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Hearing loss and acquired immune deficiency syndrome: systematic review

Perda auditiva e síndrome da imunodeficiência adquirida: revisão sistemática

ABSTRACT

Purpose: To investigate the occurrence of hearing loss in individuals with HIV/AIDS and their characterization regarding type and degree. **Research strategy:** It was conducted a systematic review of the literature found on the electronic databases PubMed, EMBASE, ADOLEC, IBECs, Web of Science, Scopus, Lilacs and SciELO. **Selection criteria:** The search strategy was directed by a specific question: "Is hearing loss part of the framework of HIV/AIDS manifestations?", and the selection criteria of the studies involved coherence with the proposed theme, evidence levels 1, 2 or 3, and language (Portuguese, English and Spanish). **Data analysis:** We found 698 studies. After an analysis of the title and abstract, 91 were selected for full reading. Out of these, 38 met the proposed criteria and were included on the review. **Results:** The studies reported presence of conductive, sensorineural, and mixed hearing loss, of variable degrees and audiometric configurations, in addition to tinnitus and vestibular disorders. The etiology can be attributed to opportunistic infections, ototoxic drugs or to the action of virus itself. The auditory evoked potentials have been used as markers of neurological alterations, even in patients with normal hearing. **Conclusion:** HIV/AIDS patients may present hearing loss. Thus, programs for prevention and treatment of AIDS must involve actions aimed at auditory health.

RESUMO

Objetivo: Investigar a ocorrência de perda auditiva em indivíduos com HIV/AIDS e sua caracterização quanto ao tipo e grau. **Estratégia de pesquisa:** Foi realizada uma revisão sistemática da literatura nas bases de dados eletrônicas PubMed, EMBASE, ADOLEC, IBECs, Web of Science, Scopus, Lilacs e SciELO. **Crítérios de seleção:** A estratégia de busca foi direcionada por uma questão específica "A perda auditiva faz parte do quadro de manifestações do HIV/AIDS?", e os critérios de seleção dos estudos envolveram a coerência com o tema proposto, os níveis de evidência 1, 2 ou 3 e o idioma (Português, Inglês e Espanhol). **Análise dos dados:** Foram localizados 698 estudos. Após análise do título e resumo, selecionaram-se 91 para leitura completa. Destes, apenas 38 atenderam aos critérios propostos e foram incluídos na revisão. **Resultados:** Os estudos relataram a presença de perda auditiva condutiva, sensorineural e mista, de grau e configuração audiométrica variáveis, além de zumbido e distúrbios vestibulares. A etiologia pode ser atribuída às infecções oportunistas, medicamentos ototóxicos ou à ação do próprio vírus. Os potenciais evocados auditivos têm sido utilizados como marcadores de alteração neurológica, mesmo em pacientes com audição normal. **Conclusão:** Pacientes portadores de HIV/AIDS podem apresentar perda auditiva. Sendo assim, programas de prevenção e tratamento da AIDS devem envolver ações voltadas à saúde auditiva.

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Conflict of interests: None

INTRODUCTION

Exactly three decades ago, the world saw the Acquired Immunodeficiency Syndrome (SIDA in Portuguese, widely known as AIDS) for the first time, a quiet illness, that in little time would reach pandemic standards⁽¹⁾. Since then, the scientific community worldwide has studied this clinical syndrome, its manifestations in man and the possibilities of cure. Caused by the Human Immunodeficiency Virus (HIV), a specific retrovirus, AIDS affects the immune system, causing the occurrence of several opportunistic infections⁽²⁾.

It is known that the central nervous system and the immune system are the main targets of the infection by the AIDS virus. There is a direct relationship between the phase of HIV infection, the patient's immunological involvement, and the neurological complications.

The first reports described in literature alluded that the infection caused by the AIDS virus can directly affect the auditory function due to the neurotropic nature of the virus, which generally manifests itself neurologically. The difficulty in establishing a direct relationship between cause and effect regarding AIDS and its auditory manifestations has proven to be a problem. Although some authors associate the indirect causes of these manifestations to the opportunistic infections – even though they might be a direct consequence of an immune system affected by the HIV infection, there's currently no consensus in literature concerning this issue.

About 20 to 40% of the patients present some type of auditory and/or vestibular manifestation as a result of the infection by the AIDS virus⁽³⁾. Such manifestations may vary from alterations on the tympanic membrane, otitis (externa, chronic media, secretory media), otorrhea, tinnitus, vertigo, conductive and sensorineural hearing loss to alterations on the central auditory pathways⁽⁴⁻⁹⁾.

OBJECTIVE

To investigate the occurrence of hearing loss in individuals with HIV/AIDS, as well as its characterization regarding type and degree, by means of a systematic review of the literature.

RESEARCH STRATEGY

Search strategy

The search strategy was directed by a specific question "Is hearing loss part of the framework of manifestations of the HIV/AIDS?". With the aim to identify the articles pertinent to the proposed question, a broad search was conducted in the period between February 2 and 25, 2011, in the electronic databases PubMed, EMBASES, ADOLEC, IBECS, web-of-Science, Scopus, Lilacs, SciELO.

In order to accomplish the search, the following combination of keywords was used: (Acquired Immunodeficiency Syndrome) OR (HIV Infection) OR (HIV Seropositivity) OR (HIV) OR (human immunodeficiency virus) OR (AIDS Related Opportunistic Infections) AND (hearing impairment) OR

(hearing loss) OR (deafness) OR (audiolog*) OR (auditory). Such combination was searched in three distinct languages: English, Portuguese and Spanish.

Selection criteria

The studies were selected in two stages. In the first stage, the titles and abstracts of all studies found were analyzed, excluding theses, dissertations and publications in annals of events. The inclusion criteria adopted were: (1) to present evidence levels 1, 2 or 3, according to the classification proposed by Cox⁽¹⁰⁾; (2) to involve patients with HIV or AIDS; (3) to analyze the occurrence of hearing loss, of any type and degree; and (4) to have been published in one of the languages previously defined. In the second stage, potentially relevant articles were fully read, seeking to analyze whether or not they effectively met the purposed inclusion criteria.

Data analysis

For each article selected in the second stage, a predefined protocol covering topics such as the occurrence of hearing loss in this specific population, the type and degree of hearing loss, the audiometric configuration and the probable etiologies was used.

RESULTS

The process of obtaining the articles selected for this systematic review of the literature had two stages, following pre-defined criteria (Figure 1). With the conclusion of this process, 38 articles were included in the review, and their relevance could be proven after a strict reading process.

The result of the content analysis of the 38 articles was obtained after individual verification of each one of them (Figure 2). The articles included in this review used, in their methodology, pure-tone threshold audiometry as instrument for audiological evaluation. However, the use of auditory evoked potentials as markers of neurological alteration, even in patients with normal hearing, was reported in 15 studies (39.47%).

The studies presented several characteristics, having as basis populations, objectives and heterogeneous methodological procedures. These facts, combined with a qualitative analysis of the data, allowed conclusions concerning hearing loss as manifestation of HIV/AIDS.

The results obtained by this systematic review do not represent the totality of research in the area. In the methodological proposal employed, a more restricted study design was chosen, both regarding consulted databases and the language presented in the original article. However, the design of this study, by encompassing the more relevant databases, as well as English, Spanish, and Portuguese, ended up reflecting a significant number of articles that had effectively approached hearing loss in individuals with HIV/AIDS.

Most of the studies were developed with the adult population and, even though it was observed that the patient with HIV/AIDS can potentially present hearing loss independently

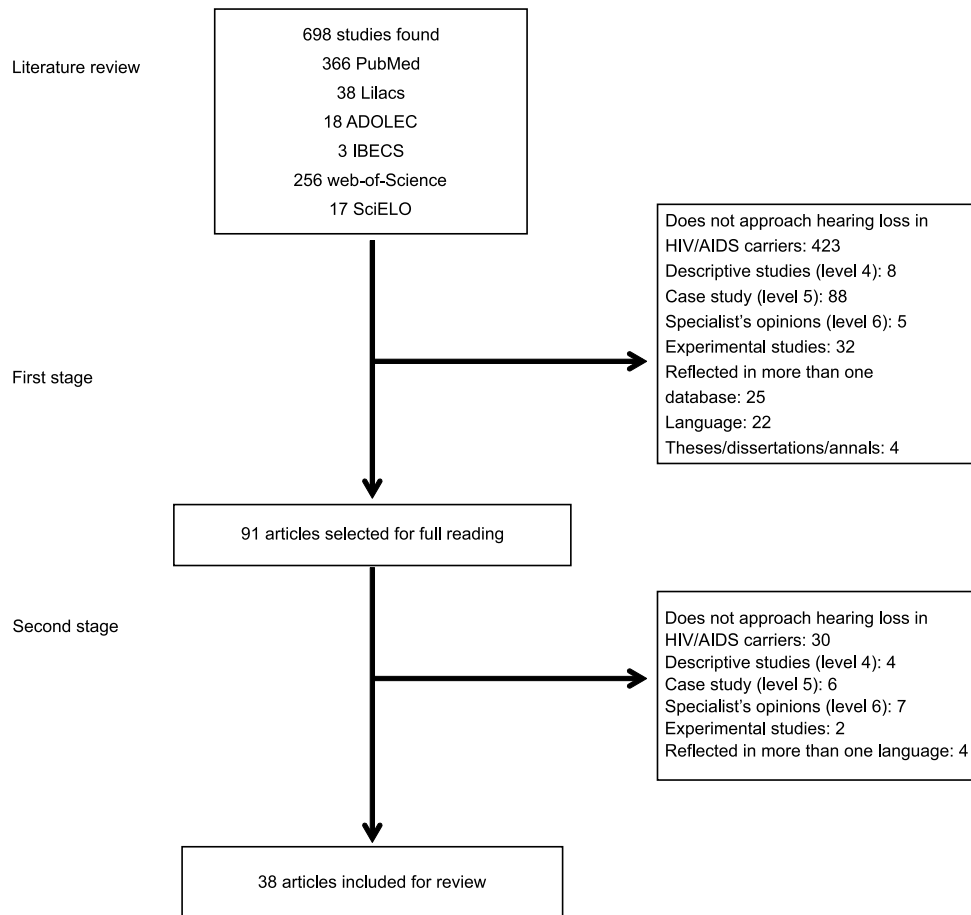


Figure 1. Summary of the process of obtaining the selected articles for the systematic review

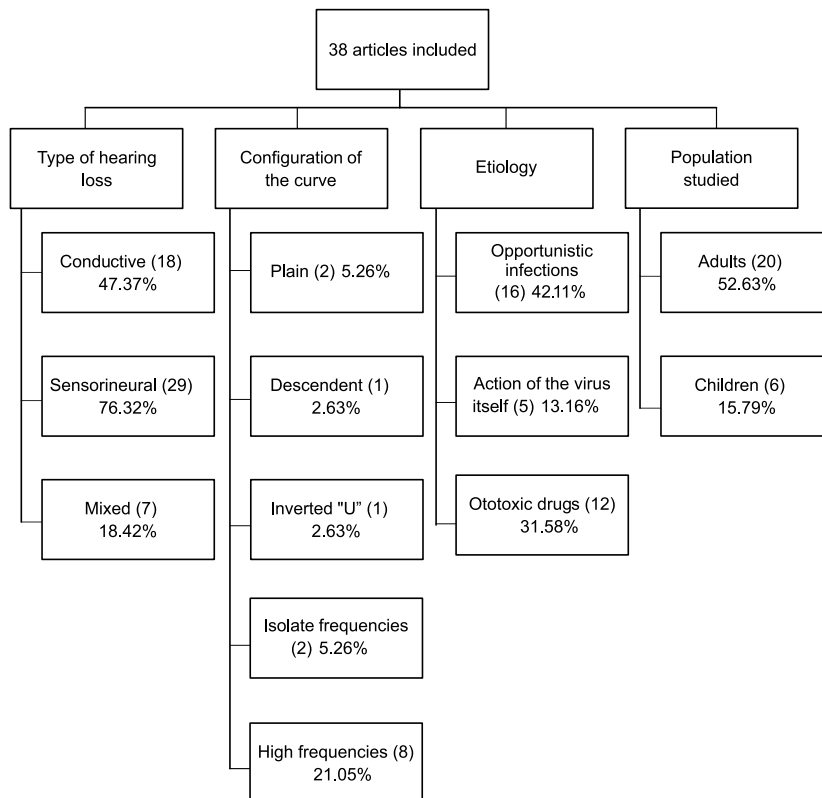


Figure 2. Analysis of the articles included for the systematic review

of the age group, it was not possible to characterize the audiological profile of these patients. It is known that, in the presence of some illnesses, it is characteristic to observe the occurrence of a determined type and degree of hearing loss, and a specific audiometrical configuration. In the presence of the virus or the syndrome studied here, the hearing loss presented variable characteristics, possibly being of conductive^(1,3,5,8,11-24), sensorineural^(1,3-6,8,9,11,13-15,17-33) or mixed^(15,18-20,22,24). Regarding the audiometric configuration, it was possible to observe the occurrence of hearing loss in high frequencies^(9,22,26-28,31-33), in isolate frequency^(9,19), in plane curve^(23,33), in “inverted U”⁽²³⁾, and descendant⁽²³⁾. Regarding the degree of hearing loss, studies have demonstrated variability between mild and profound, both for child and adult populations, which is related to the type of hearing loss.

The variability of the audiological profile of the HIV/AIDS carrier can result from the broad possibility of causes of the hearing loss in these individuals. Among them: the clinical condition of the patients, making them susceptible to numerous opportunistic infections^(3-6,11-15,17,20,21,23,25,31,33); the ototoxic drugs frequently used in the framework of HIV/AIDS^(4,9,11,13,15,17,20,22,23,25,28,34); and the action of the virus itself^(5,13,17,27,33).

Although hearing loss related to HIV/AIDS was the main focus of this work from the very beginning, two other manifestations associated to the illness could be observed throughout this review: tinnitus, described in 18.42% of the articles^(3,15,21,22,25,28), and vestibular alterations, cited in 34.2% of the studies^(7,11,15,21,22,24-27,34,35). Such manifestations were considered the main non-auditory complaints and symptoms of HIV/AIDS patients.

A last aspect to be highlighted is related to the neurological manifestations associated with HIV and the auditory evoked potentials. In the present literature review, the brainstem auditory evoked potential (BAEP) was considered a procedure of significant sensitivity both for the identification of alterations in the central auditory pathway and for monitoring the evolution of the illness⁽⁸⁾, regardless of the occurrence of hearing loss in HIV/AIDS patients^(3,5,7,8,18,22,24-27,33,36-38).

CONCLUSION

It is not possible to establish a typical audiological profile for HIV/AIDS patients. However, hearing loss is a frequent alteration in these patients. Thus, it is of significant relevance that actions directed to hearing health are added to programs for prevention and treatment of HIV/AIDS.

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