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Patient perspectives on integrated health care for HIV, hypertension and type 2 diabetes – a scoping review

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Abstract

Introduction

Anti-retroviral therapy has reduced mortality and led to longer life expectancy in people living with HIV (PLWH). These patients are now at an increased risk of non-communicable diseases (NCDs). Integration of care for HIV and NCDs has become a focus of research and policy. In this article we aim to review patient perspectives on integration of health care for HIV, type 2 diabetes and hypertension.

Methods

The framework for scoping reviews developed by Arksey and O'Malley and updated by Peter et al., 2021 was applied for this review. The PRISMA extension for scoping reviews (PRISMA-ScR) checklist was applied.

Results

Of 5502 studies initially identified, 13 articles were included in this review, of which 11 had a geographical origin in sub-Saharan Africa (SSA). Nine articles were primarily focused on HIV/diabetes health care integration while 4 articles were focused on HIV/hypertension integration. Patient's experiences with integrated care were reduced HIV-related stigma, reduced travel and treatment costs and a more holistic person-centered care. Prominent concerns were long waiting times at clinics and a lack of continuity of care. Non-integrated care was perceived as time-consuming and more expensive.

Conclusion

Patient perspectives and experiences on integrated care for HIV, diabetes and hypertension were mostly positive. Integrated services can save resources and allow for a more personalized approach to health care. There is a paucity of evidence and further longitudinal and interventional evidence from a more diverse range of health care systems are needed.

Summary Box 1. Strengths and limitations

Strengths and limitations of this study

- The prevalence of non-communicable diseases among People Living with HIV has risen significantly over the last decade and integration of health care for HIV and NCDs has become a focus of research and policy to use resources efficiently and improve health outcomes.
- We provide the first systematic review of patient perspectives on integrating health care for HIV and NCDs. The scoping review methodology and broad search terms, reflected in more than 5500 initial records identified, ensure a high sensitivity of our search strategy.
- A limitation of the current scoping review is the singular focus on type 2 diabetes and hypertension as indicator conditions. Other important diseases for integration would be mental health, cardiovascular disease, or chronic kidney disease.
- Patient's experiences with integrated care were reduced HIV-related stigma, reduced travel and treatment costs and a more holistic person-centered care.
- Integrated services can save resources and allow for a more personalized approach to health care. Taking into account patient perspectives when designing research and policy

for health care integration is important to ensure acceptability and high effectiveness of service provision.

Introduction

Global health programs such as those supported by American President's Emergency Plan for AIDS Relief (PEPFAR) or the Global Fund have since 2003 facilitated the development of separate, vertical HIV-focused health care infrastructure across sub-Saharan Africa (SSA).[1] This has led to an increased coverage with anti-retroviral therapy (ART) and in consequence to longer life expectancy in people living with HIV (PLWH). However, at the same time this has contributed to fragmentation in health systems in countries in Africa.[2] Over the last decade an increase in the burden of non-communicable diseases (NCDs) has been seen among PLWH, to a large degree due to better survival and general health status.[3,4] In parallel, the prevalence of NCDs in the general population, in particular type 2 diabetes (T2D) and hypertension (HT) has increased significantly across SSA.[5] Therefore, health care systems strengthening, increased investments and efficient use of resources are needed to counter the double burden of communicable and non-communicable diseases in Sub-Sahara Africa.[6] The established vertical health care structures in many countries, in particular those for HIV-care, risk contributing to inefficient use of resources and increased HIV-related stigma.[7,8]

Thus, integration of the existing communicable and non-communicable health care infrastructure has become a recent policy and research focus to improve care for people living with NCDs (PLWNCDs) and PLWH alike.[10] Integrated care can be defined as 'the coordination, co-location, or simultaneous delivery of communicable and non-communicable services to patients who need it, when they need it.'[4] Integration of HIV and NCDs services can be categorized as a) community-based integrated HIV/NCDs screening in the general population, b) screening for NCDs and their risk factors among PLWH, c) integrated care of HIV/NCDs in healthcare facilities, d) differentiated care for stable HIV/NCDs, and e) integrated population health for all patients with any need.[11] Taking T2D and HT as an example, potential benefits could be better control of HT and T2D, earlier diagnosis, better management and disease control, and cost saving for patients through inclusion in routine HIV control. Accordingly, benefits for HIV-control could be easier access to HIV services and the reduction of stigma.[12] A potential downside to integration can be longer waiting times for patients if integration is done with reduced resources compared with the current standard care.[13]

Patients' knowledge, attitudes, beliefs, desires and practices have a large influence on the successful delivery of health care.[14] Recently, quality of life has been proposed as the fourth 90 to complement the UNAIDS 90-90-90 targets to monitor the global HIV response, which requires a better understanding of patient reported outcomes.[9] However, little is known about patient perspectives on integration of health care for HIV and NCDs.[12]

Objective and aims

The objective of this scoping review was to identify, describe and analyze the peer-reviewed literature on patient perspectives on health-care integration for HIV and NCDs. T2D and HT were used as indicator conditions for NCDs.

Specifically, we aimed to identify the scope and describe the peer-reviewed literature on patient perspectives. Furthermore, we reviewed frameworks and methodologies used to assess patient perspectives on HIV/NCD health care integration as well as the findings and potential recommendations of the available literature on integration of HIV and NCD services.

Research questions

1. Which kind of research (quantitative, qualitative) exists and what methodologies were used?
2. In what settings (geographical, health care system, socio-economic context) has research been conducted?
3. How are patient perspectives conceptualized?
4. What are patient perspectives on integration of HIV/NCD services?
    - What are the perspectives of PLWNCDs on integration of T2D and/or HT care with HIV care?
    - What are the perspectives of PLWH on integration of HIV care with T2D and/or HT care?

Methods

A scoping review is a method of reviewing evidence-based research to, scope a body of literature, clarify concepts, identify knowledge gaps or to investigate research conduct.[15] The framework for

scoping reviews developed by Arksey and O'Malley in 2005 and updated by Peter et al. in 2015 was applied for this study.[16,17] This method of a scoping review was chosen over a more focused systematic review to apply a broader approach to the vaguely defined theme in order to map the available literature on this topic, and to identify research gaps.[16] In the preparation of this review a research protocol was created according to the PRISMA extension for scoping reviews (PRISMA-ScR) checklist to ensure quality, transparency, and complete reporting.[18]

Patients and public involvement

Patients and the public were indirectly represented in the design, conduct and reporting of this review as several of the authors are representatives of patient associations (Danish NCD Alliance, East Africa NCD Alliance).The development of the research question and outcome measures was driven by the experience of the authors as representatives of patient associations. However, no patients were involved directly in the planning and conduct of this study. The results will be disseminated to patient representatives and associations (e.g., the Global NCD Alliance and East Africa NCD Alliance).

Definitions

The definitions of PLWH/PLWA (people living with AIDS), NCDs, integrated health care and patient perspectives are provided in table 1. As the review aimed to identify definitions of patient perspectives, they were not included as an independent term in the search strategy.

Table 1. Definitions.

Category	Definitions
PLWH/PLWA	PLWH/PLWA are defined according to the definition by the UNAIDS Terminology Guidelines from 2015 as persons, who are seropositive for HIV.[19]
NCDs	NCDs are characterized by WHO as being non-transmissible and often known as chronic diseases. They are a result of combinations of genetic, physiological, environmental and behavioral factors. They are largely preventable and are linked to common risk factors and underlying determinants.[20] In this review, we chose to focus on type 2 diabetes mellitus and hypertension as indicator conditions, which have seen a rapid increase in prevalence, especially in SSA.[5]
Integrated health care	For integrated health care we used the definition of the WHO Europe Regional Office: "*an approach to strengthen people-centered health systems […] delivered by a coordinated multidisciplinary team of providers working across settings and levels of care […].*"[21]

Patient perspectives	There is no unique consensus or definition for Patient perspectives (PP).[14] For the purpose of this review we defined PP as the experiences, values, preferences, expectations, concerns, and opinions expressed by patients (in our case PLWNCDs or PLWH). They can broadly be categorized as those perspectives expressed by individually concerned patients and those expressed by informally or formally selected patient representatives (e.g., civil society organizations). They can be reported directly by patients or indirectly through health care providers or other secondary sources.

Databases and search strategy

The databases PubMed, Web of Science and Cochrane library were searched. Broad terms were included in the search strategy (Table 1). HIV, NCDs (specifically T2D and HT) and health care integration were the three main categories the search strategy was based on. The search strategy for PubMed and Cochrane library consisted of free text and Medical Subject Headings (MeSH) terms. The search strategy used in PubMed is presented in table 2, and the search terms used in the other databases are presented in supplementary tables 1 and 2. A librarian at the University of Aarhus was consulted to support the development of the search terms. References of included publications were searched for relevant articles.

Table 2. Search terms used in PubMed.

Category	PubMed search strategy
HIV	1) HIV infections 2) Human immunodeficiency virus 3) AIDS 4) 1 OR 2 OR 3

NCDs, Diabetes mellitus Type 2 and Hypertension	5) Noncommunicable diseases 6) NCDs 7) NCD 8) Diabetes Mellitus Type 2 9) ((type 2 OR type ii OR "noninsulin dependent" OR "non insulin dependent" OR "adult onset" OR "maturity onset" OR obes*) AND diabet*) 10) T2dm 11) Tiidm 12) Hypertension 13) Hypertensi* 14) Prehypertension 15) Pre hypertension 16) prehypertensi* 17) Blood pressure 18) bp 19) 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18
Health Care Integration	20) Integrated delivery systems 21) (vertical OR horizontal OR integrat* OR integrated OR coordinat* OR coordinated OR co-ordinat* OR co-ordinated OR link* OR linked) AND (program* OR care OR service*) OR delivery of health care OR primary health care OR integrat* OR health care OR health-care OR healthcare OR health service 22) 20 OR 21
	4 AND 19 AND 22

Criteria for inclusion and exclusion

Inclusion criteria

- Peer-reviewed articles (including original quantitative and qualitative studies, systematic reviews, editorials, commentaries, viewpoints) on integration of health care for HIV and T2D and/or HT which provide information on patient perspectives (according to definitions in Table 1)
- Published between 01/01/1990-01/03/2021
- Publications in English, German, French and Danish

Exclusion criteria

- Book chapters and grey literature (dissertations, conference proceedings, reports etc.)

Literature selection

The citation software Zotero was used to merge and remove the duplicates among the results. Titles and abstracts for these papers were thoroughly screened using Rayyan (a web and mobile app for systematic reviews) by two independent reviewers (SS and CK). The full texts for all the publications appearing to meet the inclusion criteria were read to make the final literature selection. Any disagreements between the two reviewers at any stage of the study selection were resolved by a third reviewer (PK).

Data collection and extraction

Data on origin of author, year of publication, geographical focus of the publication, publication type, type of NCD, definition of health care integration, definition of patient perspectives, assessment method for patient perspectives and the content of the patient perspectives were extracted and transferred into a pre-specified extraction sheet (SS). These data were used to facilitate analysis and development of figures and summarizing tables. A second researcher independently checked the data for accuracy and detail (CK). Disagreements were resolved by consensus.

Ethics

No ethical approval was required as only secondary data were investigated and used.

Results

Search results

After removal of duplicates, 5502 articles were identified. 5486 publications did not match the inclusion criteria and were excluded after review of titles and abstracts by two independent reviewers. Full texts were retrieved for 20articles. Of these, 13 were eligible[8,13,22–32] for inclusion, 7 were excluded during the assessment of full texts (Figure 1).

Characteristics of included studies

All included publications were original research articles, used cross-sectional study designs, and were published between 2016-2021. All were qualitative studies, and all except two[13,30]used semi-

structured interviews,[28] in-depth interviews (IDIs),[8,23,25,31,32] or a combination of these[22,27,29] (table 3). Some studies combined the interviews with instruments such as focus group discussions (FGDs) and patient observations. A majority of the studies (n = 7) had their origin/geographical focus in South Africa (SA). One study was conducted in Kenya[23], Tanzania[32], Uganda[31], Malawi[30], Northern Thailand[28], and North Carolina (US), respectively[29] (Table 3).

Table 3. Overview of geographical origin, research type and methodology of included studies

	Geographical focus	Research type	Assessment method for patient perspectives
Matima et al. (2018)	Khayelitsha, Cape Town, SA	Qualitative	Individually face-to-face semi-structured, in-depth interviews (IDIs) in English. The IDIs were conducted in a private room in the clinic with the presence of a translator.
Rawat et al. (2018)	Free State, SA	Qualitative	Cross-sectional survey (using likert scales) administration (in the participants' language of preference), conducted in two waves on different patients. Participants were surveyed in semi-private locations (where space permitted) or in the waiting areas.
Venables et al. (2016)	Kibera, Kenya	Qualitative	IDIs or FGDsin English or Swahili. All IDIs or FGDs took place in clinical consultation rooms or dedicated MAC areas within the clinic.
Lebina et al. (2020)	Dr. Kenneth Kaunda (DKK) district and West Rand (WR) district, SA	Qualitative	Structured interviews (including standardized open-ended and closed fixed-response questions) of healthcare workers' (nurses, administrators and ancillary staff) perceptions of patient responsiveness. Participants were asked to identify facility specific issues (context) that might hinder or support implementation fidelity of the ICDM model.
Edna N. Bosire (2021)	Soweto, SA	Qualitative	IDIs (with both closed and open-ended questions) conducted in the clinic in English and observations of the patients in their homes. The aim of the home visits was to understand patients'

			lived experiences with chronic conditions and illness management.
Ameh et al. (2017)	Agincourt, SA	Qualitative	Exit interviews followed by FGDs of 5-9 patients of similar age (to provide a conducive environment to freely discuss) (each session 1-1,5 hour) and one separate FGD for 5 clinical defaulters. The FGDs were held in a neutral venue within the catchment area of the health facility to enable the patients to freely express their experiences.
Knight et al. (2018)	Langa and Khayelitsha, Cape Town, SA	Qualitative	Semi-structured, IDIs with patients and key informant interviews (KII) with service providers to triangulate data from patients. The interviews of the patients mostly took place in their homes. The KII and few of the patient interviews took place in a quiet space within the facility or relevant place of work where people felt comfortable and privacy could be ensured.
Moise et al. (2020)	Chiang Mai, Northern Thailand	Qualitative	Semi-structured interviews in Thai
Mkumba et al. (2021)	Durham, North Carolina, US	Qualitative	Semi-structured IDIs in private rooms in the clinic
Moucheraud et al. (2020)	Lilongwe, Malawi	Quantitative	Cross-sectional survey (were multiple-choice or short-response) and data from clinical records
Peer et al. (2020)	Cape Town and surrounding municipalities, SA	Quantitative and qualitative	Quantitative surveys (Likert-scale), FGDs and IDIs
Muddu et al. (2020)	Tororo, Nagongera Health Centre IV, Mulanda Health Center IV) and the Dis- trict Health Office of Tororo	Qualitative	KIIs, IDIs and FGDs

	District, Eastern Uganda		
Manavalan et al. (2020)	Moshi urban district, Northern Tanzania	Qualitative	IDI. The interview guide included open ended questions on key domains of interest, with each question followed by a list of possible probes to guide the conversation

Study settings, healthcare systems and socio-economic contexts

An overview of the study settings, healthcare systems and socioeconomic contexts is provided in table 4.The articles described diverse health care systems regarding the integration of HIV, HT and T2D healthcare services ranging from no integration to the integration of some elements, such as integrated medication refill systems for HIV, DM and HT patients.[23,27]The presented concepts of healthcare integration were likewise diverse. Many studies from SA[22,24–27] used the Integrated Chronic Disease Management (ICDM)[33] framework, which was introduced in SA between 2011-13. The ICDM model was introduced as a response to the double burden of HIV and NCDs with a vision of providing integrated prevention, treatment and care of chronic patients at PHC level to ensure a seamless transition to assisted self-management within the community by leveraging HIV programs.[26,33] The model consists of four interrelated components; facility re-organization (administrative and patient flow), clinical supportive management (clinical mentorship), assisted self-support (adherence support) and strengthening of support systems outside the facility.[24,33]

Some places in SA[22,25] and Thailand[28]reported separate healthcare clinics for HIV and T2D. In Free State and Agincourt, SA, some of the PHC clinics provided integrated care for T2D and HIV, while other PHC clinics did not have integrated care yet, though both studies only included the PHC clinics with integrated care.[13,26] In a clinic in Khayelitsha, ART and chronic care services were located at the same clinic but in different sections[27] (table 4). A study from the Duke Adult Infectious Diseases Clinic in the US reported that NCD related health care could be provided at the HIV-clinic but almost half of the HIV clinic patients received chronic NCD care outside of the clinic.[29] Finally, two studies described infrastructures of more complete integration in the form of Medication Adherence Clubs (MACs)[23] and implementation of the ICDM model into PHCs.[24] The integrated MACs were established in 2013 in Kibera as a medication refill system for those with HIV, DM and HT.[23]

Sociodemographic characteristics of the patients

The number of included participants ranged from 10[22] to more than 800.[13]In all except one study, more female patients were included (table 4)[27]. Participant's age ranged from 18-70 years, but none included children < 18 years. All studies, except one from the USA, were conducted in low- or middle-income countries in Sub-Sahara Africa and Thailand. The participants were characterized by a low educational level[22], unemployment[22,25] and/or living in informal settlements[22] with limited financial resources.[25]

In the study by Lebina et al.[24] the patient characteristics were not available and therefore not included, because the measure of the participants' responsiveness with regard to patients/users was assessed by measuring staff's perceptions of patient responsiveness.

How were patient perspectives conceptualized?

A diversity of models and approaches were used to conceptualize patient perspectives and are presented in table 4.

Table 4.Study settings, healthcare systems, socioeconomic contexts and conceptualizations of patient perspectives

	Healthcare integration	**Infrastructure and study setting**	**Sociodemographic characteristics of patients (no. of patient-participants, gender, age, diseases, housing, employment rate, income)**	**Conceptualization of patient perspectives**
Matima et al.	The Innovative Care for Chronic Conditions (ICCC)[34] model adapted through the Integrated Chronic Disease Management (ICDM)[33] framework was used to conceptualize healthcare integration.	Separate clinics for HIV and T2D (a clinic providing care for HIV and TB, and a PHC clinic providing care for all other diseases, including T2D). The study was conducted between July and August 2015.	• n= 10 • 5 females • Age: 35-65y • Disease: HIV and T2D • Housing: Informal: 7/10 • Educational level: Primary: 1/10, Secondary: 8/10&Tertiary: 1/10 • Employment rate: ~50% • Income: N/A	The article's approach to conceptualize patient perspectives was based on the Shippee's Cumulative Complexity Model (CCM)[35] to acknowledge the workload of demands related to chronic disease management ("patient workload") which is associated with living with co-morbid conditions, and a patient's capacity to meet this workload ("patient capacity"), which is determined by capacitating factors such as their physical or mental functioning, socioeconomic resources, social support, level of literacy and attitudes or beliefs.

Rawat et al.	Healthcare integration was conceptualized as integration of HIV care in PHC clinics. Specifically for this study the date of integration was defined by the month "Nurse Initiated Management of Anti Retroviral Therapy" (NIMART) was first available at that clinic, hence enabling patients to be initiated on ART at the PHC clinic and receive follow-up care.	Some PHC clinics had integrated care for HIV, but not all. The study was conducted 2-3 years after implementation of HIV into PHC clinics. The study included only PHC clinics where HIV was integrated.	• n =812 + 9 (both patients + caregivers) • Gender: N/A • Age: >18y • Disease: HIV, T2D or other. • Housing: N/A • Educational level: N/A • Employment rate: N/A • Income: N/A	How patients experienced quality of care (QoC) and satisfaction with staff (SwS) after integration of HIV care into PHC clinics.
Venables et al.	Integration of HIV, DM and hypertensive patients in Medication Adherence Clubs (MACs).	HIV/TB services in PHC since 2003, and integrated NCD management from 2009. A fast-track system providing a 3-month supply of medication to stable patients directly through the pharmacy introduced in 2010, and MACs were implemented in 2013. MACs provide a medication refill system for HIV, DM and HT patients who meet defined clinical eligibility criteria. The study was carried out over a 2-month period (Jan-March 2015) and took place at Kibera South Clinic, 1 year after the implantation of MACs in Kibera.	• n = 81 • Gender: 51 females • Age: Median age of MAC-patients: 48y • Diseases: HIV or HT or T2D • Housing: N/A • Educational level: N/A • Employment rate: N/A • Income: N/A	How patients experienced integrated NCD-HIV Medication Adherence Clubs (MACs), the challenges they faced and their perceptions about models of care for chronic conditions.

Lebina et al.	The ICDM model[33] was used to conceptualize healthcare integration by implementing the model at PHC facilities.	Study conducted between August 2018 and March 2019. HIV and T2D integrated into PHC clinics. DKK and WR were the pilot sites for the ICDM model[33,36] implementation. 16 PHC clinics were included in the study (8 in the WR and 8 in the DKK health districts).**Health facilities:** **DKK:**1 Regional Hospital; 3 District Hospitals; 9CommunityHealth Centres; 27 PHC Clinics; 6 satellite clinics and2 mobile clinics. **WR:**1 Regional Hospital; 2 District Hospitals;4 Community Health Centres; 39 PHCClinics.	• n = N/A • Gender: N/A • Age: N/A • Diseases: The staff provided care for HIV, T2D or other diseases. • Housing: Informal: DKK: 21% &WR:19.2% • Literacy rate: DKK: 89.6% &WR: 97.6% • Employment rate: DKK: 74,6 & WR: 71,4 % • Income: N/A	The health care workers perceptions of patient perspectives regarding moderating factors of implementation fidelity of the ICDM model.[33]

Edna N. Bosire	The ICDM model[33] and WHO's definition was used to conceptualize healthcare integration. Integrated chronic care has been defined by WHO as: "the organization, management and coordination of health services so that people get the care they need, when they need it, in ways that are user-friendly, achieve the desired results and provide value for money."[37]	Study conducted between April 2018 and June 2019 in a large tertiary hospital in Soweto. Comprehensive HIV care provided at PHC clinics, and comprehensive diabetes care only provided at the tertiary hospital.	• n = 15
			• Gender: 8 females
			• Age: 40-70y
			• Diseases: T2D and HIV multi-morbidity
			• Housing: N/A
			• Educational level: N/A
			• Employment rate: < 50%
			• Income:
			  ○ 2/3: ZAR1,000 (US$60.72) to ZAR2,000 (US$121.45) a month.
			  ○ 1/3 (>60y): social grants
				How patients experienced getting access to health care for comorbid HIV and T2D, and how they experienced self-management of their concurrent chronic illnesses at home.

Ameh et al.	The ICDM model[33] and WHO's definition of integrated chronic care was used to conceptualize healthcare integration.[37]	At the time of the study, the ICDM model[33] was being implemented in 17 out of the 39 PHC clinics in the sub-district. 7 of the 17 facilities implementing the ICDM model[33] were situated in an area covered by the Agincourt Health and Demographic Surveillance System (HDSS) and were selected for the study. The study was conducted from August-October 2013.	• n = 61 • Gender: 43 females • Age: >18y • Diseases: HIV, hypertension and T2D • Housing: N/A • Educational level: N/A • Employment rate: N/A • Income: N/A	Avedis Donabedian's structure, process, and outcome theoretical framework[38] was used to conceptualize Patient perspectives regarding the quality of care in the ICDM model[33] implemented in PHC facilities and regarding the patient-provider interactions in these integrated PHC facilities.

Knight et al.	The ICDM model[33] and Chronic Care Clubs[39] (a counterpart to MACs) were used to understand healthcare integration.	**Langa:** A PHC clinic in the center of the community allowing for easy access for residents. This PHC provided care for i.a. HIV. The Vanguard Community Health Centre (CHC), a second health facility used by residents of Langa, was situated in Bonteheuwel, another community. The CHC provided similar services as the Langa Clinic and additionally chronic care services (incl. T2D). The CHC is about 2.5 km away from the Langa Clinic. **Khayelitsha**: Khayelitsha had different clinics and community health centres but this study focused on the Khayelitsha Site B Community Health Clinic. Site B provides the same services as Vanguard CHC, including care for HIV and T2D. Different staff members provide care for HIV and NCDs (incl.T2D) in different sections.	• n = Khayelitsha: 14 &Langa: 9 • Gender: Khayelitsha: 5 females & Langa: 5 females. • Age: >50y • Diseases: HIV + co- or multi-morbidity (including T2D) • Housing: N/A • Educational level: N/A • Employment rate: N/A • Income: A majority of the participants received old age and disability social grants (USD 120/month)	Older people living with HIV (OPLWH)'s experiences in accessing healthcare and treatment for co-morbidities including HIV and T2D were conceptualized in the context of the syndemics model.[40] The syndemics model assesses the interaction of two or more concurrent diseases in a biopsychosocial context to consider reasoning for behavior and outcomes.[40]

Moise et al.	The concept of healthcare integration were based on three common models established in the literature: 1) integrating services for NCD into centers initially providing HIV care; 2) integrating care for HIV into centers initially providing NCD services; and 3) synchronized integration of both HIV and NCD care and services.[10,41]	Study conducted in Chiang Mai, a province of 1.6 million people with 25 hospitals (1 general, 1 university, and 23 community), with 266 health centers. At the time of the study, T2D and HIV clinics were operated independently in Thailand. While screening for T2Dwas common among older adults living with HIV at HIV clinics, screening for HIV in T2D patients was rare. There was no dedicated medication adherence clinic for either disease. Participants were recruited from Sarapee,Sansai, and San Kamphaeng community hospitals for this study.	• n = 12 • Gender: 9 females and 1 unreported • Age: 42-56y (mean: 49y) • Diseases: Co-morbidity of HIV and DM • Housing: N/A • Educational level: 2/12: no formal education • Employment rate: N/A • Income: N/A	The syndemics framework[40] was used to explore patients' knowledge and perceptions of health status and management of care for comorbidity of T2D and HIV.
Mkumba et al.	The concept of integrated healthcare was described as a consolidated care, where all HIV and non-HIV care was provided by a single provider.[42]	The study was conducted between February 2016 and October 2017 at the Duke Adult Infectious Diseases (ID) Clinic. This clinic provided care for approx. 1900 PLWH. In 2017, 48% of HIV clinic patients received chronic NCD care outside of the clinic.	• n = 20 • Gender: N/A • Age: 44-67y (mean: 52.5y) • Diseases: HIV and NCDs (incl. T2D) • Housing: N/A • Educational level: N/A • Employment rate: N/A • Income: N/A	The conceptualization of Patient perspectives was assessed by the HIV patient's preference for provider models for their concurrent NCDs (including T2D) and how NCD care delivery could be improved according to them.

Moucheraud et al.	Respondents were classified as using 'integrated care' if they reported that they refilled antihypertensive medications and ART during the same clinic visit. Any one antihypertensive medication refill outside of Partners in Hope, or at Partners in Hope but not at the same time as an ART visit, resulted in the client being classified as a non-integrated client.	The study was conducted between June and December 2017 at Partners in Hope Medical Center, an urban, PEPFAR (President's Emergency Plan for AIDS Relief)-USAID–supported HIV-treatment site in Malawi, with an active ART cohort of approximately 5000 adults. Partners in Hope has both an outpatient clinic that operates on a fee-for-service model and an HIV clinic that provides free care (including testing and treatment).	• n = 199 • Gender: 130 (65.3%) female • Age: Mean age 52 • Diseases: HIV and hypertension comorbidity • Housing: N/A • Educational level: N/A • Employment rate: 133 (66.8%) • Income in USD: Mean (Median) 3276 (840)	Assessment of behaviors related to care-seeking and prescription refills: for each medication, respondents were asked where they obtained a refill, why this location, how often, and associated costs, both direct costs, such as medication and transportation, as well as indirect costs, such as lost wages. Assessment of care-seeking cost: Total annual care-seeking costs were calculated by adding together the components as included in the survey (ie, self-reported costs of medication, transport, lost wages and other costs, like food or childcare).

Peer et al.	Integrated Chronic Disease Management Model. This model incorporates a diagonal approach that integrates the vertical HIV program with the horizontal general healthcare system.	The study was conducted between March 2014 and May 2015 among 17 public healthcare facilities in Cape Town, South Africa and the surrounding rural municipalities. All clinics treated more than 300 HIV infected patients monthly.	• n = 55 patients (35 in six focus groups and 20 in-depth individual patient interviews) • Gender: N/A • Age: N/A) • Diseases: HIV and hypertension comorbidity • Housing: N/A • Educational level: N/A • Employment rate: N/A • Income: N/A	The study used the "framework for understanding diabetes care within the context of comorbid chronic conditions" as described by Piette and Ker (2006). Two themes were investigated: 1) Experiences of comorbid HIV and hypertension diagnoses and 2) Experiences with the primary health care system. Sub-themes were a) Patient resources and priorities for HIV management, b)Clinical resources and priorities for HIV management, c) Patient resources and priorities for comorbid non-communicable diseases (NCDs) (hypertension and/ or diabetes) management and d) Clinical resources and priorities for comorbid NCDs (hypertension and/or diabetes) management

Muddu et al.	HIV and NCD care were co-located and HIV care was part of a chronic disease care model that offered joint evaluation and management of hypertension, diabetes, and general medical conditions. HIV-infected patients received HIV and NCD-focused care simultaneously during their visit. HIV-uninfected persons received treatment for hypertension and/or diabetes.	Three high volume HIV clinics (average 3600 PLHIV) in Eastern Uganda.	• n = 72 patients (60 in focus groups and 12 in-depth individual patient interviews) • Gender: 50% male • Age: Mean age 47 ± 7.5 • Diseases: HIV and hypertension comorbidity • Housing: N/A • Educational level: N/A • Employment rate: N/A • Income: N/A	The Consolidated Framework for Implementation Research (CFIR) was used to explore barriers to and facilitators of HTN/HIV integration valance rating to identify factors which distinguished performance for integrated HTN/HIV between high and low performing HIV clinics. CFIR organizes conceptual elements across theories and disciplines into 39 constructs which are then organized in five key domains. CFIR's five major domains include intervention characteristics, outer setting, inner setting, characteristics of individuals, and implementation process.
Manavalan et al.	Hypertension care is managed separately from HIV care by a medical doctor or clinical officer in a different department.	Conducted at the Moshi urban district of northern Tanzania at two HIV clinics located in government-funded primary health centers with approximately 2300 adults (1700 women and 600 men) with HIV	• n = 13 patients • Gender: 11 female, 2 male • Age: Median age of 54 (IQR 41–65) years • Diseases: HIV and hypertension comorbidity • Housing: N/A • Educational level: None 3, Primary 9, Secondary or higher 1 • Employment rate: N/A • Income: N/A	Perspectives and Experiences of PLWH and hypertension were assessed The in-depth interview guide was developed by an interdisciplinary team of physicians, nurses and social scientists from Tanzania and the United States with expertise in hypertension or HIV.

Emerging themes (patient perspectives)

The most prominent themes among patient perspectives and experiences on health care integration were travel and treatment costs, appointment systems, waiting times at the facilities, and HIV related stigma(Table 5).

Travel and treatment costs

Patients in Khayelitsha, Langa and Soweto (SA) experienced excessive travel costs due to multiple appointments at separate clinics for HIV and T2D.[22,25,27]Some patients defaulted their appointments due to travel costs, which led to poor patient-provider relationships: *"If you come late or fail to come, the nurses will be shouting at you. But nobody really cares to know why I did not come. That's why I choose to stay at home some clinic days." (patient).*[25] In one of the facilities in Khayelitsha the services for NCDs (including T2D) and HIV were physically located in the same complex, but because the services were provided separately, the patients did not experience having coinciding appointments, and did therefore not save the travel expenses: *"[…] No, it doesn't happen, I haven't had it yet [that the dates for the appointments coincide]. My appointments are separate."(patient).*[27]PLWH with co-morbid hypertension reported concerns for additional costs of transportation and lost wages when attending integrated medicine refill locations and therefore often preferred to choose location closer to home or with perceived lower costs. However, when assessing actual incurred cost those in the integrated care group reported lower annual cost (US$21 on average) than those in the non-integrated group (US$91 on average). Non-integrated care for hypertension and HIV in Northern Tanzania was also associated with higher cost for antihypertensive medication, provider visits, transport to the clinic, and the expense of a healthy lifestyle.[32] Participants attending integrated care for HIV and hypertension in Cape Town, South Africa reported that lower travel costs and time spent accessing different clinics increased the likelihood of treatment seeking behavior and less defaulting.[8]

Continuity of care and appointment systems

As illustrated by the quote in the previous section, the facility in Khayelitsha (SA) did not provide coherent treatment for HIV and T2D even when the services were located in the same complex.[27] In Langa (SA) on the other hand patients could experience having clashing appointments at two different

clinics.[27] Visiting numerous separate clinics led to patients in Soweto (SA) receiving conflicting information from clinicians, because of poor inter-provider communication: *"Last week the rheumatologist told me that my bones are getting closer to each other, they have inserted metals in my right foot. When I attended the diabetes clinic, the doctor asked me to exercise because I was adding more weight, but I can't exercise because of the surgery they did on my leg. My ARVs have amplified my appetite" (patient).*[25]

In Durham patients were satisfied with NCD care received from their HIV providers, and generally less satisfied receiving NCD care from their primary care provider (PCP). They experienced a stronger patient-provider relationship with their HIV providers compared to their PCP. Patients valued inter-provider communication, which some found was great, while others perceived inadequacies in communication between their providers. Overall, the patients preferred an integrated care model where all their care was consolidated in one place, with one provider: *"I wish my HIV doctor could provide everything…If I could get all my care in one place that would be wonderful rather than travelling to different places" (patient).*[29]

Patients in Free State were glad to receive more comprehensive services after the integration of HIV care in PHC clinics: *''I feel the treatment they give us is better than before. We are seen quicker and everything is checked. I'm tested every 3 months for HIV and my glucose and blood pressure is checked every visit.' (patient).'*[13]While patients in Agincourt experienced rigid appointment systems after the implementation of the ICDM model into PHC facilities in which they were unable to access services for sudden-onset illnesses.[26]

In Cape Town, South Africa, PLWH and co-morbid hypertension experienced a lack of continuity of care (different health care workers) but were generally glad for the more holistic treatment approach in the integrated health care clinics.[8]

Waiting times at the facilities

Long queues and waiting times prior to appointments at the facilities were experienced by patients in Langa and Khayelitsha, especially pronounced prior to clinical appointments for T2D. In the context of HIV services this was not a problem, where advancements have been made through MACs, which avoided overcrowding and reduced waiting times at the health facilities.[22,27]The integrated MACs for HIV, T2D and HT were likewise experienced to be time saving and preventing long queues in Kibera (Kenya).[23]

In Free State and Agincourt (SA), where the PHC clinics had integrated care for HIV and NCDs, the patients experienced staff shortage leading to negative provision of quality services and long waiting times in queuing prior to consultations.[13,26]PLWH with co-morbid hypertension in Cape Town also had concerns related to longer waiting times in integrated health care facilities.[8]

HIV related stigma

Separate medical records, waiting areas and queues were experienced by some patients in Free State and the healthcare staff in DKK and WR to increase HIV related stigma; here illustrated by a patient: *''Those who [have] HIV, they are isolated to show the people that we are HIV [positive]''*[13],and by a nurse: *"They feel like they are being isolated and they feel stigmatized and that other patients can see."*[24]Despite this, many participants in Free State reported a decrease in HIV related stigma due to increased community support and through increased awareness of HIV at the community level.[13]In Cape Town, South Africa, PLWH experienced reduced stigma when attending integrated health care, instead of ART-clinics.[8]

In Kenya the integrated MACs were found to reduce HIV related stigma as some MAC members experienced HIV being treated like *'any other chronic disease'*. While the overall perception was that the MACs reduced the stigma related to HIV, some PLWH that were not using MACs, thought they had to disclose their HIV status to join the clubs, thus fearing of being stigmatized, if someone from their community recognized them. This was, however, not a requirement for joining the clubs. This can be understood in the context of some non-MAC patients explaining the little knowledge they had of the existence of the clubs, while others found the eligibility criteria for the clubs unclear.[23,27]

In Thailand people living with co-morbid HIV and T2D uttered a desire for more privacy regarding their HIV treatment: *"I think if the hospital can separate HIV patients from [others] to make it more private, it'll be good"(patient).*[28]Whether this wish for more privacy was related to HIV related stigma is not mentioned explicitly in the article.

One study received few responses on patient perspectives which led the authors to hypothesize that patients had little information on hypertension.[31]In a study in Northern Tanzania among PLWH and co-morbid hypertension attending non-integrated (separate) care participants reported delayed or

non-linkage to hypertension care, low quality or minimal counselling on hypertension and thus expressed a preference for integrated care due to convenience and efficiency.[32]

Table 5. Overview of key themes among patient perspectives for included studies (fragmented versus integrated care

Article	Fragmented vs. integrated care	Key themes among patient perspectives
Matima et al.	Fragmented care	• Travel costs • Long waiting times outside the clinics prior to appointments • Incoherent treatment
Rawat et al.	Integrated care	• Larger number of patients attending the clinic leading to staff shortage • Long waiting times outside the clinics prior to appointments • Poor confidentiality of medical records leading to increased HIV stigma • Health education + more awareness of HIV leading to reduced HIV stigma • Coherent services
Venables et al.	Integrated care	Integrated MACs considered acceptable: • Time saving • Preventing long queues • Provided people with health education and peer-support • Reduced HIV related stigma Non-MAC members: Not knowing the existence of the clubs and confusing eligibility criteria
Lebina et al.	Integrated care	• Separate medical records, waiting areas and queues leading to increased HIV stigma • Poor compliance by patients: poor adherence to appointments and medications
Edna N. Bosire	Fragmented care	• Travel costs leading to patients' defaulted appointments leading to poor patient-provider relationship • Poor inter-provider communication leading to incoherent treatment

Ameh et al.	Integrated care	• Rigid appointment systems • Long waiting times because of long breaks and late arrival of staff • Staff shortage leading to negative behavior of staff members
Knight et al.	Fragmented care	• Travel costs • Long waiting times prior to consultation • Incoherent treatment ○ Clashing appointments in Langa • Poor patient-provider relationship leading to lack of knowledge about MACs
Moise et al.	Fragmented care	• Some people living with comorbid diabetes and HIV were satisfied with their current separate treatments for HIV and T2D, while others uttered a desire for specialized care for comorbid patients. • Some people living with comorbid diabetes and HIV would like even more privacy for their HIV treatment.
Mkumba et al.	Fragmented care	• Satisfaction with NCD care received from HIV provider, and less satisfied receiving NCD care from PCP • Stronger patient-provider relationship with HIV provider than PCP • Would value a stronger inter-provider communication • A desire for an integrated care model where all their care was consolidated in one place, with one provider. • Positive towards increased participation from HIV clinic support staff
Moucheraud et al.	Fragmented and integrated care	Fragmented (non-integrated care) • Additional costs (i.e, beyond costs already incurred for ART visits), costs of transportation to refill visits and lost wages during refill visits. • Refill location for medicines chosen primarily due to perceived lower medication costs and proximity/convenience (e.g., distance to home) Integrated care • Lower annual care-seeking costs (US$21 on average) than those in the non-integrated care group (US$91 on average)
Peer et al.	Integrated care	• Removal of stigma attached to attending ART-clinic • Long waiting times at clinics, being attend to later than other (non-HIV) patients

		• Lack of continuity of care (different health care workers), but glad for holistic treatment approach • Might lead to greater treatment seeking behavior and less defaulters • Less travel costs and time spent accessing different clinics
Muddu et al. (2020)	Integrated care	• Few responses by patients about integrated HT/HIV care may be an indicator of limited knowledge about hypertension in HIV. • Participants reported gaps in clinician documentation (providers record clinical data in patients' personal books)
Manavalan et al.	Fragmented care	• Delayed or non-linkage to care for hypertension • Minimal and/or low-quality counselling on hypertension • High costs for antihypertensive medication, provider visits, transport to the clinic, and the expense of a healthy lifestyle • All respondents conveyed a preference for integrated care due to convenience and efficiency

Discussion

In this scoping review, we found that patient perspectives and experiences on integrated care for HIV, diabetes and hypertension were mostly positive, in particular reduced HIV-related stigma, reduced travel and treatment costs and a more holistic person-centered care (summary box 1).

We identified 13 articles eligible for this scoping review after applying a broad search strategy including publications between 1990 and 2021 with no geographical restrictions. This illustrates the limited number of publications regarding patient perspectives on healthcare integration of HIV, diabetes type 2 and hypertension services. Of note, all published material was from within the last 5 years (2016-21), indicating that this is an emerging research priority. Clearly, most research on patient perspectives has been conducted in SSA with only one article from North America[29] and one from Asia[28] while none of the other continents were represented. However, this might not be surprising as a rapid increase in the burden of diabetes, hypertension and other NCDs is meeting a growing population of PLWH in many countries in SSA. This epidemiological transition resulting in a double burden of disease leaves many health care systems overburdened.[5]

The study settings could be divided into whether they had integrated care or not. Six studies, all conducted in SSA, tended to have some degree of integrated care, while seven studies reported on fragmented or partially fragmented care. A majority of the studies from SA (n = 6) used the ICDM model[33] to conceptualize healthcare integration. However, there was a discrepancy between how healthcare integration was conceptualized by the ICDM model and the actual infrastructures in these study settings, e.g. many of the places still having separate care for HIV and T2D.[22,25,27]
All articles assessed perspectives and experiences of PLWH with co-morbid diabetes or hypertension, therefore no experiences or perspectives of PLWNCDs (without HIV) could be assessed.

The diversity of concepts used to assess patient perspectives, underlines the complexity of the topic, and made it difficult to compare these concepts. The patient perspectives regarding travel and treatment costs, continuity of care and appointment systems, waiting times at the facilities, and HIV related stigma were identified as the most important themes.
All the studies conducted in fragmented healthcare settings in SSA mentioned travel (and partly treatment) costs as a major burden due to the limited financial resources of patients.[22,25,27,29,30,32]
There is no doubt that more integrated care could be cost and time-saving for these patients, though cost saving is not mentioned directly in any of the studies conducted in integrated healthcare settings.

Those accessing integrated care were usually satisfied with the holistic and coherent care received and reduced stigma due to attending a general clinic with non-HIV patients. However, more rigid appointment systems, a lack of continuity of care with conflicting messages from changing health care providers and long waiting times at facilities were experienced as downsides in some health care settings.

Among those using integrated care, some patients expressed areas of improvement. Patients from one study suggested improvements in relation to access to services for sudden-onset illnesses.[26] One approach for this problem could be to have some emergency appointment-times every day at the clinics, which was found to increase patient satisfaction in a publication by Richter et al.[43] Staff shortage,[13,26] long waiting times prior to consultations[23] and patients not knowing the existence of medication adherence clubs, which provide fast access to medication [23,27] reflect the lack of (efficient)

used of resources. In general, better coverage with appropriately qualified health care workers is needed to ensure reliable health care services.[24]

Strengths and limitations

To the best of our knowledge this is the first systematic scoping review to assess patient perspectives on integration of health care for HIV and NCDs. The scoping review methodology and broad search terms, reflected in more than 5500 initial records identified, ensure a high sensitivity of our search strategy.

A limitation of the current scoping review is the singular focus on type 2 diabetes and hypertension as indicator conditions. Other important diseases for integration would be mental health, cardiovascular disease, or chronic kidney disease. However, type 2 diabetes and hypertension represent the common, major chronic conditions in Sub-Sahara Africa. Another limitation is that grey literature was not included in the search. However, cursory searches in major search engines and reference lists of included articles have not provided additional findings. In addition, the perspectives of health care workers would be of interest but were not assessed in the current review.

A further weakness is that there were no studies of integrated care and management for HIV, DM and HTN – in other words a clinic that can manage patients with either HIV, DM, HTN or combinations of these. Most of the studies involved only a small component of care to be integrated (e.g. screening) or they involved adding diabetes and hypertension services to HIV programs, which excludes people without HIV from integrated care. Of note, no studies from Europe were identified, however, some hospitals in Europe are working on integrating services (e.g., the multidisciplinary set-up in Modena, Italy (unpublished, authors correspondence). There is a clear need for more research, including longitudinal and interventional studies from different health care settings.

Conclusion

Only few articles in the peer-reviewed literature, with a limited geographical scope, were identified. However, all the publications were from 2016-21, and the majority of the articles were from SSA (n=11), indicating that the topic is an emerging research priority in this region.

Patient's experiences with integrated care were reduced HIV-related stigma, reduced travel and treatment costs and more holistic person-centered care. Prominent concerns were long waiting times at clinics and a lack of continuity of care with the same provider. Non-integrated care was perceived as time-consuming and more expensive. Integration can save resources for health services, which if

re-invested can yield benefits for PLWNCDs and PLWH alike. If additional services are simply added to existing ones (e.g. diabetes screening within HIV programmes) it will lead to increased waiting times for participants. The articles included in this review are an important source of evidence for patient-centered integration of HIV and NCD health care services, potentially also as important evidence and lessons for high-income settings (e.g., Europe). There is a paucity of evidence and further longitudinal and interventional evidence from a more diverse range of health care systems is desirable.

Figure captions

Figure 1. *Prisma Flowchart of the flow of studies through each phase of the review process*

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CK, SS and PK conceived of the study. SS, CK and PK contributed to data collection and analysis. All authors were involved in drafting and approving the final manuscript.

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Competing interests

The authors declare that they have no competing interests.

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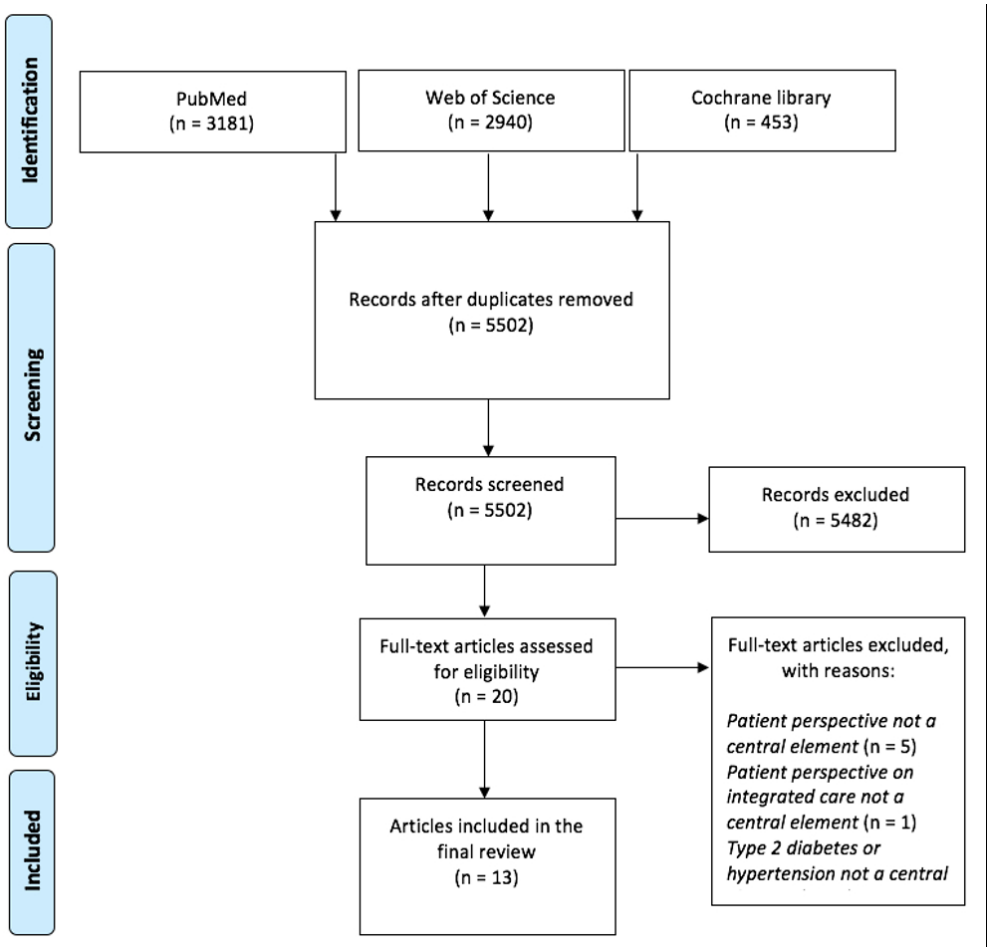

Figure 1. Prisma Flowchart of the flow of studies through each phase of the review process

432x407mm (59 x 59 DPI)

Supplementary File

Supplementary table 1: Search terms used in Web of Science.

Category	Web of Science search strategy
HIV	1) HIV infect* OR HTLV-III-LAV infect* OR HTLV III LAV infect* OR T-lymphotropic Virus Type III infect*, human OR T lymphotropic Virus Type III infect*, human OR HTLV-III infect* OR HTLV III infect* OR HIV coinfect* OR HIV co-infect* 2) Human immunodeficiency virus* OR HIV OR Human T cell lymphotropic virus type III OR Human T-cell lymphotropic virus type III OR Human T-cell leukaemia virus type III OR Human T cell leukaemia virus type III OR LAV-HTLV-III OR Lymphadenopathy-associated virus* OR Lymphadenopathy associated virus* OR Human T lymphotropic virus type III OR Human T-lymphotropic virus type III OR AIDS virus* OR Acquired immune deficiency syndrome virus OR Acquired immunodeficiency syndrome virus OR HTLV-III 3) AIDS OR Acquired immune deficiency syndrome* OR acquired immunologic deficiency syndrome* OR acquired immune deficiency syndrome* OR acquired immuno-deficiency syndrome* OR acquired immuno deficiency syndrome* 4) 1 OR 2 OR 3

NCDs, Diabetes mellitus Type 2 and Hypertension	5) Noncommunicable disease* OR non-infectious disease* OR non infectious disease* OR non-communicable disease* OR OR non communicable disease* OR noninfectious disease* OR non-communicable chronic disease* OR non communicable chronic disease* OR NCD OR NCDs 6) Diabetes mellitus type 2 OR noninsulin-dependent diabetes mellitus OR ketosis-resistent diabetes mellitus OR ketosis resistent diabetes mellitus OR non insulin-dependent diabetes mellitus OR non-insulin-dependent diabetes mellitus OR stable diabetes mellitus OR type II diabetes mellitus OR NIDDM OR noninsulin dependent diabetes mellitus OR maturity-onset diabetes mellitus OR maturity onset diabetes mellitus OR DM2 OR DM OR MODY OR slow-onset diabetes mellitus OR slow onset diabetes mellitus OR Type 2 diabetes OR adult-onset diabetes mellitus OR adult onset diabetes mellitus OR tiidm 7) Hypertens* OR high blood pressure OR high bp OR prehypertens* OR pre-hypertens* OR pre hypertens* OR blood pressure* OR blood pressure determination* OR artierial pressure* OR diastolic pressure* OR pulse pressure* OR systolic pressure* OR arterial tension* OR arterial blood pressure* OR aortic pulse pressure* OR mean arterial pressure* OR aortic pressure* OR aortic tension* OR aortic blood pressure* OR mean aortic pressure* 8) 5 OR 6 OR 7
Health Care Integration	9) (vertical* OR horizontal* OR integrat* OR integrated OR coordinat* OR coordinated OR co-ordinat* OR co-ordinated OR link* OR linked) AND (program* OR care OR service*) OR delivery of health care OR primary health care OR integrat* OR health care OR health-care OR healthcare OR health service) 10) Delivery of health care OR deliver* of health care OR healthcare deliver* OR deliver* of health-care OR health care deliver* OR health care system* OR health care deliver* OR healthcare system* OR health-care system* OR nonclinical distribution* OR non-clinical distribution* OR non clinical distribution* OR community based distribution* OR community-based distribution* OR distributional activit* OR primary health care OR primary healthcare OR primary health-care OR primary care OR health service* OR health care service* OR healthcare service* OR health-care service* 11) Integrated health care system* OR Integrated healthcare system* OR Integrated health-care system* OR integrated delivery system* 12) 9 OR 10 OR 11
	13) 4 AND 8 AND 12

Supplementary table 2: Search terms used in Cochrane library.

Category	Cochrane library search strategy
HIV	1) HIV [MeSH] 2) Acquired immunodeficiency syndrome [MeSH] 3) HIV infection 4) Human immunodeficiency virus 5) Acquired immunodeficiency syndrome OR AIDS 6) 1 OR 2 OR 3 OR 4 OR 5
NCDs, Diabetes mellitus Type 2 and Hypertension	7) Noncommunicable diseases [MeSH] 8) "Noncommunicable disease" OR "non-communicable disease" OR "non communicable disease" 9) NCD OR NCDs 10) Diabetes mellitus, type 2 [MeSH] 11) Diabetes mellitus type 2 12) ((Type 2 OR type ii OR "noninsulin dependent" OR "non insulin dependent" OR "adult onset" OR "maturity onset" OR obes*) AND diab*) 13) T2dm OR tiidm 14) Hypertension [MeSH] 15) Hyperten* OT Prehypertens* OR blood pressure OR bp 16) 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15
Health Care Integration	17) Delivery of health care [MeSH] 18) Integrated delivery system* 19) (vertical OR horizontal OR integrat* OR integrated OR coordinat* OR coordinated OR co-ordinated OR link* OR linked) AND (program* OR care OR service*) OR delivery of health care OR primary health care OR health care OR health-care OR healthcare OR health service 20) 17 OR 18 OR 19
	21) 6 AND 16 AND 20

Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	1
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	3-4
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	3-4
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	N/A
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	4-7
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	4-7
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	4-7
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	4-7
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	4-7
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	4-7
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	4-7

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	4-7
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	8-26
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	8-26
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	8-26
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	8-26
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	8-26
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	27-30
Limitations	20	Discuss the limitations of the scoping review process.	27-30
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	27-30
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	N/A

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMAScR): Checklist and Explanation. Ann Intern Med. 2018;169:467–473. doi: 10.7326/M18-0850.

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Patient perspectives on integrated health care for HIV, hypertension and type 2 diabetes – a scoping review

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Patient perspectives on integrated health care for HIV, hypertension and type 2 diabetes – a scoping review

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Abstract

Introduction

Anti-retroviral therapy has reduced mortality and led to longer life expectancy in people living with HIV (PLWH). These patients are now at an increased risk of non-communicable diseases (NCDs). Integration of care for HIV and NCDs has become a focus of research and policy. In this article we aim to review patient perspectives on integration of health care for HIV, type 2 diabetes and hypertension.

Methods

The framework for scoping reviews developed by Arksey and O'Malley and updated by Peter et al., 2021 was applied for this review. The databases PubMed, Web of Science and Cochrane library were searched. Broad search terms for HIV, NCDs (specifically type 2 diabetes and hypertension) and health care integration were used. As the review aimed to identify definitions of patient perspectives,

they were not included as an independent term in the search strategy. References of included publications were searched for relevant articles. Titles and abstracts for these papers were screened by two independent reviewers. The full texts for all the publications appearing to meet the inclusion criteria were then read to make the final literature selection.

Results

Of 5502 studies initially identified, 13 articles were included in this review, of which 11 had a geographical origin in sub-Saharan Africa (SSA). Nine articles were primarily focused on HIV/diabetes health care integration while 4 articles were focused on HIV/hypertension integration. Patient's experiences with integrated care were reduced HIV-related stigma, reduced travel and treatment costs and a more holistic person-centered care. Prominent concerns were long waiting times at clinics and a lack of continuity of care in some clinics due to a lack of health care workers. Non-integrated care was perceived as time-consuming and more expensive.

Conclusion

Patient perspectives and experiences on integrated care for HIV, diabetes and hypertension were mostly positive. Integrated services can save resources and allow for a more personalized approach to health care. There is a paucity of evidence and further longitudinal and interventional evidence from a more diverse range of health care systems are needed.

Summary Box 1. Strengths and limitations

Strengths and limitations of this study

- The prevalence of non-communicable diseases among People Living with HIV has risen significantly over the last decade and integration of health care for HIV and NCDs has become a focus of research and policy to use resources efficiently and improve health outcomes.
- We provide the first systematic review of patient perspectives on integrating health care for HIV and NCDs.
- The scoping review methodology and broad search terms, reflected in more than 5500 initial records identified, ensure a high sensitivity of our search strategy covering all settings and levels of health care systems.

- A limitation of the current scoping review is the singular focus on type 2 diabetes and hypertension as indicator conditions, while other important diseases for integration not covered would be mental health, cardiovascular disease, or chronic kidney disease.

Introduction

Worldwide, 37.7 million people are living with HIV, of which 24.5 million are on treatment. There were 680,000 AIDS-related deaths and 1.7 million new infections in 2020.[1] Global health programs and related funding streams such as those supported by American President's Emergency Plan for AIDS Relief (PEPFAR) or the Global Fund have since 2003 facilitated the development of separate, vertical HIV-focused health care infrastructure across sub-Saharan Africa (SSA).[2] This has led to an increased coverage with anti-retroviral therapy (ART) and in consequence to longer life expectancy in people living with HIV (PLWH). However, at the same time this has contributed to fragmentation in health systems in countries in Africa.[3] Over the last decade an increase in the burden of non-communicable diseases (NCDs) has been seen among PLWH, to a large degree due to better survival and general health status.[4,5] In parallel, the prevalence of NCDs in the general population, in particular type 2 diabetes (T2D) and hypertension (HT) has increased significantly across SSA.[6] It is estimated that 40.5 million (71%) of the 56.9 million worldwide deaths were from NCDs in 2016 and the highest risks of dying from NCDs were observed in low- and middle-income countries, especially in sub-Saharan Africa.[7] Therefore, health care systems strengthening, increased investments and efficient use of resources are needed to counter the double burden of communicable and non-communicable diseases in Sub-Sahara Africa.[8] The established vertical health care structures in many countries, in particular those for HIV-care, risk contributing to inefficient use of resources and increased HIV-related stigma.[9,10]

Thus, integration of the existing communicable and non-communicable health care infrastructure has become a recent policy and research focus to improve care for people living with NCDs (PLWNCDs) and PLWH alike.[11] Integrated care can be defined as 'the coordination, co-location, or simultaneous delivery of communicable and non-communicable services to patients who need it, when they need it.'[5] Integration of HIV and NCDs services can be categorized as a) community-based integrated HIV/NCDs screening in the general population, b) screening for NCDs and their risk factors among PLWH, c) integrated care of HIV/NCDs in healthcare facilities, d) differentiated care for stable

HIV/NCDs, and e) integrated population health for all patients with any need.[12] Taking T2D and HT as an example, potential benefits could be better control of HT and T2D, earlier diagnosis, better management and disease control, and cost saving for patients through inclusion in routine HIV control. Accordingly, benefits for HIV-control could be easier access to HIV services and the reduction of stigma.[13] A potential downside to integration can be longer waiting times for patients if integration is done with reduced resources compared with the current standard care.[14]

Patients' knowledge, attitudes, beliefs, desires and practices have a large influence on the successful delivery of health care.[15] Recently, quality of life has been proposed as the fourth 90 to complement the UNAIDS 90-90-90 targets to monitor the global HIV response, which requires a better understanding of patient reported outcomes.[16] However, little is known about patient perspectives on integration of health care for HIV and NCDs.[13]

Objective and aims

The objective of this scoping review was to identify, describe and analyze the peer-reviewed literature on patient perspectives on health-care integration for HIV and NCDs. T2D and HT were used as indicator conditions for NCDs as they represent a large proportion of the NCD burden, in particular in PLWH, are well-defined and most commonly used as indicator conditions in published research on HIV/NCD integration.

Specifically, we aimed to identify the scope and describe the peer-reviewed literature on patient perspectives. Furthermore, we reviewed frameworks and methodologies used to assess patient perspectives on HIV/NCD health care integration as well as the findings and potential recommendations of the available literature on integration of HIV and NCD services.

Research questions

1. Which kind of research (quantitative, qualitative) exists and what methodologies were used?

Rationale: To date no systematic review of patient perspectives on integrated health care exists. Describing the evidence, kind of research and methodologies in a systematic way helps identifying research gaps and plan for future research.

2. In what settings (geographical, health care system, socio-economic context) has research been conducted?

Rationale: We report findings by geographic setting, health care system context and socio-economic group, as approaches to health care integration can differ widely depending on the situation.

3. How are patient perspectives conceptualized?

Rationale: To the best of our knowledge no standard or best-practice conceptualization for assessing patient perspectives on health care provision exists. Identifying the concepts used can help standardize and compare patient perspectives across studies and settings.

4. What are patient perspectives on integration of HIV/NCD services?
    - What are the perspectives of PLWNCDs on integration of T2D and/or HT care with HIV care?
    - What are the perspectives of PLWH on integration of HIV care with T2D and/or HT care?

Rationale: Describing patient perspectives on integration of HIV/NCD services can inform policy makers, researchers and health care providers to design effective, patient-centered, health care interventions.

Methods

A scoping review is a method of reviewing evidence-based research to, scope a body of literature, clarify concepts, identify knowledge gaps or to investigate research conduct.[17] The framework for scoping reviews developed by Arksey and O'Malley in 2005 and updated by Peter et al. in 2015 was applied for this study.[18,19] This method of a scoping review was chosen over a more focused systematic review to apply a broader approach to the vaguely defined theme in order to map the available literature on this topic, and to identify research gaps.[18] In the preparation of this review a research protocol was created according to the PRISMA extension for scoping reviews (PRISMA-ScR) checklist to ensure quality, transparency, and complete reporting.[20]

Patients and public involvement

Patients and the public were indirectly represented in the design, conduct and reporting of this review as several of the authors are representatives of patient associations (Danish NCD Alliance, East Africa

NCD Alliance). The development of the research question(s) and outcome measures was driven by the experience of the authors as representatives of patient associations. However, no patients were involved directly in the planning and conduct of this study. The results will be disseminated to patient representatives and associations (e.g., the Global NCD Alliance and East Africa NCD Alliance).

Definitions

The definitions of PLWH/PLWA (people living with AIDS), NCDs, integrated health care and patient perspectives are provided in table 1. As the review aimed to identify definitions of patient perspectives, they were not included as an independent term in the search strategy.

Table 1. Definitions.

Category	Definitions
PLWH/PLWA	PLWH/PLWA are defined according to the definition by the UNAIDS Terminology Guidelines from 2015 as persons, who are seropositive for HIV.[21]
NCDs	NCDs are characterized by WHO as being non-transmissible and often known as chronic diseases. They are a result of combinations of genetic, physiological, environmental and behavioral factors. They are largely preventable and are linked to common risk factors and underlying determinants.[22] In this review, we chose to focus on type 2 diabetes mellitus and hypertension as indicator conditions, which have seen a rapid increase in prevalence, especially in SSA.[6]
Integrated health care	For integrated health care we used the definition of the WHO Europe Regional Office: "*an approach to strengthen people-centered health systems […] delivered by a coordinated multidisciplinary team of providers working across settings and levels of care […].*"[23]
Patient perspectives	There is no unique consensus or definition for Patient perspectives (PP).[15] For the purpose of this review we defined PP as the experiences, values, preferences, expectations, concerns, and opinions expressed by patients (in our case PLWNCDs or PLWH). They can broadly be categorized as those perspectives expressed by individually concerned patients and those expressed by informally or formally selected patient representatives (e.g., civil society organizations). They can be reported directly by patients or indirectly through health care providers or other secondary sources.

Databases and search strategy

The databases PubMed, Web of Science and Cochrane library were searched. Broad terms were included in the search strategy (Table 1). HIV, NCDs (specifically T2D and HT) and health care

integration were the three main categories the search strategy was based on. The search strategy for PubMed and Cochrane library consisted of free text and Medical Subject Headings (MeSH) terms. The search strategy used in PubMed is presented in table 2, and the search terms used in the other databases are presented in supplementary tables 1 and 2. A librarian at the University of Aarhus was consulted to support the development of the search terms. Reference lists of included publications were searched for relevant articles.

Table 2. Search terms used in PubMed.

Category	PubMed search strategy
HIV	1) HIV infections 2) Human immunodeficiency virus 3) AIDS 4) 1 OR 2 OR 3
NCDs, Diabetes mellitus Type 2 and Hypertension	5) Noncommunicable diseases 6) NCDs 7) NCD 8) Diabetes Mellitus Type 2 9) ((type 2 OR type ii OR "noninsulin dependent" OR "non insulin dependent" OR "adult onset" OR "maturity onset" OR obes*) AND diabet*) 10) T2dm 11) Tiidm 12) Hypertension 13) Hypertensi* 14) Prehypertension 15) Pre hypertension 16) prehypertensi* 17) Blood pressure 18) bp 19) 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18
Health Care Integration	20) Integrated delivery systems 21) (vertical OR horizontal OR integrat* OR integrated OR coordinat* OR coordinated OR co-ordinat* OR co-ordinated OR link* OR linked) AND (program* OR care OR service*) OR delivery of health care OR primary health care OR integrat* OR health care OR health-care OR healthcare OR health service 22) 20 OR 21
	4 AND 19 AND 22

Criteria for inclusion and exclusion

Inclusion criteria

- Peer-reviewed articles (including original quantitative and qualitative studies, systematic reviews, editorials, commentaries, viewpoints) on integration of health care for HIV and T2D and/or HT which provide information on patient perspectives (according to definitions in Table 1)
- Published between 01/01/1990-01/03/2021
- Publications in English, German, French and Danish

Exclusion criteria

- Book chapters and grey literature (dissertations, conference proceedings, reports etc.)

Literature selection

The citation software Zotero was used to merge and remove the duplicates among the results. Titles and abstracts for these papers were thoroughly screened using Rayyan (a web and mobile app for systematic reviews) by two independent reviewers (SS and CK). The full texts for all the publications appearing to meet the inclusion criteria were read to make the final literature selection. Any disagreements between the two reviewers at any stage of the study selection were resolved by a third reviewer (PK).

Data collection and extraction

Data on origin of author, year of publication, geographical focus of the publication, publication type, type of NCD, definition of health care integration, definition of patient perspectives, assessment method for patient perspectives and the content of the patient perspectives were extracted and transferred into a pre-specified extraction sheet (SS). These data were used to facilitate analysis and development of figures and summarizing tables. A second researcher independently checked the data for accuracy and detail (CK). Disagreements were resolved by consensus.

Data analysis

The extracted information were analyzed according to the research questions stated above and summarized systematically. Additional important themes reported by the included studies not covered by the predefined research questions were described in a narrative way.

Ethics

No ethical approval was required as only secondary data were investigated and used.

Results

Search results

After removal of duplicates, 5502 articles were identified. 5486 publications did not match the inclusion criteria and were excluded after review of titles and abstracts by two independent reviewers. Full texts were retrieved for 20articles. Of these, 13 were eligible[10,14,24–34] for inclusion, 7 were excluded during the assessment of full texts (Figure 1).

Characteristics of included studies

All included publications were original research articles, used cross-sectional study designs, and were published between 2016-2021. All were qualitative studies, and all except two[14,32]used semi-structured interviews,[30] in-depth interviews (IDIs),[10,25,27,33,34] or a combination of these[24,29,31] (table 3). Some studies combined the interviews with instruments such as focus group discussions (FGDs) and patient observations. A majority of the studies (n = 7) had their origin/geographical focus in South Africa (SA). One study was conducted in Kenya[25], Tanzania[34], Uganda[33], Malawi[32], Northern Thailand[30], and North Carolina (US), respectively[31] (Table 3).

Table 3. Overview of geographical origin, research type and methodology of included studies

	Patient population	Geographical focus	Research type	Assessment method for patient perspectives
Matima et al. (2018)	PLWH	Khayelitsha, Cape Town, SA	Qualitative	Individually face-to-face semi-structured, in-depth interviews (IDIs) in English. The IDIs were conducted in a private room in the clinic with the presence of a translator.

Rawat et al. (2018)	PLWH and PLWNCDs	Free State, SA	Qualitative	Cross-sectional survey (using likert scales) administration (in the participants' language of preference), conducted in two waves on different patients. Participants were surveyed in semi-private locations (where space permitted) or in the waiting areas.
Venables et al. (2016)	PLWH and PLWNCDs	Kibera, Kenya	Qualitative	IDIs or FGDsin English or Swahili. All IDIs or FGDs took place in clinical consultation rooms or dedicated MAC areas within the clinic.
Lebina et al. (2020)	PLWH and PLWNCDs	Dr. Kenneth Kaunda (DKK) district and West Rand (WR) district, SA	Qualitative	Structured interviews (including standardized open-ended and closed fixed-response questions) of healthcare workers' (nurses, administrators and ancillary staff) perceptions of patient responsiveness. Participants were asked to identify facility specific issues (context) that might hinder or support implementation fidelity of the ICDM model.
Edna N. Bosire (2021)	PLWH	Soweto, SA	Qualitative	IDIs (with both closed and open-ended questions) conducted in the clinic in English and observations of the patients in their homes. The aim of the home visits was to understand patients' lived experiences with chronic conditions and illness management.
Ameh et al. (2017)	PLWH and PLWNCDs	Agincourt, SA	Qualitative	Exit interviews followed by FGDs of 5-9 patients of similar age (to provide a conducive environment to freely discuss) (each session 1-1,5 hour) and one separate FGD for 5 clinical defaulters. The FGDs were held in a neutral venue within the catchment area of the health facility to enable the patients to freely express their experiences.
Knight et al. (2018)	PLWH	Langa and Khayelitsha, Cape Town, SA	Qualitative	Semi-structured, IDIs with patients and key informant interviews (KII) with service providers to triangulate data from patients. The interviews of the patients mostly took place in their homes. The KII and few of the patient interviews took place in a quiet space within the facility or relevant place of work where people felt comfortable and privacy could be ensured.
Moise et al. (2020)	PLWH	Chiang Mai, Northern Thailand	Qualitative	Semi-structured interviews in Thai
Mkumba et al. (2021)	PLWH	Durham, North Carolina, US	Qualitative	Semi-structured IDIs in private rooms in the clinic
Moucheraud et al. (2020)	PLWH	Lilongwe, Malawi	Quantitative	Cross-sectional survey (were multiple-choice or short-response) and data from clinical records

Peer et al. (2020)	PLWH	Cape Town and surrounding municipalities, SA	Quantitative and qualitative	Quantitative surveys (Likert-scale), FGDs and IDIs
Muddu et al. (2020)	PLWH	Tororo, Nagongera Health Centre IV, Mulanda Health Center IV) and the Dis- trict Health Office of Tororo District, Eastern Uganda	Qualitative	KIIs, IDIs and FGDs
Manavalan et al. (2020)	PLWH	Moshi urban district, Northern Tanzania	Qualitative	IDI. The interview guide included open ended questions on key domains of interest, with each question followed by a list of possible probes to guide the conversation

Study settings, healthcare systems and socio-economic contexts

An overview of the study settings, healthcare systems and socioeconomic contexts is provided in table 4.The articles described diverse health care systems regarding the integration of HIV, HT and T2D healthcare services ranging from no integration to the integration of some elements, such as integrated medication refill systems for HIV, DM and HT patients.[25,29]The presented concepts of healthcare integration were likewise diverse. Many studies from SA[24,26–29] used the Integrated Chronic Disease Management (ICDM)[35] framework, which was introduced in SA between 2011-13. The ICDM model was introduced as a response to the double burden of HIV and NCDs with a vision of providing integrated prevention, treatment and care of chronic patients at PHC level to ensure a seamless transition to assisted self-management within the community by leveraging HIV programs.[28,35] The model consists of four interrelated components; facility re-organization (administrative and patient flow), clinical supportive management (clinical mentorship), assisted self-support (adherence support) and strengthening of support systems outside the facility.[26,35]

Some places in SA[24,27] and Thailand[30]reported separate healthcare clinics for HIV and T2D. In Free State and Agincourt, SA, some of the PHC clinics provided integrated care for T2D and HIV, while other PHC clinics did not have integrated care yet, though both studies only included the PHC clinics with integrated care.[14,28] In a clinic in Khayelitsha, ART and chronic care services were located at the same clinic but in different sections[29] (table 4). A study from the Duke Adult Infectious Diseases Clinic in the US reported that NCD related health care could be provided at the HIV-clinic but almost

half of the HIV clinic patients received chronic NCD care outside of the clinic.[31] Finally, two studies described infrastructures of more complete integration in the form of Medication Adherence Clubs (MACs)[25] and implementation of the ICDM model into PHCs.[26] The integrated MACs were established in 2013 in Kibera as a medication refill system for those with HIV, DM and HT.[25]

Sociodemographic characteristics of the patients

The number of included participants ranged from 10[24] to more than 800.[14]In all except one study, more female patients were included (table 4)[29]. Participant's age ranged from 18-70 years, but none included children < 18 years. All studies, except one from the USA, were conducted in low- or middle-income countries in Sub-Sahara Africa and Thailand. The participants were characterized by a low educational level[24], unemployment[24,27] and/or living in informal settlements[24] with limited financial resources.[27]

In the study by Lebina et al.[26] the patient characteristics were not available and therefore not included, because the measure of the participants' responsiveness with regard to patients/users was assessed by measuring staff's perceptions of patient responsiveness.

How were patient perspectives conceptualized?

A diversity of models and approaches were used to conceptualize patient perspectives and are presented in table 4.

Table 4.Study settings, healthcare systems, socioeconomic contexts and conceptualizations of patient perspectives

	Healthcare integration	Infrastructure and study setting	Sociodemographic characteristics of patients (no. of patient-participants, gender, age, diseases, housing, employment rate, income)	Conceptualization of patient perspectives
Matima et al.	The Innovative Care for Chronic Conditions (ICCC)[36] model adapted through the Integrated Chronic Disease Management (ICDM)[35] framework was used to conceptualize healthcare integration.	Separate clinics for HIV and T2D (a clinic providing care for HIV and TB, and a PHC clinic providing care for all other diseases, including T2D).	• n= 10 • 5 females • Age: 35-65y • Disease: HIV and T2D • Educational level: Primary: 1/10, Secondary: 8/10 & Tertiary: 1/10 • Employment rate: ~50%	Shippee's Cumulative Complexity Model (CCM)[37] - workload of demands related to chronic disease management ("patient workload"), and a patient's capacity to meet this workload ("patient capacity"), which is determined by factors such as their physical or mental functioning, socioeconomic resources, social support, level of literacy and attitudes or beliefs.
Rawat et al.	Healthcare integration was conceptualized as integration of HIV care in PHC clinics.	Some PHC clinics had integrated care for HIV, but not all. The study was conducted 2-3 years after implementation of HIV into PHC clinics. The study included only PHC clinics where HIV was integrated.	• n =812 + 9 (both patients + caregivers) • Age: >18y • Disease: HIV, T2D or other.	How patients experienced quality of care (QoC) and satisfaction with staff (SwS) after integration of HIV care into PHC clinics.
Venables et al.	Integration of HIV, DM and hypertensive patients in Medication Adherence Clubs (MACs).	HIV/TB services in PHC since 2003, and integrated NCD management from 2009. MACs provide a medication refill system for HIV, DM and HT patients who meet defined clinical eligibility criteria.	• n = 81 • Gender: 51 females • Age: Median age of MAC-patients: 48y Diseases: HIV or HT or T2D	How patients experienced integrated NCD-HIV Medication Adherence Clubs (MACs), the challenges they faced and their perceptions about models of care for chronic conditions.
Lebina et al.	The ICDM model[35] was used to conceptualize healthcare integration by implementing the model at PHC facilities.	HIV and T2D integrated into PHC clinics. DKK and WR were the pilot sites for the ICDM model[35,38] implementation. 16 PHC clinics were included in the study (8 in the WR and 8 in the DKK health districts).	• Diseases: The staff provided care for HIV, T2D or other diseases. • Housing: Informal: DKK: 21% & WR:19.2% • Literacy rate: DKK: 89.6% &WR: 97.6% • Employment rate: DKK: 74,6 & WR: 71,4 %	The healthcare workers perceptions of patient perspectives regarding moderating factors of implementation fidelity of the ICDM model.[35]
Edna N. Bosire	The ICDM model[35] and WHO's definition:: "the organization, management and coordination of health services so that people get the care they need, when they need it, in ways that are user-friendly, achieve the desired results and provide value for money."[39]	A large tertiary hospital in Soweto. Comprehensive HIV care provided at PHC clinics, and comprehensive diabetes care only provided at the tertiary hospital.	• n = 15 • Gender: 8 females • Age: 40-70y • Diseases: T2D and HIV co-morbidity • Employment rate: < 50%	How patients experienced getting access to health care for comorbid HIV and T2D, and how they experienced self-management of their concurrent chronic illnesses at home.
Ameh et al.	The ICDM model[35] and WHO's definition of integrated chronic care was used to conceptualize healthcare integration.[39]	At the time of the study, the ICDM model[35] was being implemented in 17 out of the 39 PHC clinics in the sub-district. 7 of the 17 facilities implementing the ICDM model[35] in Agincourt Health and Demographic Surveillance System.	• n = 61 • Gender: 43 females • Age: >18y • Diseases: HIV, hypertension and T2D	Avedis Donabedian's structure, process, and outcome theoretical framework[40] was used to conceptualize Patient perspectives regarding the quality of care in the ICDM model[35] implemented in PHC facilities and regarding the patient-provider interactions in these integrated PHC facilities.

Knight et al.	The ICDM model[35] and Chronic Care Clubs[41] (a counterpart to MACs) were used to understand healthcare integration.	**Langa:** PHC provided care for HIV and the Vanguard Community Health Centre provided similar services as the Langa Clinic and additionally chronic care services (incl. T2D). **Khayelitsha**: provides the same services as Vanguard CHC, including care for HIV and T2D. Different staff members provide care for HIV and NCDs (incl.T2D) in different sections.	• n = Khayelitsha: 14 &Langa: 9. • Gender: Khayelitsha: 5 females & Langa: 5 females. • Age: >50y • Diseases: HIV + co- or multi-morbidity (including T2D) • Income: A majority of the participants received old age and disability social grants (USD 120/month)	Older people living with HIV (OPLWH)'s experiences in accessing healthcare and treatment for co-morbidities including HIV and T2D were conceptualized in the context of the syndemics model.[42] The syndemics model assesses the interaction of two or more concurrent diseases in a biopsychosocial context to consider reasoning for behavior and outcomes.[42]
Moise et al.	The concept of healthcare integration were based on three common models: 1) integrating services for NCD into centers initially providing HIV care; 2) integrating care for HIV into centers initially providing NCD services; and 3) synchronized integration of both HIV and NCD care and services.[11,43]	Study conducted in Chiang Mai, a province of 1.6 million people with 25 hospitals (1 general, 1 university, and 23 community), with 266 health centers. At the time of the study, T2D and HIV clinics were operated independently in Thailand.	• n = 12 • Gender: 9 females and 1 unreported • Age: 42-56y (mean: 49y) • Diseases: Co-morbidity of HIV and DM • Educational level: 2/12: no formal education	The syndemics framework[42] was used to explore patients' knowledge and perceptions of health status and management of care for comorbidity of T2D and HIV.
Mkumba et al.	The concept of integrated healthcare was described as a consolidated care, where all HIV and non-HIV care was provided by a single provider.[44]	Duke Adult Infectious Diseases (ID) Clinic. This clinic provided care for approx. 1900 PLWH. In 2017, 48% of HIV clinic patients received chronic NCD care outside of the clinic.	• n = 20 • Gender: N/A • Age: 44-67y (mean: 52.5y) • Diseases: HIV and NCDs (incl. T2D)	The conceptualization of Patient perspectives was assessed by the HIV patient's preference for provider models for their concurrent NCDs (including T2D) and how NCD care delivery could be improved according to them.
Moucheraud et al.	'Integrated care' if patients reported that they refilled antihypertensive medications and ART during the same clinic visit. Any antihypertensive medication refill outside of Partners in Hope, or at Partners in Hope but not at the same time as an ART visit, was classified as a non-integrated client.	Partners in Hope Medical Center, an urban, PEPFAR (President's Emergency Plan for AIDS Relief)-USAID–supported HIV-treatment site in Malawi. Partners in Hope has both an outpatient clinic that operates on a fee-for-service model and an HIV clinic that provides free care.	• n = 199 • Gender: 130 (65.3%) female • Age: Mean age 52 • Diseases: HIV and hypertension comorbidity • Employment rate: 133 (66.8%) • Income in USD: Mean (Median) 3276 (840)	Assessment of behaviors related to care-seeking and prescription refills.
Peer et al.	Integrated Chronic Disease Management Model. This model incorporates a diagonal approach that integrates the vertical HIV program with the horizontal general healthcare system.	17 public healthcare facilities in Cape Town, South Africa and the surrounding rural municipalities. All clinics treated more than 300 HIV infected patients monthly.	• n = 55 patients (35 in six focus groups and 20 in-depth individual patient interviews) • Diseases: HIV and hypertension comorbidity	The study used the "framework for understanding diabetes care within the context of comorbid chronic conditions" as described by Piette and Ker (2006). Two themes were investigated: 1) Experiences of comorbid HIV and hypertension diagnoses and 2) Experiences with the primary health care system.
Muddu et	HIV and NCD care were co-located. HIV-infected patients received HIV and NCD-focused care simultaneously during their visit. HIV-uninfected persons received treatment for hypertension and/or diabetes.	Three high volume HIV clinics (average 3600 PLHIV) in Eastern Uganda.	• n = 72 patients (60 in FDGs and 12 IDI) • Gender: 50% male • Age: Mean age 47 ± 7.5 • Diseases: HIV and hypertension comorbidity	The Consolidated Framework for Implementation Research (CFIR) was used to explore barriers to and facilitators of HTN/HIV. CFIR's five major domains include intervention characteristics, outer setting, inner setting, characteristics of individuals, and implementation process.
Manavalan et al.	Hypertension care is managed separately from HIV care by a medical doctor or clinical officer in a different department.	Conducted at the Moshi urban district of northern Tanzania at two HIV clinics located in government-funded primary health centers with approximately 2300 adults (1700 women and 600 men) with HIV	• n = 13 patients • Gender: 11 female, 2 male • Age: Median age of 54 (IQR 41–65) years • Diseases: HIV and hypertension comorbidity • Educational level: None 3, Primary 9, Secondary or higher 1	Perspectives and Experiences of PLWH and hypertension were assessed The in-depth interview guide was developed by an interdisciplinary team of physicians, nurses and social scientists from Tanzania and the United States with expertise in hypertension or HIV.

Emerging themes (patient perspectives)

The most prominent themes among patient perspectives and experiences on health care integration were travel and treatment costs, appointment systems, waiting times at the facilities, and HIV related stigma(Table 5).

Travel and treatment costs

Patients in Khayelitsha, Langa and Soweto (SA) experienced excessive travel costs due to multiple appointments at separate clinics for HIV and T2D.[24,27,29]Some patients defaulted their appointments due to travel costs, which led to poor patient-provider relationships: *"If you come late or fail to come, the nurses will be shouting at you. But nobody really cares to know why I did not come. That's why I choose to stay at home some clinic days." (patient).*[27] In one of the facilities in Khayelitsha the services for NCDs (including T2D) and HIV were physically located in the same complex, but because the services were provided separately, the patients did not experience having coinciding appointments, and did therefore not save the travel expenses: *"[…] No, it doesn't happen, I haven't had it yet [that the dates for the appointments coincide]. My appointments are separate."(patient).*[29]PLWH with co-morbid hypertension reported concerns for additional costs of transportation and lost wages when attending integrated medicine refill locations and therefore often preferred to choose location closer to home or with perceived lower costs. However, when assessing actual incurred cost those in the integrated care group reported lower annual cost (US$21 on average) than those in the non-integrated group (US$91 on average). Non-integrated care for hypertension and HIV in Northern Tanzania was also associated with higher cost for antihypertensive medication, provider visits, transport to the clinic, and the expense of a healthy lifestyle.[34] Participants attending integrated care for HIV and hypertension in Cape Town, South Africa reported that lower travel costs and time spent accessing different clinics increased the likelihood of treatment seeking behavior and less defaulting.[10]

Continuity of care and appointment systems

As illustrated by the quote in the previous section, the facility in Khayelitsha (SA) did not provide coherent treatment for HIV and T2D even when the services were located in the same complex.[29] In Langa (SA) on the other hand patients could experience having clashing appointments at two different

clinics.[29] Visiting numerous separate clinics led to patients in Soweto (SA) receiving conflicting information from clinicians, because of poor inter-provider communication: *"Last week the rheumatologist told me that my bones are getting closer to each other, they have inserted metals in my right foot. When I attended the diabetes clinic, the doctor asked me to exercise because I was adding more weight, but I can't exercise because of the surgery they did on my leg. My ARVs have amplified my appetite" (patient).*[27]

In Durham patients were satisfied with NCD care received from their HIV providers, and generally less satisfied receiving NCD care from their primary care provider (PCP). They experienced a stronger patient-provider relationship with their HIV providers compared to their PCP. Patients valued inter-provider communication, which some found was great, while others perceived inadequacies in communication between their providers. Overall, the patients preferred an integrated care model where all their care was consolidated in one place, with one provider: *"I wish my HIV doctor could provide everything…If I could get all my care in one place that would be wonderful rather than travelling to different places" (patient).*[31]

Patients in Free State were glad to receive more comprehensive services after the integration of HIV care in PHC clinics: *''I feel the treatment they give us is better than before. We are seen quicker and everything is checked. I'm tested every 3 months for HIV and my glucose and blood pressure is checked every visit.' (patient).'*[14]While patients in Agincourt experienced rigid appointment systems after the implementation of the ICDM model into PHC facilities in which they were unable to access services for sudden-onset illnesses.[28]

In Cape Town, South Africa, PLWH and co-morbid hypertension experienced a lack of continuity of care (different health care workers) but were generally glad for the more holistic treatment approach in the integrated health care clinics.[10]

Waiting times at the facilities

Long queues and waiting times prior to appointments at the facilities were experienced by patients in Langa and Khayelitsha, especially pronounced prior to clinical appointments for T2D. In the context of HIV services this was not a problem, where advancements have been made through MACs, which avoided overcrowding and reduced waiting times at the health facilities.[24,29]The integrated MACs for HIV, T2D and HT were likewise experienced to be time saving and preventing long queues in Kibera (Kenya).[25]

In Free State and Agincourt (SA), where the PHC clinics had integrated care for HIV and NCDs, the patients experienced staff shortage leading to negative provision of quality services and long waiting times in queuing prior to consultations.[14,28]PLWH with co-morbid hypertension in Cape Town also had concerns related to longer waiting times in integrated health care facilities.[10]

HIV related stigma

Separate medical records, waiting areas and queues were experienced by some patients in Free State and the healthcare staff in DKK and WR to increase HIV related stigma; here illustrated by a patient: *''Those who [have] HIV, they are isolated to show the people that we are HIV [positive]''*[14],and by a nurse: *"They feel like they are being isolated and they feel stigmatized and that other patients can see."*[26]Despite this, many participants in Free State reported a decrease in HIV related stigma due to increased community support and through increased awareness of HIV at the community level.[14]In Cape Town, South Africa, PLWH experienced reduced stigma when attending integrated health care, instead of ART-clinics.[10]

In Kenya the integrated MACs were found to reduce HIV related stigma as some MAC members experienced HIV being treated like *'any other chronic disease'*. While the overall perception was that the MACs reduced the stigma related to HIV, some PLWH that were not using MACs, thought they had to disclose their HIV status to join the clubs, thus fearing of being stigmatized, if someone from their community recognized them. This was, however, not a requirement for joining the clubs. This can be understood in the context of some non-MAC patients explaining the little knowledge they had of the existence of the clubs, while others found the eligibility criteria for the clubs unclear.[25,29]

In Thailand people living with co-morbid HIV and T2D uttered a desire for more privacy regarding their HIV treatment: *"I think if the hospital can separate HIV patients from [others] to make it more private, it'll be good"(patient).*[30]Whether this wish for more privacy was related to HIV related stigma is not mentioned explicitly in the article.

One study received few responses on patient perspectives which led the authors to hypothesize that patients had little information on hypertension.[33]In a study in Northern Tanzania among PLWH and co-morbid hypertension attending non-integrated (separate) care participants reported delayed or non-linkage to hypertension care, low quality or minimal counselling on hypertension and thus expressed a preference for integrated care due to convenience and efficiency.[34]

Table 5. Overview of key themes among patient perspectives for included studies (fragmented versus integrated care

Article	Fragmented vs. integrated care	Key themes among patient perspectives
Matima et al.	Fragmented care	• Travel costs • Long waiting times outside the clinics prior to appointments • Incoherent treatment
Rawat et al.	Integrated care	• Larger number of patients attending the clinic leading to staff shortage • Long waiting times outside the clinics prior to appointments • Poor confidentiality of medical records leading to increased HIV stigma • Health education + more awareness of HIV leading to reduced HIV stigma • Coherent services
Venables et al.	Integrated care	Integrated MACs considered acceptable: • Time saving • Preventing long queues • Provided people with health education and peer-support • Reduced HIV related stigma Non-MAC members: Not knowing the existence of the clubs and confusing eligibility criteria
Lebina et al.	Integrated care	• Separate medical records, waiting areas and queues leading to increased HIV stigma • Poor compliance by patients: poor adherence to appointments and medications
Edna N. Bosire	Fragmented care	• Travel costs leading to patients' defaulted appointments leading to poor patient-provider relationship • Poor inter-provider communication leading to incoherent treatment
Ameh et al.	Integrated care	• Rigid appointment systems • Long waiting times because of long breaks and late arrival of staff • Staff shortage leading to negative behavior of staff members
Knight et al.	Fragmented care	• Travel costs • Long waiting times prior to consultation • Incoherent treatment ○ Clashing appointments in Langa • Poor patient-provider relationship leading to lack of knowledge about MACs

Moise et al.	Fragmented care	• Some people living with comorbid diabetes and HIV were satisfied with their current separate treatments for HIV and T2D, while others uttered a desire for specialized care for comorbid patients. • Some people living with comorbid diabetes and HIV would like even more privacy for their HIV treatment.
Mkumba et al.	Fragmented care	• Satisfaction with NCD care received from HIV provider, and less satisfied receiving NCD care from PCP • Stronger patient-provider relationship with HIV provider than PCP • Would value a stronger inter-provider communication • A desire for an integrated care model where all their care was consolidated in one place, with one provider. • Positive towards increased participation from HIV clinic support staff
Moucheraud et al.	Fragmented and integrated care	Fragmented (non-integrated care) • Additional costs (i.e, beyond costs already incurred for ART visits), costs of transportation to refill visits and lost wages during refill visits. • Refill location for medicines chosen primarily due to perceived lower medication costs and proximity/convenience (e.g., distance to home) Integrated care • Lower annual care-seeking costs (US$21 on average) than those in the non-integrated care group (US$91 on average)
Peer et al.	Integrated care	• Removal of stigma attached to attending ART-clinic • Long waiting times at clinics, being attend to later than other (non-HIV) patients • Lack of continuity of care (different health care workers), but glad for holistic treatment approach • Might lead to greater treatment seeking behavior and less defaulters • Less travel costs and time spent accessing different clinics
Muddu et al. (2020)	Integrated care	• Few responses by patients about integrated HT/HIV care may be an indicator of limited knowledge about hypertension in HIV. • Participants reported gaps in clinician documentation (providers record clinical data in patients' personal books)
Manavalan et al.	Fragmented care	• Delayed or non-linkage to care for hypertension • Minimal and/or low-quality counselling on hypertension • High costs for antihypertensive medication, provider visits, transport to the clinic, and the expense of a healthy lifestyle • All respondents conveyed a preference for integrated care due to convenience and efficiency

Discussion

In this scoping review, we found that patient perspectives and experiences on integrated care for HIV, diabetes and hypertension were mostly positive, in particular reduced HIV-related stigma, reduced travel and treatment costs and a more holistic person-centered care (summary box 1).

We identified 13 articles eligible for this scoping review after applying a broad search strategy including publications between 1990 and 2021 with no geographical restrictions. This illustrates the limited number of publications regarding patient perspectives on healthcare integration of HIV, diabetes type 2 and hypertension services. Of note, all published material was from within the last 5 years (2016-21), indicating that this is an emerging research priority. Clearly, most research on patient perspectives has been conducted in SSA with only one article from North America[31] and one from Asia[30] while none of the other continents were represented. However, this might not be surprising as a rapid increase in the burden of diabetes, hypertension and other NCDs is meeting a growing population of PLWH in many countries in SSA. This epidemiological transition resulting in a double burden of disease leaves many health care systems overburdened.[6] Interestingly, the only study from a high income setting (Duke University, USA) reported that the PLWH interviewed were highly satisfied with integrated care and preferred receiving primary care from their HIV-physician due to the high degree of continuity of care. This is in contrast to studies from SSA, where participants often experienced a lack of continuity of care in integrated care. This might reflect the high staff turn-over and treatment of PLWH or PLWNCD by health care professionals other than physicians.

The study settings could be divided into whether they had integrated care or not. Six studies, all conducted in SSA, tended to have some degree of integrated care, while seven studies reported on fragmented or partially fragmented care. A majority of the studies from SA (n = 6) used the ICDM model[35] to conceptualize healthcare integration. However, there was a discrepancy between how healthcare integration was conceptualized by the ICDM model and the actual infrastructures in these study settings, e.g. many of the places still having separate care for HIV and T2D.[24,27,29]

The diversity of concepts used to assess patient perspectives, underlines the complexity of the topic, and made it difficult to compare these concepts, however, some similarities were identified, indicating that some degree of universality exists when it comes to the needs and wishes of patients. The patient

perspectives regarding travel and treatment costs, continuity of care and appointment systems, waiting times at the facilities, and HIV related stigma were identified as the most important themes. All the studies conducted in fragmented healthcare settings in SSA mentioned travel (and partly treatment) costs as a major burden due to the limited financial resources of patients.[24,27,29,31,32,34] There is no doubt that more integrated care could be cost and time-saving for these patients, though cost saving is not mentioned directly in any of the studies conducted in integrated healthcare settings.

Those accessing integrated care were usually satisfied with the holistic and coherent care received and reduced stigma due to attending a general clinic with non-HIV patients. However, more rigid appointment systems, a lack of continuity of care with conflicting messages from changing health care providers and long waiting times at facilities were experienced as downsides in some health care settings.

Among those using integrated care, some patients expressed areas of improvement. Patients from one study suggested improvements in relation to access to services for sudden-onset illnesses.[28] One approach for this problem could be to have some emergency appointment-times every day at the clinics, which was found to increase patient satisfaction in a publication by Richter et al.[45] Staff shortage,[14,28] long waiting times prior to consultations[23] and patients not knowing the existence of medication adherence clubs, which provide fast access to medication [25,29] reflect the lack of (efficient) used of resources. In general, better coverage with appropriately qualified health care workers is needed to ensure reliable health care services.[26]

In general, the findings of this review point towards the overarching challenge of integrative care to synchronize vertical, disease-oriented care with horizontal health systems strengthening programs. The ideal being to be able to draft health service delivery programs aimed at specific diseases in a manner that at the same time may drive improvement in the wider health system – a diagonal approach.[46]

Strengths and limitations

To the best of our knowledge this is the first systematic scoping review to assess patient perspectives on integration of health care for HIV and NCDs. The scoping review methodology and broad search

terms, reflected in more than 5500 initial records identified, ensure a high sensitivity of our search strategy.

A limitation of the current scoping review is the singular focus on type 2 diabetes and hypertension as indicator conditions. Other important diseases for integration would be mental health, cardiovascular disease, or chronic kidney disease. However, type 2 diabetes and hypertension represent the common, major chronic conditions in Sub-Sahara Africa. Another limitation is that grey literature was not included in the search. However, cursory searches in major search engines and reference lists of included articles have not provided additional findings. In addition, the perspectives of health care workers would be of interest but were not assessed in the current review.

A further weakness is that there were no studies of integrated care and management for HIV, DM and HTN – in other words a clinic that can manage patients with either HIV, DM, HTN or combinations of these. Most of the studies involved only a small component of care to be integrated (e.g. screening) or they involved adding diabetes and hypertension services to HIV programs, which excludes people without HIV from integrated care. Of note, no studies from Europe were identified, however, some hospitals in Europe are working on integrating services (e.g., the multidisciplinary set-up in Modena, Italy (unpublished, authors correspondence). There is a clear need for more research, including longitudinal and interventional studies from different health care settings.

Conclusion

Only few articles in the peer-reviewed literature, with a limited geographical scope, were identified. However, all the publications were from 2016-21, and the majority of the articles were from SSA (n=11), indicating that the topic is an emerging research priority in this region.

Patient's experiences with integrated care were reduced HIV-related stigma, reduced travel and treatment costs and more holistic person-centered care. Prominent concerns were long waiting times at clinics and a lack of continuity of care with the same provider. Non-integrated care was perceived as time-consuming and more expensive. Integration can save resources for health services, which if re-invested can yield benefits for PLWNCDs and PLWH alike. If additional services are simply added to existing ones (e.g. diabetes screening within HIV programmes) it will lead to increased waiting times for participants. The articles included in this review are an important source of evidence for patient-centered integration of HIV and NCD health care services, potentially also as important evidence and lessons for high-income settings (e.g., Europe). There is a paucity of evidence and

further longitudinal and interventional evidence from a more diverse range of health care systems is desirable.

Figure captions

Figure 1. *Prisma Flowchart of the flow of studies through each phase of the review process*

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Data sharing statement

No additional data available.

Authorship contribution statement

CK, SS and PK conceived of the study. SS, CK and PK contributed to data collection and analysis. SS, OK, SJ, CK, KR, PK and CK were involved in drafting and approving the final manuscript.

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Competing interests

The authors declare that they have no competing interests.

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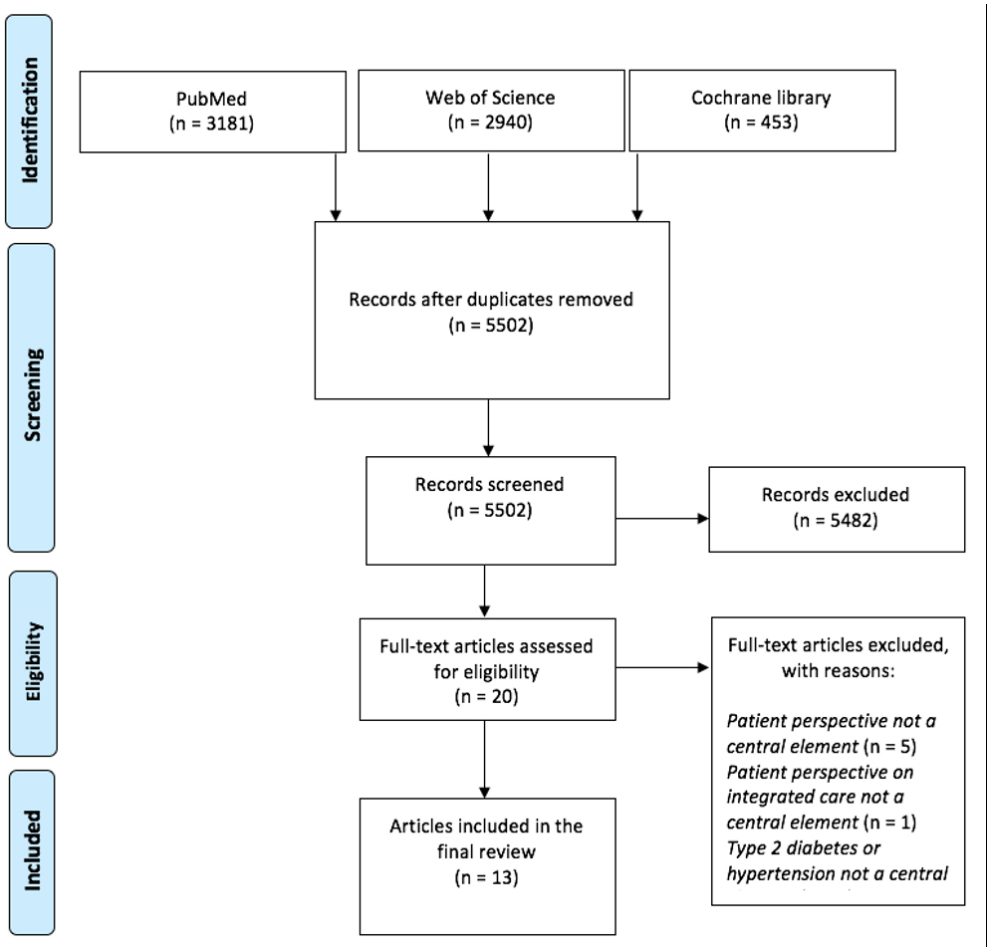

Figure 1. Prisma Flowchart of the flow of studies through each phase of the review process

432x407mm (59 x 59 DPI)

Supplementary File

Supplementary table 1: Search terms used in Web of Science.

Category	Web of Science search strategy
HIV	1) HIV infect* OR HTLV-III-LAV infect* OR HTLV III LAV infect* OR T-lymphotropic Virus Type III infect*, human OR T lymphotropic Virus Type III infect*, human OR HTLV-III infect* OR HTLV III infect* OR HIV coinfect* OR HIV co-infect* 2) Human immunodeficiency virus* OR HIV OR Human T cell lymphotropic virus type III OR Human T-cell lymphotropic virus type III OR Human T-cell leukaemia virus type III OR Human T cell leukaemia virus type III OR LAV-HTLV-III OR Lymphadenopathy-associated virus* OR Lymphadenopathy associated virus* OR Human T lymphotropic virus type III OR Human T-lymphotropic virus type III OR AIDS virus* OR Acquired immune deficiency syndrome virus OR Acquired immunodeficiency syndrome virus OR HTLV-III 3) AIDS OR Acquired immune deficiency syndrome* OR acquired immunologic deficiency syndrome* OR acquired immune deficiency syndrome* OR acquired immuno-deficiency syndrome* OR acquired immuno deficiency syndrome* 4) 1 OR 2 OR 3

NCDs, Diabetes mellitus Type 2 and Hypertension	5) Noncommunicable disease* OR non-infectious disease* OR non infectious disease* OR non-communicable disease* OR OR non communicable disease* OR noninfectious disease* OR non-communicable chronic disease* OR non communicable chronic disease* OR NCD OR NCDs 6) Diabetes mellitus type 2 OR noninsulin-dependent diabetes mellitus OR ketosis-resistent diabetes mellitus OR ketosis resistent diabetes mellitus OR non insulin-dependent diabetes mellitus OR non-insulin-dependent diabetes mellitus OR stable diabetes mellitus OR type II diabetes mellitus OR NIDDM OR noninsulin dependent diabetes mellitus OR maturity-onset diabetes mellitus OR maturity onset diabetes mellitus OR DM2 OR DM OR MODY OR slow-onset diabetes mellitus OR slow onset diabetes mellitus OR Type 2 diabetes OR adult-onset diabetes mellitus OR adult onset diabetes mellitus OR tiidm 7) Hypertens* OR high blood pressure OR high bp OR prehypertens* OR pre-hypertens* OR pre hypertens* OR blood pressure* OR blood pressure determination* OR artierial pressure* OR diastolic pressure* OR pulse pressure* OR systolic pressure* OR arterial tension* OR arterial blood pressure* OR aortic pulse pressure* OR mean arterial pressure* OR aortic pressure* OR aortic tension* OR aortic blood pressure* OR mean aortic pressure* 8) 5 OR 6 OR 7
Health Care Integration	9) (vertical* OR horizontal* OR integrat* OR integrated OR coordinat* OR coordinated OR co-ordinat* OR co-ordinated OR link* OR linked) AND (program* OR care OR service*) OR delivery of health care OR primary health care OR integrat* OR health care OR health-care OR healthcare OR health service) 10) Delivery of health care OR deliver* of health care OR healthcare deliver* OR deliver* of health-care OR health care deliver* OR health care system* OR health care deliver* OR healthcare system* OR health-care system* OR nonclinical distribution* OR non-clinical distribution* OR non clinical distribution* OR community based distribution* OR community-based distribution* OR distributional activit* OR primary health care OR primary healthcare OR primary health-care OR primary care OR health service* OR health care service* OR healthcare service* OR health-care service* 11) Integrated health care system* OR Integrated healthcare system* OR Integrated health-care system* OR integrated delivery system* 12) 9 OR 10 OR 11
	13) 4 AND 8 AND 12

Supplementary table 2: Search terms used in Cochrane library.

Category	Cochrane library search strategy
HIV	1) HIV [MeSH] 2) Acquired immunodeficiency syndrome [MeSH] 3) HIV infection 4) Human immunodeficiency virus 5) Acquired immunodeficiency syndrome OR AIDS 6) 1 OR 2 OR 3 OR 4 OR 5
NCDs, Diabetes mellitus Type 2 and Hypertension	7) Noncommunicable diseases [MeSH] 8) "Noncommunicable disease" OR "non-communicable disease" OR "non communicable disease" 9) NCD OR NCDs 10) Diabetes mellitus, type 2 [MeSH] 11) Diabetes mellitus type 2 12) ((Type 2 OR type ii OR "noninsulin dependent" OR "non insulin dependent" OR "adult onset" OR "maturity onset" OR obes*) AND diab*) 13) T2dm OR tiidm 14) Hypertension [MeSH] 15) Hyperten* OT Prehypertens* OR blood pressure OR bp 16) 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15
Health Care Integration	17) Delivery of health care [MeSH] 18) Integrated delivery system* 19) (vertical OR horizontal OR integrat* OR integrated OR coordinat* OR coordinated OR co-ordinated OR link* OR linked) AND (program* OR care OR service*) OR delivery of health care OR primary health care OR health care OR health-care OR healthcare OR health service 20) 17 OR 18 OR 19
	21) 6 AND 16 AND 20

Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	1
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	3-4
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	3-4
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	N/A
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	4-7
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	4-7
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	4-7
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	4-7
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	4-7
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	4-7
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	4-7

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	4-7
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	8-26
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	8-26
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	8-26
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	8-26
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	8-26
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	27-30
Limitations	20	Discuss the limitations of the scoping review process.	27-30
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	27-30
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	N/A

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.
* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.
† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).
‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.
§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMAScR): Checklist and Explanation. Ann Intern Med. 2018;169:467–473. doi: 10.7326/M18-0850.

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Patient perspectives on integrated health care for HIV, hypertension and type 2 diabetes – a scoping review

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Patient perspectives on integrated health care for HIV, hypertension and type 2 diabetes – a scoping review

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Abstract

Introduction

Anti-retroviral therapy has reduced mortality and led to longer life expectancy in people living with HIV (PLWH). These patients are now at an increased risk of non-communicable diseases (NCDs). Integration of care for HIV and NCDs has become a focus of research and policy. In this article we aim to review patient perspectives on integration of health care for HIV, type 2 diabetes and hypertension.

Methods

The framework for scoping reviews developed by Arksey and O'Malley and updated by Peter et al., 2021 was applied for this review. The databases PubMed, Web of Science and Cochrane library were searched. Broad search terms for HIV, NCDs (specifically type 2 diabetes and hypertension) and health care integration were used. As the review aimed to identify definitions of patient perspectives,

they were not included as an independent term in the search strategy. References of included publications were searched for relevant articles. Titles and abstracts for these papers were screened by two independent reviewers. The full texts for all the publications appearing to meet the inclusion criteria were then read to make the final literature selection.

Results

Of 5502 studies initially identified, 13 articles were included in this review, of which 11 had a geographical origin in sub-Saharan Africa (SSA). Nine articles were primarily focused on HIV/diabetes health care integration while 4 articles were focused on HIV/hypertension integration. Patient's experiences with integrated care were reduced HIV-related stigma, reduced travel and treatment costs and a more holistic person-centered care. Prominent concerns were long waiting times at clinics and a lack of continuity of care in some clinics due to a lack of health care workers. Non-integrated care was perceived as time-consuming and more expensive.

Conclusion

Patient perspectives and experiences on integrated care for HIV, diabetes and hypertension were mostly positive. Integrated services can save resources and allow for a more personalized approach to health care. There is a paucity of evidence and further longitudinal and interventional evidence from a more diverse range of health care systems are needed.

Summary Box 1. Strengths and limitations

Strengths and limitations of this study

- We conducted a systematic review of patient perspectives on integrating health care for HIV and NCDs using the framework for scoping reviews developed by Arksey and O'Malley and updated by Peter et al. in 2021.
- The scoping review methodology and broad search terms, reflected in more than 5500 initial records identified, ensure a high sensitivity of our search strategy covering all settings and levels of health care systems.
- As the review aimed to identify all relevant definitions of patient perspectives, they were not included as an independent term in the search strategy, allowing us to scope the variety of concepts and definitions used in the literature.

- A limitation of the current scoping review is the singular focus on type 2 diabetes and hypertension as indicator conditions, while other important diseases for integration not covered would be mental health, cardiovascular disease, or chronic kidney disease.

Introduction

Worldwide, 37.7 million people are living with HIV, of which 24.5 million are on treatment. There were 680,000 AIDS-related deaths and 1.7 million new infections in 2020.[1] Global health programs and related funding streams such as those supported by American President's Emergency Plan for AIDS Relief (PEPFAR) or the Global Fund have since 2003 facilitated the development of separate, vertical HIV-focused health care infrastructure across sub-Saharan Africa (SSA).[2] This has led to an increased coverage with anti-retroviral therapy (ART) and in consequence to longer life expectancy in people living with HIV (PLWH). However, at the same time this has contributed to fragmentation in health systems in countries in Africa.[3] Over the last decade an increase in the burden of non-communicable diseases (NCDs) has been seen among PLWH, to a large degree due to better survival and general health status.[4,5] In parallel, the prevalence of NCDs in the general population, in particular type 2 diabetes (T2D) and hypertension (HT) has increased significantly across SSA.[6] It is estimated that 40.5 million (71%) of the 56.9 million worldwide deaths were from NCDs in 2016 and the highest risks of dying from NCDs were observed in low- and middle-income countries, especially in sub-Saharan Africa.[7] Therefore, health care systems strengthening, increased investments and efficient use of resources are needed to counter the double burden of communicable and non-communicable diseases in Sub-Sahara Africa.[8] The established vertical health care structures in many countries, in particular those for HIV-care, risk contributing to inefficient use of resources and increased HIV-related stigma.[9,10]

Thus, integration of the existing communicable and non-communicable health care infrastructure has become a recent policy and research focus to improve care for people living with NCDs (PLWNCDs) and PLWH alike.[11] Integrated care can be defined as 'the coordination, co-location, or simultaneous delivery of communicable and non-communicable services to patients who need it, when they need it.'[5] Integration of HIV and NCDs services can be categorized as a) community-based integrated HIV/NCDs screening in the general population, b) screening for NCDs and their risk factors among PLWH, c) integrated care of HIV/NCDs in healthcare facilities, d) differentiated care for stable

HIV/NCDs, and e) integrated population health for all patients with any need.[12] Taking T2D and HT as an example, potential benefits could be better control of HT and T2D, earlier diagnosis, better management and disease control, and cost saving for patients through inclusion in routine HIV control. Accordingly, benefits for HIV-control could be easier access to HIV services and the reduction of stigma.[13] A potential downside to integration can be longer waiting times for patients if integration is done with reduced resources compared with the current standard care.[14]

Patients' knowledge, attitudes, beliefs, desires and practices have a large influence on the successful delivery of health care.[15] Recently, quality of life has been proposed as the fourth 90 to complement the UNAIDS 90-90-90 targets to monitor the global HIV response, which requires a better understanding of patient reported outcomes.[16] However, little is known about patient perspectives on integration of health care for HIV and NCDs.[13]

Objective and aims

The objective of this scoping review was to identify, describe and analyze the peer-reviewed literature on patient perspectives on health-care integration for HIV and NCDs. T2D and HT were used as indicator conditions for NCDs as they represent a large proportion of the NCD burden, in particular in PLWH, are well-defined and most commonly used as indicator conditions in published research on HIV/NCD integration.

Specifically, we aimed to identify the scope and describe the peer-reviewed literature on patient perspectives. Furthermore, we reviewed frameworks and methodologies used to assess patient perspectives on HIV/NCD health care integration as well as the findings and potential recommendations of the available literature on integration of HIV and NCD services.

Research questions

1. Which kind of research (quantitative, qualitative) exists and what methodologies were used?

Rationale: To date no systematic review of patient perspectives on integrated health care exists. Describing the evidence, kind of research and methodologies in a systematic way helps identifying research gaps and plan for future research.

2. In what settings (geographical, health care system, socio-economic context) has research been conducted?

Rationale: We report findings by geographic setting, health care system context and socio-economic group, as approaches to health care integration can differ widely depending on the situation.

3. How are patient perspectives conceptualized?

Rationale: To the best of our knowledge no standard or best-practice conceptualization for assessing patient perspectives on health care provision exists. Identifying the concepts used can help standardize and compare patient perspectives across studies and settings.

4. What are patient perspectives on integration of HIV/NCD services?
    - What are the perspectives of PLWNCDs on integration of T2D and/or HT care with HIV care?
    - What are the perspectives of PLWH on integration of HIV care with T2D and/or HT care?

Rationale: Describing patient perspectives on integration of HIV/NCD services can inform policy makers, researchers and health care providers to design effective, patient-centered, health care interventions.

Methods

A scoping review is a method of reviewing evidence-based research to, scope a body of literature, clarify concepts, identify knowledge gaps or to investigate research conduct.[17] The framework for scoping reviews developed by Arksey and O'Malley in 2005 and updated by Peter et al. in 2015 was applied for this study.[18,19] This method of a scoping review was chosen over a more focused systematic review to apply a broader approach to the vaguely defined theme in order to map the available literature on this topic, and to identify research gaps.[18] In the preparation of this review a research protocol was created according to the PRISMA extension for scoping reviews (PRISMA-ScR) checklist to ensure quality, transparency, and complete reporting.[20]

Patients and public involvement

Patients and the public were indirectly represented in the design, conduct and reporting of this review as several of the authors are representatives of patient associations (Danish NCD Alliance, East Africa

NCD Alliance). The development of the research question(s) and outcome measures was driven by the experience of the authors as representatives of patient associations. However, no patients were involved directly in the planning and conduct of this study. The results will be disseminated to patient representatives and associations (e.g., the Global NCD Alliance and East Africa NCD Alliance).

Definitions

The definitions of PLWH/PLWA (people living with AIDS), NCDs, integrated health care and patient perspectives are provided in table 1. As the review aimed to identify definitions of patient perspectives, they were not included as an independent term in the search strategy.

Table 1. Definitions.

Category	Definitions
PLWH/PLWA	PLWH/PLWA are defined according to the definition by the UNAIDS Terminology Guidelines from 2015 as persons, who are seropositive for HIV.[21]
NCDs	NCDs are characterized by WHO as being non-transmissible and often known as chronic diseases. They are a result of combinations of genetic, physiological, environmental and behavioral factors. They are largely preventable and are linked to common risk factors and underlying determinants.[22] In this review, we chose to focus on type 2 diabetes mellitus and hypertension as indicator conditions, which have seen a rapid increase in prevalence, especially in SSA.[6]
Integrated health care	For integrated health care we used the definition of the WHO Europe Regional Office: "*an approach to strengthen people-centered health systems […] delivered by a coordinated multidisciplinary team of providers working across settings and levels of care […].*"[23]
Patient perspectives	There is no unique consensus or definition for Patient perspectives (PP).[15] For the purpose of this review we defined PP as the experiences, values, preferences, expectations, concerns, and opinions expressed by patients (in our case PLWNCDs or PLWH). They can broadly be categorized as those perspectives expressed by individually concerned patients and those expressed by informally or formally selected patient representatives (e.g., civil society organizations). They can be reported directly by patients or indirectly through health care providers or other secondary sources.

Databases and search strategy

The databases PubMed, Web of Science and Cochrane library were searched. Broad terms were included in the search strategy (Table 1). HIV, NCDs (specifically T2D and HT) and health care

integration were the three main categories the search strategy was based on. The search strategy for PubMed and Cochrane library consisted of free text and Medical Subject Headings (MeSH) terms. The search strategy used in PubMed is presented in table 2, and the search terms used in the other databases are presented in supplementary tables 1 and 2. A librarian at the University of Aarhus was consulted to support the development of the search terms. Reference lists of included publications were searched for relevant articles.

Table 2. Search terms used in PubMed.

Category	PubMed search strategy
HIV	1) HIV infections 2) Human immunodeficiency virus 3) AIDS 4) 1 OR 2 OR 3
NCDs, Diabetes mellitus Type 2 and Hypertension	5) Noncommunicable diseases 6) NCDs 7) NCD 8) Diabetes Mellitus Type 2 9) ((type 2 OR type ii OR "noninsulin dependent" OR "non insulin dependent" OR "adult onset" OR "maturity onset" OR obes*) AND diabet*) 10) T2dm 11) Tiidm 12) Hypertension 13) Hypertensi* 14) Prehypertension 15) Pre hypertension 16) prehypertensi* 17) Blood pressure 18) bp 19) 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18
Health Care Integration	20) Integrated delivery systems 21) (vertical OR horizontal OR integrat* OR integrated OR coordinat* OR coordinated OR co-ordinat* OR co-ordinated OR link* OR linked) AND (program* OR care OR service*) OR delivery of health care OR primary health care OR integrat* OR health care OR health-care OR healthcare OR health service 22) 20 OR 21
	4 AND 19 AND 22

Criteria for inclusion and exclusion

Inclusion criteria

- Peer-reviewed articles (including original quantitative and qualitative studies, systematic reviews, editorials, commentaries, viewpoints) on integration of health care for HIV and T2D and/or HT which provide information on patient perspectives (according to definitions in Table 1)
- Published between 01/01/1990-01/03/2021
- Publications in English, German, French and Danish

Exclusion criteria

- Book chapters and grey literature (dissertations, conference proceedings, reports etc.)

Literature selection

The citation software Zotero was used to merge and remove the duplicates among the results. Titles and abstracts for these papers were thoroughly screened using Rayyan (a web and mobile app for systematic reviews) by two independent reviewers (SS and CK). The full texts for all the publications appearing to meet the inclusion criteria were read to make the final literature selection. Any disagreements between the two reviewers at any stage of the study selection were resolved by a third reviewer (PK).

Data collection and extraction

Data on origin of author, year of publication, geographical focus of the publication, publication type, type of NCD, definition of health care integration, definition of patient perspectives, assessment method for patient perspectives and the content of the patient perspectives were extracted and transferred into a pre-specified extraction sheet (SS). These data were used to facilitate analysis and development of figures and summarizing tables. A second researcher independently checked the data for accuracy and detail (CK). Disagreements were resolved by consensus.

Data analysis

The extracted information were analyzed according to the research questions stated above and summarized systematically. Additional important themes reported by the included studies not covered by the predefined research questions were described in a narrative way.

Ethics

No ethical approval was required as only secondary data were investigated and used.

Results

Search results

After removal of duplicates, 5502 articles were identified. 5486 publications did not match the inclusion criteria and were excluded after review of titles and abstracts by two independent reviewers. Full texts were retrieved for 20 articles. Of these, 13 were eligible[10,14,24–34] for inclusion, 7 were excluded during the assessment of full texts (Figure 1).

Characteristics of included studies

All included publications were original research articles, used cross-sectional study designs, and were published between 2016-2021. All were qualitative studies, and all except two[14,32]used semi-structured interviews,[30] in-depth interviews (IDIs),[10,25,27,33,34] or a combination of these[24,29,31] (table 3). Some studies combined the interviews with instruments such as focus group discussions (FGDs) and patient observations. A majority of the studies (n = 7) had their origin/geographical focus in South Africa (SA). One study was conducted in Kenya[25], Tanzania[34], Uganda[33], Malawi[32], Northern Thailand[30], and North Carolina (US), respectively[31] (Table 3).

Table 3. Overview of geographical origin, research type and methodology of included studies

	Patient population	Geographical focus	Research type	Assessment method for patient perspectives
Matima et al. (2018)	PLWH	Khayelitsha, Cape Town, SA	Qualitative	Individually face-to-face semi-structured, in-depth interviews (IDIs) in English. The IDIs were conducted in a private room in the clinic with the presence of a translator.

Rawat et al. (2018)	PLWH and PLWNCDs	Free State, SA	Qualitative	Cross-sectional survey (using likert scales) administration (in the participants' language of preference), conducted in two waves on different patients. Participants were surveyed in semi-private locations (where space permitted) or in the waiting areas.
Venables et al. (2016)	PLWH and PLWNCDs	Kibera, Kenya	Qualitative	IDIs or FGDsin English or Swahili. All IDIs or FGDs took place in clinical consultation rooms or dedicated MAC areas within the clinic.
Lebina et al. (2020)	PLWH and PLWNCDs	Dr. Kenneth Kaunda (DKK) district and West Rand (WR) district, SA	Qualitative	Structured interviews (including standardized open-ended and closed fixed-response questions) of healthcare workers' (nurses, administrators and ancillary staff) perceptions of patient responsiveness. Participants were asked to identify facility specific issues (context) that might hinder or support implementation fidelity of the ICDM model.
Edna N. Bosire (2021)	PLWH	Soweto, SA	Qualitative	IDIs (with both closed and open-ended questions) conducted in the clinic in English and observations of the patients in their homes. The aim of the home visits was to understand patients' lived experiences with chronic conditions and illness management.
Ameh et al. (2017)	PLWH and PLWNCDs	Agincourt, SA	Qualitative	Exit interviews followed by FGDs of 5-9 patients of similar age (to provide a conducive environment to freely discuss) (each session 1-1,5 hour) and one separate FGD for 5 clinical defaulters. The FGDs were held in a neutral venue within the catchment area of the health facility to enable the patients to freely express their experiences.
Knight et al. (2018)	PLWH	Langa and Khayelitsha, Cape Town, SA	Qualitative	Semi-structured, IDIs with patients and key informant interviews (KII) with service providers to triangulate data from patients. The interviews of the patients mostly took place in their homes. The KII and few of the patient interviews took place in a quiet space within the facility or relevant place of work where people felt comfortable and privacy could be ensured.
Moise et al. (2020)	PLWH	Chiang Mai, Northern Thailand	Qualitative	Semi-structured interviews in Thai
Mkumba et al. (2021)	PLWH	Durham, North Carolina, US	Qualitative	Semi-structured IDIs in private rooms in the clinic
Moucheraud et al. (2020)	PLWH	Lilongwe, Malawi	Quantitative	Cross-sectional survey (were multiple-choice or short-response) and data from clinical records

Peer et al. (2020)	PLWH	Cape Town and surrounding municipalities, SA	Quantitative and qualitative	Quantitative surveys (Likert-scale), FGDs and IDIs
Muddu et al. (2020)	PLWH	Tororo, Nagongera Health Centre IV, Mulanda Health Center IV) and the Dis- trict Health Office of Tororo District, Eastern Uganda	Qualitative	KIIs, IDIs and FGDs
Manavalan et al. (2020)	PLWH	Moshi urban district, Northern Tanzania	Qualitative	IDI. The interview guide included open ended questions on key domains of interest, with each question followed by a list of possible probes to guide the conversation

Study settings, healthcare systems and socio-economic contexts

An overview of the study settings, healthcare systems and socioeconomic contexts is provided in table 4.The articles described diverse health care systems regarding the integration of HIV, HT and T2D healthcare services ranging from no integration to the integration of some elements, such as integrated medication refill systems for HIV, DM and HT patients.[25,29]The presented concepts of healthcare integration were likewise diverse. Many studies from SA[24,26–29] used the Integrated Chronic Disease Management (ICDM)[35] framework, which was introduced in SA between 2011-13. The ICDM model was introduced as a response to the double burden of HIV and NCDs with a vision of providing integrated prevention, treatment and care of chronic patients at PHC level to ensure a seamless transition to assisted self-management within the community by leveraging HIV programs.[28,35] The model consists of four interrelated components; facility re-organization (administrative and patient flow), clinical supportive management (clinical mentorship), assisted self-support (adherence support) and strengthening of support systems outside the facility.[26,35]

Some places in SA[24,27] and Thailand[30]reported separate healthcare clinics for HIV and T2D. In Free State and Agincourt, SA, some of the PHC clinics provided integrated care for T2D and HIV, while other PHC clinics did not have integrated care yet, though both studies only included the PHC clinics with integrated care.[14,28] In a clinic in Khayelitsha, ART and chronic care services were located at the same clinic but in different sections[29] (table 4). A study from the Duke Adult Infectious Diseases Clinic in the US reported that NCD related health care could be provided at the HIV-clinic but almost

half of the HIV clinic patients received chronic NCD care outside of the clinic.[31] Finally, two studies described infrastructures of more complete integration in the form of Medication Adherence Clubs (MACs)[25] and implementation of the ICDM model into PHCs.[26] The integrated MACs were established in 2013 in Kibera as a medication refill system for those with HIV, DM and HT.[25]

Sociodemographic characteristics of the patients

The number of included participants ranged from 10[24] to more than 800.[14]In all except one study, more female patients were included (table 4)[29]. Participant's age ranged from 18-70 years, but none included children < 18 years. All studies, except one from the USA, were conducted in low- or middle-income countries in Sub-Sahara Africa and Thailand. The participants were characterized by a low educational level[24], unemployment[24,27] and/or living in informal settlements[24] with limited financial resources.[27]

In the study by Lebina et al.[26] the patient characteristics were not available and therefore not included, because the measure of the participants' responsiveness with regard to patients/users was assessed by measuring staff's perceptions of patient responsiveness.

How were patient perspectives conceptualized?

A diversity of models and approaches were used to conceptualize patient perspectives and are presented in table 4.

Table 4.Study settings, healthcare systems, socioeconomic contexts and conceptualizations of patient perspectives

	Healthcare integration	Infrastructure and study setting	Sociodemographic characteristics of patients (no. of patient-participants, gender, age, diseases, housing, employment rate, income)	Conceptualization of patient perspectives
Matima et al.	The Innovative Care for Chronic Conditions (ICCC)[36] model adapted through the Integrated Chronic Disease Management (ICDM)[35] framework was used to conceptualize healthcare integration.	Separate clinics for HIV and T2D (a clinic providing care for HIV and TB, and a PHC clinic providing care for all other diseases, including T2D).	• n= 10 • 5 females • Age: 35-65y • Disease: HIV and T2D • Educational level: Primary: 1/10, Secondary: 8/10 & Tertiary: 1/10 • Employment rate: ~50%	Shippee's Cumulative Complexity Model (CCM)[37] - workload of demands related to chronic disease management ("patient workload"), and a patient's capacity to meet this workload ("patient capacity"), which is determined by factors such as their physical or mental functioning, socioeconomic resources, social support, level of literacy and attitudes or beliefs.
Rawat et al.	Healthcare integration was conceptualized as integration of HIV care in PHC clinics.	Some PHC clinics had integrated care for HIV, but not all. The study was conducted 2-3 years after implementation of HIV into PHC clinics. The study included only PHC clinics where HIV was integrated.	• n =812 + 9 (both patients + caregivers) • Age: >18y • Disease: HIV, T2D or other.	How patients experienced quality of care (QoC) and satisfaction with staff (SwS) after integration of HIV care into PHC clinics.
Venables et al.	Integration of HIV, DM and hypertensive patients in Medication Adherence Clubs (MACs).	HIV/TB services in PHC since 2003, and integrated NCD management from 2009. MACs provide a medication refill system for HIV, DM and HT patients who meet defined clinical eligibility criteria.	• n = 81 • Gender: 51 females • Age: Median age of MAC-patients: 48y Diseases: HIV or HT or T2D	How patients experienced integrated NCD-HIV Medication Adherence Clubs (MACs), the challenges they faced and their perceptions about models of care for chronic conditions.
Lebina et al.	The ICDM model[35] was used to conceptualize healthcare integration by implementing the model at PHC facilities.	HIV and T2D integrated into PHC clinics. DKK and WR were the pilot sites for the ICDM model[35,38] implementation. 16 PHC clinics were included in the study (8 in the WR and 8 in the DKK health districts).	• Diseases: The staff provided care for HIV, T2D or other diseases. • Housing: Informal: DKK: 21% & WR:19.2% • Literacy rate: DKK: 89.6% &WR: 97.6% • Employment rate: DKK: 74,6 & WR: 71,4 %	The healthcare workers perceptions of patient perspectives regarding moderating factors of implementation fidelity of the ICDM model.[35]
Edna N. Bosire	The ICDM model[35] and WHO's definition:: "the organization, management and coordination of health services so that people get the care they need, when they need it, in ways that are user-friendly, achieve the desired results and provide value for money."[39]	A large tertiary hospital in Soweto. Comprehensive HIV care provided at PHC clinics, and comprehensive diabetes care only provided at the tertiary hospital.	• n = 15 • Gender: 8 females • Age: 40-70y • Diseases: T2D and HIV co-morbidity • Employment rate: < 50%	How patients experienced getting access to health care for comorbid HIV and T2D, and how they experienced self-management of their concurrent chronic illnesses at home.
Ameh et al.	The ICDM model[35] and WHO's definition of integrated chronic care was used to conceptualize healthcare integration.[39]	At the time of the study, the ICDM model[35] was being implemented in 17 out of the 39 PHC clinics in the sub-district. 7 of the 17 facilities implementing the ICDM model[35] in Agincourt Health and Demographic Surveillance System.	• n = 61 • Gender: 43 females • Age: >18y • Diseases: HIV, hypertension and T2D	Avedis Donabedian's structure, process, and outcome theoretical framework[40] was used to conceptualize Patient perspectives regarding the quality of care in the ICDM model[35] implemented in PHC facilities and regarding the patient-provider interactions in these integrated PHC facilities.

Knight et al.	The ICDM model[35] and Chronic Care Clubs[41] (a counterpart to MACs) were used to understand healthcare integration.	**Langa:** PHC provided care for HIV and the Vanguard Community Health Centre provided similar services as the Langa Clinic and additionally chronic care services (incl. T2D). **Khayelitsha**: provides the same services as Vanguard CHC, including care for HIV and T2D. Different staff members provide care for HIV and NCDs (incl.T2D) in different sections.	• n = Khayelitsha: 14 &Langa: 9. • Gender: Khayelitsha: 5 females & Langa: 5 females. • Age: >50y • Diseases: HIV + co- or multi-morbidity (including T2D) • Income: A majority of the participants received old age and disability social grants (USD 120/month)	Older people living with HIV (OPLWH)'s experiences in accessing healthcare and treatment for co-morbidities including HIV and T2D were conceptualized in the context of the syndemics model.[42] The syndemics model assesses the interaction of two or more concurrent diseases in a biopsychosocial context to consider reasoning for behavior and outcomes.[42]
Moise et al.	The concept of healthcare integration were based on three common models: 1) integrating services for NCD into centers initially providing HIV care; 2) integrating care for HIV into centers initially providing NCD services; and 3) synchronized integration of both HIV and NCD care and services.[11,43]	Study conducted in Chiang Mai, a province of 1.6 million people with 25 hospitals (1 general, 1 university, and 23 community), with 266 health centers. At the time of the study, T2D and HIV clinics were operated independently in Thailand.	• n = 12 • Gender: 9 females and 1 unreported • Age: 42-56y (mean: 49y) • Diseases: Co-morbidity of HIV and DM • Educational level: 2/12: no formal education	The syndemics framework[42] was used to explore patients' knowledge and perceptions of health status and management of care for comorbidity of T2D and HIV.
Mkumba et al.	The concept of integrated healthcare was described as a consolidated care, where all HIV and non-HIV care was provided by a single provider.[44]	Duke Adult Infectious Diseases (ID) Clinic. This clinic provided care for approx. 1900 PLWH. In 2017, 48% of HIV clinic patients received chronic NCD care outside of the clinic.	• n = 20 • Gender: N/A • Age: 44-67y (mean: 52.5y) • Diseases: HIV and NCDs (incl. T2D)	The conceptualization of Patient perspectives was assessed by the HIV patient's preference for provider models for their concurrent NCDs (including T2D) and how NCD care delivery could be improved according to them.
Moucheraud et al.	'Integrated care' if patients reported that they refilled antihypertensive medications and ART during the same clinic visit. Any antihypertensive medication refill outside of Partners in Hope, or at Partners in Hope but not at the same time as an ART visit, was classified as a non-integrated client.	Partners in Hope Medical Center, an urban, PEPFAR (President's Emergency Plan for AIDS Relief)-USAID–supported HIV-treatment site in Malawi. Partners in Hope has both an outpatient clinic that operates on a fee-for-service model and an HIV clinic that provides free care.	• n = 199 • Gender: 130 (65.3%) female • Age: Mean age 52 • Diseases: HIV and hypertension comorbidity • Employment rate: 133 (66.8%) • Income in USD: Mean (Median) 3276 (840)	Assessment of behaviors related to care-seeking and prescription refills.
Peer et al.	Integrated Chronic Disease Management Model. This model incorporates a diagonal approach that integrates the vertical HIV program with the horizontal general healthcare system.	17 public healthcare facilities in Cape Town, South Africa and the surrounding rural municipalities. All clinics treated more than 300 HIV infected patients monthly.	• n = 55 patients (35 in six focus groups and 20 in-depth individual patient interviews) • Diseases: HIV and hypertension comorbidity	The study used the "framework for understanding diabetes care within the context of comorbid chronic conditions" as described by Piette and Ker (2006). Two themes were investigated: 1) Experiences of comorbid HIV and hypertension diagnoses and 2) Experiences with the primary health care system.
Muddu et	HIV and NCD care were co-located. HIV-infected patients received HIV and NCD-focused care simultaneously during their visit. HIV-uninfected persons received treatment for hypertension and/or diabetes.	Three high volume HIV clinics (average 3600 PLHIV) in Eastern Uganda.	• n = 72 patients (60 in FDGs and 12 IDI) • Gender: 50% male • Age: Mean age 47 ± 7.5 • Diseases: HIV and hypertension comorbidity	The Consolidated Framework for Implementation Research (CFIR) was used to explore barriers to and facilitators of HTN/HIV. CFIR's five major domains include intervention characteristics, outer setting, inner setting, characteristics of individuals, and implementation process.
Manavalan et al.	Hypertension care is managed separately from HIV care by a medical doctor or clinical officer in a different department.	Conducted at the Moshi urban district of northern Tanzania at two HIV clinics located in government-funded primary health centers with approximately 2300 adults (1700 women and 600 men) with HIV	• n = 13 patients • Gender: 11 female, 2 male • Age: Median age of 54 (IQR 41–65) years • Diseases: HIV and hypertension comorbidity • Educational level: None 3, Primary 9, Secondary or higher 1	Perspectives and Experiences of PLWH and hypertension were assessed The in-depth interview guide was developed by an interdisciplinary team of physicians, nurses and social scientists from Tanzania and the United States with expertise in hypertension or HIV.

Emerging themes (patient perspectives)

The most prominent themes among patient perspectives and experiences on health care integration were travel and treatment costs, appointment systems, waiting times at the facilities, and HIV related stigma(Table 5).

Travel and treatment costs

Patients in Khayelitsha, Langa and Soweto (SA) experienced excessive travel costs due to multiple appointments at separate clinics for HIV and T2D.[24,27,29]Some patients defaulted their appointments due to travel costs, which led to poor patient-provider relationships: *"If you come late or fail to come, the nurses will be shouting at you. But nobody really cares to know why I did not come. That's why I choose to stay at home some clinic days." (patient).*[27] In one of the facilities in Khayelitsha the services for NCDs (including T2D) and HIV were physically located in the same complex, but because the services were provided separately, the patients did not experience having coinciding appointments, and did therefore not save the travel expenses: *"[…] No, it doesn't happen, I haven't had it yet [that the dates for the appointments coincide]. My appointments are separate."(patient).*[29]PLWH with co-morbid hypertension reported concerns for additional costs of transportation and lost wages when attending integrated medicine refill locations and therefore often preferred to choose location closer to home or with perceived lower costs. However, when assessing actual incurred cost those in the integrated care group reported lower annual cost (US$21 on average) than those in the non-integrated group (US$91 on average). Non-integrated care for hypertension and HIV in Northern Tanzania was also associated with higher cost for antihypertensive medication, provider visits, transport to the clinic, and the expense of a healthy lifestyle.[34] Participants attending integrated care for HIV and hypertension in Cape Town, South Africa reported that lower travel costs and time spent accessing different clinics increased the likelihood of treatment seeking behavior and less defaulting.[10]

Continuity of care and appointment systems

As illustrated by the quote in the previous section, the facility in Khayelitsha (SA) did not provide coherent treatment for HIV and T2D even when the services were located in the same complex.[29] In Langa (SA) on the other hand patients could experience having clashing appointments at two different

clinics.[29] Visiting numerous separate clinics led to patients in Soweto (SA) receiving conflicting information from clinicians, because of poor inter-provider communication: *"Last week the rheumatologist told me that my bones are getting closer to each other, they have inserted metals in my right foot. When I attended the diabetes clinic, the doctor asked me to exercise because I was adding more weight, but I can't exercise because of the surgery they did on my leg. My ARVs have amplified my appetite" (patient).*[27]

In Durham patients were satisfied with NCD care received from their HIV providers, and generally less satisfied receiving NCD care from their primary care provider (PCP). They experienced a stronger patient-provider relationship with their HIV providers compared to their PCP. Patients valued inter-provider communication, which some found was great, while others perceived inadequacies in communication between their providers. Overall, the patients preferred an integrated care model where all their care was consolidated in one place, with one provider: *"I wish my HIV doctor could provide everything…If I could get all my care in one place that would be wonderful rather than travelling to different places" (patient).*[31]

Patients in Free State were glad to receive more comprehensive services after the integration of HIV care in PHC clinics: *''I feel the treatment they give us is better than before. We are seen quicker and everything is checked. I'm tested every 3 months for HIV and my glucose and blood pressure is checked every visit.' (patient).'*[14]While patients in Agincourt experienced rigid appointment systems after the implementation of the ICDM model into PHC facilities in which they were unable to access services for sudden-onset illnesses.[28]

In Cape Town, South Africa, PLWH and co-morbid hypertension experienced a lack of continuity of care (different health care workers) but were generally glad for the more holistic treatment approach in the integrated health care clinics.[10]

Waiting times at the facilities

Long queues and waiting times prior to appointments at the facilities were experienced by patients in Langa and Khayelitsha, especially pronounced prior to clinical appointments for T2D. In the context of HIV services this was not a problem, where advancements have been made through MACs, which avoided overcrowding and reduced waiting times at the health facilities.[24,29]The integrated MACs for HIV, T2D and HT were likewise experienced to be time saving and preventing long queues in Kibera (Kenya).[25]

In Free State and Agincourt (SA), where the PHC clinics had integrated care for HIV and NCDs, the patients experienced staff shortage leading to negative provision of quality services and long waiting times in queuing prior to consultations.[14,28]PLWH with co-morbid hypertension in Cape Town also had concerns related to longer waiting times in integrated health care facilities.[10]

HIV related stigma

Separate medical records, waiting areas and queues were experienced by some patients in Free State and the healthcare staff in DKK and WR to increase HIV related stigma; here illustrated by a patient: *''Those who [have] HIV, they are isolated to show the people that we are HIV [positive]''*[14],and by a nurse: *"They feel like they are being isolated and they feel stigmatized and that other patients can see."*[26]Despite this, many participants in Free State reported a decrease in HIV related stigma due to increased community support and through increased awareness of HIV at the community level.[14]In Cape Town, South Africa, PLWH experienced reduced stigma when attending integrated health care, instead of ART-clinics.[10]

In Kenya the integrated MACs were found to reduce HIV related stigma as some MAC members experienced HIV being treated like *'any other chronic disease'*. While the overall perception was that the MACs reduced the stigma related to HIV, some PLWH that were not using MACs, thought they had to disclose their HIV status to join the clubs, thus fearing of being stigmatized, if someone from their community recognized them. This was, however, not a requirement for joining the clubs. This can be understood in the context of some non-MAC patients explaining the little knowledge they had of the existence of the clubs, while others found the eligibility criteria for the clubs unclear.[25,29]

In Thailand people living with co-morbid HIV and T2D uttered a desire for more privacy regarding their HIV treatment: *"I think if the hospital can separate HIV patients from [others] to make it more private, it'll be good"(patient).*[30]Whether this wish for more privacy was related to HIV related stigma is not mentioned explicitly in the article.

One study received few responses on patient perspectives which led the authors to hypothesize that patients had little information on hypertension.[33]In a study in Northern Tanzania among PLWH and co-morbid hypertension attending non-integrated (separate) care participants reported delayed or non-linkage to hypertension care, low quality or minimal counselling on hypertension and thus expressed a preference for integrated care due to convenience and efficiency.[34]

Table 5. Overview of key themes among patient perspectives for included studies (fragmented versus integrated care

Article	Fragmented vs. integrated care	Key themes among patient perspectives
Matima et al.	Fragmented care	• Travel costs • Long waiting times outside the clinics prior to appointments • Incoherent treatment
Rawat et al.	Integrated care	• Larger number of patients attending the clinic leading to staff shortage • Long waiting times outside the clinics prior to appointments • Poor confidentiality of medical records leading to increased HIV stigma • Health education + more awareness of HIV leading to reduced HIV stigma • Coherent services
Venables et al.	Integrated care	Integrated MACs considered acceptable: • Time saving • Preventing long queues • Provided people with health education and peer-support • Reduced HIV related stigma Non-MAC members: Not knowing the existence of the clubs and confusing eligibility criteria
Lebina et al.	Integrated care	• Separate medical records, waiting areas and queues leading to increased HIV stigma • Poor compliance by patients: poor adherence to appointments and medications
Edna N. Bosire	Fragmented care	• Travel costs leading to patients' defaulted appointments leading to poor patient-provider relationship • Poor inter-provider communication leading to incoherent treatment
Ameh et al.	Integrated care	• Rigid appointment systems • Long waiting times because of long breaks and late arrival of staff • Staff shortage leading to negative behavior of staff members
Knight et al.	Fragmented care	• Travel costs • Long waiting times prior to consultation • Incoherent treatment ○ Clashing appointments in Langa • Poor patient-provider relationship leading to lack of knowledge about MACs

Moise et al.	Fragmented care	• Some people living with comorbid diabetes and HIV were satisfied with their current separate treatments for HIV and T2D, while others uttered a desire for specialized care for comorbid patients. • Some people living with comorbid diabetes and HIV would like even more privacy for their HIV treatment.
Mkumba et al.	Fragmented care	• Satisfaction with NCD care received from HIV provider, and less satisfied receiving NCD care from PCP • Stronger patient-provider relationship with HIV provider than PCP • Would value a stronger inter-provider communication • A desire for an integrated care model where all their care was consolidated in one place, with one provider. • Positive towards increased participation from HIV clinic support staff
Moucheraud et al.	Fragmented and integrated care	Fragmented (non-integrated care) • Additional costs (i.e, beyond costs already incurred for ART visits), costs of transportation to refill visits and lost wages during refill visits. • Refill location for medicines chosen primarily due to perceived lower medication costs and proximity/convenience (e.g., distance to home) Integrated care • Lower annual care-seeking costs (US$21 on average) than those in the non-integrated care group (US$91 on average)
Peer et al.	Integrated care	• Removal of stigma attached to attending ART-clinic • Long waiting times at clinics, being attend to later than other (non-HIV) patients • Lack of continuity of care (different health care workers), but glad for holistic treatment approach • Might lead to greater treatment seeking behavior and less defaulters • Less travel costs and time spent accessing different clinics
Muddu et al. (2020)	Integrated care	• Few responses by patients about integrated HT/HIV care may be an indicator of limited knowledge about hypertension in HIV. • Participants reported gaps in clinician documentation (providers record clinical data in patients' personal books)
Manavalan et al.	Fragmented care	• Delayed or non-linkage to care for hypertension • Minimal and/or low-quality counselling on hypertension • High costs for antihypertensive medication, provider visits, transport to the clinic, and the expense of a healthy lifestyle • All respondents conveyed a preference for integrated care due to convenience and efficiency

Discussion

In this scoping review, we found that patient perspectives and experiences on integrated care for HIV, diabetes and hypertension were mostly positive, in particular reduced HIV-related stigma, reduced travel and treatment costs and a more holistic person-centered care (summary box 1).

We identified 13 articles eligible for this scoping review after applying a broad search strategy including publications between 1990 and 2021 with no geographical restrictions. This illustrates the limited number of publications regarding patient perspectives on healthcare integration of HIV, diabetes type 2 and hypertension services. Of note, all published material was from within the last 5 years (2016-21), indicating that this is an emerging research priority. Clearly, most research on patient perspectives has been conducted in SSA with only one article from North America[31] and one from Asia[30] while none of the other continents were represented. However, this might not be surprising as a rapid increase in the burden of diabetes, hypertension and other NCDs is meeting a growing population of PLWH in many countries in SSA. This epidemiological transition resulting in a double burden of disease leaves many health care systems overburdened.[6] Interestingly, the only study from a high income setting (Duke University, USA) reported that the PLWH interviewed were highly satisfied with integrated care and preferred receiving primary care from their HIV-physician due to the high degree of continuity of care. This is in contrast to studies from SSA, where participants often experienced a lack of continuity of care in integrated care. This might reflect the high staff turn-over and treatment of PLWH or PLWNCD by health care professionals other than physicians.

The study settings could be divided into whether they had integrated care or not. Six studies, all conducted in SSA, tended to have some degree of integrated care, while seven studies reported on fragmented or partially fragmented care. A majority of the studies from SA (n = 6) used the ICDM model[35] to conceptualize healthcare integration. However, there was a discrepancy between how healthcare integration was conceptualized by the ICDM model and the actual infrastructures in these study settings, e.g. many of the places still having separate care for HIV and T2D.[24,27,29]

The diversity of concepts used to assess patient perspectives, underlines the complexity of the topic, and made it difficult to compare these concepts, however, some similarities were identified, indicating that some degree of universality exists when it comes to the needs and wishes of patients. The patient

perspectives regarding travel and treatment costs, continuity of care and appointment systems, waiting times at the facilities, and HIV related stigma were identified as the most important themes. All the studies conducted in fragmented healthcare settings in SSA mentioned travel (and partly treatment) costs as a major burden due to the limited financial resources of patients.[24,27,29,31,32,34] There is no doubt that more integrated care could be cost and time-saving for these patients, though cost saving is not mentioned directly in any of the studies conducted in integrated healthcare settings.

Those accessing integrated care were usually satisfied with the holistic and coherent care received and reduced stigma due to attending a general clinic with non-HIV patients. However, more rigid appointment systems, a lack of continuity of care with conflicting messages from changing health care providers and long waiting times at facilities were experienced as downsides in some health care settings.

Among those using integrated care, some patients expressed areas of improvement. Patients from one study suggested improvements in relation to access to services for sudden-onset illnesses.[28] One approach for this problem could be to have some emergency appointment-times every day at the clinics, which was found to increase patient satisfaction in a publication by Richter et al.[45] Staff shortage,[14,28] long waiting times prior to consultations[23] and patients not knowing the existence of medication adherence clubs, which provide fast access to medication [25,29] reflect the lack of (efficient) used of resources. In general, better coverage with appropriately qualified health care workers is needed to ensure reliable health care services.[26]

In general, the findings of this review point towards the overarching challenge of integrative care to synchronize vertical, disease-oriented care with horizontal health systems strengthening programs. The ideal being to be able to draft health service delivery programs aimed at specific diseases in a manner that at the same time may drive improvement in the wider health system – a diagonal approach.[46]

Strengths and limitations

To the best of our knowledge this is the first systematic scoping review to assess patient perspectives on integration of health care for HIV and NCDs. The scoping review methodology and broad search

terms, reflected in more than 5500 initial records identified, ensure a high sensitivity of our search strategy.

A limitation of the current scoping review is the singular focus on type 2 diabetes and hypertension as indicator conditions. Other important diseases for integration would be mental health, cardiovascular disease, or chronic kidney disease. However, type 2 diabetes and hypertension represent the common, major chronic conditions in Sub-Sahara Africa. Another limitation is that grey literature was not included in the search. However, cursory searches in major search engines and reference lists of included articles have not provided additional findings. In addition, the perspectives of health care workers would be of interest but were not assessed in the current review.

A further weakness is that there were no studies of integrated care and management for HIV, DM and HTN – in other words a clinic that can manage patients with either HIV, DM, HTN or combinations of these. Most of the studies involved only a small component of care to be integrated (e.g. screening) or they involved adding diabetes and hypertension services to HIV programs, which excludes people without HIV from integrated care. Of note, no studies from Europe were identified, however, some hospitals in Europe are working on integrating services (e.g., the multidisciplinary set-up in Modena, Italy (unpublished, authors correspondence). There is a clear need for more research, including longitudinal and interventional studies from different health care settings.

Conclusion

Only few articles in the peer-reviewed literature, with a limited geographical scope, were identified. However, all the publications were from 2016-21, and the majority of the articles were from SSA (n=11), indicating that the topic is an emerging research priority in this region.

Patient's experiences with integrated care were reduced HIV-related stigma, reduced travel and treatment costs and more holistic person-centered care. Prominent concerns were long waiting times at clinics and a lack of continuity of care with the same provider. Non-integrated care was perceived as time-consuming and more expensive. Integration can save resources for health services, which if re-invested can yield benefits for PLWNCDs and PLWH alike. If additional services are simply added to existing ones (e.g. diabetes screening within HIV programmes) it will lead to increased waiting times for participants. The articles included in this review are an important source of evidence for patient-centered integration of HIV and NCD health care services, potentially also as important evidence and lessons for high-income settings (e.g., Europe). There is a paucity of evidence and

further longitudinal and interventional evidence from a more diverse range of health care systems is desirable.

Figure captions

Figure 1. *Prisma Flowchart of the flow of studies through each phase of the review process*

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Data sharing statement

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Authorship contribution statement

CK, SS and PK conceived of the study. SS, CK and PK contributed to data collection and analysis. SS, OK, SJ, CK, KR, PK and CK were involved in drafting and approving the final manuscript.

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Competing interests

The authors declare that they have no competing interests.

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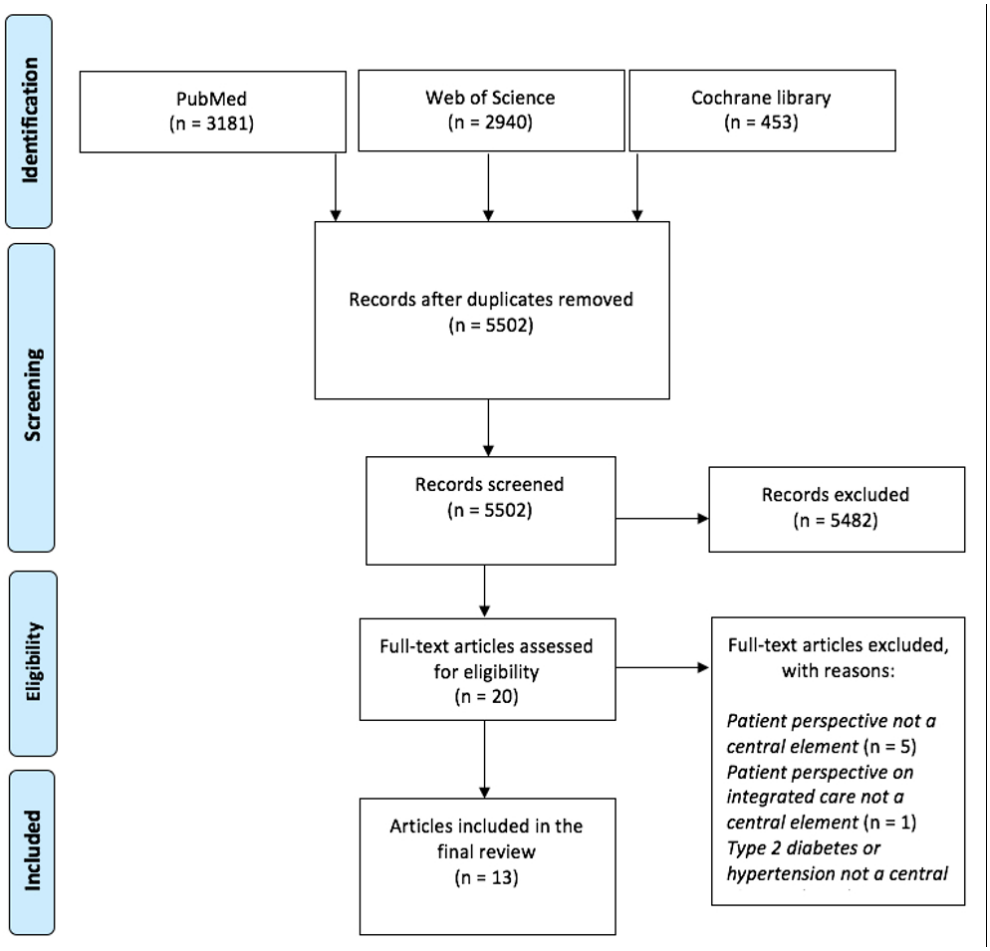

Figure 1. Prisma Flowchart of the flow of studies through each phase of the review process

432x407mm (59 x 59 DPI)

Supplementary File

Supplementary table 1: Search terms used in Web of Science.

Category	Web of Science search strategy
HIV	1) HIV infect* OR HTLV-III-LAV infect* OR HTLV III LAV infect* OR T-lymphotropic Virus Type III infect*, human OR T lymphotropic Virus Type III infect*, human OR HTLV-III infect* OR HTLV III infect* OR HIV coinfect* OR HIV co-infect* 2) Human immunodeficiency virus* OR HIV OR Human T cell lymphotropic virus type III OR Human T-cell lymphotropic virus type III OR Human T-cell leukaemia virus type III OR Human T cell leukaemia virus type III OR LAV-HTLV-III OR Lymphadenopathy-associated virus* OR Lymphadenopathy associated virus* OR Human T lymphotropic virus type III OR Human T-lymphotropic virus type III OR AIDS virus* OR Acquired immune deficiency syndrome virus OR Acquired immunodeficiency syndrome virus OR HTLV-III 3) AIDS OR Acquired immune deficiency syndrome* OR acquired immunologic deficiency syndrome* OR acquired immune deficiency syndrome* OR acquired immuno-deficiency syndrome* OR acquired immuno deficiency syndrome* 4) 1 OR 2 OR 3

NCDs, Diabetes mellitus Type 2 and Hypertension	5) Noncommunicable disease* OR non-infectious disease* OR non infectious disease* OR non-communicable disease* OR OR non communicable disease* OR noninfectious disease* OR non-communicable chronic disease* OR non communicable chronic disease* OR NCD OR NCDs 6) Diabetes mellitus type 2 OR noninsulin-dependent diabetes mellitus OR ketosis-resistent diabetes mellitus OR ketosis resistent diabetes mellitus OR non insulin-dependent diabetes mellitus OR non-insulin-dependent diabetes mellitus OR stable diabetes mellitus OR type II diabetes mellitus OR NIDDM OR noninsulin dependent diabetes mellitus OR maturity-onset diabetes mellitus OR maturity onset diabetes mellitus OR DM2 OR DM OR MODY OR slow-onset diabetes mellitus OR slow onset diabetes mellitus OR Type 2 diabetes OR adult-onset diabetes mellitus OR adult onset diabetes mellitus OR tiidm 7) Hypertens* OR high blood pressure OR high bp OR prehypertens* OR pre-hypertens* OR pre hypertens* OR blood pressure* OR blood pressure determination* OR artierial pressure* OR diastolic pressure* OR pulse pressure* OR systolic pressure* OR arterial tension* OR arterial blood pressure* OR aortic pulse pressure* OR mean arterial pressure* OR aortic pressure* OR aortic tension* OR aortic blood pressure* OR mean aortic pressure* 8) 5 OR 6 OR 7
Health Care Integration	9) (vertical* OR horizontal* OR integrat* OR integrated OR coordinat* OR coordinated OR co-ordinat* OR co-ordinated OR link* OR linked) AND (program* OR care OR service*) OR delivery of health care OR primary health care OR integrat* OR health care OR health-care OR healthcare OR health service) 10) Delivery of health care OR deliver* of health care OR healthcare deliver* OR deliver* of health-care OR health care deliver* OR health care system* OR health care deliver* OR healthcare system* OR health-care system* OR nonclinical distribution* OR non-clinical distribution* OR non clinical distribution* OR community based distribution* OR community-based distribution* OR distributional activit* OR primary health care OR primary healthcare OR primary health-care OR primary care OR health service* OR health care service* OR healthcare service* OR health-care service* 11) Integrated health care system* OR Integrated healthcare system* OR Integrated health-care system* OR integrated delivery system* 12) 9 OR 10 OR 11
	13) 4 AND 8 AND 12

Supplementary table 2: Search terms used in Cochrane library.

Category	Cochrane library search strategy
HIV	1) HIV [MeSH] 2) Acquired immunodeficiency syndrome [MeSH] 3) HIV infection 4) Human immunodeficiency virus 5) Acquired immunodeficiency syndrome OR AIDS 6) 1 OR 2 OR 3 OR 4 OR 5
NCDs, Diabetes mellitus Type 2 and Hypertension	7) Noncommunicable diseases [MeSH] 8) "Noncommunicable disease" OR "non-communicable disease" OR "non communicable disease" 9) NCD OR NCDs 10) Diabetes mellitus, type 2 [MeSH] 11) Diabetes mellitus type 2 12) ((Type 2 OR type ii OR "noninsulin dependent" OR "non insulin dependent" OR "adult onset" OR "maturity onset" OR obes*) AND diab*) 13) T2dm OR tiidm 14) Hypertension [MeSH] 15) Hyperten* OT Prehypertens* OR blood pressure OR bp 16) 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15
Health Care Integration	17) Delivery of health care [MeSH] 18) Integrated delivery system* 19) (vertical OR horizontal OR integrat* OR integrated OR coordinat* OR coordinated OR co-ordinated OR link* OR linked) AND (program* OR care OR service*) OR delivery of health care OR primary health care OR health care OR health-care OR healthcare OR health service 20) 17 OR 18 OR 19
	21) 6 AND 16 AND 20

Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	1
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	3-4
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	3-4
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	N/A
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	4-7
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	4-7
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	4-7
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	4-7
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	4-7
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	4-7
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	4-7

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	4-7
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	8-26
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	8-26
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	8-26
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	8-26
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	8-26
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	27-30
Limitations	20	Discuss the limitations of the scoping review process.	27-30
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	27-30
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	N/A

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.
* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.
† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).
‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.
§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMAScR): Checklist and Explanation. Ann Intern Med. 2018;169:467–473. doi: 10.7326/M18-0850.