Health Review

HIV Vulnerability Associated with Dementia in Non-Elderly Individuals: An Integrative Review

Cesario Rui Callou Filho [1], Rithielly Tavares dos Santos [1], José Evaldo Gonçalves Lopes Júnior [1,*], Juliana Pinto Montenegro [1], Denise Gonçalves Moura Pinheiro [1], Cristiane Gomes de Sousa Campos [1], Helayne Martins Menezes [2], Edislane Silva Souza [3], Solange Sousa Pinheiro [4]

[1] Centro Universitário Ateneu - UniAteneu, Fortaleza, Ceará, Brazil.
[2] Programa de Residência Multiprofissional da Escola de Saúde Pública do Ceara, Fortaleza, Ceará, Brazil.
[3] Unidade de Pronto Atendimento - UPA, Fortaleza, Ceará, Brazil.
[4] Programa de Pós- graduação em Saúde Coletiva da Universidade de Fortaleza- UNIFOR, Fortaleza, Ceará, Brazil.

* Correspondence: cesariofilho@professor.edu.br.

Abstract: Acquired Immunodeficiency Syndrome (AIDS) was discovered in the 1980s as a sexually transmitted infectious disease and considered a major public health problem. HIV presents very accentuated neurotropism, leading to the appearance of neurological syndromes, mainly in more chronic phases of the infectious process. The most frequent alterations are vacuolar myelopathy and a picture of cerebral atrophy, progressive dementia, and peripheral neuropathies, all related to the action of HIV and the immune system itself in the central and peripheral nervous tissue. HIV-associated dementia contributes to the morbidity of the infection and is a risk factor for mortality. Prior to the use of antiretroviral therapy, over 15% of individuals with AIDS had dementia and over 15% of minor motor cognitive impairment. Advanced infection is a risk factor for the development of dementia both in the pre- and post-pharmacological treatment era. Considering the aspects, the present study aimed to carry out an integrative literature review on the pathophysiological aspects of the relationship between dementia and HIV carriers.

Keywords: HIV; Dementia; Integrative review.

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1. Introduction

Acquired Immunodeficiency Syndrome (AIDS) was discovered in the 1980s as a sexually transmitted infectious disease and considered a major public health problem. In recent times, few health problems have generated such interest from health professionals, scientific activity, stigma, and prejudice as AIDS [1]. HIV presents very accentuated neurotropism, leading to the appearance of neurological syndromes, mainly in more chronic phases of the infectious process. The most frequent alterations are vacuolar myelopathy and a picture of cerebral atrophy, progressive dementia, and peripheral neuropathies, all related to the action of HIV and the immune system itself in the central and peripheral nervous tissue. As the infection worsens, the viral load increases and the TCD4+ lymphocyte count decreases significantly; in the most advanced stage, it reaches values below 50 cells/mm3 [2-4]. From the first diagnosed cases, the severe and progressive immunological impairment of HIV-positive patients became evident, predisposing them to neoplasia and opportunistic infections, increasing morbidity and mortality and being marker elements of the syndrome [4].

The central nervous system (CNS) and the immune system are considered the organs that contain target cells in human immunodeficiency virus (HIV) infection. In the CNS, the virus has been frequently detected in the cerebrospinal fluid (CSF) and brain tissue since the beginning of the infection and throughout its evolution, regardless of presenting neurological symptoms [4]. Neurological manifestations affect 40% to 70% of patients with HIV during their infection, and in necropsy studies, the frequency can reach more than 90%. About 46% of patients hospitalized with AIDS may have a neurological disease, either as the main reason for hospital admission or as complications during hospitalization [4]. Dementia may be the initial manifestation of AIDS in 5% of cases, but it usually appears in the advanced stages of the disease. The annual incidence, before the Effect of Highly Active Antiretroviral Therapy (HAART), ranged from 7% to 14% after the diagnosis of AIDS, with the cumulative lifetime risk of developing dementia ranging from 5% to 20% [4-6].

HIV-associated dementia contributes to the morbidity of the infection and is a risk factor for mortality. Prior to the use of antiretroviral therapy, over 15% of individuals with AIDS had dementia and over 15% of minor motor cognitive impairment. Advanced infection is a risk factor for the development of dementia both in the pre- and post-pharmacological treatment era [6-8]. Considering the aspects, the present study aimed to carry out an integrative literature review on the pathophysiological aspects of the relationship between dementia and HIV carriers.

2. Materials and methods

The present study is an integrative literature review carried out by electronic survey through the Virtual Health Library (VHL), specifically in LILACS (*Latin American and Caribbean Literature in Health Sciences*) and SCIELO (*Scientific Electronic Library Online*). For the construction of this study, the following methodological steps were followed: formulation of the question and objectives of the review; establishment of criteria for selection of articles; categorization of studies; evaluation of the studies included in the integrative review and ending with data analysis and presentation of results9. The guiding question of the present study was: *What is the relationship between the presence of HIV/AIDS and the onset of dementia?*.

Data collection took place between August and December 2014, with the inclusion criteria being articles published in Portuguese, Spanish, and English, available in databases from 1992 to 2014 and that had the descriptors "AIDS and Dementia" and "HIV and dementia". Having as an exclusion criterion the articles that did not meet the theme addressed.

In a search performed only with HIV descriptors; AIDS, a total of 2,519 articles were found, 784 articles in Portuguese, 882 articles in Spanish, 849 articles in English, 3 articles in African language and 1 article in French, which referred to other particularities. And regarding the descriptor "dementia", a total of 362 articles were found, 229 articles in Portuguese, 168 articles in English and 279 articles in Spanish. Due to the number of articles, it was decided to use only the descriptors that form the research title.

Some of the articles were initially found in the form of abstracts and subsequently searched and analyzed in full. For analysis and subsequent synthesis of the articles that met the inclusion criteria, a table was built for this purpose, which included the following aspects: year of publication, journal where it was published, location of the study and factors related to dementia, cited in the article.

A total of 12 publications were identified: 5 in English, 3 in Spanish and 4 in Portuguese for the descriptors HIV and dementia, whereas when AIDS and dementia were described, 15 publications appeared in the same languages, 4 in English, 2 in Spanish and 4 in Portuguese. After reading the title and abstract, duplicate productions that did not meet the inclusion criteria were excluded. Fifteen articles remained for full text analysis, and of these, 11 articles were excluded, as they were not related to the subject of the study. The final sample consisted of 4 scientific articles.

The articles were numbered according to the order of location, and the data were organized based on the definition of the information to be extracted from the selected publications. The critical evaluation of the articles consisted of reading the study in its entirety and then creating a synoptic table. As an aid, the thematic content analysis technique was used by reading and re-reading the results of the studies, seeking to identify relevant aspects that were repeated or stood out.

3. Results and Discussion

It was verified in the literature that the degeneration of the Central Nervous System (CNS) is caused by the virus itself and not by opportunistic diseases. The virus will infect macrophages and microglia and not effectively neurons and may cause neurological manifestations such as, for example, dementia. Viral proteins damage nervous tissue cells directly and/or through the infection of inflammatory cells in the CNS [3, 13]. In a broad way, dementia is caused by infections in the CNS that tend to be rare among the elderly and more frequent among young people. For this reason, in the face of dementia in young people, we must always consider drug abuse and infection with HIV or other viruses resulting from AIDS [3, 7].

Since the first cases of HIV, the severe and progressive immunological involvement was very evident. Due to the hematogenous dissemination of the virus and because HIV is a neurotropic virus, the CNS is a site of affinity for the virus. During pathogenesis, the virus infects and replicates in macrophages, by a mechanism called "Trojan horse" where it uses macrophages to cross the blood-brain barrier and infect glial cells [1, 4].

Dementia associated with AIDS is a joint mechanism of the virus itself and the immune response of the affected person. Dementia will occur when the already infected CNS begins to release cytokines and chemokines that will modify the synaptic structure causing damage and neuronal death [1, 4]. Dementia is strongly associated with HIV, the virus penetrates the CNS in the early and late stages, being a treatable disease when the diagnosis is made in time and HAART treatment is started. Thus, the prevalence in the incidence of dementia in an infected patient decreases [3, 11].

HIV is divided into groups according to their epidemiological and biological characteristics, with group M being the most virulent. In Brazil, subtype B is the most prevalent and has a rapid viral mutation, causing greater dissemination of the infection. On the other hand, subtype C is less prevalent in Brazil, but more prevalent in the world. Because it is a classification of the virus that develops more slowly, asymptomatic cases are more easily disseminated [11]. Considering viral subtypes and dementia. It appears that subtype B will have better dementia control than subtype C, as it is an asymptomatic subtype and will have a longer time to infect CNS cells [4, 11].

Dementia is the effect of the virus itself in asymptomatic patients will present depression, psychomotor slowness and decrease in verbal memory, in patients with advanced disease will present deficits in several cognitive domains [4]. The abilities to perform day-to-day activities are a considered complement in the patient's cognitive assessment. Its reduction may represent an index of dementia, which is evaluated in conjunction with other tests to close the diagnosis [4].

Cognitive impairment is clinically significant when it affects functioning in daily activities. Infected individuals with mild cognitive impairment may have occupational problems, even in the early stages of the disease. HIV-positive individuals with cognitive alterations, mainly in executive functions and learning processes, generally present lower performance at work [1, 13]. Thus, it can be seen in the literature that there are studies that suggest that neurological involvement will depend on a cascade of factors such as the pathogenicity of the virus, the neuroinvasive capacity of the different subtypes of the pathogen, and the degree of immune activity of the affected individual.

5. Conclusion

It could be seen that during HIV pathogenesis, the virus can penetrate the CNS at any stage of the disease. Due to this infection and the occurrence of neuronal damage, dementia can develop as a sequel. This dementia can be minimized through early diagnosis and initiation of HAART, thus the psychomotor impacts of dementia in infected patients will be reduced and the prevalence of dementia in patients with AIDS decreases.

Since there are few studies related to the subject, it is necessary to carry out complementary tests to confirm the accurate and adequate diagnosis of dementia in the early stages of the infection.

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