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BACTERIOLOGY OF URINARY TRACT INFECTION AMONG INMATES IN JOS MAIN PRISON, PLATEAU STATE, NIGERIA

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ABSTRACT

Prison inmate comprises individuals of diverse tribe and ethnic background drawn from different location to live under an overcrowded and poor sanitary condition. Inmates generally are susceptible to diseases due to stress and high risk behaviour which account for low immunity. The present study was aimed to determine the prevalence of urinary tract infection among inmates in Jos main prison, Plateau State. Sterile universal containers were used to collect single voided mid-stream urine (MSU) From 318 inmates at the Jos main prison. These samples were transported in a cooler to the Department of Medical Laboratory science, University of Jos for processing. Briefly, standard wire loop was used to streak-inoculate urine specimens onto Cysteine Lactose electrolyte deficient agar (CLED) and Chocolate agar respectively. Cultures were incubated for 18-24 hours at 37^0C. Bacterial growths after incubation were identified based on colonial characteristics, Gram staining technique and biochemical tests. Demographic data were collected by administering questionnaires to the study participants. Data collected were analyzed by EPI info statistical package version 3.5.1. Out of the 318 prison inmates who participated in the study 68 (21.4%) were positive for urinary tract infection. The study revealed that female participants had the highest occurrence 1 (33.3%) of infection, while male participants had 67 (21.3%). *Staphylococcus aureus* was the most frequently isolated uropathogen with a prevalence of 53 (77.9%). Pertaining to the duration of incarceration inmates with longer period of incarceration appeared to be the most infected >10years 5(41.7%) compared to those with shorter duration of <1 year 34(17.7%). There was no statistically significant difference in occurrence of infection regarding duration of incarceration p=0.472 (P>0.05) in the study. The present study has revealed the prevalence of urinary tract infection among inmates of Jos main prison. However, findings from this study are expected to provide information that would assist the concern health authority on the need to intensify preventive and control measures against infections.

KEYNOTES: Urinary tract infection, prison inmates, *Staphylococcus aureus*, Jos main prison.

INTRODUCTION

Urinary tract infection (UTI) is caused by colonization and invasion of any part of the urinary tract by microorganism. Urinary tract includes the organs that produce, collect, store and release urine from the body which include: kidneys, ureters, bladder and urethra. UTI can be asymptomatic or symptomatic characterized by a wide range of symptoms which could manifest differently depending on the site of the infection and length of time involved.[1] Those that affect the lower urinary tract are called cystitis (i.e. involving the bladder alone with symptoms including painful urination, burning sensation and frequent urination while those that affect upper urinary tract are referred to as pyelonephritis (i.e. involve the kidneys).[2] The gold standard for diagnosis of UTI is by the isolation and identification of the causative pathogen in urine using culture media. However, the most commonly isolated microorganism in bacterial UTI are the gram negative bacilli including *E.*

coli, Citrobacter spp., Enterobacter aerogenes, Pseudomonas aeruginosa, Proteus spp., Klebsiella spp. and *Staphylococcus spp.*[3] Prisoners in developing countries live in extremely poor conditions with dilapidated facilities. However, the risk of acquiring infection, activation or aggravation of already existing illness usually increases in prisons for various reasons. Inmates with existing health problems do not received proper medical attention and may leave prisons in worse conditions than their previous life.[4] They are more susceptible to disease owing to poor healthcare, overcrowding, demographics, high-risk behaviours, low level immunity due to stress and inadequate or poor nutritional quality, and overall low-living standards compared to the general population. [5] Besides, the environment from which they come and the unhealthy lifestyle which they lived. As a result, prisoners carry a much greater burden of illness than other members of the society.

Undoubtedly, inmates from diverse ethnic backgrounds and locations living under similarly overcrowded and poor sanitary condition needed investigation. But little information is available on the magnitude of urinary tract infection in vulnerable groups like prison inmates. This study is expected to help healthcare providers and concerned administrators make informed decision in resource mobilization and design of appropriate control strategies.

MATERIALS AND METHODS
Study area
This study was carried out in Jos main prison between the periods of November 2015 to February 2016. This prison is located in Jos, the capital city of Plateau State; North central Nigeria.

Study population
The study population includes 318 inmates who volunteered to participate in the study.

Ethical consideration
With approval from the Jos prison service, permission was sought and obtained from the concern authority of the Jos main prison. Prior to sample collection participants were informed clearly about the objective and procedure of the study. Potential participants were told that participation was totally voluntary. It was also explained to the potential participant that there was no foreseeable risk or undesirable side effect during urine sample collection and any information obtained would remain confidential. For participants who were screened for urinary tract infection and were found infected their results were forwarded to the medical unit of the prison service.

Data collection
Structured questionnaires were used as a source of data collection and were administered to inmates prior to sample collection. Information on the age, sex, occupation, duration of incarceration and level of education were captured.

Sample collection and processing
Single voided mid-stream urine (MSU) specimens were obtained from inmates at the prison yard. All the specimens were quickly transported in a cooler to microbiology laboratory of the Department of Medical laboratory science, University of Jos, for analysis.

Urine culture was performed using standard wire loop method. A loop-full (0.001 ml) of mid stream urine was steak-inoculated on 5% chocolate agar and cysteine lactose electrolyte deficient (CLED) agar plates. These agar plates were incubated at 35°C for 24 hours under aerobic conditions. Isolates were considered significant if there were pure and $\geq 10^5$ colony forming unit/ml (CFU/ml). [6] Mixed growths of more than two organisms were considered to be contaminated. Significant isolates were identified by colonial appearance, microscopy, culture and biochemical techniques. [6]

Data analysis
Data obtained were analyzed by EPI info statistical package version 3.5.1. Chi-square (X^2) was used to compare association between variables and $p < 0.05$ was considered significant at 95.0% confidence level.

RESULTS
The study on urinary tract infection among prison inmates in Jos main prison revealed an overall prevalence of 21.4%. Table 1 indicates that inmates within the age group >35 were mostly infected 18(28.1%), while the age group 15-24 24(18.2%) had the lowest prevalence. Regarding gender of inmates, females had the highest occurrence 1(33.3%) of UTI compared to their male counterparts 67(21.3%). Results from the duration of incarceration were <1 year 34(17.7%), 2-10years 29(25.4%) and >10years 5(41.7%) respectively. There was no statistically significant difference between occurrence of infection and the level of education of inmates p=0.939. However, those who had primary education recorded the highest prevalence 18(24.0%), whereas the lowest prevalence was recorded among those without any formal education. In relation to occupation of inmates, most of the individual examined 158(49.7%) belong to the business category, followed by labour 152(47.8%), while civil servants had the least number 8(2.5%) of subjects.

Table1. Demographic characteristics of inmates in Jos main prison

Demographic characteristics	Frequency n=318	No. positive (%)	Chi-square (X^2)	p-value
Age (years)				
15-24	131	24(18.2)		
25-34	123	26(21.1)	2.094	0.350
>35	64	18(28.1)		
Gender				
Female	3	1(33.3)	0.184	0.668
Male	315	67(21.3)		
Duration of incarceration(years)				
<1	192	34(17.7)		

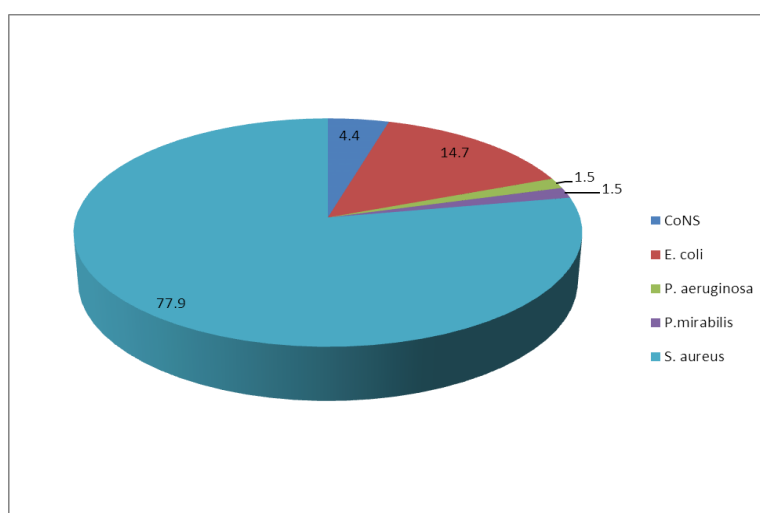|				
2-10	114	29(25.4)	1.501	0.472
>10	12	5(41.7)		
Level of education				
Non formal education	8	1(12.5)		
Primary	75	18(24.0)	0.408	0.939
Secondary	212	44(20.8)		
Tertiary	23	5(21.7)		
Occupation before incarceration				
Business	158	31(19.6)		
Civil servant	8	2(25.0)	0.238	0.888
Labour	152	35(23.0)		

Figure 1. Prevalence of bacteria isolates in urine samples of prison inmates

DISCUSSION

This result further revealed the deplorable state of health of the prison inmates studied. However, several factors that might account for this observation include poor sanitation, unhealthy habits, poor nutrition, dilapidated state of toilet facilities, overcrowding of prison facilities and the absence of preventive and control measures against infections among prison inmates. The aforementioned factors play pivotal role in the decline health status and predispose prison inmates to infection. Result from our study indicates that inmates with longer duration of incarceration had the highest rate 41.7% of infection compared to those with shorter duration 17.7% of incarceration. This is because prolong incarceration would tantamount to more exposure to stress and low standard of living that might lead to reduced immunity to diseases. Also, this finding is in tandem with the report by [7] from Jos, and [8] from South East Nigeria. The study recorded Staphylococcus aureus as the predominant pathogen of urinary tract infection, however this contradicts the finding by [8] from South East Nigeria who reported *Escherichia coli* as the prevalent uropathogen.

CONCLUSION

Undoubtedly, prison inmates consist of individual from different tribe, ethnic groups and location living together under a crowded and poor sanitary condition. However, the present study has revealed a high prevalence of urinary tract infection among prison inmates. We therefore draw the attention of the relevant authority on the urgent need to step up sanitary measures regarding facilities within the prison. Also, more attention should be geared towards the living standard of the inmates in view of the nutritional quality of food provided as this would go a long way to improving on their immune status therefore reducing their susceptibility to infection.

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