Review Article

Factors associated with death from tuberculosis and HIV/aids in prisons: integrative review

Fatores associados ao óbito por tuberculose e HIV/aids em presídios: revisão integrativa

Factores asociados al fallecimiento por tuberculosis y VIH/sida en cárceles: revisión integradora

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Abstract

Objective: Analyze the epidemiological profile and the factors associated with death from tuberculosis and HIV/aids in the prison system.

Methods: Integrative review, conducted in July 2020, whose research question and keywords were outlined through the PEO strategy. The searches were undertaken in the MEDLINE, CINAHL, Scopus, ASP, SocINDEX, Embase and LILACS databases. Two independent reviewers selected the studies and extracted the data. To assess the methodological quality of the articles included in the review, specific tools proposed by the *Joanna Briggs Institute* were used.

Results: 1,329 studies were retrieved, four of which were included in the review. The epidemiological profile and factors associated with death from tuberculosis in the prison system included the following variables: age ≥ 43 years, illiterate or low education level, concomitant pulmonary and extrapulmonary tuberculosis, non-performance of directly observed treatment and history of alcohol abuse. As for death from HIV and aids, males, mean age of 34 years, singles, black and Hispanic race/color, drug use and prolonged imprisonment, advanced infection and recent initiation of antiretroviral therapy stood out.

Conclusion: The epidemiological profile and the factors associated with death from tuberculosis and HIV/aids in the prison system show the need for a risk stratification with a continuous and comprehensive approach to the care provided to the population affected by these health conditions.

Resumo

Objetivo: Analisar o perfil epidemiológico e os fatores associados ao óbito por tuberculose e HIV/aids no sistema prisional.

Métodos: Revisão integrativa, realizada em julho de 2020, cuja pergunta de estudo e palavras-chave foram delineadas por meio da estratégia PEO. As buscas foram realizadas nas bases de dados MEDLINE, CINAHL, Scopus, ASP, SocINDEX, Embase e LILACS. A seleção de estudos e a extração dos dados foram feitas por dois revisores independentes. A avaliação da qualidade metodológica dos artigos incluídos na revisão foi conduzida com a utilização de instrumentos específicos propostos pelo *Joanna Briggs Institute*.

Resultados: Foram recuperados 1.329 estudos, dos quais quatro foram incluídos na revisão. O perfil epidemiológico e os fatores associados ao óbito por tuberculose no sistema prisional contemplaram as seguintes variáveis: idade ≥ 43 anos, analfabetos ou baixa escolaridade, concomitância de tuberculose pulmonar e extrapulmonar, não realização de tratamento diretamente observado e histórico de abuso de álcool. Quanto ao óbito por HIV e aids, destacaram-se o sexo masculino, média de idade de 34 anos, solteiros, raça/cor preta e hispânica, uso de drogas e aprisionamento prolongado, infecção avançada e início recente de terapia antirretroviral.

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Conclusão: O perfil epidemiológico e os fatores associados ao óbito pela tuberculose e pelo HIV/aids no sistema prisional mostram a necessidade de uma estratificação de risco com abordagem continuada e integral da assistência prestada à população afetada por tais condições de saúde.

Resumen

Objetivo: Analizar el perfil epidemiológico y los factores asociados al fallecimiento por tuberculosis y por VIH/sida en el sistema penitenciario.

Métodos: Revisión integradora, realizada en julio de 2020, cuya pregunta de estudio y palabras clave fueron definidas por medio de la estrategia PEO. Las búsquedas fueron realizadas en las bases de datos MEDLINE, CINAHL, Scopus, ASP, SocINDEX, Embase y LILACS. La selección de estudios y la extracción de datos fueron llevadas a cabo por dos revisores independientes. La evaluación de calidad metodológica de los artículos incluidos en la revisión fue realizada con la utilización de instrumentos específicos propuestos por el *Joanna Briggs Institute*.

Resultados: Fueron recuperados 1.329 estudios, de los cuales cuatro fueron incluidos en la revisión. El perfil epidemiológico y los factores asociados al fallecimiento por tuberculosis en el sistema penitenciario contemplaron las siguientes variables: edad ≥ 43 años, analfabetos o escolaridad baja, concomitancia de tuberculosis pulmonar y extrapulmonar, no realización de tratamiento directamente observado e historial de exceso de alcohol. Respecto al fallecimiento por VIH y sida, las variables destacadas fueron el sexo masculino, edad promedio de 34 años, solteros, raza/color negro e hispánico, uso de drogas y encarcelación prolongada, infección avanzada e inicio reciente de tratamiento antirretroviral.

Conclusión: El perfil epidemiológico y los factores asociados al fallecimiento por tuberculosis y por VIH/sida en el sistema penitenciario demuestran la necesidad de una estratificación de riesgo con un enfoque continuo e integral de la atención brindada a la población afectada por tales condiciones de salud.

Introduction

According to the United Nations Joint Programme on HIV/Aids (UNAIDS), from the beginning of the epidemic in the 1980s until the end of 2019, 75.7 million people had been diagnosed with HIV around the world, 32.7 million of whom had died from aids-related diseases. In 2018, deaths from Aids worldwide were estimated at about 770,000 people, a significant reduction compared to 2004, when 1.7 million deaths happened.[1]

As for tuberculosis (TB), considered an opportunistic disease to HIV, it remains a serious public health problem, with an alarming number of reported cases, like in 2019, when approximately ten million people became ill and 1.5 million died from TB. It is noteworthy that the percentage of HIV cases among people with TB in the world was 8.2% in 2019.[2]

Among the population segments, there are key populations to cope with HIV / aids, among which men who have sex with men, gays, sex workers, transgender people, people who use alcohol and other drugs and people deprived of freedom are highlighted.[3]

Regarding TB, socioeconomic factors are highly relevant in the occurrence of the disease, presenting higher rates in populations living in developing countries.[4] As for the vulnerabilities HIV / aids and TB have in common, the population that uses alcohol or illicit drugs and persons deprived of freedom stand out.[5]

Among persons deprived of freedom, other aspects influence the occurrence of TB and HIV, such as overcrowding of prison units and the risk behaviors of detainees, such as consensual and non-consensual sexual relations, in addition to the use of injectable drugs.[6]

Considering the great magnitude of TB and HIV among persons deprived of freedom, who are part of the key population for the occurrence of both conditions, death may reveal weaknesses in the implementation and execution of prevention, treatment and case monitoring. In addition and motivated by the challenges inherent in achieving the goals of the world policies to control these health conditions by 2030, which aim to reduce the number of HIV deaths to zero[7] and deaths from TB (*End TB Strategy*) by 90%,[8] this study aimed to analyze the epidemiological profile and the factors associated with death from TB and HIV/aids in the prison system.

Methods

This integrative review was conducted in accordance with the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (PRISMA).[9] This type of review is used for its potential to synthesize results on the state of the art of a given topic, in addition to substantiating conducts and decision-making based on the challenges met, recommending

future research, directing critical reflections on the topic addressed.[10] For this, the following steps were followed: construction of the guiding question of the study; bibliographic search in the databases; selection of primary studies; data extraction; methodological evaluation of the included studies; synthesis, presentation and analysis of the review results.

For the bibliographic search, initially, the guiding question of the study, "what is the epidemiological profile and what factors are associated with deaths from TB and HIV/aids among persons deprived of freedom in the prison system?", was identified by means of the PEO strategy,[11] proposed by the *Joanna Briggs Institute*, in which P (population of interest) corresponded to persons deprived of freedom in the prison system due to TB or HIV/aids; E (exposure), to the epidemiological profile and associated factors; O (*outcome*), to death. Then, based on that question, the descriptors could be identified to search in the databases.

Using the descriptors identified in Portuguese, which are part of the controlled vocabulary of the Descriptors in Health Sciences (DeCS), it was possible to identify their synonyms, as well as the corresponding terms in Spanish and English. For the descriptors in English, the following were also consulted: *Medical Subject Headings* (MeSH) and *Embase Subject Headings* (EMTREE). In addition, background searches were undertaken out in the databases, in order to identify the free vocabulary used in the publications.

The databases used in the searches were: Excerpta Medica dataBASE (Embase® - https://www.embase.com), Scopus, owned by Elsevier (https://www.scopus.com Medline or Publisher Medlin (accessed through the PubMed platform - https://pubmed.ncbi.nlm.nih.gov/) and Latin American and Caribbean Literature in Health Sciences (LILACS-accessed through the Regional Portal of the Virtual Health Library - https://pesquisa.bvsalud.org/portal/advanced). Finally, the searches performed in the databases *Cumulative Index to Nursing and Allied Health Literature* (CINAHL), *Academic Search Premier* (ASP) and SocINDEX were run simultaneously through the EBSCOhost platform, accessed through the CAPES Journals website (https://www.periodicos.capes.gov.br). This platform automatically excludes duplicates found in these databases. In the searches in LILACS, the vocabulary was used in Portuguese, English and Spanish while, for the searches in the other databases, the vocabulary in English was used. It should be noted that, in order to obtain a greater number of publications on the subject, no time frame and country/continent of publication was established for the bibliographic survey.

The searches were carried out in July 2020, using specific strategies according to each database and the Boolean operators AND and OR (Chart 1). The Boolean operator OR was used between the words of the same group ("word" OR "word"), and AND was used between the set of words of the different groups ("set of words of Group 1" AND "set of words of Group 2" and "set of words of Group 3").

With the search results at hand, the references were exported to the *online* systematic review application Rayyan QCRI of the *Qatar Computing Research Institute.*[12] Then, the duplicate publications were excluded, and two independent reviewers read the titles and abstracts of the others. They chose publications for full reading and possible inclusion in the study based on the following criteria: complete descriptive or observational studies, which used people deprived of freedom as a study population and discussed the epidemiological profile or the factors associated with death from TB and HIV/aids. Publications addressing populations serving sentences beyond the prison environment and studies identifying factors associated with unfavorable outcomes concomitant with the deaths were excluded.

The full reading of the articles permitted a more accurate selection of the articles to be included in the review. These were submitted simultaneously to a narrative synthesis and extraction of the data, using a specific adapted tool[13] to search for the following information: title of the article, journal, authors, country of study, language, year of publication, type of study, objective of the study, study population, sample calculation, sampling, characteristics of the studied population, source of data

Chart 1. Article search strategies for the integrative literature review on the epidemiological profile and factors associated with deaths from TB and HIV/aids among people deprived of freedom in the prison system

Database	Search strategy
Embase®	(prisoners:ti,ab,kw OR 'correctional facility':ti,ab,kw) AND (tuberculosis:ti,ab,kw OR 'acquired immune deficiency syndrome':ti,ab,kw OR 'human immunodeficiency virus':ti,ab,kw) AND (death:ti,ab,kw OR 'treatment outcome':ti,ab,kw)
Scopus	TITLE-ABS-KEY (prisoners OR prisoner OR captive OR captives OR detainee OR detainees OR inmate OR inmates OR incarcerated OR "person deprived of liberty" OR "persons deprived of liberty" OR "population deprived of liberty" OR "people deprived of liberty" OR arrested OR prisons OR prisons OR "penal centers" OR "social rehabilitation centers" OR "penal institution" OR "penal institutions" OR penitentiary OR penitentiaries OR jail OR jails) AND TITLE-ABS-KEY (tuberculosis OR tb OR "Mycobacterium tuberculosis" OR "Koch Disease" OR "Koch's Disease" OR "Kochs Disease" OR hiv OR "AIDS Virus" OR "AIDS Viruses" OR "Acquired Immune Deficiency Syndrome Virus" OR "Acquired Immunodeficiency Syndrome Virus" OR "Human Immunodeficiency Virus" OR "Human Immunodeficiency Viruses" OR "Acquired Immunodeficiency Syndrome" OR aids OR "Acquired Immune Deficiency Syndrome" OR "Acquired Immuno Deficiency Syndrome" OR "Acquired Immuno-Deficiency Syndrome" OR "Acquired Immuno-Deficiency Syndromes" OR "Acquired Immunodeficiency Syndromes") AND TITLE-ABS-KEY (death OR "treatment outcome" OR "treatment outcomes" OR "case outcomes" OR "closure of treatment" OR "closures of treatment" OR "closure of the treatment" OR "closures of the treatment" OR "closure of case" OR "closure of case" OR "closures of the case" OR "closures of the cases")
MEDLINE	((prisoners OR prisoner OR captive OR captives OR detainee OR detainees OR inmate OR inmates OR incarcerated OR "person deprived of liberty"[Title/Abstract] OR "persons deprived of liberty"[Title/Abstract] OR "population deprived of liberty"[Title/Abstract] OR "people deprived of liberty"[Title/Abstract] OR arrested OR prisons OR prisons OR "penal centers"[Title/Abstract] OR "social rehabilitation centers"[Title/Abstract] OR "penal institution"[Title/Abstract] OR "penal institutions"[Title/Abstract] OR penitentiary OR penitentiaries OR jail OR jails) AND (tuberculosis[Title/Abstract] OR TB[Title/Abstract] OR "Mycobacterium tuberculosis"[Title/Abstract] OR "Koch Disease"[Title/Abstract] OR "Koch's Disease"[Title/Abstract] OR "Kochs Disease"[Title/Abstract] OR HIV[Title/Abstract] OR "AIDS Virus"[Title/Abstract] OR "AIDS Viruses"[Title/Abstract] OR "Acquired Immune Deficiency Syndrome Virus"[Title/Abstract] OR "Acquired Immunodeficiency Syndrome Virus"[Title/Abstract] OR "Human Immunodeficiency Virus"[Title/Abstract] OR "Human Immunodeficiency Viruses"[Title/Abstract] OR "Acquired Immunodeficiency Syndrome"[Title/Abstract] OR AIDS[Title/Abstract] OR "Acquired Immune Deficiency Syndrome"[Title/Abstract] OR "Acquired Immuno Deficiency Syndrome"[Title/Abstract] OR "Acquired Immuno-Deficiency Syndrome"[Title/Abstract] OR "Acquired Immuno-Deficiency Syndromes"[Title/Abstract] OR "Acquired Immunodeficiency Syndromes"[Title/Abstract]) AND (death[Title/Abstract] OR "treatment outcome"[Title/Abstract] OR "treatment outcomes"[Title/Abstract] OR "case outcomes"[Title/Abstract] OR "closure of treatment"[Title/Abstract] OR "closures of treatment"[Title/Abstract] OR "closure of the treatment"[Title/Abstract] OR "closures of the treatment"[Title/Abstract] OR "closure of case"[Title/Abstract] OR "closure of case"[Title/Abstract] OR "closures of the case"[Title/Abstract] OR "closures of the cases"[Title/Abstract])
LILACS*	(prisioneiros OR cativo OR cativos OR detento OR detentos OR encarcerado OR encarcerados OR encarcerada OR encarceradas OR "pessoa privada de liberdade" OR "pessoas privadas de liberdade" OR "população privada de liberdade" OR preso OR presos OR prisões OR "centros penais" OR "centros de readaptação social" OR cárcere OR cárceres OR "instituição penal" OR "instituições penais" OR penitenciária OR penitenciárias OR presídio OR presídios OR prisão OR "unidades prisionais" OR prisioneros OR cautivo OR cautivos OR detenido OR detenidos OR encarcelado OR encarcelados OR "persona encarcelada" OR "persona privada de libertad" OR "personas encarceladas" OR "personas privadas de libertad" OR preso OR presos OR prisionero OR prisiones OR "centros penales" OR "centros de readaptación social" OR cárceles OR "instituciones penales" OR presídios OR prisoners OR prisoner OR captive OR captives OR detainee OR detainees OR inmate OR inmates OR incarcerated OR "person deprived of liberty" OR "persons deprived of liberty" OR "population deprived of liberty" OR "people deprived of liberty" OR arrested OR prisons OR prisons OR "penal centers" OR "social rehabilitation centers" OR "penal institution" OR "penal institutions" OR penitentiary OR penitentiaries OR jail OR jails) AND (tuberculose OR TB OR "Mycobacterium Tuberculosis" OR "doença de Koch" OR HIV OR "Vírus da Imunodeficiência Humana" OR "Vírus de Imunodeficiência Humana" OR "Síndrome de Inmunodeficiencia Adquirida" OR "Síndrome da Deficiência Imunológica Adquirida" OR "Síndrome da Imunodeficiência Adquirida" OR "Síndrome de Deficiência Imunológica Adquirida" OR soropositivo OR "Infección por Mycobacterium tuberculosis" OR VIH OR "Virus de Inmunodeficiencia Humana" OR "Virus de la Inmunodeficiencia Humana" OR "Virus del SIDA" OR "Síndrome de Inmunodeficiencia Adquirida" OR SIDA OR "Síndrome de Deficiencia Inmunológica Adquirida" OR "Síndrome de la Inmunodeficiencia Adquirida" OR tuberculosis OR "Mycobacterium tuberculosis" OR "Koch Disease" OR "Koch's Disease" OR "Kochs Disease" OR HIV OR "AIDS Virus" OR "AIDS Viruses" OR "Acquired Immune Deficiency Syndrome Virus" OR "Acquired Immunodeficiency Syndrome Virus" OR "Human Immunodeficiency Virus" OR "Human Immunodeficiency Viruses" OR AIDS OR "Acquired Immunodeficiency Syndrome" OR "Acquired Immune Deficiency Syndrome" OR "Acquired Immuno Deficiency Syndrome" OR "Acquired Immuno-Deficiency Syndrome" OR "Acquired Immuno-Deficiency Syndromes" OR "Acquired Immunodeficiency Syndromes") AND (morte OR óbito OR falecimento OR "resultado do tratamento" OR "resultados do tratamento" OR "desfecho do tratamento" OR "desfechos do tratamento" OR "desfecho do caso" OR "desfechos do caso" OR "encerramento do tratamento" OR "encerramentos do tratamento" OR "encerramento do caso" OR "encerramentos do caso" OR muerte OR fallecimiento OR óbito OR "resultado del tratamiento" OR "resultado del tratamiento" OR "resultados del tratamiento" OR "resultados del caso" OR "cierre del tratamiento" OR "cierres del tratamiento" OR "cierres del caso" OR "cierres del caso" OR death OR "treatment outcome" OR "treatment outcomes" OR "case outcomes" OR "closure of treatment" OR "closures of treatment" OR "closure of the treatment" OR "closures of the treatment" OR "closure of case" OR "closure of case" OR "closures of the case" OR "closures of the cases")
CINAHL, Academic Search Premier and SocINDEX	AB (prisoners OR prisoner OR captive OR captives OR detainee OR detainees OR inmate OR inmates OR incarcerated OR "person deprived of liberty" OR "persons deprived of liberty" OR "population deprived of liberty" OR "people deprived of liberty" OR arrested OR prisons OR prisons OR "penal centers" OR "social rehabilitation centers" OR "penal institution" OR "penal institutions" OR penitentiary OR penitentiaries OR jail OR jails) AND AB (tuberculosis OR TB OR "Mycobacterium tuberculosis" OR "Koch Disease" OR "Koch's Disease" OR "Kochs Disease" OR HIV OR "AIDS Virus" OR "AIDS Viruses" OR "Acquired Immune Deficiency Syndrome Virus" OR "Acquired Immunodeficiency Syndrome Virus" OR "Human Immunodeficiency Virus" OR "Human Immunodeficiency Viruses" OR "Acquired Immunodeficiency Syndrome" OR AIDS OR "Acquired Immune Deficiency Syndrome" OR "Acquired Immuno Deficiency Syndrome" OR "Acquired Immuno-Deficiency Syndrome" OR "Acquired Immuno-Deficiency Syndromes" OR "Acquired Immunodeficiency Syndromes") AND AB (death OR "treatment outcome" OR "treatment outcomes" OR "case outcomes" OR "closure of treatment" OR "closures of treatment" OR "closure of the treatment" OR "closures of the treatment" OR "closure of case" OR "closure of case" OR "closures of the case" OR "closures of the cases")

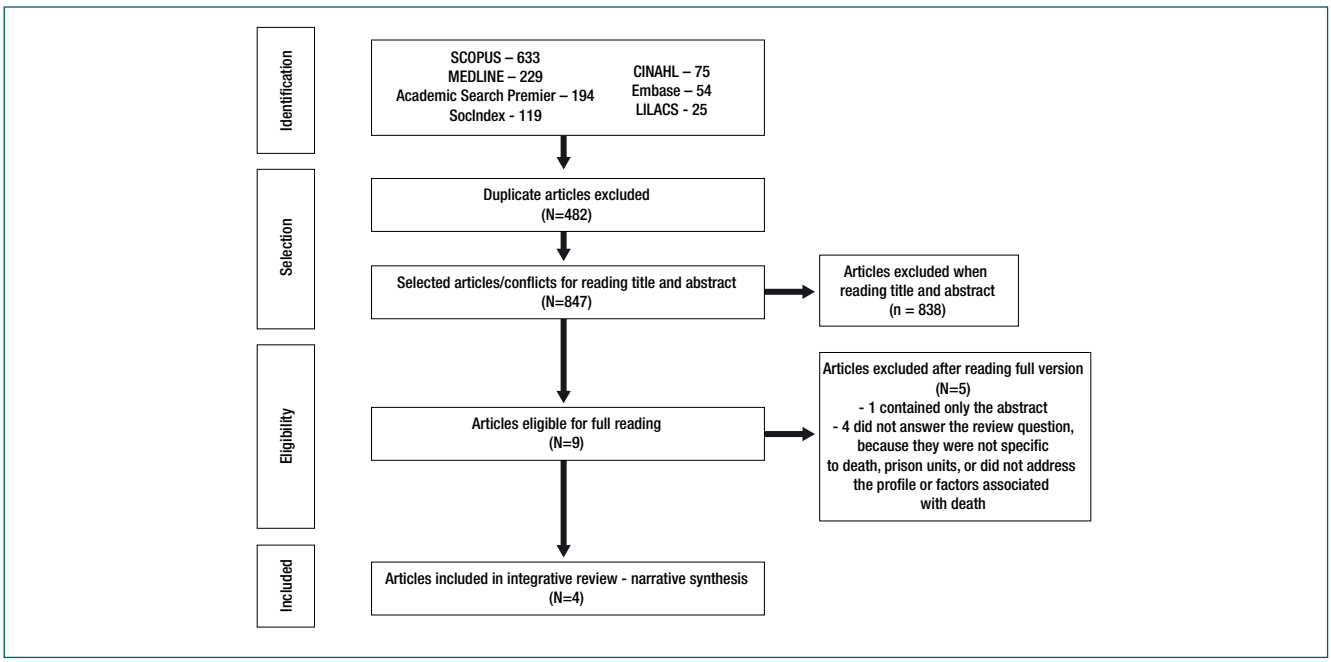
collection, dependent variable, independent variables, length of the study, statistical treatment, main results and conclusions.

Finally, to assess the methodological quality of the articles, instruments proposed by the *Joanna Briggs Institute* (JBI – https://joannabriggs.org/ebp/critical_appraisal_tools) were used.[14] Thus, for three articles, the instrument that evaluates cohort studies was used and, for another, the instrument that evaluates prevalence studies (descriptive).

Results

Based on the search in the databases, 1,329 studies were recovered, excluding 482 due to duplication, and 838 after reading the titles and abstracts. Nine selected publications were read in full, four of which were included in this review (Figure 1).[15]

All of the four articles included[16–19] were published in English, and these were carried out in Indonesia,[16] Brazil,[17] United States[18] and South



Source: Adapted from Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. PLoS Med. 2009;6(7):e1000097 .[15]

Figure 1. Flow chart of the number of publications analyzed at each stage of the integrative literature review on the epidemiological profile and the factors associated with deaths from TB and HIV/aids among persons deprived of freedom in the prison system

Africa.[19] These publications occurred between 1989 and 2017, being three cohort studies[16,17,19] and one with a descriptive design (Chart 2).[18]

The objectives and synthesis of the main results found in the scientific production on the epidemiological profile and the factors associated with deaths from TB and HIV / aids among persons deprived of freedom in the prison system are shown in Table 2. The profile and factors associated with deaths from TB in the prison system included the following variables: age ≥ 43 years, illiterate or low education level, concomitant pulmonary and extrapulmonary TB, non-performance of Directly Observed Treatment (DOD) for TB and history of alcohol abuse.[17] As for death from HIV and aids, the male sex stood out,[18] average age 34 years,[18] single,[18] race / black and Hispanic,[18] drug use,[16,18] prolonged imprisonment,[16] advanced virus infection[16,18] and recent onset or non-use of antiretroviral therapy (ART).[19]

Discussion

Limitations in this study are the small number of articles found in the databases on the research subject and one study that portrayed the epidemiological profile of aids cases in the 80s, which points to the need for current studies that contribute to reflections on the identification of the epidemiological profile and the factors associated with death from TB and HIV/aids among people deprived of freedom, in order to improve the quality of health care for both conditions and avoid unfavorable outcomes that could be avoided and managed. In addition, bibliographic material may be present in other databases than those consulted in this study. Nevertheless, the study results may contribute to the proposal of actions to prevent complications, such as death, by stratifying the risk of TB and HIV/aids cases in the prison system.

The articles included in this integrative review presented heterogeneous approaches to the research problem, as they worked separately with death among persons deprived of freedom with TB [17] or with HIV / aids,[16,18] or even among people living with HIV under ART.[19] In this sense, in order to align these different approaches to the epidemiological profile and factors associated with death from these causes among persons deprived of freedom, the findings of these studies were grouped according

Chart 2. Description of the articles included in the integrative literature review on the epidemiological profile and factors associated with deaths from TB and HIV/aids among persons deprived of freedom in the prison system

Authors / Journal / Year / Country	Type of study/ MQA (main limitations)	Objective	Study population (n)	Synthesis of results
Culbert GJ et al.[16] / *Research Reports in Tropical Medicine* / 2017 / Indonesia	Cohort 09/11 (confounding variables and strategies to minimize them were not identified)	Identify predictors of mortality and causes of death during imprisonment and up to two years after release from prison of male prisoners, infected with *HIV*, randomly selected in Indonesia.	102	There were 15 deaths from HIV among people deprived of freedom, 10 of which occurred inside the prison and five after release. The most common probable cause of death was infectious disease attributable to HIV infection, which includes deaths caused by opportunistic infections and those classifiable as HIV-related deaths based on the symptoms. No deaths were attributed to accidental injury, poisoning, suicide, or homicide. Drug overdose was ruled out as a cause of death for all but one participant. Predictors of mortality within the prison in general were similar, and shorter overall survival was associated with belonging to a specialized "narcotic" prison for drug offenders, prolonged imprisonment and advanced HIV infection. Treatment of drug dependence was associated with longer survival, although treatment with ART or methadone was not.
Ribeiro Macedo et al.[17] / *The International Journal of Tuberculosis and Lung Disease* / 2013 / Brazil	Cohort 6/11 (confounding variables and strategies to minimize them were not identified, and exposure and outcome measures may not be reliable due to the use of secondary sources)	Describe the clinical and epidemiological characteristics associated with *TB* treatment outcomes in the Brazilian prison population.	14,864	Of the 14,874 subjects in the study, 335 (2%) died from TB. People who died were more likely to be aged ≥ 43 years, to be illiterate, to suffer from alcoholism, to have other comorbidities, such as aids, to have pulmonary+extrapulmonary TB and not to be under the DOT regime.
Gido[18] / *The Prison Journal* / 1989 / United States	Descriptive 7/9 (statistical analysis presents weaknesses)	Identify the demographic and epidemiological profile of New York inmates who died from *aids* between 13 November 1981 and 31 October 1987.	506	The majority of AIDS deaths occurred in state maximum security facilities; 97% of AIDS deaths were male; average age of male mortality was 34 years, against 31 years for female mortality; a relationship was identified between aids deaths and history of intravenous drug abuse (95% of male cases and 100% of female cases); 45% of aids deaths occurred in the black race/color, followed by 44% in Hispanics; 58% of cases were unmarried; and among deaths from other causes, pneumonia due to *pneumocystis carinii* was the most common opportunistic infection among inmates who died from aids.
Telisinghe et al.[19] / *International Journal of STD & AIDS* / 2016 / South Africa	Cohort 8/11 (confounding variables and strategies to minimize them were not identified, and strategies to minimize follow-up losses were not clear)	Describe, in the prison facility, the mortality due to *HIV* of the ART program, retention in the program and suppression of viral load.	404	Among the 299 who started ART for the first time, 23 deaths occurred. Mortality from HIV was high among those who had recently started ART or those who were not under this treatment. There was no difference in mortality when considering CD4+ T lymphocyte counts among people who did not use ART.

MQA - methodological quality assessment; TB - tuberculosis; ART - antiretroviral therapy; DOT - directly observed treatment

to sociodemographic, clinical, behavioral and case treatment characteristics. It is important to highlight the small number of studies included in the review, as well as the non-simultaneous approach of TB and HIV in the studies identified, revealing an important gap in the production of scientific knowledge about mortality from TB/HIV co-infection in the prison context, therefore configuring new research opportunities in this area.

As for the sociodemographic characteristics, the only study regarding death from TB pointed out that this outcome occurs mainly among people aged ≥43 years and illiterate.[17] In the literature, another study was found that shows unfavorable outcomes of TB treatment among persons deprived of freedom associated with adults ≥ 35 years of age.[20] This expresses a pattern of deaths due to TB among adults within prisons, but still in the productive stage, which highlights the importance of health actions focused on offering proper treatment for TB throughout imprisonment, in addition to joint actions of health facilities in prisons and community-based facilities, especially to attend to the cases of exacerbation of the disease among people as age advances, and which may therefore exhibit an overlap of chronic health conditions, making them more vulnerable.[21] This pattern entails reflections on the correctional, socio-educational and health rights enforcement role of the prison system, reflecting on the worsening health conditions and mortality of those who, in theory, should be prepared to return to society and working life once they are released.

In addition, in this review, the low or no education of those who died from TB[17] corroborates the results of another study, which identified that people with nine or more years of study presented a higher chance of a favorable outcome when compared to individuals without education.[22] These findings raise hypotheses that illiterate individuals or individuals with low education are more vulner-

able because they have not had access to education and, consequently, have a lower level of knowledge regarding the disease, signs and symptoms, forms of transmission, prevention and treatment.[23] This raises the risk of death from the disease and reinforces the importance of health education actions within prison environments, which need to occur and be offered by health professionals and prison agents, enabling emancipatory dialogues for care and forms of prevention.[24]

For persons deprived of freedom who died of aids, the associated epidemiological profile shows a predominance of males, adults with an average age of 34 years, black and Hispanic race/color and not being married.[18] Because this is a descriptive study, it is assumed that the profile of death in people with aids in the prison system[18] converges to the profile of people in deprivation of freedom in the country (United States) at the time of study. In addition, results of a survey conducted in that country in 2016 show that aids cases are still disproportionately distributed among black people, including adult men and young people,[25] highlighting the consequences of violence, structural racism and social exclusion, which affect these individuals inside and beyond prisons.

Given the sociodemographic profile of individuals who may have an unfavorable outcome for the treatment of TB and HIV, the prison health team needs to be aware of the people who will use the service through the stratification of risks of chronic diseases, whether during admission, confinement, or release, allowing the identification of social groups with similar health care needs, the rupture with supply-based care, characteristic of fragmented systems, and the implementation of care based on the health needs of the population, an essential element of the care offered in the healthcare networks.[26] This situation tends to be intensified due to the potential invisibility of people living with chronic conditions, and especially those within the prison system. It is necessary to incorporate the systematic search for respiratory symptoms, the singular follow-up of sick people according to risk profiles and the inclusion of strategies that promote assisted self-care and the monitoring of regular treatment use for both TB and HIV.

Among the clinical characteristics, having the mixed form of TB (pulmonary + extrapulmonary) was associated with death from the disease among people deprived of freedom.[17] A study conducted in prisons in four Malaysian states also identified that the concomitant occurrence of pulmonary and extrapulmonary forms increased the chances of unfavorable treatment outcomes among persons deprived of freedom.[20] This aspect is noteworthy as the mixed clinical form of TB is more frequent in people living with HIV / aids, who are also included as a risk group for the outcome of death within prisons.[17]

Individuals with advanced HIV infection were more likely to develop opportunistic infections,[16] such as pneumonia from *Pneumocystis carinii*[18] and TB itself,[17] culminating in death. The prison units need to get organized in combination with the health services, with campaigns aimed at the prevention of sexually transmitted infections and for the follow-up of compliance with the treatment of HIV, TB and other opportunistic infections, as well as the incorporation of strategies to follow up the compliance and therapeutic response of people on drug treatment, with emphasis on DOT.

Regarding the behavioral aspects associated with death among persons deprived of freedom, it was identified in the studies that alcoholism contributed to death from TB.[17] It should be noted that alcohol abuse can impact unfavorable outcomes,[27] mainly because it affects the drug treatment of the disease and the nutritional situation of the population deprived of freedom, which is already impaired by the conditions of imprisonment.[17,28] The focus of attention to the treatment of alcohol dependence should be the agenda of discussions, especially of multi-and interdisciplinary teams, so that possible interventions are carried out in order to promote behavioral changes through harm reduction proposals and motivational interviews.[29]

The abuse of intravenous drugs was a predictor of death in aids cases, showing the interface between the treatment of chemical addicts and the possibility of longer life expectancy of HIV cases,[16] as well as the importance of tracking the risk factors that may contribute to an unfavorable outcome of

cases within prison units. For this screening to be possible, the presence of mental health professionals in the multidisciplinary team is important. They can contribute to the construction of knowledge of people deprived of freedom about the adoption of behaviors aimed at reducing the use/abuse of illicit drugs in the prison environment, using the same strategies as for the treatment of alcohol dependence. Nevertheless, the limitations regarding the completeness of the human resources frameworks in health within the prison system are acknowledge, which require strategies of participation and openness to professionals/different specialties, including matrix-based strategies and/or teleconsultations, exploring virtual tools and technologies for the qualification of the care offered.

Regarding treatment, a study showed that not practicing DOT in prison units is a factor associated with death from TB among people deprived of their freedom.[17] DOT is widely recommended, as a treatment regimen, to strengthen compliance with TB treatment, aiming at reducing death and other unfavorable outcomes and, consequently, controlling the disease, both within and beyond the prisons (in case of leaving the prison unit in open or semi-open prison regimes), and may include, as treatment supervisors, people from the community, family members, health professionals, prison officers and even other detainees.[17]

Thus, in addition to the aforementioned assignments, prison health units should also offer TB screening through the active search for respiratory symptomatic patients, diagnostic tests for TB and serological tests for HIV during imprisonment, confinement and release, because it allows people deprived of freedom to be diagnosed early, treated and, consequently, to promote impacts based on the decrease in cases of aggravation of both diseases, as well as through disruptions in the transmission chain for communicants in the prison environment, during visits or in the community.[30] In addition, for HIV, the importance of early diagnosis of the infection and the organization of the health team for the systematic monitoring of the detainee is reinforced, as mortality from this cause among people deprived of freedom was higher among those who had recently started ART or who did not use this treatment.[19]

It is important to highlight that, among persons deprived of freedom with HIV/aids, the included studies have shown that death was associated with prolonged imprisonment in prisons specialized in drug offenses[16] and in state maximum security prisons.[18] These findings raise reflections on the prioritization of safety to the detriment of health and the undervaluation of chronic diseases, which can lead to death without the proper management and sensitization of professionals to the longitudinality and completeness of care within prison environments, with a view to integration with other points of care of the health network, which often depends on prior release for the detainees to visit health services beyond prison walls, police escort and overcoming barriers and bureaucratic elements that hinder access to health as a constitutional right.

The focus of the epidemiological profile and the factors associated with death due to TB and HIV/aids education in the prison system need to be on the standing agenda of discussion between the managers of the health care and legal system. As the State is responsible for the protection of detainees, these outcomes in prison settings reflect a significant gap when it comes to addressing both of these diseases, and also in the efforts made in the correctional process for the sake of the recovery and rehabilitation of the prisoners, in order to return them healthily and with productive potential to society. When thinking about the degrading conditions of prison environments, it is understood that the deaths would be caused by deprivation or state neglect of the right and access to health.[31] This omission in the practice of individual rights and guarantees is complicated to the extent that the criminal and penitentiary policy, in practice, is still configured as a device that proposes to "make people die", exposing individuals to risks, segregation and discrimination.[32]

The methodological quality of the studies included in this review appointed limitations, which restrict inferences on the research topic. In the cohort studies,[16,17,19] there were limitations regarding the confounding variables and the strategies to min-

imize them, the strategies to minimize follow-up losses, and the unreliability of exposure measures and outcomes due to the use of secondary sources. In the descriptive study,[18] the results should be addressed with caution, due to the statistical analysis used.

Conclusion

The epidemiological profile of the population who died from TB and HIV/aids in the prison system is characterized by male persons, aged over 30 years, black, illiterate or with low education, unmarried, who have the mixed form of TB, do not received DOT, have a history of alcohol and other drugs abuse, and who have been in prolonged imprisonment.

Knowledge of the characteristics of persons deprived of freedom who die from TB and HIV/aids reinforces the need to look more cautiously at their multifaceted risk profiles, which encompass the sociodemographic, clinical and behavioral aspects identified.

These characteristics show the need for a continuous and integral approach to the care provided to the population affected by these health conditions. The goal should be to achieve favorable treatment outcomes, through efforts for the effective integration of TB and HIV actions in the prison context, as well as of the prison unit in all the services of the care network, in addition to early detection, using clinical tools to stratify the detainees' risk for the purpose of designing and implementing singular case monitoring strategies, including the valuation of DOT.

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Collaborations

Camillo AJG, Ferreira MRL, Bossonario PA, Andrade RLP, Saita NM, Rezende CEM, Arcêncio RA and Monroe AA declare that they contributed to the design of the study, analysis and interpretation of the data, writing of the article, relevant critical review of the intellectual content and approval of the final version for publication.

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