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HEARING DISORDERS IN HIV POSITIVE ADULT PATIENTS NOT ON ANTI-RETROVIRAL DRUGS AT KENYATTA NATIONAL HOSPITAL.

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HEARING DISORDERS IN HIV POSITIVE ADULT PATIENTS NOT ON ANTI-RETROVIRAL DRUGS AT KENYATTA NATIONAL HOSPITAL.

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ABSTRACT

Objectives: To determine the prevalence and type of hearing disorders in HIV positive patients not on anti-retroviral drugs (ARVs) and correlate this with the world health Organization (WHO) stage of HIV disease and CD4 positive cell counts.

Design: Case control study.

Setting: Comprehensive Care Clinic (CCC) and Voluntary Counseling and testing centre at Kenyatta National Hospital.

Subjects: One hundred and ninety four HIV positive patients attending CCC and 124 HIV negative subjects recruited from voluntary counseling and testing (VCT) centre.

Results: Hearing loss (HL) was present in 33.5% of HIV positive compared to 8.1% in negative subjects. No gender bias in HL Sensorineural hearing loss (SNHL) was the most common and the frequencies most affected were four and eight kHz

Conclusion: Hearing loss is more prevalent in HIV positive individuals not on anti-retroviral drugs than negative normal subjects. Low CD4 cell count and advanced HIV diseases were associated with increased chance of having a hearing loss. Otological care should be part of the comprehensive care of HIV positive patients.

INTRODUCTION

Over 50% of HIV infected patients present first to the otorhinolaryngologist (1). Of all the otorhinolaryngological manifestations, otological symptoms comprise at least 62% (2). Somefun *et al'* looked at 98 patients at Lagos University teaching hospital and found that while only 17% of the patients were referred because of otorhinolaryngological diseases, 80% of them actually had otorhinolaryngological, head and neck conditions (3).

Infections with either pneumocystis or mycobacterium tuberculosis can result in a tumour-like lesion in the external auditory canal (4) and can enlarge to occlude the entire canal (5). External ear infections in the HIV-infected patients have the same pathophysiology as in the immunocompetent patients (6) but seborrheic dermatitis of the external ear may present with recurrent superinfections of the involved skin (7). Serous otitis media and recurrent acute otitis media frequently affect paediatric patients with HIV disease because of eustachian tube dysfunction which results from nasopharyngeal lymphoid hyperplasia,

sinusitis, nasopharyngeal neoplasm or allergies (2). Primary infection by HIV of either the CNS or the peripheral auditory nerve results in increased latencies on auditory brain stem testing suggesting central demyelination consistent with a viral infection (8). When vertigo occurs in HIV infected patients, it is together with a multitude of other neurologic symptoms and it is frequently a symptom of subacute encephalitis or HIV dementia complex (6).

Numerous international studies have demonstrated a relationship between HIV/AIDS and auditory function. Kohan *et al* conducted a five year retrospective study to evaluate otologic disease in patients with AIDS at New York university medical center- Bellevue hospital. They found that 62% had hearing loss (2). Marra *et al.* did a case control study of nine HIV positive patients at the university of Washington HIV based clinic and found that 29% of the patients had hearing loss (9).

Hearing disability compromises the overall economic productivity of an individual and may render one an outcast (10). In this study, the nature and degree of hearing disability in HIV-infected patients presenting at CCC were determined.

MATERIALS AND METHODS.

This was an hospital based case control study done between January and April 2007, at the comprehensive care clinic and voluntary counselling and testing centre. A minimum sample size of 115 was required in each arm. The study subjects were aged 18 to 50 years and were HIV positive at various stages of the HIV disease but not on anti-retroviral drugs. The controls were HIV negative subjects matched for age and sex recruited from VCT centre.

A clinical history was taken followed by thorough physical examination, otoscopy and tuning fork tests. Pure tone audiometry (PTA) was done using a calibrated clinical computer audiometer model Ac5 in a sound proof-insulated room starting with 1000 hertz (Hz) followed by 2 KHz, 4 KHz, 8 KHz, 500Hz. and 250Hz in that order. Subjects who had hearing level of more that 25 decibels were categorised as having a hearing loss. The WHO staging of the HIV disease and CD4+ cell count were carried out in the study subjects. CD4+ count was determined by the automated flow cytometry analyser, FASCOUNT (Becton Dickinson international, USA). Patients who suffered diabetes, meningitis, head injury or cerebrovascular accident, wax impaction and those who had exposure to ototoxic medications as well as those who had excessive exposure to noise were excluded from the study or as control subjects, Data analysis was done using SPSS version 10.0 software and descriptive statistics were done.

Approval was obtained from the Ethics and Research committee of Kenyatta National Hospital.

RESULTS

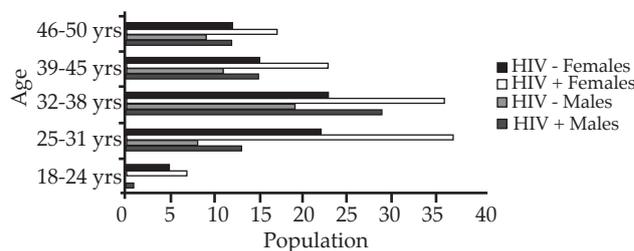
The study group comprised of 194 subjects who were HIV positive but not on ARV s and the control group were 124 subjects who were HIV negative. In the study group, males were 75 (38.7%) while females were 119 (61.3%) giving a ratio of 1:1.59. In the control group, males were 47 (37.9%) and females were 77 (62.1 %) giving a ratio of I: 1.16. Most of the patients were between 32 to 38 years old.

Table 1
Age statistics.

Age(Years)	Study group or HIV+	Control or HIV -
18-24	8	5
25-31	50	30
32-38	65	42
39-45	38	26
46-50	33	21
Mean	36.1	36.4
Median	35	36
Mode	37	37

Figure 1

Gender distribution in the study and control groups.



In the study group, 33.5% of the patients had hearing loss compared to only 8.1% in the control group (table 2).

Table 2

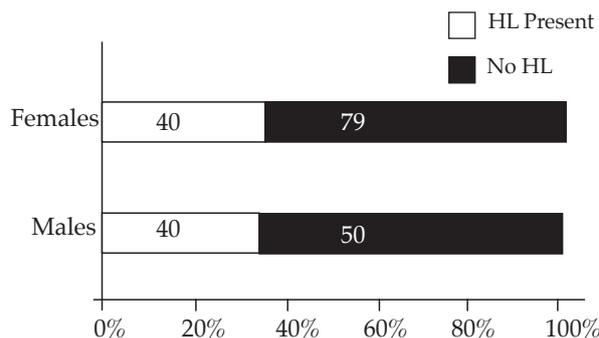
Hearing level in the study group and control group.

	Hearing level		Total
	Hearing loss	Normal hearing	
Study Group	65.0	129.0	194.0
Percentage(%)	33.5	66.5	100.0
Control	10.0	114.0	124.0
Percentage (%)	8.1	91.9	100.0

The subjects in the study population with a hearing loss comprised 40 females representing 33.6% of the females and 25 males representing 33.3% of the male population (figure 2). There was no gender bias in hearing level.

Figure 2

Gender and hearing level

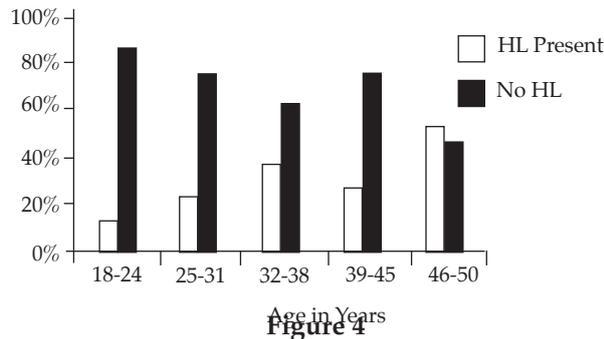


The study subjects were grouped into age sets and their hearing level determined. There was a trend of worsening hearing level with increase in age (figure 3) and this was statistically significant p=0.022.

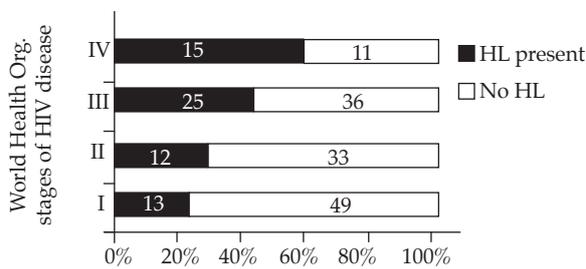
The subjects were classified according to the WHO clinical staging for retroviral disease and the hearing level determined. Results indicate that hearing loss was worse in advanced disease (figure 4) and this was statistically significant p=0.003.

Figure 3

Relationship between hearing level and age.



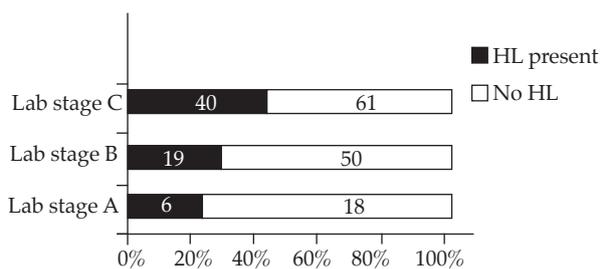
Relationship between WHO stage and hearing level.



The HIV positive patients were grouped into the CDC laboratory categories according to the CD4 positive lymphocyte counts and the hearing levels correlated. A higher percentage of patients in laboratory group C had hearing loss at 38% followed by group B at 28% and group A at 22% (figure 5). The absolute CD4 positive cell count was found to be related to the development of a hearing loss.

Figure 5

Relationship between CDC stage and hearing level.



When the nature of hearing loss was assessed, it was found that 74% had SNHL, 22% conductive hearing loss (CHL) and 4% had mixed hearing loss. Mild hearing loss (70%) was the most common followed by moderate hearing loss (24.5%), moderate severe (4.5%) and severe (1%). The frequency most affected was 8 KHz followed by 4 KHz.

DISCUSSION.

Hearing loss is a cardinal feature and disability in HIV / AIDS patients (2, 9,11,12). In this study, 33.5% of HI V positive patients not on ARVs had hearing level above 25 dB compared to only 8.1 % in HIV negative normal subjects. Soucek and Michaels got 39% in a sample size of 65 subjects (11) and Wang *et al* got 45.5% in a sample size of 350 (12). There is a wide variation found in different studies and this could be due to the sample size and the cut of decibel for hearing loss but they consistently showed hearing loss in the HIV positive patients.

This study found no difference in the HL according to gender. This suggests that the sex of the subject does not play a major role in the causation of hearing loss.

The HL gets worse with advancement of age and this was found to be statistically significant $P < 0.05$ (0.022). Marra *et al* also got a similar finding (9). In this study, patients over 50 years of age were excluded to avoid the effects of presbycusis. The older subjects in this study comprised the majority with HL compared to the younger population; however, it is not clear whether this due was to HIV infection (13) or other factors related to aging.

The number of subjects with a HL increases with advancement in the WHO stage of the disease. This was statistically significant and it could have been due to the effect of the HIV virus on the cochlear (14), middle ear infections (15) or CNS complications (11). Patients with advanced HIV disease are more predisposed to infections including those that interfere with hearing. Michaels *et al* found that 60% of patients who succumbed to HIV had features of otitis media in their temporal bones (15). Subjects with CD4+ cell counts below $200 / \mu 1$ had the highest proportion of those with HL at 38%, followed by those with CD4 cell counts between 200 and $500 / \mu 1$ at 28% and those whose CD4 cell counts were above $500 / \mu 1$ at 22%. Kohan and Giacchi's findings were similar in that more immunocompromised patients had more advanced otologic disease (16).

SNHL was the most common type of HL at 74% followed by CHL (21.5%) and mixed HL (4.5%). Mild HL was the most common at 70% followed by moderate HL (24.5%), moderate severe HL (4.5%) and severe HL was 1%. A similar pattern was seen in a study by Soucek (11).

The higher frequencies (4 KHz and 8 KHz) were the most affected while the middle frequencies are largely spared. Similar findings were gotten by Soucek where 6 KHz and 8 KHz were the most affected. This is thought to be due to changes in the cochlear mechanics (11).

The possible causes of HL in HIV disease could be divided into three, those due ototoxic drugs administered to these patients, direct effects of the virus to the CNS and opportunistic infections and tumours in the CNS, and lastly the effects of the virus on the cochlear (15).

In conclusion hearing loss is more prevalent in HIV positive individuals. This indicates that the HIV positive patient may not be able to follow the instructions and counseling usually given as part of the comprehensive care and this may negatively impact on the overall care and quality of life.

HIV positive patients frequently do not complain of deafness until significant hearing loss has occurred. They usually have many symptoms and initially may perceive hearing loss as a relatively minor problem in comparison or may actually think it is part of the disease problem (10). Therefore, clinicians should deliberately seek to find out the hearing level of these patients for early and timely remedial measures. Patients with a low CD4+ cell count and advanced WHO stage of HIV disease are likely to develop a hearing loss before commencement of ARVs.

SNHL is the most common type of hearing disorder in HIV positive individuals and the intensity of the hearing loss is mostly mild. The higher frequencies are the most affected followed by the lower frequencies while the middle ones are largely spared (11).

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