
Assessing the Impact of Socioeconomic Status on the Likelihood of Developing Hypertension in Adults

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Abstract

Background: Hypertension is an increasing public health concern in Uganda, with social determinants potentially playing a crucial role in its distribution. This study aimed to examine the relationship between socioeconomic status (SES) and hypertension among Ugandan adults, investigate potential mediating effects of lifestyle factors, and assess the moderating role of healthcare access.

Methods: A cross-sectional study was conducted among 400 adults aged 18 years and above, selected through stratified random sampling from urban and rural areas in Uganda. Data were collected using structured questionnaires and blood pressure measurements. Binary logistic regression was employed to examine associations between SES indicators (education, income, employment) and hypertension, while mediation and moderation analyses were conducted to investigate pathways and effect modifications.

Results: The prevalence of hypertension was 33% in the study population. Higher education level was significantly associated with lower odds of hypertension, with tertiary education conferring the strongest protective effect (AOR=0.41, 95% CI: 0.18-0.92, $p=0.031$). Higher income showed a protective trend, though this was attenuated after adjustment for confounders. Lifestyle factors significantly mediated the SES-hypertension relationship, with dietary patterns accounting for approximately 31% of the effect, physical activity 25%, and stress levels 14%. Healthcare access significantly moderated the protective effect of higher SES, with the combination of tertiary education and good healthcare access associated with 72% lower odds of hypertension (AOR=0.28, 95% CI: 0.11-0.73, $p=0.009$) compared to no formal education with poor access.

Conclusion: Socioeconomic disparities significantly influenced hypertension prevalence among Ugandan adults, with education showing the strongest protective effect. These disparities were partially mediated by lifestyle factors and enhanced by healthcare access. Comprehensive interventions addressing both socioeconomic determinants and lifestyle factors, while improving healthcare accessibility, are essential for effective hypertension prevention and control in Uganda.

Keywords: Hypertension, Socioeconomic status and Healthcare access

Background

The relationship between socioeconomic status (SES) and health outcomes, particularly hypertension, is deeply rooted in various social determinants of health frameworks and epidemiological models that emphasize the role of economic, educational, and occupational disparities in shaping individual health trajectories. The fundamental cause theory, as proposed by Link and Phelan (1995), suggests that SES remains a fundamental determinant of health inequalities because it influences access to resources such as healthcare, nutritious food, and health-related knowledge, which in turn affect the likelihood of developing chronic conditions like hypertension (Yoga et al., 2019). Individuals with lower SES often face structural barriers, including inadequate healthcare access, poor living conditions, and high exposure to stressors, all of which contribute to an increased risk of developing hypertension. The social gradient in health, a concept explored in the Whitehall studies, further highlights how

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differences in SES correlate with differences in health outcomes, demonstrating that individuals in lower occupational ranks are more likely to experience hypertension compared to those in higher-status jobs due to workplace stress, limited autonomy, and reduced access to preventive care (Shamirah & Sarah, 2024).

From a behavioral perspective, the health lifestyle theory by Cockerham (2005) provides a useful lens through which to understand the association between SES and hypertension by emphasizing the role of daily lifestyle choices that are shaped by socioeconomic conditions (MURTHI, 2023). Individuals from lower SES backgrounds may have limited financial and social capital to engage in health-promoting behaviors such as maintaining a balanced diet, engaging in regular physical activity, and accessing preventive healthcare services, all of which play a critical role in regulating blood pressure levels. Additionally, higher levels of occupational and financial stress among lower-income individuals contribute to maladaptive coping mechanisms, such as excessive alcohol consumption, smoking, and unhealthy dietary habits, which are known risk factors for hypertension (Sagindykova et al., 2023). The stress process model by (Simanjuntak et al., 2020) further elucidates the chronic stress experienced by socioeconomically disadvantaged groups, demonstrating how prolonged exposure to psychosocial stressors leads to physiological wear and tear, known as allostatic load, which contributes to the development of hypertension over time.

Furthermore, the biopsychosocial model by (Ahmad & Faridi, 2020) provides a comprehensive framework for examining how biological, psychological, and social factors collectively influence hypertension risk among individuals with varying socioeconomic backgrounds. Biologically, prolonged exposure to stress hormones such as cortisol due to financial insecurity, job instability, and housing problems can lead to chronic hypertension by causing endothelial dysfunction and increased vascular resistance (Kuzembekova & Zhanbyrbayeva, 2022). Psychologically, individuals in lower socioeconomic brackets often experience higher levels of anxiety and depression, which are linked to poor health behaviors and inadequate adherence to medical treatments for hypertension (Eze et al., 2019). Socially, disparities in healthcare access and quality mean that lower-income individuals are less likely to receive timely diagnosis and treatment for hypertension, leading to poorer management and increased complications. By integrating these theoretical perspectives, this study aims to assess the extent to which SES influences the likelihood of developing hypertension and provide insights into policy interventions that could mitigate these health disparities.

In Uganda, hypertension has emerged as a significant public health challenge, particularly as the country undergoes rapid urbanization and economic transformation, leading to shifts in lifestyle behaviors and healthcare access. Despite increasing awareness of non-communicable diseases, hypertension prevalence remains high, especially among individuals from lower socioeconomic backgrounds who face barriers to early diagnosis, treatment, and effective management (Barua et al., 2023). Limited access to healthcare facilities, financial constraints, and a high reliance on traditional medicine often result in delayed treatment-seeking behaviors, exacerbating the burden of hypertension-related complications such as stroke, heart disease, and kidney failure (Julius & Gracious Kazaara, 2023). Additionally, disparities in dietary habits, with lower-income households consuming more processed and high-sodium foods due to affordability issues, further contribute to the rising cases of hypertension. The stress of financial insecurity, unstable employment, and inadequate social

support systems also plays a crucial role in increasing the risk of hypertension among disadvantaged populations (KOUSAR et al., 2021). Given these realities, understanding the extent to which socioeconomic factors influence the likelihood of developing hypertension in Uganda is essential for informing public health policies, improving healthcare access, and implementing targeted interventions to reduce health inequalities in the country.

Objectives of the study.

1. To examine the relationship between different socioeconomic indicators (income level, education, and employment status) and the likelihood of developing hypertension among adults.
2. To analyze the influence of lifestyle factors (diet, physical activity, and stress levels) as mediators in the relationship between socioeconomic status and hypertension prevalence.
3. To assess the extent to which access to healthcare services moderates the association between socioeconomic status and hypertension diagnosis, treatment, and management.

Study Hypotheses

Hypothesis (H₀): There is no significant relationship between socioeconomic indicators (income level, education, and employment status) and the likelihood of developing hypertension.

Hypothesis (H₁): There is a significant relationship between socioeconomic indicators (income level, education, and employment status) and the likelihood of developing hypertension.

Hypothesis (H₀): Lifestyle factors (diet, physical activity, and stress levels) do not mediate the relationship between socioeconomic status and hypertension prevalence.

Hypothesis (H₁): Lifestyle factors (diet, physical activity, and stress levels) significantly mediate the relationship between socioeconomic status and hypertension prevalence.

Hypothesis (H₀): Access to healthcare services does not moderate the association between socioeconomic status and hypertension diagnosis, treatment, and management.

Hypothesis (H₁): Access to healthcare services significantly moderates the association between socioeconomic status and hypertension diagnosis, treatment, and management.

Problem Statement

Hypertension is a major public health concern in Uganda, contributing significantly to the rising burden of non-communicable diseases and associated complications such as heart disease, stroke, and kidney failure. Despite the increasing prevalence of hypertension, its distribution is not uniform across populations, with individuals from lower socioeconomic backgrounds disproportionately affected (Mahamoud et al., 2020). Socioeconomic status (SES), which includes income level, educational attainment, and employment status, plays a crucial role in shaping access to healthcare, health-related behaviors, and overall disease risk. In Uganda, many individuals with lower SES face barriers to healthcare access, inadequate health awareness, poor dietary habits, and high levels of chronic stress, all of which contribute to the increased likelihood of developing hypertension. However, there is limited empirical evidence on the extent to which SES influences the risk of hypertension, particularly within the Ugandan context, where economic disparities and healthcare accessibility challenges persist (Wilson & Charles, 2023a).

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Previous studies have primarily focused on biological and behavioral risk factors for hypertension, often overlooking the structural and socioeconomic determinants that drive health inequalities. While factors such as diet, physical activity, and healthcare access have been linked to hypertension, their role as mediators or moderators in the SES-hypertension relationship remains inadequately explored (Moses et al., 2023). Furthermore, the extent to which healthcare access mitigates the impact of socioeconomic disparities on hypertension outcomes is not well understood (Wilson & Charles, 2023b). Addressing this gap is essential for developing targeted interventions and policies aimed at reducing the burden of hypertension, especially among disadvantaged populations. This study, therefore, seeks to assess the impact of socioeconomic status on the likelihood of developing hypertension among adults in Uganda (Wilson & Charles, 2023b). By employing logistic regression analysis, the study will evaluate the relationship between SES indicators and hypertension prevalence while examining the mediating role of lifestyle factors and the moderating effect of healthcare access. The findings will provide valuable insights for policymakers, healthcare providers, and public health professionals in designing equitable strategies to prevent and manage hypertension, particularly among vulnerable populations.

Methodology

This study employed a cross-sectional research design to assess the impact of socioeconomic status on the likelihood of developing hypertension among adults in Uganda. The cross-sectional design was chosen because it allowed for the collection of data at a single point in time, making it suitable for examining associations between socioeconomic factors and hypertension prevalence. The study population consisted of adults aged 18 years and above, selected from both urban and rural areas to ensure a representative sample. A sample size of 400 respondents was determined using Cochran's formula for estimating sample size in large populations. A stratified random sampling technique was employed, where the population was divided into strata based on socioeconomic indicators such as income level, education, and employment status. Within each stratum, systematic random sampling was used to select participants, ensuring diversity and representativeness. The stratified sampling method was justified as it enabled the study to capture variations in hypertension prevalence across different socioeconomic groups while minimizing selection bias.

Data were collected using structured questionnaires that included sections on demographic characteristics, socioeconomic indicators, lifestyle behaviors, healthcare access, and hypertension status. The questionnaires were pretested on a small sample to ensure clarity, reliability, and validity. Additionally, blood pressure measurements were taken using a digital sphygmomanometer to objectively determine hypertension status based on WHO classification criteria (systolic BP ≥ 140 mmHg or diastolic BP ≥ 90 mmHg). The data collection process was conducted by trained research assistants who followed standardized procedures to minimize measurement errors and interviewer bias. Ethical approval was obtained from the relevant institutional review board, and informed consent was sought from all participants before data collection. To ensure data integrity, collected responses were checked for completeness and consistency before being entered into a secure database. Data were analyzed using Stata statistical software (version 17). Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarize the characteristics of the study population.

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Logistic regression analysis was employed to address the study objectives. To examine the relationship between socioeconomic indicators and hypertension prevalence, binary logistic regression was performed, with hypertension status (yes/no) as the dependent variable and income level, education, and employment status as independent variables. To analyze the mediating role of lifestyle factors (diet, physical activity, and stress), a mediation analysis was conducted to determine the extent to which these factors influenced the SES-hypertension relationship. Lastly, a moderation analysis was performed using interaction terms to assess the effect of healthcare access on the SES-hypertension association. The results were presented in the form of odds ratios (ORs) with corresponding confidence intervals (CIs) and p-values, with statistical significance set at $p < 0.05$. Findings were interpreted and discussed in relation to existing literature to provide meaningful conclusions and recommendations for public health interventions (Nelson et al., 2022, 2023).

Results of the Study on Socioeconomic Status and Hypertension in Uganda

Table 1: Demographic and Socioeconomic Characteristics of the Study Participants (N=400)

<i>Characteristic</i>	<i>N</i>	<i>%</i>
<i>Gender</i>		
<i>Male</i>	196	49.0
<i>Female</i>	204	51.0
<i>Age (years)</i>		
<i>18-35</i>	128	32.0
<i>36-50</i>	145	36.3
<i>51-65</i>	87	21.8
<i>>65</i>	40	10.0
<i>Residence</i>		
<i>Urban</i>	215	53.8
<i>Rural</i>	185	46.3
<i>Education Level</i>		
<i>No formal education</i>	72	18.0
<i>Primary</i>	123	30.8
<i>Secondary</i>	147	36.8
<i>Tertiary</i>	58	14.5
<i>Monthly Income (UGX)</i>		
<i><200,000</i>	162	40.5
<i>200,000-500,000</i>	138	34.5
<i>500,001-1,000,000</i>	67	16.8
<i>>1,000,000</i>	33	8.3
<i>Employment Status</i>		
<i>Unemployed</i>	84	21.0
<i>Self-employed</i>	156	39.0

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Formally employed	97	24.3
Retired	63	15.8
Hypertension Status		
Yes	132	33.0
No	268	67.0

The demographic and socioeconomic characteristics of the study participants revealed a relatively balanced gender distribution, with females slightly outnumbering males (51% vs. 49%). The majority of participants were middle-aged adults between 36-50 years (36.3%), followed by young adults aged 18-35 years (32%). The study captured both urban (53.8%) and rural (46.3%) residents, reflecting the population distribution in Uganda. In terms of education, most participants had attained secondary education (36.8%), while 18% had no formal education. The income distribution showed that a significant proportion of participants (40.5%) earned less than 200,000 UGX monthly, indicating relatively low incomes among the study population. Self-employment was the most common form of employment (39%), followed by formal employment (24.3%). The prevalence of hypertension in the sample was found to be 33%, indicating that one in three adults in the study population had elevated blood pressure.

Table 2: Association Between Socioeconomic Factors and Hypertension (Binary Logistic Regression)

Variable	Crude OR (95% CI)	p-value	Adjusted OR* (95% CI)	p-value
Education Level				
No formal education	1.00 (Reference)	-	1.00 (Reference)	-
Primary	0.78 (0.43-1.42)	0.421	0.82 (0.44-1.52)	0.526
Secondary	0.51 (0.28-0.91)	0.023	0.58 (0.31-1.09)	0.092
Tertiary	0.32 (0.15-0.67)	0.003	0.41 (0.18-0.92)	0.031
Monthly Income (UGX)				
<200,000	1.00 (Reference)	-	1.00 (Reference)	-
200,000-500,000	0.83 (0.52-1.32)	0.427	0.88 (0.54-1.43)	0.603
500,001-1,000,000	0.62 (0.34-1.13)	0.119	0.69 (0.36-1.32)	0.264
>1,000,000	0.41 (0.18-0.94)	0.035	0.47 (0.19-1.13)	0.091
Employment Status				
Unemployed	1.00 (Reference)	-	1.00 (Reference)	-
Self-employed	0.89 (0.52-1.52)	0.671	0.93 (0.53-1.63)	0.802
Formally employed	0.61 (0.33-1.12)	0.112	0.75 (0.38-1.48)	0.406
Retired	1.37 (0.72-2.59)	0.336	0.91 (0.42-1.97)	0.813

*Adjusted for age, gender, and residence

The logistic regression analysis examining the association between socioeconomic factors and hypertension revealed significant patterns. In the unadjusted analysis, education level showed a strong inverse relationship with hypertension, with participants who had tertiary education being 68% less likely to have hypertension compared to those with no formal education (OR=0.32, 95% CI: 0.15-0.67, p=0.003). Similarly, those with

secondary education had a 49% lower odds of hypertension (OR=0.51, 95% CI: 0.28-0.91, $p=0.023$). After adjusting for age, gender, and residence, tertiary education remained significantly protective against hypertension (OR=0.41, 95% CI: 0.18-0.92, $p=0.031$), while the association with secondary education became marginally significant ($p=0.092$). With regard to income, participants earning more than 1,000,000 UGX monthly had significantly lower odds of hypertension in the unadjusted analysis (OR=0.41, 95% CI: 0.18-0.94, $p=0.035$), but this association was attenuated after adjustment for confounders ($p=0.091$). Employment status showed no statistically significant association with hypertension, although formally employed individuals tended to have lower odds compared to the unemployed in both crude and adjusted analyses.

Table 3: Mediation Analysis of Lifestyle Factors in the SES-Hypertension Relationship

Mediator	Direct Effect (DE) of SES on HTN	Indirect Effect through Mediator (IE)	Total Effect (TE)	Proportion Mediated (%)	p-value
Education Level (Tertiary vs. No formal)					
Dietary pattern	-0.631	-0.289	-0.920	31.4%	0.008
Physical activity	-0.689	-0.231	-0.920	25.1%	0.017
Stress level	-0.793	-0.127	-0.920	13.8%	0.045
Income Level (>1M vs. <200K UGX)					
Dietary pattern	-0.543	-0.242	-0.785	30.8%	0.012
Physical activity	-0.602	-0.183	-0.785	23.3%	0.028
Stress level	-0.659	-0.126	-0.785	16.1%	0.039

Note: Values represent regression coefficients from mediation analysis; SES = Socioeconomic Status; HTN = Hypertension

The mediation analysis explored the pathways through which socioeconomic status influenced hypertension prevalence. For education, the analysis revealed that lifestyle factors significantly mediated the relationship between tertiary education and hypertension. Specifically, dietary patterns accounted for 31.4% of the total protective effect of tertiary education on hypertension ($p=0.008$), while physical activity mediated 25.1% of this relationship ($p=0.017$). Stress levels played a smaller but still significant mediating role, accounting for 13.8% of the education-hypertension relationship ($p=0.045$). Similar patterns were observed for income, where dietary patterns mediated 30.8% of the protective effect of high income on hypertension ($p=0.012$), followed by physical activity (23.3%, $p=0.028$) and stress levels (16.1%, $p=0.039$). These findings indicated that the protective effect of higher socioeconomic status on hypertension was partially explained by healthier dietary practices, increased physical activity, and lower stress levels among individuals with higher education and income.

Table 4: Moderation Analysis - Effect of Healthcare Access on SES-Hypertension Relationship

Interaction Term	Adjusted OR* (95% CI)	p-value
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Education × Healthcare Access

No formal education × Poor access	1.00 (Reference)	-
No formal education × Good access	0.82 (0.39-1.71)	0.598
Tertiary × Poor access	0.57 (0.23-1.45)	0.241
Tertiary × Good access	0.28 (0.11-0.73)	0.009

Income × Healthcare Access

Low income × Poor access	1.00 (Reference)	-
Low income × Good access	0.79 (0.45-1.38)	0.407
High income × Poor access	0.68 (0.31-1.49)	0.339
High income × Good access	0.32 (0.13-0.77)	0.011

*Adjusted for age, gender, residence, and lifestyle factors Note: High income = >500,000 UGX; Low income = ≤500,000 UGX; Good access = Regular healthcare visits and health insurance

The moderation analysis examined how healthcare access modified the relationship between socioeconomic status and hypertension. The results showed significant interaction effects between education, income, and healthcare access. Participants with tertiary education and good healthcare access had a 72% lower odds of hypertension compared to those with no formal education and poor healthcare access (OR=0.28, 95% CI: 0.11-0.73, p=0.009). In contrast, tertiary education with poor healthcare access was associated with a smaller, non-significant reduction in hypertension risk (OR=0.57, 95% CI: 0.23-1.45, p=0.241). Similarly, high income combined with good healthcare access was associated with a 68% reduction in the odds of hypertension (OR=0.32, 95% CI: 0.13-0.77, p=0.011), while high income with poor healthcare access showed a weaker, non-significant association (OR=0.68, 95% CI: 0.31-1.49, p=0.339). These findings suggested that healthcare access significantly enhanced the protective effect of higher socioeconomic status on hypertension, indicating that the benefits of education and income for hypertension prevention were maximized when individuals had adequate access to healthcare services.

Discussion

The findings of this study provided valuable insights into the complex relationship between socioeconomic status and hypertension prevalence among Ugandan adults. The overall hypertension prevalence of 33% observed in this study was consistent with previous research in Uganda and other sub-Saharan African countries, which have reported prevalence rates ranging from 25% to 40% (Guwatudde et al., 2015; Kayima et al., 2015). This relatively high prevalence underscored the growing burden of hypertension in Uganda and highlighted the need for effective prevention and control strategies.

The study found a significant inverse relationship between education level and hypertension, with tertiary education conferring the strongest protective effect. This finding aligned with the global evidence on social determinants of health, which consistently shows that higher educational attainment is associated with better health outcomes (Agnes et al., 2023). Education likely influences hypertension risk through multiple pathways, including improved health literacy, greater awareness of cardiovascular risk factors, better adherence to medical advice, and adoption of healthier lifestyle behaviors (Oliver & Matovu, 2023). In the Ugandan context, this

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association might be particularly relevant, as educational opportunities vary widely across socioeconomic groups, contributing to health disparities.

Income level also showed an inverse relationship with hypertension prevalence, although this association was attenuated after adjusting for confounders. Similar findings have been reported in other low- and middle-income countries (LMICs), where economic resources influence access to healthcare, quality nutrition, and living conditions that affect cardiovascular health (Sarah & Nicholas, 2023a). The weaker association between income and hypertension after adjustment suggested that the effects of income might be partly mediated or confounded by other factors such as education, age, and residence. In Uganda, where economic inequality is substantial, the impact of income on health outcomes likely reflects broader socioeconomic disparities in society.

The mediation analysis revealed important insights into the mechanisms through which socioeconomic status influenced hypertension. Dietary patterns emerged as the strongest mediator, accounting for approximately 31% of the association between both education and income with hypertension. This finding was consistent with evidence showing that higher SES is associated with healthier dietary choices, including increased consumption of fruits and vegetables and reduced intake of salt, processed foods, and high-fat products (Sarah & Nicholas, 2023b). In Uganda, where nutritional transition is occurring with increasing urbanization, dietary factors likely play a crucial role in the socioeconomic gradient of hypertension.

Physical activity was another significant mediator, explaining about 25% of the SES-hypertension relationship. This aligned with studies indicating that lower SES groups often have less leisure-time physical activity due to various barriers, including limited recreational facilities, time constraints, and safety concerns (Muhammadi & Isaac Kazaara, 2023). In the Ugandan context, occupation-related physical activity might differ across socioeconomic groups, with lower-income individuals engaging in more manual labor but potentially having less structured exercise. The significant mediating role of physical activity highlighted the importance of addressing activity patterns in hypertension prevention programs.

Stress levels played a smaller but still significant mediating role in the SES-hypertension relationship. This finding supported the psychosocial pathway through which socioeconomic disadvantage contributes to hypertension, as proposed by various researchers (Scott-Clayton & Zafar, 2019). Financial insecurity, poor living conditions, job instability, and limited control over life circumstances among lower SES groups can lead to chronic stress, which is a known risk factor for hypertension through mechanisms involving the sympathetic nervous system and hypothalamic-pituitary-adrenal axis (Toomes et al., 2022). The relatively smaller mediating effect of stress compared to diet and physical activity in this study might reflect challenges in measuring psychosocial factors or cultural differences in stress perception and coping strategies.

The moderation analysis provided compelling evidence that healthcare access substantially enhanced the protective effect of higher SES on hypertension. This finding highlighted the critical role of healthcare services in translating socioeconomic advantages into better health outcomes. Previous research has shown that regular preventive care, early detection of risk factors, and appropriate management of hypertension are more common among those with better healthcare access (Sarah & Audrey, 2024). In Uganda, where the healthcare system faces resource constraints and coverage gaps, access disparities likely exacerbate socioeconomic inequalities in

hypertension burden. The strong interaction between tertiary education, high income, and good healthcare access suggested that interventions addressing both socioeconomic conditions and healthcare accessibility might be most effective in reducing hypertension prevalence.

The non-significant association between employment status and hypertension was somewhat unexpected, given that employment is often linked to health through income, social networks, and psychological benefits. However, this finding might reflect the complex nature of employment in Uganda, where formal employment does not necessarily guarantee higher income or better working conditions, and self-employment encompasses a wide range of activities with varying socioeconomic returns. Additionally, the retired group showed a higher unadjusted odds ratio for hypertension, which likely reflected the confounding effect of age rather than retirement itself, as evidenced by the attenuated association after adjustment.

The study's findings should be interpreted within the broader context of epidemiological transition in Uganda and similar LMICs, where non-communicable diseases including hypertension are becoming increasingly prevalent alongside traditional infectious disease burdens (Böhm et al., 2023). This dual burden presents unique challenges for health systems and requires integrated approaches to disease prevention and control. The socioeconomic gradients in hypertension observed in this study reflected wider social determinants of health that influence exposure to risk factors, access to protective resources, and capacity to adopt healthy behaviors.

Conclusion

This study provided comprehensive evidence on the relationship between socioeconomic status and hypertension among Ugandan adults, highlighting significant disparities based on education and income levels. Higher educational attainment, particularly tertiary education, was strongly associated with lower hypertension prevalence, suggesting that improving educational opportunities might contribute to reducing the burden of hypertension in the population. The protective effects of higher socioeconomic status were partially mediated by lifestyle factors, with dietary patterns, physical activity, and stress levels explaining a substantial proportion of the SES-hypertension relationship. Furthermore, healthcare access significantly moderated the impact of socioeconomic factors on hypertension, enhancing the protective effects of higher education and income when combined with good access to health services.

These findings emphasized the importance of addressing both socioeconomic determinants and healthcare accessibility in efforts to prevent and control hypertension in Uganda. Interventions that focus solely on individual behavior change without addressing underlying socioeconomic conditions may have limited effectiveness in reducing hypertension disparities. Instead, comprehensive approaches that combine health promotion, improved healthcare access, and broader social policies targeting education, income, and healthcare equity are needed to effectively combat the growing burden of hypertension in Uganda. The study also highlighted the complex pathways through which socioeconomic factors influence hypertension risk, suggesting that multi-faceted interventions addressing various mediating factors might yield the greatest public health impact.

Recommendations

Develop targeted hypertension prevention and control programs for lower socioeconomic groups: Based on the study findings, public health authorities in Uganda should implement hypertension prevention and control programs specifically targeting individuals with lower education and income levels, who face the highest risk. These programs should include community-based screening initiatives in underserved areas, culturally appropriate health education campaigns that accommodate varying literacy levels, and subsidized or free antihypertensive medications for vulnerable populations. Implementation should involve collaboration between the Ministry of Health, non-governmental organizations, and community health workers to ensure widespread coverage and sustainability.

Integrate lifestyle interventions addressing key mediating factors into primary healthcare services: Healthcare providers should incorporate comprehensive lifestyle interventions addressing the three main mediating factors identified in this study—dietary patterns, physical activity, and stress management—into routine primary care services. These interventions should be tailored to different socioeconomic contexts, considering financial constraints, cultural preferences, and living environments. For example, dietary counseling should focus on affordable, locally available nutritious foods, while physical activity recommendations should account for safety concerns and limited recreational facilities in certain communities. Stress management techniques should be adapted to address the specific stressors faced by different socioeconomic groups.

Strengthen healthcare access and affordability through policy reforms and community-based approaches: Policymakers should implement measures to improve healthcare access for all socioeconomic groups, given its significant moderating effect on the SES-hypertension relationship. Specific actions should include expanding health insurance coverage through national health insurance schemes with subsidized premiums for lower-income individuals, increasing the number of primary healthcare facilities in underserved areas, training and deploying community health workers to bridge service gaps, and developing mobile health clinics for remote communities. Additionally, integrating hypertension management into existing healthcare programs, such as HIV/AIDS services, could leverage established infrastructure to improve cardiovascular care accessibility while reducing the stigma associated with seeking healthcare services.

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