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Aging with HIV in Latin America and the Caribbean: a Systematic Review

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Abstract

Purpose of Review—With the establishment of antiretroviral treatment (ART) programs in low- and middle-income countries, people with HIV (PWH) in Latin America and the Caribbean (LAC) are living longer, subsequently developing chronic noncommunicable diseases (NCDs). Few studies focus on the impact of aging among older LAC PWH. This systematic review aims to fill this information gap and understand the burden of aging with HIV in LAC. We identified peer-reviewed literature published in English, Spanish, or Portuguese from several databases to assess currently available evidence on the burden of aging with HIV in LAC and selected six common NCDs found in older PWH (cardiovascular disease [CVD], bone and musculoskeletal [MSK] disorders, cancer, renal disease, neurocognitive impairment [NCI], and depression).

Recent Findings—Of the 5942 publications reviewed, only 53 articles were found with populations 40 years and older or age-related findings (27 CVD, 13 NCI or depression, 6 MSK disorders, 4 renal disease, 3 cancer). Most (79%) publications were from Brazil with few longitudinal studies on aging with HIV. Prevalence of illnesses such as CVD, NCI, depression, or

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osteoporosis varied widely depending on the screening instrument utilized and geographic population surveyed. Age was a significant predictor of comorbidity in nearly all studies.

Summary—Our results demonstrate the need for longitudinal studies and validated screening instruments appropriate for use among PWH in LAC. Understanding the mechanisms behind aging in HIV and the roles of sociocultural factors and genetic diversity specific to LAC is needed to appropriately manage chronic comorbidities as PWH age.

Keywords

HIV; Aging; Latin America; The Caribbean; Morbidity

Introduction

Low- and middle-income countries (LMIC) are burdened with the HIV epidemic and socioeconomic factors that compromise HIV control measures [1]. Since 2004, HIV prevention and treatment programs have been established in over 30 LMIC worldwide, allowing 19.5 million people with HIV (PWH) to receive antiretroviral treatment (ART) [2], including 2.24 million PWH from Latin America and the Caribbean (LAC) [3].

In recent years, while Latin America has achieved stable HIV prevalence rates, HIV prevalence in the Caribbean has been decreasing, with an average HIV prevalence throughout all of LAC of 0.4% [4]. As in other LMIC, life expectancy of PWH in LAC has dramatically improved with ART introduction and related morbidity and mortality trends are changing [5, 6]. However, as PWH are living longer on ART, they face the additive challenges of long-term effects of lifelong ART and greater burden of age-related chronic disorders exacerbated by HIV [7]. PWH age > 50 years have a higher likelihood of presenting with one or more non-communicable diseases (NCDs), leading to greater pill burden, risking poor ART adherence and consequently negative health outcomes and worse survival [4, 8].

HIV population data from LAC have demonstrated growing trends toward aging-related NCD comorbidities [9], with cardiovascular disease (CVD), bone and musculoskeletal (MSK) disorders, cancer, renal disease, neurocognitive impairment (NCI), and depression as the six most common NCDs reported [8, 10-14]. CVD is the leading cause of death in LAC countries in the general population, particularly among older people [15]. The CVD spectrum includes conditions such as metabolic syndrome, a constellation of disorders that includes abdominal obesity, hypertension, dyslipidemia, and hyperglycemia [16, 17]. NCI related to HIV results in a clinical syndrome known as HIV-associated neurocognitive disorder (HAND), with varying degrees of cognitive impairment [18]. Since the introduction of ART, the incidence of HIV-associated dementia, a severe form of HAND, has decreased [19, 20], but the overall prevalence of HAND worldwide remains stable (30 to 50%), particularly in aging populations [21, 22].

Bone and MSK disorders, such as osteoporosis, have been reported to occur at earlier ages among PWH worldwide, with accelerated bone mineral density (BMD) loss and higher risk of fractures among older PWH [23, 24]. Likewise, renal impairment is increasingly reported

among PWH and has been associated with major cardiovascular morbidity and death [25]. The incidence and prevalence of these conditions, particularly renal disease, have been growing rapidly among PWH in LAC, likely due to an increase in life expectancy and a growing epidemiologic transition across LAC [4]. Furthermore, HIV-related cancer epidemiology has shifted from AIDS-defining malignancies (e.g., Kaposi sarcoma and non-Hodgkin's lymphoma) to non-AIDS-defining malignancies (NADM) worldwide [26]. According to the Pan American Health Organization, cancer is the second cause of death in the Americas [7]; however, studies conducted in LAC on NADM among aging PWH are scarce.

Acknowledging the need to develop measures for prevention and patient care specifically considering older PWH has been reported in LAC [27], as this age bracket has not been commonly described among LAC PWH. Addressing gaps in the literature on chronic comorbidities of aging PWH in LAC is dire to guide future clinical care in the region [4]. We conducted a systematic review exploring the relationship of aging with HIV in LAC focused on the burden of these six common NCDs.

Methods

We used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statements [28]. The study was registered on PROSPERO (CRD42020191260).

Data Sources and Searches

One medical librarian (AG) designed the search strategy executed by two medical librarians (AG & JS) in the following databases: Cochrane Library, LILACS, Ovid Global Health, Ovid Embase, Ovid Medline, Ovid PsychInfo, Scopus, and Web of Science Core Collection were searched in English, and Europe PMC, La Referencia, Redalyc, Repositorio Alicia, and Science Direct were searched in Spanish/Portuguese. Each database was searched from inception of database to March 13, 2020. The search was peer-reviewed by another medical librarian using PRESS [29]. The search used a combination of controlled vocabulary and keywords to identify publications regarding HIV comorbidities in the LAC population. The search was not limited by publication type, year, or language. Details of the full search strategy are listed in Appendix Table A.

Study Selection

Citations from all databases were imported into an EndnoteX9 library. Duplicates were removed in Endnote, reducing the initial list of 10,150 citations to 5942 citations. The database of 5942 citations was imported into Covidence, a screening and data extraction tool. Two independent screeners (MMD and DMC) performed a title/abstract review with a third screener (PJG) to resolve ties. The included studies were then reviewed in full text by two independent screeners (MMD and DMC) with a third screener (PJG) available to resolve ties. The inclusion criteria were (i) study site in Spanish- or Portuguese-speaking LAC; (ii) study participants limited to PWH age \geq 40 years, or age-stratified outcomes data available for participants age \geq 40 years; and (iii) data available for at least one HIV-related chronic comorbidity (CVD, renal disease, neurological and psychiatric disease, bone and

MSK disorders, and NADM). Eligible Spanish- or Portuguese-speaking LAC countries included (i) Central American countries: Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama; (ii) Spanish-speaking or Latin Caribbean countries: Cuba, Puerto Rico, and Dominican Republic; (iii) South American Southern Cone countries: Argentina, Chile, Paraguay, and Uruguay; (iv) South American Andean countries: Bolivia, Colombia, Ecuador, Peru, and Venezuela; (v) Mexico; and (vi) Brazil [4]. We did not include case reports or conference abstracts, and we excluded studies from English- or French-speaking countries in LAC.

Data Extraction and Quality Assessment

Two reviewers (DMC and MMD) extracted data independently and in duplicate from each included study. The data entries were compared and any disagreements were resolved by a third author (PJG). Data extracted from each eligible study included study characteristics, country, sample size, HIV characteristics (i.e., recent CD4+ T-lymphocytes [CD4 cells], duration of HIV infection), reported prevalence, and risk factors of the condition studied. Authors from any included study or excluded conference abstracts were not contacted for any additional unpublished data. We tabulated the total sample ($n = 53$) of published work for geographical location, HIV comorbidity topic, publication type, and citation information. For the sub-group analysis of each of the comorbidities, we reported prevalence or risk factors of the condition under study for population age ≥ 40 years. The Cochrane Risk of Bias Tool was used to determine the risk of bias for each study.

Results

Of the 5942 studies reviewed, 5389 were excluded based on the title and abstract review, leaving 553 for full-text review. Of these, 53 articles were included in this review (four in Portuguese, three in Spanish, the rest in English). The full-text articles were excluded for having a population age < 40 years or not reporting age-related findings (268), wrong outcomes (134), wrong patient population (69), duplicate sample (6), wrong setting (5), wrong study design (4), and available as an abstract only (3) (Fig. 1). Of 53 included studies, 27 address CVD (Table 1), 10 chronic neurological or psychiatric conditions (Table 2), nine MSK disorders (BMD, disability, or frailty), four renal disease, and three oncology (Table 3). The large majority of publications (79%) were from Brazil with the rest from Argentina, Chile, Colombia, Ecuador, Mexico, Peru, or Venezuela (Fig. 2). All studies included were found to have low risk of bias.

Cardiovascular Disease

Cardiovascular Risk Stratification—Nine publications (Table 1) reported cardiovascular risk among older PWH living in LAC countries (seven from Brazil [30-36], one from Peru [37], and one study involving several LAC countries [38]). CVD-associated death was more common among PWH age ≥ 40 years [33] and multimorbidity was higher among PWH age ≥ 50 years in two studies [34, 35]. Five studies utilized the Framingham Risk Score (FRS) [30-32, 37, 38] and two used the Prospective Cardiovascular Munster (PROCAM) risk scale [30, 37]. Older age was associated with greater risk of disagreement between FRS and PROCAM [30]. Age ≥ 50 years was considered an independent risk factor

for 10-year CVD risk and the strongest predictor of CVD, and FRS score increased by 0.09 for every month of exposure to ART among PWH living in Brazil [31, 38]. Among 341 Brazilian PWH age ≥ 40 years, high CVD risk was found among 26% applying the FRS tool, but in 46% of the same cohort using the ACC/AHA risk score [32]. However, in another study in Peru of 111 older PWH (median age 47 [Interquartile Range, IQR; 43, 53] years), high cardiovascular risk was only found in 5.4% using the FRS and 3.6% using the PROCAM risk tool [37].

Dyslipidemia—We included 11 studies (Table 1) assessing dyslipidemia prevalence or risk factors (seven from Brazil [39-45], two from Peru [48, 49], two from Mexico [46, 47]). Age ≥ 40 years was a risk factor for dyslipidemia in several studies [39, 41, 42, 44-49], reported as either greater carotid intima media thickness [43], higher triglyceride levels [44, 46], or greater hyperapolipoproteinemia B levels [45]. Prevalence of dyslipidemia in one Brazilian study ($N=340$) was 13.7% among 31 PWH age ≥ 60 years (vs. 6% in 112 PWH age < 40 years, $p=0.02$) [41]; however, two Brazilian studies ($N=268$ and $N=498$, respectively) found no relationship between lipid levels and older age [40, 44]. In one Peruvian study ($N=538$), 80% of 267 PWH age ≥ 40 years had dyslipidemia [48] and 61% of 111 PWH age ≥ 50 years in another Peruvian cohort ($N=305$) [49], a significantly greater prevalence compared with younger PWH enrolled in each study. Older age modified the relationship between ART regimen and total cholesterol and triglycerides [39]. Across all ages, risk factors for dyslipidemia included current protease inhibitor use [39, 44, 48], longer ART use irrespective of ART schema [40], and HIV duration > 10 years [41], the latter two factors coinciding with older age.

Metabolic Syndrome—Five studies were included (Table 1) on metabolic syndrome (MetS) in older PWH (three from Brazil [16, 17, 50], two studies from several LAC countries [38, 51]). MetS prevalence ranged from 20 to 47% across all age groups [16, 17, 38] and was higher (47%) among 273 post-menopausal women with HIV age ≥ 40 years in Brazil [16]. Among older PWH, female sex and protease inhibitor use were both significantly associated with MetS [16, 17, 51], but there was no association between greater inflammatory biomarker levels and MetS [50]. Older men and post-menopausal women with HIV had a greater risk of developing MetS [16, 38].

Hypertension—Five studies (Table 1) reported hypertension prevalence among older PWH (three from Brazil [52-54], one from Peru [49], one from Mexico [47]). Age ≥ 40 years has increased risk of hypertension in all studies [47, 49, 52-54]. Four studies reported hypertension prevalence across all ages, but only one study ($N=305$) reported the prevalence of hypertension among PWH age ≥ 50 years at 19% ($n=111$ vs. 3.1% in younger ages, $p<.001$) [49].

Neurological Illness, Frailty, and Mental Health

HIV-Associated Neurocognitive Disorder—Eight publications (Table 2) were included that described HAND prevalence and associated risk factors among older PWH in LAC (seven from Brazil [55-61, 80], one from Mexico). Most commonly, the International HIV Dementia Scale (IHDS) [81] was applied [57-59, 61] with HAND prevalence ranging

from 37 to 64%, or the Mini-Mental State Exam (MMSE) [82] was used with reported prevalence from 27 to 37% [55, 60] across all ages. Several studies from Brazil did report NCI prevalence among PWH age ≥ 50 years at 23% [55], 36.5% [60], 43% [61], and 54% [58], respectively. Mild neurocognitive disorder (MND) and HIV-associated dementia, two HAND sub-types, were more frequent among PWH age ≥ 40 years in one Brazilian study ($N = 195$), but this age effect was lost when stratified by sex [59]. One study from Mexico found a higher prevalence of HAND (66%) among 206 PWH age ≥ 50 years which was associated with prefrailty [62•].

Mental Health—We included four studies (Table 2) on aging and depression in PWH from LAC (three from Brazil [57, 60, 63], one from Mexico [64]). The prevalence of depressive symptoms was 21% ($n = 114$) and 35% ($N = 52$) in two Brazilian studies [57, 60] and 15.9% in one study ($N = 328$) from Mexico [64], all among PWH age ≥ 50 years. Depressive symptoms were present in 27.7% of another Brazilian cohort of 72 PWH age ≥ 60 years [63]. One Brazilian study ($N = 392$) found no differences in depression rates between PWH ≥ 50 years and those younger than 50 ($p = 0.34$) [57]. Risk factors for worse depressive symptoms included being female, lower CD4 cell count, and being a current smoker [63]. Those with depression tended to have worse functional impairment [60]. In Mexico, depression risk factors among 328 PWH age ≥ 50 years included female sex, frailty, and disability in activities of daily living (ADLs) [64].

Bone and Musculoskeletal Disorders

Bone Mineral Density and Fracture Burden—Six studies conducted in LAC assessed BMD and MSK disorders among aging PWH (Table 3). Four studies [65-67, 69] reported prevalence of low BMD among older PWH compared to HIV-negative controls using dual X-ray absorptiometry (DXA) scan of the lumbar spine, femoral neck, and total hip with classification into osteoporotic, osteopenic (or low BMD), or normal categories according to the World Health Organization (WHO) guidelines [83]. Overall, low BMD across all ages was reported among 23% [65], 55% [67], and 63% [69] of three Brazilian cohorts, respectively, and low BMD of the lumbar spine in 14% [66]. All studies found age ≥ 50 years to be a risk factor for low BMD. Other risk factors included smoking, reduced physical activity, low body mass index, and menopause [65, 67]. One study of PWH age ≥ 50 years found that male sex increased the risk of low BMD [67], contrary to findings from other studies. Another small study of Chilean PWH found that all PWH with osteopenia or osteoporosis (63%) had low levels of vitamin D (40% were age ≥ 50 years) [69]. Vertebral fractures are the most common sequelae of osteoporosis [84], but only one study from Mexico reported a vertebral fracture prevalence of 25% among PWH age ≥ 40 years [70•]. This was the only study that reported fracture outcomes among older PWH in LAC.

Sarcopenia and Frailty—Among studies of MSK disorders, only one study reported sarcopenia prevalence with nearly 5 times (95% CI 1.34, 18.23) greater risk among older PWH, with a stronger association of sarcopenia among older virally suppressed PWH (mean age 59 years) compared to an HIV-negative group of individuals older than the comparison group (mean age 70 years, $p = 0.01$) [68]. Another study found that among 201 Brazilian PWH age ≥ 50 years, frailty was present in 19.4%, significantly greater compared to HIV-

negative individuals [85] with a mean age at least 15 years more than the study population [73].

Disability and Pain—HIV-associated pain, defined as presence of recent pain interfering with daily activities using the Brief Pain Inventory, was measured in older Brazilian PWH [71] (Table 3). Mild pain severity was present among 59.3% of the cohort, and pain severity worsened with increasing age [71]. In Mexico, Chaba et al. reported that 26.1% of PWH age 50 years had an impaired ability to perform activities of daily living (ADL) and 17.9% had difficulty with independent ADLs. Factors such as older age, lower education level, lower CD4 cells, and detectable viral load were independently associated with disability [72].

Renal Disease

Four papers (Table 3) explored age-related renal abnormalities among older PWH in LAC, all from Brazil [25, 74–76]. Santiago et al. found low glomerular filtration rates (GFR) in 4% of PWH (80% were age 40 years) using the Chronic Kidney Disease Epidemiology collaboration (CKD-EPI) equation [74]. In this study, PWH with lower GFR were more frequently age 50 years (51.4% vs. 18.7% age < 50 years), and factors independently associated with low GFR included age 50 years, diabetes, hypertension, lower CD4 cells, and past exposure to tenofovir or indinavir across all ages. Tenofovir-containing regimens and CD4 cells < 200 cells/mm³ were also associated with pathological proteinuria in another study of 666 PWH [76], with a majority of affected patients (68.3%) age 40 years. Menezes et al. explored the prevalence of mild GFR decrease (60–89 mL/min/1.73 m²) among 193 PWH and found that older PWH were at higher risk of mild GFR decrease, with every additional year of life associated with mild renal decline (aRR = 1.05, 95% CI 1.03, 1.06, *p* < 0.001) [25]. Moreover, another cross-sectional study found that age 50 years was also independently associated with low GFR (OR 3.3, 95% CI 1.11, 9.90) [75].

Non-AIDS-Related Malignancies

Three studies (Table 3) were included reporting cancer outcomes among older PWH, all conducted in Brazil [77, 79, 86]. Andrade et al. [77] reported a breast cancer incidence of 13% among PWH of all ages, similar to that observed in the general female population of Brazil. However, the mean age of cancer diagnosis for PWH in this study was 46 years, while in the general population, cancer incidence rates were most prevalent at 65–70 years of age. Another study found that 40% of NADM cases were among PWH age 50 years, which was associated with higher cancer risk (aOR 16.4, 95% CI 3.3, 80.5) [86]. Ferreira, et al. [79] explored cervical cancer outcomes among 87 PWH and 336 HIV-negative Brazilian women, and found that PWH had greater cervical cancer–specific mortality and relapse across all ages; however, women age 50 years with cervical cancer did not have a greater mortality risk (HR 0.71, 95% CI 0.46, 1.11).

Discussion

HIV remains prevalent throughout much of LAC. With increasing access to ART, PWH in LAC are living longer, accumulating NCD comorbidities with age with at least half of PWH age 50 years in LAC having at least one NCD [87, 88]. Our study demonstrates that few

publications to-date have focused on aging populations with HIV living in LAC, yet the burden of aging in HIV persists and continues to grow [89].

The majority of published studies on comorbidities associated with HIV did not focus on older populations nor did they report findings related to aging. This may be due to lower numbers of older PWH in LAC due to less access to ART compared with high-income countries [89]. We found only 14 studies that included exclusively older populations with HIV with older age defined differently by each author [16, 32, 34, 36, 37, 56, 60, 62•, 63, 64, 66, 70•, 72, 73]. Including only older PWH in studies allows determination of the true burden of disease with age [88]. We also found that the large majority of studies on aging and HIV were from Brazil (79%). Notably, there were no studies that met our inclusion criteria from the Spanish-speaking Caribbean (Cuba, Puerto Rico, Dominican Republic). Although the prevalence of HIV in the Caribbean is decreasing [4], there are older PWH who will need lifelong care in these countries, necessitating regional studies on aging PWH.

The majority of studies that met criteria for inclusion focused on CVD (27) or neurological or psychiatric outcomes (10). Within the CVD literature, different cardiovascular risk assessment tools were used, leading to varying prevalence of moderate-to-high cardiovascular risk. This stresses the need for implementation of a standard cardiovascular risk assessment tool applied in routine HIV care for determination of prognosis, appropriate lifestyle modification counseling [90, 91], and application of existing guidelines for hypertension management in the LAC region [92, 93]. Notably, we found no studies on longitudinal cardiovascular outcomes, such as cardiovascular death, stroke, or myocardial infarction among older PWH in LAC, likely because only two studies were longitudinal in nature and the rest were cross-sectional [38, 51]. Of the studies on NCI, we found differing NCI and HAND prevalence by country depending on the screening instrument utilized. Thus, optimization of an NCI screening instrument validated against a complete neuropsychological battery, the gold standard for diagnosis of HAND [94], for use in the LAC region is needed. With appropriate NCI screening in routine clinical care, targeted management of HAND can be applied uniformly across the LAC region (i.e., change in ART if necessitated, lifestyle modification) [21, 95]. Although depression risk is known to be greater in older PWH, there were few studies on the topic, and each study utilized different depression screening tools [63]. Again, as for CVD and NCI, a unified approach to identifying those older PWH at greatest risk for depression is needed to implement culturally appropriate mental health outreach and treatment strategies, increasing social support systems and community-wide interventions.

By contrast, we found few publications on MSK disorders (9), renal disease (4), and NADM (3) among older PWH from LAC or with age-related findings, although renal disease and NADM are known to increase with age in the setting of HIV [96, 97]. Post-menopausal women with HIV are known to be disproportionately affected by low BMD and osteoporosis; however, we found only one study [66] with exclusively older HIV-positive women, indicating a literature gap on the burden of osteoporosis among older women in LAC. Additionally, the lack of DXA scans in many LAC countries makes evaluation and treatment of bone disease in PWH difficult [70•]. The few studies on renal disease among older PWH were exclusively from Brazil [25, 74], thus studies are needed from other LAC

countries to determine risk of renal disease across the region. Similarly, few studies were identified on NADM in older PWH, and no studies were found regarding common malignancies with older age, such as lung, colorectal, or prostate cancer risk and outcomes [96, 98]. Thus, further work should focus on quantifying the burden of MSK disorders, renal disease, and NADM among aging PWH from LAC as they remain widespread among PWH worldwide [99].

Within each country, we found only prevalence data within a particular region or city in which the work was done, and these prevalence estimates were not standardized across any disease group or between countries, indicating the need for population-level epidemiological data across the LAC region to determine the true burden of comorbidities. Few studies have analyzed the role of multimorbidity and how NCDs occurring with aging may affect the incidence or prevalence of one another [10, 12-14, 27, 35, 100]. None of the studies reported on evidence-based practices for screening or management of these conditions in older age in LAC. Although the WHO has published guidelines on management of chronic comorbid conditions in HIV [101], culturally appropriate guidelines for HIV comorbidity management are needed across the LAC region.

We also found that very few aging studies from LAC were longitudinal in nature (two of 53) [38, 51], and none reported on long-term outcomes of HIV with aging. Further work may initiate longitudinal studies that can help identify long-term outcomes of chronic comorbidities in HIV. The majority of the publications we found were prevalence studies, and within the cardiovascular and NCI literature, prevalence of illness varied widely across studies depending on the instrument used and even within each individual country. Efforts to validate instruments that can be applied in the primary care setting across many LAC regions accounting for international variations in culture, language, or access to resources should be made. Only two studies [42, 56] investigated the pathophysiological mechanism of comorbidities in older PWH. This could be of particular importance in LAC given the wide genetic phenotypic variability and different HIV genotypes across the region that may modify predisposition and risk factors for disease [4]. Additionally, we found no studies on older men who have sex with men (MSM), transgender PWH, female sex workers, or intravenous drug users in LAC, four key populations known to be at high risk for HIV [4]. There was a lack of clinical trials pointing to the need for clinical trials targeting management of comorbid conditions of older PWH in LAC. A cohesive network focused on aging with HIV across the LAC region could bring together investigators with these interests and form cross-collaborations and research initiatives across LAC that could take on these research endeavors.

This study has limitations, including possible underreporting of the burden of aging on HIV-associated comorbidities due to publication bias, with investigators from LAC countries having more difficulty publishing in scientific journals compared with their high-income country counterparts. We found only three papers published in Spanish and four in Portuguese, which are less likely to reach the global scientific community. Second, we did not include studies from English- or French-speaking LAC countries as the focus of this study was on Spanish- or Portuguese-speaking Latino populations throughout LAC. Thus, our study results cannot be extrapolated to English- and French-speaking countries of LAC.

Third, it is known that HIV-related comorbidities occur at earlier ages compared with the general population. We included only studies reporting findings among PWH age 40 years or that reported on aging as a risk factor for disease to ensure a focus on aging as a risk factor throughout the region. Thus, there were publications that were not included on comorbidities in younger populations in our study. Lastly, most studies were from Brazil, and the prevalence and risk factors reported from these studies may not be generalizable across the LAC region.

Conclusions

Studies focused on the role of mechanisms of aging with HIV in LAC are needed, such as the role of immune senescence within specific pathologies (i.e., osteoporosis, CVD), the impact of chronic HIV-related co-infections commonly found in LAC on NCDs, differing HIV genotypes and characteristics, and the effect of sociocultural factors from LAC that may affect aging with HIV. Given the rich genetic diversity of LAC, more studies are warranted to determine if genetic variation and ancestry may affect aging in HIV. However, we identified no studies that investigated these factors. Because HIV remains prevalent throughout all of LAC, determining the burden of aging among PWH in all countries will help implement and drive policies to increase resources for this population across the region. WHO guidelines [101] exist on management of comorbidities that do not account for sociocultural factors encountered in LAC, thus efforts to create region-specific guidelines for HIV care and management should be pursued. Lastly, there is limited data throughout LAC on the prevalence of PWH by age group, as data collected are based on age of HIV diagnosis and not current age of the person, particularly for older people currently living with HIV throughout the LAC region. This limits the epidemiological inferences on aging with HIV that can be made. Finally, our study results have highlighted the lack of longitudinal studies among aging populations with HIV throughout LAC, other than Brazil, and the need for standardized comorbidity screening instruments to mitigate the wide variability in reported comorbidity rates throughout LAC.

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Appendix

Appendix A: Search Strategy

Search for Ovid Embase

Additional databases provided upon request: Alyssa.grimshaw@yale.edu

1. exp Caribbean Islands/
2. exp Caribbean/
3. (Caribbean or Carib or West Indies).mp.
4. (Anguilla* or Antilles or Antigua* or Aruba* or Barbuda or Bahamas or Bahamian* or Barbados or Barbadian* or Barthelemy or Saint Barthelemy or Barts or Bermuda or Bermudian* or Bonaire or Bonairian* or Cuba* or Cayman or Caymanian* or Curacao* or Caicos or Belonger* or croix or Crucian* or Dominica or Dominican Republic or Dominican* or Santo Domingo).mp.
5. (Eustatius or Grenada or Grenadian* or Guadeloupe* or grenadines or Haiti* or Hispaniola or Jamaica* or Martinique or Martiniquais or Martinican* or Puerto Rico or Puerto Rican* or Nevis or Nevisian* or Montserrat* or Virgin Island or Virgin Islands or Virgin Islander or Virgin Islanders or Saba or Statia or Suriname* or Trinidad or Tobago or Trinidadian or Tobagonian or Tortola or Turks Island* or French Guiana or French Guianese or Leeward or Windward).mp.
6. (USVI or BVI).ti,ab.
7. ("St Lucia" or Saint Lucia or Lucian* or "St Kitts" or Saint Kitts or Kittian* or Saint Martin or "St Martin" or St Marteen or Saint Marteen or "St Thomas" or "St John" or Saint Thomas or Saint John or Sint Marteen or Water islander* or st thomian* or st johnian*).mp.
8. exp "South and Central America"/
9. (Costa Rica* or El Salvador or Salvadoran* or Guatemala* or Honduras or Honduran* or Nicaragua* or Nica or Nicoya or Pinolero or Nicaraguenses or Panama or Panamanian*).mp.
10. (Argentina* or Chile or Chilean* or Ecuador* or Paraguay* or Uruguay*).mp.
11. (Andean or Latin America* or Central America* or South America* or Bolivia* or Colombia* or Peru* or Venezuela* or Mexico or Mexican* or Brazil*).mp.
12. or/1-11
13. exp Human immunodeficiency virus infection/
14. (human immunodeficienc* or human immun* deficienc* or acquired immunodeficiency syndrome or HIV or AIDS or HIV?AIDS).tw,kw.
15. (Human T?Cell Lymphotropic Virus Type III or Human T?Cell Lymphotropic Virus Type III or LAV-HTLV-III or Lymphadenopathy Associated Virus or HTLV-III or HTLVIII?LAV).tw,kw.
16. 13 or 14 or 15

17. 12 and 16
18. exp kidney disease/
19. ((renal or kidney) and (disease or failure* or insufficienc* or injury or injuries or dysfunction*)).tw,kw.
20. (kidney tubular necrosis or lower nephron nephrosis or lower nephron nephroses).tw,kw.
21. exp Rhabdomyolysis/
22. exp Thrombotic Microangiopathies/
23. exp Glomerular Filtration Rate/
24. (nephropath* or Rhabdomyolysis or rhabdomyolyses or Myoglobinuria* or Thrombotic Microangiopath* or urinary tract obstruction* or urinary obstruction* or urinary blockage* or tubulointerstitial renal or tubulo-interstitial renal or tubulointerstitial kidney* or tubulo-interstitial kidney* or Glomerular Filtration Rate*).tw,kw.
25. 18 or 19 or 20 or 21 or 22 or 23 or 24
26. 17 and 25
27. exp mood disorder/
28. exp cognitive defect/
29. exp neuropsychology/
30. exp "disorders of higher cerebral function"/
31. (Depression* or Depressive or Mood Disorder* or Mental Health or Affective Disorder* or neuropsychological or neuropsychiatric or dementia* or amentia* or senile* or senility or Alzheimer*).tw,kw.
32. ((Cognitive* or Neurocognitive*) adj3 (decline* or disorder* or impairment* or deterioration* or dysfunction*)).tw,kw.
33. 27 or 28 or 29 or 30 or 31 or 32
34. 17 and 33
35. exp malignant neoplasm/
36. (cancer* or malignanc* or neoplasm* or neoplasia* or tumor* or tumour* or leukemia* or carcinoma* or melanoma* or lymphoma).tw,kw.
37. (Human papillomavirus or human papilloma virus or HPV).tw,kw.
38. 35 or 36 or 37

39. 17 and 38
40. exp spine fracture/
41. exp hip fracture/
42. exp Bone Diseases, Metabolic/
43. exp bone mass/ or exp bone density/
44. (bone mass or bone densit* or bone mineral densit* or vertebral fracture* or spinal fracture* or hangman* fracture* or Intertrochanteric fracture* or hip fracture* or Trochanteric fracture* or Subtrochanteric fracture* or Vitamin D or Calcium or Body composition measurement* or frailty or osteopenia* or low bone densit* or bone disease* or osteoporosis or osteoporoses or bone loss).tw,kw.
45. 40 or 41 or 42 or 43 or 44
46. 17 and 45
47. exp cardiovascular disease/
48. exp Cholesterol/
49. (cardiovascular disease* or heart disease* or heart failure or stroke* or cerebrovascular accident* or Apoplex* or brain vascular accident* or heart attack* or myocardial infarct* or blood pressure* or hyperlipidemia* or Lipidemia* or Lipemia* or Hyperlipemia* or high blood pressure* or hypertension or Epicholesterol or cholesterol or cardiac fat infiltration* or myocardial fibrosis or cardiac fibrosis or left ventricular or systolic dysfunction* or diastolic dysfunction* or Atrial Fibrillation* or Thromboembolism* or Arteriosclerosis or Arterioscleroses or Coronary Artery Disease*).tw,kw.
50. 47 or 48 or 49
51. 17 and 50
52. (non-aids event* or non aids event* or serious clinical event* or non-aids clinical event* or non aids clinical event* or non-aids-related event* or non aids related event* or non-aids defining cancer* or non aids defining cancer* or NACD or NACDs or non-aids defining event* or non aids defining event* or non-aids morbidit* or non-aids morbidi* or non-aids endpoint* or non aids endpoint* or non-aids comorbidit* or non aids comorbidit*).tw,kw.
53. 12 and 52
54. 26 or 34 or 39 or 46 or 51 or 53

Appendix B:

Table of Excluded Studies

Year	First Author	Title	Journal	Exclusion Reason
2019	Abel	High prevalence of human papillomavirus infection in HIV-infected women living in French Antilles and French Guiana	PLoS ONE [Electronic Resource]	Wrong patient population
2018	Ablanedo-Terrazas	Prevalence and risk factors for oral human papillomavirus infection in Mexican HIV-infected men	Salud Publica de MÃ©xico	Wrong outcomes
1993	Abreu	[Cognitive deficit assessment in asymptomatic HIV-infected females]	Revista ABP-APAL	Wrong patient population
2017	Adenis	High prevalence of HPV infection in the remote villages of French Guiana: an epidemiological study	Epidemiology and Infection	Wrong patient population
2008	Agostini	Prevalence of dyslipidemia in HIV+ pregnant women, under high-effectiveness anti-retroviral treatment (HEAT). [Spanish]	Revista Medica de Rosario	Age<40 or not stratified by age
2005	Albuquerque	High frequency of Fredrickson's phenotypes IV and IIb in Brazilians infected by human immunodeficiency virus	BMC Infectious Diseases	Age<40 or not stratified by age
2017	Alderete-Aguilar	Assessment of depression, anxiety, hopelessness and suicidal risk in HIV+ inpatients	Salud Mental	Age<40 or not stratified by age
1994	Alegria	HIV infection, risk behaviors, and depressive symptoms among Puerto Rican sex workers	American Journal of Public Health	Wrong patient population
2010	Aleixo	DMFT index and oral mucosal lesions associated with HIV infection: cross-sectional study in Porto Velho, Amazonian region - Brazil	Brazilian Journal of Infectious Diseases	Wrong outcomes
2012	Alencastro	Metabolic syndrome and population attributable risk among HIV/AIDS patients: comparison between NCEP-ATPIII, IDF and AHA/NHLBI definitions	AIDS Research & Therapy [Electronic Resource]	Age<40 or not stratified by age
2011	Alencastro	Independent predictors of metabolic syndrome in HIV-infected patients	AIDS Patient Care and STDS	Age<40 or not stratified by age
2000	Alfonso	Prevalence of HPV in anal samples from Venezuelan male HIV positive patients	Eurogin 2000: 4th International Multidisciplinary Congress	Wrong outcomes
2019	AliagaRamos	Clinical and endoscopic findings of patients with cutaneous Kaposi sarcoma and gastrointestinal involvement. Experience in a single center of Lima-Peru in the last 3 years	Revista de GastroenterologÃ­a del PerÃº	Wrong outcomes
2018	Almeida	Biomarkers of neuronal injury and amyloid metabolism in the cerebrospinal fluid of patients infected with HIV-1 subtypes B and C	Journal of Neurovirology	Age<40 or not stratified by age
2016	Almeida	Blood-CSF barrier and compartmentalization of CNS cellular immune response in HIV infection	Journal of Neuroimmunology	Wrong outcomes
2015	Almeida	Colorectal cancer DNA methylation patterns from patients in Manaus, Brazil	Biological Research	Wrong patient population
2009	Almeida	Metabolic changes associated with antiretroviral therapy in HIV-positive patients	Revista de Saude Publica	Age<40 or not stratified by age

Year	First Author	Title	Journal	Exclusion Reason
2008	Almonte	Risk factors for human papillomavirus exposure and co-factors for cervical cancer in Latin America and the Caribbean. (Prevention of Cervical Cancer in the Latin America and Caribbean Region: Progress and Challenges on HPV Vaccination and Screening.)	Vaccine	Age<40 or not stratified by age
2008	Almonte	Risk factors for human papillomavirus exposure and co-factors for cervical cancer in Latin America and the Caribbean	Vaccine	Wrong outcomes
1992	Altieri	AIDS and the heart in the Caribbean: a silent entity	American Journal of Cardiovascular Pathology	Wrong outcomes
2015	Alvarez	Which HIV patients should be screened for osteoporosis: An international perspective	Current Opinion in HIV and AIDS	Age<40 or not stratified by age
2016	Alvarez-Tostado	The relationship between cognitive reserve and the clinical stage of HIV infection	AIDS Care	Age<40 or not stratified by age
2014	Alves	HIV-associated lipodystrophy: a review from a Brazilian perspective	Therapeutics and Clinical Risk Management	Age<40 or not stratified by age
2017	Alves	Use of the Coding Causes of Death in HIV in the classification of deaths in Northeastern Brazil	Revista de Saude Publica	Age<40 or not stratified by age
2017	Amador Romero	Cognitive slowing in HIV infection: a sign of premature aging? [Spanish]	Revista Cubana de Salud y Trabajo	Age<40 or not stratified by age
2019	Anaya-Saavedra	Impact of early recognition of potentially malignant oral disorders on the prognosis in people living with HIV	International Journal of STD & AIDS	Wrong outcomes
2013	Anaya-Saavedra	HPV oral lesions in HIV-infected patients: the impact of long-term HAART	Journal of Oral Pathology and Medicine	Wrong outcomes
2006	Andrade	Endothelial function and cardiovascular diseases in HIV infected patient	Brazilian Journal of Infectious Diseases	Age<40 or not stratified by age
2008	Andrade	Cross-sectional study of endothelial function in HIV-infected patients in Brazil	AIDS Research and Human Retroviruses	Age<40 or not stratified by age
2015	Andrade-Fuentes	Proximal renal tubular dysfunction related to antiretroviral therapy among HIV-infected patients in an HIV clinic in Mexico	AIDS Patient Care and STDs	Age<40 or not stratified by age
2016	Anonymous	Correction: Anal Human Papillomavirus (HPV) Prevalences and Factors Associated with Abnormal Anal Cytology in HIV-Infected Women in an Urban Cohort from Rio de Janeiro, Brazil (AIDS Patient Care and STDs (2015) 29 (4-12) DOI: 10.1089/apc.2014.0166)	AIDS Patient Care and STDs	Wrong outcomes
2016	Anonymous	Corrigendum to: Cervical cancer screening practices, knowledge of screening and risk, and highly active antiretroviral therapy adherence among women living with human immunodeficiency virus in Lima, Peru (International Journal of STD & AIDS, (2016), 10.1177/0956462416678121)	International Journal of STD and AIDS	Wrong outcomes
2019	Anonymous	Correction: Case of primary bilateral diffuse large B-cell lymphoma of the ovary with plasmablastic features in an HIV-negative female patient (BMJ Case Reports (2017) 2017 DOI: 10.1136/bcr-2016-218117)	BMJ Case Reports	Wrong patient population

Year	First Author	Title	Journal	Exclusion Reason
2004	Anton	Estudio de una serie clinica de pacientes infectados por el VIH mayores de 50 años	Enferm Infecc Microbiol Clin	Wrong Patient Population
2015	Antonello	Urinary protein-to-creatinine ratio versus 24-h proteinuria in the screening for nephropathy in HIV patients	International Journal of STD & AIDS	Age<40 or not stratified by age
2018	Anzinger	Glut1 expression level on inflammatory monocytes is associated with markers of cardiovascular disease risk in HIV-infected individuals	JAIDS, Journal of Acquired Immune Deficiency Syndromes	Wrong patient population
2012	Araujo	Incidence of cervical intraepithelial neoplasia in a cohort of HIV-infected women	International Journal of Gynecology & Obstetrics	Age<40 or not stratified by age
2012	Arentoft	Multidimensional effects of acculturation on English-language neuropsychological test performance among HIV+ Caribbean Latinas/os	Journal of Clinical & Experimental Neuropsychology: Official Journal of the International Neuropsychological Society	Wrong setting
2006	Arrivillaga	Anxiety, depression and perception of control in women diagnosed with HIV/AIDS	Pensamiento Psicologico	Age<40 or not stratified by age
2015	Arruda	Patients with HIV/Aids in use of protease inhibitors and relationship between nutritional status and hypertension	Revista de Ciencias Medicas	Age<40 or not stratified by age
1983	Autran	AIDS in a Haitian woman with cardiac Kaposi's sarcoma and Whipple's disease	Lancet	Wrong patient population
2014	Azevedo	Cognitive/affective disorders associated with HAART and the quality of life in the context of AIDS	Revista Interamericana de Psicologia	Age<40 or not stratified by age
1996	Bacchi	AIDS-related lymphoma in Brazil. Histopathology, immunophenotype, and association with Epstein-Barr virus	American Journal of Clinical Pathology	Wrong outcomes
2013	Bacci	Acute lymphocytic leukaemia and AIDS	BMJ Case Reports	Wrong outcomes
2018	Badial	Detection and genotyping of human papillomavirus (HPV) in HIV-infected women and its relationship with HPV/HIV co-infection	Medicine	Wrong outcomes
2012	Baird	Mental health of Caribbean women with HIV/AIDS	Psychology	Wrong patient population
2018	Bakal	Obesity following ART initiation is common and influenced by both traditional and HIV-/ART-specific risk factors	Journal of Antimicrobial Chemotherapy	Age<40 or not stratified by age
2013	Bambury	Cervical intraepithelial neoplasia in a cohort of HIV-positive women at the University Hospital of the West Indies: management and outcome	West Indian Medical Journal	Wrong patient population
2018	Beraldo	Anthropometric measures of central adiposity are highly concordant with predictors of cardiovascular disease risk in HIV patients	American Journal of Clinical Nutrition	Age<40 or not stratified by age
2017	Beraldo	Body fat redistribution and changes in lipid and glucose metabolism in people living with HIV/AIDS	Revista Brasileira de Epidemiologia	Age<40 or not stratified by age
2013	Barbosa	Impact of antiretroviral therapy on bone metabolism markers in HIV-seropositive patients	Bone	Age<40 or not stratified by age
2004	Basurco	Cervical squamous intraepithelial lesions among HIV infected women in Lima, Peru:	Xv International Aids Conference:	Abstract

Year	First Author	Title	Journal	Exclusion Reason
		Screening implications in a resource limited setting	Epidemiology and Prevention	
2018	Batavia	Blood pressure and mortality in a prospective cohort of HIV-infected adults in Port-au-Prince, Haiti	Journal of Hypertension	Wrong patient population
2014	Beck-Sague	Depression and response to Antiretroviral Therapy in the Dominican Republic	Journal of AIDS and Clinical Research	Age<40 or not stratified by age
1987	Beckett	Symptomatic HIV infection of the CNS in a patient without clinical evidence of immune deficiency	American Journal of Psychiatry	Wrong patient population
2018	BeckfordJarrett	High prevalence of psychiatric and substance use disorders among persons seeking treatment for HIV and other STIs in Jamaica: a short report	AIDS Care	Wrong patient population
2015	BeltranPerez	Social determinants of mental health among latino msm living with hiv/aids on the u.s.-mexico border	Dissertation Abstracts International: Section B: The Sciences and Engineering	Wrong patient population
1991	Beral	AIDS-associated non-Hodgkin lymphoma	Lancet	Wrong outcomes
1986	Berg	Vasculitis in a suspected AIDS patient	Southern Medical Journal	Wrong patient population
2003	Berretta	Therapeutic approaches to AIDS-related malignancies	Oncogene	Wrong outcomes
1996	Bessell	Primary non-Hodgkin's lymphoma of the CNS treated with BVAM or CHOD/BVAM chemotherapy before radiotherapy	Journal of Clinical Oncology	Wrong patient population
2017	Betancur	Quality of life, anxiety and depression in patients with HIV/AIDS who present poor adherence to antiretroviral therapy: a cross-sectional study in Salvador, Brazil	Brazilian Journal of Infectious Diseases	Age<40 or not stratified by age
2015	Blas	HPV Prevalence in Multiple Anatomical Sites among Men Who Have Sex with Men in Peru	PLoS ONE [Electronic Resource]	Wrong outcomes
2012	Borato	Changes of metabolic and inflammatory markers in HIV infection: glucose, lipids, serum Hs-CRP and myeloperoxidase	Metabolism, Clinical and Experimental	Age<40 or not stratified by age
2015	Boyd	Body composition outcomes at 96 weeks in the second-line RCT DXA sub study	Topics in antiviral medicine.	Abstract
2018	Branas	Cronicidad, envejecimiento y multimorbilidad	Enferm Infecc Microbiol Clin.	Wrong Patient Population
2003	Bruera	Decreased bone mineral density in HIV-infected patients is independent of antiretroviral therapy	AIDS	Age<40 or not stratified by age
2014	Burkhalter	Prevalence and risk factors for chronic kidney disease in a rural region of Haiti	Swiss Medical Weekly	Wrong patient population
2019	Caballero-Suarez	Effects of cognitive-behavioural therapy on anxiety, depression and condom use in people with HIV in Mexico City: a pilot study	Psychology Health & Medicine	Age<40 or not stratified by age
2017	Caballero-Suarez	Comparison of levels of anxiety and depression between women and men living with HIV of a Mexico City clinic	Salud Mental	Age<40 or not stratified by age
1993	Cabie	[Renal parenchymatous involvements in African and Caribbean patients with human immunodeficiency virus infection. Apropos of 10 cases]	Annales de Medecine Interne	Wrong patient population
2012	Cabrera	[HIV-related lymphoma in a public hospital in Chile. Analysis of 55 cases]	Revista Medica de Chile	Wrong outcomes

Year	First Author	Title	Journal	Exclusion Reason
2019	Cabrera	Argentina and Uruguay: a comparison of the mortality rate from sexually transmitted diseases in persons aged 50 and over during the five-year periods 1997-2001 and 2010-2014	Poblacion Y Salud En Mesoamerica	Wrong outcomes
2000	Cahn	AIDS in Latin America	Infectious Disease Clinics of North America	Wrong outcomes
2014	Calvetti	Psychosocial factors associated with adherence to treatment and quality of life in people living with HIV/AIDS in Brazil	Jornal Brasileiro de Psiquiatria	Age<40 or not stratified by age
2019	Camargo	Depression and coping are associated with failure of adherence to antiretroviral therapy among people living with HIV/AIDS. (Special Issue: Aging and HIV.	AIDS Research and Human Retroviruses	Age<40 or not stratified by age
2018	Camargo	Association of HIV status with infection by multiple HPV types	Tropical Medicine & International Health	Wrong outcomes
2014	Camargo	Human papillomavirus detection in women with and without human immunodeficiency virus infection in Colombia	BMC Cancer	Wrong outcomes
2015	Cambou	Anal human papillomavirus (HPV) prevalences and factors associated with abnormal anal cytology in HIV-infected women in an urban cohort from Rio de Janeiro, Brazil	AIDS Patient Care and STDS	Wrong outcomes
2015	Cambou	Time trend analysis of cervical high-risk human papillomavirus (HPV) in HIV-infected women in an urban cohort from Rio de Janeiro, Brazil: the rise of non-16/18 HPV	International Journal of Infectious Diseases	Wrong outcomes
2010	Campos	Anxiety and depression symptoms as risk factors for non-adherence to antiretroviral therapy in Brazil	AIDS and Behavior	Duplicate paper
2005	Campos	Prevalence of human papillomavirus and its genotypes in the uterine cervix of HIV-infected and non-infected women	Revista Brasileira de Ginecologia e Obstetricia	Wrong outcomes
2013	Cantres-Rosario	Cathepsin B and cystatin B in HIV-seropositive women are associated with infection and HIV-1-associated neurocognitive disorders	AIDS	Age<40 or not stratified by age
2015	Canuto	Risk factors associated with hypovitaminosis D in HIV/aids-infected adults	Archives of Endocrinology & Metabolism	Age<40 or not stratified by age
2015	Cardenas	Relation of cerebrospinal fluid/plasma HIV-RNA discordance with neurocognitive impairment	National Medical Journal of India	Age<40 or not stratified by age
2013	Cardoso	Aging with HIV: A practical review	Brazilian Journal of Infectious Diseases	Brazilian Journal of Infectious Diseases
2009	Carpio	Oral manifestations of HIV infection in adult patients from the province of Sancti Spiritus, Cuba	Journal of Oral Pathology and Medicine	Wrong outcomes
2015	Carr	Prevalence of and risk factors for low bone mineral density in untreated HIV infection: A sub study of the INSIGHT Strategic Timing of AntiRetroviral Treatment (START) trial	HIV Medicine	Age<40 or not stratified by age
1999	Carreiro-Rodriguez	Hypertrophic pulmonary osteoarthropathy in acquired immunodeficiency syndrome. Case report and review	Investigacion Clinica	Wrong outcomes

Year	First Author	Title	Journal	Exclusion Reason
2006	Carvalho	Evaluation of neuropsychological performance of HIV-infected patients with minor motor cognitive dysfunction treated with highly active antiretroviral therapy	Infection	Wrong outcomes
2018	Carvalho	Evaluation of inflammatory biomarkers, carotid intima-media thickness and cardiovascular risk in HIV-1 treatment-naive patients	Revista da Sociedade Brasileira de Medicina Tropical	Age<40 or not stratified by age
2012	Casariego	Statistical method analysis of oral manifestations in HIV/Aids patients before and after antiretroviral therapy. [Spanish]	Salud(i)Ciencia	Wrong outcomes
2009	Casseus	The diagnosis of HIV/AIDS as traumatic for Haitian women: An Internet study exploring depression, stigmatization, social support, and any positive outcomes---toward a tailored model of care	Dissertation Abstracts International Section A: Humanities and Social Sciences	Wrong patient population
2015	Castilho	HIV and cancer: a comparative retrospective study of Brazilian and U.S. clinical cohorts	Infectious Agents & Cancer [Electronic Resource]	Age<40 or not stratified by age
2015	Castilho	A cross-sectional study of high-risk human papillomavirus clustering and cervical outcomes in HIV-infected women in Rio de Janeiro, Brazil	BMC Cancer	Age<40 or not stratified by age
1995	Castillo	Effects of a program of psychological counseling on the levels of anxiety and depression in HIV+ patients	Avances en Psicología Clínica Latinoamericana	Wrong setting
2008	Castro	Vascular access-related infections in HIV patients undergoing hemodialysis: Case description and literature review	Brazilian Journal of Infectious Diseases	Wrong patient population
2018	Castro	Sudden bilateral sensorineural hearing loss in a patient immunocompromised by the human immunodeficiency virus	Revista da Sociedade Brasileira de Medicina Tropical	Wrong outcomes
2004	Castro-Sansores	HIV-encephalopathy as initial manifestation of acquired immunodeficiency syndrome in Yucatan State, Mexico	Archives of Medical Research	Wrong outcomes
2006	Castro-Sansores	[Hyperlipidemia and glucose intolerance in patients with HIV infection receiving antiretroviral therapy]	Salud Publica de México	Age<40 or not stratified by age
2006	Castro-Sansores	Comparison of three methods for estimating cardiovascular risk in a population of patients with HIV infection. [Spanish]	Medicina Interna de Mexico	Age<40 or not stratified by age
2012	Castro-Sansores	Prevalence of few atherogenic lipid phenotypes in patients with HIV, with and without antiretroviral therapy. [Spanish]	Medicina Interna de Mexico	Age<40 or not stratified by age
2007	Catzin-Kuhlmann	Human immunodeficiency virus-infected subjects have no altered myocardial perfusion	International Journal of Cardiology	Age<40 or not stratified by age
2008	Catzin-Kuhlmann	No evidence of increased risk for certain highly atherogenic lipoprotein phenotypes in HIV-infected patients	Archives of Medical Research	Age<40 or not stratified by age
2007	Cavalcante	Prevalence of persistent proteinuria in stable HIV/AIDS patients and its association with HIV nephropathy	Brazilian Journal of Infectious Diseases	Age<40 or not stratified by age
2019	Ceballos	Vitamin D and bone mineral density in HIV newly diagnosed therapy-naive patients without any secondary causes of osteoporosis	Calcified Tissue International	Wrong outcomes
2019	Cecchini	Women of Reproductive Age Living with HIV in Argentina: Unique Challenges for Reengagement in Care	Journal of the International Association of Providers of AIDS Care	Age<40 or not stratified by age

Year	First Author	Title	Journal	Exclusion Reason
2011	Ceccato	Antiretroviral therapy-associated dyslipidemia in patients from a reference center in Brazil	Brazilian Journal of Medical and Biological Research	Wrong outcomes
2015	Ceccato Junior	Prevalence of cervical infection by human papillomavirus and cervical intraepithelial neoplasia in HIV-positive and negative women	Revista Brasileira de Ginecologia e Obstetricia	Age<40 or not stratified by age
2016	Ceccato Junior	Incidence of cervical human papillomavirus and cervical intraepithelial neoplasia in women with positive and negative HIV status	Revista Brasileira de Ginecologia e Obstetricia	Age<40 or not stratified by age
2014	Cecchini	Evolution of Framingham cardiovascular risk score in HIV-infected patients initiating EFV – and LPV/r-based HAART in a Latin American cohort	Journal of the International AIDS Society	Wrong study design
2011	Cedeno-Laurent	Gliomas and brain lymphomas in HIV-1/AIDS patients: reflections from a 20-year follow up in Mexico and Brazil	Microbiology Research	Age<40 or not stratified by age
2008	Cerqueira	New variants of human papillomavirus type 18 identified in central Brazil	Virus Genes	Wrong outcomes
2016	Chang	Mucocutaneous malignancies in patients with AIDS. Report of 32 cases	Our Dermatology Online	Wrong outcomes
2009	Charua-Guindic	Anal intraepithelial neoplasia and human papillomavirus infection in anoreceptive patients. [Spanish]	Revista de Gastroenterología de México	Age<40 or not stratified by age
2012	Chaves	Prevalence of abnormal anal cytology in women infected with HIV	Journal of Medical Virology	Wrong outcomes
2001	Chernilo	Pulmonary involvement due to disseminated non Hodgkin lymphoma in one patient with AIDS	Revista Medica de Chile	Wrong outcomes
2005	Chernilo	[Lung diseases among HIV infected patients admitted to the "Instituto Nacional del Torax" in Santiago, Chile]	Revista Medica de Chile	Wrong outcomes
1999	Christian	Pulmonary hypertension and HIV infection. Report of one case	Revista Medica de Chile	Age<40 or not stratified by age
2013	Christo	Neurocognitive performance in patients with AIDS in Brazil: A case-control study	Clinical Neuropsychiatry	Age<40 or not stratified by age
2010	Christo	Cognitive alterations associated with HIV-1 infection and Aids	Revista da Associacao Medica Brasileira	Wrong outcomes
2005	Christo	HIV-1 RNA levels in cerebrospinal fluid and plasma and their correlation with opportunistic neurological diseases in a Brazilian AIDS reference hospital	Arquivos de Neuro-Psiquiatria	Age<40 or not stratified by age
2018	Cibrian-Ponce	Changes in cardiovascular risk and clinical outcomes in a HIV/AIDS cohort study over a 1-year period at a specialized clinic in Mexico	Therapeutics and Clinical Risk Management	Age<40 or not stratified by age
2010	Clarke	Depression among persons attending a HIV/AIDS outpatient clinic in Kingston, Jamaica	West Indian Medical Journal	Wrong patient population
2004	Coelho	Association of cervical intraepithelial neoplasia with CD4 T cell counts and viral load in HIV-infected women	cancer Epidemiology	Age<40 or not stratified by age
2015	Coelho	Vitamin D³ supplementation in HIV infection: effectiveness and associations with antiretroviral therapy	Nutrition Journal	Duplicate paper

Year	First Author	Title	Journal	Exclusion Reason
2005	Collins	High proportion of T-cell systemic non-Hodgkin lymphoma in HIV-infected patients in Lima, Peru	Journal of Acquired Immune Deficiency Syndromes: JAIDS	Wrong outcomes
2008	Cornejo-Juarez	AIDS and non-Hodgkin's lymphoma. Experience at an oncological center in Mexico	Revista de Investigaci3n Cl3nica	Wrong outcomes
2011	Conrado	Vitamin D Deficiency in HIV-Infected Women on Antiretroviral Therapy Living in the Tropics	Journal of the International Association of Physicians in AIDS Care: IAPAC	Age<40 or not stratified by age
2018	Cornejo-Juarez	Non-AIDS defining cancer (NADC) among HIV-infected patients at an oncology tertiary-care center in Mexico	AIDS Research & Therapy [Electronic Resource]	Age<40 or not stratified by age
2000	Corti	Cavum lymphoma in a hemophiliac patient with AIDS	Medicina	Wrong outcomes
2006	Corti	[Non-Hodgkin's lymphomas of the digestive tract and aneal glands in AIDS patients]	Acta Gastroenterologica Latinoamericana	Wrong outcomes
2004	Corti	Oligodendroglioma in a patient with AIDS: case report and review of the literature	Revista do Instituto de Medicina Tropical de Sao Paulo	Age<40 or not stratified by age
2004	Corti	[Primary central nervous system lymphomas in AIDS patients]	Enfermedades Infecciosas y Microbiolog3a Cl3nica	Wrong outcomes
2005	Corti	Primary pulmonary AIDS-related lymphoma	Revista do Instituto de Medicina Tropical de Sao Paulo	Wrong outcomes
2007	Corti	Burkitt's lymphoma of the duodenum in a patient with AIDS	Revista da Sociedade Brasileira de Medicina Tropical	Wrong outcomes
2011	Corti	Non-Hodgkin lymphomas of the oral cavity in AIDS patients in a reference hospital of infectious diseases in Argentina: report of eleven cases and review of the literature	Journal of Gastrointestinal Cancer	Wrong outcomes
2012	Corti	Anal squamous carcinoma: a new AIDS-defining cancer? Case report and literature review	Revista do Instituto de Medicina Tropical de Sao Paulo	Age<40 or not stratified by age
2015	Corti	Primary central nervous system lymphoma as first manifestation of AIDS. Report of a case and literature review	Revista de Patologia Tropical	Wrong outcomes
2014	Corti	Primary extranodal non-hodgkin lymphoma of the head and neck in patients with acquired immunodeficiency syndrome: a clinicopathologic study of 24 patients in a single hospital of infectious diseases in Argentina	International Archives of Otorhinolaryngology	Wrong outcomes
2007	Corti	Oral cavity lymphoma as secondary AIDS-defining neoplasm in a patient on HAART with immune reconstitution	Revista da Sociedade Brasileira de Medicina Tropical	Wrong outcomes
2006	Corti	Central nervous system involvement in Hodgkin's lymphoma associated with Epstein-Barr virus in a patient with AIDS: Case report and review of the literature	Brazilian Journal of Infectious Diseases	Wrong outcomes
2010	Corti	AIDS related lymphomas: histopathological subtypes and association with Epstein Barr virus and Human Herpes virus type-8	Medicina	Wrong outcomes
2010	Corti	Non Hodgkin's lymphoma with cutaneous involvement in AIDS patients: report of five cases and review of the literature	Brazilian Journal of Infectious Diseases	Wrong outcomes

Year	First Author	Title	Journal	Exclusion Reason
2009	Costa	Prevalence of human papillomaviruses in urine samples of male patients infected with HIV-1 in Sao Paulo, Brazil	Journal of Medical Virology	Wrong outcomes
2014	Crabtree-Ramirez	HIV and noncommunicable diseases (NCDs) in Latin America: A call for an integrated and comprehensive response	Journal of Acquired Immune Deficiency Syndromes	Age<40 or not stratified by age
2014	Cruz	High-risk HPV DNA test for screening anal lesions in HIV-positive and negative patients	Journal of AIDS and Clinical Research	Wrong outcomes
2013	Cruz	Screening-related factors in anal canal lesions in HIV-positive patients	Journal of AIDS and Clinical Research	Wrong outcomes
2015	Cruz-Rodriguez	Tenofovir and its relation to osteoporosis in HIV-patients. [Spanish]	Medicina Interna de Mexico	Age<40 or not stratified by age
2018	Cuellar	Prognostic factors in HIV-positive patients with non-Hodgkin lymphoma: a Peruvian experience	Infectious Agents & Cancer [Electronic Resource]	Wrong outcomes
2019	Cunha	Vitamin D serum levels in HIV patients and its association with clinical and nutritional factors	Nutricion Clinica y Dietetica Hospitalaria	Age<40 or not stratified by age
2013	Cunha	Serum levels of IgG antibodies against oxidized LDL and atherogenic indices in HIV-1-infected patients treated with protease inhibitors	Clinical Chemistry and Laboratory Medicine	Age<40 or not stratified by age
2015	Dal-Bo	Depressive Symptoms and Associated Factors among People Living with HIV/AIDS	Journal of the International Association of Providers of AIDS Care	Age<40 or not stratified by age
2009	Dames	The prevalence of cervical cytology abnormalities and human papillomavirus in women infected with the human immunodeficiency virus	Infectious Agents & Cancer [Electronic Resource]	Wrong patient population
2014	Dames	High-risk cervical human papillomavirus infections among human immunodeficiency virus-positive women in the Bahamas	PLoS ONE [Electronic Resource]	Wrong patient population
2015	daRocha	Polymorphisms associated with renal adverse effects of antiretroviral therapy in a Southern Brazilian HIV cohort	Pharmacogenetics and Genomics	Wrong outcomes
2015	daSilva	Association between religiousness and mental health in patients with HIV	Psicologia: Teoria e Pratica	Age<40 or not stratified by age
2006	deAlmeida	Human immunodeficiency virus and the central nervous system	Brazilian Journal of Infectious Diseases	Wrong outcomes
2013	deAlmeida	Neurocognitive impairment in HIV-1 clade C-versus B-infected individuals in Southern Brazil	Journal of Neurovirology	Age<40 or not stratified by age
2016	deAlmeida	Biomarkers of chemotaxis and inflammation in cerebrospinal fluid and serum in individuals with HIV-1 subtype C versus B	Journal of Neurovirology	Wrong outcomes
2016	deAlmeida	Suicide risk and prevalence of major depressive disorder (MDD) among individuals infected with HIV-1 subtype C versus B in Southern Brazil	Journal of Neurovirology	Age<40 or not stratified by age
2017	deAlmeida	Improving Detection of HIV-Associated Cognitive Impairment: Comparison of the International HIV Dementia Scale and a Brief Screening Battery	Journal of Acquired Immune Deficiency Syndromes: JAIDS	Age<40 or not stratified by age
2018	deAlmeida	Nephrilysin in the Cerebrospinal Fluid and Serum of Patients Infected With HIV1-Subtypes C and B	Journal of Acquired Immune Deficiency Syndromes: JAIDS	Age<40 or not stratified by age

Year	First Author	Title	Journal	Exclusion Reason
2018	deAlmeida	Neurocognitive impairment with hepatitis C and HIV co-infection in Southern Brazil	Journal of Neurovirology	Age<40 or not stratified by age
2011	deBrito	Markers of vulnerability for cervical cancer in HIV-infected women	Revista Latino Americana de Enfermagem	Age<40 or not stratified by age
2010	DeLaHaye	Patterns of depressive symptoms among patients with HIV infection	West Indian Medical Journal	Wrong patient population
2017	Delgado	Cervical cancer screening practices, knowledge of screening and risk, and highly active antiretroviral therapy adherence among women living with human immunodeficiency virus in Lima, Peru	International Journal of STD & AIDS	Wrong outcomes
2011	deMattos	Diversity and uncommon HPV types in HIV seropositive and seronegative women attending an STI clinic	Brazilian Journal of Microbiology	Wrong outcomes
2018	Deresz	Dietary intake and cardiovascular risk among people living with HIV/AIDS	Ciencia & Saude Coletiva	Age<40 or not stratified by age
1993	deSanjose	Prostitution, HIV, and cervical neoplasia: a survey in Spain and Colombia	Cancer Epidemiology, Biomarkers & Prevention	Age<40 or not stratified by age
2013	deSousa	Prevalence of bipolar disorder in a HIV-infected outpatient population	AIDS Care	Age<40 or not stratified by age
2018	DeSouza	Comparison of pain burden and psychological factors in Brazilian women living with HIV and chronic neuropathic or nociceptive pain: An exploratory study	PLoS ONE [Electronic Resource]	Age<40 or not stratified by age
2016	Diaz	Traditional and HIV-specific risk factors for cardiovascular morbidity and mortality among HIV-infected adults in Brazil: a retrospective cohort study	BMC Infectious Diseases	Age<40 or not stratified by age
2008	Diehl	[Prevalence of HIV-associated lipodystrophy in Brazilian outpatients: relation with metabolic syndrome and cardiovascular risk factors]	Arquivos Brasileiros de Endocrinologia e Metabologia	Age<40 or not stratified by age
2007	Domingos	Dyslipidaemia associated with the highly active antiretroviral therapy in AIDS patient: Reversion after switching (stavudine to tenofovir and lopinavir/ritonavir to atazanavir/ritonavir)	Brazilian Journal of Infectious Diseases	Age<40 or not stratified by age
2009	Domingos	Metabolic effects associated to the highly active antiretroviral therapy (HAART) in AIDS patients	Brazilian Journal of Infectious Diseases	Age<40 or not stratified by age
2014	Domingues	Causes of death among people living with AIDS in the pre- and post-HAART Eras in the city of Sao Paulo, Brazil	PLoS ONE [Electronic Resource]	Duplicate paper
2016	Duarte	Anal cancer diagnosis in patients with human papillomavirus (HPV) and human immunodeficiency virus (HIV) coinfection	Revista do Instituto Adolfo Lutz	Wrong patient population
2019	Duran	[High prevalence of hypovitaminosis D in HIV-infected persons attending an outpatient clinic, Buenos Aires city]	Medicina	Age<40 or not stratified by age
2014	Elenga	Incidence and predictive factors of depression among patients with HIV infection in Guadeloupe: 1988-2009	International Journal of STD & AIDS	Wrong patient population
2013	Eller	A randomized controlled trial of an HIV/AIDS Symptom Management Manual for depressive symptoms	AIDS Care	Age<40 or not stratified by age

Year	First Author	Title	Journal	Exclusion Reason
2014	Eller	Depressive symptoms, self-esteem, HIV symptom management self-efficacy and self-compassion in people living with HIV	AIDS Care	Wrong patient population
2010	Eller	Prevalence, correlates, and self-management of HIV-related depressive symptoms	AIDS Care	Age<40 or not stratified by age
2007	Ellis	NeuroAIDS in Brazil	Journal of Neurovirology	Age<40 or not stratified by age
2010	Entiauspe	[Human papillomavirus: prevalence and genotypes found among HIV-positive and negative women at a reference center in the far south of Brazil]	Revista da Sociedade Brasileira de Medicina Tropical	Wrong outcomes
2004	Everall	Proteomic pointers in HIV neurocognitive disorder	The Lancet	Wrong patient population
2008	Fasce	Depression and social support among men and women living with HIV	Journal of Applied Biobehavioral Research	Age<40 or not stratified by age
2013	Fazito	Trends in non-AIDS-related causes of death among adults with HIV/AIDS, Brazil, 1999 to 2010	Cadernos de Saúde Publica	Age<40 or not stratified by age
1997	Fernandez	Psychological and behavioral issues of a cohort of Puerto Rican HIV/AIDS patients	Cellular and Molecular Biology	Wrong patient population
2013	Ferreira	The effects of a diet formulation with oats, soybeans, and flax on lipid profiles and uricemia in patients with AIDS and dyslipidemia	Revista da Sociedade Brasileira de Medicina Tropical	Age<40 or not stratified by age
2016	Ferreira	Prevalence of hypovitaminosis D and its association with oral lesions in HIV-infected Brazilian adults	Revista da Sociedade Brasileira de Medicina Tropical	Age<40 or not stratified by age
2012	Figliuolo	Clinical and laboratorial study of F1PV infection in men infected with HIV	International Braz J Urol	Wrong outcomes
2011	Fink	Cancer in HIV-infected persons from the Caribbean, Central and South America	Journal of Acquired Immune Deficiency Syndromes: JAIDS	Age<40 or not stratified by age
2018	Fink	Survival after cancer diagnosis in a cohort of HIV-positive individuals in Latin America	Infectious Agents & Cancer [Electronic Resource]	Age<40 or not stratified by age
2003	Fontes	Endocrine disorders in Brazilian patients with acquired immune deficiency syndrome	Clinical Infectious Diseases	Wrong outcomes
2010	Francischini	HIV-associated oral plasmablastic lymphoma and role of adherence to highly active antiretroviral therapy	International Journal of STD & AIDS	Wrong outcomes
2019	Frank	Global, regional, and national incidence, prevalence, and mortality of HIV, 1980-2017, and forecasts to 2030, for 195 countries and territories: a systematic analysis for the Global Burden of Diseases, Injuries, and Risk Factors Study 2017	The Lancet HIV	Age<40 or not stratified by age
2015	Galindo	Knowledge, attitudes and practices towards nutrition among persons living with HIV/AIDS and their relation with metabolic syndrome. Cali-Colombia	Perspectivas en Nutricion Humana	Age<40 or not stratified by age
1998	Garau	Guidelines for the evaluation, diagnosis, and treatment of cognitive disturbances associated with HIV infection. [Spanish]	Revista Neurologica Argentina	Wrong patient population
2018	Graces	Prevalence and risk factors of HBV, HCV, and HIV infections among cervical cancer patients	European Journal of Gynaecological Oncology	Age<40 or not stratified by age

Year	First Author	Title	Journal	Exclusion Reason
2011	Garcia-Cedillo	Mental disease indicators in Mexican patients with AIDS and its link with therapeutic adherence	Actualidades en Psicología	Age<40 or not stratified by age
2009	Gaviria	Copying strategies, anxiety and depression in HIV/Aids patients. [Spanish]	Terapia Psicologica	Age<40 or not stratified by age
2006	Geraix	Bezafibrate for the treatment of hypertriglyceridemia in HIV1-infected patients on highly active antiretroviral therapy	Brazilian Journal of Infectious Diseases	Age<40 or not stratified by age
2018	Ghelfi	New capa-dependent cystatin c equation: Increased detection of decreased glomerular filtration in hiv-infected patients. [Spanish]	Revista de Nefrologia, Dialisis y Trasplante	Age<40 or not stratified by age
2011	Gijon-Mitre	Primary central nervous system lymphoma associated with acquired immunodeficiency syndrome: A 10-year experience in a referral hospital. [Spanish]	Revista Mexicana de Neurociencia	Wrong outcomes
2011	Gimenez	The value of high-resolution anoscopy in the diagnosis of anal cancer precursor lesions in HIV-positive patients	Arquivos de Gastroenterologia	Age<40 or not stratified by age
2017	Godoi	Intima-Media Thickness in the Carotid and Femoral Arteries for Detection of Arteriosclerosis in Human Immunodeficiency Virus-Positive Individuals	Arquivos Brasileiros de Cardiologia	Age<40 or not stratified by age
2016	Gomes	Incidence of Diabetes Mellitus and Obesity and the Overlap of Comorbidities in HIV+ Hispanics Initiating Antiretroviral Therapy	PLoS ONE [Electronic Resource]	Age<40 or not stratified by age
2010	GomezPadron	Cardiovascular disorders in patients with HIV infection	Revista Cubana de Medicina	Wrong study design
1999	Goncalves	Relationship between human papillomavirus (HPV) genotyping and genital neoplasia in HIV-positive patients of Santos City, Sao Paulo, Brazil	International Journal of STD & AIDS	Wrong outcomes
2000	Gongora-Rivera	The clinical spectrum of neurological manifestations in AIDS patients in Mexico	Archives of Medical Research	Age<40 or not stratified by age
2018	Gonzalez-Hernandez	HPV genotypes detected by linear array and next-generation sequencing in anal samples from HIV positive men who have sex with men in Mexico	Archives of Virology	Wrong outcomes
2013	Grinsztejn	Changing Mortality Profile among HIV-Infected Patients in Rio de Janeiro, Brazil: Shifting from AIDS to Non-AIDS Related Conditions in the HAART Era	PLoS ONE	Age<40 or not stratified by age
2013	Guevara-Silva	Cognitive profile in human immunodeficiency virus-infected neurologically asymptomatic patients	Anales de la Facultad de Medicina	Age<40 or not stratified by age
2014	Guevara-Silva	Human immunodeficiency virus-associated neurocognitive disorders (HAND)	Anales de la Facultad de Medicina	Wrong outcomes
2014	Guevara-Silva	Cognitive impairment and antiretroviral treatment in a Peruvian population of patients with human immunodeficiency virus	Neurologia	Age<40 or not stratified by age
2011	Guimaraes	Morphometric analysis of dendritic cells from anal mucosa of HIV-positive patients and the relation to intraepithelial lesions and cancer seen at a tertiary health institution in Brazil	Acta Cirurgica Brasileira	Age<40 or not stratified by age
2014	Guimaraes	Cytokine expression in the cervical stroma of HIV-positive and HIV-negative women with cervical intraepithelial neoplasia	Viral Immunology	Age<40 or not stratified by age

Year	First Author	Title	Journal	Exclusion Reason
2018	Guimaraes	Prevalence of low bone mass and changes in vitamin D levels in human immunodeficiency virus-infected adults unexposed to antiretrovirals	Revista da Sociedade Brasileira de Medicina Tropical	Age<40 or not stratified by age
2016	Gupta	Efficacy, safety, bone and metabolic effects of HIV nucleoside reverse transcriptase inhibitor BMS-986001 (AI467003): a phase 2b randomised, controlled, partly blinded trial	The Lancet. HIV	Wrong outcomes
2019	Haguihara	Factors associated with mortality in HIV patients failing antiretroviral therapy, in Salvador, Brazil	Brazilian Journal of Infectious Diseases	Wrong outcomes
2014	Havers	Change in vitamin d levels occurs early after antiretroviral therapy initiation and depends on treatment regimen in resource-limited settings	PLoS ONE [Electronic Resource]	Age<40 or not stratified by age
2014	Havers	25-Hydroxyvitamin D insufficiency and deficiency is associated with HIV disease progression and virological failure post-antiretroviral therapy initiation in diverse multinational settings	Journal of Infectious Diseases	Age<40 or not stratified by age
2015	Hearps	HIV and Aging: Parallels and Synergistic Mechanisms Leading to Premature Disease and Functional Decline	Advances In Geroscience	Wrong patient population
2006	Hernandez	Human immunodeficiency virus-associated diffuse non-Hodgkin's lymphoma in Venezuelan patients: treatment with full-dose cyclophosphamide-doxorubicin-vincristine-prednisone without routine use of granulocyte-colony stimulating factor	European Journal of Cancer Care	Wrong outcomes
2019	Hernandez	Increased incidences of noninfectious comorbidities among aging populations living with human immunodeficiency virus in Ecuador: a multicenter retrospective analysis	HIV/AIDS Research and Palliative Care	Age<40 or not stratified by age
2001	HernandezJaco me	Hypertriglyceridaemia and nephrolithiasis in HIV patients receiving combination antiretroviral therapy	Revista Medica del Institute Mexicano del Seguro Social	Wrong outcomes
2018	Hernandez-Pilotzi	Differences in electrocardiographic changes in HIV patients with and without treatment with protease inhibitors vs NNRTI. [Spanish]	Medicina Interna de Mexico	Age<40 or not stratified by age
2018	Hinojosa	Prevalence and variables associated with an abnormal ankle-brachial index among patients with human immunodeficiency virus/acquired immunodeficiency syndrome	Vascular	Age<40 or not stratified by age
2013	Ikeda	Association of blood pressure and hypertension with alcohol consumption in HIV-infected white and nonwhite patients	The Scientific World Journal	Age<40 or not stratified by age
2008	Iribarren	Clinical manifestations of HIV infection in distinct geographical areas. [Spanish]	Enfermedades Infecciosas y MicrobiologÃa ClÃnica	Wrong outcomes
2015	Jao	Low vitamin D status among pregnant Latin American and Caribbean women with HIV Infection	International Journal of Gynaecology and Obstetrics	Wrong patient population
2017	Jimenez	La infecci3n por VIH como causa de envejecimiento acelerado y fragilidad		Wrong patient population
2018	Jose	Chronic Kidney Disease Risk in African and Caribbean Populations With HIV	Journal of Infectious Diseases	Wrong setting
2010	JuniorSilva	Acute kidney injury in AIDS: Frequency, RIFLE classification and outcome	Brazilian Journal of Medical and Biological Research	Wrong outcomes

Year	First Author	Title	Journal	Exclusion Reason
2008	Junqueira	Women living with HIV/AIDS: sleep impairment, anxiety and depression symptoms	Arquivos de Neuro Psiquiatria	Age<40 or not stratified by age
2012	Kadhel	Cervical intraepithelial neoplasia and invasive cancer risks in women infected with HIV in the French West Indies	HIV Medicine	Wrong patient population
2013	Kamat	Implications of apathy and depression for everyday functioning in HIV/AIDS in Brazil	Journal of Affective Disorders	Age<40 or not stratified by age
2016	Kohli	Cholesterol Levels in HIV- and/or HCV-Infected Drug Users Living in Argentina	Journal of the International Association of Providers of AIDS Care	Age<40 or not stratified by age
2012	Kroll	Prevalence of obesity and cardiovascular risk in patients with HIV/AIDS in Porto Alegre, Brazil	Prevalence of obesity and cardiovascular risk in patients with HIV/AIDS in Porto Alegre, Brazil	Age<40 or not stratified by age
1998	Laguna-Torres	[Renal anatomopathological changes in patients with acquired immunodeficiency deficiency syndrome]	Revista da Sociedade Brasileira de Medicina Tropical	Wrong outcomes
2011	Lauda	Metabolic syndrome and its components in HIV-infected individuals	Revista da Associacao Medica Brasileira	Age<40 or not stratified by age
2007	Laurido	[Incidence variation in malignancies associated or not with AIDS at an outpatient care center, 1997-2005]	Medicina	Age<40 or not stratified by age
2016	Lazcano	[Evaluation of cardiovascular risk in HIV positive patients in a specialized center at Santiago, Chile]	Revista Chilena de Infectologia	Age<40 or not stratified by age
2018	Lazcano-Ponce	Prevention and control of neoplasms associated with HPV in high-risk groups in Mexico City: The Condesa Study	Salud Publica de MÃ©xico	Wrong outcomes
2013	Lazzaretti	Genetic markers associated to dyslipidemia in HIV-infected individuals on HAART	The Scientific World Journal	Age<40 or not stratified by age
2014	Lazzarotto	Physical training on the risk of ischemic heart disease in HIV/AIDS subjects on HAART	Revista Brasileira de Medicina do Esporte	Age<40 or not stratified by age
2008	Leite	Metabolic abnormalities and overweight in HIV/AIDS persons-treated with antiretroviral therapy	Revista de Nutricao	Age<40 or not stratified by age
2011	Leite	Cardiovascular risk: anthropometric, clinical and dietary markers in HIV-infected persons	Revista de Nutricao	Age<40 or not stratified by age
2015	Leon	Strong correlation between protein reagent strip and protein-to-creatinine ratio for detection of renal dysfunction in HIV-infected patients: a cross-sectional study	AIDS Research and Therapy	Age<40 or not stratified by age
2004	Levi	Presence of multiple human papillomavirus types in cervical samples from HIV-infected women	Gynecologic Oncology	Wrong outcomes
2002	Levi	High prevalence of human papillomavirus (HPV) infections and high frequency of multiple HPV genotypes in human immunodeficiency virus-infected women in Brazil	Journal of Clinical Microbiology	Wrong outcomes
2011	Levine	A comparison of screening batteries in the detection of neurocognitive impairment in HIV-infected Spanish speakers	Neurobehavioral HIV Medicine	Wrong setting

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2017	Lima	Systemic Arterial Hypertension in people living with HIV/AIDS: integrative review	Revista Brasileira de Enfermagem	Wrong setting
2017	Limia	Human papillomavirus infection in anal intraepithelial lesions from HIV infected Cuban men	Infectious Agents & Cancer [Electronic Resource]	Wrong outcomes
2019	Lins-Kusterer	Validity and reliability of the 36-Item Short Form Health Survey questionnaire version 2 among people living with HIV in Brazil	Brazilian Journal of Infectious Diseases	Wrong outcomes
2019	Llernea	Systemic lupus erythematosus in the HIV/AIDS epidemic. Initial report of cases in Cuba	Revista Cubana De Reumatologia	Age<40 or not stratified by age
2019	Lopez	Epidemiological, clinical, and laboratory factors associated with chronic kidney disease in Mexican HIV-infected patients	Jornal Brasileiro de Nefrologia	Age<40 or not stratified by age
2018	Lopez	Social inequalities in HIV mortality and malignant tumours in municipalities in the Department of Valle del Cauca (Colombia), according to economic indicators 2009-2013	Archivos De Medicina	Wrong outcomes
1992	Lopez	Glomerular disease and human immunodeficiency virus infection in Brazil	American Journal of Nephrology	Age<40 or not stratified by age
2013	Lorenzo	Use of the exercise treadmill test for the assessment of cardiac risk markers in adults infected with HIV	Journal of the International Association of Providers of AIDS Care	Age<40 or not stratified by age
2012	Luz	Cervical cytological abnormalities and factors associated with high-grade squamous intraepithelial lesions among HIV-infected women from Rio de Janeiro, Brazil	International Journal of STD & AIDS	Wrong patient population
2013	Luz	Survival and Prognostic Factors for AIDS and Non-AIDS Patients with Non-Hodgkin's Lymphoma in Bahia, Brazil: A Retrospective Cohort Study	Isrn Hematology Print	Age<40 or not stratified by age
2014	Luz	AIDS and non-AIDS severe morbidity associated with hospitalizations among HIV-infected patients in two regions with universal access to care and antiretroviral therapy, France and Brazil, 2000-2008: hospital-based cohort studies	BMC Infectious Diseases	Age<40 or not stratified by age
2014	Machado	Hypertension, preeclampsia and eclampsia among HIV-infected pregnant women from Latin America and Caribbean countries	Journal of Infection	Wrong outcomes
1994	Maj	WHO Neuropsychiatric AIDS study, cross-sectional phase II. Neuropsychological and neurological findings	Archives of General Psychiatry	Age<40 or not stratified by age
1994	Maj	WHO Neuropsychiatric AIDS study, cross-sectional phase II. Neuropsychological and neurological findings	Archives of General Psychiatry	Age<40 or not stratified by age
1993	Maj	Mild cognitive dysfunction in physically asymptomatic HIV infection: Recent research evidence and professional implications	European Psychiatry	Wrong patient population
1991	Maj	The World Health Organization's cross-cultural study on neuropsychiatric aspects of infection with the human immunodeficiency virus 1 (HIV-1). Preparation and pilot phase	British Journal of Psychiatry	Wrong patient population
2004	Malavazi	Abnormalities in apolipoprotein and lipid levels in an HIV-infected Brazilian population under different treatment profiles: the relevance of apolipoprotein E genotypes and immunological status	Clinical Chemistry and Laboratory Medicine	Age<40 or not stratified by age

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1999	Malbergier	Depressive disorders in injecting drug users infected by the HIV virus	Revista Brasileira de Psiquiatria	Age<40 or not stratified by age
2013	Malow	Depression, substance abuse and other contextual predictors of adherence to antiretroviral therapy (ART) among Haitians	AIDS and Behavior	Wrong patient population
2009	Mantilla	Neuropathologic features of the infection HIV-AIDS: Study autopsy in the Hospital Universitario de Santander, Bucaranranga, Colombia. [Spanish]	Colombia Medica	Wrong outcomes
2018	Marcon	Incidence of hepatocellular carcinoma in patients with chronic liver disease due to hepatitis B or C and coinfecting with the human immunodeficiency virus: A retrospective cohort study	World Journal of Gastroenterology	Age<40 or not stratified by age
2018	Marques	Neoplasms-associated deaths in HIV-1 infected and non-infected patients in Bahia, Brazil	Cancer Epidemiology	Age<40 or not stratified by age
2018	Martinez-Banfi	Neuropsychological performance in patients with asymptomatic HIV-1 infection	AIDS Care	Age<40 or not stratified by age
2019	Martinez-Iglesias	Comorbidities among adults living with hiv from two healthcare centers in Colombia	Infectio	Age<40 or not stratified by age
2015	Mata-Marin	Anal intraepithelial neoplasia among HIV-positive men who have sex with men	Sexual Health	Age<40 or not stratified by age
2007	Matos	Avascular necrosis of the femoral head in HIV infected patients	Brazilian Journal of Infectious Diseases	Age<40 or not stratified by age
2015	Mauas	[Cognitive Screening in Hiv-1 Infected Young Adults at Buenos Aires. Preliminary Data]	Vertex: Revista Argentina de Psiquiatria	Age<40 or not stratified by age
2003	Mayor	Differences between patients with non-Hodgkin's lymphomas in a cohort of HIV/AIDS patients in Puerto Rico	Cellular and Molecular Biology	Wrong patient population
2005	Mayor	Mortality trends of HIV-infected patients after the introduction of highly active antiretroviral therapy: analysis of a cohort of 3,322 HIV-infected persons	Ethnicity & Disease	Age<40 or not stratified by age
2010	Mayor	The morbidity and mortality associated with kidney disease in an HIV-infected cohort in Puerto Rico	Ethnicity & Disease	Wrong patient population
2018	Medina-Laabes	Human Papillomavirus Correlates With Histologic Anal High-Grade Squamous Intraepithelial Lesions in Hispanics With HIV	Journal of Lower Genital Tract Disease	Wrong patient population
1993	Medina-Rodriguez	Rheumatic manifestations in human immunodeficiency virus positive and negative individuals: a study of 2 populations with similar risk factors	Journal of Rheumatology	Age<40 or not stratified by age
2004	Mehta	[Epidemiology of the metabolic abnormalities in patients with HIV infections]	Revista de Investigación Clínica	Age<40 or not stratified by age
2006	Mello	Depression in women infected with HIV	Revista Brasileira de Psiquiatria	Age<40 or not stratified by age
2010	Mello	Depression in women living with HIV: clinical and psychosocial correlates	Archives of Women's Mental Health	Age<40 or not stratified by age

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2020	Melo	Evaluation of cardiovascular risk factors in people living with HIV in Sao Paulo, Brazil	Journal of Infection in Developing Countries	Age<40 or not stratified by age
2014	Melo	Prevalence and risk factors associated with anal intraepithelial neoplasia among HIV-positive men in Brazil	Journal of Lower Genital Tract Disease	Wrong outcomes
2017	Menezes	Endothelial Glycocalyx Damage and Renal Dysfunction in HIV Patients Receiving Combined Antiretroviral Therapy	AIDS Research and Human Retroviruses	Age<40 or not stratified by age
2011	Menezes	Prevalence and risk factors associated to chronic kidney disease in HIV-infected patients on HAART and undetectable viral load in Brazil	PLoS ONE [Electronic Resource]	Age<40 or not stratified by age
2019	Mesquita	Severe infection increases cardiovascular risk among HIV-infected individuals	BMC Infectious Diseases	Age<40 or not stratified by
2009	Metta	Endobronchial leiomyoma: an unusual non-defining neoplasm in a patient with AIDS	Revista do Instituto de Medicina Tropical de Sao Paulo	Wrong outcomes
2011	Micheletti	Benign and malignant neoplasias in 261 necropsies for HIV-positive patients in the period of 1989 to 2008	Revista do Instituto de Medicina Tropical de Sao Paulo	Age<40 or not stratified by age
2017	Miranda	High-risk papillomavirus infection among women living with human Immunodeficiency virus: Brazilian multicentric study	Journal of Medical Virology	Wrong outcomes
1995	Mohar	[AIDS and neoplasms in Mexico]	Salud Publica de MÃ©xico	Wrong outcomes
2018	Monteiro	HIV Infection Is Not Associated With Aortic Stiffness. Traditional Cardiovascular Risk Factors Are the Main Determinants-Cross-sectional Results of INI-ELSA-BRASIL	Journal of Acquired Immune Deficiency Syndromes: JAIDS	Age<40 or not stratified by age
2012	Monteiro	Is arterial stiffness in HIV-infected individuals associated with HIV-related factors?	Brazilian Journal of Medical and Biological Research	Age<40 or not stratified by age
2006	Monteiro	Anti-glomerular basement membrane glomerulonephritis in an HIV positive patient: Case report	Brazilian Journal of Infectious Diseases	Wrong outcomes
2017	Moraes	Depression and adherence to antiretroviral treatment in HIV-positive men in Sao Paulo, the largest city in South America: Social and psychological implications	Clinics (Sao Paulo, Brazil)	Age<40 or not stratified by age
2016	Moreira	Diabetes Mellitus is Associated with Increased Death Rates Among HIV-Infected Patients in Rio de Janeiro, Brazil	AIDS Research and Human Retroviruses	Age<40 or not stratified by age
2010	Moreira Guimaraes	Coronary heart disease risk assessment in HIV-infected patients: a comparison of Framingham, PROCAM and SCORE risk assessment functions	International Journal of Clinical Practice	Age<40 or not stratified by age
2011	Moreno	Kidney transplantation in HIV infected patients	Revista da Associacao Medica Brasileira	Wrong patient population
2016	Moura de Araujo	Perfil Clínic e epidemiológico de pacientes idosos com HIV/AIDS ceará, Brasil	Dissertation	Wrong Outcomes
2017	Mouras	[Heart transplantation in an HIV-infected patient]	Medicina	Wrong outcomes
2019	Muller	Risk factors for cardiovascular disease in HIV/AIDS patients treated with highly active antiretroviral therapy (HAART) in the central-southern region of the state of Parana - Brazil	Ciencia & Saude Coletiva	Age<40 or not stratified by age

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2019	Mueses-Marin	Psychometric properties and validity of the Center for Epidemiological Studies Depression Scale (CES-D) in a population attending an HIV clinic in Cali, Colombia	Biomedica	Age<40 or not stratified by age
2014	Murray	Global, regional, and national incidence and mortality for HIV, tuberculosis, and malaria during 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013	Lancet	Wrong outcomes
2008	Nacher	Risk factors for high blood pressure among HIV patients in French Guiana	Journal of Acquired Immune Deficiency Syndromes: JAIDS	Wrong patient population
2010	Nacher	Predictive factors and incidence of anxiety and depression in a cohort of HIV-positive patients in French Guiana	AIDS Care	Wrong patient population
2007	Nadal	[Outcome of treatment of anal squamous cell carcinoma and its precursor in HIV-infected patients]	Revista da Associacao Medica Brasileira	Age<40 or not stratified by age
2017	Naidu	Prevalence of Metabolic Syndrome Among People Living with HIV in Developing Countries: A Systematic Review	AIDS Patient Care and STDS	Age<40 or not stratified by age
2014	Narayan	HIV and noncommunicable disease comorbidities in the era of antiretroviral therapy: a vital agenda for research in low- and middle-income country settings	Journal of Acquired Immune Deficiency Syndromes: JAIDS	Wrong patient population
2003	Naud	Improving health systems towards equality-based control of cervical cancer in Latin America. Comparing pap smear cytology, aided visual inspection, cervicography and human papillomavirus (HPV) testing as optional screening tools in Brazil and Argentina. Multicentric study - Description of data from Porto Alegre - Brazil	Eurogin 2003: 5th International Multidisciplinary Congress	Abstract
1991	Negron	Incidence and prevalence of HIV-positive patients on chronic hemodialysis at the University and San Juan City Hospital	Boletín - Asociaci3n Medica de Puerto Rico	Wrong patient population
2013	Nery	Cardiovascular risk assessment: a comparison of the Framingham, PROCAM, and DAD equations in HIV-infected persons	The Scientific World Journal	Age<40 or not stratified by age
2011	Nery	Dyslipidemia in AIDS patients on highly active antiretroviral therapy	Brazilian Journal of Infectious Diseases	Age<40 or not stratified by age
2004	Neves-Motta	Highly aggressive squamous cell carcinoma in an HIV-infected patient	Revista da Sociedade Brasileira de Medicina Tropical	Wrong outcomes
2015	Noguera-Orozco	Psychosocial factors associated with late HAART initiation in Mexican patients with HIV. [Spanish]	Salud Publica de M4xico	Wrong outcomes
2015	Nomoto	Socioeconomic disadvantage increasing risk for depression among recently diagnosed HIV patients in an urban area in Brazil: cross-sectional study	AIDS Care	Age<40 or not stratified by age
2019	Ocampo	[Effectiveness and safety of switching to raltegravir-based regimen in dyslipidemic HIV-infected patients receiving antiretroviral therapy at Arriaran Foundation]	Revista Chilena de Infectologia	Age<40 or not stratified by age
2011	Ogalha	A randomized, clinical trial to evaluate the impact of regular physical activity on the quality of life, body morphology and metabolic parameters of patients with AIDS in Salvador, Brazil	Journal of acquired immune deficiency syndromes (1999)	Duplicate paper

Year	First Author	Title	Journal	Exclusion Reason
2011	Ogalha	A randomized, clinical trial to evaluate the impact of regular physical activity on the quality of life, body morphology and metabolic parameters of patients with AIDS in Salvador, Brazil	Journal of acquired immune deficiency syndromes (1999)	Age<40 or not stratified by age
2019	Ojo	Feasibility of integrated, multilevel care for cardiovascular diseases (CVD) and HIV in low- and middle-income countries (LMICs): A scoping review	PLoS ONE [Electronic Resource]	Wrong patient population
2011	Olalla	Ankle-brachial index in the assessment of cardiovascular risk among HIV infected patients	Revista Medica de Chile	Age<40 or not stratified by age
2018	Oliveira	Effects of antiretroviral treatment and nadir CD4 count in progression to cardiovascular events and related comorbidities in a HIV Brazilian cohort: a multi-stage approach	AIDS Care	Age<40 or not stratified by age
2014	Oliveira	Effects of fish oil on lipid profile and other metabolic outcomes in HIV-infected patients on antiretroviral therapy: a randomized placebo-controlled trial	International Journal of STD & AIDS	Age<40 or not stratified by age
2014	Oliveria	Glioblastoma multiforme in an HIV-infected patient: an unexpected diagnosis	Journal of the International Association of Providers of AIDS Care	Age<40 or not stratified by age
2010	Oliveira	Prevalence and risk factors for cervical intraepithelial neoplasia in HIV-infected women in Salvador, Bahia, Brazil	Sao Paulo Medical Journal = Revista Paulista de Medicina	Wrong outcomes
2017	O'Neill	Risk of Colorectal Cancer and Associated Mortality in HIV: A Systematic Review and Meta-Analysis	Journal of Acquired Immune Deficiency Syndromes: JAIDS	Wrong patient population
2004	Orem	AIDS-associated cancer in developing nations	Current Opinion in Oncology	Wrong outcomes
2014	Ortiz	Anal cancer trends in Puerto Rico from 1985 to 2005: the potential impact of the AIDS epidemic	AIDS Patient Care and STDS	Wrong patient population
2014	Ortiz	Human papillomavirus-related cancers among people living with AIDS in Puerto Rico	Preventing Chronic Disease	Wrong patient population
2007	Osorio	[Lymphomas and HIV infection in a reference hospital of Santiago, Chile: 1990-2002: report of 14 cases and review]	Revista Chilena de Infectologia	Wrong outcomes
2017	Osorio	Bone Age and Mineral Density Assessments Using Plain Roentgenograms in Tenofovir-exposed Infants in Malawi and Brazil Enrolled in HIV Prevention Trials Network 057	Pediatric Infectious Disease Journal	Wrong patient population
2009	Pacheco	Temporal changes in causes of death among HIV-infected patients in the HAART era in Rio de Janeiro, Brazil	Journal of Acquired Immune Deficiency Syndromes	Age<40 or not stratified by age
2015	Pacheco	Traditional risk factors are more relevant than HIV-specific ones for carotid intima-media thickness (cIMT) in a Brazilian cohort of HIV-infected patients	PLoS ONE [Electronic Resource]	Age<40 or not stratified by age
2003	Palomo	Prevalence of antiphospholipid and antiplatelet antibodies in human immunodeficiency virus (HIV)-infected Chilean patients	Journal of Clinical Laboratory Analysis	Age<40 or not stratified by age
1983	Pape	Characteristics of the acquired immunodeficiency syndrome (AIDS) in Haiti	New England Journal of Medicine	Wrong patient population

Year	First Author	Title	Journal	Exclusion Reason
2015	Passos	An evaluation of quality of life and its determinants among people living with HIV/AIDS from Southern Brazil	Cadernos de SaÃºde Publica	Wrong outcomes
2019	Patricio	Depression, self-concept, future expectations and hope of people with HIV	Revista Brasileira de Enfermagem	Age<40 or not stratified by age
1986	Patrick	Focal and segmental glomerulosclerosis in the acquired immunodeficiency syndrome	West Indian Medical Journal	Wrong patient population
2014	Paula	Continuous increase of cardiovascular diseases, diabetes, and non-HIV related cancers as causes of death in HIV-infected individuals in Brazil: an analysis of nationwide data	PLoS ONE [Electronic Resource]	Age<40 or not stratified by age
2018	Perazzo	Predictive factors associated with liver fibrosis and steatosis by transient elastography in patients with HIV mono-infection under long-term combined antiretroviral therapy	Journal of the International AIDS Society	Wrong patient population
2007	Perez Laspiur	CSF proteomic fingerprints for HIV-associated cognitive impairment	Journal of Neuroimmunology	Age<40 or not stratified by age
2010	Pernasetti	[Renal abnormalities in HIV infected patients]	Medicina	Age<40 or not stratified by age
2009	Petrolito	Glomerulonephritis in HIV(+) patients examined from Buenos Aires City Public Hospital. [Spanish]	nefrología, diálisis y trasplante	Age<40 or not stratified by age
2019	Pierre	Prevalence of hypertension and cardiovascular risk factors among long-term AIDS survivors: A report from the field	Journal of Clinical Hypertension	Wrong patient population
2017	Pimenta	Anemia and lipids profile in pregnant women living with HIV	Saude e Pesquisa	Age<40 or not stratified by age
2008	Pina Lopez	[Association between stress and depression levels and treatment adherence among HIV-positive individuals in Hermosillo, Mexico]	Pan American Journal of Public Health	Age<40 or not stratified by age
2016	Pinto Neto	Nephrotoxicity during tenofovir treatment: a three-year follow-up study in a Brazilian reference clinic	Brazilian Journal of Infectious Diseases	Age<40 or not stratified by age
2004	Pinheiro	Dental and oral lesions in HIV infected patients: a study in Brazil	International Dental Journal	Wrong outcomes
2013	Pizarro	[Lymphomas associated with HIV infection in patients at the Hospital San Borja Arriaran /Fundacion Arriaran 2001-2008, Santiago, Chile]	Revista Chilena de Infectologia	Wrong outcomes
2015	Porras-Mendez	Prevalence of metabolic syndrome in patients of the North Central Hospital of Pemex with HIV-infection in antiretroviral treatment. [Spanish]	Medicina Interna de Mexico	Age<40 or not stratified by age
2005	Portugal	Comparative study of clinical, morphological and immunophenotypical features of Non-Hodgkin Lymphoma occurring in HIV-positive and HIV-negative patients in Salvador, Bahia, Brazil	Revista da Sociedade Brasileira de Cancerologia	Wrong outcomes
2020	Poteat	Depression, sexual behavior, and HIV treatment outcomes among transgender women, cisgender women and men who have sex with men living with HIV in Brazil and Thailand: a short report	AIDS Care	Age<40 or not stratified by age

Year	First Author	Title	Journal	Exclusion Reason
2018	Price	Prevalence of chronic kidney disease among patients attending an HIV outpatient clinic in Kingston, Jamaica	West Indian Medical Journal	Wrong patient population
2015	Puga	[Intensive chemotherapy for Burkitt lymphoma in HIV positive patients]	Revista Medica de Chile	Wrong outcomes
2017	Rael	Depression and key associated factors in female sex workers and women living with HIV/AIDS in the Dominican Republic	International Journal of STD & AIDS	Age<40 or not stratified by age
2013	Ramirez-Crescencio	Epidemiology and trend of neurological diseases associated to HIV/AIDS. Experience of Mexican patients 1995-2009	Clinical Neurology and Neurosurgery	Age<40 or not stratified by age
2014	Ramirez-Marrero	Metabolic syndrome in relation to cardiorespiratory fitness, active and sedentary behavior in HIV+ Hispanics with and without lipodystrophy	Puerto Rico Health Sciences Journal	Age<40 or not stratified by age
2010	Ramirez-Marrero	Risk of cancer among Hispanics with AIDS compared with the general population in Puerto Rico: 1987-2003	Puerto Rico Health Sciences Journal	Wrong patient population
2010	Ramirez-Marrero	Prevalence of cardiometabolic risk factors in Hispanics living with HIV	Ethnicity & Disease	Age<40 or not stratified by age
2016	Ramos	Expression of CHRFAM7A and CHRNA7 in neuronal cells and postmortem brain of HIV-infected patients: considerations for HIV-associated neurocognitive disorder	Journal of Neurovirology	Age<40 or not stratified by age
2020	Ramos-Cartagena	Assessment of Anal Cancer Screening Tools in Detecting High-Grade Anal Squamous Intraepithelial Lesions in Women	Journal of Lower Genital Tract Disease	Wrong patient population
2004	Ronchini	Cardiovascular complications and increased levels of circulating modified low density lipoprotein in HIV patients and patients with lipodystrophy	Brazilian Journal of Medical and Biological Research	Age<40 or not stratified by age
2017	Raposo	Metabolic disorders and cardiovascular risk in people living with HIV/AIDS without the use of antiretroviral therapy	Revista da Sociedade Brasileira de Medicina Tropical	Age<40 or not stratified by age
2011	Raposo	Performance by cytology and hybrid capture II in screening for high-grade squamous intraepithelial lesions in women with HIV	Cadernos de SaÃºde Publica	Wrong patient population
2012	Reekie	Regional differences in AIDS and non-AIDS related mortality in HIV-positive individuals across Europe and Argentina: The EuroSIDA study	PLoS ONE	Age<40 or not stratified by age
2011	Reis	Symptoms of depression and quality of life of people living with HIV/AIDS	Revista Latino-Americana de Enfermagem	Age<40 or not stratified by age
2017	Reis	Prevalence and factors associated with depressive symptoms in individuals living with HIV/AIDS	Salud Mental	Age<40 or not stratified by age
2009	Reyes-Corcho	Lung cancer and HIV infection. A case report and literature review	Revista del Instituto Nacional de Enfermedades Respiratorias	Age<40 or not stratified by age
2019	Rezaei	Global prevalence of depression in HIV/AIDS: a systematic review and meta-analysis	BMJ supportive & palliative care	Wrong outcomes
2009	Rezende	Clinical, endoscopic and prognostic aspects of primary gastric non-Hodgkin's lymphoma associated with acquired immunodeficiency syndrome	Brazilian Journal of Infectious Diseases	Wrong outcomes

Year	First Author	Title	Journal	Exclusion Reason
2016	Rezer	Effect of antiretroviral therapy in thromboregulation through the hydrolysis of adenine nucleotides in platelets of HIV patients	Biomedicine and Pharmacotherapy	Age<40 or not stratified by age
2018	Rezer	Changes in inflammatory/cardiac markers of HIV positive patients	Microbial Pathogenesis	Age<40 or not stratified by age
2014	Ribeiro	Incidence and determinants of severe morbidity among HIV-infected patients from Rio de Janeiro, Brazil, 2000-2010	Antiviral Therapy	Age<40 or not stratified by age
2007	Rivera	Validation of the Zung Depression Scale in persons with HIV	Terapia Psicologica	Wrong patient population
2016	Robertson	International neurocognitive normative study: neurocognitive comparison data in diverse resource-limited settings: AIDS Clinical Trials Group A5271	Journal of Neurovirology	Wrong patient population
2012	Robertson	Improved neuropsychological and neurological functioning across three antiretroviral regimens in diverse resource-limited settings: AIDS Clinical Trials Group study a5199, the International Neurological Study	Clinical Infectious Diseases	Age<40 or not stratified by age
2007	Robertson	Assessment of neuroAIDS in the international setting	Journal of Neuroimmune Pharmacology	Age<40 or not stratified by age
2013	Rodrigues	Validity of the International HIV dementia scale in Brazil	Arquivos de Neuro-Psiquiatria	Age<40 or not stratified by age
1991	Rodrigues	AIDS and myopathy: report of a case and review of the literature. [Portuguese]	Arquivos de Neuro-Psiquiatria	Wrong outcomes
2019	Rodriguez-Diaz	Comorbidities in a sample of adults with HIV in Puerto Rico: an exploratory study	HIV/AIDS Research and Palliative Care	Wrong patient population
2020	Rohner	Cervical cancer risk in women living with HIV across four continents: A multicohort study	International Journal of Cancer	Age<40 or not stratified by age
2011	Rojas	[Lymphomas associated with human immunodeficiency virus infection: retrospective review of medical records]	Revista Medica de Chile	Wrong outcomes
1994	RosalesGuzman	[The autopsy findings in 51 cases of AIDS with cardiovascular damage]	Archivos del Instituto de Cardiología de México	Wrong outcomes
2017	Ruiz-Henao	Disorders of bone mineral density in patients with HIV on antiretroviral treatment-Colombia Risaralda Pereiras. [Spanish]	Infectio	Age<40 or not stratified by age
2014	Russomano	Recurrence of cervical intraepithelial neoplasia in human immunodeficiency virus-infected women treated by means of electrosurgical excision of the transformation zone (LLETZ) in Rio de Janeiro, Brazil (vol 131, pg 405, 2013)	Sao Paulo Medical Journal	Wrong outcomes
2008	Russomano	Recurrence of cervical intraepithelial neoplasia grades 2 or 3 in HIV-infected women treated by large loop excision of the transformation zone (LLETZ)	Sao Paulo Medical Journal = Revista Paulista de Medicina	Wrong outcomes
2013	Russomano	Recurrence of cervical intraepithelial neoplasia in human immunodeficiency virus-infected women treated by means of electrosurgical excision of the transformation zone (LLETZ) in Rio de Janeiro, Brazil	Sao Paulo Medical Journal = Revista Paulista de Medicina	Wrong outcomes

Year	First Author	Title	Journal	Exclusion Reason
2017	Sacilotto	Body composition and metabolic syndrome components on lipodystrophy different subtypes associated with HIV	Journal of Nutrition and Metabolism	Age<40 or not stratified by age
2010	Sainz	Cognitive disorders prevalence in patients with HIV-AIDS in a Mexican cohort. [Spanish]	Medicina Interna de Mexico	Age<40 or not stratified by age
2010	Sainz	Prevalence of depression in HIV/AIDS patients in the hospital general de zona # 11 (IMSS), Lic. Ignacio Diaz Lopez. [Spanish]	Enfermedades Infecciosas y Microbiologia	Age<40 or not stratified by age
2015	Sales	High frequency of deficient consumption and low blood levels of 25-hydroxyvitamin D in HIV-1-infected adults from Sao Paulo city, Brazil	Scientific Reports	Age<40 or not stratified by age
2018	Salmazo	Frequency of Subclinical Atherosclerosis in Brazilian HIV-Infected Patients	Arquivos Brasileiros de Cardiologia	Age<40 or not stratified by age
2009	Sanchez-Pena	Diseases associated with HIV infection: study of biopsies and surgical resection specimens at a large general hospital in Mexico City	Annals of Diagnostic Pathology	Wrong outcomes
2011	Sandkovsky	Non-Hodgkin lymphoma of bone in an HIV-infected patient from Argentina	Journal of Infection in Developing Countries	Wrong outcomes
1998	Santana	Relationship between HIV infection and infectious and non-infectious diseases included into the AIDS. [Spanish]	Biotecnologia Aplicada	Wrong outcomes
2003	Santos	Alterations in bone mineral metabolism in Brazilian HIV-infected patients	AIDS	Age<40 or not stratified by age
2006	Santos Silva	VULNERABILIDADE AO HIV/AIDS DE HOMENS E MULHERES DE 50 A 59 ANOS	Dissertations	Wrong outcomes
2016	Santo so	HIV-associated dementia in the Dominican Republic: a consequence of stigma, domestic abuse and limited health literacy	BMJ Case Reports	Age<40 or not stratified by age
2019	Sartori	Neurocognitive disorders in HIV positive patients. Preliminary data of a Uruguayan prospective cohort	Revista Medica Del Uruguay	Age<40 or not stratified by age
2001	Schoffel	Assessment of depressive and anxiety symptoms in HIV-positive patients	Revista de Psiquiatria do Rio Grande do Sul	Wrong patient population
2011	Silva	Anal cancer precursor lesions in HIV-positive and HIV-negative patients seen at a tertiary health institution in Brazil	Acta Cirurgica Brasileira	Age<40 or not stratified by age
2016	Silva	Multiple facets of HIV-associated renal disease	Brazilian Journal of Medical and Biological Research	Age<40 or not stratified by age
2012	Silveira	Depressive symptoms in HIV-infected patients treated with highly active antiretroviral therapy	Revista Brasileira de Psiquiatria	Age<40 or not stratified by age
2018	Silveira	Association of physical inactivity with hypertension and low educational level in people living with HIV / AIDS	AIDS Care	Age<40 or not stratified by age
2011	Sherr	HIV and depression--a systematic review of interventions	Psychology Health & Medicine	Wrong outcomes
2011	Shin	Mental Health Burden Among Impoverished HIV-Positive Patients in Peru	Journal of the International Association of Physicians in AIDS Care: JIAPAC	Wrong outcomes

Year	First Author	Title	Journal	Exclusion Reason
2012	Silva	Neuropathology of AIDS: an autopsy review of 284 cases from Brazil comparing the findings pre- and post-HAART (highly active antiretroviral therapy) and pre- and postmortem correlation	AIDS Research and Treatment	Wrong outcomes
2005	Silva	Highly active antiretroviral therapy access and neurological complications of human immunodeficiency virus infection: impact versus resources in Brazil	Journal of Neurovirology	Age<40 or not stratified by age
2009	Silva	Lipid profile, cardiovascular risk factors and metabolic syndrome in a group of AIDS patients	Arquivos Brasileiros de Cardiologia	Wrong outcomes
2010	Silva	Nutritional and clinical status, and dietary patterns of people living with HIV/AIDS in ambulatory care in Sao Paulo, Brazil	Revista Brasileira de Epidemiologia	Wrong outcomes
2020	Silva	HOPE FOR LIFE AND DEPRESSION: PEOPLE LIVING WITH HIV/AIDS	Revista De Pesquisa-Cuidado E Fundamental Online	Wrong outcomes
2015	Silva	High-risk human papillomavirus and cervical lesions among women living with HIV/AIDS in Brazilian Amazon, Brazil	Brazilian Journal of Infectious Diseases	Wrong outcomes
2020	Silva	Outcomes of HIV-associated Burkitt Lymphoma in Brazil: High treatment toxicity and refractoriness rates - A multicenter cohort study	Leukemia Research	Wrong outcomes
2009	Silva	Human immunodeficiency virus encephalopathy: Cognitive and radiologic improvement after antiretroviral therapy	Archives of Neurology	Wrong outcomes
2018	SilvaJunior	Acute kidney injury and other factors associated with mortality in hiv-infected patients	Revista da Associacao Medica Brasileira	Wrong outcomes
2003	Simoni	Mediational models of spirituality and depressive symptomatology among HIV-positive Puerto Rican women	Cultural Diversity & Ethnic Minority Psychology	Wrong patient population
2000	Siqueira-Batista	Nephropathy associated with human immunodeficiency virus infection	Revista Brasileira de Medicina	Wrong patient population
1999	Sobesky	Contribution of infection with the human papillomavirus and human immunodeficiency virus to cervical dysplasia occurrence in French Guyana. [French]	Revue Française de Gynécologie et d'Obstétrique	Wrong patient population
2015	Soliman	Baseline cardiovascular risk in the INSIGHT Strategic Timing of AntiRetroviral Treatment (START) trial	HIV Medicine	Age<40 or not stratified by age
1998	Soriano-Rosas	AIDS-associated nephropathy: 5-year retrospective morphologic analysis of 87 cases	Pathology, Research and Practice	Age<40 or not stratified by age
2010	Soto	The effect of antiretroviral therapy on the lipid profile of AIDS patients in Maracaibo, State of Zulia, Venezuela	Kasmera	Age<40 or not stratified by age
2012	Spuldaro	[Kidney transplantation in HIV positive patients: two case reports from Hospital de Clinicas de Porto Alegre initial experience]	Jornal Brasileiro de Nefrologia	Wrong outcomes
2018	Tanaka	Risk for cancer among people living with AIDS, 1997-2012: the Sao Paulo AIDS-cancer linkage study	European Journal of Cancer Prevention	Age<40 or not stratified by age
2018	Tanaka	Cancer survival in people with AIDS: A population-based study from Sao Paulo, Brazil	International Journal of Cancer	Age<40 or not stratified by age

Year	First Author	Title	Journal	Exclusion Reason
2017	Tanaka	Trends in the incidence of AIDS-defining and non-AIDS-defining cancers in people living with AIDS: a population-based study from Sao Paulo, Brazil	International Journal of STD & AIDS	Age<40 or not stratified by age
2007	Tanaka	Hodgkin lymphoma among patients infected with HIV in post-HAART era	Clinical Lymphoma & Myeloma	Age<40 or not stratified by age
2006	Tanaka	Non-Hodgkin's lymphoma among patients infected with human immunodeficiency virus: the experience of a single center in Brazil	International Journal of Hematology	Wrong outcomes
2010	Tanaka	A prognostic score for AIDS-related diffuse large B-cell lymphoma in Brazil	Annals of Hematology	Wrong outcomes
2007	Tanaka	Non-Hodgkin's lymphoma among patients infected with human immunodeficiency virus: The experience of a single center in Brazil (vol 84, pg 337, 2006)	International Journal of Hematology	Wrong study design
2012	Teixeira	Prevalence and risk factors for cervical intraepithelial neoplasia among HIV-infected women	Brazilian Journal of Infectious Diseases	Age<40 or not stratified by age
2016	Terra Junior	Study of natural cytotoxicity receptors in patients with HIV/AIDS and cancer: a cross-sectional study	The Scientific World Journal	Age<40 or not stratified by age
1998	Tomadoni	[Cancer in AIDS patients: experience at a general hospital in the Province of Buenos Aires]	Medicina	Wrong outcomes
2004	Tostes	The quality of life of HIV-infected women is associated with psychiatric morbidity	AIDS Care	Wrong outcomes
1995	Trujillo	Neurologic manifestations of AIDS: a comparative study of two populations from Mexico and the United States	Journal of Acquired Immune Deficiency Syndromes and Human Retrovirology	Age<40 or not stratified by age
2015	Tufano	The influence of depressive symptoms and substance use on adherence to antiretroviral therapy. A cross-sectional prevalence study	Sao Paulo Medical Journal = Revista Paulista de Medicina	Age<40 or not stratified by age
2018	Uip	Frequency of Subclinical Atherosclerosis in HIV-infected Brazilians	Arquivos Brasileiros de Cardiologia	Age<40 or not stratified by age
2019	Valdelamar-Jimenez	Comparison of Three Health-Related Quality of Life Instruments to Evaluate Symptoms of Depression in HIV Patients in Brazil	Journal of Clinical Psychology in Medical Settings	Age<40 or not stratified by age
2019	Valderrama	Evaluation and management of cardiovascular risk in VIH infection: Expert consensus of ACIN (Colombian Association of Infectious Diseases). [Spanish]	Infectio	Age<40 or not stratified by age
2012	Vanni	Cervical cancer screening among HIV-infected women: an economic evaluation in a middle-income country		
2014	Varela	[Depression and HAART adherence in HIV infected patients attending Hospital San Pablo of Coquimbo, Chile]	Revista Chilena de Infectologia	Age<40 or not stratified by age
2014	Varela	"Depression and adherence to anti-retroviral therapy in HIV infected patients treated in the Hospital San Pablo de Coquimbo, Chile" Year 2014	Revista Chilena de Infectologia	Wrong study design
2008	Valencia Arroyo	Metabolic alterations and metabolic syndrome in HIV infected patients induced by highly active antiretroviral therapy from Arzobispo Loayza National Hospital - a pilot study	Acta Medica Peruana	Age<40 or not stratified by age

Year	First Author	Title	Journal	Exclusion Reason
2016	Vargas Parada	Cost-Effectiveness Study of HPV Vaccination as a Primary Prevention Strategy for Anal Cancer in HIV-Positive Men in Chile	Value in Health Regional Issues	Age<40 or not stratified by age
2009	Velazquez	Antioxidant enzyme dysfunction in monocytes and CSF of Hispanic women with HIV-associated cognitive impairment	Journal of Neuroimmunology	Age<40 or not stratified by age
2016	Vicari	Renal transplantation in human immunodeficiency virus-infected recipients: a case-control study from the Brazilian experience	Transplant Infectious Disease	Age<40 or not stratified by age
2015	Vitoria	Causes of hospital admission among people living with HIV worldwide: A systematic review and meta-analysis	The Lancet HIV	Age<40 or not stratified by age
2017	Weikum	An explanatory factor analysis of a brief self-report scale to detect neurocognitive impairment among HIV-positive men who have sex with men and transgender women in Peru	AIDS Care	Age<40 or not stratified by age
2006	Wojna	Prevalence of human immunodeficiency virus-associated cognitive impairment in a group of Hispanic women at risk for neurological impairment	Journal of Neurovirology	Age<40 or not stratified by age
2010	Wright	Cardiovascular risk factors associated with lower baseline cognitive performance in HIV-positive persons	Neurology	Age<40 or not stratified by age
2015	Wright	Factors associated with neurocognitive test performance at baseline: a substudy of the INSIGHT Strategic Timing of AntiRetroviral Treatment (START) trial	HIV Medicine	Age<40 or not stratified by age
2008	Wu	Burden of depression among impoverished HIV-positive women in Peru	Journal of Acquired Immune Deficiency Syndromes: JAIDS	Age<40 or not stratified by age
2007	Yu	Cardiovascular risk reduction in HIV positive patients: Results from short-term medical intervention	International Journal of Atherosclerosis	Age<40 or not stratified by age
2017	Zanetti	Does nonlinear resistance training reduce metabolic syndrome in people living with HIV? A randomized clinical trial	Journal of Sports Medicine and Physical Fitness	Age<40 or not stratified by age
2009	Zena-Castillo	Impact of hospital-associated anxiety and depression on the CD4 counts of naive HIV/AIDS patients from locations in Northern Peru	International Journal of Infectious Diseases	Age<40 or not stratified by age
2012	Zimmermann	Langerhans cell density in cervical intraepithelial neoplasia associated with human papillomavirus infection in HIV-infected and HIV-noninfected Brazilian women	International Journal of Gynecological Cancer	Wrong outcomes
2006	Zimmermann	Association between CD4+ T-cell count and intraepithelial cervical neoplasia diagnosed by histopathology in HIV-infected women	Revista Brasileira de Ginecologia e Obstetricia	Wrong outcomes
2014	Zimpel	Depression as a major impact on the quality of life of HIV-positive Brazilians	Psychology Health & Medicine	Age<40 or not stratified by age
2012	Zirpoli	Angina pectoris in patients with HIV/AIDS: prevalence and risk factors	Brazilian Journal of Infectious Diseases	Age<40 or not stratified by age
		Special Issue: HIV and noncommunicable disease comorbidities in the era of antiretroviral therapy: a vital agenda for research in low- and middle-income country settings. (Special Issue: HIV and	JAIDS, Journal of Acquired Immune Deficiency Syndromes	Wrong patient population

Year	First Author	Title	Journal	Exclusion Reason
2018		noncommunicable disease comorbidities in the era of antiretroviral therapy: a vital agenda for research in low- and middle-income country settings.)		
		Non-Hodgkin lymphoma risk in adults living with HIV across five continents	AIDS	Age<40 or not stratified by age

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• Of importance

•• Of major importance

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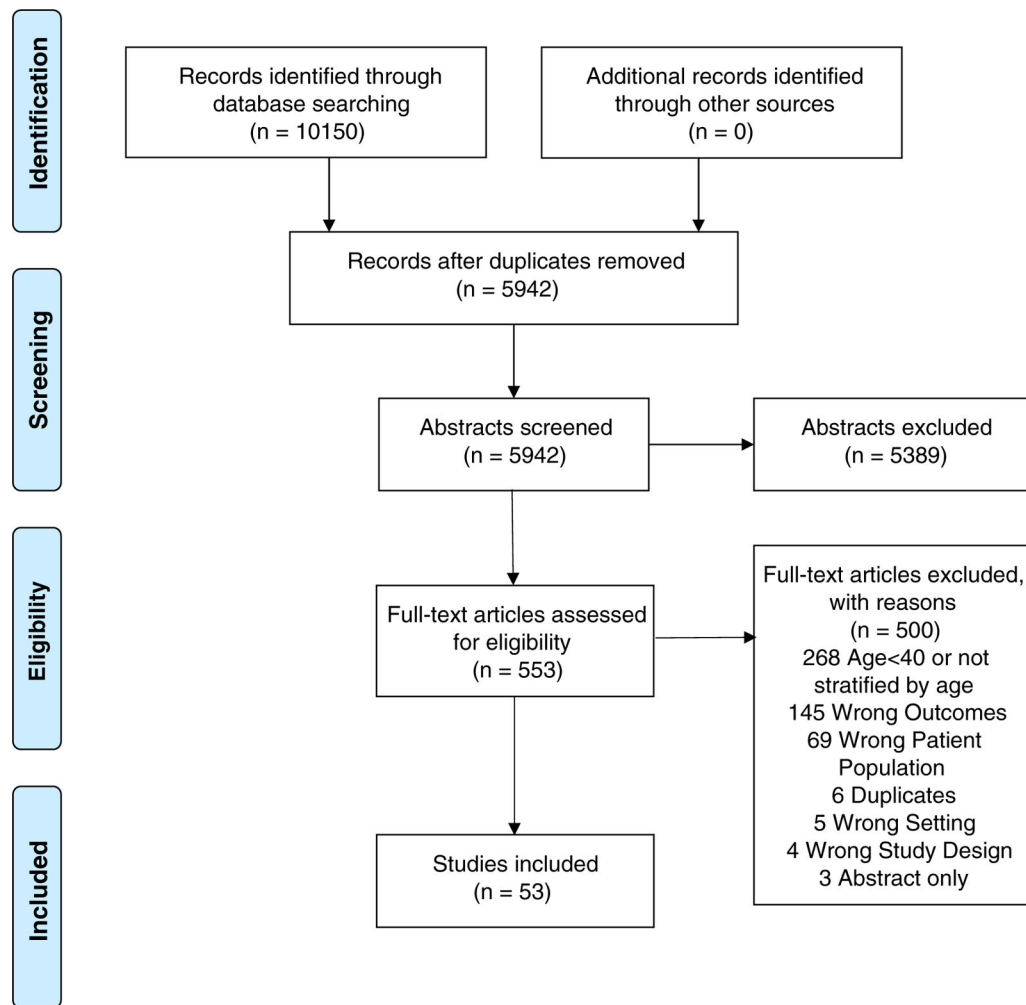


Fig. 1. PRISMA 2009 Flow Diagram. Adapted from Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLoS Med* 6(7): e1000097

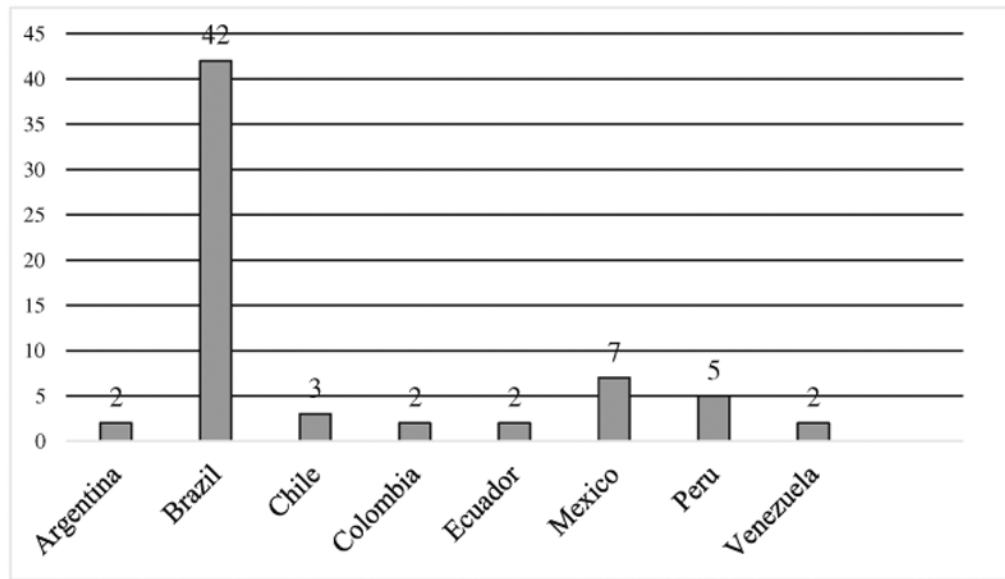


Fig. 2.

Number of publications on aging with HIV by country*. *Two studies [38, 51] included several LAC (Argentina, Brazil, Chile, Colombia, Ecuador, Peru, Venezuela), thus were counted toward the publication count for each individual country accounting for 65 total publications included in this figure

Table 1

Studies reporting cardiovascular disease-related outcomes

Author; year (references)	Country; language	Sample size (total N; age 40 years, n)	Type of study	Definition of older age (years)	% on ART; time on ART (median [IQR] or mean [SD] years)	HIV duration (median [IQR] or mean [SD] years or % cohort)	CD4 cells absolute count (median [IQR] or mean [SD])	Objectives of the study	Aging-related outcomes of each study
Cardiovascular risk stratification									
Barros ZM, et al.; 2010 [30]	Brazil; English	348; 267 (age 40 years)	Prospective, cross-sectional	40	81.8%; 5.4 (5.9)	6 (6.8)	383 (308)	-Agreement between Framingham and PROCAM scores. -Factors associated with disagreement between the scales.	-In univariate analyses, age 40 years was associated with disagreement between FRS and PROCAM classifications ($p=0.018$). -Multivariable analyses revealed age 40 years had an aOR 10.8 (95% CI 2.1, 54.5) risk of disagreement between FRS and PROCAM.
Fuchs SC, et al.; 2013 [31]	Brazil; English	3529; 146 (age 50 years)	Retrospective, cross-sectional	50	70.2%; not reported	22% had HIV duration 8 years.	Not reported	-Determine the 10-year risk for CHD using Framingham risk score among PWH living in 3 regions of Brazil.	-Age 50–59 years was an independent risk factor for CHD over 10 years (aRR 16.3 [10.8, 24.7]), age 60 years (aRR 43.4 [28.5, 66]); $p < 0.001$. -Prevalence of intermediate or high FRS score was similar between regions among patients age 60 years. -Age was the strongest predictor for CHD, after controlling for confounders.
Pinto-Neto LF, et al.; 2017 [32]	Brazil; English	341; 341 (age 40 years)	Prospective, cross-sectional	40	97.9%; not reported	-31.7% (5–10 years) -18.8% (16–20 years) -6.7% (age 20 years)	-4% (CD4 cells <200) -66% (CD4 cells 500)	-Compare predictions of Framingham and American College of Cardiology/American Heart Association (ACC)/AHA risk scores among PWH in Vitoria, Espirito Santo, Brazil, older than 40 years of age	Among PWH age 40 years: -Framingham: High risk: 26% -ACC/AHA: High risk: 46% -Kappa = 0.745, $p < .039$. -Both ACC/AHA and Framingham underestimated high cardiovascular risk among PWH
Fonseca Pacheco AG; 2009 [33]	Brazil; English	67,249; age 40–49 years: 4186; age 50–59 years: 1881; age 60+: 974	Prospective, longitudinal	40–49; 50–59; 60+	67%; not reported	Not reported	Not reported	-To assess temporal trends in mortality due to CVD and diabetes among PWH in Brazil over time.	-In all ages, adjusted average yearly increase of death due to CVD was 8% among PWH but 0.8% among HIV-negative persons. -CVD-associated death in PWH was more common in age groups 40–49, 50–59, and 60+ years compared with younger age groups.
Maciel RA, et al.; 2018 [34]	Brazil; English	208; 208 (age 50 years)	Cross-sectional, prospective	50	Not reported; 10.9 (5.7)	14.3 (7.3)	598 (400–790)	-To compare the disease burden (including CVD) of older PWH to matched	-CVD prevalence among PWH age 50 years: 9.6%. -Prevalence of multimorbidity is higher

Author; year (references)	Country; language	Sample size (total N; age 40 years, n)	Type of study	Definition of older age (years)	% on ART; time on ART (median [IQR] or mean [SD] years)	HIV duration (median [IQR] or mean [SD] % cohort)	CD4 cells absolute count (median [IQR] or mean [SD])	Objectives of the study	Aging-related outcomes of each study
Castilho JL, et al.; 2019 [35]	Brazil; English	6206; not reported	Retrospective, longitudinal	50	100% not on ART	Not reported	238 (118–337)	HIV-negative controls living in Brazil.	<ul style="list-style-type: none"> -In PWH age 50 years (63%) vs. age-matched controls (43%); $p < 0.001$. -Age 50 years ($p < 0.001$) and HIV-positive status (prevalence ratio 1.47, $p < 0.001$) was significantly associated with greater multimorbidity. -Older age was associated with increased risk of any incident non-communicable disease (aHR 6.6 [4.9, 9.0] for age 50 years vs. age < 30 years). -Older age (50 years vs. <30 years) at cohort entry: aHR 11.39 [7.2, 18.1]; $p < 0.001$.
Brites-Alves C, et al.; 2018 [36]	Brazil; English	220; 220 (age 35 years)	Prospective, cross-sectional, case-control design	35	100%; 100% (ART duration 12 months)	11.8 (6.5)	764 (350)	-To examine non-communicable disease multimorbidity (including CVD) in a multi-site observational cohort of PWH in Brazil.	<ul style="list-style-type: none"> -Among PWH age 35 years, higher IL-6 levels were associated with increased cardiovascular risk. -Activated CD4 cells were associated with increased proinflammatory cytokines. -Cases with HIV co-infections were older ($p = 0.0002$).
Lister-Del Pino P, et al.; 2015 [37]	Peru; Spanish	111; 111 (age 40 years)	Prospective, cross-sectional	40	100%; not reported	Not reported	Not reported	Determine concordance between Framingham and PROCAM among older PWH in Peru.	<ul style="list-style-type: none"> -For all participants (age 40 years); Framingham: Moderate risk, 13.6%; High risk, 5.4%. -PROCAM: Moderate risk, 25.2%; High risk, 3.6%. -Concordance lost as risk score increased. -Kappa = 0.56 indicating strong correlation between both scales.
Cahn P, et al.; 2010 [38]	Argentina, Brazil, Chile, Colombia, Ecuador, Peru, Venezuela; English	4010 (N across all countries) Age 45 years, men; age 55 years, women	Prospective, longitudinal	45, men; 55, women	100%; 2 (0.83, 4.25), across all countries	Not reported	417 (266, 621), across all countries	-Determine the prevalence of metabolic syndrome (MetS), metabolic abnormalities, and 10-year risk for CVD.	<ul style="list-style-type: none"> -10-year risk of CVD (Framingham) was 10.4 (24.7). -Longer exposure to HAART seen in dyslipidemia ($p = 0.0034$), type 2 diabetes ($p < .001$), MetS ($p < 0.001$). -CVD risk (FRS) increased by 0.09 per month of ART exposure. -Male patients had greater CVD risk factors compared with females.

Author; year (references)	Country; language	Sample size (total N; age 40 years, n)	Type of study	Definition of older age (years)	% on ART; time on ART (median [IQR] or mean [SD] years)	HIV duration (median [IQR] or mean [SD] years or % cohort)	CD4 cells absolute count (median [IQR] or mean [SD])	Objectives of the study	Aging-related outcomes of each study
126 -Ecuador: 44 -Peru: 75									
Dyslipidemia									
De Araujo PSR, et al.; 2007 [39]	Brazil; English	372; 111 (age 40 years)	Prospective, cross-sectional	40	69.6%; not reported	55.6% (2 years HIV duration)	Not reported	Determine the association between type of ART used and dyslipidemia and hyperglycemia prevalence.	-No differences in glycemia between age groups ($p = 0.107$). -Higher total cholesterol ($p = 0.04$) and triglyceride levels ($p < 0.001$) with increasing age. -Age 40 years had a stronger effect on the relationship between ART schema and total cholesterol (aOR 1.68 [0.97, 2.9]) and triglycerides (aOR 2.0 [1.2, 3.3]).
Farhi L, et al.; 2008 [40]	Brazil; Portuguese	268; not reported; age 42.4 ± 0.6 years (mean ± SD)	Prospective, cross-sectional	Not reported	Not reported	Not reported	432 (318, 588)	To determine the prevalence of dyslipidemia among PWH followed in a clinic in Rio de Janeiro, Brazil.	-There was no correlation between older age and dyslipidemia in this study. -Dyslipidemia prevalence across all ages was 77.5% with more males with dyslipidemia. -Age 40 years associated with elevated total cholesterol.
Melo ES, et al.; 2019 [41]	Brazil; Portuguese	340; 228 (age 40 years)	Prospective, cross-sectional	40	100%; 55% (ART duration 5 years)	64.4% (HIV duration 5 years)	6.5% (CD4 cells <200)	Determine the prevalence of dyslipidemia in PWH and risk factors for dyslipidemia.	-Prevalence of older age group with elevated total cholesterol: age 40–59 years (59% vs. 57% normal), age 60 years (13.7% vs. 6% normal); $p = 0.02$.
Falcao Mda C, et al.; 2012 [42]	Brazil; English	122; 70 (age 40 years)	Prospective, cross-sectional	40	81.1%; 24.5% (ART duration 5 years)	Not reported	14% (CD4 cells <200)	-Determine the frequency of carotid atherosclerosis. -Determine the association of biomarker levels and carotid intimal-medial thickening in PWH in Pernambuco, Brazil.	-Prevalence of atherosclerosis irrespective of age, 42.6%; among age 40 years, 60%. -Age 40 years increased risk of subclinical atherosclerosis (aOR 6.3 [2.72, 14.6], $p = 0.00$) in multivariable analyses. -PWH age 40 years with either intermediate or high FRS were more likely to develop atherosclerosis in univariable analyses.
Pacheco AG, et al.; 2016 [43]	Brazil; English	535; not reported (age 40 years)	Prospective, cross-sectional	40	88.9%; 4.6 (1.7, 10.8)	7.9 (3.4, 14.4)	534 (366, 735)	-To compare carotid intima media thickness between PWH and HIV-negative controls.	-No difference in carotid intima media thickness between PWH and controls. -Age 40 years was a significant risk factor for greater carotid intima media thickness.

Author; year (references)	Country; language	Sample size (total N; age 40 years, n)	Type of study	Definition of older age (years)	% on ART; time on ART (median [IQR] or mean [SD] years)	HIV duration (median [IQR] or mean [SD] years or cohort)	CD4 cells absolute count (median [IQR] or mean [SD])	Objectives of the study	Aging-related outcomes of each study
Pinto-Neto LF, et al.; 2013 [44]	Brazil; English	498; 57 (age 50 years)	Retrospective, cross-sectional	50	100% on ART; not reported	7.7 (3.8, 10)	Not reported	-To evaluate cumulative incidence of dyslipidemia and fasting glucose impairment 3 years after ART initiation; determine the association with ART regimen.	-Among those with dyslipidemia, age 50 years comprised 31.5%. -There was no significant difference in dyslipidemia prevalence by age groups. -Age 50 years was associated with higher triglyceride levels (36.5% vs. 27.9%, $p=0.039$). -Impaired fasting glucose was more frequent among age 50 years (53.3%); $p=0.01$.
de Carvalho EH, et al.; 2010 [45]	Brazil; English	256; 40 (age 50 years)	Prospective, cross-sectional	50	85.1%; 4.7 (2.7)	5.6 (3.7)	Not reported	-To estimate the prevalence of hyperapolipoprotein B (hyperapoB) and its association with cardiovascular risk.	HyperapoB prevalence (all ages), 32.4%. -40% of those with hyperapoB were age 50 years ($p=0.014$, compared with age < 29 years). -HyperapoB was higher in patients with MetS across all ages. -Age 50 years had greater risk of HyperapoB by OR 5.0 (1.37, 15.0).
Mata-Marin JA, et al.; 2015 [46]	Mexico; English	223; 76 (age 40 years)	Retrospective, cross-sectional	40	100%; 100% (48 weeks of ART)	Not reported	209 (92, 316)	-Determine lipid and glucose levels following 48 weeks of ART therapy among ART-naïve PWH.	-Age 40 years was associated with hypertriglyceridemia (aOR 1.9 [1.01, 3.63], $p=0.044$) and hypercholesterolemia (aOR 2.4 [1.15, 4.9], $p=0.004$). -Hypertriglyceridemia prevalence (all ages), 37.2%. -Hypercholesterolemia (all ages), 32.3%.
Mata-Marin JA, et al.; 2019 [47]	Mexico; English	125; 60 (age 50 years)	Prospective, case-control, cross-sectional	50	Not reported	7 (2-16) (among age 50 years)	509 (324-730) (among age 50 years)	-To determine and compare the prevalence of polypharmacy and comorbidity among older Mexican PWH compared with younger PWH.	-Older PWH had a greater risk of hyperlipidemia (aOR 2.8 [1.2, 6.3], $p=0.042$) compared with younger Mexican PWH. -Among PWH age 50 years, 70% had polypharmacy (aOR 6.58 [3.01, 14.4], $p<.001$)
Rondan PL, et al.; 2017 [48]	Peru; Spanish	538; 267 (age 40 years)	Retrospective, cross-sectional	40	100%; 2.96 (0.5, 13.21)	4.36 (0.6, 20.65)	13% (CD4 cells < 200)	Determine the frequency and characteristics of dyslipidemia among PWH in a Peruvian public hospital.	-Age 40 years was associated with increased risk for dyslipidemia (aOR 1.17 [1.05, 1.28]). -Dyslipidemia prevalence (all ages), 74.7%. -Dyslipidemia prevalence (age 40 years), 80.5%.

Author; year (references)	Country; language	Sample size (total N; age 40 years, n)	Type of study	Definition of older age (years)	% on ART; time on ART (median [IQR] or mean [SD] years)	HIV duration (median [IQR] or mean [SD] years or % cohort)	CD4 cells absolute count (median [IQR] or mean [SD])	Objectives of the study	Aging-related outcomes of each study
Hidalgo JA, et al.; 2018 [49]	Peru; English	305; 111 (age 50 years)	Retrospective, cross-sectional	50	100%; 7.8 (4.3)	Not reported	614.2 (295.8)	To describe the most frequent cardiometabolic abnormalities among PWH in Peru.	For age 50 years, reported prevalence: -Dyslipidemia, 61.3% (vs. 45.9%); $p = 0.006$. -Obesity, 10.8% (vs. 11.3%); $p = 0.524$. -Diabetes, 16.2% (vs. 2%); $p < 0.001$. -CVD, 5.4% (vs. 2.1%); $p = 0.108$. -Dyslipidemia, diabetes, hypertension were related to older age (p values between 0.006 and <0.001).
Metabolic syndrome (MetS)									
AkLD, et al; 2017 [16]	Brazil; English	273; 273 (age 40 years)	Prospective, cross-sectional	40	91%; 9.4 (4.8)	9.9 (5.4)	7.5% (CD4 cells <200); 61.7% (CD4 cells 500)	-Determine the prevalence of MetS in middle-aged women with HIV in Brazil.	-MetS prevalence among menopausal women (age 40 years), 46.9%. -MetS was associated with age 50 years ($p = 0.0002$); schooling < 8 years ($p = 0.0003$); post-menopause ($p < 0.0001$); BMI 25 kg/m ² ($p < 0.0001$) all among women age 40 years. -No association between protease inhibitor use and MetS among women age 40 years.
Diehl LA, et al.; 2008 [17]	Brazil; Portuguese	180; not reported (age 40 years)	Prospective, cross-sectional	40	87.2%; not reported	8.6 (4.2)	404.7 (251)	-To evaluate cardiovascular risk factors and MetS prevalence among PWH with lipodystrophy.	-MetS prevalence among PWH with lipodystrophy, 36%. -Risk factors for MetS: Age 40 years at time of HIV diagnosis ($p = 0.002$).
Lacerda HR, et al.; 2014 [50]	Brazil; English	125; 76 (age 40 years)	Prospective, cross-sectional	40-65	81.6%; 25% (ART 5 years)	Not reported	15% (CD4 cells < 200)	-To evaluate the association of CD4 cells, viral load, ART, and metabolic and cardiovascular inflammatory cytokines.	-MetS (all ages) was associated with high C-reactive protein (CRP) levels. -Hypertension (all ages) was associated with high interleukin (IL)-6 levels. -Age 40 years was not associated with increased levels of TNF-alpha, IL-6, or CRP.
Alvarez C, et al.; 2010 [51]	Argentina, Brazil, Chile, Colombia, Ecuador, Peru, Venezuela; English	4010 (N across all countries) Age 45 years, men; age 55 years, women: -Across all countries 1066 -Argentina: 235 -Brazil: 331 -Chile: 9	Prospective, longitudinal	45, men; 55, women	100%; 3.3	6.7	417 (266, 621)	-To evaluate the prevalence and associated factors of metabolic syndrome in PWH in LAC from the RAPID II study.	-MetS prevalence, 20.2% (pooled across all countries, all ages). -Older age was associated with greater risk of MetS among PWH.

Author; year (references)	Country; language	Sample size (total N; age 40 years, n)	Type of study	Definition of older age (years)	% on ART; time on ART (median [IQR] or mean [SD] years)	HIV duration (median [IQR] or mean [SD] years or % cohort)	CD4 cells absolute count (median [IQR] or mean [SD])	Objectives of the study	Aging-related outcomes of each study
		-Colombia: 126 -Ecuador: 44 -Peru: 75 -Venezuela: 125							
Cahn P, et al.; 2010 [38]	Argentina, Brazil, Chile, Colombia, Ecuador, Peru, Venezuela; English	4010 (N across all countries), Age 45 years, men; age 55 years, women	Prospective, longitudinal	45, men; 55, women	100%; 2 (0.83, 4.25), across all countries	Not reported	417 (266, 621), across all countries	-Determine prevalence of MetS, metabolic abnormalities and 10-year risk for CVD.	-MetS prevalence (all ages), 20.2%. -Males were older (mean age [SD] 42.2 [9.9] years) with higher prevalence of dyslipidemia and risk factors for CVD.
Hypertension									
Arruda Junior ER, et al.; 2010 [52]	Brazil; English	958; 303 (age 40 years)	Prospective, case-control study	40	80.5%; 36% (ART duration 5 years)	40.1% (HIV duration 5 years)	16.8% (CD4 cells <200)	-Determine the prevalence of hypertension and related risk factors.	-Age 40 years independently associated with increased risk for hypertension (OR 3.06 [1.91, 4.97]). -Mean age of hypertensive PWH higher than pre-hypertensive and normotensive PWH (age 43.4 ± 9.2 years vs. age 40.4 ± 9.8 years vs. age 36.9 ± 8.9 years); <i>p</i> < 0.0001.
Arruda Junior ER, et al.; 2010 [53]	Brazil; English	958; 479 (age 40 years)	Prospective, cross-sectional	40	85.9%; 74.7% (ART 2 years)	71% (HIV duration 2 years)	452 (234)	-To estimate the prevalence of hypertension and risk factors associated with hypertension in PWH.	-Hypertension prevalence (across all ages), 25.6%. -Obesity prevalence (all ages), 52.7%. -Hypertensive PWH were significantly older (age 40 years); <i>p</i> = 0.0004.
Cunha GHD, et al.; 2018 [54]	Brazil; English	208; 71 (age 45 years)	Prospective, cross-sectional	45	100%; 6.5 (4.1)	7.45 (4.3)	604 (339)	-To determine the prevalence of hypertension among PWH on ART.	-Hypertension prevalence (all ages), 17.3%. -Age 45 years increased risk of hypertension (<i>p</i> < .0001). -PWH age 45 years had greater risk of

Author; year (references)	Country; language	Sample size (total N; age 40 years, n)	Type of study	Definition of older age (years)	% on ART; time on ART (median [IQR] or mean [SD] years)	HIV duration (median [IQR] or mean [SD] years or % cohort)	CD4 cells absolute count (median [IQR] or mean [SD])	Objectives of the study	Aging-related outcomes of each study
Mata-Marin JA, et al.; 2019 [47]	Mexico; English	125; 60 (age 50 years)	Prospective, case-control, cross-sectional	50	Not reported	7 (2–16) (age 50 years)	509 (324–730) (age 50 years)	-To determine and compare prevalence of polypharmacy and comorbidity among older Mexican PWH compared to younger PWH.	having hypertension (OR 2.97 [1.42, 6.18]); $p = 0.003$. -Older age had a greater risk of hypertension (aOR 15.75 [3.5, 71]) and diabetes (aOR 14.4 [1.8, 115]) compared with younger PWH.
Hidalgo JA, et al.; 2018 [49]	Peru; English	305; 111 (age 50 years)	Retrospective, cross-sectional	50	100%; 7.8 (4.3)	Not reported	614.2 (295.8)	-To describe the most frequent cardiometabolic abnormalities among PWH in Peru.	-Hypertension prevalence (age 50 years), 18.9% (vs. 3.1%); $p < 0.001$. -Hypertension was associated with older age ($p < 0.001$).

FRS, Framingham risk score; CHD, chronic heart disease; PWH, people living with HIV; CVI, cardiovascular disease; ART, antiretroviral treatment; BMI, body mass index; aOR, adjusted odds ratio; aRR, adjusted relative risk; aHR, adjusted hazard ratio; OR, odds ratio; CI, confidence interval

Table 2

Studies reporting neurological or psychiatric-related outcomes

Author; year (references)	Country; language	Sample size (total N, age, years, n)	Type of study	Definition of older age (years)	% on ART; time on ART (median [IQR] or mean [SD] years)	HIV duration (median [IQR] or mean [SD] years or % cohort)	CD4 cells absolute count (median [IQR] or mean [SD])	Objectives of the study	Instruments used	Aging-related outcomes of each study
Neurological conditions										
Sereia AL, et al.; 2012 [55]	Brazil; English	100; 16 (age 50 years)	Prospective, cross-sectional	50	100%; 100% (2 years)	Not reported	374 (28)	-Determine neurocognitive impairment (NCI) prevalence among PWH.	Mini-Mental State Exam (MMSE)	-Prevalence of NCI (age 50 years, 23%; age < 50 years, 77%). -Age 50 years associated with more frequent cognitive impairment ($p < 0.001$).
de Araujo ML, et al.; 2018 [56]	Brazil; English	73; 73 (age 35 years)	Prospective, cross-sectional	35	Not reported	9.8–15.10 years (range)	635 (240)	-Determine the association between NCI and leukocyte telomere length (LTL).	None	-PWH with MND and HAD were older (ages [mean \pm SD]): MND, 52.0 \pm 6.9 years; HAD, 49.7 \pm 6.8 years vs. cognitively normal, 46.7 \pm 7.4 years). -Age-matched LTL were shorter among PWH compared with HIV-negative controls. -No association between LTL and NCI among PWH.
Pinheiro CA, et al.; 2016 [57]	Brazil; English	392; 114 (age 50 years)	Prospective, cross-sectional	50	89.3%; Not reported	34.4% (HIV duration 3–8 years); 36.8% (HIV duration 8 years)	14.4% (CD4 cells < 200); 52% (CD4 cells 500)	-Determine the prevalence of NCI among PWH in southern Brazil; determine associated risk factors with NCI.	International HIV Dementia Scale (IHDS), Grooved Pegboard, Color Trails Test 1 and 2, Finger Tapping Test, MOCA	-Greater risk of NCI among PWH age 52 years (OR 4.85 [2.34, 10.03]) compared with younger ages. -Prevalence of NCI among age groups: 44–51 years, 41.5% (OR 3.04 [1.58, 5.86]; $p = 0.001$); age 52 years, 54% (OR 4.85 [2.32, 10.03]; $p < .001$ (vs. age < 34 years, 18.9%)). -Depression had strongest association with NCI (all ages).
Pinheiro CA, et al.; 2016 [58]	Brazil; English	392; 114 (age 50 years)	Prospective, cross-sectional	50 (mean 56.7 years, range 50–82 years)	95%; 6.4 (4.9)	Not reported	13.2% (CD4 cells < 200)	-Compare NCI and demographic characteristics among older vs. younger PWH.	IHDS, Grooved Pegboard, Color Trails Test 1 and 2, Finger Tapping Test, MOCA	-Age 50 years had higher risk of NCI (aOR 2.28 [1.35, 3.82]; $p = 0.002$). -Prevalence of NCI among older PWH (IHDS only),

Author; year (references)	Country; language	Sample size (total N, age, years, n)	Type of study	Definition of older age (years)	% on ART; time on ART (median [IQR] or mean [SD] years)	HIV duration (median [IQR] or mean [SD] years or % cohort)	CD4 cells absolute count (median [IQR] or mean [SD])	Objectives of the study	Instruments used	Aging-related outcomes of each study
Troncoso FT, et al.; 2015 [59]	Brazil; English	195; 79 (age 40 years)	Prospective, cross-sectional	40	87.7%; 7.1 (5.5)	8.6 (5.7)	7.9% (CD4 cells < 200)	-Determine NCI prevalence and associated risk factors among PWH using the IHDS.	IHDS	63.7%; (IHDS ± test battery), 53.2%. -NCI was more common among older ages: age 40 years (61%) vs. age < 40 years; (35.3%) (OR 2.87 [1.24, 6.64]), but not when stratified by sex. -NCI prevalence among women age 40 years (57.1%) vs. age < 40 years (68.3%); <i>p</i> = 0.67. -NCI prevalence among men age 40 years (52.8%) vs. age < 40 years (29.6%); <i>p</i> = 0.07.
Fernandes Filho SM, et al.; 2012 [60]	Brazil; English	52; 52 (age 50 years)	Prospective, cross-sectional	50 (57.6 ± 6.2 [mean ± SD])	94.2%; not reported	4.97 (3.58)	459 (259)	-Describe NCI and depression prevalence among older PWH age 50 years.	MMSE, IHDS	Among PWH age 50 years: -NCI prevalence, 36.5%. -73.5% of those with NCI had cortical impairment. -HIV-associated dementia (HAD) prevalence, 13.5%.
Gascon MRP, et al.; 2018 [61]	Brazil; English	412; 141 (age 50 years)	Prospective, cross-sectional	50	Not reported	14.25 (7.23)	626 (291)	-Determine HAND prevalence among PWH, particularly among PWH age 50 years.	-IHDS -Vocabulary and Matrix Reasoning (WAIS-III) -Trail Making Test A and B -Coding subtest (WAIS-III) -Digit Span (WAIS-III) -Rey Auditory Verbal learning test -Key Complex Figure Test -Phonemic Verbal Fluency Test (Animal Naming) -Grooved Pegboard Test -Finger Tapping Test	-Asymptomatic neurocognitive impairment (ANI) prevalence, 68.1% (age 50 years); 31.9% (age 50 years). -MND/HAD prevalence, 57% (age 50 years); 43% (age 50 years); <i>p</i> = 0.12. -In univariate analyses, age 50 years had greater risk of symptomatic HAND compared with age 50 years (OR 1.63 [1.02, 2.62]; <i>p</i> = 0.043).
Zamudio-Rodriguez A; 2018 [62*]	Mexico; English	206; 206 (age 50 years)	Prospective, cross-sectional	50	100%; not reported	11.1 (5.5)	6.3% (CD4)	-Investigate the relationship between frailty and	NEUROPSI neuropsychological battery	Among PWH age 50 years, prevalence: -HAND, 66%

Author; year (references)	Country; language	Sample size (total N, age, years, n)	Type of study	Definition of older age (years)	% on ART; time on ART (median [IQR] or mean [SD] years)	HIV duration (median [IQR] or mean [SD] years or % cohort)	CD4 cells absolute count (median [IQR] or mean [SD])	Objectives of the study	Instruments used	Aging-related outcomes of each study
Psychiatric conditions										
Fernandes Filho SM, et al.; 2012 [60]	Brazil; English	52; 52 (age 50 years)	Prospective, cross-sectional	50 (57.6 ± 6.2 [mean ± SD])	94.2%; not reported	4.97 (3.58)	459 (259)	-Describe the prevalence of NCI and depression among older PWH.	Yesavage Geriatric Depression Scale (15-item)	-Among PWH age 50 years: -Prevalence of depressive symptoms, 34.6%. -PWH with depressive symptoms had more functional impairment ($p < 0.001$). -Frailty, 2.9% -Prefrailty, 26.2% -Prefrailty was associated with MIND but not with ANI among PWH age 50 years.
Pinheiro CA, et al.; 2016 [58]	Brazil; English	392; 114 (age 50 years)	Prospective, cross-sectional	50 (56.7, 50-82 [mean, range])	95%; 6.4 (4.9)	not reported	13.2% (CD4 cells < 200)	-Compare NCI and demographic characteristics among older vs. younger PWH, including depression.	Not reported	-No difference in prevalence of depression between PWH age 50 years (21.3%) vs. age < 50 years; (25.7%); $p = 0.34$.
Carvalho Filho AD, et al.; 2013 [63]	Brazil; English	72; 72 (age 60 years)	Prospective, cross-sectional	60	100%; 7.9 (4.8)	Not reported	450 (243)	-Determine factors associated with Major Depression among older PWH.	Yesavage Geriatric Depression Scale (15-item)	Among PWH age 60 years: -Prevalence of major depression, 27.7%. -Factors associated with MD: female sex, low CD4 cells, current smoker. -Age at time of HIV diagnosis and age at the start of the study did not significantly impact depression.
Avila-Funes JA, et al.; 2018 [64]	Mexico; English	328; 328 (age 50 years)	Prospective, cross-sectional	50 (58.4 ± 7.2 [mean ± SD])	100%; 8.2 (5.8)	10.4 (6.6)	12.5% (CD4 cells < 200)	-Determine the prevalence of and factors associated with depressive symptoms among older PWH age 50 years.	Yesavage Geriatric Depression Scale (15-item)	-Prevalence of depressive symptoms among PWH age 50 years, 15.9% -No age differences between PWH with depressive vs. no depressive symptoms. -Factors associated with depressive symptoms among PWH age 50 years: frailty ($p < 0.01$), disability for ADLs ($p < 0.01$), female sex ($p = 0.01$) compared to those without depressive symptoms.

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NCI, neurocognitive impairment; *MND*, mild neurocognitive disorder; *HAD*, HIV-associated dementia; *PWH*, people living with HIV; *IHDS*, international HIV dementia scale; *MCCA*, Montreal cognitive assessment; *MMSE*, Mini-Mental State Examination; *HAND*, HIV-associated neurocognitive disorder; *ANI*, asymptomatic neurocognitive impairment; *ADL*, activities of daily living; *OR*, odds ratio; *SD*, standard deviation

Table 3
 Studies reporting bone/musculoskeletal disorders, renal disease, or non-AIDS-related malignancy outcomes

Author; year (references)	Country; language	Sample size (total N; age 40 years, n)	Type of study	Definition of older age (years)	% on ART; time on ART (median [IQR] or mean [SD] years)	HIV duration (median [IQR] or mean [SD] years or % cohort)	CD4 cells absolute count (median [IQR] or mean [SD])	Objectives of the study	Aging-related outcomes of each study
Bone/musculoskeletal (MSK) disorders									
Chaba Dcds, et al.; 2017 [65]	Brazil; English	108; 22 (age 50 years)	Prospective, cross-sectional	50	74%; 61.4 months	45.4% (48 months); 50.93% (< 48 months)	399 (275, 567)	Explore the prevalence of low bone mineral density (BMD) and risk factors among PWH receiving care at a referral center in São Paulo, Brazil.	-Low BMD was detected in 15% (6, 22) of PWH age < 50 years and 54% (32, 77) among PWH age 50 years. -The risk of low BMD was higher in PWH age 50 years (14.45% vs. 54.54%; RR 3.77 [1.97, 7.02]; <i>p</i> = 0.001). Among women with HIV age 40 years: -Low spinal BMD prevalence, 14.6% vs. 4.6% in HIV-negative women. -Well-controlled HIV-seropositive women on long-term ART had low spinal (L1-L4) BMD. -Femoral neck BMD rates were similar to those of HIV-negative women. -In bivariate analyses, older age was associated with lower spine BMD (<i>p</i> < 0.001). -The only factor associated with lower BMD of the femoral neck was older age (<i>p</i> = 0.002).
Gomes DC, et al.; 2015 [66]	Brazil; English	239; 239 (age 40 years)	Prospective, cross-sectional	40	92%; not reported	9.9 (5.4)	61.8% (CD4 500)	Assess BMD and its associated factors in HIV-seropositive and seronegative climacteric women.	
Pinto Neto L, et al.; 2011 [67]	Brazil; English	300; 99 (age 50 years)	Prospective, cross-sectional	50	88.3%; 5 (1.4, 9)	7 (3, 10)	522 (388, 734)	Evaluate BMD and clinical risk factors among PWH attending an outpatient clinic in Vitoria, Brazil.	-Low BMD (all ages) was detected in 54.7% (IQR 39, 52). -Low BMD was more frequent among PWH age 50 years compared with younger PWH (73.7% vs. 45.3%, <i>p</i> < 0.001).
Pinto Neto L, et al.; 2016 [68]	Brazil; English	93; 33 (age 50 years)	Prospective, cross-sectional	50-78	100%; not reported	Not reported	Not reported	Compare the prevalence of sarcopenia, presarcopenia, and severe sarcopenia in PWH compared to healthy HIV-uninfected older individuals.	-Strong positive association of presarcopenia and sarcopenia among PWH with mean age of 59 years and on regular ART compared to HIV-negative controls with a mean age of 70 years (<i>p</i> = 0.01).
Perez C. et al.; 2014 [69]	Chile; Spanish	16; 12 (age 40 years)	Prospective, cross-sectional	40 (IQR 29, 60)	100%; not reported	Not reported	532	Determine the frequency of hypovitaminosis D and low BMD among PWH.	-40% of PWH with low BMD were age 50 years.

Author; year (references)	Country; language	Sample size (total N; age 40 years, n)	Type of study	Definition of older age (years)	% on ART; time on ART (median [IQR] or mean [SD] years)	HIV duration (median [IQR] or mean [SD] years or % cohort)	CD4 cells absolute count (median [IQR] or mean [SD])	Objectives of the study	Aging-related outcomes of each study
Mata-Marin J, et al.; 2018 [70•]	Mexico; English	104; 104 (age 40 years)	Prospective, cross-sectional	49 (42, 52)	100%; 6.5 (1.6, 9)	Not reported	Not reported	Determine the prevalence of and associated risk factors for vertebral fractures (VF) in PWH in a tertiary care hospital in Mexico	Among PWH age 40 years: -Prevalence of VF was high at 25% (17, 34). -Gender, HCV co-infection, previous corticosteroid use, history of AIDS, plasma HIV viral load, and current and previous use of protease inhibitors were not significantly associated with VF.
Frailty or disability									
Pereira AC, et al.; 2019 [71]	Brazil; English	302; 101 (age 40 years)	Prospective, cross-sectional	40	98%; not reported	Not reported	63.6% (CD4 cells 500)	-Evaluate pain in PWH and relate it to clinical factors.	-PWH age 49 to 59 years had greater pain intensity than people age 18 to 29 years (OR 3.85 [CI 1.40, 100.61]; $p = 0.008$).
Avila-Funes JA, et al.; 2016 [72]	Brazil; English	184; 184 (age 50 years)	Prospective, cross-sectional	50	100%; 8 (5.7)	11 (6.4)	478.8 (236.7); 38, 1168 (range)	-Determine the correlates of prevalent disability in PWH age 50 years.	-In multivariate logistic regression, older age was independently associated with both ADL and IADL difficulties ($p = 0.004$). -Among PWH age 50 years: -26.1% had disability for ADLs; 17.9% for IADLs. -Low CD4 cell count and detectable plasma viral load were independently associated with both types of disability.
Zeballos D, et al.; 2019 [73]	Brazil; English	201; 201 (age 50 years)	Prospective, cross-sectional	50	99.5%; 16 (7, 18)	16 (7, 18)	673 (470, 900)	-Determine the prevalence and factors associated with frailty and define the impact of frailty on quality of life.	-Among PWH age 50 years: -Prevalence of frailty was higher than that of the general population. -Prevalence of frailty and prefrailty was 19.4% and 49.3%, respectively. -Female sex, unemployment, and pain were associated with frailty. -Unemployment (aOR 4.41 [1.60, 12.15]; $p = 0.004$) and the use of nucleoside reverse transcriptase inhibitors (aOR 7.43 [1.34, 41.25]; $p = 0.022$) were associated with prefrailty. -Frailty was associated with a decrease in health-related quality of life.
Renal disease									
Santiago P, et al.; 2014 [74]	Brazil; English	1936; 1091 (age 50 years)	Prospective, cross-sectional	50	82.9%; 67.7 months	78.5 months (29.1, 136.2)	460 (307, 650)	-Explore prevalence and risk factors of decreased glomerular filtration rate (GFR) and associated risk	-PWH with decreased GFR were more frequently age 50 years (51.4% vs. 18.7%, age < 50 years).

Author; year (references)	Country; language	Sample size (total N; age 40 years, n)	Type of study	Definition of older age (years)	% on ART; time on ART (median [IQR] or mean [SD] years)	HIV duration (median [IQR] or mean [SD] years or % cohort)	CD4 cells absolute count (median [IQR] or mean [SD])	Objectives of the study	Aging-related outcomes of each study
Menezes A, et al.; 2015 [25]	Brazil; English	193; not reported (age 40 years)	Prospective, cross-sectional	41.5 (8.3)	100%; 5.8 (3.7)	Not reported	585.9 (179.4)	factors in PWH from Brazil -Determine the prevalence and associated factors with mild decrease in GFR of PWH on ART and undetectable viral load in Brazil. -Determine risk factors associated with altered renal function in PWH.	-Older PWH were at higher risk of mild decrease in GFR, where an increase of GFR with every year of life was associated with mild renal function decline (aRR 1.05 [1.03, 1.06]; $p < 0.001$). -Age 50 years (aOR 3.3 [1.11, 9.90]) was independently correlated with low GFR.
Pinto Neto L, et al.; 2011 [75]	Brazil; Portuguese	103; 58 (age 50 years)	Prospective, cross-sectional	50	84.3%; not reported	7.3 (4.33)	89% (CD4 200)	-Investigate the prevalence of pathological proteinuria and its risk factors among PWH	-Prevalence of pathological proteinuria (all ages) was 20%. -68.3% of PWH with pathological proteinuria were age 40 years.
Antonello VS, et al.; 2015 [76]	Brazil; English	666; 378 (age 40 years)	Retrospective	40	77.7%; not reported	Not reported	47.1% (CD4 < 50); 10.5% (CD4 < 200); 42.4% (CD4 200–500)	-Describe the breast cancer cases occurring in a cohort of 860 HIV-infected women followed in Rio de Janeiro, Brazil, and estimate the incidence rate of breast cancer for this population.	-Patients with later diagnosis suffered from worse prognosis. -The median age of the HIV-infected women diagnosed with breast cancer was 46 years, but in the general population, the incidence rate of breast cancer increases with age, reaching its highest rate at ages 65–70 years.
Non-AIDS-related malignancies (NADM)									
Andrade AC, et al.; 2011 [77]	Brazil; English	9; 7 (age 40 years)	Prospective	40	88.9%; not reported	Not reported	470.9 (236.3)	-Investigate cancer prevalence and associated factors among PWH attending an AIDS outpatient clinic in Vitória, State of Espírito Santo, Brazil.	-From all cases of cancer identified, 40% were PWH age 50 years. -Among NADM analyses, age 50 years (aOR 16.4 [3.3, 80.5]; $p = 0.001$) was associated with higher risk of cancer.
Pinto Neto L, et al.; 2012 [78]	Brazil; English	730; 199 (age 50 years)	Prospective, cross-sectional	50	87.4%; not reported	5.5 (2, 10)	Not reported	-To assess mortality, treatment response, and relapse among HIV-infected and HIV-uninfected women with cervical cancer in Rio de Janeiro, Brazil.	-Across all ages, HIV infection was associated with significantly elevated overall mortality (HR 1.38 [1.02, 1.87]) and a non-significant elevation in cancer-specific mortality (HR 1.31 [0.94, 1.82]) and elevated risk of subsequent relapse (aHR 3.60 [1.86, 6.98], adjusted for clinical stage)
Ferreira MP, et al.; 2017 [79]	Brazil; English	87; 53 (age 35–49 years); 12 (age 50 years)	Prospective	50	63%; not reported	Not reported	263 (137, 368)		

Author; year (references)	Country; language	Sample size (total N; age 40 years, n)	Type of study	Definition of older age (years)	% on ART; time on ART (median [IQR] or mean [SD] years)	HIV duration (median [IQR] or mean [SD] years or % cohort)	CD4 cells absolute count (median [IQR] or mean [SD])	Objectives of the study	Aging-related outcomes of each study
									-Age 50 years was not associated with elevated overall mortality (HR 0.71 [0.46, 1.11]) nor cancer-specific mortality (HR 0.67 [0.42, 1.09]).

BMD, bone mineral density; *PWH*, people living with HIV; *ART*, antiretroviral treatment; *VF*, vertebral fracture; *HCV*, hepatitis C virus; *ADL*, activities of daily living; *IADL*, instrumental activities of daily living; *GFR*, glomerular filtration rate; *NADM*, non-AIDS-defining malignancies; *RR*, relative risk; *IQR*, interquartile range; *OR*, odds ratio; *aOR*, adjusted odds ratio; *aRR*, adjusted relative risk; *HR*, hazard ratio; *aHR*, adjusted hazard ratio