Asymptomatic bacteriuria (ASB) is defined as the presence of $\geq 10^5$ colony forming units (cfu) of a single type of bacteria per milliliter of urine detected by culture of mid stream urine specimen in asymptomatic patients. ASB occurs in up to 6.0% of healthy individuals. Asymptomatic infection of the urinary tract infection (UTI) is probably the commonest bacterial infection encountered by physicians at their clinics and hospitals. It also refers to microbial colonization of the urinary tract and tissue invasion.

As urinary tract infection is the most common bacterial infection, screening for asymptomatic bacteriuria to prevent pyelonephritis and renal scarring is widely recommended. Not all patients with ASB respond to treatment even in need treatment. Children with vesicoureteral reflux, kidney transplant recipients, pregnant women, diabetes individuals and people with infected kidney stones appear to be more likely to benefit from treatment with antibiotics.

The clinical significance and management of asymptomatic bacteriuria (ASB) differs according to different groups of patients. Asymptomatic bacteriuria requires antibiotic treatment in children aged 5-6 years and pregnant women prior to invasive genitourinary procedures. However, there is consensus that ASB in the healthy school girls and young women, elderly, diabetic women and patients with indwelling catheters or intermittent catheterization has no clinical significance and antibiotic prescription is not indicated.

ASB in school children is a significant problem since this is not associated with burnt out pyelonephritis but with active disease process in kidney. Hence if left undetected and untreated, these children can develop bouts of cystitis and pyelonephritis and many may go into renal failure at a later age. The present study was done to determine the prevalence of ASB in school children of different age groups and to isolate the organisms responsible for asymptomatic bacteriuria. Hopefully, the study will provide valuable information to the future researchers and clinicians.

This study was carried out in the department of Microbiology, Nepalese Army Institute of Health Sciences (NAIHS), Kathmandu, Nepal to isolate the asymptomatic bacteriuria causing pathogens. Exclusion criteria included were urinary catheterization, renal disease, chronic antibiotic use and pregnancy. A total of 600 mid-stream urine (MSU) samples were collected randomly in a sterile, wide mouthed container from the school going children below 18 years of different secondary and higher secondary schools during the period of March 2015 to October 2015. The study group comprised of 350 girls and 250 boys. Before each school was visited, care was taken to notify the Head Master/Mistress and other staff about the investigation to be carried. The total population available for screening was identified from the class register. During sampling, students were suggested to follow the standard microbiological procedures to collect the urine sample. Care was taken to adopt correct methods of collection of urine samples, hence the instructions to the parents for the collection of mid-stream urine sample were typed on a paper and copies were distributed to the children along with sterile wide mouth bottles.

Urine samples collected from all the children were transported to the laboratory within one hour of its collection. A standard loop technique was used to place 0.01 ml of urine on MacConkey agar and blood agar media. Then the plates were examined after overnight incubation to quantify the organisms present. The colony count was evaluated and organisms were identified according to the Clinical Laboratory Standard Institute (CLSI) guidelines. A total of 600 urine samples were collected from the students of different higher secondary schools of Nepal. Out of 600 urine samples processed, 30 (5.0%) showed bacterial growth that are responsible to cause urinary tract infection with female 24 (4.0%) predominance over male 6 (1.0%), however the age-group, sex difference was not statistically significant (Table 1). The incidence was common in all age groups, but girls of age group 16-18 years showed a higher prevalence of asymptomatic bacteriuria.
Though the frequency of different bacterial isolates in urine samples are not equal (p=0.000), out of the organisms isolated, *Escherichia coli* was the commonest bacteria and accounted for 21(70.0%) of the total isolates followed by *Staphylococcus saprophyticus* 3(9.0%), *Staphylococcus aureus* 2(6.0%), *Klebsiella pneumoniae* 1(3.0%), *Proteus mirabilis* 1(3.0%), *Pseudomonas aeruginosa* 1(3.0%) and *Enterococcus* species 1 (3.0%) (Table 2).

The incidence of ASB in school going children varies among different studies. In a study done by CM Kunin, a gradual increase in the incidence of ASB was noted in girls from pre-pubertal age to the post pubertal. Similarly, a study conducted by McLachlin, reported 1.0% to 1.7% ASB prevalence among children of 5 to 10 years of age-group. In a study in Malaysia, out of screened 44,816 healthy school going children, the prevalence of ASB was found to be 12.0%. The current study shows a 5.0% prevalence of significant bacteriuria. This value is similar with the findings done by Omer & Ahmed while slightly higher, i.e. 10.0% incidence of significant bacteriuria was reported by Olatian. The findings obtained by Ettehad G et al., Jha & Singh were slightly less than that of the present study. One study done by Canadian Task Force on preventing health care showed that the incidence of asymptomatic bacteriuria from age 4 to 11 years was 0.0% for male and 1.8% for female school age children and also showed that the incidence of male was 0.03% and female was 1.1 to 2.4% among 5-20 years of ages.

Akinkugbe et al. reported the incidence of ASB in pediatric population, while Omer & Ahmed in 1992, reported incidence of asymptomatic bacteriuria in school going children. Although bacteriuria amongst school going children, especially among girls, rarely leads to end stage renal failure, it is not entirely benign and it cannot be ignored. It may be the first clue to the important underlying anatomical abnormalities in some patients. Girls with bacteriuria have more recurrent infection and urological abnormalities and are at a high risk of developing bacteriuria during pregnancy.

Kumar CVS et al. reported a gradual increase in the incidence of ASB in girls from 11 years (7.5%) to 15 years (13.7%). The report showed that females had a higher incidence of ASB which might be due to a variety of factors, such as close proximity of the female urethral meatus to the anus, as well as incomplete and in coordinate voiding of urine in school girls which is often associated with constipation. Alternatively, vaginal microflora also plays a critical role in encouraging vaginal colonization with coliforms and this can lead to urinary tract infection. Asymptomatic bacteriuria is a common bacterial illness in infants, children and the people of reproductive age.

In our study, seven different bacterial species have been isolated; *Escherichia coli* was the commonest bacteria isolated and accounted for 21(70.0%) of the total isolates followed by *Staphylococcus saprophyticus* 3(9.0%), *Staphylococcus aureus* 2(6.0%), *Klebsiella pneumoniae* 1(3.0%), *Proteus mirabilis* 1(3.0%), *Pseudomonas aeruginosa* 1(3.0%) and *Enterococcus* species 1 (3.0%). The finds are similar to many previous reports.

The variability of the results in asymptomatic bacteriuria is related to various factors, i.e. higher value obtained could be possibly due to increase in sexual activities among higher secondary students. The less value obtained may be attributed to the differences in socio-economic and hygienic level of the students.

### Table 1. Prevalence of asymptomatic bacteriuria in different age and sex groups

<table>
<thead>
<tr>
<th>Age group (Years)</th>
<th>Male</th>
<th>Female</th>
<th>Total (n=30)</th>
<th>Percentage</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-12</td>
<td>1</td>
<td>6</td>
<td>7</td>
<td>21.0</td>
<td>0.0910</td>
</tr>
<tr>
<td>13-15</td>
<td>2</td>
<td>7</td>
<td>9</td>
<td>27.0</td>
<td></td>
</tr>
<tr>
<td>16-18</td>
<td>3</td>
<td>11</td>
<td>14</td>
<td>42.0</td>
<td></td>
</tr>
</tbody>
</table>

### Table 2. Bacterial Isolates from Urine Samples

<table>
<thead>
<tr>
<th>Organisms</th>
<th>Total isolates [n = 30, 5.0%] (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Escherichia coli</em></td>
<td>21 (70.0)</td>
</tr>
<tr>
<td><em>Staphylococcus saprophyticus</em></td>
<td>3 (9.0)</td>
</tr>
<tr>
<td><em>Staphylococcus aureus</em></td>
<td>2 (6.0)</td>
</tr>
<tr>
<td><em>Klebsiella pneumoniae</em></td>
<td>1 (3.0)</td>
</tr>
<tr>
<td><em>Proteus mirabilis</em></td>
<td>1 (3.0)</td>
</tr>
<tr>
<td><em>Pseudomonas aeruginosa</em></td>
<td>1 (3.0)</td>
</tr>
<tr>
<td><em>Enterococcus</em> species</td>
<td>1 (3.0)</td>
</tr>
</tbody>
</table>
This study suggests the need for regular screening of urine sample of children of bacterial infection. Improved level of hygiene is likely to assist in reducing asymptomatic bacteriuria which may be complicated by urinary tract infection. The female students should always clean from forward to the backward after using toilets so as not to transfer the microorganisms from the bowel to the vagina. This will help in reducing the high rate of asymptomatic bacteriuria among the school going girls. The toilet facilities in most public schools should be improved. Health education and practice should be included in children’s curriculum to ensure adequate and proper use of toilets and clean up after use. Children represent vulnerable group that should be protected from infection through intensive and regular medical checking.

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Conflict of Interest: Nil

References