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Prevalence of Urinary Schistosomiasis Among Human Immunodeficiency Virus Patients Attending Faith Alive Medical Centre in Jos North, Plateau State, Nigeria

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ABSTRACT: Prevalence of urinary schistosomiasis and some other human blood related parasitic diseases infecting Patients in medical institutions in Nigeria have become a major concern following numerous observable clinical symptoms of these diseases mostly among Human Immunodeficiency Virus (HIV) patients under surveillance by various health personnel in endemic localities. This has therefore generated various research interests among scholars of recent. In this paper, a similar situation among HIV Patients attending Faith Alive Medical Centre, in Jos North, Plateau State, Nigeria was considered. The study was aimed at determining the prevalence of urinary schistosomiasis among HIV patients. Blood and urine samples were collected for examination from willing patients in the medical centre. Parasitological screening for urinary schistosomiasis and detection of *S. haematobium* eggs was done, as urine samples were examined using the simple sedimentation method; while the simultaneously collected blood samples from a total of 210 HIV patients that visited the medical centre were further screened to reaffirm infection with the virus, using the recommended microscopy for HIV examination methods. Questionnaires were equally administered on the 210 confirmed HIV patients to determine their Knowledge, Attitude and Perception (KAP) in regards to urinary schistosomiasis. The data obtained from the laboratory screenings and retrieved questionnaires were analyzed using the R-console software (version 2.9.2) and simple collation of responses to questions to cover the supposed KAP studies of the patients respectively. The proportion of data for both samples examined was compared using chi-square test. The results obtained for urinary schistosomiasis prevalence among the reaffirmed HIV Patients in the study location was 4.3 % and 100% respectively. The differences in infection rate were however significant $P < 0.05$. Infection rate in sex-related prevalence shows that for urinary schistosomiasis, females (4.5%) were slightly higher than males (3.9%); while that of confirmed HIV patients was 100%, yet no significant difference between both sexes was observed. Among age-related prevalence, the difference in urinary schistosomiasis infection was highly significant ($P < 0.001$). Age groups 30-39yrs and 20-29yrs had the highest (5.9%) and (2.8%) prevalence rates for the disease, with similar age groups also been highest for the confirmed HIV Patients among the various age groups ranging between 10-19 and 60+. Results on occupation-related prevalence also showed highest among housewives and fishers/farmers (4.8%) each amongst other occupations examined. While the responses to questionnaires revealed that a total of 175, (male 50 and female's 125) knowledge, attitude and perception regarding urinary schistosomiasis was positive and reassuring, as only 11 respondents were uncertain about the disease amongst 210 responses collated. Although low level prevalence of urinary schistosomiasis was confirmed amongst these reaffirmed HIV patients in the study location, an intensive medical attention is seriously advocated for both diseases to improve the health status of the people. While regular health awareness campaigns should serve as measure for enlightenment of the populace in order to keep the awareness level high, on HIV virus and its possible association among patients with other blood related diseases.

Keywords: Schistosomiasis, Human Immunodeficiency Virus (HIV), Association, R-console software.

Introduction

Epidemiologic mapping studies of HIV/AIDS and Schistosomiasis in Africa depict a substantial overlap, in many regions, between areas in which *Schistosoma haematobium* (implicated for urinary Schistosomiasis) is endemic and areas in which women have high prevalence of HIV infection (Anosike *et. al*, 2006). In rural areas, women having limited access to clean water are more often put at risk for urinary Schistosomiasis. HIV prevalence also peaks at younger ages at the rural level than in older women in urban areas (Adeyemi *et. al*, 2014). This observed gender quotient also suggests that risk factors for HIV acquisition may be different between rural and urban populations. The Acquired Immunodeficiency Syndrome (AIDS) is a deadly disease that has so far claimed more than 16 million people globally in the last two decades (Anderson, 1976). By the end of 2001 approximately 40 million people were living with human Immunodeficiency Virus (HIV), the causative agent of AIDS as the infection causes immune suppression of infected individuals (UNAIDS, 2004). Severely immune compromised individuals (with end stage HIV infection) are said to have AIDS, which is frequently associated with other human blood related parasitic infections. These include *Mycobacterium tuberculosis*, *Cryptosporidium species*, *Schistosoma species*, *Plasmodium* etc (Anosike, 2006). AIDS also increases the rate of other parasitic infections including those of the *Helminthes*. *Schistosoma* species which causes Schistosomiasis, is one of such parasitic infections of public health importance associated with AIDS. As a disease, it ranks second most important parasitic disease after malaria in the tropics. *Schistosoma haematobium* and *S. mansoni* are the most important causes of Schistosomiasis worldwide (WHO 2003). Among the pathogenic effects of Schistosomiasis include chronic diarrhoea, hepatosplenomegaly, liver fibrosis, ulceration of genital organs and haemorrhage. Thus Schistosomiasis of the urethra tract leads to destruction of mucosal cells of the reproductive organs through the piercing action of the oval spines. This particular pathological effect has become so significant especially in women where there are usually obvious chronic symptomatic lesions and inflammations (Anderson, 1976; Abolarinwa, 2000).

The ethnic groups are known for their cultural beliefs, tin mining, one of the major sources of their economic activities that has gradually been replaced with subsistence farming. Due to the tin mining, small ponds, man – made dams, burrow-pits and rivers are developed. Many of these water bodies, which serve as sources of water for domestic uses, recreation, fishing and agricultural purposes, have been identified by many studies as major snail – infested habitats for Schistosomiasis disease, especially during the dry season. However, transmission in human definitive host occurs mainly during recreational, irrigation, fishing, agricultural and domestic activities when there is contact between the definitive host (human) and *Cercariae* infested water. The study was carried out to study interaction of Schistosomiasis and HIV among both males and females attending Faith Alive Medical Centre, Jos.

Materials and Method

Study area

The study was conducted in Faith Alive Medical Centre Jos, Plateau State situated in the North central part of Nigeria, generally referred to as middle belt zone. The state is characterized by its landscape and highlands that stand at an average height of about 120 metres above sea level. Furthermore the state lies between latitude 71° and 111° N, and 70° and 25° E with a temperature that ranges from a minimum of 11°C to a maximum of 28 – 30°C. It has an annual rainfall of 150cm lasting between 6 and 7 months with the lowest temperature between November and February accompanied by the dry harmattan winds.

Collection of Samples

Prior to commencement of sample collection, an official permission was sought as ethical clearance obtained from the medical director and the State Ministry of Health. Urine specimens were collected using sterile wide-mouthed plastic bottles and screened for Schistosomiasis using sedimentation method. Serum was simultaneously collected from blood of various subjects who were already screened and found to be HIV positive for the purpose of reaffirmation. The collected blood was transferred to a clean sterile bottle and allowed to sediment, then the upper part of the settled plasma known as the serum was extracted and transferred into a bottle using 1000µl micropipette.

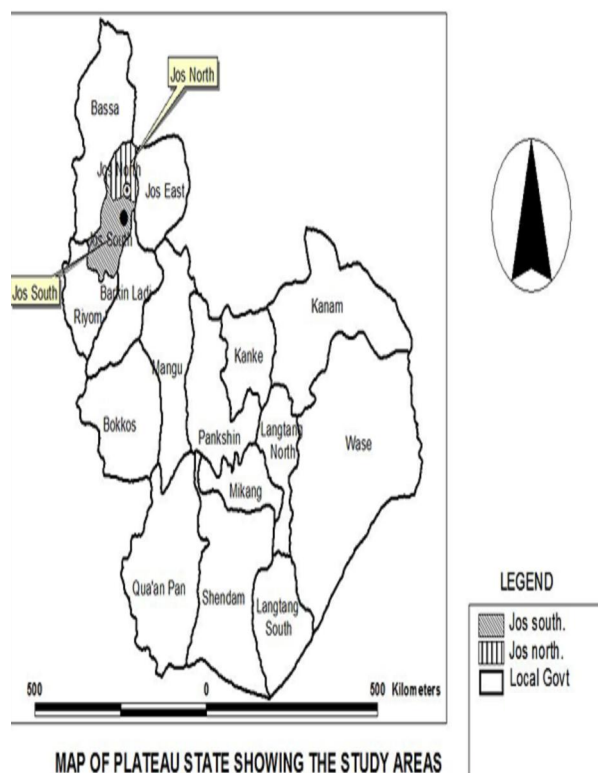


Fig. 1: Map of study location- Jos North, Nigeria

Laboratory Examination

Parasitological screening for urine samples to detect *S. haematobium* eggs, were collected and examined.

Urinalysis

The method used for urine analysis was sedimentation method as described by WHO (2003), where each urine sample collected was properly shaken and poured into a centrifuge tube, centrifuged for about 5 minutes. 10mls syringes were used to draw and discard the supernatant leaving only about 1ml – 2ml sediments of the urine in the specimen bottles, which drops were carefully placed, on the free grease glass slides using a dropper, alongside a drop of Lugol iodine and covered with a cover slip. These were further viewed under the microscope using low power objective lens (x10).

Blood Analysis for HIV

The patient's cubital arm was cleaned properly, using methylated spirit on cotton wool to disinfect the hand from bacteria. The pulmonary veins were located and using a syringe, blood was drawn. The blood was centrifuged together with an anticoagulant to stop the blood from clotting. After 5 minutes the serum was collected and placed on a HIV test strip. Double horizontal lines signified positive and a single line signified negative. This HIV blood re-screening was targeted at reaffirming the presence of the virus in the earlier examined and confirmed HIV Patients to avoid doubt and therefore reassure the study embarked upon in the location.

Statistical Analysis

Data obtained were analyzed using R-Console software (Version 2.9.2). Data for parameters were analyzed using Chi-square test. Statistical significance was achieved as $P < 0.05$ from the use of the above analytical methods.

Administration of questionnaires.

Questionnaires were administered simultaneously on the 210 individuals who were examined for Schistosomiasis, who were also reaffirmed to be with HIV, as to also determine their Knowledge, Attitude, and Perception (KAP) as regards the both infections, especially urinary schistosomiasis. Same numbers of Questionnaires distributed were retrieved from respondents during the blood sample collection and further collated to generate the required analyzed data.

Results

The results of the study showed that of the 210 persons examined for the diseases, prevalence of Schistosomiasis was 4.3% and HIV infection reaffirmed was 100% (Table 1) Sex related prevalence of Schistosomiasis was 3.9% in males and 4.5% (Table 2) in female, while HIV prevalence rate was 76(100%) in males and 100% in females (Table 3). In age related prevalence of Schistosomiasis, 30-39yrs had the highest prevalence rate of 5.9%, while 60yrs and above had the least prevalence rate of 0.0%. Age related prevalence of HIV was also highest among age 30-39yrs and least among 60yrs and above. Furthermore, results on occupation-related prevalence also showed highest among Housewives and Fishers/Farmers 4.8% each amongst others examined, especially Civil servants with the least 0.0% (Table 4). Finally, a total of 175 respondents, 50 males and 125 females, gave their 'yes' answers to buttress their level of awareness for urinary Schistosomiasis infection, while only 11 of the respondents were uncertain of their knowledge and perception regards the diseases (Table 5).

Table1. The Prevalence of Urinary Schistosomiasis Among Reaffirmed HIV Patients in the Study Location

| Infection | No. Examined | No. Infected | % Infected |
|-------------------------|--------------|--------------|------------|
| Urinary Schistosomiasis | 210 | 9 | 4.3 |
| HIV | 210 | 210 | 100 |

Table 2. Sex-related Prevalence of urinary Schistosomiasis among Reaffirmed HIV Patients in the Study location.

| Sex | No. Examined | No. Infected | % Infected |
|--------|--------------|--------------|------------|
| Male | 76 | 3 | 3.9 |
| Female | 134 | 6 | 4.5 |
| Total | 210 | 9 | 8.4 |

Discussion

In spite of the enormous and overwhelming evidence of urinary Schistosomiasis in Nigeria (Anosike, *et al*, 2002), our findings reveal that the situation in Jos North is at a lower prevalence rate of 4.3%. There also seems to be a significant difference, $P < 0.001$, in the infection rates of both Schistosomiasis and HIV, which is in agreement with the findings of Monday *et al.* (2014) who reported 15.5% prevalence of urinary Schistosomiasis among the people in Bali Town in Taraba State and Okpala *et al.* (2004), with 0.33% recorded among pupils in Apata and Laranto area, 2.4% also reported by Akunfongwe *et al.* (1995), in some primary schools at Abattoir area, both in Jos North, Plateau State, Nigeria. Anosike *et al.* (1992) had earlier reported Schistosomiasis prevalence rate of 9.18% in some other states bordering the Plateau. The disease is a biologically important health burden in tropical Africa and believed to be endemic in Northern Nigeria (Blumenthal *et al*, 1987). Faith Alive Medical Centre, Jos, is a medical centre that renders free medical services, therefore infected people from other neighbouring states come for free HIV test or for anti-retroviral drugs. This accounts for the high number of HIV positive people in the Medical Centre.

There are various figures, ranging from 1% to over 50% prevalence from earlier surveys carried out in Central Plateau as reported by Anosike *et al.* (1992) in their work in parts of Bauchi State, and the infection in other parts of Nigeria rather patchy and variable.

Table 3. Age-related Prevalence of Schistosomiasis Among Reaffirmed HIV Patients in the Study Location.

| Age-group | No. Examined | No. Infected | % Infected |
|--------------|--------------|--------------|------------|
| 10 – 19 | 5 | 1 | 20.0 |
| 20 – 29 | 71 | 2 | 2.8 |
| 30 – 39 | 85 | 5 | 5.9 |
| 40 – 49 | 35 | 1 | 2.9 |
| 50 – 59 | 10 | 0 | 0.0 |
| 60 and above | 4 | 0 | 0.0 |
| Total | 210 | 9 | 31.6 |

Table 4: Occupation-related prevalence of Urinary Schistosomiasis among Reaffirmed HIV Patients in the Study Area.

| Occupation-group | No. Examined | No. Infected | % Infected |
|------------------|--------------|--------------|------------|
| Students | 7 | 1 | 0.1 |
| Housewives | 85 | 4 | 4.8 |
| Civil Servants | 20 | 0 | 0.0 |
| Business People | 36 | 1 | 2.8 |
| Fishers/Farmers | 63 | 3 | 4.8 |
| Total | 210 | 9 | 31.6 |

Table 5: Response to Questionnaires to Determine the Knowledge, Attitude and Perception (KAP) of Reaffirmed HIV Patients by Sex as Regards to Urinary Schistosomiasis in the Study Area.

| Sex | No. of Respondents | ‘Yes’ | ‘No’ | ‘Uncertain’ | Total |
|--------|--------------------|-------|------|-------------|-------|
| Male | 76 | 50 | 18 | 8 | 76 |
| Female | 134 | 125 | 6 | 3 | 134 |
| Total | 210 | 175 | 24 | 11 | 210 |

The rate of infection of Schistosomiasis between the males and females was not significant. For the 210 people that were examined, higher prevalence of Schistosomiasis was 4.5% in the females while it was 3.9% for the males. The slightly higher prevalence in female is probably due to their high frequency of visits to water bodies through activities like washing of utensils, laundry and fetching of water in rivers, lakes and other stagnant pools. It is believed that all age groups are susceptible to the disease. These women might have been infected at a tender age

and because clinical features of the disease take time to manifest until at adulthood they do not show symptoms. This might have contributed to the slightly higher prevalence rate observed in the females. This agrees with the studies of (Poggense *et al.*, 1998) in a Tanzanian endemic community where 40% of women of child bearing age were infected. Other studies contradict this finding; for example, Farid *et al.* (1968) recorded higher infection rate in males than in females. This was because males are exposed constantly to various activities such as irrigation, scale damming, rice cultivation and therefore are exposed to high risk of infection. Also, Schulz (1986) had earlier reported higher prevalence in male than in female due to the fact that boys and men bath in pools on return to farms.

Anya *et a.* (1986) also reported in their study that males had a significant prevalence rate in urinary Schistosomiasis than the females ($p < 0.05$), attributed to cultural habits of regular and longer contact with cercaria infested water during farming and fishing which also agrees with the farmers/fishers' highest prevalence rate 4.8% among the various occupational groups examined in this study. The disease was higher in the age groups 30-39 yrs and 20-29 yrs. This is similar to the findings of Okufongwe *et.al.* (1996) who recorded a high infection rate in 20-24 age group. These age groups are actively involved in activities such as farming, fishing, washing etc that exposes them to the risk of the infection, though not supported by Babatunde *et al.* (2013) who reported highest prevalence in the age group 10-19 years as was further supported by Monday *et al.* (2014) who emphasized same 10-19 years in Bali, Taraba State, attributing it to be the most vulnerable and therefore, most commonly found in prolonged contact with water bodies for various reasons, these include; leisure, swimming, bathing, fishing etc than those within 0-9 years, who are either too young or afraid to actively engage in such activities, whereas those of 20 years and above also being too old for the same exercises, thus had lower prevalence rate.

Sociological indices based on KAP studies indicates the highest level of awareness of urinary Schistosomiasis among females (134), in linear progression with the number of respondents to questionnaires in the location as compared to males (76), among the female majority in line and susceptibility to those reaffirmed to be HIV patients in the study location.

The prevalence of reaffirmed HIV patients was 100% among the different age groups. Those within age group 30-39yrs and also 20-29yrs were more infected probably because at these age range, both sexes are sexually more active, but become carefree and negligent to protective sex thereby may have direct sexual intercourse without protection. This is similar to the findings and reports of William *et al.* (1997) who also reported high prevalence amongst age group 25-40 years old. Eka *et al.* (1997) also reported that majority of the HIV positive women were between 21 and 30 years old. Nwoye (1994) also reported high HIV cases amongst the 25-30 years old. The findings in this study are not far from these reports above. They all reported that these groups are made up of the sexually more active individuals.

Conclusion.

The result obtained from this study shows that among the 100% reaffirmed HIV infected patients, urinary Schistosomiasis was prevalent at 4.3%. This study requires an equal measure of urgent attention by healthcare providers at both local and international support levels to further assess the study location, following the success of the findings reported here, as it provides for preliminary data both for further researchers and intervention teams. This will certainly improve the health of the dwellers in the area. Precautionary measures through extensive educational enlightenment campaign against such activities exposing the people to the infections will also help minimize prevalence and attacks of Schistosomiasis and HIV/AIDS in this location.

Recommendations

1. Similar research efforts to further ascertain and improve on the results and findings obtained in this study be conducted both in the location and other similar areas.
2. Long term data should be collected and collated for both diseases from same medical centre and others sharing close boundaries with it on the Plateau for comparative purposes in order to improve the health status of those within the study location.
3. Government, NGOs and well meaning individuals should be encouraged to create possible public health awareness campaign avenues especially to target groups within the age brackets vulnerable to the diseases in and around the study location and beyond.
4. Adequate counselling should be embarked upon by professionals as to enlighten the people on the dangers of spreading the disease through unwholesome behaviours in the study location.

5. Establishment of more health centres and employment of health personnel should be done by both government and private health practitioners to satisfactorily engage in the above health activities in and around the study location.

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