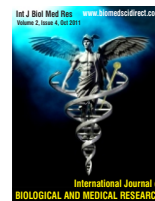


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## International Journal of Biological & Medical Research

Journal homepage: [www.biomedscidirect.com](http://www.biomedscidirect.com)



### Original Article

# Cross sectional study of audiologic disorders by auditory brainstem evoked response analyzer among people living with HIV in rural areas of wardha district

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#### ARTICLE INFO

##### Keywords:

BERA  
HIV  
CD4+ count

#### ABSTRACT

**Objectives:** The objectives of this study was to explore this relationship in a group of adults infected with HIV/AIDS attending 909-bedded tertiary care teaching hospital. **Methods:** This is a cross-sectional study of HIV-positive patients, with data collected using an otologic questionnaire, otologic examination and audiologic evaluation. All 158 patients who had proven HIV infection, and those who had met the WHO stage criteria for the diagnosis of AIDS volunteered for this study. One of the tools that were used to assess audio logic disorders is the auditory brainstem evoked response analyzer (BERA). **Results:** 60.7% were males and the average age was 35.6 ± 8.57 years. 76 (48.1%) participants were having hearing loss. 63.1% had hearing loss with CD 4+ cell count less than 200 Cells/mm<sup>3</sup>. **Conclusion:** This study will benefit all those health care providers working in primary health care, agencies working on home-based programs and the caregivers. It will promote, restore and maximize a person's level of comfort and function, which include care towards a dignified death.

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### 1. Introduction

At one time, HIV disease was a progressive, deteriorating and terminal illness with no effective treatment and caused an often-rapid decline in health, leading to death. The management of HIV-infected patients has undergone dramatic change during the past several years with the advent of antiretroviral therapy [1].

Over the decades, the global campaign against HIV/AIDS has focused not only on decreasing the spread of the disease, but also on promoting and improving health and quality of life of the people world wide living with HIV/AIDS [2].

The disability experience of persons with HIV illness has shifted from issues related to physical well-being to those concerning performance of daily life activities and wider community participation [3].

Living longer with HIV often means dealing with impairments, activity limitations, and participation restrictions that range from moderate or inconvenient, to severe and debilitating disease which is one of the more important determinants of health-related quality of life in person with HIV/AIDS [4].

National Institutes of Health (NIH) estimates indicate that as many as 75 percent of adults with AIDS experience auditory dysfunction as a result of opportunistic infections or treatment with drug combinations that are potentially ototoxic. Yet, while hearing loss and other speech and language disorders that occur as a direct or indirect consequence of HIV-infection are so commonplace, there appears to be little awareness among medical professionals about the serious effects of these disorders on people living with HIV/AIDS. Physicians know very little about AIDS and its relationship to communication disorders [5].

The patients with HIV/AIDS are at a higher risk for developing communication disorders resulting in a greater need for early interventionists to focus on the prevention of communication disorders and the tools needed to achieve this [6].

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Many early interventionists in clinical practice still do not appear to be wholeheartedly committed to participating in the prevention of communication disorders and the promotion of optimal development, which have been identified as primary roles for all professionals [6].

Despite scientific and technological advances in this field, many aspects of contemporary life remain profoundly difficult for individuals with communication disorders. These difficulties are multiplied when persons with a communication disorder also have a co-occurring condition, such as HIV/AIDS.

The present study attempted to explore the hearing impairment associated with HIV/AIDS since on this issue there is a limited knowledge base and is compounded by the current situation that developing countries, do not specifically collect information pertaining to hearing impairment and communication disorders or difficulties experienced by this population.

This study will benefit all those health care providers working in primary health care, agencies working on home-based programs and the caregivers. It will promote, restore and maximize a person's level of comfort and function, which include care towards a dignified death.

**2. Materials and Method**

This cross-sectional study was conducted among the people with HIV/AIDS who came to this 850-bedded tertiary care teaching hospital of Datta Meghe Institute Of Medical Sciences University (NAAC Accredited Grade A), Wardha. Patients visit this hospital from various states and mostly from Central India.

This study was conducted after the approval from the Institutional Ethical Committee. Each patient was examined once. Individuals at all stages of HIV infection were included. All 158 patients had proven HIV infection, and all had met the WHO stage criteria for the diagnosis of AIDS. The participants were evaluated according to pre-designed protocol. People with HIV/AIDS were explained the purpose of the study and were requested to participate. All subjects signed Institutional Review Board-approved consent prior to participation in this study. Following who left the interview and examination halfway for various reasons were also excluded from the study. Rapport was developed with the people with HIV/AIDS.

The data was collected using structured interview information related to the presence of factors for hearing loss, otitis complaints, disorders related to the external and middle ears and examination by trained and experienced evaluators. The examination was carried out using an otoscope to verify the conditions for the electrophysiological examination. Each interview and examination lasted for at least 45 to 60 minutes.

At the end of the interview and examination the questionnaire was checked for completeness and the interviewer thanked the responder. Almost all patients received public assistance for medical care.

After audiological evaluation, brainstem auditory evoked potentials were carried out using multi-channelled Polyrite system. One of the tools that were used to assess audio logic disorders is the auditory brainstem evoked response analyzer (BERA).

**3. Results**

Out of 194 participants who came, 158 were included in the study. 23 participants who were not willing to participate, and 13 others who withdrew in between were excluded from the analysis. Thus the response rate was 81.44%.

Among the 158 participants, 84 (53.1%) were unemployed, and 74 (46.9%) had quit their jobs, for infection-related reasons. Average time since notification of HIV status was approximately 2.3 years. Among the 158 participants studied, 60.7% were males and the average age was 35.6 ± 8.57 years. 76 (48.1%) participants were having hearing loss.

18 (18.75%) males and 8 (13.33%) females had Sensory neural loss. Conductive hearing loss was seen in 13 (13.5 %) males and 6 (10.0 %) females. 21 (21.8%) males and 10 (16.6 %) females had Mixed hearing loss.

The maximum percent of hearing loss was seen in subjects over 50 years of age group. with 22.8%, 20.08% and, 28.5% hearing loss in sensorineural, Conductive and Mixed hearing loss.

Out of 76 subjects having hearing loss, 48 (63.1%) had hearing loss with CD 4+ cell count less than 200 Cells/mm<sup>3</sup>. While 14 (53.8%) had Sensory Neural loss, 12 (63.1%) had Conductive hearing loss and 22 (70.9%) had Mixed hearing loss with CD 4+ cell count less than 200 Cells/mm<sup>3</sup>.

**Table 1: Age, sex distribution of subjects in the study.**

Age	Male	Female	Total
< 25 yrs	36 (37.5)	19 (31.6)	55 (34.8)
26-50 yrs>	41 (42.7)	27 (45.1)	68 (43.0)
50 yrs	21 (21.8)	14 (23.3)	35 (22.2)
Total	96	60	158

**Table 2: Relation of age and sex distribution of subjects with types of hearing loss in the study**

Age	Male			Female			Total
	Sensory Neural loss	Conductive hearing loss	Mixed	Sensory Neural loss	Conductive hearing loss	Mixed	
< 25 yrs	6	3	7	2	1	2	21
26-50 yrs>	7	6	8	3	2	4	30
50 yrs	5	4	6	3	3	4	25
Total	18	13	21	8	6	10	76

**Table 3: Relation of CD 4+ Cells/mm<sup>3</sup> of subjects with types of hearing loss in the study**

CD 4+ Cells/mm <sup>3</sup>	Sensory Neural loss	Conductive hearing loss	Mixed	Total
≤200	14 (53.8)	12 (63.1)	22 (70.9)	48 (63.1)
201-350	7 (26.9)	5 (26.3)	5 (19.3)	17 (22.3)
≥351	5 (19.23)	2 (10.6)	4 (12.8)	11 (14.4)
Total	26	19	31	76

#### 4. Discussion

While hearing impairment is the major determinant of need for formal or informal personal & professional care services or other long-term care, relatively little work has been done on the extent of hearing impairment associated with HIV/AIDS in these tasks. In the Acquired Immunodeficiency Syndrome (AIDS) caused by the human immunodeficiency virus (HIV), a progressive compromise of the immune response of the individual occurs making him/her susceptible to a number of opportunistic infections.

With the development of the disease, a progressive impairment of the central nervous system (CNS) may occur including the central auditory system, either due to the direct action of the virus on the CNS affecting the maturational process, due to opportunistic infections [7] as well as due to the use of anti-retroviral drugs or ototoxic medicine [8], causing a sensorineural hearing loss.

Due to these impairments we may find abnormalities in the tests that evaluate the central auditory processing reflecting difficulties in the attention, discrimination, recognition and comprehension of auditory information[9].

Understanding these patterns, however, is important in planning services for persons with HIV disease. This study provides a systematic view of the extent of hearing impairment associated with HIV/AIDS in PLHIV. In our study we have observed that a hospital-based sample of people living with HIV in rural tertiary care center have been experiencing strikingly high levels of the extent of hearing impairment associated with HIV/AIDS by BERA.

This study indicates that a substantial fraction of HIV-infected patients seen have hearing loss. Almost half of patients surveyed reported hearing loss, and almost 19.6 % of patients reported mixed hearing loss complaints, 16.4% of patients reported Sensory Neural loss, and 12% reported Conductive hearing loss. Previous report by Castro M et al.[10] have demonstrated hearing impairment in HIV-infected persons. But this study is the first to demonstrate the relation with sex and age. Hearing Impairment are important because of their potential influence on quality of life, nutrition, and medication compliance. While a study conducted by Khoza et al. [11] reported 23% of HIV infected patients with Sensory Neural loss.

Very few published data from was available. Such findings emphasize the importance of a detailed investigation of the auditory. Function of individuals with AIDS aiming at the identification of possible alterations that could be associated with this pathology, as well as the characterization of the type of damage and its possible causes (compromising the peripheral auditory system - external, middle or inner ears, and/or central auditory system) helping thus, the establishment of the therapeutic follow up with these patients.

Many studies commented on the difficulty in having community-physicians and HIV specialists both recognize auditory disorders in patients and refer patients with these

symptoms to the appropriate specialists for evaluation and treatment. Reseachers speculated that this difficulty may have contributed to the soft statistics on the incidence of these disorders in HIV disease which could range anywhere from 20 to 49 percent, "depending who you read" [5].

Bankaitis said that she was concerned that HIV-associated auditory defects may have been seriously under-reported. There are anecdotal reports suggesting that hearing loss and dizziness which are often the initial symptoms of underlying auditory system disease may not have been reported by patients prior to highly active antiretroviral therapy (HAART) because many patients focused on the life-threatening complications of HIV disease rather than on quality of life issues. People who have benefitted from HAART may now become more conscious of symptoms of these disorders[5].

Also, while respective advances are being made in communication disorders as well as HIV/AIDS areas, these advances may not be applied to those who have both the communication disorder and HIV/AIDS. The HIV/AIDS infection itself and its treatment may also be contributory to the development of the communication disorder.

#### 5. Limitation of the study

The hearing loss may have been due to account noise exposure, immune status and age, which may have over estimated the cases.

Concern over the response by some physicians that the potential risk of hearing loss due to oto-toxicity is so minimal that there is no need to screen for symptoms of hearing loss[1]. There have not been appropriately designed trials to determine the risk of hearing loss and other communication disorders in people with HIV disease;[2] the questionable pre-HAART data may not be applicable to those people with HIV disease whose survival has been significantly extended and in whom new manifestations of the disease and side effects of more complex therapies are increasing; and [3] audiologists rarely serve as clinical trial consultants, thus the collection of data on patient responses to symptoms of hearing loss could be biased by not asking the questions according to audiologist established standards for symptom screening.

#### 6. Conclusion

Given the diversity of the feature and degree of hearing impairment among individuals with HIV/AIDS in different parts of the world, future joint efforts of research incorporating a greater number of field trials, case studies, or both will be helpful in further scrutinizing the practical usefulness of the hearing impairment in the field.

Moreover, there is also a need for accumulated studies or users' feedback that would help to determine comprehensiveness and appropriateness of hearing impairment in assessing and identifying the magnitude of diverse hearing impairment encountered by different kinds of disease or health problem.

As HIV disease has become a more lifelong, unpredictable but medically manageable condition, there is a need for more

collaboration with other disability groups in order to identify commonalities in their experiences and to share collective concerns.

This study will raise awareness among community physicians and HIV specialists about the special challenges to HIV patients with communication disorders. As a result to advance the necessary research in HIV-associated communication disorders that would provide a matrix to bring more audiologists, otologists, otolaryngologists, and speech-language pathologists into the healthcare team providing the comprehensive HIV/AIDS management. These findings highlight the need for improved specialised training in the area of HIV/AIDS; more continuing professional development workshops on HIV/AIDS for qualified practitioners; better access to resources for health care providers & further research in this area.

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