Studies on Antibiotic Sensitivity on Urinary Tract Infection among Women Attending Referal Hospitals in Ebonyi State Nigeria

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ABSTRACT

Studies on the antibiotic sensitivities on urinary tract infection among women in two referral hospitals in Ebonyi State were conducted to determine the prevalence of *Staphylococcus aureus*. The study revealed that out of 250 women attending antenatal clinics who were randomly selected and screened using urinalysis and MCS techniques.115 (45 %) out of 250 subjects were infected with samples from EBSUTH 75 (46.7 %) recording high infection. Statistically, there is no significant difference between the age infected (P<0.05) while there is statistical difference between the infected and the uninfected. Women at the age of 38-48 were infected commonly 53(26.5%) than other age group. The antibiotic sensitivities showed that it were resilient to certain drugs but proved effective and susceptible to others like gentamicin, ciprofloxacin, ofloxacin, cefoxitin and erithromycin due to complex reaction with aminoglycoside content. Therefore, there is need for hygienic improvement, abiding by one man one wife system, enhance sensitization on the risk factors and possible transmission potentials while infected women should be treated adequately with the administration of the most effective antibiotics.

Keywords: UTI, *Staphylococcus aureus*, antibiotics, women, Ebonyi State.

INTRODUCTION

Staphylococcus aureus is an endogenous micro-organism colonizing the nasal cavities, skin, gastrointestinal, anuses and vaginal vaults of healthy women. *Staph. aureus* is a gram positive coccus in grape like clusters when viewed through the microscope [1,2]. It is spherical with the diameter of 0.5-1-5um. *Staph. aureus* is a pathogen of greater concern because of its virulence [3]. *Staph. aureus* is a bacterium that causes illnesses ranging from minor skin infection and abscesses to life threatening disease such as pneumonia, meningitis and septicemia [4].The wide use of antibiotics has been responsible for the development of numerous problem including the emergence of multi drug resistant bacteria, increased number of nosocomial and community acquired infections and increased health care costs [5]. Because of high virulence of these organisms, its ability to cause a diverse array of life threatening infections and its capacity to adapt to different environmental conditions and resistance to most drug regime has made it more difficult to prevent and cure [6]. The level of antibiotic resistance in a given community can be based upon these measures; the use of antimicrobial agents and the proportion that spread from person to person, its state of danger to their professionals and possess a challenge to public health [7]. Approximately, 60% of women harbor this organism intermittently at one or more sites of the body and studies showed that women 7.25% harbours toxins producing *Staph. aureus.* Pathogenic staphylococci are usually opportunistic and

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can cause illnesses only in its ability to produce coagulase proteins that affects fibrinogen of the blood clothing cascade. Interestingly, coagulase negative species are not highly virulent but are important cause of infection in certain high risk groups [8]. Some strain have acquired genes making them resistant to multiply antimicrobial agents staphylococci are quite resistant to desiccation and high osmotic conditions. This characteristic facilitates their survival in the environmental growth. Although, staphylococcus infections were once readily treatable with antibiotics while, some strains have acquired genes making them resistant to multiple antimicrobial agents [9]. This work is aimed to determine the prevalence of *Staph. aureus* infection among females in Abakaliki and infer possible effective antibiotics for control measures.

MATERIALS AND METHODS

Study area: the study was conducted at two major hospitals in Abakaliki which serve as referral Centre's. It entertains up to 1000 different cases per day and houses both male and female genders. There are located at the heart of the town. Abakaliki town lie at longitude 7.30^o and 8.30^oE and latitude 5.40^o and 6.45^oN. It has estimated population of 739,136 and Area of about $5,5334km^2$.

Sample collection: A total of 250 urine samples were collected from apparently healthy women attending referral service from two referral hospitals: the EBSUTH (Ebonyi State University Teaching Hospital Abakaliki) and FMC (Federal Medical Centre Abakaliki) all in the capital of Ebonyi State. The samples were transported to Applied Biology laboratory of Ebonyi State University Abakaliki.
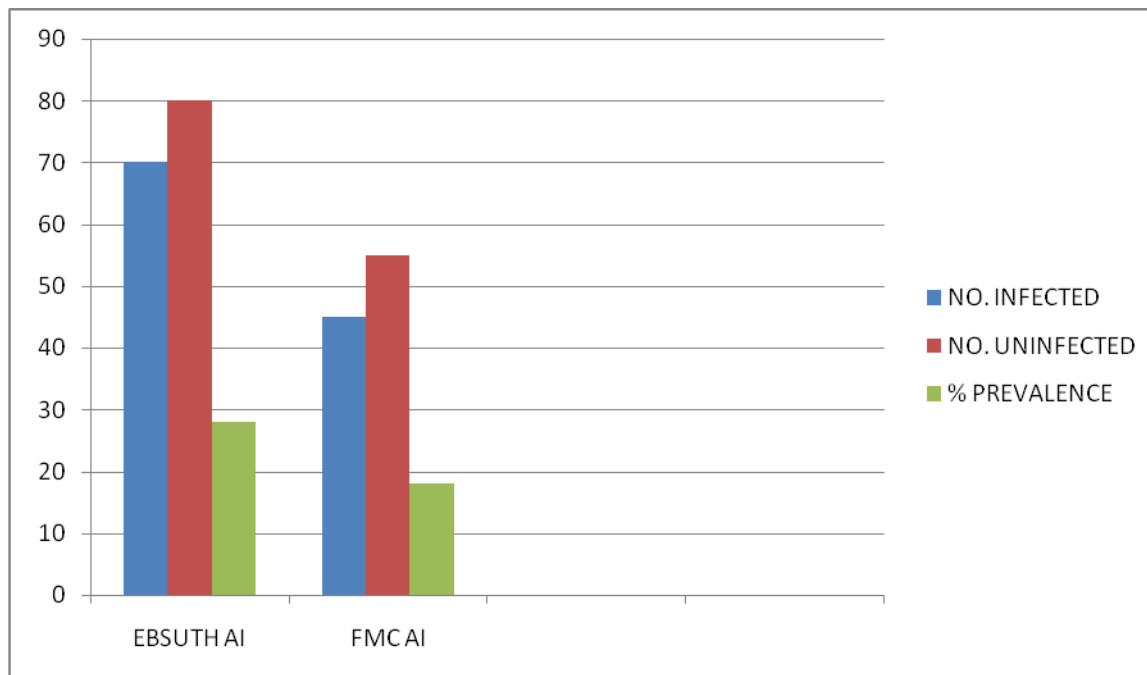
Sample analysis

A loopful of each urine sample was inoculated into test tube containing 5mls of nutrient broth and inoculated for 24 hours at 37^o_C The growth from the nutrient broth was streaked onto manitol salt agar plates and incubated at 37^o_C for 24hrs. Suspected colonies of staphylococcus species were further characterized by gram staining techniques, catalase test and coagulase test.

Gram staining: with the modified method of [1], smear was prepared from each of the culture on a free grease glass slide, allowed to air dry and heat fixed under a flame of Bunsen burner. The smear was covered with crystal violet stain for 30-60sec, then the stain was washed off with clean water. The smear was later covered again with lugol's iodine. It was allowed to stand for 60 secs, then washed and tip off the excess water. It was decolorized with acetone/Alcohol and washed off immediately with clean water. The smear was then covered with safranine for 30-60secs and washed with clean water. The slide was observed under X100 oil immersion objective lens of the light microscope.

Ethical clearance/informed consent: Ethical clearance was obtained from the Department of clinical research and development of the two hospitals prior the commencement of the work while consent was sort from each subject and instructions given on the method of collection and the secrecy surrounding the researches were appropriately kept and concealed for the sake of research and adoption on diagnosis and cure.

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RESULTS

Table 1: The percentage prevalence of *Staphylococcus aureus* among the hospitals sampled.

Table 2: Age prevalence relationship to *Staphylococcus aureus* among females sampled.

Age Class	EBSUTH Ai	FMC Ai	Total /age	%age Total
15-20	31	27	58	23.2 %
21-37	47	36	83	33.2%
38-48	45	30	75	30.0 %
49-51	16	18	34	13.6 %
Total	139	111	250	

Chi square test: 3.295 at p<0.05

Table 3: Test to antibiotic resistance pattern of gram positive *Staph aureus* from urine samples

S/N	Antibiotic test&ug range	No. Urine sample	% resistance of *Staph aureus*
1	Ampicillin 10ug	55	47.8 %
2	Cephalexin 30ug	45	39.1 %
3	Ciprofloxacin 5ug	2	1.7 %
4	Clindamycin 2ug	47	40.8 %
5	Gentamycin 30ug	2	1.7 %
6	Methicillin 10ug	43	37.3 %
7	Ofloxacin 5ug	2	1.7 %

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8	**Cefoxitin 30ug**	6	5.2 %
9	**Erythromycin 15ug**	2	1.7 %
10	**Vancomycin 40ug**	41	35.6 %

Table 4: Multi drug resistance pattern of gram positive *Staph. aureus* from urine samples

S/N	Parametric agents	No. of multi drug agents	MDARI
1	**Fully sensitivity**	**10**	**0.0869**
2	**Resistant to 1 agent**	**12**	**0.1043**
3	**Resistant to 2 agent**	**12**	**0.1043**
4	**Resistant to 3 agent**	**9**	**0.0782**
5	**Resistant to 4 agent**	**17**	**0.1478**
6	**Resistant to 5 agent**	**41**	**0.3565**
7	**Resistant to 6 agent**	**7**	**0.0608**
8	**Resistant to 7 agent**	**4**	**0.3478**
9	**Resistant to 8 agent**	**0**	**0.00**
10	**Resistant to 9 agent**	**0**	**0.00**
11	**Resistant to 10 agent**	**3**	**0.0260**

NB: MDARI=Multi drug antibiotic resistant index

MDARI=a/b; where *a=number of antibiotics to which resistant organism was established while *b=total number of antibiotics to which the resistant organism has been evaluated.

DISCUSSION

The global spate of infertility and childlessness in our society has drawn up concern due to family restiveness and frequent divorces imminent in our societies and this could be blamed on the prevalence of urinary tract disease. This however, has necessitated concern into determining the remote cause, abrupt risk factors, epidemiology and prevalence of UTI among women in Ebonyi State Nigeria as this will be a panacea into solving the problem.

The prevalence studies of 115 (45 %) out of 250 women subjects recorded high infection with *Staphylococcus aureus* from samples of urine examined. This revealed that subjects from EBSUTH 70 (28 %) had the highest infection rate that FMC 45(18 %). Surprisingly, it was observed that polygamy/polyandry, hygiene and poverty are consequential risks of these problems which not only lead to infertility but family restiveness and stigmatization which later can lead to death. Other researchers reported 40% of infection in

Abuja risked to poor hygiene and promiscuity by [10]; 31% and 46% for married and single women in Zaria by [11, 12]; and 55% infection recorded in Congo republic and attribute it majorly to hygiene, poverty, lack of education, awareness and unfaithfulness.

The age wise relationship to the distribution of *Staph. aureus* infection revealed that women between the age bracket of (21-37) and (45-37) had the highest infection as seen from both hospitals in table 2. Seemingly, it could be deduced that as people advance in age so there improves in personal hygiene and develops phobia to unprotected sex and observes save sex, save hygiene and good health. Also, it could be ascribed to the fact that at the vulnerable age lack education awareness on the potential risk factors of UTI which is common here. Majority of the infected women are rural women who does not understand the impact of polygamy to disease spread and does not access health facilities unless critically sick. *Staphylococcus aureus*

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could be age dependent as the prevalence is recorded high in certain age limit while certain other ages resist the establishment of the infection causing more pathological disorders and virulence than other ages. This is because of the lack of awareness on the transmission potentials and risk factor incidence of the disease, thus having way to more infection.

The studies on the antibiotic resistance with gram positive *Staphylococcus aureus* showed that Ampicillin had full resistance (47.8 %) and high susceptibility to gentamicin is due to the complexity of the aminoglycosides and the route of administration. The resistance to cephalexin and clindamycin pattern is in conformity to the works of [11,12], which states that majority of antibiotics were resisted by *Staph. aureus,* this could be due to the acquisition of resistance gene and

environmental condition. The flouroquinoline content is designed for the inhibition of DNA replication and stops the multiplication of the bacteria cells. The multi-drug resistance pattern exhibited by gram positive *Staph. aureus* shows that about 72% isolates were resistant to at least four antibiotics, 95% were resistance to at least one antibiotics and only 5% were susceptible to all the antibiotics tested. This could be supported by the reports of [3], who states that highest resistant bacteria load were harbored by rural people. Presently, this society is characterized with inappropriate prescription, indiscriminate use of antibiotics and unethical dispensing. Because of the loss of the battle against resistant organism, immense concern should be taken by physicians to enhance the efficacy of drugs for antibiotic control.

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