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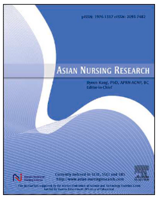

Review Article

The Reasons of Late Diagnosis in Patients With HIV/AIDS: A Meta-Synthesis

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SUMMARY

Purpose: To comprehensively integrate qualitative findings on the reasons for late diagnosis in HIV/AIDS patients and to encourage timely clinic consultations for advisory purposes.

Methods: A qualitative systematic review utilizing a meta-aggregation approach. Extensive searches were conducted across PubMed, Embase, Cochrane Library, Web of Science, CINAHL, ProQuest, Scopus, Medline, CNKI, VIP, Chinese Biomedical, and Wanfang databases. The search was completed on December 10, 2024. Studies were screened according to predefined inclusion and exclusion criteria. Quality assessment was performed using the Joanna Briggs Institute Critical Appraisal Checklist for Qualitative Research. The review adhered to the PRISMA 2021 guidelines.

Results: A total of 13 articles were included, and 113 original findings were extracted and categorized into 13 new categories, which were further synthesized into three integrated findings: (1) lack of proper knowledge about HIV; (2) complex psychological distress and (3) inadequate medical resources and limited services.

Conclusion: This meta-synthesis of qualitative research focused on the reasons for late diagnosis in people living with HIV(PLWH). It is based on an in-depth exploration of patients' personal feelings and experiences, as well as insights into their genuine desires. Patients' lack of disease knowledge may amplify fears, leading to anxiety, depression, and other adverse psychological conditions that reduce their willingness to seek medical care and contribute to late HIV diagnosis. Furthermore, this reduced healthcare-seeking behavior contributes to the underutilization of healthcare resources and impairs system efficiency. Consequently, the risk of late-stage consultation for serious conditions such as AIDS increases. Given these diagnostic challenges, enhancing early detection among PLWH is critical for reducing viral transmission and improving the quality of life of those infected. Q2

Clinical trial registration: As it was based entirely on previously published studies, this study protocol was registered on the PROSPERO website (CRD42025631287).

Introduction

The ongoing threat to global public health posed by HIV infection remains a significant concern. By the end of 2023, an estimated39.9 million individuals were living with HIV globally; alarmingly, 86 % were aware of their HIV status, and a substantial 77 % were receiving antiretroviral therapy (ART). Yet, this figure remains significantly below the 95-95-95 target established by the United Nations Programme on AIDS (UNAIDS), which states that 95 % of all individuals living with HIV should know their HIV status, and among those aware of their status, 95 % should access

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treatment, and among those receiving treatment, 95 % should achieve viral suppression [1]. It is crucial to recognize that, although there has been a substantial decrease in HIV-related morbidity and mortality due to the widespread dissemination of ART, the global burden of infection remains significant, with approximately 1.3 million new cases reported annually [1]. In this context, the expansion of testing and the promotion of diagnosis have become pivotal in the efforts to prevent the transmission of HIV.

In 2010, European nations reached a consensus regarding the definition of late presentation [2]. This definition was subsequently updated in 2022, where late HIV diagnosis (LHD) is defined as individuals who are first diagnosed with HIV with a CD4 count <350 cells/μL or with an AIDS-defining event, regardless of the CD4 cell count [3]. The prevalence of LHD remains high on a global scale, as demonstrated by studies reporting an incidence of LHD ranging from 42.4 % to 72.8 %, which exhibits significant geographic variation [4–7]. A dual challenge arises from late diagnosis, as it not only is associated with increased susceptibility to opportunistic infections and specific cancers [7,8], but also significantly increases the difficulty of treatment and mortality [9]. Furthermore, people living with HIV (PLWH) with LHD generally report a decreased quality of life compared to those diagnosed earlier, resulting in increased healthcare costs and treatment expenses [10,11]. In addition, Malekinejad's study found that undetected HIV status is linked to a heightened risk of transmission [12]. The risk of transmission is exacerbated among individuals diagnosed late due to higher viral loads, posing a serious threat to public health. The reasons for LHD are complex and varied, including poor awareness of tests, limited knowledge about HIV, unsafe sex, distance to testing facilities, attitudes of healthcare providers, long waiting times, and social stigma, among other factors [13–15].

The World Health Organization (WHO) has emphasized that the reduction of LHD as a critical component in achieving the target of eradicating the AIDS epidemic by 2030 [16]. However, despite improved guidelines and policies, the challenge of LHD continues to be frequently neglected in practical applications. Although there are many studies on LHD in recent years, the majority primarily concentrate on epidemiological data and quantitative analyses, with limited attention given to the in-depth investigation of patient experiences.

Previous research has shown that accessing the lived experiences of individuals with LHD is critical to understanding the reasons for LHD and promoting early diagnosis. For example, a qualitative study conducted in Uganda revealed that numerous individuals with LHD postponed getting tested due to fear of social stigma and the need to preserve their social status, coupled with the perception of normality within their familial and societal contexts [17]. However, a solitary qualitative investigation is insufficient to comprehensively address the multifaceted nature of LHD, including its social, health, and cultural determinants. Sun [18] conducted a quantitative study to explore the factors influencing LHD in China, and the data sources were mainly from the HIV prevention and treatment system, while excluding the first-hand experiences of patients. Belay [19] meticulously analyzed the late diagnosis of HIV-positive adults in Ethiopia, but did not investigate the underlying reasons for late diagnoses. Presently, there is a dearth of meta-integration of qualitative studies focusing on late HIV diagnosis, especially from the patient's viewpoint. Qualitative studies offer a unique perspective for understanding LHD by offering nuanced insights into individual experiences and the surrounding context. This research aims to synthesize existing research on late HIV diagnosis through systematic reviews and qualitative research methods, focusing on the patients' perspective. This study aims to synthesize relevant research on late HIV diagnosis to gain a deeper understanding of the multifaceted reasons for the late diagnosis of patients, and to provide a certain basis for promoting the early diagnosis of HIV.

Methods

Design

The JBI approach was utilized to conduct a structured qualitative evidence review, complemented by the JBI Critical Appraisal Tool for Qualitative Studies [20]. The research findings were reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [21]. Furthermore, this qualitative meta-synthesis was registered with PROSPERO (CRD42025631287).

Search strategy

The JBI three-stage retrieval approach was employed for the literature review [20]. Initially, a preliminary search was performed in PubMed and Embase to extract relevant vocabulary and keywords from titles and abstracts. Subsequently, extensive searches were conducted across PubMed, Embase, Cochrane Library, Web of Science, CINAHL, ProQuest, Scopus, Medline, CNKI, VIP, Chinese Biomedical, and Wanfang databases. Additionally, reference lists of the included studies were scrutinized to identify further relevant research. The search was conducted on December 10, 2024, and the comprehensive search methodology is detailed in Supplementary Appendix 1.

Study selection

To establish the inclusion and exclusion criteria, the PICoS framework—a combination of Participants, Interest of phenomena, Context, and Study design—was employed as the guiding framework. The criteria were carefully defined to include the following: [1] Participants: adults aged 18 years and older living with HIV/AIDS; [2] Interest of phenomena: experiences related to late HIV diagnosis within the HIV/AIDS community; [3] Context: determinants of late HIV diagnosis in clinical settings; [4] Study design: various qualitative methodologies, such as phenomenology, descriptive qualitative research, grounded theory, narrative research, case studies, participant observation, etc. The exclusion criteria were as follows: [1] studies not published in English or Chinese; [2] articles lacking full text or containing insufficient data; [3] duplicates; and [4] conference proceedings. Moreover, during the literature screening process, studies were excluded if it was unclear whether the viewpoints or original quotations originated from patients themselves.

Screening

References were imported into EndNote 20, resulting in the elimination of 671 duplicates and screened independently by two researchers (SJ and TJ) possessing expertise in evidence-based medicine. Titles and abstracts were initially screened independently by two researchers (SJ and TJ) possessing evidence-based medicine. Eligibility was assessed by reviewing titles and abstracts to exclude studies that did not meet the inclusion criteria. The final set of included studies was determined through full-text review. Disagreements arising during the screening phase were resolved through discussion between the two researchers. If agreement was not reached, a third reviewer (WB) was consulted to provide additional input.

Quality appraisal

The methodological quality of the studies was assessed by two experienced investigators (SJ and WCT) proficient in evidence-based inquiry. They utilized the JBI Critical Appraisal Checklist for Qualitative Research (edition 2024), to ensure a thorough assessment [20]. The rating criteria consisted of 10 distinct items, each assessed as "yes", "no", "not sure", or "not applicable". Each item was assigned 1 point if evaluated as "yes". The total quality score for each study was the sum of the scores from these 10 questions. Studies scoring below 6 were deemed of low quality; scores between 6 and 8 indicated moderate quality; and those between 9 and 10 were considered high quality. In the event of disagreements arising during the assessment phase, collaborative dialogue was conducted between the two reviewers. If consensus was not reached, a third researcher (WB) was consulted to mediate the remaining disputes. Only studies meeting the criteria for moderate to high quality were included in the comprehensive review.

Data extraction

Data extraction was independently performed by two researchers (SJ and TJ) using the JBI General Information Extraction Form [20] for qualitative research. Extracted information included authors, year of publication, country, study design, data collection method, participants, phenomenon of interest, main findings, and supporting examples. Any discrepancies were resolved by a third researcher (WB) through discussion. When a study included both healthcare providers and patients, only data pertaining to patients' experiences of LHDs were extracted.

Data synthesis

Compared to other integration methods, such as meta-ethnography, realist synthesis, and framework synthesis, JBI's meta-aggregation method [20] was chosen due to its significant advantages, including faithful presentation of original research, generation of actionable recommendations, integration of multiple methodological studies, and provision of high transparency and reproducibility. The findings were evaluated using the JBI credibility criteria [20]. A finding was considered "unequivocal" if it was clearly supported by strong evidence; "credible" if there was no direct link between the findings and supporting data; and "unsupported" if the evidence failed to substantiate the original claims. If the research findings were deemed unsupported, they were excluded.

The JBI meta-integration method [20] was employed for content integration. The first author (SJ) initially conducted a thorough analysis by repeatedly reading the original literature, examining the research background, methods, results, and conclusions. Based on this, discussions were held with the second author (TJ) to summarize and categorize similar findings, thereby forming new categories. After categorization was completed, these new categories were further integrated to develop synthesized findings. During the research process, disagreements between the two researchers were resolved by consulting the corresponding author (WB), who possesses extensive experience, to ensure the objectivity and generalizability of the findings. JBI's meta-aggregation method not only demonstrates the depth and breadth of qualitative research but also highlights the researchers' ability to systematically interpret and explain the research phenomenon. Through repeated reading, analysis, categorization, and integration, researchers gain a deeper understanding of the essence and significance of the research phenomenon, thereby forming conclusions that are highly generalized and persuasive.

Confidence in the findings

The ConQual method was utilized to assess the quality of evidence related to the synthesis of research findings [22]. The synthesized outcomes were rated as high quality and subsequently ranked according to their reliability and credibility scores, culminating in a final overall quality assessment of the aggregated evidence. Study inclusion was assessed based on ConQual criteria, focusing on items 2, 3, 4, 6, and 7. The rating remained unchanged if items 4 and 5 were affirmed. However, if items 2 and 3 were endorsed, the rating decreased by one level. If items 0 and 1 were affirmed, the rating decreased by two levels. If the consolidated outcomes consisted of unequivocal findings, the rating remained unchanged. If the findings included a mix of unequivocal and credible evidence, the rating decreased by one level. If the findings were solely credible, the rating decreased by two levels. If findings were a combination of credible and unsupported evidence, the rating decreased by three levels. If findings were a combination of credible and unsupported evidence, the rating decreased by three levels. If both sets of findings were unsupported, the rating decreased by four levels.

Results

Literature search

A total of 1979 studies were identified through the search strategy. Additionally, 20 articles were added through reference tracing. Additionally, 20 articles were added through reference tracing. After removing duplicates, 1328 remained. Subsequently, 66 studies were selected for full-text screening following title and abstract screening. Ultimately, 13 eligible studies were included. The results adhered to PRISMA guidelines [21], and the search process is illustrated in Figure 1.

Quality appraisal

Discrepancies between declared philosophical viewpoints and applied research methods were evident in all studies [23–35]. Only one study exhibited inconsistency between the research methodology and the presentation and analysis of the data [27]. Eight studies did not include a statement situating the researcher culturally or theoretically [23,25–27,31–34]. The influence between the researcher and the study was not described in six studies [23,24,30,32–34]. Regarding ethical compliance, one study [23] reported none, while ethical compliance was unclear in three studies [25,26,34]. The remaining studies all received "yes" scores in the quality assessment. The remaining studies all received "yes" scores in the quality assessment. Following the quality assessment, a total of 13 articles were ultimately included. Moreover, at least six items on the JBI Critical Appraisal Checklist for Qualitative Research (2024 edition) were rated "yes" in each study [20]. The methodological quality assessment of the included studies is presented in Table 1**.**

Study characteristics

This collection of studies was published after 2007 and encompassed research conducted across eight distinct countries: America (n = 4) [23–25,28], the Netherlands (n = 2) [29,31], Malaysia (n = 2) [32,35], the United Kingdom (n = 1) [26], Spain (n = 1) [27], Brazil (n = 1) [30], Vietnam (n = 1) [33], and Malawi (n = 1) [34]. Most studies stated that they were qualitative studies but did not specify the qualitative research method used [23,25–28,31–35]. However, one was described as an exploratory

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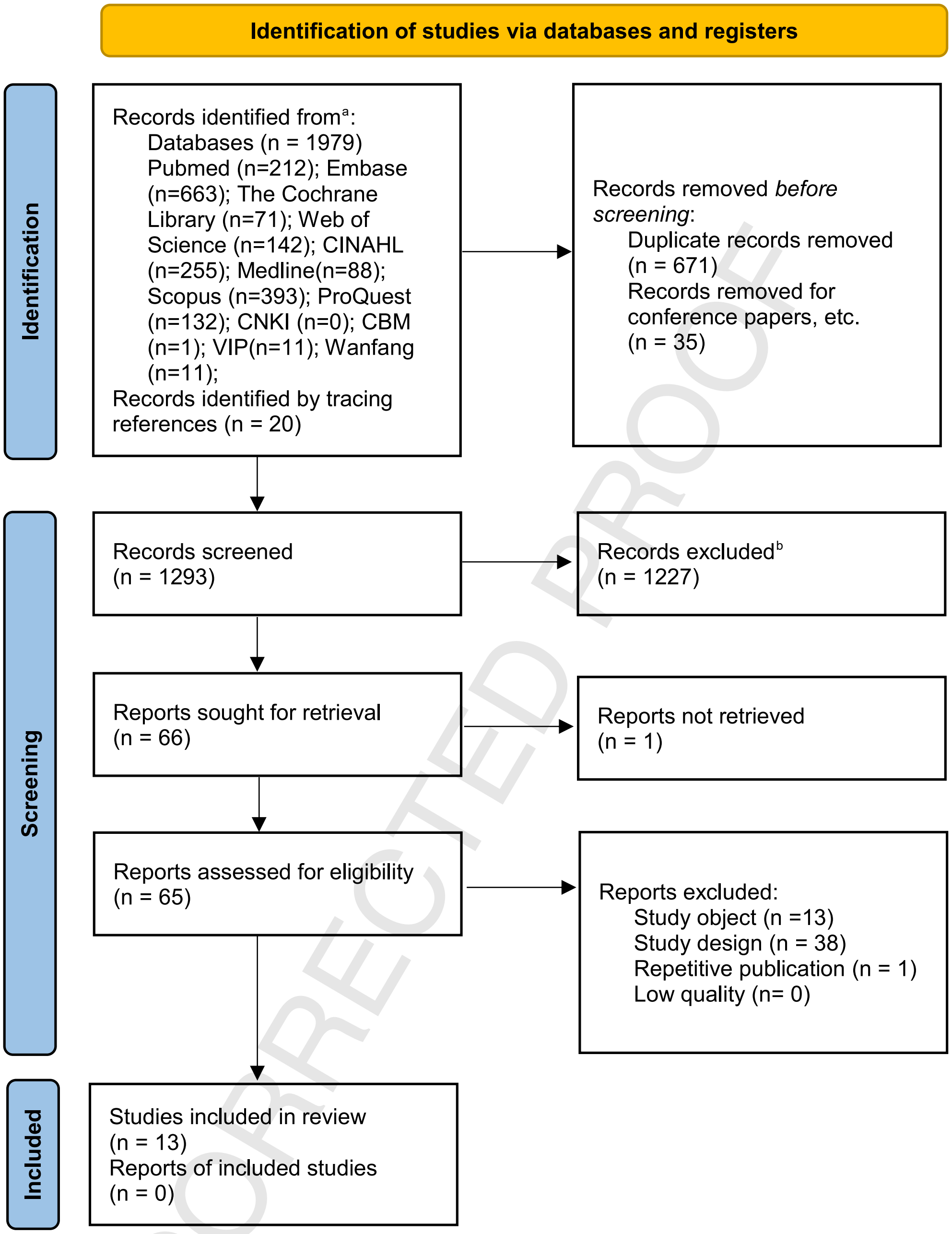

Figure 1. **Literature screening process.**

[a] Consider, if feasible to do so, reporting the number of records identified from each database or register searched (rather than the total number across all databases/registers).

[b] If automation tools were used, indicate how many records were excluded by a human and how many were excluded by automation tools.

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Source: Page MJ, et al. BMJ 2021; 372:n71. doi: 10.1136/bmj.n71.

ethnographic study [24], another as a grounded theory study [29], and a third employed a constructivist approach to sociology [30]. Data were primarily collected through interviews. The analysis included data from 325 HIV-positive individuals. Study details are outlined in Table 2.

Main findings of the meta-synthesis

In total, 13 studies were included, from which 113 distinct findings were extracted. Of these, 102 findings were classified as unequivocal, while 11 were deemed credible, as detailed in Supplementary Appendix 1. The data were then categorized into 13 categories and subsequently synthesized into three integrated findings: lack of proper knowledge about HIV, complex psychological distress, and inadequate medical resources and limited services, as detailed in Figure 2.

Lack of proper knowledge about HIV

Patients with LHD often exhibit significant deficits in understanding critical aspects, including HIV risks, transmission routes, high-risk behaviors, infection symptoms, early HIV testing, and treatment options. Limited risk perception among patients can lead to engagement in risky behaviors and reduce their likelihood of voluntarily seeking early HIV testing. Moreover, misconceptions about transmission routes can distort patients' risk perception, thereby increasing their likelihood of infection. Additionally,

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Table 1 *Results of the Quality Appraisal.*

Articles	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Scores
Louis 2007 [24]	U	Y	Y	Y	Y	N	N	Y	N	Y	6
McCoy 2009 [25]	U	Y	Y	Y	Y	Y	N	Y	Y	Y	8
Schwarcz 2011 [26]	U	Y	Y	Y	Y	N	Y	Y	Y	Y	8
Dowson 2012 [27]	U	Y	Y	Y	Y	N	Y	Y	U	Y	8
De Apodaca 2014 [28]	U	Y	Y	N	Y	Y	Y	Y	U	Y	8
Schwartz 2014 [29]	U	Y	Y	Y	Y	N	Y	Y	Y	Y	8
van Opstal 2018 [30]	U	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
Ribeiro 2019 [31]	U	Y	Y	Y	Y	Y	N	Y	Y	Y	8
Bedert 2021 [32]	U	Y	Y	Y	Y	N	N	Y	Y	Y	7
Chong 2021 [33]	U	Y	Y	Y	Y	N	N	Y	Y	Y	7
Nguyen 2021 [34]	U	Y	Y	Y	Y	N	N	Y	Y	Y	7
Katirayi 2023 [35]	U	Y	Y	Y	Y	N	N	Y	U	Y	7
Wong 2024 [36]	U	Y	Y	Y	Y	Y	Y	Y	Y	Y	9

Note. N = No; NU = Not applicable; U = Unclear; Y = Yes.
Q1, congruity between the stated philosophical perspective and the research methodology; Q2, congruity between the research methodology and the research question or objectives; Q3, congruity between the research methodology and the methods used to collect data; Q4, congruity between the research methodology and the representation and analysis of data; Q5, congruity between the research methodology and the interpretation of results; Q6, a statement locating the researcher culturally or theoretically; Q7, the influence of the researcher on the research, and vice-versa; Q8, representation of the participants and their voices; Q9, ethical according to current criteria or evidence of ethical approval by an appropriate body; Q10, the conclusions drawn in the research report flow from the analysis, or interpretation, of the data.

Table 2 *Study Characteristics.*

Author (year)	Country	Study design	Data collection	Participants	Phenomenon of interest	Main findings
Louis 2007 [24]	America	Exploratory ethnographic study	A structured questionnaire and open-ended interview	31 adults with HIV	Identify factors associated with late presentation for HIV care	Three themes were identified: (1) lack of identification of HIV transmission and symptomatology; (2) poverty and socioeconomic status; (3) quality of prior experience with local health care system.
McCoy 2009 [25]	America	Qualitative study	In-depth, semi-structured interviews	24 HIV infected persons	The barriers and facilitators to HIV testing and care among HIV infected persons who presented with clinically advanced illness.	Five themes were identified: (1) HIV-related information and experience; (2) perceived susceptibility; (3) perceived benefits and barriers; (4) cues to take action; (5) connecting to medical care
Schwarcz 2011 [26]	America	Qualitative study	In-depth, semi-structured interviews	41 HIV infected persons	Investigate personal and contextual factors with late diagnoses, who developed AIDS within 12 months of their HIV diagnosis.	Four themes were identified: (1) HIV diagnosis; (2) Risk behaviors and perception; (3) Health care prior to diagnosis; (4) Participant recommendations.
Dowson 2012 [27]	UK	Qualitative study	Semi-structured interviews	17 men who have sex with men (MSM)	Identify ideas and themes as to why testing was not carried out earlier in MSM who presented with late HIV infection.	Four themes were identified: (1) psychological barriers; (2) stigma of HIV; (3) perceived low risk; (4) barriers in healthcare.
De Apodaca 2014 [28]	Spain	Qualitative study	Semi-structured interviews	25 HIV infected persons	Analyse the determinants of late diagnosis of HIV infection.	Four themes were identified: (1) perceived risk and threat; (2) appraisal of coping abilities; (3) beliefs about the opinion of reference persons; (4) HIV testing: context and signal for action.
Schwartz 2014 [29]	America	Qualitative study	Semi-structured interviews	17 HIV adults	Understand factors contributing to the delayed diagnosis of HIV.	Three themes were identified: (1) risk perception; (2) missed opportunities for diagnosis; (3) routine testing and the role of the medical community.

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Table 2 *(continued)*

Author (year)	Country	Study design	Data collection	Participants	Phenomenon of interest	Main findings
van Opstal 2018 [30]	Netherlands	Grounded theory study	Individual or telephone interviews, semi structured interview	34 HIV-infected late-presenters	"What are the reasons for late diagnoses from the perspective of late-presenters in the Netherlands?" and "Which consequences of HIV are experienced by late-presenters in their vocational functioning?"	Three themes were identified: (1) reasons for Late Diagnoses; (2) consequences of Late Diagnosis for vocational functioning; (3) suggestions to prevent a Late Diagnosis.
Ribeiro 2019 [31]	Brazil	Constructivist approaches of sociology	Open interview	18 people with a late or very late diagnosis of HIV infection.	The representations built by people living with HIV on the infection and their influence on the delayed search by diagnosis.	Four themes were identified: (1) AIDS as a transmissible and dangerous disease; (2) disease of the other; (3) severe, incurable and deadly disease; (4) denial of risk due to trust in a steady partner.
Bedert 2021 [32]	Netherlands	Qualitative study	Depth, semi-structured interviews	14 people diagnosed with advanced HIV-infection	A better understanding of the reasons why people who were diagnosed with advanced HIV-infection did not test earlier for HIV.	Two themes were identified: (1) psychosocial factors; (2) health-system factors.
Chong 2021 [33]	Malaysia	Qualitative study	Semi-structured interviews	20 persons with HIV	The context and experiences of people at risk of HIV infection testing and seeking treatment later in the course of their infection.	Five themes were identified: (1) testing and diagnosis of HIV; (2) HIV knowledge and risk awareness; (3) HIV status disclosure, stigma and discrimination; (4) antiretroviral therapy: life saver and financial burden; (5) peer and social support.
Nguyen 2021 [34]	Vietnam	Qualitative study	Depth interviews	36 HIV-infected persons	Understand why late presentation into HIV care persists.	Two themes were identified: (1) individual-level factors; (2) network and other structural-level factors.
Katirayi 2023 [35]	Malawi	Qualitative study	In-depths interviews	32 above diagnosed with AHD, 16 lay workers and 16 health carers	Explored factors that influenced the delay among newly initiated AHD patients decision to test for HIV and initiate treatment.	Four themes were identified: (1) delayed hiv testing among the newly diagnosed; (2) treatment initiation; (3) treatment retention; (4) recommendations to improve ahd services.
Wong 2024 [36]	Malaysia	Qualitative study	Semi-structured, in-depth qualitative interviews, focus group	16 older persons living with HIV, 7 healthcare providers (HCP)	Explore factors influencing late HIV diagnosis among older adults ≥50 years.	Three themes were identified: (1) challenge in recognizing HIV symptoms among older persons; (2) older persons and HCPs having low index of suspicion of HIV; (3) poor acceptance of HIV testing among older persons due to perceived personal and social identities.

insufficient awareness of infection symptoms often causes patients to dismiss or misinterpret these symptoms as common illnesses, resulting in delayed HIV diagnosis and treatment. Therefore, this persistent lack of accurate knowledge remains a significant barrier to timely HIV diagnosis.

Lack of HIV risk perception

Several studies had indicated that LHD often causes patients to underestimate their infection risk or incorrectly assume that they were not part of an HIV risk category. Because they had engaged in low-risk sexual behavior, patients tended to believe they had not made a mistake, thus ignoring the potential risk of infection [24,26,29,31,33,35]. Some patients even denied that they were at risk of infection at all, viewing HIV as a disease that occured only in others. For instance, despite not using a condom during intercourse with their partner, they remained convinced of their immunity to infection [25,27,30,34]. Others believed that HIV infection was impossible, regardless of their risk [24]. Furthermore, previous experiences of negative test results had made some more reckless, further reinforcing false perceptions of safety [29].

> I knew that maybe throughout my life maybe, I had a few slip-ups here and there, but nothing that would lead me to HIV. I never had any sexually transmitted diseases (STDs) or venereal diseases, so I thought there was no way I had HIV or AIDS [24].

> I really thought it would never happen to me. It's as though it seemed like an illness that, until you know a bit more about it,

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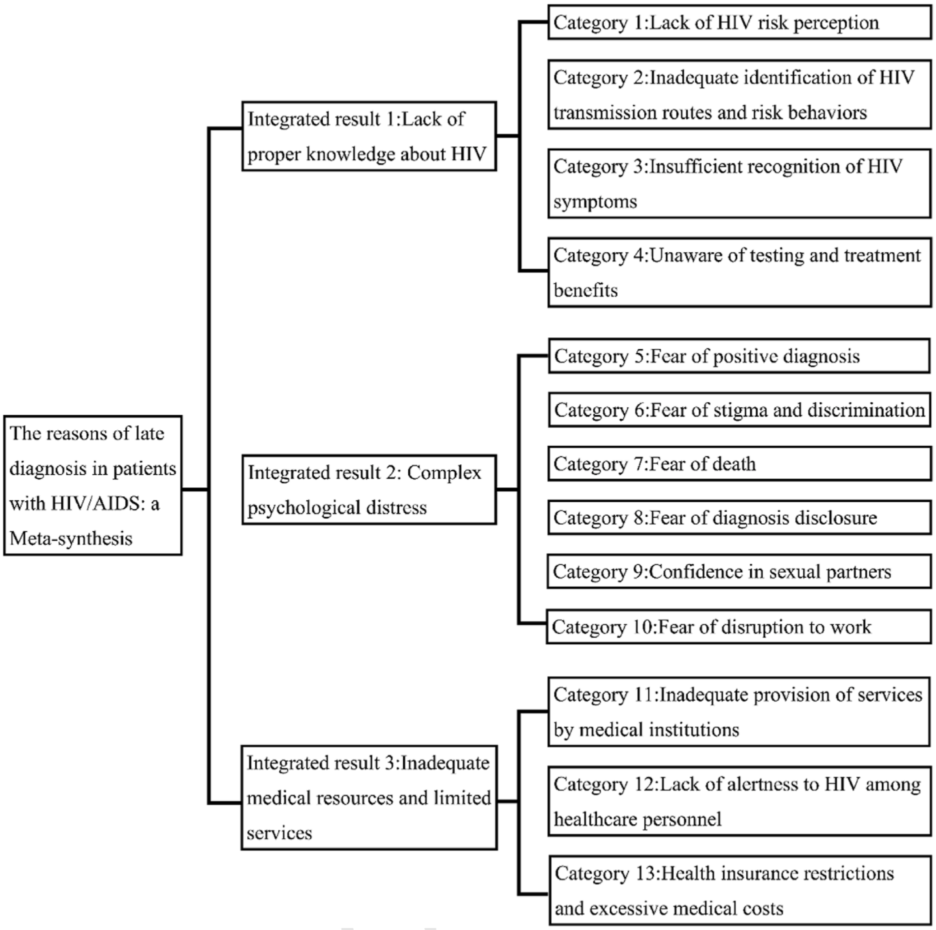

Figure 2. Structure diagram of integration results.

> you think it's something that only happens to people who go to whorehouses or inject drugs. And since I don't inject drugs [27].

Inadequate identification of HIV transmission routes and risk behaviors

Several studies haver consistently shown that individuals infected with HIV exhibited significant knowledge deficits regarding the modes of virus transmission [23,25,28–30,32,35]. Although it is well established that HIV is primarily transmitted through sexual contact, numerous misconceptions regarding its transmission continue to persist. For example, HIV was commonly and mistakenly believed to be transmitted via skin-to-skin contact, respiratory droplets, or shared household items and food [29,30]. Despite awareness that certain behaviors increase the risk of infection, engagement in such behaviors continued without full recognition of the potential risks [25,28,32]. They may even engage in risky sexual behavior later in life to seek increased excitement in their lives [35].

> I thought I got it in the air, rather than sexual intercourse. Today, I am living with this reality (…) [30].

> I have multiple partners, I know them via dating apps, I am not having protected sex most of the time [32].

Insufficient recognition of HIV symptoms

Under-recognition of HIV infection symptoms was frequently observed. When individuals felt healthy and exhibited no obvious symptoms, it was mistakenly assumed infection was absent, and the necessity for HIV testing was consequently ignored [23,26,29]. Even when they experienced mild symptoms, such as occasional rashes or fatigue, they were often not taken seriously as long as daily activities were not affected. Instead, these symptoms were frequently attributed to overwork, other illnesses, aging, stressful events, or other non-HIV-related factors [29,34]. As symptoms worsened, some individuals opted to purchase symptomatic medication [33–35]. In many cases, the optimal opportunity for early detection and management had already been missed, thereby resulting in late HIV diagnosis [24,32,35].

> I had some problems before the diagnosis, but I thought that was the result of chemotherapy [29].

> When I got sick, I had cough and I was coughing persistently; I had no strength because I was so weak, I would buy medications and take but wouldn't get well [34].

> I was brought to hospital and I was not fully conscious … the next day while I was still in the emergency department waiting for a bed in the ward, someone whispered to me that I have HIV [32].

Unaware of testing and treatment benefits

Individuals who presented late for treatment generally had limited knowledge of HIV treatment and were unaware of the potential benefits of HIV testing [24]. Prior to HIV diagnosis, the distinction between HIV and AIDS was unclear, and HIV was generally assumed to be incurable [25,30,32,35]. Observing a friend treated for early-stage HIV, who experienced significant

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side effects and poor outcomes, contributed to belief that early diagnosis and treatment are of no benefit [25]. Concurrently, apprehension regarding potential post-diagnosis consequences, including medication-related side effects, was also reported [29].

> No, that highly active antiretroviral therapy (HAART) is not really broadcasted. Of course, if I know there's a medication to suppress the disease, I will come earlier for testing [35].

> I think it's important to tell them to start taking the medicine when they are healthy, rather than waiting until they are in a serious condition like me, where it might be too late [25].

Complex psychological distress

Among patients with LHD, even those with some knowledge of HIV may still refuse early HV testing due to multiple psychological barriers. These barriers include fear of positive test results, stigma, social discrimination, fear of death, concerns over privacy breaches, and worries about unemployment. Because of real factors like stigma, social discrimination, and self-stigma, patients often fear being diagnosed HIV-positive. This fear intensifies as they consider a chain of negative consequences, including rapid health decline, intensified stigma following privacy breaches, and potential loss of income. These overlapping psychological pressures accumulate, significantly increasing patients' emotional burden and further reinforcing their reluctance to undergo early HIV testing.

Fear of positive diagnosis

Multiple qualitative investigations revealed fear of a positive diagnostic outcome serves as a primary barrier to timely medical visits among PLWH [24,25,27–29,33,35]. Studies had shown that the inability to cope with a potential HIV diagnosis often lead to entailed avoidance behaviors, including steadfast refusal to undergo an HIV testing, declining to receive test results despite testing, or failure to pursue necessary medical follow-up after an initial diagnosis [27,33]. Moreover, patients diagnosed by non-HIV professionals frequently experienced feelings of abandonment, confusion, and dread regarding future medical treatment; however, such fears may be alleviated following consultation with an HIV professional [24].

> I was scared to take it. I thought if I take it, and it comes out positive, what am I gonna do? I didn't want to deal with the facts, so I just said "No" [28].

> I'm afraid to think about what my life would be like if I were HIV positive, and how I would explain this to my family … [33].

> My HIV-positive friend told me that I might be infected and that I needed to come back for an HIV confirmation test. I was really scared … So I didn't do it [27].

Fear of stigma and discrimination

Stigma-related apprehension had served as a major deterrent to HIV testing [26,27,29,31,33–35]. Upon receiving an HIV-positive diagnosis, individuals feared facing widespread social stigmatization, which could seriously impact their quality of life [26]. Multiple misconceptions about HIV exist in society, with the general public frequently equating HIV testing facilities with HIV-positive individuals, believing that those who seek testing were inevitably HIV-positive. Consequently, testing was often refused due to fear of being misinterpreted [27,31]. Moreover, because HIV was primarily transmitted through sexual contact; many individuals may postpone or avoid initial screenings due to concerns about being labeled as "disorderly" or "immoral" [31,34].

> Some people never dare to say it aloud. They'd better die than get tested. They're afraid that they'll be stigmatized [33].

> If you have HIV, they say you slept with a lot of men, that you are not serious [31].

Fear of death

The Perception that being infected with HIV was tantamount to facing inevitable and rapid death discourages individuals from seeking HIV testing [30]. This was particularly pronounced when a friend or partner died from AIDS, leading to even more negative attitudes towards HIV [26]. Despite significant progress in combating HIV in recent years, public awareness of HIV treatment remained inadequate, and an HIV diagnosis continued to be perceived as a "death sentence." In fact, advances in antiretroviral therapy and early diagnosis had significantly improved both the quality of life and life expectancy of PLWH.

> I used to hear about it, but today I live with it. I did not know it was that dangerous. If catching it, would die soon. I would die, right [30] ?

> It's the fear of dying I think … I was scared, very scared [26].

Fear of diagnosis disclosure

Concerns about disclosing personal information made individuals reluctant to disclose their HIV status to strangers, even when they were aware of community organizations providing HIV services [32]. Thus, individuals might hesitate to disclose their HIV status to acquaintances. Alternatively, to avoid encountering someone they knew at the testing site, they may decide not to get tested [35]. When seeking medical care, individuals might fabricate false ailments to justify their frequent absences, thereby avoiding suspicion of being HIV-positive. Additionally, they were also concerned that medical records from hospital visits might not be adequately protected for privacy [34].

> I made the choice of coming to [treatment facility name] for my antiretroviral refill and treatment because of how patients are insulted at our village hospital. The insult that the patients get is about disclosing your HIV status to other people [34].

> If I join a social organization, there might be people I know within it. I'm worried that when they learn that I have HIV, they might spread the news [32].

Confidence in sexual partners

People in stable or formal relationships may be more likely to engage in unsafe sex because they felt confident in the fidelity of their partners [29,30,32]. This trust was often based on the assumption that partners were faithful, respectful of each other, and physically "clean," meaning they were free of sexually transmitted diseases [30]. Some women believed they were not at risk of infection because they perceived the marital relationship as protective [32].

> I got infected with HIV through my partner. We were together for three years and we had unsafe sex because I trusted him [29].

> In my entire life, I have only had one sexual partner. I trust him and don't consider myself to be at risk of contracting HIV [32].

Fear of disruption to work

For many PLWH, a diagnosis often led to job loss [27,29,32]. Particularly among those with low CD4 counts, they expressed

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distress over symptoms such as fatigue, general malaise, and oral infections that could significantly impair work performance [29]. Individuals might become unemployed because they required extended medical leave for treatment and they chose not to disclose their HIV status due to fears of jeopardizing their employment prospects. They also worried that disclosing their HIV status to managers during HIV testing might lead to job loss [35].

> The year prior to the diagnosis, I was frequently sick. When I was able to work, I felt tired and was unable to do as much as I used to do [29].

> I'm afraid that if the hospital finds out that I'm HIV positive, I'll be dismissed and will never be able to work again [32].

Inadequate medical resources and limited services

Structural barriers—including the shortage of medical resources, limited vigilance among healthcare providers regarding HIV, restricted health insurance coverage, and high medical costs—significantly impede early HIV diagnosis. In resource-limited areas, staff shortages and heavy workloads not only restrict access to HIV testing and treatment services but also diminish healthcare providers' vigilance toward HIV. Declining capacity to recognize HIV symptoms and associated risk factors reduces healthcare providers' ability to identify potential infections, consequently limiting opportunities for proactive screening and early detection. Limitations in health insurance coverage combined with high medical costs jointly increase patients' economic burden, raise barriers to healthcare access, and further compromise the efficient utilization of medical resources. In summary, these factors interact systemically to form a vicious cycle that not only impedes early diagnosis but also undermines patients' willingness to seek testing and treatment, ultimately elevating the incidence of late HIV diagnosis.

Inadequate provision of services by medical institutions

Six qualitative studies have shown that inadequate healthcare was an important reason for late diagnosis [23,28,29,31,33,34]. The lack of local services discouraged patients from seeking treatment at local hospitals and undermined confidence in the healthcare system. This resulted in reluctance to travel to hospitals for care, even when patients were seriously ill [23]. Moreover, some patients did not meet the criteria for free sexual health clinics, which further exacerbated the problem [31]. Ambiguity in health service provision also contributed to late presentation, as many patients were unaware of what tests were available or where to go, even if they were willing to undergo the appropriate tests [29]. Even when people were aware of testing options, long waiting lists could be discouraging [31,33].

> I once came to a hospital, but it was too crowded. I waited for a while then left. It was only when I had a fever that I came to this district health care center [33].

Facts regarding the transmission of HIV, the efficacy of modern antiretroviral therapies in suppressing viral replication, the occurrence of drug-related side effects, the procedures for seeking medical assistance, and the management of AIDS have been instrumental in promoting early HIV testing [29,34]. For example, the active promotion of HIV testing and comprehensive education in health facilities may encourage individuals to view HIV testing as an essential component of their health management, thereby promoting increased self-testing and early intervention [28].

> I would have liked to receive such information that the drugs are bringing in such results, health care workers should be aware of how they could help me [34].

Lack of alertness to HIV among healthcare personnel

Inadequate knowledge of HIV among healthcare providers has been identified as a significant barrier to early testing [24,29]. Men who have sex with men (MSM) attributed the late diagnosis to health professionals' inadequate explanation of the importance of testing, and they would have been be more likely to undergo HIV testing if offered [25,26]. For this reason, general healthcare professionals must remain vigilant to potential HIV infection symptoms and adopt a more proactive approach in offering HIV testing, especially when symptoms were recurrent or the patient belongs to a high-risk group. For this reason, general healthcare professionals must remain vigilant to potential HIV infection symptoms and adopt a more proactive approach in offering HIV testing, especially when symptoms are recurrent or the patient belongs to a high-risk group [29]. The necessity of HIV testing must not be overlooked simply because patients did not perceive themselves as fitting the stereotypical HIV risk profiles [28]. Furthermore, older adults may not be offered HIV testing even when they exhibit signs and symptoms of HIV infection, as these manifestations were often misinterpreted as age-related conditions [35].

> If the doctors would pursue it and tell you "Why I think you should go get tested ", I will take HIV testing. Because they didn't ask about my lifestyle or anything [25].

> They offered me an HIV test … they said "Do you want an HIV test? " and I said "no," end of story [26].

Despite patients seeking care for poor health, primary care and specialist providers often failed to associate symptoms with HIV and instead misclassified them as unrelated diseases, thereby missing critical opportunities for early diagnosis [27,29]. Reflecting the numerous missed opportunities for early HIV diagnosis during health services encounters, many patients were not diagnosed until hospital admission with a serious illness or AIDS-defining disease [27]. In other cases, medical staff may not have communicated or discussed HIV infection with patients due to concerns about the topic's sensitivity, despite HIV infection being considered a possible diagnosis [31].

> They have blinders on, also the general practitioner, he later apologized for this but he never considered HIV [31].

> I had pneumonia several times and shingles, but they only diagnosed chronic obstructive pulmonary disease [29].

Health insurance restrictions and excessive medical costs

Studies have shown that financial difficulties contributed significantly to LHD. In most cases, patients lacked health insurance coverage. Even when they actually had health insurance, the associated costs were often not reimbursed [23,25,28,29,34]. Furthermore, patients who had health insurance prior to HIV diagnosis may avoid applying for treatment coverage due to concerns that it could jeopardize the coverage for other conditions [32]. However, if HIV testing were readily available and free, most patients would be willing to undergo testing [24,25].

> Sometimes the cost is about RM100, RM300 or RM500 [for various test, i.e. CD4] … if my insurance company knew I've HIV, I don't know what will happen … will I lose insurance [32]?

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I was afraid of the costs involved, because my health insurance would probably not cover it [29].

Quality appraisal of synthesized findings

The 13 articles evaluated in this analysis met at least six criteria, thereby qualifying for inclusion in the study. The research methodology was consistent with the data presentation and analysis in all but one study [27]. Eight studies did not include a declaration regarding the investigator's cultural or theoretical stance [23,25–27,31–34]. Six studies failed to describe the influence of the researcher on the study [23,24,30,32–34]. Four of these studies received a score of 3 [24,32–34]. Consequently, the dependability ratings of the three synthesized findings decreased by one level. Five extracts lacked a clear connection between their explanations and the cited sources; as a result, the credibility rating of the "lack of proper knowledge about HIV" was reduced by one level. Five extracts lacked a clear connection between their elaborations and the citation; as a result, the credibility rating of the "lack of proper knowledge about HIV" was reduced by one level. Ultimately, the three integration outcomes received ConQual ratings of "low," "medium," and "medium," respectively, which consequently affected the strength of the practice recommendations. Ultimately, the three integration outcomes received ConQual ratings of "low", "medium", and "medium", respectively, which consequently affected the strength of the practice recommendations. The quality assessment of the synthesized findings is detailed in Table 3.

Discussion

A qualitative meta-synthesis was conducted to explore factors contributing to late HIV diagnoses. Our findings indicated that the lack of proper knowledge about HIV, complex psychological distress, and inadequate medical resources and limited services were barriers to early diagnosis. Patients' lack of disease knowledge may exacerbate their fear, subsequently triggering anxiety, depression, and other negative psychological states, which reduce their willingness to seek medical care and ultimately lead to delays in doing so. Simultaneously, patients' decreased willingness to seek medical care may lead to underutilization of healthcare resources, thereby further compromising the efficiency of the healthcare system. This chain of events, in turn, increases the risk that patients will seek care only at a late stage for serious illnesses such as AIDS. Therefore, gaining insight into obstacles to early diagnosis based on patients' experiences can assist healthcare providers in enhancing services effectively, which in turn may reduce HIV prevalence and accelerate progress toward eradication.

Raising awareness and promoting health

This study showed that a lack of proper knowledge about HIV, including inadequate risk perception, modes of transmission, symptom recognition and awareness of testing, was a key factor contributing to delays in seeking medical care. This finding aligns with the results of a study conducted in Iran [36]. Chone [37] conducted a study confirming that the lack of HIV-related knowledge is an important risk factor for LHD. Specifically, when individuals have insufficient understanding of transmission routes, early symptoms, and the importance of testing, their willingness and ability to seek testing actively may decline, thereby leading to late diagnosis. This finding is consistent with the research results of the Ghazali's team [38]. They noted that the risk of LHD increases significantly among individuals with lower education levels, likely due to limited access to health information and insufficient disease awareness within this population. The results of this study further support this correlation and emphasize the crucial role of health education in HIV prevention and treatment. In addition, individual characteristics such as older age, single status, male gender, and a history of drug use also constitute significant risk factors for LHD [38]. Specifically, older adults are more likely to experience LHD due to lower acceptance of new health information and limited awareness of proactive health screening. Single individuals may lack social support networks, which can reduce motivation for health-related decisions and hinder timely medical care-seeking. Males face a relatively higher risk of LHD because of insufficient attention to their health and lower initiative in disease detection. Additionally, individuals with a history of drug use have an increased HIV infection risk due to high-risk behaviors like needle sharing and often encounter social discrimination and limited access to medical services, further exacerbating LHD occurrence. Moreover, the research revealed that only 40.9 % of the general public possessed substantial knowledge about HIV transmission, confirming the presence of "asymptomatic cognitive bias," identified in a Tanzanian study across different regions [39].

Individuals' understanding of HIV is strongly correlated with their health-seeking behaviors; high levels of disease knowledge promote early detection and timely care-seeking, whereas low levels often result in late diagnosis and treatment. The discrepancy between the self-reported HIV risk and actual risky behaviors among HIV-negative individuals was striking; many reported zero, one, or even multiple risk behaviors despite claiming a high perceived risk of HIV infection [40]. Despite being a demographic with a heightened risk of HIV infection, MSM urgently need more specialized interventions. A randomized controlled study demonstrated that a comprehensive intervention utilizing an HIV forecasting tool reduced the number of sexual partners among MSM and enhanced condom use among infrequent partners [41]. To effectively increase HIV awareness, contemporary information technologies [42] such as smartphone apps, short message services, internet-based platforms, audiovisual materials, and digital health education platforms, can be leveraged to enhance understanding of HIV through multiple channels. The introducing of a micro-app at a primary health care facility in Guangzhou, China, significantly increased voluntary utilization of HIV counseling and testing services and streamlined early HIV detection, highlighting the pivotal role digital health solutions play in reducing disparities in service delivery [43]. Therefore, health professionals, community providers, and other stakeholders can offer educational opportunities to the public via modern interventions, such as mobile apps to improve HIV awareness, reduce high-risk behaviors, and promote early diagnosis.

Table 3 *Quality Appraisal of Synthesized Findings.*

Synthesized findings	Type of research	Dependability	Credibility	ConQual Score
Lack of proper knowledge about HIV	Qualitative	Downgrade 1 level	Downgrade 1 level	Low
Complex psychological distress	Qualitative	Downgrade 1 level		Medium
Inadequate medical resources and limited services	Qualitative	Downgrade 1 level		Medium

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Improving psychological construction and reducing psychological distress

Our study demonstrated that multiple complex psychological concerns are intertwined, collectively constituting barriers for patients seeking HIV testing and treatment, which lead to a reluctance in pursuing early diagnosis. At the individual psychological level, a quadruple fear was the main barrier, consisting of the fear of a positive diagnosis, specifically, fears related to the unknown nature of the disease, potential health risks and possible social consequences. In a qualitative study [39], many participants reported that receiving an HIV-positive diagnosis caused significant psychological shock. The second was the fear of stigma, which not only affected patients' mental health but also contributed to late in testing and treatment. Bin Ahmad's research indicated that high levels of HIV-related stigma significantly hindered clinic attendance among patients with late-stage HIV [44]. Janek also noted that fear of societal stigma associated with HIV can cause individuals to conceal their status or refuse treatment [45]. Thirdly, fear of death remains significant: HIV has long been considered a fatal disease; although advances in treatment mean that HIV is no longer a death sentence, many patients still believe that an HIV diagnosis inevitably leads to death. Fourth, a heightened fear of disclosure was particularly prevalent among women, MSM and immigrants. The European Center for Disease Control and Prevention (ECDC) and WHO joint report highlighted that some patients chose to postpone testing or conceal their infection status due to fear of family rejection or social stigma following a positive diagnosis [46]. Furthermore, the Global Alliance for AIDS Prevention noted that an assessment of HIV prevention progress in 40 high-burden countries revealed fear of disclosure as a major social barrier to early testing, particularly among key populations such as MSM and transgender people [47].

Interpersonally, trust in partners often leads to significant cognitive distortion. Although few direct studies have examined how confidence in sexual partners leads patients to refuse early medical care, this issue has been explored in various studies on HIV transmission. Studies have suggested that trust in partners may lead individuals to mistakenly assume their partners are HIV-negative. This misplaced trust may reduce individuals' willingness to undergo testing. For example, 76 % of pregnant women believed that their spouses "would want to know their state of infection," yet there was a substantial gap between actual spousal testing rates and these confidence levels [48]. At the social level, workplace discrimination constitutes a significant institutional barrier. Patients may postpone testing to avoid potential job and income consequences, fearing that an HIV-positive diagnosis could harm their careers through job loss, limited promotion opportunities, or workplace discrimination [49]. Indeed, a Swedish national study based on population data revealed increases in employment rates among PLWH over time; however, these rates remained lower than those of HIV-negative individuals [50]. Consequently, these concerns are well-founded.

To reduce the fear of testing positive, it is recommended to strengthen HIV education. Standardized ART enables HIV-positive individuals to achieve a longer lifespan while maintaining a good quality of life. Simultaneously, promoting the "U=U" (Undetectable = Untransmittable) concept is crucial, as this means that if the viral load remains undetectable, the risk of transmission is effectively eliminated. Additionally, it is imperative to provide psychological services and guidance for populations at elevated risk, including pre-test counseling to help build psychological resilience. It is also important to foster an atmosphere of tolerance and understanding in society by collaborating with the media and community organizations to dispel misconceptions and eliminate discriminatory attitudes and behaviors. In addition, partner-based collaborative testing should be implemented, encouraging both partners to undergo testing and counseling, with psychological support provided to help patients and their partners properly understand the significance of test results [47]. Simultaneously, sexual health education should be enhanced to emphasize that, even when partners are trusted, the importance of HIV testing should never be overlooked. Conversely, Conyers emphasized that patient-centered employment support models, such as the client-centered working model, integrated employment services, micro-enterprise employment intervention, peer employment model and others, can effectively address the employment needs of PLWH [51].

Strengthening the health system and improving health services

Results from this study indicate that inadequate health resources and limited services significantly hinder timely access to early care. Global multi-regional studies have confirmed that LHD markedly increases mortality risk and shortens survival time. A retrospective cohort study in India demonstrated that the average survival time of patients diagnosed late with HIV was 23 months shorter than that of those diagnosed early, thus further underscoring the critical importance of early diagnosis in reducing mortality [7]. Therefore, early diagnosis and timely management are essential for reducing mortality and extending the lifespan of patients. Additionally, a significant proportion of individuals with HIV infection—over 50 %—visited public healthcare institutions before their diagnosis, often due to symptoms such as pneumonia, sexually transmitted infections, or unexplained fever. However, these individuals were not promptly referred for HIV testing, thereby missing opportunities for early intervention [52]. Moreover, a study conducted in the United States revealed a significant association between social and economic factors —including poverty and unemployment—and late HIV diagnosis [53]. Specifically, the rate of late HIV diagnosis in rural areas is usually higher than that in urban areas, which may be related to the scarcity of medical resources and inconvenient transportation in rural areas. For instance, city-dwelling females had a 1.41 times higher likelihood of receiving HIV screening and counseling during prenatal visits compared to their rural counterparts, according to a multilevel analysis based on large nationally representative data from sub-Saharan Africa [54]. This disparity is closely linked to differences in HIV service accessibility. Furthermore, patients' distance from health facilities significantly contributed to lateness in accessing care [55]. Therefore, improving both awareness of and access to HIV diagnosis and treatment services is crucial to enhancing overall public health outcomes. Accordingly, it is recommended to promote point-of-care (POC) rapid testing to reduce dependence on traditional healthcare facilities. Simultaneously, testing coverage should be expanded via mobile testing units and pharmacy-based testing sites to optimize the service delivery network. Moreover, simplifying the testing process and providing clear, concise guidance are necessary to enable patients to access testing services promptly. In regions with high concentrations of at-risk groups, medical resources should be scaled up, and specialized HIV testing and treatment centers should be established.

An important factor contributing to LHD is the clinical decision-making skills of healthcare professionals. In regions with limited healthcare resources, LHD often results from two primary key issues: healthcare professionals' failure to recognize common symptoms and at-risk populations' insufficient knowledge of testing options. A cohort study conducted at a Lebanese specialist clinic found that up to 76.5 % of patients exhibiting atypical symptoms were not promptly referred for HIV testing, and 35.3 % of these patients were already in the AIDS stage at diagnosis—a

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phenomenon closely linked to structural deficiencies in the primary health care system [8]. In addition to lacking the ability to provide accurate information and referrals, many primary care workers also lacked effective interpersonal and communication skills, hindering their effective engagement with their clients and arguably contributing to LHD [56]. Enhancing healthcare professionals' ability to recognize HIV indicators and emphasizing the importance of testing are vital, as is strengthening their patient-centered communication skills. Simultaneously, standardized HIV testing procedures should be promoted to ensure that healthcare workers proactively recommend testing when symptoms are suspected.

Access to HIV prevention services depends on socio-economic capacity and health insurance coverage. In low-resource settings, the unmet need for HIV care among uninsured individuals was 58.7 %, primarily due to insufficient financial resources to cover testing and treatment costs. A recent survey conducted in the United States revealed that only 12 % of respondents discussed HIV prevention strategies with a healthcare provider. Moreover, only a mere 6 % participated in HIV prevention programs. Interestingly, those without health insurance were significantly less likely to participate in such activities compared to insured individuals [57]. This finding clearly indicated that an increasing in health insurance coverage had a beneficial impact on HIV prevention efforts. Evidence from Cameroon further indicated that health insurance was crucial in lessening the HIV burden among women and girls who have sex with women (WGTS) and the general population [58]. Facilitated by widespread access to ART and the use of pre-exposure prophylaxis (PrEP), health insurance coverage significantly reduces HIV transmission and improves health outcomes [58]. Based on this evidence, it is recommended to expand health insurance coverage and incorporate HIV screening into basic public health packages to fully cover the costs of testing and initial ART treatment. Furthermore, regional HIV health funds should be established to alleviate the financial burden on economically vulnerable populations through tiered co-payments (e.g.,0 % out-of-pocket for individuals with incomes below the poverty line) and to facilitate early access to care.

Limitation

When analyzing the outcomes of this investigation, several important issues must be considered. Regarding the reliability of the studies, the reliability of each of the three composite outcomes was compromised due to insufficient information about the authors' assessment of study impact, as well as the cultural and theoretical frameworks applied. When examining the quality of qualitative research, it became apparent that several key components in some studies were rated as "unclear" or "no", potentially undermining the overall clarity of the findings. Limiting the research to Chinese and English texts significantly constrained the scope of the studies. By excluding other languages, the studies lacked breadth, which may limit the generalizability of the findings to diverse contexts. Therefore, simply identifying the factors contributing to late HIV diagnosis is insufficient. A comprehensive understanding of the causes of LHD requires enhancing the reliability of studies, improving literature quality, and broadening the range of languages included in the research.

Conclusion

This meta-synthesis of qualitative research focused on identifying the reasons for LHD of PLHIV. It is based on an in-depth exploration of patients' personal feelings and experiences, as well as insights into their genuine desires. The review provided a more comprehensive understanding of the reasons for LHD than the existing literature, through in-depth analyses of studies that highlighted factors such as lack of proper knowledge about HIV, complex psychological distress, and inadequate medical resources and limited services. Given these diagnostic challenges, enhancing early detection among PLHIV is crucial for curbing virus transmission and improving the quality of life of those infected. Given the significance of early diagnosis, understanding the factors contributing to the late identification of HIV-positive individuals and implementing effective strategies to address them will help improve early HIV diagnosis and thereby contribute to achieving the ambitious target of ending the HIV epidemic sooner rather than later.

Uncited reference Q3

[59.]

Patient consent statement

There was no direct contribution from patient to this study because the data were sourced solely from previously published articles.

Ethics approval statement

This was not a clinical trial; this study did not require the approval of an Ethics Committee because it was based entirely on previously published studies.

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Conflict of interest

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Appendix A. Supplementary data

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