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Bacteriology of Urinary Tract Infection in Children Attending Federal Staff Hospital in Abuja

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Abstract

Urinary tract infection (UTI) is a term applied to a variety of clinical conditions ranging from asymptomatic presence of bacteria in the urine to severe infection of the kidney with resultant sepsis. The study was designed to identify the bacteria associated with urinary tract infection among children attending Federal staff hospital, Abuja and to ascertain their antibiogram. Mid-stream urine samples were collected from the subjects enrolled into the study and were cultured into Cysteine Lactose electrolyte deficient medium and Blood agar and incubated appropriately. The plates were read and isolated were subjected to biochemical reactions and antibiogram were carried out on pathogenic organisms. The results showed the overall prevalence of 10.8% urinary tract infections among the studied subjects. The females subject had the highest prevalence of 91.7% while the male counterpart recorded 8.3%. The age groups 1-5 years had the highest prevalence of 50.0% while least prevalent of 16.7% were recorded by age group 6 to 10 years old. Escherichia coli was the highest isolated with 51.7% while Proteus Species and Streptococcus faecalis recorded the prevalence of 2.5% respectively. This study concluded that urinary tract infections is very common among children attending Federal staff hospital in Abuja.

Keywords*: BA- Blood agar, CLED-Cysteine Lactose, Electrolyte deficient medium, FSH-Federal Staff Hospital, UTI- Urinary Tract Infection.*

Introduction

Urinary tract infection (UTI) is an infection in the urinary tract involving the ureters, bladder or kidney(s) and the urethra. These are the structures that urine passes through before being eliminated from the body [1].

It is understood that the infection targets the different parts of the urinary tract and consequently result in the contagion of the lower and the upper urinary tracts. The infection is named based on the site of infection.

The infection of urethra and ureter are referred to as urethritis and urethritis respectively whereas cystitis and pyelonephritis corresponds to bladder and kidney infections [2] Cystitis is a common type of infection whereas the infection associated with the renal damage is an issue of serious concern. Therefore, the infection of bladder and urethra are referred as the infection of the lower urinary tract whereas the kidney and ureter infection is an indication of upper tract infection. Generally, UTIs are classified based on the factors that trigger the

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infection and the nature of occurrence. Taking these aspects in to consideration, UTIs can be classified as follows:

1. Uncomplicated or complicated (based on the factor that triggers the infection).
2. Complicated urinary tract infection occurs in men and women at any point of their life and has the tendency to produce severe outcomes resulting in death under serious circumstances. These infections are highly intricate and are difficult to treat and they are persistent. These complicated urinary tract infections can lead to outcomes like structural anomalies that blights that capability of urinary tract to flush out the urine and this in turn provides better scope for the growth of bacteria as urine is a suitable growth medium and lead to dire consequences. Patients with urinary tract infection are often subjected to medical devices and one such device.

UTI are among the most common bacterial infections in human both in community and hospitals settings and occur in all age groups and sexes [3]. It is an infection which is a leading cause of childhood morbidity and mortality and is one of the commonest causes of renal diseases in childhood of one year to six years of age [4].

UTI is a term applied to a variety of clinical conditions ranging from asymptomatic presence of bacteria in the urine to severe infection of the kidney with resultant sepsis [5] UTI is defined also as the growth of a known bacterial pathogen more than 1000 cfu/ml in association with a positive dipstick or urinalysis [6].

According to The National Institute for Health and Clinical Excellence (NICE) guidelines, urinary tract infection is defined by a combination of clinical features and presence of bacteria in urine [7]. The Clinical symptom of UTI usually includes frequency, dysuria, pyuria, abdominal pain, back pain, fever, or urgency [8].

The prevalence of urinary tract infection varies markedly with sex and age. Malnutrition, poor hygiene, low social-economic status is also associated with UTI. Infection may occur at many places along the genitourinary tract: urethra, bladder, ureter, renal, pelvis or parenchyma as represented in different sexes and in children below. The farther up in the urinary tract the infection is located, the more serious it is [9]. In the United States, urinary tract infections account for more than 7million visits to medical offices and hospitals each year. Urinary tract infections are much more common in adults than in Children, but about 1-2% of Children do get urinary tract infections. Urinary tract infections in children are more likely to be serious than those in adults and should not be ignored (especially in younger children) [1]. These infections are much more common in girls and women than in boys and men younger than 50 years of age. The reason for this is not well understood, but anatomic differences between the genders (a short urethra in women) might be partially responsible. About 40% of women and 12% of men have a urinary tract infection at some time in their life [10].

Figure 1. Female Urinary Tract

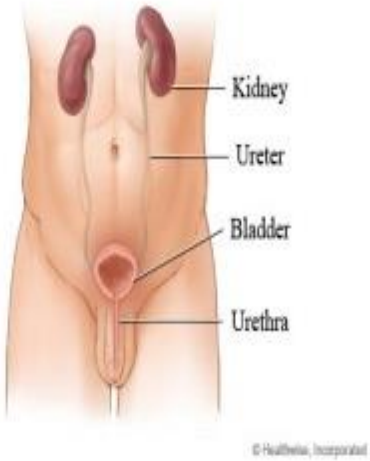

Figure 2. Male Urinary Tract

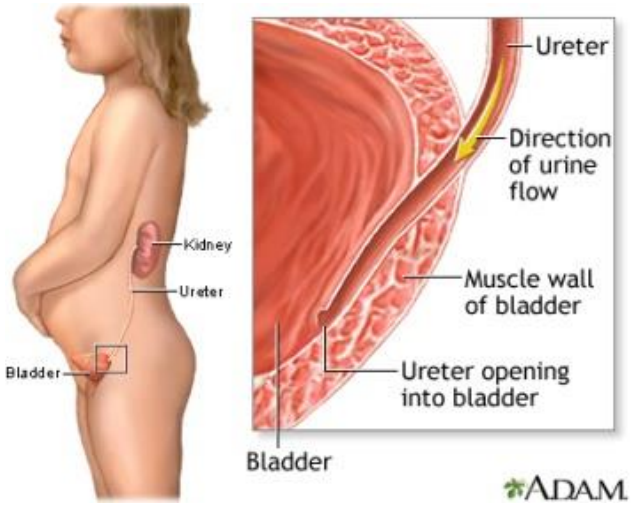

Figure 3. Vesicoureteral Reflux

Purpose of the Study

1. To study bacteria involved in UTI in children attending Federal staff hospital (FSH), Federal Secretariat, Abuja.
2. To identify the common bacteria associated with UTI in children attending FSH.
3. To relate the prevalent of UTI to age groups and sex.

Possible Treatment Pattern

Problem to be Solved

1. Urinary tract infection is the common urinary tract problem in children besides bedwetting.
2. Also, nuclear renal scans suggest that the vast majority of febrile young children with UTI have pyelonephritis putting them at risk for renal scanning and the long term sequel of hypertension and renal failure [6].
3. It is imperative that physicians identify these children to institute early treatment, evaluate the urinary tract, and monitor for recurrent UTI [7].
4. It is understood that the infection targets the different parts of the urinary tract and consequently result in the contagion of the lower and the upper urinary tracts. The infection is named based on the site of infection.

5. The infection of urethra and ureter are referred to as urethritis and urethritis respectively whereas cystitis and pyelonephritis corresponds to bladder and kidney infections [11] Cystitis is a common type of infection whereas the infection associated with the renal damage is an issue of serious concern. Therefore, the infection of bladder and urethra are referred to as the infection of the lower urinary tract whereas the kidney and ureter infection are an indication of upper tract infection. Generally, UTIs are classified based on the factors that trigger the infection and the nature of occurrence. Taking these aspects in to consideration, UTIs can be classified as follows:
   a) Uncomplicated or complicated (based on the factor that triggers the infection) Gender is an important factor in UTI [2]. Sex shows preponderance of UTI in boys during the first year of life, but after the first year of life more girls than boys have UTI [5].
   b) The risk of bacteriuria, follow up studies show that individuals who have childhood UTIs continue to be at risk of adult UTIs whether they have Vesical urethral reflux, in a study in the University Hospital in Bern, Switzerland, from vagina to the urethra, only small percentage of teenage girls and women appear to be at risk from intercourse associated infection [8]Circumcision is one of the oldest surgical procedures in the world, it is Performed for religious, social, and medical reasons, its prevalence varies widely among different ethnicities and cultures [9] Many studies have suggested an association between UTI and the uncircumcised state, although these studies have been criticized on the methodological grounds a recent case control study on 144 children under 5 years of age showed that circumcision was strongly associated with a decreased risk of symptomatic UTIs [10].

Causative organisms of UTI

Bacteria

1. Most of urinary tract infections are caused by Gram-negative bacteria like *Escherichia coli, Klebsiella species, Proteus mirabilis, Pseudomonas aeruginosa, Acinetobacter, and Serratia.* 90%of UTI cases are caused by gram-negative bacteria while only 10% of the cases are caused by gram-positive bacteria. Gram-positive bacteria include *Enterococcus, Staphylococcus, Streptococcus agalactiae [*13]. E*scherichia coli* are the most common gram-negative bacteria responsible for UTI [14] At least 75% to 87% of UTI cases.
2. *Escherichia coli* At least 80% of the uncomplicated cystitis and pyelonephritis are due to *Escherichia coli* [5] Whereas *Proteus mirabilis* and *Klebsiella pneumonia* infections accounts 10%, 6% respectively [10] Adherence properties of some organisms prevent the normal washout for these organisms by bladder emptying and mucosal host defense mechanisms. *Escherichia coli* are virulent due to the presence of P. fimbriae, organelles on its strains that may attach or adhere on specific receptors of uroepithelial cells and interfere with the washout of bacteria [5] *Escherichia coli* are predominant in girls, whereas *Proteus mirabilis* and *Klebsiella pneumonia* are likely encountered in boys [10] High incidence of UTI due to *Proteus* spp., *Klebsiella* spp. and *Enterobacter* spp. Infections are more common among children with recurrent UTIs and in those treated with antibiotic prophylaxis. Whereas other uropathies' like *Pseudomonas, Serratia* and *Candida* are more common among children with urogenital abnormalities [16] 78% of community-acquired UTI are due to *Escherichia coli* and 12% by *Klebsiella*; whereas in hospital

acquired UTI 65% are caused by *Escherichia coli* and other pathogens, including *Pseudomonas* [17].

Fungal UTI

Urinary tract infection may be caused by Fungi and Virus. Fungi, such as Candida, is the second most cause of Nosocomial UTI in patients it can be spread systematically and can be life threatening. Fungi infections are seen in infants and children who are on long-term antibiotics, patients who are Immunocompromised, or patients using invasive devices like IVs, grains and Candida [13] Fungi infections are more prevalent in children with Urinary tract Anomaly (UTA) [15] it is associated with infections after instrumentation of the urinary tract [13] The prevalence rate 27.2% [11]Treatment of Candiduria includes stopping antibiotics, removing or changing indwelling catheters, and starting antifungal agents like oral fluconazole, parental or intravesical amphotericin B [2].

Viral UTI

Viral UTI can be caused by Adenovirus types 11 and 21, polyomavirus, BK, and herpes simplex viruses [4].

Mode of Bacterial Entry

There are two modes of bacterial entry into the genitourinary tract. The ascending route and the hematogenous route.

The Ascending Route: Most cases of pyelonephritis are caused by the ascent of bacteria from the bladder, through the ureters and into the renal parenchyma [5] Most cases of UTIs are caused by bacteria ascending from the perineum [6].

Hematogenous Route: This type usually occurs in neonates and immunocompromised Patients [5] At first 8 to 12 weeks of life urinary tract infection may be secondary to hematogenous source. Because of that, the diagnosis of UTI in young children is very important as it is considered a marker for urinary tract abnormalities in newborns. UTI from nematogenous source may be associated with bacteraemia [16] Staphylococcus aureus, Candida species, and Mycobacterium tuberculosis are common pathogens that travel through the blood to infect the urinary tract [5].

Pathogenesis of UTI

Circumcision status in males, peri-urethral flora, micturition disorders, bowel disorders, local factors, and hygienic measures are important factors involve in the pathogenesis of UTI [8]The main long term consequence of UTI is renal scarring which may lead to hypertension and end-stage renal disease [2] Of the 3% of girls and 1% of boys who contract a prepubertal UTI, 17% or more have infection-related renal scarring, 10% to 20% may become hypertensive, but only a rare child has progressive renal dysfunction culminating in end-stage renal disease [14] The pathogenicity of bacteria in UTIs is influenced by both bacterial and host factors like bacterial adhesion and motility, in addition to host immune response and genetic factors [6].

Existing Solutions

1. It is very important to recognize and treat UTI rapidly. Treatment of UTI with the appropriate antibiotic can minimize mortality, morbidity, and any renal damage from acute UTI. Choosing the appropriate antimicrobial agents sounds difficult, but advances in the introduction of new antimicrobial agents have allowed physicians to appropriately tailor specific treatment for each patient [5].
2. Treatment of UTI depends on the age of patient, location of infection, etiology of the disease, degree of illness in the patient, efficacy of antibiotic and resistance profile within the community [13].
3. The main treatment of UTI is to initiate appropriate antibiotic therapy promptly. Most organisms causing UTI to originate from the gastrointestinal tract; the most common of them is *Escherichia coli.*

Antibiotics prescribed must be active against these organisms, in cases where the patients are seriously ill broader spectrum of antibiotics must be used.

4. The majority of patients respond to oral antibiotics, but in some cases intravenous antibiotics must be used, these cases are seriously ill or septic patients, children less than 1 month of age, and in the case of vomiting. The duration of traditional treatment with antibiotics is 7-10 days in acute pyelonephritis, whereas in lower tract UTI short course treatment from 3-4 days is effective in clearing the infection [2].
5. Antibiotics used in the treatment of UTI must be active against urinary pathogens with low rate of resistance, to be free of side effects, palatable, sugar-free preparations, available, and having no effect on normal gut flora [7].
6. Antibiotics used in treatment of UTI include:

Sulphamethoxazole/ Trimethoprim, Fluroquinolones (e.g Ciprofloxacin), Nitrofurantoin, Aminoglycosides (e.g Gentamicin, Amikacin), cephalosporin and Aminopenicillins (e.g Ampicillin and Amoxycillin) [5]. Trimethoprime/ Sulphamethoxazole, Cephalosporin's and amoxicillin-clavulanate are the most acceptable antibiotics for the treatment of UTI in pediatrics in comparison to quinolones, which has an effect on joint development, and first line therapy of amoxicillin which has a high prevalence of resistance to *Escherichia coli* in many communities [6].

Since antibiotics are given empirically, it is necessary to access the distribution and susceptibility of the microorganisms in each case. In addition, there should be a periodic re-evaluation for UTI treatment policies in children every 5 years [2, 9]. Antibiotics are not recommended for initial empirical therapy when their resistance rate≥10-20% [10].

Resistance to commonly used antibiotics was found to be very high among the isolates due to prolonged use of antibiotics and this could damage periurethral flora, allowing uropathogens to colonize and subsequently to infect the urinary tract, leaving clinicians with very few choices of drugs to another depending on antibiotic use. Trimethoprim-sulphamethoxazole is commonly used to treat many UTIs, except those caused by *Enterococci* and *Pseudomonas* spp.it interferes with the bacterial metabolism of folate. It is highly effective and relatively inexpensive [5]. The use of TMP-SMX has declined due to the increased incidence of bacterial resistance [5] A study was conducted in northern Isreal, it was shown that ampicillin, cephalexin and TMP-SMX cannot be used empirically in the treatment of community-acquired UTI as the incidence of bacterial resistance has increased for these antibiotics [8].

The prevention and control of urinary tract infections:

1. Drink plenty of liquids, especially water that helps dilute your urine and ensures that you will urinate more frequently allowing bacteria to be flushed from your urinary tract before an infection can begin.
2. Wipe from front to back: Doing so after urinating and after a bowel movement helps prevent bacteria in the anal region from spreading to the vagina and urethra.
3. Empty your bladder soon after intercourse: Also, drink a full glass of water you help flush bacteria.

Avoid potentially irritating feminine products: Using deodorant sprays or other feminine products, such as douches and powders, in the genital, they can irritate the urethra.

Materials and Methods

Study Area

The Study Area is Federal Staff hospital, Annex l, ground floor, Laboratory unit in phase one of the Federal Secretariat, in Abuja, Federal Capital Territory in Abuja Municipal Area, Council. (AMAC) located at the Abuja central business District as shown in Appendix 1, Figure

4, (The building) showing the study Area of where the study was carried out.

Ethical Clearance

Ethical clearance was sought and obtained from the institution review body before commencement of the study.

Study Duration

The study was carried out within the fellowship programme approved by the Medical Laboratory Council of Nigeria (MLSCN).

Sample Size Determination and Sampling

The minimum sample size was calculated based on the general formula as described by Fisher *et.al.,* (1991) and Thrust field, (2005).

$$N = Z^2P\ (1-P)/d^2$$

N = Sample size.

Z = 1.96(Standard error at 95CL).

P = Prevalence of (15%).

D = Level of prevalence at 5% ($p<0.05$, $p>0.05$).

$$N = Z^2P\ (1-P)/d^2$$

$$N = \frac{(1.96)^2 \times 0.15\ (1-0.25)}{0.05^2}$$

$$N = \frac{3.841 \times 0.1275}{0.0025} = 195.891$$

Using the above formula, the minimal size is 195 but a total of 300 samples was collected. Sample size greater than the value determined by the formula, was used to improve precision estimates of the study.

Study Population

Urine Samples was randomly collected from a total of 300 children between the ages of 1 to 15 years.

Inclusion Criteria

Children attending Federal Staff clinic, Abuja with symptoms of urinary tract infection.

Exclusion Criteria

Children attending Federal Staff clinic currently on antibiotics.

Sample Collection

Clean-catch midstream urine was collected into sterile universal bottles given to parents or Guardians of the subjects and transported to the Laboratory immediately in ice packed bags for processing but if delay is inevitable, they are refrigerated to ensure that there is no proliferation of microorganism if at all there was any or further contamination which might lead to false reading. Alternatively, a measured amount of boric acid powder (0.1g/10ml of urine) would be added to preserve the specimen, and thoroughly mixed. White cells, red cells, and casts are also well preserved, and there is no interference in the measurement of urinary protein and glucose. Bactericidal chemicals such as thymol, bleach, hydrochloric acid, acetic acid, or chloroform was not used as a preservative for urine culture.

Sample Analysis

Macroscopic examination of the urine, the colour and appearance of the urine was examined. Normal freshly passed urine is clear straw or light yellow in colour. More concentrated urine appeared as dark yellow. When left to stand, cloudiness developed due to the precipitation of urates in acid urine or phosphates and carbonates in alkaline urine. Urates may have given the urine a pink- orange colour.

Microscopic Examination

Wet Preparation of fresh uncentrifuged urine: three loopfuls of well-mixed fresh urine was placed on a slide and covered with a cover glass; the preparation was examined using the 10x and 40x objectives.

Results

The following was found in the urine: - bacteria, pus cells, red blood cells, epithelial cells, yeast cells, crystals, casts, *Trichomonas vaginalis*, *Schistosoma haematobium*, and other parasites.

Cultivation

Standard quantitative culture was carried out. A loop calibrated to deliver approximately 0.001ml was used to inoculate blood agar and Cysteine lactose electrolyte- deficiency (CLED) medium which is a non-inhibitory medium.

The urine sample collected was thoroughly mixed and a sterile standard wire loopful was used to inoculate the urine specimen onto CLED and Blood agar medium. The media was incubated aerobically at 37◦c for 24 hours.

Microscopy Examination

Two 2mls of urine specimen was placed into a centrifuge tube and centrifuged at 10,000 rpm for 5minutes.The supernatant was discarded into a jar with disinfectant added and the sediment was examined under ×10 and ×40 objectives.

Culture Plate Reading

The culture media was macroscopically examined for colour, size, shape, edge, elevation, emulcifiability, hemolysis and lactose fermentation. Determination of significant bacteriuria: Bacterial growth on the culture media was determined for significant bacteriuria using Significant bacteria=>10^5orgs/ml.

Bacterial Identification

Each significant colony was using biochemical test to identify the bacteria in the urine specimen using the following.

Gram Staining Technique

1. A drop of normal saline will be placed on a clean grass slide with a sterile wire loop and a colony of organism will be emulsified in the saline, the smear will be allowed to air-dry.
2. The smear will be heat fixed by passing it through a uniform flame three times.
3. The slide will be placed on a staining rack and Crystal violet applied for one minute after which it will be flooded with running tap water.
4. Lugol's iodine test will be applied for one minute. The smear will be allowed to decolorize immediately using acetone few seconds and flooded with water immediately.
5. Natural red will be applied for a minute. The slide will then be rinsed with water and the back of the slide wiped with clean cotton wool and allowed to air-dry.
6. Using oil immersion objectively, the stained smear will be examined microscopically, and the result recorded appropriately.

These procedures was carried out for all the colonies obtained.

Biochemical Analysis

A biochemical test will be carried out to identify the organism. These includes oxidase, indole, citrate utilization, urease production, motility for Gram negative organisms, while catalase and coagulase was conducted on Gram positive organisms.

Catalase Test

Principle: This test is used to differentiate those bacteria that produce the enzyme catalase, such as Staphylococci, from non-catalase producing bacteria such as Streptococci.

Procedure

1. A loop full of normal saline was placed on a clean grease free, Glass slide using a sterile wire loop and a portion of a colony of organism was emulsified in the saline.
2. A drop of 3% hydrogen peroxide was added to the suspension.
3. The suspension will be examined immediately for the presence of effervescence. Positive and negative controls will be set up alongside the test.

The presence of effervescence was an indication of Staphylococcus aureus.

Coagulase Test

Principle: this test is used to identify *Staphylococcus aureus* which produces the enzyme coagulase. Coagulase causes plasma to

clot by converting fibrinogen to fibrin. Two types of coagulases are produced by most strains of Staphylococcus aureus:

1. Free coagulase which converts fibrinogen to fibrin by activating a coagulase-reacting factor present in plasma. Free coagulase is detected by clotting in a glass slide.
2. Bond coagulase (clumping factor) which converts fibrinogen to fibrin without requiring a coagulase reacting factor. It can be detected by the clumping of bacterial cells in the test tube.

Tube Test Method (Detects Free Coagulase)

1. Using a graduated Pasteur pipette 0.2mls of plasma was placed into a tube and 0.8ml of the broth culture was added.
2. It was mixed gently and incubated at 37ºc. It was examined for clotting after an hour by tilting each tube gently.
3. Positive and negative controls will be set up alongside the test.

Results

Clumping within 10 seconds -Positive.
No clumping within 10 seconds -Negative.

Indole Test

Principle: testing for indole production is important in the identification of Enterobacteria. Most strains of *Escherichia coli*, *Proteus vulgaris*, *Proteus rettgeri* and *Providencia species* breakdown the amino acid tryptophan with the release of indole.

Produce

1. The organism was inoculated into a bijou bottle containing 3ml of sterile tryptone water.
2. It will be incubated at 37ºc for up to 24hrs.
3. Place 0.5ml of Kovac's reagent into 2ml of the incubated peptone water and shake gently.
4. Positive and negative controls were set up alongside the test.

Results

Red surface layer -Positive Indole test.
No red surface layer- Negative Indole test.

Oxidase Test

The oxidase test is used to assist in the identification of Pseudomonas, Neisseria, Vibrio, Brucella, and Pasteurella species, all of which produce the enzyme cytochrome oxidase. The enzyme oxidase will oxidize tetra-methyl paraphenlyene-diamine-dihydrochloride.

Procedure

1. A piece of filter paper was placed in a clean petri dish and 2 drops of freshly prepared oxidase reagent added.
2. A piece of stick was used to remove a colony of the test organism and smeared on the filter paper.
3. Positive and negative controls were set up alongside the test.

Results

Blue Purple colour- Positive oxidase test.
No blue purple colour- Negative oxidase test.

Citrate Utilization Test

Principle: This test is one of several techniques used occasionally to assist in the identification of enterobacteria. This test is based on the ability of an organism to utilize citrate as its only source of carbon and ammonium as its only source of nitrogen. Citrate is metabolized to acetone and carbon dioxide.

Procedure

1. The organism was inoculated into a bijou bottle containing 3ml of sterile peptone water.
2. And were incubated at 37ºc for 24 hrs.
3. The surface of the citrate slope was inoculated and incubated overnight at 37ºc; a blue color indicates positive result.
4. Positive and negative controls will be set up alongside the test.

Results

Blue colour- Positive citrate test.

Green colour- Negative citrate test.

Urease Test

Principle: This is one of the several techniques used occasionally to assist in the identification of enterobacteria. The enzyme urease decomposes urea by hydrolysis to give ammonia and carbon dioxide. This reaction turns medium alkaline which is shown by a red, pink color.

Antibiotic Sensitivity Test

Disc Diffusion Technique: Antibiotic sensitivity tests was performed by the antibiotic disc diffusion method of Kirby-Bauer on Mueller-Hinton agar plates using the following antibiotics: Augmentin (30ug), Ceftriaxone (30ug), Nitrofurantoin (200ug), Gentamycin (10ug), Cotrimoxazole (25ug), Ofloxacin (5ug), Amoxycillin (25ug), Ciprofloxacin (10ug), Tetracycline (30ug), Pefloxacin (5ug) as described by the NCCLS (16). They will be locally obtained. The culture plates was incubated at 37ºC for 24hrs after which the zone of growth inhibition was measured to the nearest millimeter. The zone of inhibition will be measured to the nearest millimeter using a ruler and classified as sensitive, intermediate, and resistant. These procedures will be carried out for all organisms isolate.

Data Analysis

The Data obtained was entered and analyzed as shown below using statistical package for social science (SPSS) version 17.0. P value of <0.05 was considered statistically significant.

Results

A total of 300 urine samples were examined in this study and 120(40%) had significant bacteriuria. There was no significant bacterial growth in 180(60%) of the samples. There were 240(45.8%) females recruited for the study while 60(16.7%) were males this difference is statistically significant (P<0.05).

Bacterial isolates in this study were *Escherichia coli* 62(21%), followed by *Klebsiella species* 30(10%), *Staphylococcus aureus* 20(7%), *Proteus species* 3(1%), *Streptococcus faecalis* 3(1%), *Pseudomonas aeruginosa* 2(1%). *Pseudomonas aeruginosa, proteus species*, and *Streptococcus faecalis* had the lowest frequency of isolation. In overall, UTI was caused mainly by Gram- negative organisms 97(82.99%) than Gram-positive organisms 23(34.78%) Table 3. Table 1 and 2 showed the prevalence of urinary tract infection in relation to age and sex respectively of patients. Results obtained showed that a high percentage of organisms were isolated from both males and females within the age bracket of 1-5years, 6-10years, and 11-15 years. However, there were more cases in females than males.

Antibiotics susceptibility pattern of the microbial agents isolated (antibiogram) were showed in Table 4. It was observed that Gram-positive isolates *Staphylococcus aureus* was mostly sensitive to Ampicillin, Amoxicillin, Cotrimoxazole, Ofloxacin, Ciprofloxacin, Tetracycline, Gentamycin, Cefuroxime, Erythromycin, while streptococcus faecalis was mostly sensitive to Ofloxacin, Cloxacillin, Erythromycin but were resistant to the following antibiotics as follows, Ampicillin, Amoxicillin, Cotrimoxazole, Ciprofloxacin, Tetracycline, Gentamycin the gram negative isolates were mainly sensitive to Ofloxacin, Cloxacillin, Cefuroxime, Gentamycin and cotrimoxazole the in-vitro sensitive testing showed that all gram-negative isolate were mostly sensitive to Cotrimoxazole, Ofloxacin, Ciprofloxacin, Cefuroxime, Gentamycin, Erythromycin were effective against the Gram-positive organisms, very high proportions of the organisms (Gram-positive and Gram negative were resistant to the following antibiotics, Ampicillin, Amoxicillin, Cotrimoxazole, Ciprofloxacin, Tetracycline, Gentamycin.

Table 1. Age Distribution of Urinary Tract Infection among Children Attending Federal Staff Hospital, Abuja

Age groups	Number Examined	Number Positive	Prevalence (%)
1-5	111	60	50.0
6-10	80	20	16.7
11-15	108	40	33.3
Total	**300**	**120**	**100**

Table 2. Prevalence of Urinary Tract Infection among Children Attending Federal Staff Hospital Abuja in Relation to Sex

Sex	Number Examined	Number Positive	Prevalence (%)
Males	60	10	8.3
Females	240	110	91.7
Total	**300**	**120**	**100**

Table 3. Bacterial Isolate from Urine of Children Attending Federal Staff Hospital, Abuja

Isolates N=300	No. Positive	Prevalence (%)
S. aureus	20	16.6
S. faecalis	3	2.5
E.coli	62	51.7
Klebsiella species	30	25.0
P. species	3	2.5
P. aeruginosa	2	1.7
Total	**120**	**100**

Table 4. Antibiogram of Isolates from Urine of Children Attending Federal Staff Hospital, Jos

ISOLATES	AMP	AMX	COT	OFX	CIP	TE	CN	CEF	ERY
	Pos (%)	Pos (%)	Pos (%)	Pos (%)	Pos (%)	Pos (%)	Pos (%)	Pos (%)	Pos (%)
S. aureus 20	(5.0)	(5.0)	(10.0)	3(15.0)	5(25.0)	2(10.0)	2(10.0)	2(10.0)	2(10.0)
S. faecalis 3	0(0.0)	0(0.0)	0(0.0)	1(33.3)	0(0.0)	0(0.0)	0(0.0)	1(33.3)	1(33.3)
E. coli 62	1(1.6)	1(1.6)	14(22.6)	10(16.1)	3(4.8)	8(12.9)	22(35.5)	30(48.4)	6(9.7)
K. species 30	2(6.7)	2(6.7)	2(6.7)	5(16.7)	6(20.0)	1(3.3)	6(20.0)	5(16.7)	1(3.3)
P. species 2	1(33.3)	1(33.3)	1(33.3)	0(0.0)	0(0.0)	0(0.0)	1(33.3)	0(0.0)	0(0.0)
P. aeruginosa 2	0(0.0)	0(0.0)	0(0.0)	1(50.0)	0(0.0)	0(0.0)	2(100.0)	0(0.0)	0(0.0)

Discussion and Conclusion

Urine is one of the sterile body fluids, but when it is colonized with bacteria, all the structures of the urinary tracts are at risk of being invaded. In this study, twenty-four (24) (9.6%) gave significant growth and no reason for the absence of the bacterial growth recorded in one eighty samples may be since patients were undergoing antibiotics therapy collected from the hospital before coming to the hospital for diagnostics and as such the antibiotics must have inhibited or destroyed the pathogens.

In this study the most predominant organisms isolated among the children attending federal staff hospital in Abuja were Escherichia coli 21% and Klebsiella species 9%. This finding agrees with other reports which indicated that gram negative bacteria mostly E. coli and Krebs. Species are the most common pathogens isolated in patients with UTI.

The prevalence of UTI occurred more in females than males. Of the 120 isolates obtained 110 were from females while 10 were from males. These results also agree with other reports, which shows that UTI's are most frequent in females than males during adolescence and adulthood.

The reason for the absence of the bacterial growth recorded in forth samples may be because patients were undergoing antibiotics therapy collected from the prison yard clinic before coming to the hospital for diagnosis and as such the antibiotics must have inhibited or destroyed the pathogens. Also, a recent case control study on 144 children under 5 years of age showed that circumcision was strongly associated with a decreased risk of symptomatic UTIs. The prevalence of UTI occurred more in females than males of the 141 isolates obtained 96 were from females, while 45 were from males. These also agree with other reports which show that UTI's are more frequent in males than in females.

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Conflict of Interest

The Author declares that there is no conflict of interest.

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