

ORIGINAL ARTICLE

AFRICAN JOURNAL OF CLINICAL AND EXPERIMENTAL MICROBIOLOGY
AJCEM/21304

JANUARY 2013

ISBN 1595-689X VOL 14(1) 2013

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AFR. J. CLN. EXPER. MICROBIOL 14(1): 19-22

UNUSUALLY HIGH PREVALENCE OF ASYMPTOMATIC BACTERIURIA AMONG MALE UNIVERSITY STUDENTS ON REDEMPTION CAMP, OGUN STATE, NIGERIA

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ABSTRACT

Differences are known to occur in prevalence rates in urinary tract infections (UTI) between men and women due to the difference between the urinary tracts of the sexes. Moreover, different organisms are known to infect and cause bacteriuria in men. When urine samples from 55 apparently healthy male students of Redeemer's University were examined, nine bacteria species including *Micrococcus luteus*, *Viellonella parvula*, *Micrococcus varians*, *Streptococcus downei*, *Streptococcus pneumoniae*, *Bacillus subtilis*, *Streptococcus pyrogenes*, *Staphylococcus saprophyticus*, and *Enterococcus aquimarinus* were isolated from the samples. The two most prevalent organisms reported in this study were *Micrococcus luteus* (40%) and *Micrococcus varians* (27.3%). The implication of the high prevalence rates (54.5%) of asymptomatic bacteriuria obtained in this population is discussed.

Key words: Asymptomatic UTI, bacteriuria, *Micrococcus luteus*

INTRODUCTION

Urinary tract infections (UTIs) are caused by the presence and growth of micro-organisms anywhere in the urinary tract and are perhaps the single commonest bacterial infection of mankind (1, 2).

Urinary tract infection occurs when bacteria is introduced into the urinary system usually through the urethra, when it gets into the urinary system it multiplies and travels up the urinary tract causing inflammation and irritation along the way. The high incidence of the *Escherichia coli* in UTIs could be attributed to the fact that it is a commensal of the bowel and that infection is mostly by faecal contamination due to poor hygiene. Other organisms typically reported to be responsible for urinary tract infections include *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Klebsiella aerogenes*, *Enterobacter spp.*, and *Proteus spp.* While this list is not exclusive, the prevalence and degree of occurrence of one or two of these organisms over the other are dependent on the environment (3).

The prevalence and incidence of Urinary Tract Infections is typically higher in women than in men, which is likely the result of several clinical factors including hormonal effects, behavioural pattern and anatomical differences. This is partially due to short and wider female urethra and its proximity to the anus (3). The risk factors identified with high prevalence of UTIs in young adult females include sexual intercourse, spermicide-based contraception, and a history of UTIs (4).

Asymptomatic bacteriuria is reportedly rare in young adult males accounting for typically approximately 5-6% wherever reported (8). Asymptomatic UTIs occur when urinary tract pathogens enter into the bladder without causing apparent symptoms. It is defined by the presence of at least 10⁵ colony forming units (CFU) of organism per millilitre of urine specimens in the absence of symptoms of infection referable to the urinary tract (5). Factors that have been reported to predispose young men to urinary tract infections include poor personal hygiene, sexual intercourse, urethritis due to gonorrhoeal infections, homosexuality, and lack of circumcision (6, 7, 8, 9).

Reports from a previous work conducted on the same population of Redeemer's University students showed a 26.7% prevalence of bacteriuria in males when compared to 73.3% among females with an overall prevalence of 25% in the same population (10). A re-examination of the males in this population was necessitated by the unusually high prevalence reported for males in the previous study. The present study investigates the UTI-causing organisms and their frequency of occurrence in the male population of Redeemer's University students. Possible explanations for these observations are discussed.

MATERIALS AND METHODS

Mid-stream urine was collected randomly from apparently healthy male undergraduates of Redeemer's University. Informed consent form written in English was administered to each person

whose urine was collected. The samples were collected into sterile plastic disposable bottles, refrigerated and examined within 2-4 hours of collection. The students were apparently healthy and symptoms free at the time samples were collected. Students on antibiotic treatment within one week of the study were avoided.

55 Urine samples were examined using standard methods (11). A 30 morse gauge, 3.26mm calibrated wire loop capable of delivering 0.001 ml of urine was used for culturing on Cysteine-Lactose Electrolyte Deficient (CLED) and MacConkey agar. The culture plates were incubated aerobically at 37°C for 24 hours. Culture plates without visible growth were further incubated for an additional 24 hours before being discarded. The number and types of colonies grown on the medium (CLED) was recorded as being insignificant when samples gave a colony count of less than 10⁴ CFU ml. Samples with colony count

equal to or greater than approximately 10⁵ CFU ml of the urine samples were considered to have significant bacteriuria. Bacterial isolates were identified based on a combination of cultural, morphological and biochemical characteristics (12).

RESULTS

The present results show a 54.5% occurrence of significant bacteriuria among the total of 55 samples examined (Table 1). A total of nine bacteria species were isolated from the urine samples and these were *Micrococcus luteus*, *Viellonella parvula*, *Micrococcus varians*, *Streptococcus downei*, *Streptococcus pneumonia*, *Bacillus subtilis*, *Streptococcus pyrogenes*, *Staphylococcus saprophyticus*, and *Enterococcus aquimarinus*. The frequency of occurrence of these species is shown in Table 2. *Micrococcus luteus* was the most frequently encountered organism at 40% followed by *Micrococcus varians* with a frequency of occurrence of 27.3% (Table 2)

TABLE 1: COLONY COUNT OF BACTERIA FOUND IN URINE SAMPLES

| | Number of occurrence | Percentage (%) occurrence |
|---|----------------------|---------------------------|
| Samples with significant asymptomatic bacteriuria ($\geq 10^5$) | 30 | 54.5 |
| Samples with insignificant asymptomatic bacteriuria ($\leq 10^4$) | 25 | 45.5 |
| Total | 55 | 100 |

Samples with $\geq 10^5$ CFU bacteria colonies per ml of urine samples were considered to have significant bacteriuria

TABLE 2: FREQUENCY OF OCCURRENCE OF BACTERIA ISOLATES

| Bacteria isolates | No of samples | Frequency (%) |
|-------------------------------------|---------------|---------------|
| <i>Micrococcus luteus</i> | 22 | 40.00 |
| <i>Viellonella parvula</i> | 5 | 9.10 |
| <i>Micrococcus varians</i> | 15 | 27.27 |
| <i>Streptococcus downei</i> | 3 | 5.45 |
| <i>Streptococcus pneumonia</i> | 2 | 3.64 |
| <i>Bacillus subtilis</i> | 3 | 5.45 |
| <i>Steptococcus pyrogenes</i> | 1 | 1.82 |
| <i>Staphylococcus saprophyticus</i> | 3 | 5.45 |
| <i>Enterococcus aquimarinus</i> | 1 | 1.82 |
| TOTAL | 55 | 100 |

DISCUSSION

The difference in urinary tract infections between men and women arises from the difference between the urinary tracts of the sexes. Moreover, different organisms are known to infect and cause bacteriuria in men and the prevalence is known to vary even among men at different ages (7). The present result shows that the causal organisms isolated from samples in the present study is mostly different from those found in the mixed population comprising male and female students of Redeemer's University examined in a previous study (10). Only a minimal occurrence of members of the genus *Staphylococcus* and *Streptococcus* were found in samples examined in both studies.

The two most prevalent organisms reported in this study *Micrococcus luteus* and *Micrococcus varians* are known to be commensal organisms found commonly in skin microflora that may cause opportunistic infections particularly in immunocompromised

individuals such as those with conditions such as recurrent bacteremia, septic shock, septic arthritis, endocarditis, meningitis, and cavitating pneumonia (13). Moreover, *M. luteus* and *M. varians* are obligate aerobes found in soil, dust, water and air and as such have been implicated in the infection of the human upper respiratory tract particularly in individuals with poor hygiene that enjoy active living and sports outdoors (13, 14, 15). Since the urine samples examined in the present study were obtained from apparently healthy male students of Redeemer's University, the high prevalence of asymptomatic bacteriuria obtained in this study may be due predominantly to poor hygiene on the part of the male students who understandably are prone to engage more in active outdoor activities such as sports than their female counterparts and are less disposed to hygienic practices such as frequent bathing, frequent washing of hands, washing of private parts after urinating and so on.

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