacteriuria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Girls (380)</strong></td>
</tr>
<tr>
<td>1. No History of UTI</td>
</tr>
<tr>
<td>No Bacteriuria</td>
</tr>
<tr>
<td>2. No History of UTI</td>
</tr>
<tr>
<td>Bacteriuria present</td>
</tr>
</tbody>
</table>
Table 2: Antimicrobial Susceptibility Patterns of the 5 Urinary Isolates (totals in parenthesis: susceptible numbers are shown in table)

<table>
<thead>
<tr>
<th>Organisms</th>
<th>AP</th>
<th>CO</th>
<th>SF</th>
<th>NA</th>
<th>NI</th>
<th>S</th>
<th>TS</th>
<th>T</th>
<th>CXM</th>
<th>Pi</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. E. coli</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>2. Staph aureus</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3. Klebsiella spp.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

past infections. Of these 20 students (18 girls, 2 boys) with past histories, 4 girls had bacteriuria.

All the students claimed they were sexually inactive. All 9 infected students were successfully treated with pipemic acid (Urotracsin); 400mg twice daily for 3 days. Urine cultures checked at 2 and 6 weeks were sterile. Four students (3 boys, 1 girl) of the 50 (25 boys, 25 girls) randomly screened had Schistosoma haematobium; a prevalence rate of 8%.

DISCUSSION

We recorded a prevalence rate 1.05% of asymptomatic bacteriuria in school children in Kumasi. This is similar to the rates reported in previous studies. The study groups were representative and no bias was introduced. The similarity of the rates seen in boys and girls in this study differed from the lower rates seen in boys in other studies; this could be either due to the smaller size of the boy's study population, or that single detectable case could be a contaminant.

In the study, over 50% of the girls had taken prescribed antibiotics in the recent past. This could have an effect on the infection rate in the community, however, since this factor was common to the community, we believe the findings are still relevant. Only 5 students had bacteriuria yielding 5 organisms. Though the number is small making comparison unreliable, we note that the distribution of the organisms and their antimicrobial sensitivities are similar to those of earlier studies.

The dominant organisms were E. coli and Staphylococcus aureus. E. coli is the leading organism in UTI, and the rising importance of Staph. aureus and Klebsiella spp. have also been noted.

If these findings reflect the true situation at the community level, then the more resistant hospital organisms are shifting to the community; this is an ominous sign. Pyuria was not a significant finding in this study; a fact also noted by Abu Bakare et al. Normal urinary white cell count, apparently does not rule out infection.

Whilst the low infection rate correlates well with no or minimal sexual activity, as UTI is promoted by coitus, it is rather doubtful that none of the students was sexually active. More confidentiality could have yielded more reliable information. We detected schistosomiasis in 4/50 (8%) of the students; 3/25 (12%) and 1/25 (4%) in boys and girls respectively. This is much lower than the 21.1% detected by Arinola in Nigerian schoolchildren. The difference might be real, or it could also be due to the more sensitive Nytre filter method Arinola used.

Opinion differ as to the importance of treatment of children with asymptomatic bacteriuria. Winberg and others who object, do concede that many asymptomatic subjects feel more comfortable after the eradication of their infection. We treated those infected because our study also established a high rate of recurrent UTI in some of the children excluded from the study.

Due to the small number of people with asymptomatic bacteriuria, a much larger population would need to be screened to establish the distribution and characteristics of the organisms involved, and to determine the true significance of our findings.

ACKNOWLEDGEMENT

We thank the Headteachers, staff and students of the Roman Girls JSS, Kumasi, and the St. Louis Demonstration JSS, Kumasi for their cooperation.
We thank especially Ms. Jean Atuah for her help in the collection of data and samples. We also thank the proprietors of Benny Vee Chemists, Kumasi, for the provision of Urotactin (pipemic acid) capsules and discs. Guinness (Gh) Ltd. partly supported this study with a grant.

REFERENCES


858