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HEALTH INEQUALITIES AND NON-COMMUNICABLE DISEASES IN UGANDA: A SYSTEMATIC REVIEW.

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ABSTRACT

Background
Non-communicable diseases (NCDs), including cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes, are leading causes of death worldwide, particularly affecting low— and middle—income countries (LMICs). This study systematically reviews the extent of health inequalities in NCDs across various demographic groups in Uganda.

Methodology
This systematic review employed the PICO framework and followed standardized international protocols for data extraction and quality assessment. Comprehensive searches were conducted across PubMed and Web of Science databases, yielding 296 and 106 initial records from the databases respectively. After screening and applying inclusion criteria, 53 studies were included for qualitative synthesis. Data extraction focused on study characteristics, population demographics, interventions, outcomes, and key findings. Methodological quality was appraised to ensure validity, accuracy, and generalizability.

Results
The review highlights significant disparities in NCD prevalence across different demographic groups in Uganda. Notably, the elderly population in rural areas shows a high prevalence of NCDs, influenced by factors such as poor housing conditions, limited physical activity, and inadequate kitchen ventilation. Individuals living with HIV (PLHIV) exhibit compounded health burdens, with hypertension being a common comorbidity. Urban-rural disparities in NCD prevalence are evident, with lifestyle factors associated with urbanization contributing to increased risks. Alarmingly, mortality rates attributable to NCDs, particularly cardiovascular diseases and diabetes, have risen over the past decade. Barriers to healthcare access, including geographic, financial, and policy—related challenges, exacerbate these disparities.

Conclusion
Among the elderly population residing in rural areas, a strikingly high prevalence of NCDs is observed, influenced by factors such as substandard housing conditions, limited physical activity, and inadequate kitchen ventilation. This underscores the urgent need for targeted interventions aimed at improving living conditions and promoting healthy behaviors among this vulnerable demographic group.

Recommendation
Further research is warranted to explore the underlying determinants of these disparities in greater depth.

Keywords: *Health inequalities, Non-Communicable diseases, Uganda*
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INTRODUCTION

There is ample evidence that social factors, including education, employment status, income level, gender, and ethnicity, significantly influence an individual's health. In all countries—whether low—, middle—, or high—income—there are wide disparities in health status among different social groups. Generally, the lower an individual's socio-economic position, the higher their risk of poor health. Health inequities are systematic differences in health status or the distribution of health resources between different population groups, arising from the social conditions in which people are born, grow, live, work, and age (WHO, 2018). These inequities result in unfair and avoidable differences in health outcomes, as groups have different opportunities to achieve optimal health

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(Braveman, 2006; WHO, 2018). Factors that structure differential access to health opportunities include race and ethnicity, gender, employment and socioeconomic status, disability, immigration status, and geography.

The United Nations (UN) and other international organizations promote and seek integrated approaches to the Sustainable Development Goals (SDGs), which attempt to address current global health inequalities through multi-sectoral maneuvers (Evans et al., 2012; Niessen et al., 2018). Five SDGs include explicit aims for reducing health disparities nationally and globally. These objectives include poverty eradication, universal health and well—being, equitable education, gender equality, and the decrease of inequalities both within and between countries. The reduction of health inequalities and poverty reduction is the prominent promise of SDGs Therefore, addressing the health inequalities is important and it is gaining policy recognition globally including in developing countries like Uganda.

Health inequities in non—communicable diseases (NCDs) are influenced by various social determinants of health (SDH) such as education, employment, and living conditions (Marmot & Bell, 2019; McNamara et al., 2021; Schmidt & Duncan, 2022). Studies have shown that education—based inequities play a significant role in the prevalence of NCDs, with certain conditions like diabetes being particularly affected by educational disparities (Schmidt & Duncan, 2022). Additionally, employment and working conditions have been identified as important determinants of health inequalities related to NCDs, with reductions in occupational inequalities observed across European regions after adjusting for non—standard employment and poor working conditions (McNamara et al., 2021). Socio-economic factors also contribute to health inequalities in NCDs, with older individuals in both rural and urban areas experiencing significant disparities favoring the wealthy, emphasizing the need for policies targeting wealth gaps and social health insurance to achieve health equality (Le et al., 2021).

Non-communicable diseases (NCDs), often referred to as chronic illnesses, develop gradually, influenced by a mix of genetic, physiological, environmental, and behavioral factors. Among the prominent NCDs are cardiovascular diseases (e.g., heart attacks and stroke), cancers, chronic respiratory diseases (e.g., chronic obstructive pulmonary disease and asthma), and diabetes (WHO, 2023c). Noncommunicable diseases (NCDs) continue to be the biggest threat to public health in the twenty-first century, resulting in ill health, mortality, disability, economic loss, declining living standards, and poor social development in both high— and low-income countries (WHO, 2023c). These diseases disproportionately affect low— and middle-income countries (LMICs), where more than three—quarters of global NCD—related fatalities occur. NCDs are expected to kill 41 million people each year, accounting for 71% of all mortality globally, with 77% of those deaths occurring in LMICs, including Uganda (WHO, 2023c) (WHO, 2023c). NCDs account for 71% of all deaths globally, with 77% of these fatalities happening in LMICs (WHO, 2023c). The prevalence of NCDs is exacerbated by factors such as the aging population, rapid urbanization, and lifestyle choices like physical inactivity, poor diets, and substance abuse (Beaglehole et al., 2011; Licher et al., 2019). Despite their profound impact, only a small fraction of development assistance is allocated to combat NCDs (Palma et al., 2016). Although various infectious diseases remain common in Uganda and have long been significant contributors to the disease burden, the burden of NCDs is also rising (WHO, 2023a), posing a substantial threat to the country's attainment of Sustainable Development Goal 3.4. This goal calls for a 30% reduction in NCD—related mortality through prevention, treatment, and the promotion of mental health and well—being (NCD Countdown 2030 collaborators, 2018; WHO, 2013).

Projections suggest that deaths from NCDs could escalate to 52 million by 2030, with an anticipated cost of US$47 trillion between 2010 and 2030 (Capizzi et al., 2015). This economic burden not only impacts households' finances but also leads to extended illness, higher treatment expenses, lost productivity, and significant opportunity costs, potentially fueling poverty and inequality. In response, various international, national, and municipal commitments have been made to tackle NCDs, aligning with Sustainable Development Goals to reduce early deaths from major NCDs by one—third among individuals aged 30—69 by 2030 (WHO, 2023c).

Contrary to the perception that NCDs primarily afflict older populations, evidence indicates that 17 million NCD—related deaths occur before the age of 70, with 86% of these premature fatalities concentrated in LMICs. Vulnerability to NCD risk factors spans all age groups, from children to the elderly, with unhealthy dietary habits, physical inactivity, tobacco exposure, excessive alcohol consumption, and air pollution exacerbating their prevalence (WHO, 2023c).

Cardiovascular diseases top the list of NCD—related fatalities, claiming 17.9 million lives annually, followed by cancers (9.3 million), chronic respiratory diseases (4.1 million), and diabetes (2.0 million, including deaths due to diabetes-induced kidney disease). Together, these four categories contribute to over 80% of all premature NCD—related deaths. Risk factors such as tobacco use, physical inactivity, unhealthy diets, and air pollution further heighten the likelihood of NCDs (WHO, 2023c).

While the WHO (2023b) recognizes health as a fundamental human right, avoidable inequalities persist in disease prevalence, overall health status, and healthcare access among different social groups (Marmot, 2001). A complex interplay of structural determinants like income

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distribution and individual—level factors such as health behaviors shapes the vulnerability to poorer health outcomes among certain populations (Graham, 2004; Marmot, 2001).

Global Perspective on Health Inequalities in NCDs

Non—communicable diseases (NCDs) are a major contributor to global mortality and morbidity, significantly impacting low—income countries and individuals with lower socioeconomic status in high—income countries (Ramesh & Kosalram, 2023). NCDs, which include cardiovascular diseases, neoplasms, and chronic respiratory diseases, exhibit regional and sex disparities with fluctuating trends over time (Bai et al., 2023). These diseases, particularly diabetes, cardiovascular diseases, and stroke, underscore the urgent need for preventive measures and health promotion strategies (Alwazzan, 2022).

Socioeconomic inequality in the burden of NCDs is stark, with a higher concentration in countries with low Human Development Index (HDI), indicating pro-poor inequality for Communicable, Maternal, Neonatal, and Nutritional Diseases (CMNNDs). Conversely, high—HDI countries experience pro-rich inequality in NCD burden (Emadi et al., 2021). Despite reductions in absolute inequality, relative health inequality remains high, highlighting the ongoing need to address NCDs to sustain progress in reducing health disparitiesSteinbeis et al. (2019). The inequitable distribution of NCD—related deaths globally, with developing countries bearing a significant burden of premature NCD mortality, further illustrates this point(Determille et al., 2020).

Gender disparities are also evident, with women facing higher morbidity for chronic respiratory diseases compared to men, despite a focus on mortality outcomes (Ngaruiya, 2022). Moreover, minoritized ethnic groups are at higher risk of developing multiple long—term conditions (MLTCs) compared to the white population (Gkiouleka et al., 2023). Socioeconomic factors, such as lower education, income, wealth, job categories, area deprivation, and ethnic minority status, are significantly associated with a higher likelihood of progression of multiple chronic health conditions (MCC) in adults (Holdroyd et al., 2022).

Addressing health inequalities in NCDs requires a comprehensive understanding of the prevalence of MLTCs across different ethnic groups and the impact of socioeconomic factors on MCC progression. The effectiveness of strategies such as the National Health Inequality Strategy is crucial in reducing health disparities (Albert-Ballestar & García-Altés, 2021). Screening programs play a critical role in identifying individuals at risk for NCDs, underscoring the need for timely interventions and counseling to effectively prevent and manage these diseases (Ali et al., 2022).

The extensive research on NCDs consistently reveals substantial health disparities in prevalence, management, and outcomes, often linked to socioeconomic factors, race, ethnicity, and healthcare access. This underscores the necessity for continued and focused efforts to mitigate these disparities and improve health outcomes globally.

Health Inequalities in NCDs in Africa

In Africa, health inequalities in Non—Communicable Diseases (NCDs) are prevalent due to various social determinants of health, including poverty, unequal healthcare access, and lifestyle risk factors (Amzat et al., 2023; Dieteren & Bonfrer, 2021; Owolade et al., 2022; S. Yaya et al., 2018). The burden of NCDs in Sub—Saharan Africa is escalating rapidly, with challenges such as inadequate financing, health system issues, and low awareness levels hindering effective prevention and control efforts (Owolade et al., 2022).

Studies have shown that lifestyle risk factors like tobacco use, alcohol consumption, and overweight/obesity are unequally distributed across socioeconomic segments in low— and middle—income countries, with tobacco and alcohol use more concentrated among the poor, while overweight is more prevalent among the better—off (Dieteren & Bonfrer, 2021; S. Yaya et al., 2018).

Socioeconomic disparities in the prevalence of NCD risk factors such as high blood pressure, overweight/obesity, alcohol consumption, and tobacco use vary across wealth quintiles in sub—Saharan African countries (Karamagi et al., 2023). The shift towards a more Westernized diet high in sugar and processed foods, coupled with income and wealth inequalities, has increased the burden of NCDs in low— and middle—income countries in Africa (Sanni Yaya et al., 2018). , Omotoso (2022) emphasizes the need for political will, community engagement, behavioral changes, and interdisciplinary coordination to address NCDs effectively.

Owolade et al. (2022) document health inequalities and risk factor distribution in Southern African Development Community (SADC) countries, highlighting the need for concerted efforts to address socioeconomic disparities in ill—health and health risk factors. These disparities are evident in both urban and rural settings, underscoring the need for targeted interventions tailored to different wealth quintiles (Dieteren & Bonfrer, 2021; Keetile et al., 2019). Efforts to reduce health inequalities in NCDs should consider the socioeconomic context to effectively implement policies and interventions that address the specific needs of different population segments. Addressing these disparities is crucial for improving health outcomes and reducing the burden of NCDs in Africa.

Health Inequalities in NCDs in Uganda

Non—communicable diseases (NCDs) are a growing health burden in Sub—Saharan Africa (SSA) (Dalal et al., 2011), with deaths from NCDs projected to outpace those

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from infectious diseases by 2030 (Kengne & Mayosi, 2014). This has led to a dual burden of disease in SSA, where countries face ongoing epidemics of communicable diseases like HIV, tuberculosis (TB), and malaria, alongside a dramatic rise in NCDs (Bygbjerg, 2012). Despite the disability-adjusted life year (DALY) burden from NCDs being estimated at 37% in low—income countries, only about 1.5% of development assistance in 2015 was allocated to combat NCDs (Palma et al., 2016).

The burden of NCDs is particularly significant in Uganda, where there is already a high incidence of NCDs and their risk factors. Eighty-five percent of premature NCD-related deaths occur in low— and middle—income countries, Uganda inclusive. Blessing A, 2023 says that Lifestyle factors, including unhealthy diet, tobacco use, physical inactivity, and harmful use of alcohol, largely contribute to the NCDs burden. Uganda is not exempt from this trend. According to the WHO (2019) report, 35 percent of total deaths in Uganda are due to NCDs. Every Ugandan resident has a 22 percent chance of dying prematurely from NCDs. According to the Uganda Cancer Institute (UCI), cancer diagnoses are quickly increasing, with 4,000 new cases documented each year. 27 percent of persons in the country are hypertensive, and diabetes cases increased by 7% between 2012 and 2016 (WHO, 2016).

This burden will continue to rise unless immediate action is taken. Notably, NCDs do not only kill, but they also lead to reduced quality of life, increased healthcare costs, and decreased productivity. The burden falls disproportionately on vulnerable populations, worsening health disparities in terms of access and utilization of health services. NCDs are becoming more prevalent as a result of socioeconomic inequalities not only in Uganda but also internationally.

NCDs share several behavioral risk factors, such as poor diet, excessive alcohol use, cigarette use, and sedentary lifestyles, all of which contribute to metabolic risk factors such as overweight and obesity, high blood pressure, high blood glucose, and high cholesterol (Riley et al., 2017). These remain serious public health concerns in several developing countries.

Hypertension, diabetes, tobacco use, dyslipidemia, overweight, and obesity have all been identified as major risk factors for NCDs by researchers (Bernard et al., 2022; Nakaganda et al., 2023; Uphoff et al., 2013). Considering the variations in outcome and exposure indicators, the burden of behavioral risk factors for NCDs is modified by socioeconomic features in resource-constrained settings (Allen et al., 2017).

Socioeconomic status has been established as a significant predictor of the distribution of NCD risk factors which has resulted in an increased interest in measuring healthcare inequality (Heckley et al., 2016). Moreover, inadequate resources, an aging population, and a weak health system all pose significant impediments to eliminating the burden of NCDs (Biswas et al., 2016; Sommer et al., 2015). The general interest in socioeconomic inequality in health extends beyond their quantification to comprehending and analyzing their underlying causes (S. Yaya et al., 2018). The country has a high burden of both communicable (such as malaria, tuberculosis, HIV/AIDS) and non—communicable diseases (NCDs). The latter was estimated to have caused 36% of deaths in 2019. NCDs are a major health problem in Uganda. The age-standardized mortality rate across four major NCDs (Cardiovascular Disease, Chronic Respiratory Disease, Cancer, and Diabetes) was 709 per 100,000 in males and 506 in females in 2021. Uganda has implemented efforts on the NCD progress indicators related to NCD policy and plan, NCD guidelines, tobacco (tobacco taxes, advertising ban), and alcohol taxes, but progress has been more limited on indicators related to alcohol advertising restrictions, salt policies, trans fats policies, marketing to children and physical activity guidelines (WHO, 2023a). However, the burden of non—communicable diseases (NCDs) in Uganda is increasingly apparent, as highlighted by various studies. Nakaganda et al. (2023) demonstrated varying prevalence rates of lifestyle risk factors like unhealthy diet, harmful alcohol use, and obesity among different demographic groups. Bernard et al. (2022) showcased the significant burden of major NCDs among HIV—positive patients in Northern Uganda, encompassing cardiovascular diseases, diabetes, cancers, and mental disorders. Similarly, Ssekubugu et al. (2022) shed light on the notable prevalence of Non—Communicable Chronic Morbidities (NCCMs) among the elderly population in Eastern Uganda, influenced by factors such as family history, poor housing conditions, and physical inactivity. Additionally, the Rural Uganda Non-Communicable Disease (RUNCD) cohort study, as reported by Wanziima et al. (2022), underscored low levels of self—reported NCDs in rural areas, emphasizing the need for improved education and healthcare services to address disparities in NCD prevalence. Furthermore, disparities in NCD prevalence, progression, and complications across socioeconomic strata and rural-urban divides were elucidated by various researchers. Kakama and Basaza (2022) and T. Siddharthan et al. (2021) demonstrated the significant burden of NCDs in rural areas, with hypertension being particularly prevalent. Robertson et al. (2019) highlighted the pivotal role of socioeconomic status in NCD risk factors, with lower SES associated with behaviors like smoking and alcohol consumption, while higher SES is linked to conditions like overweight and raised blood pressure. Moreover, the disparities in access to COPD management and treatment are more pronounced in rural populations due to the limited availability of medications, diagnostic tools, and awareness of the disease. Addressing these disparities requires targeted interventions focusing on education, healthcare access, and training programs, especially in rural communities.

Research has consistently shown that material factors contribute significantly to differences in self—rated health (Zhao & Zhang, 2017). Furthermore, socioeconomic inequalities have been linked to a higher burden of NCDs such as obesity, diabetes, cardiovascular disease, and metabolic syndrome (Uphoff et al., 2013). Additionally, Ding et al. (2016) highlighted the economic burden of physical inactivity, emphasizing the global impact of socioeconomic disparities on NCDs. These findings underscore the need to address socioeconomic factors in the prevention and management of chronic diseases. The impact of race and ethnicity on health inequalities in NCDs has been well—documented. Flores et al. (2005) highlighted racial and ethnic disparities in the health and healthcare of children, indicating that specific population groups face unique challenges in accessing care and managing chronic conditions. Furthermore, disparities in mental health problems among children and adolescents have been linked to socioeconomic and racial factors (Reiss, 2013). These findings emphasize the need for targeted interventions to address racial and ethnic disparities in NCDs. Shared decision—making interventions have been shown to significantly improve outcomes for disadvantaged patients (Ding et al., 2016). This suggests that empowering individuals to participate in their healthcare decisions can help reduce health inequalities in NCDs. Moreover, smartphone interventions have been identified as effective tools for managing chronic diseases (Durand et al., 2014), indicating the potential for technology-based interventions to bridge the gap in healthcare access and management.

While existing research has shed light on various aspects of health inequalities in NCDs, several knowledge gaps and potential future research directions can be identified. Firstly, there is a need to further explore the impact of socioeconomic factors on the prevalence and management of specific NCDs, particularly in different populations and locations (Maresova et al., 2019). Additionally, the utilization of eHealth and smartphone interventions for chronic disease management requires more targeted investigation, especially in populations that may face barriers to accessing these technologies (Wang et al., 2014). Furthermore, the development of natural language processing methods for analyzing clinical notes related to chronic diseases is still in progress (Petrovic et al., 2018), indicating the potential for innovative approaches to understanding and addressing health inequalities. Finally, the applicability of chronic disease models to diverse populations remains unclear, highlighting the need for research that considers the unique challenges and needs of different demographic groups (Maresova et al., 2019). In conclusion, addressing health inequalities in NCDs requires a comprehensive understanding of the complex interactions between socioeconomic, racial, and technological factors. By integrating and synthesizing the existing research findings, this literature review contributes to the ongoing discourse on health inequalities and offers valuable insights for future research and interventions.

Study Aim

The objective of this systematic review is to explore the extent of health inequalities in non—communicable diseases (NCDs) across different demographic groups in Uganda. Specifically, the review aims to:

Explore the extent of health inequalities: Determine how disparities in NCD prevalence, mortality rates, healthcare access, and health outcomes vary among demographic groups in Uganda.

Research Questions

Extent of Health Inequalities

1. How do prevalence rates of NCDs vary across different demographic groups in Uganda?
2. What are the mortality rates attributable to NCDs among various demographic groups in Uganda?
3. What disparities exist in access to healthcare services for NCD management among different demographic groups?

Hypotheses

Significant health inequalities exist in the prevalence, management, and outcomes of non—communicable diseases among different demographic groups in Uganda.

METHODS

The PICO framework

To systematically investigate this question, the PICO (Population, Intervention, Comparison, and Outcome) framework has been utilized. The PICO model is a widely recognized tool in evidence-based practice for formulating research questions. It helps in structuring the investigation by clearly defining the population of interest, the interventions or exposures being examined, the comparisons made, and the desired outcomes. This approach ensures a comprehensive and focused investigation into health inequalities in NCDs. The PICO framework will guide this systematic review process, ensuring that each component of the research question is addressed systematically and thoroughly.

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Table 1: The PICO framework for this study

Population	What are the patterns of health inequalities in non—communicable diseases (NCDs) across different demographic groups (e.g., socioeconomic status, race/ethnicity, gender)? How do disparities in NCD prevalence, access to healthcare, and health outcomes vary among different population groups?
Intervention	Among individuals affected by non—communicable diseases (NCDs) and experiencing health inequalities, what interventions or strategies have been implemented to address health disparities in NCD prevention, management, or treatment? What is the effectiveness of these interventions in reducing health inequalities and improving NCD outcomes?
Comparison	In populations with health inequalities related to non—communicable diseases (NCDs), what factors contribute to disparities in NCD prevalence, access to healthcare, and health outcomes? How do socioeconomic status, race/ethnicity, gender, and other demographic factors influence disparities in NCD outcomes?
Outcome	Among individuals with non—communicable diseases (NCDs) and experiencing health inequalities, what are the long—term trends and projections of health disparities in NCD prevalence, access to healthcare, and health outcomes?

Search Strategy

The review identified eligible studies, between January 2014 and February 2024, by searching Medline, Embase, and Cochrane databases. Search terms for lifestyle risk factors included: smoking; alcohol use; unhealthy diet; physical inactivity; and being overweight and obese. These search terms were combined with: Africa, East Africa; sub—Saharan Africa; Uganda, and all names of major towns and cities in Uganda. The search strategy was developed, using database—controlled thesaurus terms (MeSH for Medline and EmTree for Embase), index terms, and free text terms. Search terms were combined, using Boolean operators (OR and AND) and applying truncations, wildcard, and proximity operators to free text terms. EndNote reference manager was used to store the search results and to identify duplicate studies. Further published and unpublished evidence was obtained by searching relevant websites and journals; scanning reference lists of relevant studies, and citation searching using Google Scholar.

A comprehensive search of PubMed and Web of Science databases was conducted using the following keywords: PubMed; ("Non—communicable diseases" OR "Chronic diseases" OR "Cardiovascular diseases" OR "Cancer" OR "Diabetes mellitus" OR "Chronic respiratory diseases") AND ("Socioeconomic factors" OR "Socioeconomic status" OR "Health disparities" OR "Health inequalities" OR "Poverty" OR "Education" OR "Income" OR "Employment") AND "Uganda" in All Text. Under Web of Science; ("Non—communicable diseases" OR "Chronic diseases" OR "Cardiovascular diseases" OR "Cancer" OR "Diabetes mellitus" OR "Chronic respiratory diseases") AND ("Socioeconomic factors" OR "Socioeconomic status" OR "Health disparities" OR "Health inequalities" OR "Poverty" OR "Education" OR "Income" OR "Employment") AND "Uganda". The search was limited to studies published between January 2014 and February 2024.

Inclusion and Exclusion Criteria for Search Articles

Table 1 below shows the inclusion and exclusion criteria employed in this study. Studies were included if they examined the prevalence, management, or outcomes of non—communicable diseases (NCDs) in Uganda and focused on health inequalities related to socioeconomic status, race/ethnicity, gender, or geographic location. Only studies published in peer-reviewed journals in English were considered. Studies were excluded if they focused on communicable diseases, were not peer-reviewed (such as conference abstracts or dissertations), or did not provide sufficient data on health inequalities.

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Table 2: Inclusion and exclusion criteria

Inclusion	Exclusion
Population: Studies involving individuals or populations within Uganda. Studies focusing on subpopulations within Uganda, such as specific age groups, gender, or regions (e.g., urban vs. rural). Study Design: Original research studies, including randomized controlled trials (RCTs), cohort studies, case-control studies, cross-sectional studies, and observational studies. Systematic reviews and meta-analyses are relevant to the research question. Outcomes: Studies examining lifestyle risk factors: smoking, alcohol use, unhealthy diet, physical inactivity, being overweight, and obesity. Studies assessing the socioeconomic implications: socioeconomic status, health disparities, health inequalities, poverty, education, income, and employment. Time Frame: Studies published between January 2014 and February 2024. Language: Studies published in English. Geographic Focus: Studies conducted within Uganda or including Uganda as part of a broader study in East Africa or sub—Saharan Africa.	Population: Studies focus on populations outside Uganda unless they specifically compare Ugandan data to other regions as part of the analysis. Study Design: Non—original research such as opinion pieces, editorials, commentaries, and letters to the editor. Abstracts without full—text availability. Outcomes: Studies that do not address the specified lifestyle risk factors or their socioeconomic implications. Studies that focus solely on clinical outcomes without considering lifestyle or socioeconomic factors. Time Frame: Studies published before January 2014 or after February 2024. Language: Studies were published in languages other than English unless an English translation was available. Geographic Focus: Studies with no specific data or analysis about Uganda.

Inclusion Criteria and Data Abstraction

The review included studies conducted at the population level in Uganda. Studies were selected if conducted in people aged fifteen years and above and reported prevalence estimates for at least one of the lifestyle risk factors. The review excluded general discussion papers, editorials, and conference abstracts without corresponding reports. The language was set to be English. Multiple reports and papers from one study were treated as a single study and references were made to all publications. In case of discrepancies among multiple papers, information from the parent study was prioritized. In cases of significant disparities, authors were contacted for clarification. Two reviewers (KR and KM) independently selected the studies based on pre-defined inclusion criteria by screening titles, abstracts, and full papers. The reviewers resolved disagreements over the inclusion of studies through discussion and consensus. They also abstracted the data and appraised the quality of studies. A Data Extraction Form and Excel sheet were used to extract data from the eligible studies. The review extracted information about the study setting and context; population characteristics (age, sex, region, and settlement patterns); methods; lifestyle measures; study outcomes; and results. Studies were assessed for quality by highlighting their strengths and weaknesses. The quality appraisal focused on the methodology, validity, accuracy, and generalizability of the results.

Data Extraction

Two reviewers independently extracted data on study characteristics, population demographics, interventions, outcomes, and key findings. Discrepancies were resolved through discussion or consultation with a third reviewer

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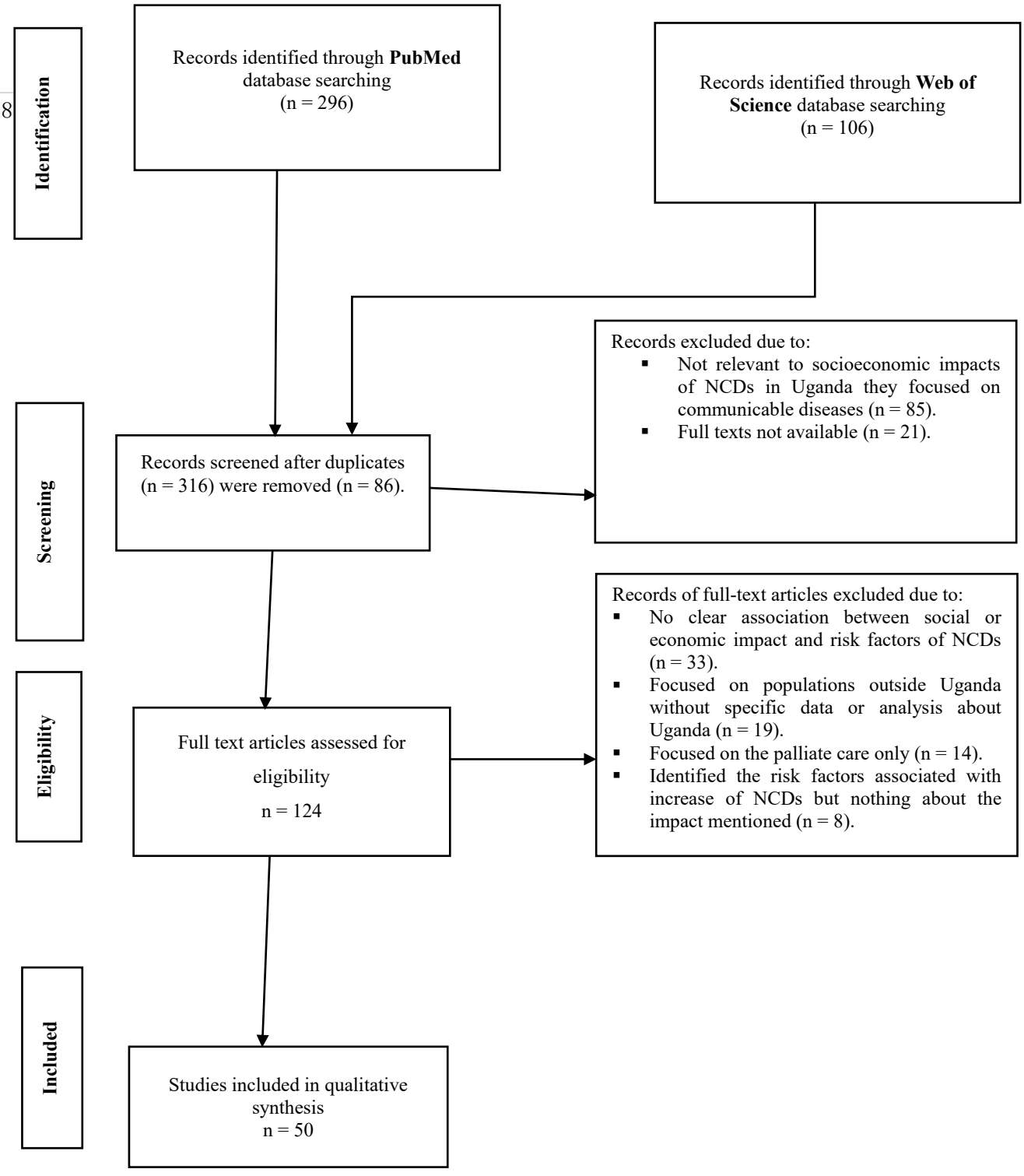

Figure 1: Flow Chart Showing Selection Procedure Followed Adapted from Moher et al. (2009)

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Table 2: Study article's characteristics

Author (Year)	Country	Study design/ Methods used	Results	Conclusions	Practical Implications
Wanziima et al. (2024)	Uganda	Population-based cross-sectional study design. Self—report, medical records, and symptom checklist for diagnoses.	Prevalence of NCCMs among elderly in Bulambuli: 85.5% Factors influencing NCCMs: family history, poor housing, physical inactivity.	High prevalence rate of NCCMs (85.5%) among elderly in rural Uganda. Ministry of Health urged to take preventive measures.	High prevalence of NCCMs (85.5%) in rural Eastern Uganda. Ministry of Health urged to take preventive measures.
T. Siddharthan et al. (2021)	Uganda	Population-based census for NCD research. Systematic enrollment of adults in rural Uganda district	Hypertension most prevalent self—reported disease (6.3%). Self—reported NCD levels are lower compared to nationwide levels.	The study establishes a large NCD patient cohort in rural Africa. The study highlights the need for better education and care for rural communities.	Establishes one of the largest NCD patient cohorts in rural Africa. Highlights the need to better educate and care for rural communities
Omech et al. (2022)	Uganda	Retrospective cross-sectional chart review of hospitalized patients. Binary and multivariable regression analyses for mortality predictors.	HIV-positive patients had a lower prevalence of major NCDs. Middle-aged (40—50 years) was a predictor of mortality in HIV patients.	HIV+ patients had lower major NCD prevalence than HIV—. Middle-aged (40—50 years) was a predictor of mortality in HIV+.	Prioritize screening for NCDs in hospitalized HIV-positive patients. Increase service capacity to reduce NCD burden in PLHIV.
Twinomugisha (2020)	Uganda	Juridical measures, community participation, gender perspective. Strong political will from government actors.	Right to health framework critical in tackling NCDs in Uganda. Neoliberalism contributes significantly to the NCDs challenge in Uganda.	The state should regulate industries affecting health to prevent NCD escalation. Lifestyle changes alone may fail without addressing structural factors.	The state should regulate industries to prevent NCD escalation. Lifestyle changes alone may fail without addressing structural factors.

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Table 2: Study articles characteristics(continuation)

Author (year)	Country	Study design/ Methods used	Results	Conclusions	Practical Implications
Dowhaniuk (2021)	Uganda	Accessibility analysis using walking, bicycling, and driving scenarios. Statistical analysis including spatial statistics, Random Forest analysis, and Linear Mixed-effect models.	Percentage of Ugandans within 1—hour walking distance of health centers: 71.73% Bicycles increase access to health centers by 27.52 percentage points.	Bicycles can increase health access equity in Uganda. Rural poor residents face disproportionately long travel times to health centers.	Bicycles increase health center access for vulnerable Ugandans. Disparities exist between urban and rural populations in health access.
Meghani et al. (2021)	Uganda	In-depth interviews with 30 policy actors. Thematic data analysis was conducted.	Funding constraints hinder NCD's strategic plan development and execution in Uganda. Fragmented NCD efforts due to crowding of non—governmental actors.	Funding constraints hinder government leadership in NCD efforts. Skepticism remains about the government's commitment to increase NCD funding.	Increase funding, reduce fragmentation, and prioritize NCD prevention in Uganda. Skepticism remains about the government's commitment to address NCD needs.
Kakama and Basaza (2022)	Uganda	Two metrics of inequity: quintile ratio and concentration index. Data analysis from Demographic and Health Surveys conducted in 2006, 2011, and 2016.	Improved health services reduce disparities between poor and wealthy, rural and urban. Worsening inequities in under-five mortality, malnutrition, and prevalence of ARI.	Significant improvement in population averages across socioeconomic categories and rural-urban areas. Healthcare utilization indicators show trends toward perfect equity levels.	Prioritize impoverished and rural communities in intervention initiatives. Consider both wealthier and urban groups in health policies and initiatives.
Essue and Kapiriri (2018)	Uganda	Mixed methods design. Kapiriri & Martin framework for evaluation of priority setting.	Noncommunicable disease control priority setting faced challenges and delays. Insufficient resources and alignment with national priorities were identified.	Priority setting for noncommunicable diseases in Uganda faced challenges. Insufficient resources, delays in implementation, and stakeholder influence were noted.	Insufficient resources hinder noncommunicable disease control despite being a priority. Strengthening local capacity for priority setting is crucial for success.
Kansiime et al. (2019)	Uganda	Cross-sectional study. Data extracted from routine care patient files.	Overall NCD prevalence: 20.7% Hypertension prevalence: 12.4%	1 in 5 PLHIV has a non—communicable disease. Encourage early diagnosis and treatment of NCDs in Uganda.	1 in 5 PLHIV has a non—communicable disease. Encourage early diagnosis and treatment of NCDs among PLHIV.

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Author (year)	Country	Study design/ Methods used	Results	Conclusions	Practical Implications
Rishworth (2019)	Uganda	Structural equation modeling (SEM) used to investigate the determinants of SWB. Data from the 2013 Uganda Study on Global Aging and Health was analyzed.	Increased age is linked to poorer subjective well-being (OR=0.43, p=0.01). Care responsibilities, financial status, and social supports affect SWB by gender.	Increased age is linked to poorer subjective well-being, mediated by various factors. Care responsibilities negatively impact subjective well-being regardless of age.	Address inequalities in subjective well-being among the elderly in Uganda. Consider factors like care responsibilities, financial status, and social support.
Roberts et al. (2015)	Uganda	Triangulated data from censuses, surveys, and administrative sources. Used statistical models for regional—level trend analysis.	Under—5 mortality decreased from 163 to 85 deaths per 1,000. Disparities in health intervention coverage persisted between regions in Uganda.	The MCH landscape in Uganda improved between 1990 and 2011. Subnational benchmarking identified regions needing health systems strengthening.	Identify regions needing health system strengthening based on regional disparities. Regular subnational health trend analysis for informed policy decisions.
Armstrong-Hough et al. (2020)	Uganda	Prospective, descriptive analysis of medicine availability and cost in Uganda. Surveyed 23 health facilities in—person over five weeks.	Availability of medicines varied substantially over time, especially among public facilities. Among private—for-profit facilities, the cost of the same medicine varied from week to week. Private—not—for—profit facilities experienced less dramatic fluctuations in price	Essential medicines availability and cost vary sharply within facilities weekly. Standardized continuous monitoring is needed to stabilize availability and patient cost.	The availability and cost of essential medicines vary weekly in Uganda. Continuous monitoring is needed to stabilize availability and reduce uncertainty for patients.
S. Yaya et al. (2018)	SSA	Analyzed DHS data from 33 sub—Saharan Africa countries. Used concentration index and Lorenz curve for socioeconomic inequalities.	Prevalence of high blood pressure, overweight/obesity, alcohol, tobacco use. Socioeconomic inequalities in risk factors among women in Sub—Saharan Africa.	Wealth disparities influence NCD risk factors distribution. Interventions should target high—risk women for effectiveness.	Target high—risk women for interventions. Address wealth—based disparities in NCD risk factors.

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Dieteren and Bonfrer (2021)	LMICs	Data from 1,278,624 adult respondents to Demographic & Health Surveys across 22 LMICs between 2013 and 2018 are used. The multilevel model is estimated to examine associations of individual characteristics with lifestyle risk factors.	Tobacco use is concentrated among the poor in LMICs. Overweight is concentrated among the better—off in LMICs.	Tobacco and alcohol use are most prevalent among males with a low socioeconomic status. Better off females are mainly overweight.	Priority should be given to populations in Zambia, Tanzania, and Cambodia for implementing policies to reduce NCDs. Interventions to reduce lifestyle risk factors in LMICs should be tailored towards high—risk populations.
Ngaruiya et al. (2021)	East Africa	WHO STEPS tool and PHQ—9 survey of 923 adults. Descriptive statistics and covariate-adjusted logistic analysis for analysis.	Over a third had hypertension, 18.3% diabetes, 11.7% cardiovascular disease. Education level associated with tobacco and alcohol use.	The Emergency Department (ED) is a primary source of NCD care that has been under—prioritized in Africa. Patient—driven interventions and collaboration with community—based stakeholders are ideal considerations for addressing NCDs leveraging the ED in resource-limited settings.	ED crucial for NCD care in resource-limited settings in Africa. Patient—driven interventions and collaboration with community stakeholders are recommended.
Rockers et al. (2018)	Kenya	A cross-sectional survey was administered to patients prescribed medicines for hypertension, diabetes, or asthma. Data was collected on medicines available in the home, location, and purchase cost.	The positive association between wealth and access to medicines for hypertension and asthma. Poorer patients lived farther from the nearest health facility.	Wealthier patients have better access to non—communicable disease medicines in Kenya. Pro-poor policies are needed to improve equity in access to medicines.	Poorer patients face barriers in accessing NCD medicines in Kenya. Pro-poor policies are needed to improve equity in access.

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Author(Year)	Country	Study design/ Methods used	Results	Conclusion	Practical Implications
Omotoso (2022)	South Africa	Descriptive statistics. Concentration index method.	Real food expenditures have increased on average and are concentrated among the rich. Real food expenditure in certain food groups has become less concentrated over time in the richer populations, particularly for sugary food products.	Real food expenditures have increased and are concentrated among the rich. The concentration of real food expenditure on certain foods among lower socioeconomic groups exacerbates health inequality.	Exacerbates burden of diet-related NCDs. Increases health inequality.
Gyasi and Phillips (2020)	SSA & other LMICs	Call for action by governments. Strengthen universal health coverage and public-private partnerships.	The burden of non-communicable diseases (NCDs) is increasing in sub—Saharan Africa and other low—and middle—income countries (LMICs). The authors call for action to address NCDs through universal health coverage, economic empowerment, and public education.	Aging populations in LMICs are at risk for NCDs. Targeting NCDs can lead to a brighter future.	Strengthen universal health coverage (UHC). Implement effective fiscal regulation.
Dagadu and Patterson (2015)	SSA	Life table functions estimation using single decrement techniques. Cause—deleted method to analyze communicable and non—communicable diseases impact.	Equal research focus on communicable and non—communicable diseases is needed. Economic development doesn't directly correlate with disease patterns.	Non—communicable and communicable diseases warrant equal attention. Economic development does not necessarily reduce communicable diseases.	Equal attention and funding are needed for communicable and non—communicable diseases. Economic development is not directly linked to disease burden distribution.
Nelson et al. (2015)	Ghana	Cross-sectional survey conducted among medical and surgical outpatients. Participants were selected through systematic random sampling to determine NCD risk factors.	Obesity level: 40.4%, overweight: 54% Prevalence of risk factors: physical inactivity, alcohol consumption, raised blood pressure	High prevalence of alcohol, physical inactivity, overweight, and hypertension. Hospitals should monitor NCD risk factors routinely to address concerns.	Hospitals should monitor NCD risk factors routinely. Address the high prevalence of alcohol, physical inactivity, overweight, and hypertension.

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Sanni Yaya et al. (2018)	SSA	The current Demographic and Health Survey (DHS) data sets from 33 countries in the sub-Sahara Africa region were used in this study. The individual woman component of DHS 2008–2016 was used. Binary and multinomial logistic regression models were used to investigate the correlates of the variables.	In sub—Saharan Africa, Hypertension was most prevalent in Lesotho (17.3%) and least in Burundi (1.0%). Anemia affected more than half of women in different countries, with Gabon having the highest prevalence at 60.6%. Obesity rates were notable in Lesotho, Gabon, and Ghana, while Madagascar had the lowest obesity rates. Body mass index was linked to both hypertension and anemia. Modifiable factors for hypertension and BMI included smoking, fruits, vegetables, and alcohol intake, whereas non—modifiable factors encompassed age, residence, education, wealth, marital status, employment, and number of children. Anemia shared similar factors with the addition of exercise being associated with both anemia and hypertension.	The problem of NCDs and associated factors remains high among women of reproductive age in the sub-Sahara region.	The findings of this study suggest that the promotion of regular positive healthcare-seeking behavior, screening, and early treatment are essential to mitigate the burden of NCDs. Preventive interventions for NCD risk factors should be strengthened among key populations through behavior change communication with support from the government and stakeholders in health care.

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Author(Year)	Country	Study design/ Methods used	Results	Conclusion	Practical implications
Faye et al. (2020)	SSA	Household surveys. Composite coverage index.	Large subnational inequalities in RMNCH coverage within 39 sub—Saharan countries. Persistence of large inequalities between subnational units within many countries.	Large subnational inequalities in RMNCH coverage persist in many countries. Poor governance and conflict contribute to these inequalities.	Identify subnational inequalities for targeted health interventions. Address governance and conflict issues to reduce disparities.
Sidze et al. (2022)	SSA	Systematic review according to PRISMA guidelines.	Great variation in Maternal, Newborn and Child Health Services (MNCHS) access and utilization in urban sub—Saharan Africa. Vulnerability factors include poverty, low education, unemployment, etc.	There is a great variation in MNCH services utilization across urban sub—Saharan Africa. Context-specific intervention programs are essential to improve access and use of MNCH services.	Context-specific intervention programs are essential. Resolve barriers for vulnerable urban populations.
Somuah et al. (2022)	SSA	Systematic literature search in multiple databases. Compilation of data in Excel for final presentation with heat maps	The majority of countries in SSA have a hypertension prevalence between 20—40%. Diabetes has a prevalence of below 10% in the majority of countries in SSA.	NCDs are on the rise in Sub—Saharan Africa. Action-oriented research and policies are needed to reduce the burden.	Inform policy and future research on NCDs in SSA. Urgent need for action-oriented research and healthcare financing.
Spearman and Sonderup (2015)	SSA	Analysis of liver disease burden in sub—Saharan Africa. Identification of major causes of liver disease in the region.	Cirrhosis mortality doubled between 1980 and 2010. Cirrhosis mortality rates were higher in Central, Eastern, and Western Africa compared to Southern Africa.	Liver disease disparities in sub—Saharan Africa due to various factors. Access to care barriers can be overcome with vaccines and therapies.	Improve education, awareness, and resources for liver disease management. Implement sustainable access to lifesaving liver disease medications.
Duah et al. (2020)	SSA	Analysis of secondary data from the World Bank Describing trends in NCD mortalities in sub—Saharan Africa.	Proportionate mortalities attributed to NCDs in SSA increased from 22.49% in 2000 to 33.69% in 2016. NCD mortalities increased in low—, middle—, and high—income countries in SSA.	Proportionate mortalities attributed to NCDs in SSA increased from 22.49% in 2000 to 33.69% in 2016. NCD prevention and control initiatives need higher prioritization.	Higher prioritization of NCD prevention and control initiatives. Integration of NCD prevention into existing public health structures.

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Author(Year)	Country	Study design/ Methods used	Results	Conclusion	Practical implications
Ramesh and Kosalram (2023)	India	A scoping review of literature on the burden of NCDs in India. Preliminary search using search engines like PubMed, Google Scholar, etc.	NCDs accounted for 71% of global deaths in 2019. India should develop a policy tailored to NCDs and emphasize preventive actions.	NCDs contribute to global and national health disparities. India should implement a higher—level coordinating framework and overarching policy for NCDs.	India should establish a higher—level coordinating framework and overarching policy for NCDs. Emphasize health promotion and preventive actions to limit risk factor exposure.
Nakaganda et al. (2023)	Uganda	Followed PRISMA statement for systematic reviews Registered review protocol with PROSPERO, CRD42018115265	Unhealthy diet most prevalent lifestyle risk factor in Uganda. Tobacco use decreased, and overweight increased over time in Uganda.	Unhealthy diet is the most prevalent lifestyle risk factor. Tobacco use has decreased while being overweight has increased.	Develop targeted interventions for lifestyle cancer risk factors in Uganda. Implement a multi-sectoral approach involving various stakeholders for cancer control.
Natukwatsa et al. (2021)	Uganda	Verbal autopsies with structured questionnaires for cause of death. Physicians assigned likely cause of death using ICD—10 codes.	53% of deaths were due to non—communicable diseases. Cardiovascular diseases and diabetes were the leading causes of NCD deaths.	NCDs are the leading cause of death in Eastern Uganda. Cardiovascular diseases and diabetes are the predominant causes of NCD deaths.	NCDs are the leading cause of death in Eastern Uganda. Verbal autopsies help monitor mortality trends in low—resource settings.
Dowhaniuk (2021)	Uganda	Accessibility analysis using walking, bicycling, and driving scenarios. Statistical analysis including spatial statistics, Random Forest analysis, and Linear Mixed-effect models.	Percentage of Ugandans within 1—hour walking distance of health centers: 71.73% Bicycles increase access to health centers by 27.52 percentage points.	Bicycles can increase health access equity in Uganda. Rural poor residents face disproportionately long travel times to health centers.	Bicycles increase health center access for vulnerable Ugandans. Disparities exist between urban and rural populations in health access.
Armstrong-Hough et al. (2018)	Uganda	Poisson regression model used with 2013 SARA data from Uganda. Predictors tested: basic amenities, equipment, region, facility type, and managing authority.	For-profit facilities had 98% more EM—NCD than public. General hospitals had 98% higher EM—NCD availability.	Multiple disparities in the availability of essential medicines for treating non-communicable diseases (EM—NCD) in Uganda. Private for-profit facilities have higher EM—NCD counts compared to public facilities.	Identify disparities in essential medicine availability for non—communicable diseases. Guide resource distribution and address gaps in healthcare services.
Rogers et al. (2018)	Uganda	Survey developed based on WHO—PEN standards Needs assessment conducted in 53 public health facilities.	Significant resource gaps in all sampled facilities for NCDs. None of the facilities met WHO—PEN standards for NCD interventions.	Critical gaps in the capacity of public sector health facilities. Need for scaling up low—cost, high—impact NCD interventions.	Highlighted critical gaps in NCD service delivery in Uganda. Urgent need to scale—up low—cost, high—impact NCD interventions.

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Author(Year)		Study design/ Methods used	Results	Conclusion	Practical implications
Kalyesubula et al. (2019)	Uganda	Retrospective cohort study of patients at Mulago Hospital, Uganda. Detailed history, physical exams, and investigations to confirm diagnosis. Cox survival analysis was used to identify factors associated with in-hospital mortality.	The majority had NCDs as the primary reason for admission. Decline in infectious diseases, rise in NCD admissions.	NCDs increasing as a major cause of admissions over 4 years. Urgent need for early detection and management of NCDs.	Increase focus on early NCD detection and management in Uganda. Maintain efforts in managing infectious diseases alongside NCDs.
Guwatudde et al. (2015)	Uganda	Cross-sectional study design. Used WHO STEP—wise approach for NCD risk factor analysis.	High prevalence of hypertension and pre-hypertension in Uganda. A small percentage of affected individuals are aware of their condition.	High prevalence of hypertension and pre-hypertension in Uganda. Low awareness of high blood pressure among affected individuals.	High prevalence of hypertension in Uganda, and low awareness among the population. Urgent need for nationwide strategies to raise awareness and screening.
Mondo et al. (2014)	Uganda	WHO STEP—wise approach for chronic disease risk—factor surveillance. Three steps: questionnaire, measurements, and laboratory investigations.	Prevalence of hypertension: 22.1% for men, and 20.5% for women. Prevalence of overweight: 15% for men, 16.8% for women.	First NCD risk—factor profile in Kasese district, Uganda. Need for prevention strategy to avoid more diseases.	Provides evidence for health policymakers and district authorities. Calls for effective prevention strategies to avoid the increased burden of diseases.
Kakama and Basaza (2022)	Uganda	Two metrics of inequity: quintile ratio and concentration index. Data analysis from UDHS of 2006, 2011, and 2016.	Improved health services reduce disparities between poor and wealthy, rural and urban. Worsening inequities in under-five mortality, malnutrition, and prevalence of ARI.	Significant improvement in population averages across socioeconomic categories and rural-urban areas. Healthcare utilization indicators show trends towards perfect equity levels.	Prioritize impoverished and rural communities in intervention initiatives. Consider both wealthier and urban groups in health policies and initiatives.
Twinomugisha (2020)	Uganda	Juridical measures, community participation, gender perspective. Strong political will from government actors.	Right to health framework critical in tackling NCDs in Uganda. Neoliberalism contributes significantly to the NCDs challenge in Uganda.	The state should regulate industries affecting health to prevent NCD escalation. Lifestyle changes alone may fail without addressing structural factors.	The state should regulate industries to prevent NCD escalation. Lifestyle changes alone may fail without addressing structural factors.

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Kabwama et al. (2016)	Uganda	Cross-sectional study design. WHO STEP—wise approach for NCD risk factors.	26.8% of participants were current alcohol users. 9.8% of adults in Uganda have an alcohol—use—related disorder.	Of high alcohol use in Uganda, 9.8% have alcohol-related disorders. Males, older individuals, and certain regions are more likely medium—high users.	Of high alcohol use in Uganda, 9.8% have alcohol-related disorders. Males, older individuals, and specific regions are at higher risk for alcohol use.
Bahendeka et al. (2016)	Uganda	A nationwide cross-sectional survey was conducted between April and July 2014. Fasting capillary glucose was measured to estimate glycemia.	IFG prevalence: 2.0%, diabetes mellitus prevalence: 1.4%. The majority with hyperglycemia are unaware of their status.	Low prevalence of IFG and diabetes in Uganda population. The majority with hyperglycemia are unaware of their status.	The low prevalence of diabetes in Uganda allows prevention opportunities. The majority with hyperglycemia are unaware, leading to potential late complications.
Stephens et al. (2021)	Uganda	VHWs screen for hypertension and other NCDs through a door—to—door biannual health census. VHWs serve as primary providers at monthly village—based NCD clinics.	22% had BP ≥140/90, 5% had BP ≥160/100. 68% of treated patients had BP below target.	VHW—led NCD screening and management model with novel strategies. Addressed common barriers to care in rural communities effectively.	Model for VHW-led NCD screening and management with novel strategies. Addresses barriers like lack of awareness, access, and medication stockouts.
Kavishe et al. (2015)	Uganda and Tanzania.	Population-based cross-sectional survey. Multistage sampling with five strata per country.	High prevalence of hypertension and risk factors for NCDs in Tanzania and Uganda. Low prevalence of diabetes mellitus and other NCDs.	High prevalence of hypertension and risk factors for NCDs. The majority of hypertension cases were untreated and unrecognized.	Urgent need for prevention efforts against NCDs. Strengthen health services for early detection and treatment.
Kwarisiima et al. (2016)	Uganda	Blood pressure measurement and demographic data collection on 65,000 adults. Conducted multi-disease community health campaigns in 20 rural Ugandan communities.	HTN prevalence: 14% overall, 11% among HIV—positive individuals. 79% undiagnosed, 85% not on medication, 50% uncontrolled BP.	HIV—negative individuals had 1.2-fold higher odds of hypertension. Hypertension prevalence was 14% overall, 11% among HIV—positive individuals.	HIV—negative individuals have higher odds of hypertension. Universal HIV screening programs could address hypertension in Sub—Saharan Africa.
Sommer et al. (2015)	Uganda	Overview of systematic reviews. Search in various databases for relevant publications.	Low SES increases the risk of developing CVD, lung cancer, and diabetes. Lower SES is a risk factor for obesity in HIC.	Association between socioeconomic inequalities and NCDs. Poor methodological quality of the reviews.	Identify gaps for future research in LMIC countries. Compile evidence on childhood SES and NCDs.

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Al-Hanawi (2021)	Saudi Arabia	Univariate, bivariate, and multivariate logistic regression analyses. Concentration curve and concentration indices for inequality assessment.	The prevalence of NCDs in Saudi Arabia is 32.15%. The prevalence of NCDs is higher among women and elderly respondents.	The prevalence of NCDs in Saudi Arabia is 32.15%. Inequalities in NCD prevalence exist, particularly among women and those with lower education levels.	Monitor risk factors, develop targeted interventions for NCDs, and achieve health equality. Consider socio-economic status, age, marital status, nationality, and region.
Akif and Salman (2020)	India	The concentration curve and concentration index were used to analyze socioeconomic inequality. Binary logistic regression was used to calculate odds ratios.	Inequality was found in the prevalence of selected NCDs among the Indian population. NCDs are disproportionately concentrated among rich populations in rural and urban areas.	Target high—risk groups to combat NCDs effectively. NCD prevalence is higher among the rich population in India.	Target high—risk groups for effective NCD prevention strategies. Address socioeconomic inequalities in NCD prevalence for better outcomes.
Macinko and Mullachery (2022)	Brazil	Data from two cross-sectional population-based surveys, the 2013 and 2019 Brazilian National Health Surveys (PNS), were used. The surveys used a complex sample design and conducted face—to—face interviews using structured questionnaires.	Increased prevalence rates of all NCDs from 2013 to 2019. Educational inequities in NCDs remained significant between 2013 and 2019.	NCDs increased, with significant educational inequities. Urgent need for equity—promoting health policies and programs.	Urgent need for equity—promoting health policies and programs. Action to reduce socioeconomic and geographic inequalities in NCDs.

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Gouda et al. (2019)	SSA	Data from the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2017 was used to analyze the burden of NCDs in sub—Saharan Africa in terms of disability-adjusted life—years (DALYs)—with crude counts as well as all—age and age-standardized rates per 100 000 population—with 95% uncertainty intervals (UIs).	All—age total DALYs due to NCDs increased by 67·0% between 1990 (90·6 million [95% UI 81·0—101·9]) and 2017 (151·3 million [133·4—171·8]), reflecting an increase in the proportion of total DALYs attributable to NCDs (from 18·6% [95% UI 17·1—20·4] to 29·8% [27·6—32·0] of the total burden). Although most of this increase can be explained by population growth and aging, the age-standardized DALY rate (per 100 000 population) due to NCDs in 2017 (21 757·7 DALYs [95% UI 19 377·1—24 380·7]) was almost equivalent to that of communicable, maternal, neonatal, and nutritional diseases (26 491·6 DALYs [25 165·2—28 129·8]). Cardiovascular diseases were the second leading cause of NCD burden in 2017, resulting in 22·9 million (21·5—24·3) DALYs (15·1% of the total NCD burden), after the group of disorders categorized as other NCDs (28·8 million [25·1—33·0] DALYs, 19·1%). These categories were followed by neoplasms, mental disorders, and digestive diseases.	Although crude DALY rates for all NCDs have decreased slightly across sub—Saharan Africa, age-standardized rates are on the rise in some countries (particularly those in southern sub—Saharan Africa), and for some NCDs (such as diabetes and some cancers, including breast and prostate cancer).	To effectively address these changing needs, countries in sub—Saharan Africa require detailed epidemiological data on NCDs.

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Umuhoza and Ataguba (2018)	SADC	The indirect standardization method is used for standardizing the y—y-variable. Erreygers corrected index (EC) was used to normalize the concentration index. Data came from the 2002/04 World Health Survey (WHS) using six SADC countries (Malawi, Mauritius, South Africa, Swaziland, Zambia and Zimbabwe) where the WHS was conducted.	Generally, pro-poor socioeconomic inequality exists in poor SAH in the six countries. However, this is only significant for South Africa ($CI = -0.0573$; $p < 0.05$), and marginally significant for Zambia ($CI = -0.0341$; $P < 0.1$) and Zimbabwe ($CI = -0.0357$; $p < 0.1$). Smoking and inadequate fruit and vegetable consumption were significantly concentrated among the poor. Similarly, the use of biomass energy, unimproved water, and sanitation were significantly concentrated among the poor. However, inequalities in heavy drinking and physical inactivity are mixed. Overall, a positive relationship exists between inequalities in ill—health and inequalities in risk factors of ill—health.	Pro-poor socioeconomic inequality in poor self—assessed health in SADC. Need for inter-sectoral action to address health inequalities.	Socioeconomic inequalities in health and health risk factors exist in the SADC countries. Tackling these inequalities requires intersectoral action.
Pérez-Mesa et al. (2020)	SSA	Comparable household surveys for 33 Sub—Saharan countries. Estimation of child health inequality and its causes.	Child health inequality is lower for older cohorts. Factors such as family background and household facilities contribute to child health inequality.	Child health inequality is lower for older cohorts. Factors such as family background and household facilities contribute to child health inequality.	Child health inequality is higher for younger cohorts.
Mudie et al. (2019)	SSA	scoping review to map the extent of current NCD research in SSA by identifying studies published after the year 2000 using prospectively collected cohort data on any of the six NCDs (cardiovascular diseases, diabetes, obesity, chronic kidney disease, chronic respiratory diseases, and cancers)	30 cohort studies meeting eligibility criteria were identified. The majority (27%) of the studies were set in South Africa. Hypertension ($n = 23$) was most commonly reported, followed by obesity ($n = 16$), diabetes ($n = 15$), CKD ($n = 6$), COPD ($n = 2$), cervical cancer ($n = 3$), and breast cancer ($n = 1$). The majority ($n = 22$) reported data on at least one demographic/environmental, lifestyle, or physiological risk factor but these data varied greatly. Most studies collected data on hypertension, diabetes, and obesity.	Existing data on NCDs in SSA focused on hypertension, diabetes, and obesity. Limited data were available for COPD, with self—report or invalid methods.	Existing data on NCDs in SSA is focused on hypertension, diabetes, and obesity. Limited data is available for COPD and cancer.

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RESULTS AND ANALYSIS

Health inequalities refer to the systematic differences in health status or the distribution of health resources between different population groups, arising from the social conditions in which people are born, grow, live, work, and age. Non—communicable diseases (NCDs), including cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes, represent a major public health challenge globally and particularly in Uganda. This systematic review aims to elucidate the extent of these inequalities, To systematically review the literature to understand the extent of health inequalities in non-communicable diseases (NCDs) across various demographic groups, including socioeconomic status, race/ethnicity, gender, and geographic location. A comprehensive search of the literature was conducted, focusing on studies published between 2010 and 2024 that address NCDs in Uganda. Databases searched included PubMed, Google Scholar, and regional health repositories. The inclusion criteria were studies that reported on the prevalence, determinants, and outcomes of NCDs among different demographic groups. Data extraction focused on the primary and secondary outcome measures outlined in the research objective.

Prevalence of NCDs Among Various Demographic Groups

Wanziima et al. (2022) reported an alarming prevalence of NCDs (85.5%) among the elderly in rural Uganda. Factors influencing this prevalence include family history, poor housing conditions, physical inactivity, and inadequate kitchen ventilation. These findings suggest a multifaceted approach to addressing NCDs among the elderly, involving improvements in living conditions and promoting physical activity. T. Siddharthan et al. (2021) found self—reported NCD levels to be lower than national estimates, with hypertension being the most frequently reported disease at 6.3%. The lower self—reported levels might indicate underreporting or lack of awareness about NCDs among the general population, highlighting the need for better health education and screening programs. Kansiime et al. (2019) identified that 20% of PLHIV in Uganda had an NCD, with hypertension being particularly prevalent. This indicates a compounded health burden for PLHIV, necessitating integrated care approaches to manage both HIV and NCDs effectively. Wanziima et al. (2022) found significant differences in the prevalence of NCDs between urban and rural areas, with urban residents showing higher rates of diabetes and hypertension. This suggests that urbanization may be linked to lifestyle changes that increase NCD risk, such as dietary changes and reduced physical activity. Lubega et al. (2023) highlighted that urbanization and lifestyle changes significantly contribute to the rising prevalence of NCDs in Uganda. This study aligns with Wanziima et al. (2022) findings on urban-rural disparities, reinforcing the need for targeted urban health interventions. Kavishe et al. (2015) discussed the double burden of communicable and non—communicable diseases in Uganda, emphasizing the need for integrated health services to address the complex health challenges faced by the population.

Mortality Rates Attributable to NCDs

Natukwatsa et al. (2021) provided insights into the mortality rates attributable to NCDs, indicating that cardiovascular diseases and diabetes are the leading causes of death among adults in Uganda. This underscores the importance of early detection and management of these conditions to reduce mortality rates. Kalyesubula et al. (2019) examined mortality trends over the past decade, revealing an upward trend in NCD—related deaths. The study calls for urgent public health interventions to address this growing burden.

Disparities in Access to Healthcare Services

Dowhaniuk (2021) highlighted that rural poor populations experience significantly longer travel times to health centers compared to their urban counterparts. This geographic disparity severely limits timely access to necessary healthcare services, thereby exacerbating health outcomes related to NCDs. Introducing bicycles or other transportation means could mitigate this issue and improve healthcare access. Kakama and Basaza (2022) revealed substantial inequities in maternal and child health indicators, even with overall improvements in healthcare utilization. These inequities suggest that health system improvements are not uniformly distributed, leaving rural and impoverished communities at a disadvantage. This finding underscores the need for targeted policies to address these disparities. Meghani et al. (2021) emphasized that financial constraints and policy gaps significantly hinder access to NCD care.

This finding calls for enhanced policy frameworks and increased funding to improve healthcare access and equity. Addressing financial barriers is crucial for ensuring that vulnerable populations receive timely and adequate care. Murphy et al. (2015) noted that healthcare services for NCDs are often concentrated in urban areas, making it difficult for rural populations to access care. This urban-centric healthcare delivery model contributes to the disparities observed in NCD management. Sidze et al. (2022) identified that cultural beliefs and stigma associated with NCDs further impede access to care, especially in rural areas. Community—based interventions are needed to address these cultural barriers and promote health-seeking behaviors. The fragmented nature of healthcare efforts, as highlighted by Meghani et al. (2021), poses significant challenges in managing NCDs effectively. Funding

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constraints and lack of cohesive strategies among non—governmental organizations contribute to suboptimal healthcare utilization patterns. Addressing these issues requires a coordinated approach to resource allocation and healthcare delivery. Kansiime et al. (2019) and Essue and Kapiriri (2018) suggested that integrated care models, which combine services for HIV and NCDs, could improve healthcare utilization and outcomes. Such models would ensure that patients receive comprehensive care that addresses all their health needs, potentially improving adherence to treatment and overall health outcomes. Spearman and Sonderup (2015) reported that healthcare utilization for NCD management is often hindered by a lack of awareness and health literacy among patients. Educational programs are necessary to improve patient knowledge and engagement in their care. Stephens et al. (2021) examined healthcare utilization patterns and found that frequent stock-outs of essential NCD medications in public health facilities deter patients from adhering to prescribed treatments.

Health Outcomes Associated with NCDs

The review indicates a high burden of NCDs among vulnerable populations, with significant implications for overall health outcomes and quality of life. For instance, elderly populations and PLHIV with NCDs face compounded health challenges, leading to reduced life expectancy and poorer quality of life. These findings emphasize the need for targeted interventions to address the unique needs of these populations. Ngaruiya et al. (2021) highlighted the psychological impact of living with NCDs, including increased rates of depression and anxiety among patients. Addressing mental health as part of NCD management is critical for improving overall health outcomes. Kwarisiima et al. (2016) found that poor adherence to NCD medications significantly worsens health outcomes, emphasizing the need for strategies to support medication adherence. Regarding health behaviors and risk factors related to NCDs, studies by Dieteren and Bonfrer (2021) demonstrated that low SES is associated with higher tobacco use, while overweight issues are more prevalent among wealthier individuals. This bifurcation highlights the dual burden of NCD risk factors across different SES groups in Uganda. Interventions need to be tailored to address these specific risks within each SES group. Wanziima et al. (2022) identified key behavioral risk factors among the elderly, including physical inactivity and inadequate kitchen ventilation, contributing to the high prevalence of NCDs in rural areas. These findings emphasize the need for targeted behavioral interventions to promote physical activity and improve living conditions. Mondo et al. (2014) noted that men are more likely to engage in risky behaviors such as smoking and excessive alcohol consumption, leading to higher NCD rates among males compared to females. This highlights the importance of gender-specific health promotion strategies to address these risks and reduce NCD prevalence among men. Omotoso (2022) explored the role of dietary habits in NCD risk, finding that high consumption of processed foods is a significant risk factor for NCDs. Public health campaigns should promote healthier eating habits to reduce NCD risk. Nakaganda et al. (2023) and Nelson et al. (2015) studied the impact of physical activity on NCD prevalence, noting that sedentary lifestyles are a major contributor to the rising NCD burden. Initiatives to encourage physical activity should be prioritized. Regarding measures of healthcare quality, there is a notable lack of data on adherence to clinical guidelines and patient satisfaction in the reviewed studies. This gap suggests an area for future research to ensure that NCD management aligns with best practice standards. Improved adherence to clinical guidelines could enhance treatment outcomes and patient satisfaction. More comprehensive studies are needed to evaluate patient satisfaction with healthcare services for NCDs. Understanding patient experiences and satisfaction levels can provide valuable insights into the effectiveness of healthcare delivery and areas for improvement. The systematic review results reveal substantial health inequalities in the prevalence, access to care, and outcomes of NCDs in Uganda. These inequalities are influenced by socioeconomic status, geographic location, and gender, among other factors. Addressing these disparities requires a multifaceted approach, including preventive measures, improved access to healthcare, increased funding, targeted interventions, and integrated care models. Future research should focus on filling gaps in data on healthcare quality and patient-reported outcomes to provide a more comprehensive understanding of health inequalities and NCD management in Uganda.

DISCUSSION OF FINDINGS

The extent of Health Inequalities in NCDs

The extent of health inequalities among different demographic groups in Uganda is significant, particularly regarding the prevalence and mortality rates of non—communicable diseases (NCDs). Studies indicate that the prevalence of NCDs, such as hypertension, is notably high among the elderly and varies by gender, with women reporting higher rates of certain conditions. For example, Wanziima et al. (2022) reported an 85.5% prevalence of non—communicable chronic morbidities (NCCMs) among the elderly in Bulambuli District, while Siddharthan et al. (2021) found hypertension to be the most common self—reported NCD in a rural Uganda cohort. Disparities in mortality rates are also evident, as Omech et al. (2022) highlighted lower mortality rates for some NCDs among HIV—positive patients compared to HIV—negative controls, suggesting HIV status can influence NCD outcomes. High NCD prevalence among the elderly,

particularly in rural areas, is influenced by factors such as poor housing conditions, limited physical activity, and inadequate kitchen ventilation. These findings underscore significant disparities in NCD prevalence, mortality rates, and healthcare access across various demographic groups in Uganda. The study findings indicate that rural populations face higher NCD prevalence due to limited access to healthcare facilities and services. This aligns with the work of Natukwatsa et al. (2021), who found that rural areas have limited healthcare resources, leading to higher NCD prevalence. However, urban residents, while having better access to healthcare, showed higher incidences of lifestyle-related NCDs, such as obesity and diabetes, likely due to sedentary lifestyles and dietary habits. This result aligns with those by Supakul et al. (2019) in Vietnam, who showed that people living in urban areas are more likely to consume more alcohol, have a higher BMI, and have been diagnosed with diabetes more when compared to those in rural areas. Furthermore, studies of NCD behavioral risk factors between urban and rural dwellers in other lower—and middle—income countries in Asia such as Myanmar (Htet et al., 2016), and Cambodia as well as in other countries from the different geographical areas such as Africa: the Zulu community (Seedat et al., 1982), Uganda (Chiwanga et al., 2016), and Cameroon (Sobngwi et al., 2004), where rural-urban disparities persist. These findings are in agreement with those of Siddharthan et al. (2021), who identified similar trends in urban populations. The study reveals that mortality rates attributable to NCDs are disproportionately higher in low socioeconomic status (SES) groups. This trend is consistent with findings from Bernard et al. (2022), who reported that financial constraints and lower health literacy often lead to delayed diagnosis and treatment, resulting in higher mortality rates in low SES groups. The mortality rates for cardiovascular diseases (CVDs) and cancers were particularly high among rural and low SES populations, underscoring the urgent need for targeted health interventions. Sommer et al. (2015) conducted an overview of systematic reviews on socio-economic inequalities and NCDs. Unlike the current study, this study compared outcomes between countries (rather than individuals within countries). However, similar to the current study's findings related to cancer and cardiovascular disease, Sommer et al. (2015) found that having low SES or living in an LMIC increased the risk of developing CVD, lung and gastric cancer and increased the risk of mortality from lung cancer and breast cancer. Unlike the present study, it found that having low SES also increased the risk of developing type 2 diabetes or COPD and increased the risk of mortality from COPD. Allen et al. (2017) conducted a review on the association between SES and NCD risk factors (harmful use of alcohol, tobacco use, unhealthy diets, and physical inactivity within LLMICs). Just as the present study found that low SES groups had worse outcomes related to cancer and CVD, Allen et al. (2017) found that low SES groups had a significantly higher prevalence of tobacco and alcohol use, and consumed fewer vegetables, fish, and fiber. The study findings also highlight significant disparities in access to healthcare services for NCD management, with rural and low SES populations facing notable barriers. These findings are corroborated by Trishul Siddharthan et al. (2021), who also reported frequent stock-outs of essential NCD medications in public health facilities, deterring patients from adhering to prescribed treatments. Additionally, the lack of specialized healthcare services in rural areas forces patients to travel long distances to receive care, further exacerbating health inequities.

CRITICAL INTERPRETATION

Policy frameworks should prioritize reducing healthcare access disparities and improving healthcare quality, especially in underprivileged areas. Efforts must go beyond individual behavior change to address systemic issues like funding constraints and policy fragmentation. Despite improvements in healthcare utilization, disparities persist, emphasizing the need for continuous quality enhancement and economic barrier reduction. Integrated care approaches are crucial for managing multiple health conditions, particularly among HIV—positive patients. By addressing health disparities through targeted, systemic interventions, it is possible to reduce the burden of NCDs and promote equitable health outcomes for all populations.

LIMITATIONS OF THE STUDY

Despite the comprehensive analysis, this study has several limitations that need to be acknowledged. First, the reliance on secondary data from various studies may introduce inconsistencies due to differences in study design, sample size, and data collection methods. This can affect the comparability of findings across different demographic groups and geographic locations.

Third, the cross-sectional nature of many of the referenced studies limits the ability to establish causality between determinants and health outcomes. Longitudinal studies would provide a more robust understanding of how these determinants influence health inequalities over time. Additionally, the study primarily focuses on the elderly and rural populations, which may overlook health inequalities experienced by other vulnerable groups, such as children, adolescents, and urban poor. These limitations highlight the need for future research to address these gaps, particularly through longitudinal studies, and comprehensive data collection on a broader focus on diverse population groups. By addressing these limitations, future studies can provide a more nuanced understanding of health inequalities and inform more effective interventions and policies to reduce the burden of NCDs in Uganda.

IMPLICATIONS FOR POLICY AND PRACTICE

1. Enhanced Preventive Measures: There is a need for robust preventive measures, including health education and screening programs, to ensure early detection and management of NCDs.
2. Improved Access to Healthcare: Reducing geographic barriers by providing transportation options and increasing the availability of healthcare facilities in remote areas is crucial.
3. Increased Funding and Resource Allocation: Allocating more resources to NCD prevention and control programs is essential. This can support comprehensive care models and ensure the sustainability of health interventions.
4. Targeted Interventions: Developing targeted interventions to address the specific needs of vulnerable populations, such as the elderly, PLHIV, and individuals with low SES, is necessary. These interventions should focus on addressing the root causes of health disparities and improving access to quality healthcare services.
5. Integrated Care Models: Promoting integrated care models that combine services for communicable and non—communicable diseases can ensure comprehensive care for patients with multiple health conditions.
6. Research and Data Collection: Conducting more research on adherence to clinical guidelines, patient satisfaction, and patient-reported outcomes is crucial for evaluating the quality of healthcare services and identifying areas for improvement.

CONCLUSIONS

This systematic review study on health inequalities and non—communicable diseases (NCDs) in Uganda illuminates critical disparities in health outcomes across various demographic groups. Through a comprehensive review of the literature, several key findings emerge, shedding light on the prevalence of NCDs in the Ugandan context. Among the elderly population residing in rural areas, a strikingly high prevalence of NCDs is observed, influenced by factors such as substandard housing conditions, limited physical activity, and inadequate ventilation in kitchens. This underscores the urgent need for targeted interventions aimed at improving living conditions and promoting healthy behaviors among this vulnerable demographic group. Additionally, disparities in self—reported NCD levels hint at potential underreporting or lack of awareness, emphasizing the importance of robust health education and screening initiatives to accurately assess and address the burden of NCDs.

For individuals living with HIV (PLHIV), the co-occurrence of NCDs poses a compounded health burden, with hypertension emerging as a prevalent comorbidity. This highlights the necessity of integrated care models that holistically address both HIV and NCD management to optimize health outcomes for affected individuals. Furthermore, urban-rural disparities in NCD prevalence underscore the influence of lifestyle factors associated with urbanization, necessitating tailored interventions to mitigate NCD risk in urban settings.

The study also underscores the alarming mortality rates attributable to NCDs, particularly cardiovascular diseases and diabetes, which exhibit an upward trend over the past decade. Early detection and comprehensive management of NCDs are identified as crucial strategies for curbing mortality rates and improving overall health outcomes among the Ugandan population.

However, disparities in access to healthcare services, compounded by geographic, financial, and policy—related barriers, present formidable challenges in addressing NCDs effectively. Integrated care models and strategies to enhance medication adherence are identified as pivotal approaches to improve healthcare utilization and outcomes for individuals with NCDs.

Ultimately, the findings from this study have significant implications for policy and practice, calling for enhanced preventive measures, improved access to healthcare services, increased funding, and targeted interventions to address health inequalities and optimize NCD management in Uganda. By promoting integrated care models, conducting further research, and prioritizing data collection on healthcare quality and patient-reported outcomes, stakeholders can work towards reducing the burden of NCDs and fostering equitable health outcomes across demographic groups in Uganda.

RECOMMENDATIONS

Firstly, given the significant disparities in NCD prevalence and access to healthcare services across demographic groups, further research is warranted to explore the underlying determinants of these disparities in greater depth. Qualitative studies could investigate the socio-cultural, economic, and environmental factors that contribute to disparities in NCD burden and healthcare access, providing valuable insights for targeted intervention development.

Additionally, there is a pressing need for longitudinal studies to track trends in NCD prevalence, mortality rates, and healthcare utilization over time. Longitudinal data would facilitate a more comprehensive understanding of the evolving NCD landscape in Uganda and enable the assessment of the effectiveness of interventions and policy initiatives implemented to address NCDs and health inequalities.

Furthermore, interventions aimed at improving healthcare access and quality should be prioritized, particularly in underserved rural areas. This could involve initiatives to strengthen primary healthcare infrastructure, increase the availability of essential medications, and reduce financial barriers to accessing care. Community—based approaches that empower local healthcare providers and engage community members in health promotion and disease prevention efforts may also be effective in addressing disparities in healthcare access and outcomes.

Integrated care models that address the holistic health needs of individuals, including both NCDs and comorbidities such as HIV, should be expanded and evaluated for their effectiveness in improving health outcomes and healthcare utilization. These models have the potential to enhance coordination between different healthcare providers, streamline care delivery, and improve patient outcomes.

Finally, efforts to enhance health literacy and promote healthy behaviors should be intensified, with a particular focus on vulnerable populations such as the elderly, PLHIV, and those with low socioeconomic status. Health education campaigns that raise awareness about NCD risk factors, symptoms, and preventive measures can empower individuals to take control of their health and make informed decisions about healthcare—seeking behaviors.

In summary, future research should aim to deepen our understanding of the composite drivers of health inequalities and NCD burden in Uganda, while policy and practice should focus on strengthening healthcare systems, expanding access to quality care, and implementing evidence-based interventions to address disparities and improve health outcomes for all Ugandans.

LIST OF ABBREVIATIONS

BP	Blood Pressure
CVD	Cardiovascular Disease
ED	Emergency Department
HIC	High-income countries
HIV	Human Immunodeficiency Virus
HTN	Hypertension
LMICs	Low— and Middle—Income Countries
MNCHS	Maternal Newborn and Child Health Services
NCDs	Non—Communicable Diseases
PICO	Population, Intervention, Comparison, Outcome
PLHIV	People Living with HIV
RMNCH	Reproductive, Maternal, Newborn, and Child Health
RUNCD	Rural Uganda Non—Non-Communicable Disease
SES	Socioeconomic Status
SSA	Sub—Saharan Africa
UHC	Universal Health Coverage
VHWs	Village Health Workers
WHO	World Health Organization

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