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Scoping review of women 's navigation of co-morbid HIV and non-communicable disease (NCD) health conditions and integrated HIV/NCD health services in sub-Saharan Africa.

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Abstract

Background: The 2030 Agenda for Sustainable Development recognises the importance of addressing HIV and NCDs, and establishes the need to address female and child specific health outcomes as a whole. Women experience a triple burden of ill-health spanning non-communicable diseases (NCDs), reproductive and maternal health conditions and human immune deficiency virus (HIV) in sub-Saharan Africa (SSA).

Method: A scoping review methodology was used to map and describe what is known about the health needs, service experiences and health outcomes of women living with HIV (WLHIV), diabetes and/or hypertension in SSA.

Results: The final data set of 15 records represented seven SSA countries (Kenya, South Africa, Tanzania, Uganda, Ghana, Malawi and Zimbabwe). Following final charting and analysis of the data, four themes emerged: *Prevalence of NCD and related co-morbidities; Environmental, biological and cultural determinates of health; Access to healthcare services and medication; and Integrated HIV.NCD care.*

Conclusion: The evidence base with detail on this gendered health topic within the African sustainable development agenda is limited. subject is small. Further research which involves women in the community and female patients receiving integrated care for HIV and NCDs at hospital and primary care levels in SSA is warranted on a larger scale.

Key Words

HIV, non-communicable disease, diabetes, hypertension, integrated care, women, sub-Saharan Africa

Introduction

Worldwide, there is a rapidly increasing burden of non-communicable diseases (NCDs), with an estimated 41 million deaths annually, equivalent to 74% of all deaths globally (World Health Organization, 2022). The World Health Organization (WHO), reports that cardiovascular disease accounts for the majority of NCD related deaths (estimated 17.9 million per year globally), followed by cancers (9.3 million), respiratory diseases (4.1 million), and diabetes mellitus (2 million) (World Health Organization, 2022). Chronic long-term conditions, such as diabetes mellitus and

hypertension, represent a growing challenge to healthcare systems worldwide, with detection and treatment forming critical aspects of the health service response to NCDs (Bennett et al., 2020). Diabetes mellitus and hypertension are also the underlying causes of the majority of NCD related mortality, disproportionately affecting people in low- and middle-income countries (LMICs). Of the 15 million NCD related deaths annually which occur in people aged 30-69 years, 85% occur in LMICs (van Hout et al., 2022) .

Sub-Saharan Africa

In 2021, 1 in 22 adults (24 million) adults in Africa are estimated to be living with diabetes mellitus. The number of adults in Africa with diabetes mellitus is predicted to rise to 55 million by 2045, an increase of 129% (International Diabetes Foundation, 2021). Additionally, more than 1 in 4 adults in Africa are believed to have hypertension (Jaffar et al., 2021). Whilst lifestyle changes associated with urbanisation and globalisation (such as eating habits and lack of physical exercise) underpin the ongoing demographic and epidemiological shift towards increased NCD prevalence, these changes also affect chronic conditions such as human immunodeficiency virus (HIV)/acquired immune deficiency syndrome (AIDS) (Adeloye & Basquill, 2014; Atun et al., 2017; Remais et al., 2013).

HIV/AIDS remains the leading cause of death of adults aged 15–59 years (40.7%) in sub-Saharan Africa (SSA), with females disproportionately affected (44.1 vs 37.9) (Chisumpa et al., 2019). However, whilst the expansion of and improvements in life-saving ART has decreased HIV related morbidity and mortality, this has led to an ageing population living with HIV who are more susceptible to common NCDs such as hypertension (McCombe et al., 2022). Additionally, patient population data from SSA is significantly demonstrating the younger age of onset of NCDs, with comorbidity of NCDs with HIV, and that the impact of NCDs is particularly severe in populations affected by poverty (Addo et al., 2007; Chang et al., 2019; George et al., 2019; Jaffar & Gill, 2017; Remais et al., 2013). 78% of adults over 55 years in SSA are estimated to be living with hypertension (Ibrahim & Damasceno, 2012) and 19 million are living with diabetes mellitus, prevalence anticipated to double between 2010 and 2030 (International Diabetes Foundation, 2021; McCombe et al., 2022). The prevention, control and management of these NCDs is one of the greatest challenges facing health systems and population health in SSA. Additionally, health service coverage for NCDs remains low in contrast to HIV, despite increasing prevalence of co-morbidity of NCDs with HIV (Adeloye & Basquill, 2014; Atun et al., 2017; Remais et al., 2013). For example, only about 5%–10% of persons with diabetes mellitus are thought to be in regular care, and the figure is likely to be similar for persons with hypertension (Addo et al., 2007; Atun et al., 2017; Jaffar & Gill, 2017).

Women and young girls living in the SSA region

Women and young girls disproportionately affected by HIV and NCDs in the SSA region. UNAIDS 2022 data demonstrates that in the SSA, six in seven new HIV infections among adolescents aged 15–19 years are among girls. Also, girls and young women aged 15–24 years are twice as likely to be living with HIV than young men; and that women and girls accounted for 63% of all new HIV infections in SSA during 2021 (UNAIDS, 2022). The WHO Global Status Report on NCDs predicts that, by 2030, 85% of NCD-related deaths among women will occur in LMICs, many of which are in SSA (SSA) (Alwan et al., 2011) For women living in LMICs, there is a triple burden of ill-

health from NCDs, reproductive and maternal health conditions and communicable diseases (HIV) (M. C. A. van Hout et al., 2022). This triple burden results in a significant risk of developing NCDs (NCD Alliance, 2022). Furthermore, the double burden of HIV and NCD related complications amongst pregnant women (including hyperglycaemic disorders, hypertensive disorders, weight gain, and osteopenia) in LMICs with high burden of HIV disease constitutes a significant public health threat for all women of childbearing age (Hoffman et al., 2021). Women with cardiovascular disease in LMICs are also more likely to die from it than women in higher resource settings (NCD Alliance, 2022). In order to respond to the gap in evidence, a scoping review was conducted to map and describe the health needs, experiences and outcomes of WLHIV and diabetes and/or hypertension in the SSA region.

Methodology

Scoping reviews are predominantly used with the aim of addressing broader research questions than a systematic literature review may be able to answer (Arksey & O'Malley, 2005; Khalil et al., 2016; Levac et al., 2010; Peters et al., 2015) A scoping review is defined as *“a type of knowledge synthesis, following a systematic approach to map evidence on a topic and identifying main concepts, theories, sources, and knowledge gaps”* (Tricco et al., 2018). This approach is generally adopted to identify knowledge gaps, examine the nature/characteristics, size, and the range/variety) of a specific subject (in the case of this research, WLHIV and diabetes mellitus an/or hypertension in the SSA region), summarise the findings of a large diverse body of knowledge, and propose health agendas for future policy, interventions and research (Arksey & O'Malley, 2005; Levac et al., 2010; Tricco et al., 2016). Our scoping review was underpinned by the research question **“What do we know about the health needs, experiences and outcomes of WLHIV and diabetes and/or hypertension in the SSA region”**. A five-stage iterative process scoping review methodology, as set out by Arksey and O'Malley (2005) methodology was closely adhered to.

All searches were carried out through university electronic library between November 2022 and June 2023. The databases searched where: MEDLINE, CINAHL, Web of Science, and SCOPUS. Searches were limited to the past 10 years, also to English language. An additional secondary search was conducted using Google Scholar and comprehensive backward and forward citation search of the bibliographies within available literature. Grey literature searches were also undertaken, including searches of various UN Agency websites. The resulting list of citations was saved in the citation management programme Endnote, screened for duplicates, and all records managed and categorised accordingly. Search terms were developed from identified key concepts which included knowledge, attitudes, practices of care and barriers to care for WLHIV and diabetes and/or hypertension in the SSA region (**Table 1**). The framework for study inclusion was adopted using the Population, Interest, and Context (PICo) framework for qualitative studies (Munn et al., 2018) (**Table 2**). All eligible publications based on the inclusion criteria were screened in a two-step process (Waffenschmidt et al., 2019). This included a first stage of title and abstract screening followed by a second stage of full-text screening.

Table 1: Search Terms

S1	TI ("NCD" OR "Noncommunicable disease*" OR "non-communicable disease*") OR AB ("NCD" OR "Noncommunicable disease*" OR "non-communicable disease*")	Boolean/Phrase
S2	(MH "Noncommunicable Diseases")	Boolean/Phrase
S3	S1 OR S2	Boolean/Phrase
S4	TI (diabetes OR hypertension OR “cardiovascular diseas*” OR “heart disease risk” OR “high blood pressure”) OR AB (diabetes OR hypertension OR “cardiovascular diseas* ” OR “heart disease risk” OR “high blood pressure”)	Boolean/Phrase
S5	(MH "Diabetes Melitus+") OR (MH "Hypertension+")	Boolean/Phrase
S6	S4 OR S5	Boolean/Phrase
S7	S3 OR S6	Boolean/Phrase
S8	TI "HIV" OR “human immunodeficiency virus” OR AB "HIV" OR “human immunodeficiency virus”	Boolean/Phrase
S9	(MH "HIV+")	Boolean/Phrase
S10	S8 OR S9	Boolean/Phrase
S11	Angola OR Benin OR Botswana OR “Burkina Faso” OR Burundi OR Cameroon OR “Central African Republic” OR Chad OR Congo OR Cote d'Ivoire OR Eritrea OR Ethiopia OR Gabon OR Gambia OR Ghana OR Guinea OR Guinea-Bissau OR Kenya OR Lesotho OR Liberia OR Madagascar OR Malawi OR Mali OR Mauritania OR Mauritius OR Mozambique OR Namibia OR Niger OR Nigeria OR Rwanda OR Senegal OR Sierra Leone OR Somalia OR South Africa OR “United Republic of Tanzania” OR Togo OR Uganda OR Zaire OR Zambia OR Zimbabwe OR “SSA” OR sub Saharan Africa	Boolean/Phrase
S12	(MH "Africa South of the Sahara+")	Boolean/Phrase
S13	S11 OR S12	Boolean/Phrase
S14	S7 AND S10 AND S13	Boolean/Phrase
S15	LIMIT TO WOMEN	Boolean/Phrase
S16	TI (Women OR Girl* OR female) OR AB (Women OR Girl* OR female)	Boolean/Phrase
S17	(MH "Women+")	Boolean/Phrase
S18	S16 OR S17	Boolean/Phrase
S19	S14 AND S18	Boolean/Phrase
	COMPARE RESULTS FOR 15 VS 19	Boolean/Phrase

S20	S15 OR S19	Boolean/Phrase
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Table 2: Framework for the inclusion of studies in the review

TOOL [PICo]	Inclusion Criteria	Exclusion Criteria
Population	<ul style="list-style-type: none"> - Women or Young Girls living with HIV/AIDS and DM and/or HTN - Adults will be defined according to the WHO standardization criteria as people aged 20 years and above (Ahmad et al., 2001) 	<ul style="list-style-type: none"> Males Women or Young Girls who are not living with HIV/AIDS
Interest	<ul style="list-style-type: none"> - Studies that include knowledge about Women or Young Girls living with HIV/AIDS and DM and/or HTN. - Studies pertaining to the barriers in accessing healthcare for WLHIV and DM and/or HTN. - Studies that include attitudes towards integrated care for HIV and DM and/or HTN. - Studies that include WLHIV's experiences of integrated care for HIV and DM and/or HTN. - Studies that include practices concerning integrated care for HIV and NCDS. 	<ul style="list-style-type: none"> Studies pertaining to other communicable diseases or conditions Studies where HIV/NCD co-morbidities are not present.
Context	<ul style="list-style-type: none"> - Studies carried out in all settings within SSA 	<ul style="list-style-type: none"> All studies carried out of SSA will be excluded

Study Selection

The initial search identified 13,029 records based on the search terms outlines in Table 1. Following initial examination 8,662 records were removed (e.g. duplicates, studies outside of SSA and not diabetes/Hypertension) (see Figure 1 for detailed breakdown). This was then followed by title and abstract screening of the 4,367 records remaining. Studies included were empirical studies in peer-reviewed journals, clinical case reports, and grey literature such as national policy reports and documents and needs assessments. Subsequently, 852 records were identified for charting and full-text screening whereby a further 840 were removed leaving a final number of 12. Manual hand searching of the reference lists of these 12 records was carried out as an additional step to capture any further empirical studies and in particular grey literature, resulting in a final number of 15 records for charting and analysis. Finally, a search for grey literature was carried out using google scholar and on websites of relevant public health and community organisations. This additional search failed to provide any additional records which were not already included captured in previous stages.

[Fig 1: Charting of Included Studies]

Citation	Type of Record	Population	Country (Countries)	Method	Finding / Conclusion
Birungi, J., Kivuyo, S., Garrib, A., Mugenyi, L., Mutungi, G., Namakoola, I., Mghamba, J., Ramaiya, K., Wang, D., Maongezi, S., Musinguzi, J., Mugisha, K., Etukoit, B.M., Kakande, A., Niessen, L.W., Okebe, J., Shiri, T., Meshack, S., Lutale, J., Gill, G., Sewankambo, N., Smith, P.G., Nyirenda, M.J., Mfinanga, S.G. and Jaffar, S., (2021) Integrating health services for HIV infection, diabetes and hypertension in sub-Saharan Africa: a cohort study. <i>BMJ open</i> , [online] 1111. Available at: https://pubmed.ncbi.nlm.nih.gov/34728457/	Journal Article	Primary Care Patients	Tanzania & Uganda	Examination of an integrated care model for PLHIV in sub-Saharan Africa	Study demonstrated that integration of HIV, DM and hypertension services achieved high levels of patient retention and can provide a comprehensive service for those with co-morbidities.
Bukenya, D., van Hout, M.C., Shayo, E.H., Kitabye, I., Musenze Junior, B., Kasidi, J.R., Birungi, J., Jaffar, S. and Seeley, J., (2022) Integrated healthcare services for HIV, diabetes mellitus and hypertension in selected	Journal Article	Integrated care service users and healthcare workers	Uganda	Interviews with service users and health care workers within a newly established HIV/NCD integrated care clinic	Integrated healthcare services save patients time, improve their access to services and increase their general health literacy. However, issues in the supply of equipment, medications, fully supported healthcare workers were

<p>health facilities in Kampala and Wakiso districts, Uganda: A qualitative methods study. <i>PLOS Global Public Health</i>, [online] 22, p.e0000084. Available at: https://journals.plos.org/globalpublichealth/article?id=10.1371/journal.pgph.0000084</p>					<p>observed and a greater commitment for improvement at government level needed.</p>
<p>Chiwandire, N., Zungu, N., Mabaso, M. and Chasela, C., (2021) Trends, prevalence and factors associated with hypertension and diabetes among South African adults living with HIV, 2005–2017. <i>BMC Public Health</i>, [online] 211, pp.1–14. Available at: https://bmcpublihealth.biomedcentral.com/articles/10.1186/s12889-021-10502-8</p>	<p>Journal Article</p>	<p>Adults living with HIV</p>	<p>South Africa</p>	<p>Secondary analysis of data from the South African National HIV Prevalence, Incidence, Behaviour, and Communication (SABSSM) surveys in 2005, 2008 and 2017 to establish trends, prevalence and risk factors for Dm and hypertension in PLHIV.</p>	<p>Findings showed that urbanisation may have played a significant role in the increased prevalence of DM and hypertension. Also, women were found to have a higher prevalence of NCDs compared to men.</p>
<p>Clouse, K., Motlathledi, M., Bonnet, K., Schlundt, D., Aronoff, D.M., Chakkalakal, R. and Norris, S.A., (2018) 'I just wish that everything is in one place': facilitators and barriers to continuity of care among HIV-positive, postpartum women with a non-</p>	<p>Journal Article</p>	<p>Postpartum HIV-positive women</p>	<p>South Africa</p>	<p>Examination of postpartum WLHIV with NCD's, and the facilitators and barriers to treatment and follow-up to better manage co-morbidity.</p>	<p>The study found that female patients were more likely to seek advice regarding HIV and NCD's from family, peers and their community, whereas they would seek medical advice for issues relating to their baby's health. These findings may indicate a lack of</p>

<p>communicable disease in South Africa. <i>AIDS care</i>, [online] 30sup2, pp.5–10. Available at: https://pubmed.ncbi.nlm.nih.gov/29848002/</p>					<p>counselling or patient interaction in the clinic, and a call for integration of maternal care into the HIV and NCD care pathways. WLHIV were also found to struggle to achieve continuity of HIV care after delivery, with additional struggles if NCD co-morbidity is present.</p>
<p>Gonah, L., Moodley, I. and Hlongwana, K., (2020a) Effects of HIV and non-communicable disease comorbidity on healthcare costs and health experiences in people living with HIV in Zimbabwe. <i>Southern African journal of HIV medicine</i>, [online] 211. Available at: https://pubmed.ncbi.nlm.nih.gov/32934832/</p>	<p>Journal Article</p>	<p>People living with HIV attending 6 ART clinics</p>	<p>Zimbabwe</p>	<p>An insight and analysis into the effects of HIV-NCD co-morbidity for PLHIV, the ability to carry out daily activities and the related costs, experiences and treatment options available.</p>	<p>An increased number of days being unable to carry out usual daily tasks as a result of HIV/NCD co-morbidity was associated with being female in comparison to male. Women bear a greater burden of comorbid disease, and experience greater ‘disability’. Multi-morbidity was more common amongst females than males. Female participants were less likely than males to be able to afford monthly medication. The links between female gender and unemployment (prevalent in patriarchal societies, such as Zimbabwe) Predispose unemployed female participants to negative health outcome. Lack of employment results in</p>

					inability to afford NCD medications and take control of their health.
Gonah, L., Moodley, I. and Hlongwana, K., (2020b) Prevalence of diabetes mellitus and hypertension in people living with human immunodeficiency virus on antiretroviral therapy in Gweru district, Zimbabwe. <i>African journal of primary health care & family medicine</i> , [online] 121. Available at: https://pubmed.ncbi.nlm.nih.gov/32787407/	Journal Article	People living with HIV attending 6 ART clinics	Zimbabwe	Overview of the prevalence of DM and hypertension in PLHIV attending ART clinics.	Women were 3 times more likely than men to have a prevalence of DM and/or hypertension. Urban ART sites also showed an increased prevalence of DM and hypertension compared to rural ART sites. A correlation between higher levels of obesity in women is suggested to correlate with their increased risk of DM and hypertension.
Hanley, S., (2019) Primary prevention of cardiovascular disease in South African women living with HIV. <i>South African family practice: official journal of the South African Academy of Family Practice/Primary Care</i> , [online] 616, p.273. Available at: /pmc/articles/PMC6939387/	Journal Article: Open forum opinion	Women living with HIV	South Africa	Brief opinion piece regarding the impact of culture-specific body image and its implications of high levels of hypertension and cardio-vascular disease amongst South African women	A heightened immune activation and inflammation and higher BMI are believed to be risk factors for WLHIVs increased hypertension prevalence. Women may have sex-specific risk factors and culture-specific perceptions of body image which heighten their risk of NCD/HIV co-morbidities.
Hing, M., Hoffman, R.M., Seleman, J., Chibwana, F., Kahn, D. and Moucheraud, C., (2019) 'Blood pressure can kill you tomorrow, but HIV gives you time':	Journal Article	Adults living with HIV and Hypertension	Malawi	Examination into the factors effecting adherence to HIV and hypertension treatments within Malawi, including illness perceptions, and medication affordability.	Costs of anti-hypertension medications are too much and often come at the expense of other household items. Transportation costs to access NCD medications

illness perceptions and treatment experiences among Malawian individuals living with HIV and hypertension. <i>Health policy and planning</i> , [online] 34Supplement_2, pp.II36–II44. Available at: https://pubmed.ncbi.nlm.nih.gov/31723966/					are a burden to many, and impact on ability to adhere to medication regime. Many patients rely on family members and friends for financial support to purchase medications, which leaves them feeling ashamed.
Morgan, S.A., Eyles, C., Roderick, P.J., Adongo, P.B. and Hill, A.G., (2019) Women living with multi-morbidity in the Greater Accra Region of Ghana: a qualitative study guided by the Cumulative Complexity Model. <i>Journal of biosocial science</i> , [online] 514, pp.562–577. Available at: https://pubmed.ncbi.nlm.nih.gov/30472965/	Journal Article	WLHIV attending polyclinics	Ghana	Collation of the perceptions and experiences of women living with multi-morbidity in Ghana, and how the system responds to their needs.	Many women reported depending of family members or pastors for financial aid to purchase NCD medications. Some medications were avoided all together due their unaffordability.
Okyere, J., Ayebeng, C., Owusu, B.A. and Dickson, K.S., (2022) Prevalence and factors associated with hypertension among older people living with HIV in South Africa. <i>BMC Public Health</i> , [online] 221, pp.1–9. Available at: https://bmcpublihealth.biomedcentral.com/article	Journal Article	Older (age 50+) people living with HIV	South Africa	Findings specific to those PLHIV over the age of 50+ and the associated prevalence of hypertension within this age group. Risk factors of increased risk also examined,	Women were more likely to hypertension than men (58% VS 22.9%). Older females were five times more likely than males to have hypertension. Biological changes such as pregnancy and menopause may influence women’s increased prevalence of hypertension

s/10.1186/s12889-022-14091-y					
Roomaney, R.A., van Wyk, B., Cois, A. and Pillay-van Wyk, V., (2022a) Multimorbidity Patterns in a National HIV Survey of South African Youth and Adults. <i>Frontiers in public health</i> , [online] 10. Available at: https://pubmed.ncbi.nlm.nih.gov/35444991	Journal Article	People aged 15+ in South Africa	South Africa	Synopsise of a secondary analysis of the Fifth South African National HIV Prevalence, Incidence, Behaviour and Communication Survey (SABSSM 2017) whereby the prevalence of multimorbidity is discussed and associated factors.	Prevalence of multi-morbidity was higher amongst females, and increased with age. Women's increased likelihood to seek medical care, as well as to self-report medical conditions to researchers was considered to be a factor for increased reported prevalence.
Roomaney, R.A., van Wyk, B., Cois, A. and Pillay-van Wyk, V., (2022b) One in five South Africans are multimorbid: An analysis of the 2016 demographic and health survey. <i>PLOS ONE</i> , [online] 175, p.e0269081. Available at: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0269081	Journal Article	People aged 15+ in South Africa	South Africa	Secondary data analysis of the 2016 Demographic and Health Surveys (DHS) 6 (SADHS 2016) in order to establish prevalence and risk factors associated with sex and age.	Prevalence of multi-morbidity in females was almost double that of males. Younger females (15-34years) had larger odds of being multi-morbid compared to males across 6 NCD's and HIV.
Shayo, E.H., Kivuyo, S., Seeley, J., Bukenya, D., Karoli, P., Mfinanga, S.G., Jaffar, S. and van Hout, M.C., (2022) The acceptability of integrated healthcare services for HIV and non-communicable diseases: experiences from patients and healthcare workers in	Journal Article	Integrated HIV/NCD care service users and healthcare providers	Tanzania	Interviews with service users and healthcare providers within a newly established HIV/NCD integrated care clinic	Integrated healthcare services were satisfied overall with the integrated care model. However, issues with long wait times, supply of medications, and minimal privacy were discussed. Those with HIV/NCD comorbidity were low in number but expressed a desire to

<p>Tanzania. <i>BMC Health Services Research</i>, [online] 221, pp.1–12. Available at: https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-022-08065-4</p>					<p>continue integrated services.</p>
<p>Van Hout, M.C.A., Zalwango, F., Akugizibwe, M., Namulundu Chaka, M., Bigland, C., Birungi, J., Jaffar, S., Bachmann, M. and Murdoch, J., (2022) Women living with HIV, diabetes and/or hypertension multi-morbidity in Uganda: a qualitative exploration of experiences accessing an integrated care service. <i>Journal of Integrated Care</i>, [online]. Available at: https://www.emerald.com/insight/content/doi/10.1108/JICA-06-2022-0033/full/html</p>	<p>Journal Article</p>	<p>Women living with HIV and hypertension and/or diabetes</p>	<p>Uganda</p>	<p>Thematic analysis of narratives presented by WLHIV with DM and/or hypertension, their experiences of integrated care, and health behaviours.</p>	<p>Participants reported satisfaction with the “one stop” integrated clinic and reported improved medical treatment and care compared to separate HIV and NCD clinics. An improvement in quality of life as a result of integrated clinic was reported, as well as a stabilisation of their medical conditions. Psychological, time and economic benefits, including an increased ability to work and earn income was a main positive finding. Financial constraints and the decision between food or medications was a mitigating factor for adherence to medical regime. Some participants reported needing to rely on family for support due to an inability to work as a result of their illnesses.</p>

Using Microsoft Excel, a spreadsheet was created to chart relevant data with the headings: author, title, year of publication, country of publication, study type, population, setting, Hypertension/Diabetes/Both, and key findings. The extracted data was then thematically analysed to identify commonalities, emergent issues, themes, and gaps in the literature using Microsoft Excel spreadsheet. The spreadsheet data extraction table was broad, to ensure all records included were thoroughly analysed. Keywords and themes emerging were generated and charted in parallel to the data extraction. Following final charting and analysis of the data as outlined above, four themes emerged: *Prevalence of NCD and related co-morbidities*; *Environmental, biological and cultural determinates of health*; *Access to healthcare services and medication*; and *Integrated HIV.NCD care*.

[Table 3: Charting of included studies – See Supplementary Appendix 1]

Results

Profile of studies

The final 15 record comprised of qualitative studies (n=6), mixed methods studies (n=1), retrospective data analysis (n=4), reviews (n=1) and case control quantitative studies (n=2). The records originated from a variety of sub Saharan countries including Uganda (Bukonya et al., 2022; M. C. Van Hout et al., 2023; M. C. A. van Hout et al., 2022), South Africa (Chiwandire et al., 2021; Clouse et al., 2018; Hanley, 2019; Okyere et al., 2022; Roomaney et al., 2022a, 2022b), Zimbabwe (Gonah et al., 2020a, 2020b), Malawi (Hing et al., 2019), Ghana (Morgan et al., 2019) and Tanzania (Shayo et al., 2022) and well as one which represented both Tanzania and Uganda (Birungi et al., 2021). Studies included ranged from 2018 to 2023.

Prevalence of NCD and related co-morbidities

Prevalence of WLHIV and diabetes mellitus and/or hypertension was reported in six studies (Birungi et al., 2021; Gonah et al., 2020a, 2020b; Okyere et al., 2022; Roomaney et al., 2022b, 2022a). Birungi et al. found that 75.1% (n= 437) of women who were attending selected health care facilities in Tanzania and Uganda had multiple conditions (detailed as HIV, diabetes mellitus or hypertension) (Birungi et al., 2021). The increased burden of co-morbidities for WLHIV was further evidenced in Zimbabwe, where a study of NCD co-morbidity amongst PLHIV attending anti-retroviral clinics showed that the prevalence of diabetes mellitus and/or hypertension among WLHIV was 74.9%, almost 3 times higher than the male counterparts (25.1%) in the same study (Gonah et al., 2020b). Amongst the PLHIV involved in the study, 5.9% also had a confirmed diagnosis of both diabetes mellitus and hypertension, with the overwhelming majority (72.1%) being female (Gonah et al., 2020b). Additional analysis conducted amongst PLHIV in Zimbabwe confirmed this imbalance, with case group findings indicating that two or more NCDs were more common in female cases compared with males (Gonah et al., 2020a).

This increased burden of co-morbid disease for WLHIV is one which has also been evidenced in South Africa, where results from the WHO SAGE Well-Being of Older People Survey (WOPS), found that older WLHIV were five times more likely than their male counterparts to have hypertension (Okyere et al., 2022). Another South African study

indicated that although women had a higher prevalence of multimorbidity than men across all age groups examined, increased age was a risk factor amongst women particularly with a 21.9% prevalence rate amongst the oldest age group (70+) (Roomaney et al., 2022a)

Interestingly however other studies from the same country demonstrated that it's not just those of an older age which have an increased risk. Findings from a national South African study (Roomaney et al., 2022b) showed that approximately 32% of people with HIV under 30 years of age also had hypertension, with females being more frequently affected. Additionally, younger females (15–34 years) from the same South African study were found to have increased odds of being multimorbid compared to males in the same age groups (Roomaney et al., 2022b).

Environmental, biological, and cultural determinates of health

A number of studies examined the potential causes for increased risk of co-morbidity for WLHIV, ranging from biological factors to environmental determinates. Urbanisation and its implications on health were identified in two studies in South Africa and Zimbabwe with both indicating a higher prevalence of comorbidity in female patients who reside in an urban setting in comparison to rural locations. In a Zimbabwe based study, diabetes mellitus was found in 1,494 out of 17,784 PLHIV (8.4%), the majority of them being female patients (76.4%). The prevalence of diabetes mellitus amongst the PLHIV in urban clinical sites in Zimbabwe was 8.7%, yet only 6.5% in rural ART sites (Gonah et al., 2020b). Furthermore, the prevalence of comorbid diabetes mellitus and hypertension in urban ART sites was 6.0%, compared to 5.0% in rural ART sites.(Gonah et al., 2020b) A South African study which examined data from three separate years of national HIV surveys also found that females who resided in an urban area had the highest prevalence of both diabetes mellitus and hypertension (Chiwandire et al., 2021). The correlation between urbanisation and the associated lifestyle changes such as poor diet and low physical activity) are documented as increasing the risks for both diabetes mellitus and hypertension (Price et al., 2018) and were highlighted within this review.

In addition to urbanisation, biological factors associated with being female were highlighted, and how they may also play a role in increasing risk of HIV/NCD co-morbidities. WLHIV in South Africa are thought to be at a higher risk of developing diabetes mellitus and hypertension as a result of their higher body mass index and hip-to-weight ratios when compared with their male counterparts (Chiwandire et al., 2021; Gonah et al., 2020a; Hanley, 2019). Hanley also indicated that a heightened immune activation and inflammation (which increases risk of hypertension) have been shown to be more pronounced in WLHIV, and possibly related to sex hormonal differences (Hanley, 2019). Furthermore, Hanley expanded on the correlation between weight, BMI and an increased risk of diabetes mellitus and hypertension, by suggesting that body image, and culture-specific perceptions encountered in their South African study, suggest a higher BMI and body weight amongst women is culturally promoted (Hanley, 2019). Further biological influences for WLHIV's increased NCD risk observed in two studies from South Africa included the physical changes women undergo, such as menopause and pregnancy (Clouse et al., 2018; Okyere et al., 2022). It's reported that after menopause a process of endogenous oestrogen withdrawal takes place which exacerbates the likelihood of post-menopausal hypertension. Also, during pregnancy women sometimes face gestational hypertension and eclampsia which does not resolve post-partum (Okyere et al., 2022)

Throughout the studies retrieved in this scoping review, there was consistently a higher proportion of female study participants. One explanation reported was the higher likelihood for women to be actively seeking healthcare in comparison to men, as well as their increased tendency to self-report conditions to researchers (Roomaney et al., 2022a). This proactive healthcare seeking behaviour was not validated throughout the selected studies however. Findings from post-partum WLHIV in South Africa suggested that for both NCDs and HIV, survey participants reported turning to family and their community for advice and support as opposed to clinic staff. When asked who they seek advice from regarding their baby's health however, the majority of WLHIV stated they would seek clinicians' advice (Clouse et al., 2018). Furthermore, WLHIV were reported to struggle to achieve continuity of HIV care after delivery with findings suggesting that having a co-morbid NCD results in multiple clinic visits with many hours spent at each (Clouse et al., 2018). This reluctance to discuss their own issues, and evidence for increased instability of HIV care post-partum, suggest that ease of discussion is not universal amongst women.

Access to healthcare services and medication

Employment, and its associated financial implications, consistently came through as a limiting factor for WLHIV trying to access and maintain HIV and NCD care. Gonah's (2020a) analysis from Zimbabwe found that the female gender and unemployment are inextricably linked together in patriarchal societies, such as that in Zimbabwe, predisposing unemployed female participants to negative health outcomes. It was also noted that female participants were statistically less likely than males to be able to afford monthly medication requirements (Gonah et al., 2020a). Women's ability to continue in employment was observed to have been considerably impacted whilst navigating HIV/NCD co-morbidities, with many being unable to work consistently, if at all (van Hout et al., 2022). The inability to work was discussed further, with WLHIV detailing the need to rely on family members for financial support, and lack of income as being a key factor in patients' inability to afford NCD medication (M. C. A. van Hout et al., 2022). Interestingly, one of the positive outcomes for WLHIV enrolled in the HIV/NCD integrated care services outlined in Van Hout et al's study in Uganda, was a return to regular working activities and there-by having a regular income. Additionally, it is not just employment specifically which is affected, as Gonah et al (2020b) examined the implications of NCD co-morbidity amongst PLHIV in Zimbabwe, and how this effects the daily lives of those effected. The study found that larger number of days spent without doing usual daily tasks or activities were more heavily associated with being female, and that women spent more days without usual daily activities when compared with men in both cases and controls (Gonah et al., 2020a).

A commonly reported theme in the literature is the unaffordability of NCD medications in SSA, which in turn effects patients both physically and psychologically. (Gonah et al., 2020a; Hing et al., 2019; Morgan et al., 2019; M. C. A. Van Hout et al., 2022) A respondent from the Ugandan study on WLHIV by Van Hout and colleagues illustrates this struggle by stating:

"Sometimes I can only get very little money for buying food and so I cannot afford to spend it on

medicine before I buy food" (Widowed WLHIV with hypertension, 44 years) (M. C. A. van Hout et al., 2022).

A study of PLHIV based in Malawi reported that female interview respondents perceived antihypertensive medications, and the cost of travel to access them, as too excessive to afford monthly and if purchased, came at the expense of other household items or food (Hing et al., 2019). Additionally, WLHIV in the same study expressed worry and anxiety in knowing that they had a health issue (hypertension) but were unable able to take action on it because of money (Hing et al., 2019). In order to maintain medication adherence, participants from three studies in Uganda, Malawi and Ghana disclosed that family members or friends would sometimes lend them money to pay for the drugs but felt shame at having to ask that burden of their loved ones or members of the community (Hing et al., 2019; Morgan et al., 2019; M. C. A. van Hout et al., 2022). In the case of WLHIV with multi-morbidities, having more than one NCD in addition to HIV naturally translated into more money needed to purchase medication (Gonah et al., 2020a). Gonah's findings from Zimbabwe suggests that given that the majority of the co-morbid women who participated in their study were either unemployed or had an unstable source of income, this lack of financial revenue significantly hinders their adherence to medication regimes (Gonah et al., 2020a).

Integrated HIV/NCD care

Four studies from Uganda and Tanzania specifically discussed the experiences of patients attending integrated HIV/NCD clinics, with data pertaining specifically to females being noted. One WLHIV with diabetes mellitus and hypertension from a clinic in Tanzania reported a greater level of satisfaction with her care in comparison to single services and went on to state that she would advise her friends and family to join the integrated care clinic (Shayo et al., 2022). Similarly, findings from a Ugandan integrated care clinic detailed the satisfaction of one WLHIV, who felt the level of care she was provided with was higher than that of a single clinic, with particular appreciation for calls the clinic made prior to her appointment to remind her to attend, and follow up conversations (Bukonya et al., 2022). Van Hout et al. (2022) also reported findings specifically from WLHIV and diabetes mellitus and/or hypertension, attending a "One Stop" integrated care clinic in Uganda WLHIV all said that they wished to continue receiving care at the "one stop" clinic. All described feeling that their medical treatment and care was much improved, compared to that received from separate HIV and NCD clinics, and described how their quality of life had improved. Additionally, all reported that their conditions became stable when using the clinic, with many experiencing both psychological and economic benefits, including an increased ability to work and earn an income for their families (M. C. A. van Hout et al., 2022). Furthermore later interviews with patients and focus groups with community members revealed how for patients with HIV and diabetes mellitus and/or hypertension, the ability to be treated and receive medicine in one visit for multiple conditions had benefits on the amount of time, money and physical effort required by patients to get help for their condition (M. C. Van Hout et al., 2023).

Discussion

This is the first scoping review to date which focused explicitly on the situation of WHLIV with diabetes mellitus and/or hypertension within the SSA region. Whilst the number of studies with details on this topic is limited, the

information within all points to a number of key themes and questions which require further investigation and consideration.

Understanding the correlation between increased BMI and weight within WLHIV, and the African culture-specific perceptions of body image is perhaps key to mitigating risk factors for NCD development and progression of disease. Previous studies have shown that low-body weight and wasting syndrome, linked to progressed HIV/AIDS, has been shown to be associated with stigma (Serwadda et al., 1985). As a result, PLWHIV and WLHIV tend to embrace weight gain through adoption of poor eating patterns like high caloric diets so as to avoid being stigmatised (Nalugga et al., 2022). There is further discussion to be had around cultural beliefs that a larger body size is more desirable as it is thought to be a sign of health, prosperity and fertility (Alhassan et al., 2022; Croffut et al., 2018; Matoti-Mvalo & Puoane, 2016; Nalugga et al., 2022; Nyamaruze & Govender, 2020). The reality for WLHIV in SSA in particular is this increased weight, whether it be due to lifestyle, cultural beliefs, or stigma, puts them at an increased risk of developing diabetes mellitus and hypertension, further increasing their disease burden.

Women's propensity to actively seek health care, and to self-report their conditions was a consideration which needs to be acknowledged, particularly in the role it plays in facilitating the higher prevalence figure amongst the studies included. This tendency to self-report could be attributed to a mix of biological factors and societal gender inequalities which contribute to the size of the gender gap overall in self-reported health (Boerma et al., 2016). This openness in conversation was not indicated in all studies however, and for postnatal WLHIV the discrepancy between their likelihood to talk to medical staff about their baby, but not their HIV or NCD's, may underscore a reluctance to talk to healthcare providers about their own needs, and also may indicate a lack of counselling and patient interaction within those services. This also may highlight a key opportunity to use maternity care as a starting point to not only improve care after delivery, but to offer follow-up care for chronic conditions like HIV and NCDs. Furthermore, by integrating maternity and sexual health services into HIV and NCD clinics, the post-delivery struggles for WLHIV to maintain their HIV/NCD regimen may be improved, with reduced visits required and a greater level of care and education.

Whilst integrated care models for HIV and NCD's in SSA and other low resource settings have been evaluated over the last decade (Ameh, Klipstein-Grobusch, Musenge, et al., 2017; Bosire, 2021; Lebina et al., 2020; Matima et al., 2018; Moucheraud et al., 2020; Muddu et al., 2020; Venables et al., 2016), pertinent findings relating specifically to women's experiences are scarce. However, the positive developments and experiences outlined in studies included in this scoping review (Birungi et al., 2021; M. C. A. van Hout et al., 2022) clearly demonstrate that successful integration of HIV and NCD care in Africa can provide psychological and economic benefits, an increased ability to work and thereby care and earn income for their families. Quality of life overall can be improved, with a reduction in time spent and costs of transport being a significant benefit. That being established, barriers in accessing healthcare and NCD medications due to financial constraints in SSA remain significant for WLHIV and this is a central theme which repeatedly appeared throughout the included studies. Furthermore, these difficulties in having to pay for NCD medication (in contrast to HIV drugs which are free of charge) and transport, as well as choosing between food and medicine, are also reported in other integrated care evaluations (of both male and female participants) demonstrating

their universal impact (Ameh, Klipstein-Grobusch, D'Ambruoso, et al., 2017; Bukenya et al., 2022; Iwelunmor et al., 2019; Shayo et al., 2022).

This scoping review has fundamentally found that WLHIV in the SSA region have a greater risk of developing diabetes mellitus or hypertension, and that these co-morbidities are then exacerbated by the continuing difficulties in accessing care and retention in care. These gendered differentials need to be further unpacked to provide insight on how health systems can be more gender sensitive and gender responsive to the needs of women with multimorbidity. This is crucial to support all aspects of sustainable development targets and goals in the region. There is also the need for research to inform gender appropriate health literacy materials and to sustain health education and promotion programmes tailored to the needs of women, and WLHIV if efforts are to be made to reduce the burden of disease due to HIV/NCD co-morbidities.

Limitations

Limitations of the review centre on its small-scale nature due to the relative dearth of information on WLHIV and the selected NCDs (diabetes mellitus/hypertension) and the restriction of searches to the English language. Future reviews of the SSA region should include searches in French, Portuguese, Afrikaans and other native languages.

Conclusion

The 2030 Agenda for Sustainable Development recognises the importance of addressing and improving HIV and NCDs, reproductive, maternal, newborn, child and adolescent health (RMNCAH) as a collective and lays out specific targets to reduce the burden of related disease. The NCD Alliance is calling for increased integration of NCD prevention, treatment and control into existing health programmes and services for HIV/AIDS, along the RMNCAH pathways and to provide a gender sensitive refined and strengthened approach (NCD Countdown 2023 Collaborators, 2020).

Our review provides an informative overview of the current situation for WLHIV and diabetes mellitus and/or hypertension within SSA. However, there are a number of gaps which have come to light as a result of this scoping review, which require further investigation and evaluation in order to fully inform medical training and education, and country level health systems policy and practice. These are pertinent to the African sustainable development agenda, and include the further examination into body image (including cultural beliefs) and how this may impact on women developing NCD risk factors such as obesity; the specific aspects of day-to-day life which are impacted as a result of HIV/NCD co-morbidity, and any gender specific elements (i.e. childcare roles, employment); the role which maternity and sexual health services can play in early detection of HIV/NCD co-morbidities and how those services can be used to promote healthy lifestyle behaviours; the role of stigma and how this impacts health seeking behaviours for WLHIV and NCD's; and an expansion in education around healthy lifestyle behaviours, and consistency in care regimens.

By using these questions as guiding principles, future investigations undertaken will aim to bring light to these areas and give a more comprehensive understanding of the role integrated NCD/HIV care could play in women's healthcare outcome. Further research which involves women in the community and female patients receiving integrated care for

HIV and NCDs at hospital and primary care levels is warranted on a larger scale. Additionally, evaluations of integrated models of care in different contexts in SSA are warranted in order to support context adaptation and a platform for the sharing of lessons learnt and best practices, develop and pilot standard operating procedures cognisant of gender and other patient vulnerabilities and leverage for health system and policy reforms.

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