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A SURVEY OF OPPORTUNISTIC INFECTIONS IN HIV SEROPOSITIVE PATIENTS ATTENDING MAJOR HOSPITALS OF KEBBI STATE, NIGERIA

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ABSTRACT

A survey was conducted to determine the prevalence of HIV/AIDS related opportunistic infections from the patients attending the five major Hospitals in Kebbi State , which included Federal Medical Center (FMC), Birnin Kebbi, Sir Yahaya Memorial Hospital (SYMH), Birnin Kebbi, General Hospital, Argungu (GHA), General Hospital , Yauri (GHY) and General Hospital , Zuru (GHZ). The screening for the HIV/AID was done using the Genic II HIV-1/HIV – 2 Test and the screening for opportunistic infections was done using thin and thick blood films, direct wet mount, formal ether concentration technique and modified Ziehl – Neelsen (ZN) technique. Microbial Pathogens were isolated through culture and identified through gram staining and biochemical tests. Out of the 1950 patients screened for HIV/AIDS infection, 606 (31.6%) were positive. Higher prevalence 195 (32.2%) was from FMC and the lowest from GHY 90 (15%). The result revealed that 374 (61.7%) of HIV/AIDS positive patients were also positive to one or more opportunistic infections. In this respect, higher prevalence of 32.3% was observed from FMC and the lowest was observed from SYMH with 13.9%. The result of the study also revealed the presence of malarial (Plasmodium) parasites with prevalence of (75.9%).The Federal Medical Centre (FMC) had the highest prevalence of 29.5%, SYMH, 21.7%, GHA, 17.2%, GHY, 16.1 and lastly GHZ with 15.4%. There is therefore the need for urgent positive control programme of HIV and HIV related opportunistic infections.

Keywords: Survey, opportunistic infections, HIV Sero positive, Kebbi State.

INTRODUCTION

Human immodeficiency virus (HIV) is one of the greatest challenges facing mankind. People with advanced stage of HIV infection are vulnerable to secondary infections and malignancies that are generally termed as opportunistic infections. This is because they take the advantage of the opportunity offered by a weakened immune system. Opportunistic infections are common complications of HIV infection and other AIDS (Acquired Immune Deficiency Syndromes) defining conditions that rarely cause harm in healthy individuals (Avert Org. 2005a).

Some of the most common opportunistic infections include bacterial diseases such as those caused by *Mycobacterium turbaculosum* (TB); *Mycobacterium cholerea* (Cholera); *Pneumonia* and septicaemia (blood poisoning). Protozoan infections, such as: *Prenmocystis carinii Pneumonia (PCP)*, Toxoplasmosis, Isosporiasis, Leishmaniasis and Giardiasis. Fungal infections include candidiasis, cryptococcosis (Cryptococcal meningitis CRM) and Penilliosis. Viral infections associated with HIV/AIDS include cytomegalovirus (CMV), *Herpes simplex* and *Herpes zoster* viruses. Other opportunistic infections include HIV associated malignancies such as kaposi's sarcoma *Lymphoma* and squamous cell carcinoma etc. (Avert Org. 2005a). A healthy uninfected person usually has 800-1200 CD_4^+ T cells/mm^3 of blood. During untreated HIV infection, the number of cells declines. When they fall to 200/mm3 the person becomes particularly vulnerable to the opportunistic infection (UNAIDS, 2004). Opportunistic infection typically began to manifest when the CD4 Lymphocytes count of an infected person decline below critical level, i.e. 800 cells/ml of which the normal value is 1200 cells/m/ (Avert Org. 2005a). When immune system is severely suppressed in this manner infection can be fatal, usually resulting to death in less than 2 years, unless the patient receives specific therapy for HIV infection, (Avert. Org. 2005a).

One of the most common opportunistic infections associated with HIV is *Pneumocystic pneumonia*,(CDC, 2004).It has been identified as the most common cause of serious pulmonary dysfunction in AIDS patents which accounts for about 40% (Kavock and Masur, 1985).

Toxoplasmosis is one of the common opportunistic parasitic diseases associated with HIV/AIDS patents. *Toxoplasma encephalitis which* is the hearting pathogenic effect, frequently present with neurological signs such as confusion, headache, vertigo, seizures, high temperatures and lethargy. Cerebral toxoplasmosis is the commonest cause of focal brain lesion and accounts for about 13% of all AIDS cases in one series of post-mortem examination (Richard Donald, 1989).

Protozoan parasites like *Cryptosporidrium parvum, Isospora belli, Microsporidia, Entamoeba histolytica* and *Giardia lamblia* account for a significant number of cases of diarrhoea in HIV patients (Kava *et al*., 2002). In addition, *Trichomonas vaginalis Trichomonas vagnialis* infection typically elicits an aggressive local celluler immune response with inflammation of vaginal epithelium and exocervix in women and the urethra of men (Sardana *et al.,* 1994; Sorvillo, *et al.,* 2001). This inflammatory response induces a large infilteration of leucocytes, including HIV target cells such as CD4 + bearing lymphocytes and macrophages to which HIV can bind and gain access (Kiviat, *et al*., 1985 and Levine, *et al*., 1998).

With the alarming rate of reports of HIV/AIDS infection prevalence in the state, there is the need for an in depth study of other diseases affecting HIV/AIDS patients. Thus, the main objectives of this work are:

i) To determine the prevalence of HIV/AIDS infection among patients attending major hospitals in Kebbi State .

ii) To determine the opportunistic infections associated with HIV/AIDS in the state.

iii) To determine the specific prevalence of *Plasmodium* parasite infection in seropositive HIV patients.

MATERIALS AND METHODS

Study Area

Kebbi State is one of the 36 states making up the Federal Republic of Nigeria. The state is located between latitude 10° and 13°N and longitude 2°-6°E. According to 1991 census the state has a population of 2,062, 226 comprising 1,024,334 males and 1,037,892 females. It has an overall density of about 50 persons/sq km. A survey of existing health care facilities showed that there are five major general hospitals located at Birnin Kebbi, Argungu, Yauri and Zuru. In addition, there are 467 EPI units. Other health facilities include primary health centers, maternal health clinics, dispensaries, leprosy clinics, first aid centers, and a disease surveillance unit under WHO at Birnin Kebbi (Kudo and Mamman, 1993).

Sample Collection

The subjects studied were the patients suspected of having HIV infection by the doctors. About 3ml of blood samples were collected from the sampled patients in the hospital laboratories using sterile needles and syringes. The blood samples were collected from patients attending five major hospitals including: Federal Medical Centre, Sir Yahaya Memorial Hospital , Birnin Kebbi, General Hospital , Argungu, General Hospital , Yauri and General Hospital, Zuru. A total of 1950 patients were chosen after acquiring ethical approval from relevant authorities and informed consent of the patients. The age range of the patients was 15-55 years. Sample collection was done between the months of November, 2005 and November, 2006. All patients were screened for HIV infection. The 606 confirmed HIV seropositive patients were selected for the study.

Blood samples were collected in Ethylene Diethyl (EDTA) bottles, while urine, stool and sputum samples were collected in sterile universal bottles and a sterile swab stick was used for the collection of high virginal swab, endocervical swab and wound swab. The samples were analyzed immediately using standard laboratory procedures.

Blood Screening for HIV Infection

The 3ml of blood samples collection from each was quickly transferred into a clean dry test tube each for clotting to take place. The sera were then separated by centrifuging at 3000 rpm for 5 minutes after which the clear sera were aspirated by means of pasture pipettes into clean dry test tubes ready for use.

Genie II HIV – 1 /HIV-2 Test

HIV serum samples were tested for HIV infection using Genie II HIV-1/HIV-2 test kit as described by Gallo (1988). Reaction devices and samples were brought to room temperature for 15 minutes. The required number of Genie II HIV-1/HIV-2 reaction devices was removed from their aluminum pouches. Three drops (15ul) of specimen diluent was added to a microtube; 50µL of specimen (serum) was added and refilling by ejecting repeatedly with the pipettle to mix the content of the tube. The entire content of the microtube were transferred to port A of the reaction device and allowed to stand for 3 minutes. Three drops of streptavidin/AP conjugate was added to port B and allowed to stand for 3 minutes. Port B was filled to the top with solution until absorbed. Two drops of chromo give substrate solution was added to port B, and with top solution and allowed to stand until the solution has been absorbed. The result was read within 5 minutes HIV position cases showed two spots, while negative cases showed one spot.

The serum samples were also tested for HIV using determine HIV-1/HIV-2 kit as described by BI0RAD (2004). HIV positive cases showed two red lines/band and HIV negative cases showed one red band.

Parasitological Examinations

As for the haemoparasites like *Plasmodium,* both thin and thick films were prepared as described by Cheesebrough (1998). Slides were prepared, stained and mounted under microscope for viewing.

Stool samples were analyzed using saline and eosine, formal ether concentration technique and modified Ziehl Neelsn (ZN) method also as described by Cheesebrough, (1998) for the presence of intestinal parasites.

As for urine analysis, fresh urine samples were collected. The color and appearance were noted. About 5ml was centrifuged at 3000 rpm for 15 minutes. The supernatant was discarded and the sediment transferred on to a clean, geese free slide and covered with cover-slip. The preparation was examined under the microscope with x 10 x 40 objective.

Statistical Analysis

The percentage prevalence of HIV infection and the prevalence of opportunistic infection in the HIV seropositive patients attending the 5 health centers from different locations of the state was calculated by one way analysis of variance(ANOVA) to compare the opportunistic infective among the different locations. Pair wise comparison was also made between the group using student-t-test and $P<0.05$ was regarded as significant.

RESULTS

Out of the 1950 patients attending the 5 major health centers screened for HIV infection in Kebbi State, 606 (31.6%) were confirmed positive, with the Federal Medical Centre (FMC) having the highest prevalence of 195 (32.2%) and General Hospital Yauri (GHY) having the lowest of 90 (15%) (Figure1).

Of the 606 HIV seropositive patients, a total of 374 (61.7%) were found infected with one or more of the opportunistic infections. The result of the opportunistic infections include: STD/*Gonorrhoea*, (22.1%), Trichomoniasis, (10%), Tuberculosis (TB), (6.7%),Candidiasis, (8.6%), Hepatitis B,(3.4%), Ascariasis,(15.5%),Giardiasis,(13%) and *Plasmodium* (18.8%) (Figure 2) In this respect, Federal Medical Centre (FMC) had the highest prevalence of (32.3%), followed by General Hospital Zuru (GHZ) with 20.3%, followed by General Hospital Yauri and Argungu (16.8 and16.6%) respectively and lastly, Sir Yahaya Memorial Hospital (SYMH) with 13.9% (Figure 1). Also, the result of the study revealed the presence of malarial parasites. In this respect, highest prevalence of (29.5%) was observed in FMC, 21.7% in SYMH, followed by GHA (17.2%), GHY (16.1%) and lastly GHZ (15.4%)
(Figure 3).

DISCUSSION

The result of the study showed a seemingly high prevalence (31.6%) of HIV infection as compared to the world wide prevalence. It also showed that HIV patients in Kebbi State have a variety of opportunistic infection, which included *Gonorrhoea,* Trichomoniasis, Tuberculosis, Hepatitis, urinary tract and intestinal parasitic infections. The prevalence of HIV related opportunistic infection was even higher (61.7). These findings were in conformity with those of Awogu (1984) and Okudua *et al*. (2003). However, the (28.5%) prevalence of intestinal infections(Ascariasis and Giardiasis) revealed was relatively low compared to the higher prevalence of 89.5% in Lagos State as reported by Awogu (1984), but in line with 28.4% reported, by Okudua *et al*. (2003) in Abeokuta, Nigeria and lower than 44.8% reported by Awole *et al*. (2003) in Addis-Ababa, Ethiopia. The low rate of the intestinal infections could be as a result of public awareness and improved sanitation coupled with the improved patients' attendance to clinics, as also indicated by Okudua *et al*. (2003). Higher rate of malarial parasites and STD infections may be as a result of high population of mosquitoes in most areas and promiscuous acts by many people. This may be as a result of laxity by many people in respect of adopting sanitary and moral education and could be due to low socio-economic background of the general populace which may contribute to their failure as far as treatment and control of the diseases is concerned.

High prevalence of malarial parasites in HIV/patients could be as a result of co-infection as reported by many workers. In line with this finding, Peter *et al* (2006) reported that malaria and HIV are the two most common fatal infections in sub-Sahara Africa . There is increasing evidence that malaria parasite and HIV interact such that HIV infection reduces the effectiveness of anti-malarial drugs, thus, HIV is associated with increased risk of malarial infection.

The higher prevalence of malarial parasite observed at FMC and SYMH may ssssbe due to their locations in the capital city and therefore are considered as dumping ground for all complicated cases from all parts of the state. However, GHZ, with the lowest result (15.4%) could be attributed to the higher topography characteristically prominent around Zuru and lacking permanent water bodies that facilitate mosquito breeding, thus, low chance of malaria transmission, Finally, the study has revealed the presence of high HIV/AIDS prevalence as compared with other areas, however, with low opportunistic infections in relation to other tropical areas.

CONCLUSION AND RECOMMENDATIONS

In conclusion, opportunistic infectious in seropositive HIV patients in Kebbi State , Nigeria is in line with reports from other areas especially in sub-Sahara Africa . Studies from various parts of the world showed a more or less contrasting prevalence rates with marked geographical varieties. There is therefore, the need for similar control measures to be enforced in Kebbi State . From the result of the current study it might be suggested that:

i) Kebbi State Government should enforce control strategy against the spread of HIV/AIDS.

ii) HIV infected patients should be provided with all the necessary treatments and control measures to boost their deteriorating immune responses.

iii) Enforce improved hygienic habit/environmental sanitation to reduce the level of opportunistic parasitic disease transmission.

iv) Enforce mass health education campaign against HIV/AIDS as well as opportunistic infections.

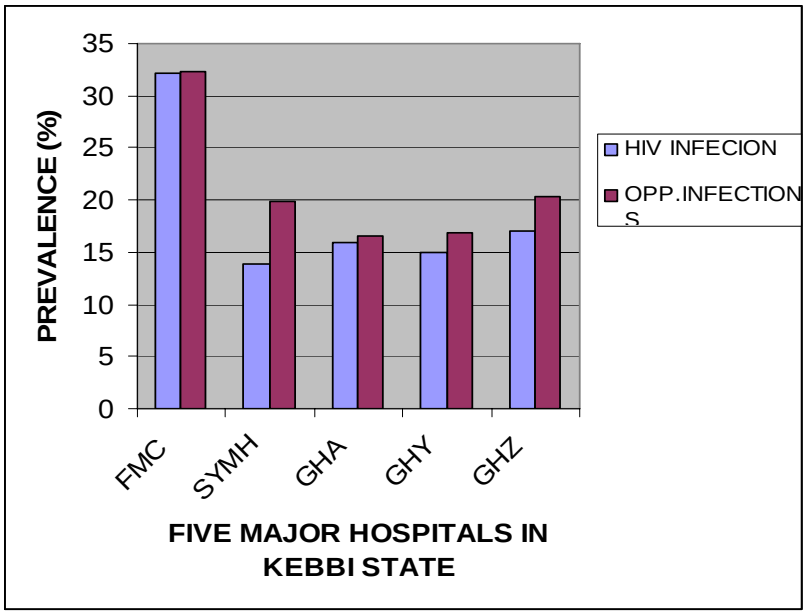

Figure 1: Prevalence of HIV/AIDS and HIV/Related Opportunistic Infections Among Patients Attending Major Hospitals in Kebbi State , Nigeria

Key FMC = Federal Medical Centre, SYMH = Sir Yahaya Memorial Hospital, Birnin Kebbi, GHA = General Hospital, Argungu, GHY = General Hospital, Yauri, GHZ = General Hospital, Zuru.

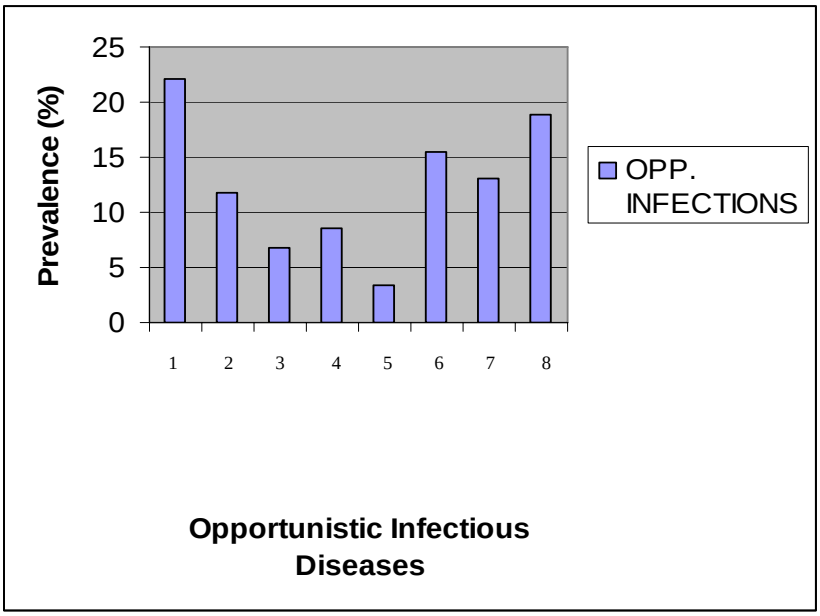

Figure 2: Prevalence of Opportunistic Infections in Seropositive HIV Patients Attending Major Hospitals in Kebbi State , Nigeria .

*Note:
1. STD (Sexually Transmitted Diseases, eg *Gonorrhoea* , 2. Trichomoniasis, 3. *Mycobacterium tuberculosum* (T.B), 4. Candidiasis, 5. Hepatitis B, 6. Ascariasis, 7. Giardiasis, 8. Malarial Parasite (*Plasmodium).*

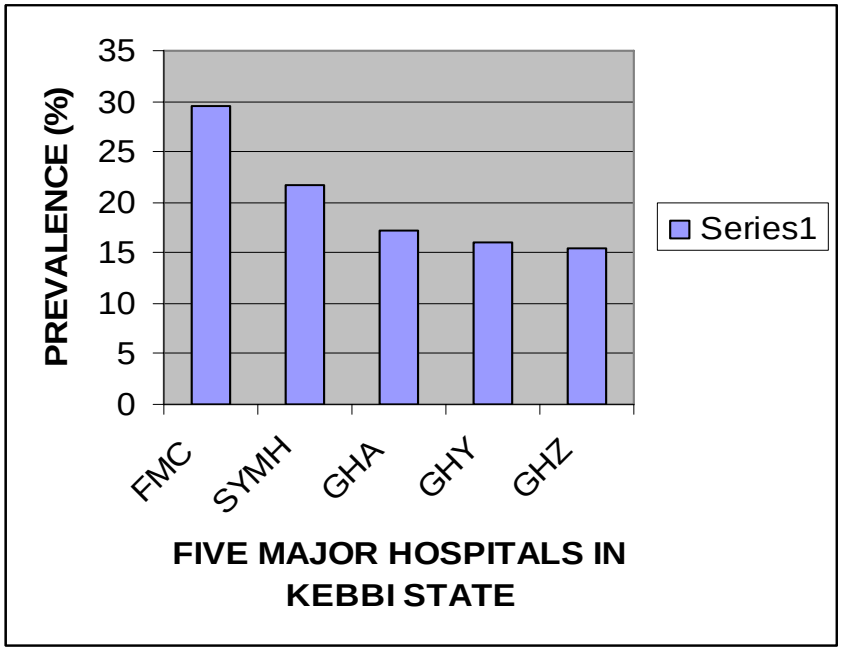

Figure 3: Prevalence of Malarial Parasites among HIV patients Attending Major Hospitals in Kebbi State , Nigeria

Key FMC = Federal Medical Centre, SYMH = Sir Yahaya Memorial Hospital, Birnin Kebbi, GHA = General Hospital, Argungu, GHY = General Hospital, Yauri, GHZ = General Hospital, Zuru.

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