

Microbial Status Of Prison Inmates In Abakaliki Prison, Ebonyi State Southeastern Nigeria

Alo M.N.,¹ Ugah, U.I.,² Saidu A.Y.,³ and Alhassan H.M.⁴

¹Department of Biological Sciences, Faculty of Science and Technology, Federal University Ndufu-Alike Ikwo, Ebonyi State, Nigeria.

²Department of Medical Biochemistry, Faculty of Basic Medical Sciences, Federal University Ndufu-Alike Ikwo, Ebonyi State, Nigeria.

³Department of Biological Sciences, Faculty of Sciences, Federal University of Dutse Jigawa State, Nigeria

⁴Department of Immunology, Faculty of Medical Laboratory Science, Usman Danfodiyo University, Sokoto, Sokoto State, Nigeria

Abstract: Prisoners in developing countries live in extremely poor conditions. They carry a much greater burden of illness than other members of the society. They harbor diseases that are determined both by the environment from which they come and by the prison in which they live. This study aimed at determining the epidemiology of intestinal, haemoparasites and urinary infection among the inmates of Abakaliki prison. Venous blood, stool and clean-catch midstream urine specimens were collected from each informed and consenting prison inmate and analyzed following standard laboratory methods. A total of three hundred and fifty (350) prison inmates were enrolled in this study. Among this, 267 (76.29%) were positive for intestinal parasites, 193 (55.14%) were positive for urinary bacteria while 324 (92.57%) were positive for malaria parasites. The pathogens were observed to be higher among prison inmates who had been incarcerated for a longer duration than among those with shorter duration of incarceration. This study advocates immediate renovation and decongestion of prisons, as well as continuous education of prison inmates and prison officers, adequate nutrition and proper cooking of food served to inmates. Provision of potable water, improved toilets, beddings, clothing and social welfare facilities.

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Introduction

Urinary tract infection is said to exist when significant number of microorganisms usually greater than 10^5 cells/ml of urine are detected in properly collected clean-catch midstream urine [1], [2]. The gold standard for diagnosis is the detection and identification of the causative pathogen in the urine [3]. Urinary tract infection (UTI) is one of the most common infections to plague man worldwide. The common etiologic agents of UTI include *Enterobacteriaceae* like *E.coli* and *Klebsiella spp* as well as Gram – positive organisms like *Staphylococci* and *Enterococci* as well as *Candida albicans* in patients with underlying physiological debilitation [4], [5],[6].

Prisoners carry a much greater burden of illness than other members of the society. They harbor diseases that are determined both by the environment from which they come and by the prison in which they live. Prisoners in developing countries live in extremely poor conditions. There are inadequate facilities, malnutrition, lack of potable water, dirty environment and very poor personal and environmental hygiene. There are also problems of

drug abuse, alcoholism, HIV/AIDS, tuberculosis, skin and helminthes infections etc.

Infections by parasites and urinary tract pathogens as well as blood-borne pathogens are greater among populations who are heavily exposed in low income countries [8], [9].

Intestinal and urinary parasites have a cosmopolitan distribution but they are more prevalent in tropical and subtropical regions [10]. This high prevalence is promoted by epidemiological factors such as poor personal and environmental sanitation and hygiene, ignorance, environmental degradation, climate conditions and socio-cultural practices such as the use of feces for fertilizer. [11], [12].

The health and socio-economic implications associated with intestinal helminthes are enormous especially in rural communities of the developing countries where malnutrition and other factors complicate the impact of the infection [13]. However, because many parasitic infections especially those of helminthes origin are usually asymptomatic. They are often neglected until serious complications or chronic clinical features appear [14].

There is apparently a dearth of published data on intestinal helminthiasis as well as the health status of

prison inmates in Nigeria. This study aimed at determining the epidemiology of intestinal, haemoparasites and urinary infection among the inmates of Abakaliki prison. This has become necessary to highlight the burden of infection on this group of individuals.

Materials And Methods

Study Area

This study was carried out in Abakaliki prison, it is located in Abakaliki metropolis, the capital of Ebonyi State, South-Eastern Nigeria. It has a tropical climate with predominant rainforest vegetation, an average annual rainfall of about 1500mm³. The study area has two distinct seasons, wet and dry. The wet season takes place between April and October while the dry season occurs from November to March.

Ethical Consideration

Ethical clearance was sought for and obtained from the Chief Warden. Informed consent was also obtained from all the subjects enrolled in the study.

Study Population

This study was conducted among prison inmates of Abakaliki prison. A total of three hundred and fifty subjects were enrolled into the study using simple random sampling technique. Only informed and consenting inmates were enrolled into the study. The participants were assured of the anonymity of the test result.

Sample Collection

Ten (10)ml of clean-catch midstream urine specimen was collected from each of the informed and consenting subjects into sterile universal containers. Stool specimens were collected from the subjects into sterile wide mouthed screw capped containers. Two (2)ml of blood specimens were collected by venepuncture into sterile EDTA containers.

Laboratory Analysis

Stool specimens were inoculated into Selenite F broth from where it was subcultured onto Deoxycholate Citrae agar, Xylose Lysine Deoxycholate agar and Salmonella-Shigella agar. Direct microscopic examination using normal saline and lugol's iodine method and subsequently formal-ether concentration and Kato-katz technique for fecal specimens were used for microscopic identification of helminth eggs [15], [16].

Urine specimens were inoculated onto MacConkey agar, Blood agar, Eosin methylene blue agar. Subsequently, it was centrifuged at 4000 rpm for 3 minutes and the supernatant was discarded while the sediment was examined for possible parasites.

The parasites and bacterial isolates were identified and characterized using standard methods. Cysts, ova and trophozoite were identified based on their morphological characteristics, motility and

presence of cytoplasmic inclusion bodies such as erythrocytes in trophozoites and chromatoid bodies in cysts. Bacterial isolates were identified based on their colonial characteristics, Gram reaction and biochemical reactions.

Data Analysis

Data collected were analysed at $p < 0.05$ level of significance using descriptive statistics, Chisquare test was used to compare the rate of infections. The analysis was performed with the aid of Statistical Programme for Social Sciences (SPSS) version 18.0

Result

A total of three hundred and fifty (350) prison inmates were enrolled in this study. Among this, 267 (76.29%) were positive for intestinal parasites, 193 (55.14%) were positive for urinary bacteria while 324 (92.57%) were positive for malaria parasites.

The intestinal parasites found among the subjects are; *Ascaris lumbricoides*, Hookworm, *Entamoeba histolytica*, *Trichuris trichuria* and *Balantidium coli* (Table 1). The bacteria isolates from both stool and urine specimens analysed are; *Escherichia coli*, *Klebsiella spp.*, *Staphylococcus aureus*, *Salmonella spp*, *Shigella spp*, *Pseudomonas aeruginosa* and *Enterococcus spp*.

Table 1: Parasites isolated from the prison inmates studied

Organism	Number present (%)
<i>Ascaris lumbricoides</i>	188 (53.71)
Hokworm	109 (31.14)
<i>Entamoeba histolytica</i>	143 (40.86)
<i>Trichuris trichuria</i>	96 (27.43)
<i>Balantidium coli</i>	27 (7.71)
<i>Plasmodium spp</i>	324 (92.57)

Table 2: Bacteria isolated from the prison inmates studied

Organism	Number present (%)
<i>Escherichia coli</i>	143 (40.86)
<i>Klebsiella spp</i>	115 (32.86)
<i>Staphylococcus aureus</i>	93 (26.57)
<i>Pseudomonas aeruginosa</i>	84 (24.00)
<i>Enterococcus spp</i>	65 (18.57)
<i>Salmonella spp</i>	195 (55.71)
<i>Shigella spp</i>	153 (43.71)

Table 3: prevalence of infected prisoners based on their duration of incarceration

Duration in prison	Number examined	number infected
0 – 5	100	49
6 – 10	100	78
11 – 15	100	96
16 – 20	50	44
Total	350	267

The pathogens were observed to be higher among prison inmates who had been incarcerated for a longer duration than among those with shorter duration of incarceration. The prevalence of the pathogens among the prison inmates was statistically significant $p= 0.02$. however, the difference between the duration of incarceration in the prison and the presence of pathogen was statistically non-significant ($p> 0.05$).

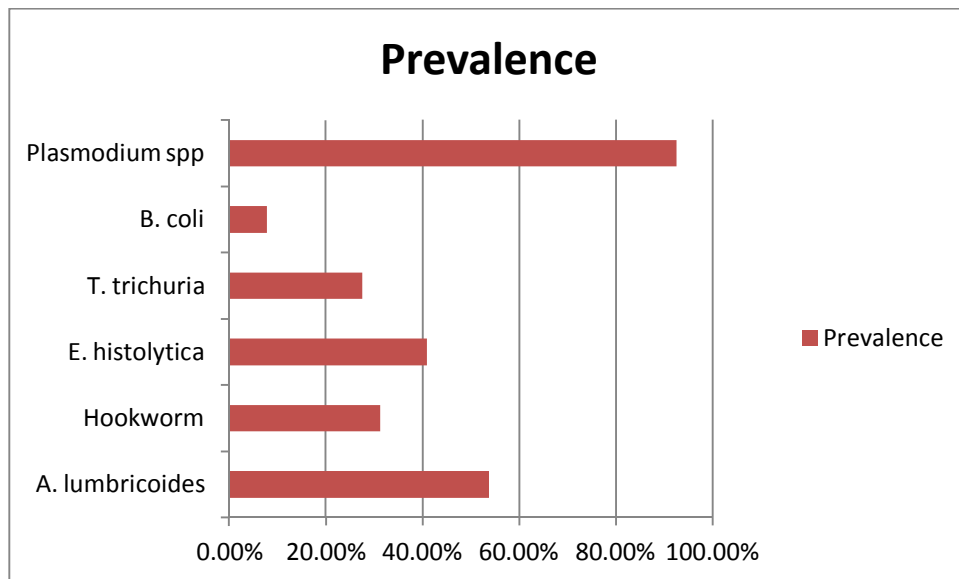


Figure 1: bar chart showing the prevalence of parasites among the subjects studied.

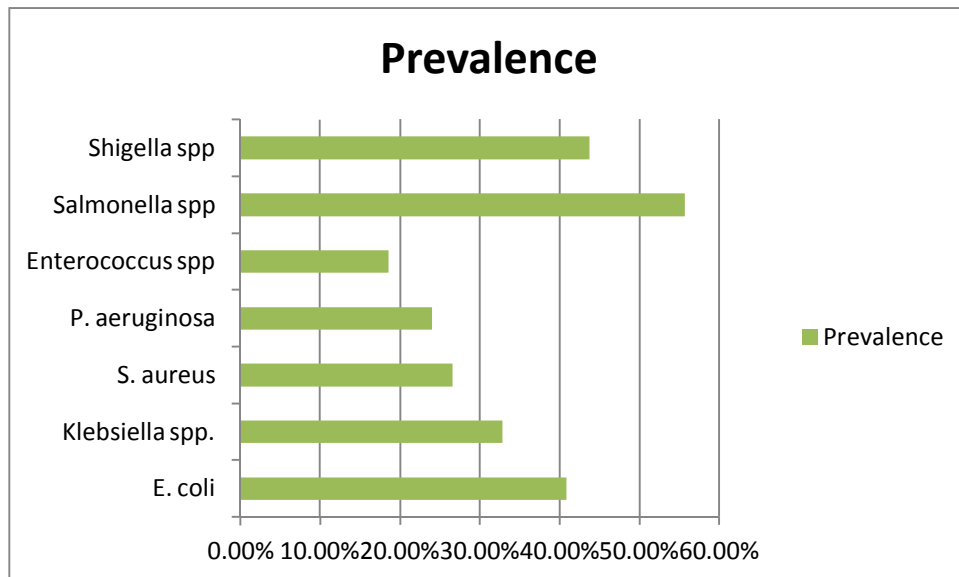


Figure 2: bar chart showing the prevalence of bacteria isolates among the subjects studied.

Discussion

The prevalence of intestinal parasites, urinary pathogens and haemoparasites recorded in this study was 76.29%. This result exposes the deplorable state of health of the prison inmates studied. Several factors have been posited to contribute to this observation. The poor sanitation, inadequate water supply, unhealthy habits and lack of education are among these factors. However, the worst factors which play pivotal roles in the declined health status of the test subjects include; overcrowding of the prison facility, poor nutrition, decadent state of the environment as well as the dilapidated state of the prison toilets, buildings, infrastructures and the environment.

Besides the aim of serving punishment for various criminal activities, the goal of confining individuals convicted of various offences is primarily for character reformation. However, the continuous attitude of abandoning prisons and lack of renovation of prison facilities as well as the overcrowding of prisons further complicates the problem and increases the burden of infectious diseases among prison inmates. The absence of concern on the state of the prisons further increases the chances of easy spread of various infectious agents between prison inmates.

The apparently high prevalence of various infections observed in this study may be attributed to the direct effect of the environment. There was observed incessant and indiscriminate deposition of faecal matter by the prison inmates within the environment and most of them walk around without footwear, this increases the chances of transmission of geohelminths. Also, the apparently high prevalence of malaria parasites observed is a reflection of the almost absence of healthcare and preventive as well as control measures against malaria infection. The absence of insecticide treated bednets against the backdrop of heavy vegetations and other breeding grounds for mosquitoes also contributes to the problem.

Eating of raw or undercooked vegetables or unwashed fruits among the inmates may be regarded as a probable source of parasitic infection among the inmates. Also, person-to-person transfer of these parasites among the inmates constitute likely sources of infection [14].

The finding that inmates who had served longer prison terms had higher infection rates than those with shorter terms is in consonance with the study by Mamman and Reuben in Nigeria [14]. Also, the finding that intestinal parasites had a higher prevalence than other infections also agrees with the results of another study [7].

This study also affirms that *E.coli* still remains the most frequent isolate in our environment causing

urinary tract infection. However, this pathogen as well as other *Enterobacteriaceae* especially *Klebsiella spp* is showing increased resistance to numerous antimicrobial agents. Regular antibiotic surveillance is therefore advocated.

This study advocates immediate renovation and decongestion of prisons, as well as continuous education of prison inmates and prison officers, adequate nutrition and proper cooking of food served to inmates. Provision of potable water, improved toilets, beddings, clothing and social welfare facilities. This is necessary because the establishment of these parasites within the prison inmates may portend grave consequences on human health as they serve as reservoirs for these parasites. It is therefore important to introduce and intensify preventive and control measures for these infections among prison inmates taking into mind the fact that almost all the factors that facilitate the spread of these infections observed can be controlled.

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