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KNOWLEDGE, ATTITUDES, PERCEPTIONS, AND PRACTICES TOWARDS CARDIOVASCULAR DISEASE RISK PREVENTION AND MANAGEMENT IN PATIENTS LIVING WITH HIV IN SUB-SAHARAN AFRICA: A SCOPING REVIEW OF QUALITATIVE LITERATURE

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ABSTRACT

Background: Cardiovascular diseases are projected to bypass HIV as the most common cause of death in sub-Saharan Africa (SSA) by 2030. People living with HIV (PLHIV) are more likely to develop complications of cardiovascular disease. This poses a major developmental challenge.

Methods: A scoping review of qualitative literature mapped what is known about cardiovascular disease awareness, prevention and management from the perspectives of PLHIV in SSA. Six qualitative studies from Malawi, Kenya, and South Africa were charted and analysed thematically.

Results: Patients were aware of cardiovascular diseases but had varied attitudes and practices towards prevention. Social support and fear of developing life-threatening complications motivated some PLHIV to change their health behaviours. Financial hardship, unavailability of medication, and hearsay prevented adherence to lifestyle measures and medical treatment.

Conclusions: Targetted prevention initiatives are critical in response to the unique needs of PLHIV and improve overall health indices in the SSA region.

Keywords: cardiovascular disease risk, HIV, knowledge, attitudes, perceptions, practices, SSA

BACKGROUND

Non-communicable diseases (NCDs) are the most common causes of mortality and morbidity worldwide, responsible for 71% of all deaths and 80.6% [649 million] of the number of years lost to disability (Vos et al., 2017). They pose a major threat to sustainable development as they are the leading cause premature mortality globally and are an important driver of poverty (Naghavi et al., 2017). The United Nations through target 3.4 of the sustainable development goals (SDG) aim to decrease premature mortality from NCDs by a third by the year 2030 through prevention and treatment and by promoting mental health (United Nations, 2015). Despite the significant decrease in global disability (Hay, 2017; James et al., 2018; Vos et al., 2017) and deaths (Naghavi et al., 2017) due to HIV/AIDS, malaria, and other communicable diseases, total deaths from NCDs have continued to rise (Naghavi et al., 2017). Cardiovascular diseases (CVDs) are the most common causes of NCD-related deaths(Naghavi et al., 2017). It is projected that by the year 2030 these NCD deaths would encompass an estimated 52 million people (World Health Organization, 2014). Annually, about 75% of all NCD-related mortality and 80% (16 million) of premature deaths occur in low- and middle-income countries (LMIC) (WHO, 2021).

Map 1: Sub-Saharan Africa.

In sub-Saharan Africa (SSA) (Map 1) HIV/AIDS is still the most common cause of disability and deaths in young adults (Naghavi et al., 2017), however, the burden of CVDs has rapidly increased over the last two decades and is projected to bypass HIV as the leading cause of deaths by 2030 (Gouda et al., 2019; Yuyun, Sliwa, Kengne, Mocumbi, & Bukhman, 2020). The integration of HIV and NCD services have been identified as an important action plan to achieving SDGs in SSA where the greatest impact of this double burden of diseases is felt (Adeyemi et al., 2021).

Significant progress has been made in the availability of resources and funding for HIV screening, treatment, and retention of care worldwide (UNAIDS, 2020). By the end of 2019, 81% of people living with HIV (PLHIV) were aware of their status, with 67% of them being on antiretroviral treatment (ART). It also reported advances in treatment effectiveness and retention, with 59% of PLHIV achieving a suppressed viral load. The UNAIDS report further underscores that increased access to ART has prevented about 12 million deaths over the last decade (UNAIDS, 2020, p. 13). However, as people are living longer and exposed to the risk factors of CVDs and other NCDs, with HIV and ART identified as risk factors for CVDs (Bloomfield et al., 2014; Law et al., 2006). PLHIV are two times more likely to develop CVDs compared to people without HIV (So-Armah et al., 2020;Ekrikpo et al., 2018; Temu et al., 2015; Getahun, Azage, Abuhay, & Abebe, 2020; Hyle et al., 2017).

Despite high prevalence of CVDs and chronic ill health in PLHIV living in the SSA region, very little is known about the knowledge, attitudes, and practices (KAP) of PLHIV regarding risks and prevention of CVD (Okello et al., 2020). Individual health-seeking behaviour is determined by their knowledge of the likelihood of developing an illness and consequent physical harm and social disability (Becker, Maiman, Kirscht, Haefner, & Drachman, 1977). KAP are integral in understanding patient CVD risk perceptions, and characteristics that can motivate prevention or hinder health-seeking behaviours (World Health Organization, 2008), (2020) Thse can include lack of resources (facilities, medicines, and nutrition), low patient awareness, emotional stress and depression as major barriers (Okello et al., 2020; Webel et al., 2020).

Research on CVD risk reduction in key populations such as PLHIV is under-developed in the SSA region. See Map 1. A systematic review that evaluated the knowledge and awareness of CVDs in SSA indicated that about 2% of Nigerian participants and 73% of Ugandan participants could not identify even one risk factor for CVD. It further showed that close to 67% of participants were never worried about the possibility of developing stroke, with only 5% expressing such concerns (Boateng et al., 2017). Similar findings have been reported in cohorts of PLHIV in SSA with only 3% of participants in Cameroon having a good knowledge of CVD risk factors (Mfeukeu-Kuate et al., 2017). In a Kenyan cohort, Temu et al., (2015) reported that approximately 16% of participants could not identify a single CVD risk factor. Both studies reported inadequate practices towards CVD risk prevention in PLHIV (Mfeukeu-Kuate et al., 2017; Temu et al., 2015). The double burden of CVD and HIV poses an enormous negative effect on health outcomes and financial and economic development both at the individual and national levels (Achwoka, Mutave, Oyugi, & Achia, 2020; Araújo, Bahia, & Frosi Stella, 2013). With the increasing health care challenges faced by SSA arising from the increasing burden of CVDs, alongside efforts to tackle HIV/AIDs, it is therefore important to scale up early detection and prevention of CVDs both in PLHIV and in the general population.

A spectrum of barriers to the primary prevention and management of CVD risk in PLHIV in SSA are identified at the patient, health provider, and health systems levels (Okello et al., 2020). At the patient level, gaps in knowledge and awareness have been identified as an important barrier to CVD risk reduction in the region (Okello et al., 2020). KAP studies have been widely used to identify gaps in knowledge and perceptions and their impact on behavioural patterns in specific population groups to implement targeted public health interventions (Papagiannis et al., 2020). Although population based studies provide valuable data that can be used to influence health policy and practice, Muleme et al., (2017) argue that they fail to provide in-depth information on other contextual or personal factors that can influence or limit patients' behaviours and health practices. Qualitative studies in contrast offer a unique insight and yield a deep understanding of lived experiences of multi-morbidities, context-specific factors and the potential roadblocks or enablers of CVD risk prevention from the patients' perspective. Furthermore whilst systematic reviews form the basis of a critical and rigorous synthesis of research evidence to guide informed policy-making (Mallett, Hagen-Zanker, Slater, & Duvendack, 2012), qualitative KAP reviews are important because they explore factors beyond the scope and limitations of the quantitative studies and provide synergistic value to understanding patient behaviours and practices in relation to their knowledge and perceptions about CVDs and risk factors (Muleme et al., 2017).

Hence we conducted a scoping review of qualitative literature in order to better understand extant knowledge, attitudes, perceptions and practices towards CVD risk and prevention in PLHIV living in the SSA region, and to develop evidence-based recommendations used to inform health policy and contribute towards the realization of the United Nation’s (UN) agenda 2030 on sustainable development.

METHODOLOGY

Scoping reviews are generally used to collate evidence and investigate emerging trends in understudied fields (Munn, Peters, et al., 2018). They are used to map and describe key concepts and theories on a specific area of research (Daudt, van Mossel, & Scott, 2013). We adhered closely to the Arksey and Malley scoping review framework (Arksey & O'Malley, 2005). We focused on scoping the extant qualitative literature on knowledge, attitudes, perceptions and practices towards CVD risk and prevention in PLHIV living in the SSA region, with subsequent synthesis of qualitative information used successfully by our team in a similar qualitative scoping review (Van Hout, Lungu-Byrne, & Germain, 2020). The scoping review was guided by a research question; *what is known in the qualitative literature about the knowledge, attitudes, perceptions, and practices of PLHIV in SSA towards CVD risks?* The framework for qualitative study inclusion was adopted using the Population, Interest, and Context (PICo) framework for qualitative studies (Munn, Stern, Aromataris, Lockwood, & Jordan, 2018). See Table 1. Search terms were developed from identified key concepts which included knowledge, attitudes, perceptions, practices, HIV/AIDS, and SSA. See Table 2. A comprehensive search on MEDLINE, CINAHL and PUBMED was conducted, and supported by a second stage search on Google Scholar, SCOPUS and Web of Science, and a detailed backward and forward citation searching within the bibliographies of available references. We included all primary or original scientific literature published in peer-review journals with no restriction on the date of publication. The resulting list of citations was saved in the citation management programme Endnote, screened for duplicates, and all records maintained for future reference. All eligible citations based on the inclusion criteria were screened in a two-step process (Waffenschmidt, Knelangen, Sieben, Bühn, & Pieper, 2019). This included a first stage of title and abstract screening followed by a second stage of full-text screening. We focused on studies with adults as defined according to the WHO standardization criteria as people aged 20 years and above (Ahmad et al., 2001).

TOOL [PICo]	**Inclusion Criteria**	**Exclusion Criteria**
Population	- Adults living with HIV/AIDS. - The scoping review will also include all qualitative studies on adults with a confirmed diagnosis of HIV at any stage of their treatment. - Adults will be defined according to the WHO standardization criteria as people aged 20 years and above (Ahmad et al., 2001)	Studies which are not qualitative. Studies including adolescents and children will be excluded
Interest	- Qualitative studies that include Knowledge of CVDs - Qualitative studies that include attitudes towards CVDs - Qualitative studies that include perceptions of CVDs - -Qualitative studies that include practices concerning CVDs. - The scoping review will include all qualitative records that illustrate one or more of the KAP elements either as a single factor or in combinations.	Studies which are not qualitative. Studies with no information on any of the KAP elements will be excluded
Context	- Studies carried out in all settings within sub-Saharan Africa	Studies which are not qualitative. All studies carried out in countries out of sub-Saharan Africa will be excluded

Table 1: Framework for the inclusion of studies in the review

Grouping	Concept	Search #	Searches
Group 1	Adults living with HIV/AIDS	Search 1 [S1]	[HIV OR AIDS OR HIV/AIDS OR “human immunodeficiency virus” OR “acquired immune deficiency syndrome”] AND [adults OR young adults]
Group 2	KAP	Search 2 [S2]	[Knowledge OR attitude* OR perception* OR self-perception* OR belie* OR practice* OR comprehension OR views OR feelings OR experience*]
Group 3	CVD risk	Search 3 [S3]	[“cardiovascular diseas* risk” OR “heart disease risk” OR “ischemic heart disease” OR stroke OR angina OR “heart attack” OR hypertension OR “blood pressure” OR diabetes OR obes* OR overweight OR “atherosclerotic heart disease” OR “metabolic syndrome” OR “metabolic risk”]
Group 4	SSA: countries located within SSA according to the UNICEF groupings will be used	Search 4 [S4]	Angola OR Benin OR Botswana OR “Burkina Faso” OR Burundi OR Cameroon OR “Central African Republic” OR Chad OR Congo OR Cote d'Ivoire OR Eritrea OR Ethiopia OR Gabon OR Gambia OR Ghana OR Guinea OR Guinea-Bissau OR Kenya OR Lesotho OR Liberia OR Madagascar OR Malawi OR Mali OR Mauritania OR Mauritius OR Mozambique OR Namibia OR Niger OR Nigeria OR Rwanda OR Senegal OR Sierra Leone OR Somalia OR South Africa OR “United Republic of Tanzania” OR Togo OR Uganda OR Zaire OR Zambia OR Zimbabwe
The 4 search groups were combined to obtain the final articles for screening		Search 5 [S5]	S1 AND S2 AND S3 AND S4

Table 2: Search strategy

A total of 572 references were identified by author one from the electronic database searches. 160 titles were removed after the two-stage duplicate screening process. A further 370 titles were removed after abstract and title screening for lack of relevance to the research question. Following the full-text screening, six records (Matima, Murphy, Levitt, BeLue, & Oni, 2018; Moucheraud, Phiri, & Hoffman, 2021; Roos, Myezwa, & van Aswegen, 2015; Temu et al., 2017; Tokwe & Naidoo, 2020) were retained for the final analysis. Authors two and three provided independent screening support See Figure 1.

The records were charted by author one, with regard to authors’ name, year of publication, study setting, study design, study objectives, data collection methods, methods of data analysis, and summary of key findings. A thematic synthesis method was used to analyse the data and results presented using a narrative approach [32]. The analysis was conducted by authors one, two and three in consultation, using three stages (2008); line-by-line coding of the results using the NVIVO software; development of descriptive themes from these codes and categorization; and generation of two analytic themes (*knowledge and perceptions; attitudes and practices*) to answer the scoping review question about the KAP of PLHIV towards CVD risks in SSA. See Figure 1.

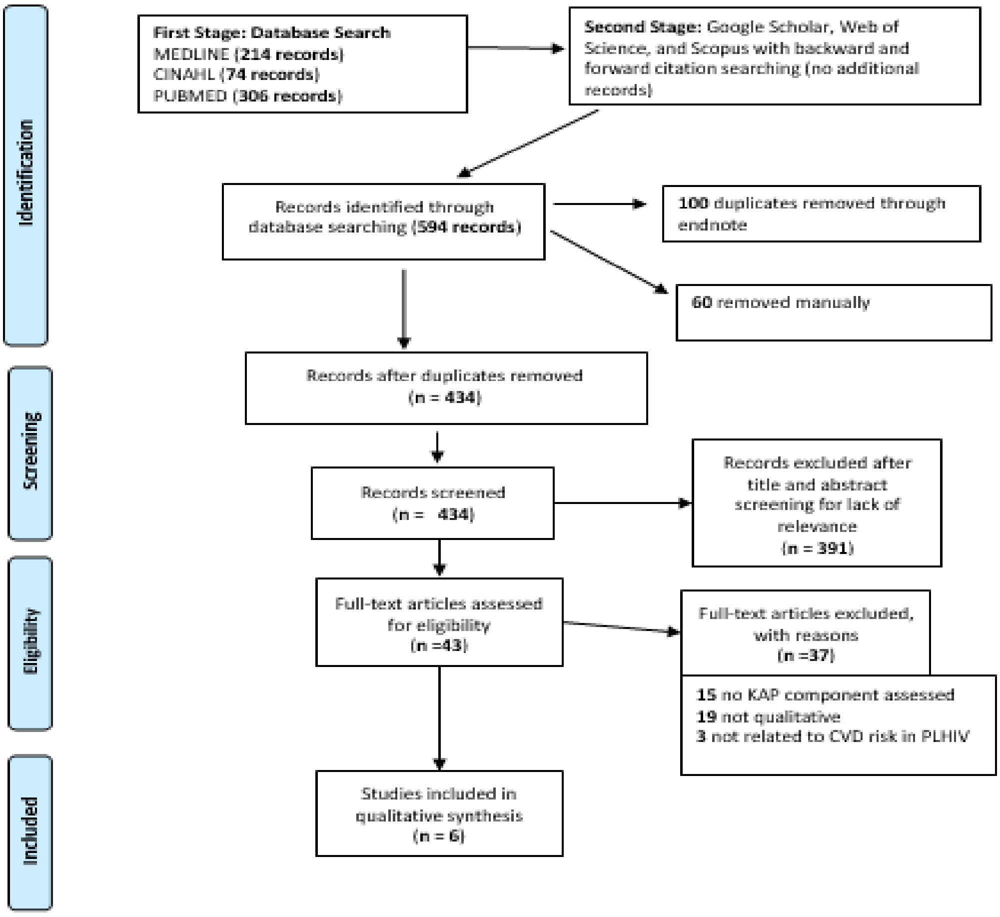

Figure 1: PRISMA Flowchart *(adapted from the Prisma guidelines for reporting systematic reviews (PRISMA, 2009) (following page)*

RESULTS

All records explored one or more of the four domains of interest; CVD knowledge, attitudes, perceptions, and practices in PLHIV in SSA. Included records originated from three SSA countries namely Kenya (Temu et al., 2017), Malawi (Hing et al., 2019; Moucheraud et al., 2021), and South Africa (Matima et al., 2018; Roos et al., 2015; Tokwe & Naidoo, 2020). See Table 3.

Study	**Recruitment strategy**
(Roos et al., 2015)	Participants were conveniently sampled according to their age and duration of highly active antiretroviral treatment. The sample size depended on the information obtained during the interview process and participants were consecutively added until a saturation point was reached.
(Temu et al., 2017)	Participants were recruited purposively by community health workers who were familiar with the HIV Clinic to ensure variation in participant characteristics
(Matima et al., 2018)	Participants were conveniently and purposively sampled from two public service clinics
(Hing et al., 2019)	Participants coming for their routine follow-up were recruited from a single HIV treatment clinic and were included after their charts were reviewed across the inclusion criteria
(Moucheraud et al., 2021)	Participants at three secondary-level hospitals were recruited using convenience sampling.
(Tokwe & Naidoo, 2020)	Participants coming for their chronic medication visit in a sub-district health facility were invited to take part in the study and purposively sampled.

Table 3: Strategies and methods for participant recruitment in the included studies

See Table 4 following page.

Table 4: Charted Records of included studies

Author[s]	Title, Journal, Year of publication	Aims	Methodology	Target population	Key themes identified/results	Conclusions
Roos, Myezwa and van Aswegen	'If you have a problem with your heart, you have a problem with your life': Self-perception and behaviour in relation to the risk of ischaemic heart disease in people living with HIV. *African Journal of Primary Health Care and Family Medicine, 2015*	"To determine the self-perception and behavior in relation to risk for IHD in a cohort of South African PLWHIV"	**Data collection:** 30 Face-to-face interviews using semi-structured questionnaires. **Data analysis:** Content analysis using an inductive approach	20 – 65 years of age	The main themes identified included Knowledge and understanding related to IHD Insight into own risk for IHD Health character in the context of HIV infection	Programs are needed to educate and focus on the effects of advancing age, obesity, physical activity, HIV, and ARV on IHD risk. Stress was identified as a significant risk factor for IHD with exercise programs identified as an intervention strategy to manage stress.
Temu TM	Lay beliefs about hypertension among HIV-infected adults in Kenya. *Open Heart. 2017*	To explore lay beliefs about hypertension among HIV-infected adults to inform the development of culture-sensitive hypertension prevention and control program	**Data collection**: Focus group discussion for 53 participants **Data analysis:**Thematic analysis via an inductive approach	21 – 60 years of age	The main results were PLHIV perceived hypertension as being a temporal condition and is more serious than HIV Stress was identified as the main cause of hypertension Alcohol and tobacco use was not linked to hypertension Participants identified obesity as a cause of hypertension but did not identify weight loss as a treatment option	There was a limited understanding of the causes, treatment, and prevention of hypertension in PLHIV This showed the need for hypertension education programs in HIV clinics Understanding culture-based beliefs is critical for designing future programs aimed at preventing hypertension in PLHIV.

Matima R	A qualitative study on the experiences and perspectives of public sector patients in Cape Town in managing the workload of demands of HIV and type 2 diabetes multimorbidity. *Plus ONE. 2018*	To examine individual's experiences of HIV/T2D multimorbidity in the South African context	**Data collection:** 16 semi-structured interviews [10 patients and 6 health workers **Data analysis:** Thematic content analysis	35 – 65 years	The main themes identified included Perceived patient workload Perceived patient capacity	Integrating chronic services and addressing the social determinants is a vital step towards reducing the burden and improving access and utilization of services. The Cumulative complexity model is effective to understand patients lived experiences of managing multimorbidity
Hing M	'Blood pressure can kill you tomorrow, but HIV gives you time': illness perceptions and treatment experiences among Malawian individuals living with HIV and hypertension. *Health Policy and planning. 2019*	To identify and explore factors influencing adherence among individuals with HIV and hypertension in Malawi	**Data collection:** 75 semi-structured interviews **Data analysis:** thematic analysis using a deductive approach	Aged 18 years and above	Key themes stratified according to the constructs of the health belief model included Perceived susceptibility to HIV and hypertension Perceived severity of HIV and hypertension Perceived benefits of controlling HIV and hypertension Perceived barriers to controlling HIV and hypertension Perceived self-efficacy in controlling HIV and hypertension	Patients are motivated to control their hypertension but face substantial individual and system-level obstacles in adhering to treatment. This necessitates the provision of an integrated care model that pays attention to the complex illness experiences of people with these diseases.

Moucheraud, Phiri and Hoffman	Health behaviours and beliefs among Malawian adults taking antihypertensive medication and antiretroviral therapy: A qualitative study. *Global Public Health. 2021*	To understand experiences of living with hypertension – including health behaviours and beliefs about hypertension management	**Data Collection** 30 interviews **Data analysis** Thematic synthesis	Aged 18 years and above	The main themes identified included High awareness of hypertension and benefits of treatment Social support helps with adherence to medication Acceptability of skipping or stopping medication if feeling healthy Relatively infrequent reports of side effects or adverse events as a barrier to adherence Dietary changes are important but can be challenging Reducing stress and stressful relationships is part of self-care	The importance of examining health behaviours and beliefs in the context of NCD self-care, and understand the social factors which shape health behaviours.
Tokwe T and Naidoo JR	Lived experiences of human immunodeficiency virus and hypertension in the Eastern Cape, South Africa. *African Journal of Primary Health Care & Family Medicine, 2020*	To explore the facilitating and inhibitory factors experienced by PLWHIV and hypertension.	**Data collection** 11 semi-structured interviews **Data analysis** Giorgi's phenomenological approach	40 – 59 years	Key themes identified Overcoming illness related stigma Sources of support Self-love: taking ownership of the disease Creating transforming behaviours and self-care strategies	Participants' lived experiences of living with HIV and hypertension were facilitated by self-love, self-care practices, and support.

Knowledge and Perceptions

PLHIV had varied understanding and perceptions regarding CVD risk factors. Hypertension was often referred to as "*BP"* or "*pressure"* and participants had a limited understanding of the meaning of the word and the significance of the different blood pressure values (Moucheraud et al., 2021; Temu et al., 2017). A Kenyan female said *"I ask the nurse and I am told your blood pressure is okay […] sometimes it is 80/60 […] 100/80 so I don't know exactly which is which but I will like to know"* (Temu et al., 2017). They described psychological factors such as stress, overthinking (Roos et al., 2015; Temu et al., 2017), worrying about HIV diagnosis (Temu et al., 2017), and denial of HIV positive status (Roos et al., 2015) as the cause of hypertension and heart disease. Another Kenyan female stated that *"My pressure was caused by thinking too much […] being in denial and refusing to accept my status […] of HIV. […] I believe that is what caused me to have pressure" (Temu et al., 2017)*

Some participants were sceptical about hypertension due to its asymptomatic nature and only believed it was an authentic disease after observing some members of their community take antihypertensive medications and others suffer from complications such as stroke (Hing et al., 2019). Others accepted their diagnosis after they received consistent support from the nurses of the HIV clinic (Tokwe & Naidoo, 2020). In Malawi, a female said;*"It was hard for me to accept that I have hypertension […] but with the counselling I received from the doctors, I accepted as I did with HIV, knowing that I was not the first one […]".(2019)*. Conversely, others had high awareness about the dangers of hypertension including sudden death, heart attacks, loss of vision, and severe disability (Hing et al., 2019; Temu et al., 2017). A participant illustrates this; *"You can be attacked anytime and anywhere"*

PLHIV either perceived themselves as being at risk of CVD or not. Those who perceived themselves as being at risk described an inability to control their vulnerability (Hing et al., 2019). They cited lifestyle and behavioural factors such as diets rich in fats, uncooked and/or excessive salt intake, being inactive, taking ARVs, family history, and eating hot pepper as factors that increased their susceptibility (Hing et al., 2019; Moucheraud et al., 2021; Roos et al., 2015; Temu et al., 2017). One South African female said "*because of the stress and unhealthy diet and not exercising. I think sometimes I can feel my heart tension that is not normal. Anger causes your high blood to go higher and you can even feel that your heart is not "klopping" [beating] normal […]*"(Roos et al., 2015). Although they acknowledged lifestyle factors as a contributor to hypertension, only a few [4%] (2015) in South Africa recognized smoking as a risk factor. Similarly, no participant in the study by Temu et al., (2017) in Kenya identified smoking, age, or use of alcohol as a risk for hypertension although close to a quarter of them were either smoking or using alcohol.

For those who did not perceive themselves as being at risk of CVDs, PLHIV explained that since commencing ARTs, they followed a healthy lifestyle, developed coping behaviours, and maintained their health (Roos et al., 2015). They went further to state that using ARTs protected them against CVD. A male South African mentioned that *"[…] at the moment with HIV and the life I have been leading before, it has been a healthy life throughout […] in the course of time, I could get heart disease, but at the moment I don't think so" (Roos et al., 2015)*. Another said, *"No since I am taking ARVs I am healthy"(Roos et al., 2015).*

Despite the varied perceptions about the risk of CVD among PLHIV, there was a consensus that hypertension and IHD were potentially fatal conditions (Hing et al., 2019; Moucheraud et al., 2021; Temu et al., 2017; Tokwe & Naidoo, 2020). A majority perceived hypertension to be a more severe illness than HIV because with hypertension you can suddenly develop a complication, while with HIV you can live for long with only medication(Temu et al., 2017; Tokwe & Naidoo, 2020). A female in Kenya explained that *"you cannot die from HIV if you are taking medication […] but blood pressure you can be on medication but you encounter something that shock you […] and may go to sleep and never wake up in the* *morning*."(Temu et al., 2017). Hing et., (2019) illustrated this in Malawi *"even sitting on this chair right now I can die. While HIV, you stay longer, you cannot die a sudden death."* Participants believed HIV was more debilitating than hypertension. They cited ART resistance, fear of an untreatable HIV strain, and the different diseases associated with untreated HIV as possible explanations. They also believed HIV was more dangerous since HIV can only be managed with medication while hypertension can be managed with lifestyle changes. A male in Malawi said *"BP has so many controlling measures […] with HIV the only control measure is the medicine. Staying without medicine you may die anytime"* (Hing et al., 2019).

Attitudes and Practices

Participants' attitudes and practices towards CVD prevention and management were largely influenced by their knowledge and perceptions. In Temu et al., (2017) participants claimed hypertension was symptomatic, and paying attention to their bodies was enough to determine whether their blood pressure was elevated or not. Consequently, they only adjusted their lifestyle and management after they experienced symptoms such as headaches and dizziness. A female in Kenya said *"I normally know when my pressure is high cause I get migraine on the forehead or I see black […]. I refused medication because there is no way I can take the medication for the virus and then add for pressure […] that is too much drugs in your body. I told the doctor […]. I will control my pressure because there is a way you can feel it is high"* (Temu et al., 2017). Roos, Myezwa, and Van Aswegan (2015) illustrated how South African participants were conscious of the high risk of mortality associated with CVD and were fully aware of prevention measures such as lifestyle adjustments, health-seeking behavior, and medical management. These included "*Healthy balanced life; drink enough water, sleep enough and don't stress too much […]*".In Malawi participants described lifestyle measures such as exercise, proper sleep, drinking enough water, and proper nutrition as a management strategy for hypertension[42]. Moucheraud, Phiri, and Hoffman (2021) reported that PLHIV especially females cited stress management strategies as a control measure for hypertension. A female explained that "*[…]I should not think a lot, I should not be at a noisy place when someone wants to tell me something they should not tell me in a loud frightening way". [37]* They also avoided certain foods considered to be unhealthy and consumed more fruits and vegetables. For participants with co-morbid HIV and diabetes, there were no challenges with adhering to recommendations for physical activity (Matima et al., 2018). In addition to conventional medicine, a few in Malawi used herbal remedies such as tea and garlic (Hing et al., 2019).

PLHIV on medical treatment for CVDs had diverse motivations for commencing treatment. Moucheraud, Phiri, and Hoffman (2021) in Malawi reported on the occurrence of adverse events such as stroke and sudden death as motivation for treatment; "*I just fell and had a stroke. This made me start treatment for BP".* Another participant stated that "*My mother died of BP, She just collapsed and was pronounced dead within an hour. I am scared of BP*". This fear of perceived adverse events served as a motivation for medication adherence: "*If I stop [BP medication] my BP can get worse and I could lose my life. .. I try to take them every day no matter what […]" (Moucheraud et al., 2021)*. The benefits of reducing the undesirable symptoms of hypertension were deemed a motivating factor in Malawi; "*I was not living well .I was always feeling angry […], I could feel headaches but now it has stopped[…] because of the hypertension medicine"*. [42] Similarly in Kenya, a known hypertensive for five years believed medications are needed for survival as she stated, *"You cannot survive without medication […]*"(Temu et al., 2017).

Another important motivator mentioned by a majority of PLHIV was social and community support. They emphasized the role of family support and social structures in promoting their adherence to medication and other forms of treatment (Hing et al., 2019; Matima et al., 2018; Moucheraud et al., 2021; Roos et al., 2015; Tokwe & Naidoo, 2020). A hypertensive male in Malawi stated: "*My wife reminds me to take the drugs"* (Moucheraud et al., 2021). Another participant explained that "*sometimes it happens that you don't have money, so most of the times the support comes from children […] (Hing et al., 2019)*. Tokwe and Naidoo (2020) explained that family support helped South African PLHIV to overcome community stigma, accept their diagnosis and adhere to treatment for both HIV and hypertension. In their study a male said *"[…] my wife […] will say after eating your porridge in the morning take your treatment and do not forget it"* and a female said that *"[…] my family, […] said that […] if you are taking your treatment the right way, you will be alright"*.

In addition to family support, peer support was mentioned as an important factor that motivated treatment and medication adherence for hypertension in PLHIV (Tokwe & Naidoo, 2020). Although there was no clinic or support group for people living with both diseases, participants relied on each for support and would have meaningful discussions with their peers during their monthly HIV clinic visits (Tokwe & Naidoo, 2020). One female in South Africa explained that her peers would tell her *"[…] my sister we are living with pills since we were started in years ago […]. We are still taking our pills ..we are still walking and alive"*. Another female mentioned that she and her peers would remind and motivate each to continue taking their medications. She said *" […] we even remind each other not be defeated by one pill, the one we take at eight in the morning"* (Tokwe & Naidoo, 2020).

Many patients faced some roadblocks that affected their practices toward both non-pharmacologic and pharmacologic prevention and management of CVDs. Concerning non-medical measures, several especially widows found it difficult to adhere to recommended dietary changes due to cost, unavailability, and difficulties in the preparation of the meals (Moucheraud et al., 2021). Unemployment was also cited as a barrier to lifestyle measures because it hindered compliance to recommended dietary options (Roos et al., 2015). Some found it hard to incorporate the recommended foods into their family diets because it was either unaffordable (Matima et al., 2018) or stressful eating different meals from the rest of the family (Hing et al., 2019). Others considered the dietary measures to be restrictive, for example in Malawi, a man said: *"[…] my wife at home doesn't allow that they should have their own food and I should also eat mine, so we just eat what I eat and I feel like it's not fair to her"* (Moucheraud et al., 2021).

Concerning, pharmacologic management of NCDs, commonly cited factors that hindered adherence included the cost of medication (Hing et al., 2019; Matima et al., 2018; Temu et al., 2017) and undesirable side effects such as erectile dysfunction, dizziness, weight loss, diabetes, night sweats and frequent urination (Hing et al., 2019; Matima et al., 2018; Moucheraud et al., 2021). This was observed in Malawi: "*When I am taking the [hypertension] drugs accordingly, I feel well […] it is hard, because the drugs are needed, but I have little money and the drugs are expensive […] so you just buy 2 or 3 and you don't buy the other, and live without taking them"* (Hing et al., 2019). Hing et al., (Hing et al., 2019) cited some individuals who expressed frustration at the unavailability of hypertension medication when compared to HIV medicines. A hypertensive patient in Malawi said "*Taking [hypertension] medicine is not a choice but a problem where I cannot find the medicine, while the ART, I have never been in a situation that I want to go get the drugs but find that there is no medicine at the hospital […]"* (Hing et al., 2019).

Patients in the studies by Matima et al., (2018) and Hing et al., (2019) explained that it was challenging to take medicines for HIV and diabetes, and hypertension simultaneously. However, some patients reported that this burden disappeared with time and they managed both conditions comfortably: "*I found it difficult at the time that I'd just been diagnosed with diabetes* […] *to inject myself and I have to take a certain amount of pills* […] *but now now I'm just living life"* (Matima et al., 2018). Although not frequently mentioned some interrupted their medication for hypertension because they felt better and in some cases, they were advised by a health care worker to cease the medicines when their blood pressures improved (Moucheraud et al., 2021). One patient in Malawi explained that *" [The doctor] said my condition is* *stable and I should stop taking the drugs […] They will let me know if they see that I need to get back on the drugs if my BP is high […]* (Moucheraud et al., 2021).

Finally, contrasting information and misinformation including rumours and hearsay contributed to low CVD treatment acceptance and adherence in PLHIV in South Africa and Malawi (Matima et al., 2018; Moucheraud et al., 2021). One female highlighted the influence of some religious institutions on treatment adherence as she mentioned that *"Some churches tell their members to stop taking medication, and that they have been prayed for and healed"* (Moucheraud et al., 2021).

DISCUSSION

The scoping review exercise indicates that there is a dearth of empirical qualitative data on CVD KAP in PLHIV in SSA. To the best of our knowledge, this review is the first qualitative scoping review to explore the KAP of CVD risk prevention and management in PLHIV in SSA. Our focus on qualitative narratives, whilst smallscale is intended to yield an in-depth understanding of PLHIV experiences of CVD soas to inform better patient care pathways, and education tactics. It highlights the paucity of qualitative data that provides lived insights by exploring the perspectives about CVD prevention in vulnerable groups especially PLHIV. Narratives suggests that PLHIV may have limited knowledge, inadequate practices and misconceptions towards CVD prevention and management, driven by perspectives drawn from personal experiences and environmental influences. Similar findings have been reported in quantitiative studies elsewhere (Rwanda, Kenya, South Africa) (Biraguma, Mutimura, & Frantz, 2019). This highlights a critical need for targeted health promotion that hinges on patients prior knowledge, preferences, and perceptions. The review further highlights the importance of support from social structures such as the family, community, and healthcare professionals in the prevention and management of CVD among PLHIV. Their perceptions about CVD risks are strongly driven by their experiences with CVDs as well as support from social structures especially the family. Additionally, the type of information received from healthcare workers had a significant impact on their practices and acceptance of medical treatment for CVD risk. The poor attitudes and practices towards CVD prevention and management can be attributed to the lack of a trusted source of information and contrasting and incorrect information given to patients by healthcare professionals. This is also reflected in a study in Kenya, where only 3% of PLHIV were reported to have received CVD information from a health care provider with the majority getting this information from television and radio programmes, magazines, and the internet (Temu et al., 2015). Lastly, the included qualitative studies did not mention a support group or clinic for CVDs for PLHIV. This further strengthens the need for an integrated patient-centred approach to the prevention and control of CVD risk factors in PLHIV in SSA.

CONCLUSION

PLHIV in SSA have inadequate knowledge, poor attitudes, misconceptions and inadequate practices toward CVD risk prevention and management. This pattern appears influenced by psychological factors, environmental and social structures, and the healthcare professionals. Mindful that, there is no one-size-fits-all approach to the prevention and management of CVD risks in both PLHIV and the general population, this scoping review of quaitative literature strengthens the call for improved and targetted patient and health worker education and stresses the need for an integrated approach to CVD and HIV care in SSA. Improving health and reducing disability by integrating NCD and HIV care is integral for sustainable economic growth and development in SSA.

Conflict of Interest

None declared.

Authors Contributions

Divine Tim Bonghaseh: Conceptualised the study, designed the study, collected and analysed data, interpreted data, and prepared the reviewed manuscript for the final submission. Marie-Claire Van Hout and Charlotte Bigland: Editing and reviewing and validating the manuscript for the final submission. All the authors have read and agreed to the final manuscript

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