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RESEARCH ARTICLE

Dementia prevalence and risk factors in people with and without HIV in Malawi: A medical record review

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Abstract

BACKGROUND: Sub-Saharan Africa (SSA) is experiencing a rapid increase in its aging population, including people living with human immunodeficiency virus (HIV) (PLHIV). The purpose of this study was to determine the prevalence of dementia among PLHIV and people without HIV (POHIV) in Malawi.

METHODS: We conducted a retrospective medical record review of 400 consecutive patients from a single tertiary health center (200 PLHIV from an HIV clinic and 200 POHIV from an outpatient clinic) in Lilongwe, Malawi.

RESULTS: The overall rate of dementia was higher in PLHIV than that in POHIV (22% vs 10%; $p = 1.4e$). Older age, unknown employment or unemployed, and depression were significant risk factors for dementia for PLHIV, while older age and depression were significant among POHIV.

DISCUSSION: Our study confirmed the increased risk of dementia in PLHIV and provides valuable groundwork for future dementia studies to accurately examine the prevalence and risk factors of dementia in SSA, including Malawi.

KEYWORDS
dementia, depression, double burden, electronic medical record, HIV infection, infrastructure, lack of health resource, low-income country, Malawi, medical record review, risk factors

Highlights

- Malawians, in SSA, face the double burden of HIV AD and related dementias.
- We conducted a retrospective medical record review to assess dementia prevalence and risk factors.
- Dementia prevalence was higher in PLHIV than in POHIV.
- Older age, unknown employment or unemployed, and depression were risk factors for dementia in PLHIV.
- Our findings, reflecting the current diagnosing and medical documenting practice in Malawi, provide valuable groundwork for future dementia research in Malawi.

1 | BACKGROUND

The aging population in sub-Saharan Africa (SSA) presents an "impending crisis," with the number of people with dementia projected to exceed 7.6 million by 2050.[1,2] This forecast represents a 250% increase from current numbers, according to Alzheimer's Disease International.[3] In Malawi, 8% to 12% of the adult population is chronically infected with human immunodeficiency virus (HIV).[4–7] Life expectancy for HIV-positive people on antiretroviral therapy (ART) has improved worldwide, including in SSA,[6–8] and this may contribute to the rapid increase in the number of people with dementia and AD in Malawi, where there is a growing concern that they will experience the double burden of dementia and HIV in later life.[8–10]

Studies have identified both non-modifiable and modifiable risk factors for dementia. Non-modifiable, inherited risk factors include age, genetics, and family history. The Lancet Commission on dementia reported 12 potential modifiable risk factors, including less education, obesity, physical inactivity, smoking, blood pressure, excessive alcohol consumption, traumatic brain injury, air pollution, depression, and social isolation.[11–13] Individuals with HIV are at risk for premature age-related comorbidities, including diabetes, hypertension, dyslipidemia, malignancy, and dementia at an earlier age,[14–16] and they face the double burden of both infectious and non-infectious chronic diseases. HIV may increase dementia and AD risk by causing neuroinflammation and oxidative damage in the central nervous system.[17–20] Also, studies indicate that there are other potential factors associated with increased dementia risk in people living with HIV (PLHIV), which include duration of HIV infection, type of HIV medication, HIV-related inflammation, or ART treatment.[14,15,19,20] Most of the information on dementia and AD is from research studies in high-income countries (HICs), but less is known about the prevalence of dementia and AD and risk and resilience factors for dementia and AD from populations with and without HIV in low-income countries (LICs), including Malawi. Addressing the data disparities in LICs in dementia and AD research is critical given the rapidly increasing aging populations, both PLHIV and people without HIV (POHIV), and to develop knowledge and understanding of differences and similarities through studies of risk factors for dementia and AD in LICs. Therefore, our study aims to examine the prevalence of dementia among Malawians with and without HIV infection, to examine risk factors for dementia, and to compare these risk factors between these two groups.

2 | METHODS

2.1 | Research setting and participants

A retrospective study was conducted using a manual review of 400 consecutive patients' medical records at the ambulatory clinics of Kamuze Central Hospital (KCH) (200 PLHIV from the Lighthouse and 200 POHIV from an outpatient clinic) in Lilongwe, Malawi. The Lighthouse is a registered public trust contributing to Malawi's national response to HIV, providing a continuum of high-quality care while building capacity in the health sector. The Lighthouse Trust, a World Health Organization (WHO)-recognized Centre of Excellence, works in close coordination with the Ministry of Health. The Lighthouse is located at the KCH, which is a tertiary hospital. KCH provides more than 300,000 contacts with patients annually, and the Lighthouse at the KCH campus provides free clinical care to over 1000 HIV patients per week and follows about 11,500 HIV-positive patients on ART. Inclusion criteria were as follows: (1) adult patients 30 years and older who (2) visited ambulatory clinics at Lighthouse Clinic or KCH between October 2022 and May 2023. We selected all charts that met the inclusion criteria without any exceptions. Since there was no electronic medical records (EMR) system in KCH, trained data collectors manually reviewed the medical records between August 2023 and October 2023.

2.2 | Development of data extraction tool

We first developed the draft of the data extraction form based on a literature review and the Malawi National Health Survey. Then we conducted a pretest to review 20 patient charts to check whether the medical record could answer the proposed clinical questions about the prevalence of dementia and the potential risk factors for dementia.[11–13] The reviewers examined the 20 medical charts with a holistic view of all aspects of patient conditions, primarily focusing on a query for documentation about dementia. Through analysis of pretest chart reviews, we were able to examine the availability of the study variables.[21] We found that information related to dementia and its risk factors was recorded in patient medical records but not as a structured database following Diagnostic Related Group (DRG) or standardized guidelines for dementia diagnosis such as the International Classification of Disease (ICD) or the Diagnostic and Statistical Manual of Mental Disorder (DSM). Hence, the diagnoses were based solely on the clinical impressions highlighted in the patients' records (retrospective chart review). More specifically, we used the "information of diagnosis" documented by clinicians within the patients' medical history, including clinical notes, diagnostic test results, and any records stating "dementia," all found within the patients' medical record files, which were categorized in four ways: HIV-associated dementia; suspected HIV-associated dementia; dementia; and suspected dementia. This categorization was used as the operational definition of dementia in our study.

RESEARCH IN CONTEXT

1. **Systematic review**: The aging populations in LICs face an "impending crisis," with the number of people with dementia expected to surpass 7.6 million by 2050. In addition, life expectancy among HIV-positive people on ART has improved worldwide, including in Malawi.
2. **Interpretation**: Most of the knowledge on dementia comes from research studies in HICs, and significant data disparities exist in understanding the prevalence and risk and resilience factors for dementia in populations with and without HIV.
3. **Future directions**: The findings point to the limitations of medical record review where there is a lack of EMR systems. There remains insufficient investment in, and implementation of, screening and control efforts for dementia in LICs, which demands innovative approaches that integrate dementia studies in the existing healthcare systems and implement a standardized dementia diagnosis and culturally and psychometrically validated cognitive assessment tools with normative scores from the target populations.

2.3 | Selection of data collectors

We recruited five data collectors, and the required qualifications were being bilingual in both English and Chichewa, having a degree in the healthcare field (three were registered nurses and two were data officers), knowledge of specific medical terminology involved in medical record review, and work experience of more than 5 years in hospital settings in Malawi (preferred working experience either at KCH or the Lighthouse).

2.4 | Data collection process

We learned that there could be more than one medical record for a patient, depending on their history of outpatient visits or admissions, and no EMR was available at KCH, so we decided to recruit ward clerks who worked at KCH to locate medical records efficiently for the study. Data collectors were trained for 3 days, including pretest experiences. Before pretest data collection, a 1-day basic orientation was held to provide protocols of the study, a review of the medical record review instrument, and general procedures of medical record review, as well as the importance of protecting the confidentiality of the data. After pretest chart reviews were completed, each data collector was debriefed on details of categorizing procedures and on any difficulties or confusion that arose, and the medical review forms were revised to resolve confusion or difficulties. The findings of the pretest and the summary of the debriefing were reviewed with Malawian key investigators who understood current day-to-day clinical operations in Malawi, and the medical record extraction form was finalized. The standardized abstraction form for chart review was developed to guide and ensure a measure of consistency among the data collectors while helping to reduce errors in data collection.[21]

Since there was no EMR system at KCH, the ward clerks manually searched the medical records starting from May 2023 until they reached the goal of 200 cases for PLHIV and 200 cases for POHIV. The Lighthouse used an electronic health system (EHS) to locate patients' medical records related to mental health-related visits, but the information needed for the study was obtained by manually reviewing patients' physical medical charts. Trained data collectors manually reviewed all medical records of 400 consecutive PLHIV and POHIV with all their ambulatory visits as well as inpatient admissions to ensure completeness of the data collection.

2.5 | Statistical data analysis

The data were analyzed after dividing patients into two groups, patients with HIV and without HIV. Descriptive statistics for continuous data were presented with the means and standard deviation (SD) and proportions for categorical variables. Chi-squared or Fisher's exact test was used to analyze categorical variables, while logistic regression was employed for continuous variables to compare the

characteristics between the two groups. When categorizing age, we used 50 as the threshold for the older age group, in contrast to the 60 or 65 used in HICs, due to the significantly lower life expectancy and demographic patterns observed in both PLHIV and POHIV populations in Malawi.[22,23] Education was categorized into two levels, tertiary or secondary (>8 years) and primary or less (≤8 years). Employment was assessed as five categories: employed, business, farmer, unemployed, and other. The "other" category included street vendors, hand washing clothes for others, or being employed seasonally based on availability of work. To evaluate the association with dementia in our data, multivariate logistic regression analysis was performed for the known sociodemographic and clinical variables, including age, education, employment, hypertension, diabetes, and depression in the model, separately for the group with HIV and without HIV infection. Employment was aggregated into two categories, *stable* (employed, business, farmer) and *unstable* (unemployed and other), to assess the effect of employment status instead of the specific employment category in the regression analysis. In all tests, a p value $< .05$ was treated as a significance threshold. All statistical analyses were conducted using R version 4.4.1.

3 | RESULTS

3.1 | Characteristics of participants

Demographic and clinical characteristics of patients with and without HIV are provided in Table 1. For the PLHIV group, the mean age was 44.2 (SD ± 8.1) years, 54.5% were female, 59.5% had primary school or less education, and 33.5% were either unemployed or other. Only 2.5% of patients had a history of smoking, only 1% of patients had a history of diabetes, 5.5% of patients had a history of hypertension, 6% had a history of tuberculosis (TB), 3.5% had cancer, and 8% had a history of depression. All participants in the PLHIV group were treated with ART. The viral load was less than 200 copies/mL for 66.5% of PLHIV, the mean CD4 count was 276 cells/uL among 146 PLHIV with data, and there were 49 people with CD4 counts lower than 200.

For the POHIV group, the mean age was 57.7 (SD ± 16.3), 50% were female, 62.5% had primary school or less education, and 37.0% were either unemployed or other. In addition, 12.5% of patients had a history of smoking, 14.5% of patients had a history of diabetes, 49.5% of patients had a history of hypertension, 10.5% had a history of TB, and 2.5% had a history of depression. Notably, HIV-negative subjects were significantly older, had lower education levels, smoked more frequently, had a higher prevalence of hypertension, and were less likely to have depression compared to HIV-positive subjects.

3.2 | The prevalence of dementia

The overall prevalence of dementia was higher in PLHIV than that of people in the comparison group of POHIV (22.0% vs 10.0%; $p = 1.4 \times 10^{-3}$ before adjusting for age and $p = 1.9 \times 10^{-3}$ after adjusting age). The prevalence difference was higher among older individuals (age > 50; 38.8% vs 13.4%; $p = 3.2 \times 10^{-4}$ before adjusting for age and $p = 4.9 \times 10^{-7}$ after adjusting for age) (Table 2). Although dementia prevalence increased with age in both groups: 12.5% (age < 50), 19.6% (50 to 64), and 21.6% (65 and over), the increase was more rapid in PLHIV compared to POHIV: 16.6%, 37.8%, and 50% versus 4.1%, 5.3%, and 20%, respectively (Figure 1).

3.3 | Factors associated with dementia

The results from multivariate regression analyses to evaluate factors associated with dementia separately for each HIV status group are shown in Table 3. For the PLHIV group, age, employment status, and depression were significant predictors. Age was associated with statistically significant odds of having dementia (odds ratio [OR] = 1.09; 95% confidence interval [CI] = 1.04 to 1.15). Additionally, patients whose employment status was categorized as *unstable* had significantly higher odds of having dementia (OR = 2.52, 95% CI = 1.12 to 5.85) compared to those who were employed, owned a business, or were involved in farming. Of the clinical factors assessed, only depression was significantly associated with dementia (OR = 5.83; 95% CI = 1.85 to 19.06). When multivariate regression was performed with the same variables in the POHIV group, only age and a history of depression were found to significantly increase the odds of having dementia (age: OR = 1.09; 95% CI 1.05 to 1.14 and depression: OR = 11.8; 95% CI 1.04 to 126.29).

4 | DISCUSSION

Our study examined the prevalence of dementia among Malawians with and without HIV, where the prevalence of dementia is 22% for PLHIV and 10% for POHIV through a retrospective medical record review from KCH, a national teaching hospital in Lilongwe, Malawi. The prevalence rate among PLHIV we observed is close to the previously reported rate among Malawians.[24,25] Studies consistently have reported that despite effective ART use and declining dementia incidence among PLHIV, dementia incidence and prevalence remain higher among PLHIV compared with POHIV.[17,26] While data on dementia prevalence among older PLHIV in Malawi and in SSA are limited, a systematic review[27] showed that the magnitude of dementia among the HIV population varied widely across studies and countries, ranging from 2% (Canada) to 88% (Kenya) using various cognitive assessment batteries. For instance, in a study from Cameroon, the prevalence of dementia was 21.1% among PLHIV compared with 2.5% in POHIV.[28] While a study conducted in Kenya reported 88% HIV-associated cognitive impairment,[29] another study from Uganda reported 64.4% with dementia in 681 PLHIV using IHDS.[30] This high variability in the prevalence of cognitive impairments in patients with HIV might be due to a lack of consensus on diagnosis, a lack of comprehensive assessment, and non-standardized criteria.[31–33] Therefore, when conducting a dementia/AD and related dementias study in SSA, including Malawi, it is crucial to use cognitive assessment tools that have been linguistically

TABLE 1 Sociodemographic and clinical characteristics stratified by HIV status.

Characteristic	PLHIV ($n = 200$)	POHIV ($n = 200$)	p value
Age (years)	200 (44.23 ± 8.07) [30, 73]	200 (57.67 ± 16.28) [31, 110]	$<2.0 \times 10^{-16}$ ***
<40	59 (29.5)	31 (15.5)	
40 to 49	92 (46.0)	42 (21.0)	
50 to 59	42 (21.0)	31 (15.5)	
60 to 69	6 (3.0)	37 (18.5)	
≥70	1 (0.5)	59 (29.5)	
Sex			0.4233
Female	109 (54.5)	100 (50.0)	
Male	91 (45.5)	100 (50.0)	
Education			0.6083
>8 years	81 (40.5)	75 (37.5)	
≤8 years	119 (59.5)	125 (62.5)	
Employment			
Employed	61 (30.5)	26 (13.0)	
Business	68 (34.0)	29 (14.5)	
Farmer	4 (2.0)	71 (35.5)	
Unemployed	26 (13.0)	35 (17.5)	
Other	41 (20.5)	39 (19.5)	
Smoking			1.93×10^{-4}***
Yes	5 (2.5)	25 (12.5)	
Hypertension			$< 2.2 \times 10^{-16}$***
Yes	11 (5.5)	99 (49.5)	
Diabetes mellitus			
Yes	2 (1.0)	29 (14.5)	
Tuberculosis			0.1450
Yes	12 (6.0)	21 (10.5)	
Depression			0.0228*
Yes	16 (8.0)	5 (2.5)	
Viral load (copies/mL)			
≥200	36 (18.0)	–	
<200	133 (66.5)	–	
Unknown	31 (15.5)	–	
CD4 count (cells/μl)	146 (276.10 ± 176.47)	–	
≥400	33 (16.5)	–	
200 to 399	64 (32.0)	–	
< 200	49 (24.5)	–	
Unknown	54 (27.0)	–	

Note: Data are presented as *N* (%) for categorical variables and *N* (mean ± SD) and range [min, max] for continuous variables. *P* value from chi-squared or Fisher's exact test for categorical variables, logistic regression for continuous variables, done only when there were at least five in each group/subgroup.
Abbreviations: PLHIV, people living with HIV; POHIV, people without HIV.
*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

TABLE 2 Overall and age-stratified dementia cases identified in people with HIV ($N = 200$) and without HIV ($N = 200$).

Dementia	PLHIV *N* (%)	POHIV *N* (%)	Logistic regression Model	OR (95% CI)	*p* value
All					
Yes	44 (22.0)	20 (10.0)	Unadjusted	2.54 (1.45–4.57)	1.37×10^{-3}**
No	156 (78.0)	180 (90.0)	Age-adjusted	10.63 (4.58–27.30)	1.90×10^{-7}***
Age < 50					
Yes	25 (16.6)	3 (4.1)	Unadjusted	4.63 (1.55–19.93)	0.0148*
No	126 (83.4)	70 (95.9)	Age-adjusted	4.65 (1.56–20.01)	0.0146*
Age ≥ 50					
Yes	19 (38.8)	17 (13.4)	Unadjusted	4.09 (1.91–8.94)	3.23×10^{-4}***
No	30 (61.2)	110 (86.6)	Age-adjusted	35.02 (9.74–160.22)	4.94×10^{-7}***

Abbreviations: PLHIV, people living with HIV; POHIV, people without HIV.
*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

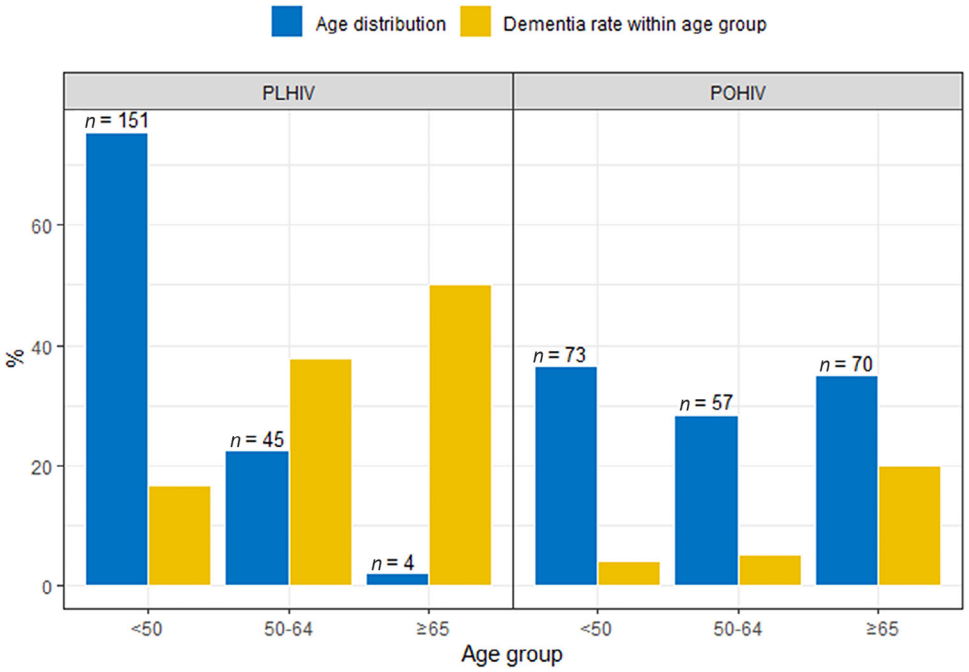

FIGURE 1 Age-stratified dementia rates in PLHIV and POHIV. PLHIV, people living with HIV; POHIV, people without HIV.

and culturally adapted as well as psychometrically validated to ensure accurate and reliable results.

Though there is growing interest in using available medical records as a source of data for health services, epidemiology, and clinical research,[21,34] there is a limitation to the accuracy of available data in Malawi.[35–37] In part, this is because there is no diagnostic classification system such as the DSM code or ICD for classifying all illnesses in Malawi or standardized guidelines from the Malawian government or Malawian medical association. In addition, dementia incidence and prevalence in SSA might be under-reported due to a number of factors, including a lack of awareness in the community, a healthcare system centered on infectious diseases, and a lack of healthcare resources, including a shortage of healthcare professionals.[38,39] In addition, though functional limitation is a major criterion for the diagnosis of dementia, the daily activities and social functioning of the living environment of many older people in Malawi are simple and often less cognitively demanding than those of people living in HICs.[40–42] Consequently, some people who would be diagnosed with dementia in middle- and high-income countries might not be diagnosed in Malawi. Furthermore, one should be cautious about using available data on medical records that inaccurately report or under-report dementia due to a shortage of healthcare professionals or a lack of time for

TABLE 3 Factors for dementia in study population, stratified by HIV status.

	PLHIV ($n = 200$)		POHIV ($n = 200$)	
Variable	**OR (95% CI)**	***p* value**	**OR (95% CI)**	***p* value**
Age at review	1.09 (1.04 to 1.15)	2.58×10^{-4}***	1.09 (1.05 to 1.14)	2.09×10^{-5}***
Education ≤ 8 years	2.14 (0.90 to 5.39)	0.0932	0.75 (0.23 to 2.68)	0.6395
Employment unstable	2.52 (1.12v5.85)	0.0276*	0.94 (0.30 to 2.82)	0.9060
Hypertension yes	0.70 (0.08 to 3.32)	0.6894	0.68 (0.23 to 1.97)	0.4831
Diabetes mellitus yes	2.86 (0.10 to 83.27)	0.4883	2.99 (0.70 to 11.48)	0.1175
Depression yes	5.83 (1.85 to 19.06)	2.68×10^{-3}**	11.8 (1.04 to 126.29)	0.0382*

Abbreviations: PLHIV, people living with HIV; POHIV, people without HIV.
*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

clinicians who miss the diagnosis or fail to examine and document their clinical assessment and dementia diagnosis in patients' charts. Malawi has a severe lack of health resources, including a shortage of health workers and a lack of adequate infrastructure and human resources in health research and healthcare service.[43–45] For instance, there is only one neurologist for the entire adult population. Nonetheless, our findings capture the current clinical practice of diagnosing and recording dementia in Malawi. Together, these findings underscore the need to develop clinical practice guidelines for dementia screening, diagnosis, and management tailored to Malawians and the Malawian healthcare system. It also points to an urgent need to develop infrastructure for dementia care as well as to devise and adopt strategies to meet the human resource challenges related to the management of dementia for both PLHIV and the general population.

Previous studies reported that sociodemographic factors, such as age, education, and employment, and clinical factors, such as cardiovascular diseases, diabetes, and mental health, are associated with the prevalence of dementia in both PLHIV and the general population.[11–13,30] Congruent with previous studies from SSA, we found that older age, unstable employment status, and depression were significant risk factors for dementia in PLHIV, while older age and depression were significant risk factors for dementia in POHIV (Table 3). The finding that PLHIV are diagnosed with dementia at younger ages than those of POHIV is consistent with other studies that reported premature aging in PLHIV, characterized by both a younger age at diagnosis and rapid accrual of aging-related conditions.[21,46,47] Hence, screening for treatable causes of cognitive impairment among PLHIV may also offer the potential for early intervention to reduce the risk of developing dementia.

We found strong links between depression and dementia in both groups. Notably, depression was known to have strong associations with dementia and synergistic interactions with dementia causing adverse health outcomes.[48–50] A systematic review of the factors associated with cognitive decline in later life from observational studies and randomized control trials revealed an association between depression and the development of dementia.[51] Nevertheless, very little is known about the prevalence of depression and management for PLHIV, as well as in the general population in Malawi. The estimated lifetime prevalence of major depressive disorder is estimated at approximately 18%,[52] and the estimated treatment gap for major depressive disorder in Malawi exceeds 90%.[52,53] One study conducted in clinics with outpatient services in Malawi reported that the probable incidences of common mental disorders and depression were 28.8% and 19%, respectively.[52] Robust population-based data on the incidence and prevalence of depression and mental health problems for both PLHIV and the general population are needed in Malawi.

4.1 | Strengths and limitations

We note that there were no data on the HIV-standardized and age-standardized dementia incidence rates in both the general and HIV populations available in Malawi, and there was scarce information to understand the increased risk of dementia among these groups. We also acknowledge that most cases lacked standardized cognitive testing or neuroimaging testing; however, this is the current standard of care in Malawi, where access to resources is very limited. Thus, while our study design might limit detailed etiologic information, the way dementia diagnoses were made reflects the clinical practice in Malawi. The findings from this first study contribute to understanding the prevalence of dementia and its risk factors in the outpatient clinic population of PLHIV and POHIV, extending the literature in this area generated from existing medical records reflecting the current healthcare practice of diagnosing and recording in Malawi. The results of our study should be interpreted within the context of the following limitations. First, the limitations of using medical documentation in LICs include the fact that there are very limited EMR system adaptations due to obstacles that frequently impede the implementation of EMR systems in LICs, including Malawi.[54,55] It is a fact that it is hard to locate medical records, there are illegible records, and there are no DSM or ICD codes or detailed information for a dementia diagnosis, which may cause coding errors and misclassifications, as well as missing data. We also discovered that there were no records on alcohol or substance use. Second, study participants were recruited from outpatient clinics, and dementia diagnoses based on medical records were subject to variation across providers, which could limit

generalizability. Clinicians' diagnosis of dementia can vary due to factors like the diagnostic tools or the types of clinicians,[56,57] as it is possible that clinicians working in the HIV/ART field are more likely to screen for dementia compared to clinicians in general populations due to increased awareness of HIV-associated neurocognitive disorders. Also, given limited medical resources, an experienced clinician's diagnosis, incorporating limited available patient data, could potentially lead to an inflated prevalence of dementia within a population. Third, data were from medical record reviews for clinical rather than research purposes, and some data on biomarkers and social factors were unavailable. Health data archives in LICs face challenges impacting data quality, and support is needed to improve the use of medical records. The EMR system in most high- and middle-income countries is a common practice in healthcare institutions to enhance the quality of healthcare. EMR in healthcare systems could be instrumental in improving healthcare quality in LICs, but implementation is lagging and affected by multiple challenges, including the economy, infrastructure, healthcare professional readiness, lack of necessary technological infrastructure, and limited access to software training.[54,55,58]

5 | CONCLUSION

This study provides new insight into the prevalence and risk factors of dementia in Malawi. Compared to the general population, PLHIV had a higher incidence of dementia despite receiving ART and were diagnosed with dementia at younger ages than POHIV. These findings highlight an urgent need to conduct a more comprehensive study of dementia, including in-person studies encompassing both populations with and without HIV, capturing genetic and lifestyle factors. In addition, there is a critical need to develop culturally and psychometrically validated cognitive assessment tools with normative scores from the target population.

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CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest to disclose. Author disclosures are available in the Supporting Information.

CONSENT STATEMENT

Consent was not necessary

ETHICAL CONSIDERATIONS

This study was approved as exempted (waived) from the institutional review board of the Malawi National Health Science Research Committee.

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