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EFFECTS OF CARDIOVASCULAR DISEASES ON SOCIO-ECONOMIC WELL-BEING OF HOUSEHOLD IN BOMET COUNTY, KENYA

A Dissertaion
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The School of Education and Social Sciences Studies
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In Partial Fulfillment
of the Requirements for the Degree of
Master of Development Studies

by
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September, 2024

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DECLARATION

This thesis is my original work and has not been presented before for a degree in any other university

…… ……

ROTICH JOHN KIPKEMOI

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We confirm that the work reported in this dissertation was carried out by the student under our supervision as the university supervisors.

…… ……

Dr. Antony Odek **Date**

…… ……

Dr. Wachira Wanjugu **Date**

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DEDICATION

This research is dedicated to all the people who are devoted towards assisting people with Cardiovascular Diseases to lead a normal life.

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ACKNOWLEDGMENTS

From the outset, I express my deepest gratitude to Almighty God for blessing me with the health and favor to conceive of and actualize the idea in my mind. My university supervisors, Dr. Antony Odek and Dr. Wanjugu Wachira, deserve heartfelt thanks for their dedicated and insightful guidance, which was instrumental in my thesis writing. My appreciation also extends to the entire teaching staff, especially those who equipped me with knowledge in my area of specialization. Finally, I want to thank my dear wife, Peris Njambi and my sons, Dalon Kipngeno and Dylan Kipngetich for their unwavering support throughout my studies. Though I may not have mentioned everyone who contributed directly or indirectly, my sincere thanks go to all of you.

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ABSTRACT

Cardiovascular diseases (CVDs) are a growing public health concern in sub-Saharan Africa, with significant socioeconomic implications if left unaddressed. However, limited research exists on the economic impact of CVDs on households, particularly in rural Africa. This study aimed to assess the socioeconomic effects of CVDs on households in Bomet County, Kenya, focusing on the types of CVDs, access to healthcare services, and awareness of CVDs in relation to economic well-being.

The study utilized the Fundamental Cause Theory, Material Deprivation Theory, and Psychosocial Theory to explore the relationship between socioeconomic disadvantage and CVD onset. A descriptive design was employed, incorporating mixed-methods approach with households survey, in-depth interviews, and focus group discussions. A sample of 399 households from three sub-counties in Bomet County was randomly selected for analysis using descriptive statistics, inferential statistics, and thematic analysis.

Results showed that heart failure was the most common CVD, followed by stroke and rheumatic heart disease. Only 23.2% of respondents reported easy access to healthcare services, with financial barriers affecting 75.2% of households. Awareness of CVDs was low, with just 18.5% of respondents being familiar with these diseases, and 67.4% lacking formal education on the subject.

Households affected by CVDs experienced 30% lower incomes, higher healthcare costs (27% of their budget), and faced challenges such as debt, asset depletion, food insecurity, and lower educational attainment compared to non-CVD households. Qualitative findings highlighted catastrophic treatment costs, loss of livelihoods, and social isolation.

In conclusion, CVDs impose widespread socioeconomic hardships on rural Kenyan households. To mitigate these impacts, integrated interventions involving healthcare reform, social protection, and community education are essential to alleviate the burden and promote universal health coverage.

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ABBREVIATIONS

AHI	Average Household Income
ACS	Acute CoronarySyndrome
AMI	Acute Myocardial Infarction
CAD	Coronary Artery Disease
CVD	Cardio-Vascular Diseases
CDT	Cardio Thoracic Ratio
CHD	Coronary Heart Disease
CHE	Catastrophic Health Expenditure
CHF	Congestive Heart Failure
ECC	EmergencyChest Complications
HIC	High-Income Country
HIV	Human Immune Virus
ICD-10	International Classification of Diseases, 10th Revision
SES	Socioeconomic Well-being
PIR	Income-to-Poverty Ratio
NHANES	National Health and Nutrition Examination Survey

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CHAPTER ONE

INTRODUCTION

1.0 Overview of the Chapter

This chapter provides an introduction and background to the study, which aims to investigate the effects of cardiovascular diseases (CVDs) on the socio-economic well-being of households in Bomet County, Kenya. It highlights the growing burden of CVDs globally and in sub-Saharan Africa, with a particular focus on the high prevalence of CVDs in rural Kenya, including Bomet County. The chapter outlines the study's objectives to examine the types of CVDs, access to healthcare, and awareness levels in Bomet households. It discusses assumptions, significance in informing policies to mitigate medical impoverishment, justification for selecting the study site, scope limitations like potential biases, and definitions of key terms related to CVDs and socioeconomic well-being. This background prepares for the subsequent research methodology to quantify the economic burden of CVDs on rural Kenyan households.

1.1 Background to the Study

Cardiovascular diseases (CVDs) have emerged as the leading cause of mortality worldwide, accounting for an estimated 31% of all global deaths in 2019 (World Health Organization [WHO], 2021). In recent years, the burden of CVDs has undergone significant changes, with an increasing prevalence in low- and middle-income countries (LMICs). While previously associated primarily with high-income nations, nearly 80% of CVD-related deaths now occur in low- and middle-income countries (LMICs) (Roth et al., 2020).

The global prevalence of CVDs has risen steadily, with age-standardized death rates increasing by 17.1% between 2005 and 2015 (GBD 2015 Mortality and Causes of Death Collaborators, 2016). This trend is particularly pronounced in LMICs, where rapid urbanization, lifestyle changes, and increased life expectancy have contributed to a rising incidence of CVD risk factors (Kaptoge et al., 2019). A recent systematic review and meta-analysis found that the global prevalence of hypertension in adults was 31.1% in 2010, with projections suggesting this could rise to 33.7% by 2025 (NCD Risk Factor Collaboration, 2021).

Sub-Saharan Africa is facing an escalating burden of CVDs due to the rising prevalence of risk factors such as hypertension, obesity, smoking, and diabetes (Bigna & Noubiap, 2019). The number of annual deaths from CVDs in Africa is projected to increase

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by 73% between 2015 and 2030 (Gouda et al., 2019). A systematic review of studies from 2000 to 2020 found that the prevalence of hypertension in sub-Saharan Africa ranged from 15.9% to 33.2%, with rates generally being higher in urban areas compared to rural settings (Bosu et al., 2019).

A study across six African countries estimated that the cost of hypertension care alone ranged from 0.7% to 1.4% of the gross domestic product (GDP) (Gheorghe et al., 2018). Moreover, CVDs contribute significantly to catastrophic health expenditures, with out-of-pocket payments for CVD care pushing an estimated 1-5% of households into poverty annually across different African countries (Attaei et al., 2017).

In Kenya, CVDs were estimated to account for 13% of all deaths in 2019, making them the second leading cause of mortality after infectious diseases (WHO, 2020). The Kenya Stepwise survey for Non-Communicable Diseases risk factors in 2015 revealed that 24% of Kenyans had raised blood pressure or were currently on medication for hypertension (Ministry of Health, Kenya, 2015). More recent studies have shown even higher prevalence rates, with a 2020 survey in Western Kenya finding hypertension prevalence of 35.2% among adults (Wamai et al., 2020).

The economic burden of CVDs in Kenya is substantial. A study by Subramanian et al. (2018) found that the annual cost of hypertension care per patient in Kenya ranged from US$26 to US$234, depending on the level of care. Given that the gross national income per capita in Kenya was US$1,750 in 2019 World Bank, (2020), these costs represent a considerable economic challenge for many households. This burden can manifest in various ways, including direct out-of-pocket healthcare expenses, potential loss of income due to illness or caregiving responsibilities, and reduced household spending on other essential needs such as education or nutrition. For some families, these costs may even push them into poverty or deepen existing financial hardships. Bomet County, located in Kenya's Rift Valley, exemplifies the rural dynamics of CVD burden. Recent studies have shown varying prevalence rates of hypertension in the County, ranging from 20.4% to 30.3% (Kiplagat et al., 2020; Olack et al., 2019). These rates are concerning given the limited access to healthcare services in rural areas and the potential for significant socioeconomic impacts on affected households.

As the epidemiological burden of CVDs rises in rural Kenya, it can have major adverse socioeconomic consequences at the individual and household level if not effectively managed through a combination of preventive measures, early detection, and accessible treatment. Such management should include widespread health education, regular screening

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programs, affordable medication, and consistent follow-up care. However, research quantifying the economic effects of CVDs on households remains limited, especially in rural African settings like Bomet County. Preliminary studies in Kenya indicate that CVD-affected households face greater risks of catastrophic health expenditures, asset depletion, and loss of income (Oyando et al., 2019; Mwai & Muriithi, 2021). However, data quantifying these economic effects and investigating associated factors in rural settings is lacking. This study aims to address that gap by analyzing the effects of cardiovascular diseases on the socio-economic well-being of households in Bomet County. The findings can strengthen understanding of the relationship between CVDs and poverty in the region to inform policies that alleviate the economic burden of CVDs on vulnerable households and contribute to achieving universal health coverage goals.

1.2 Statement of the Problem

Cardiovascular diseases (CVDs) have become a growing public health challenge in low- and middle-income countries (LMICs), particularly in rural areas with limited access to healthcare services (Roth et al., 2020). Although the epidemiological burden of CVDs in these regions is well-documented NCD Risk Factor Collaboration, (2021), there is a significant gap in understanding the socioeconomic consequences for affected households. Most existing research has focused on urban areas or national-level data leaving rural households underexamined (Amegah, 2018; Alam et al., 2019),.

Initial qualitative research suggests that CVD-affected households in rural areas face severe financial strain, including asset depletion, increased reliance on family members or non-governmental organizations, and reduced spending on education (Wang'ombe & Mwaniki, 2018; Oyando et al., 2019). However, these studies provide limited quantitative evidence, and the exact socioeconomic impacts—such as the scale of asset loss and the extent of reduced educational investment—remain unclear.

This research gap is especially evident in sub-Saharan Africa, where the prevalence of CVDs is rising rapidly Bigna andNoubiap, (2019), while healthcare systems, particularly in rural regions, remain under-resourced (Ismail et al., 2020). Households affected by CVDs may face distinct financial challenges, such as loss of income, the high cost of long-term care, and inadequate healthcare access. Despite these challenges, comprehensive data on the economic differences between CVD-affected and unaffected rural households are lacking (Mwai & Muriithi, 2021).

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To address this gap, there is a need for robust, household-level research that quantifies the economic effects of CVDs in rural LMICs. Specifically, research should focus on comparing healthcare expenses, income changes, and asset ownership between affected and unaffected households. Additionally, it should identify key factors that contribute to the economic burden of CVDs in rural settings.

By examining these aspects, this study aims to provide detailed insights into the socioeconomic effects of CVDs on rural households in LMICs. The findings will inform evidence-based interventions and policies to alleviate the financial strain on these communities and prevent CVD-related impoverishment.

1.3 Objectives of the Study

1.3.1 General Objective

The general objective of the study was to investigate the effects of cardiovascular disease on the socio-economic well-being of the households in Bomet County, Kenya.

1.3.2 Specific Objectives

The specific objectives of this study were:

1. To investigate the types of CVDs found among households in Bomet County
2. To assess access to healthcare services for CVD management based on the economic well-being among households in Bomet County,
3. To measure the level of awareness of CVDs based on the economic well-being among households in Bomet County.

1.4 Research Questions

1. What are the types of cardiovascular diseases based on the economic well-beingamong households in Bomet County?
2. What are the barriers to accessing healthcare services for cardiovascular diseases based on the economic well-beingamong households in Bomet County?
3. What is the level of awareness on cardiovascular diseases based on the economic well-being among households in Bomet County?

1.5 Significance of the Study

This study is significant because it will generate evidence on the economic effects of cardiovascular diseases at the household level in Bomet County. Currently, there is limited

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research on this topic in Kenya. Most studies have focused on biomedical aspects and healthcare costs of CVDs.

By examining how CVDs affect metrics like income, expenditures, assets, debt, and subjective wellbeing, this study will provide novel insights into the socio-economic consequences for families caring for members with these chronic conditions.

The findings will be useful for policymakers and health program planners in Bomet County and other similar rural settings in Kenya. They can use the evidence to design interventions that protect households from medical poverty and material deprivation due to CVDs. This can inform social protection policies as well as sustainable healthcare financing reforms.

In addition, this study lays the groundwork for larger investigations into the household economic burden of non-communicable diseases in Kenya. The methodology and analysis approach can be replicated in other counties and for other chronic conditions like cancer, diabetes, and respiratory diseases.

By highlighting the effects of CVDs on socio-economic well-being, this study ultimately draws attention to the need for comprehensive universal health coverage and social welfare policies to safeguard Kenyan households from catastrophic health expenditures.

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1.6 Justifications of the Study

Recent statistics reveal a concerning rise in cardiovascular diseases (CVDs) in Bomet County, with hypertension prevalence now estimated at 26% compared to the national average of 24.5% (Ministry of Health, 2021). This high disease burden provides a substantial population for studying the socioeconomic impact of CVDs. Additionally, current data indicate that rural counties like Bomet face significant challenges in accessing healthcare, with over 50% of the population living more than five kilometres from a health facility. These health facilities suffer from severe shortages of healthcare workers (World Bank, 2020). These barriers intensify the socioeconomic effects of CVDs, making Bomet an ideal site for examining the disparity between rural and urban healthcare access.

Second, Bomet County's poverty rate is alarmingly high, with 46.8% of residents living below the poverty line, significantly higher than the national average of 36.1% (Kenya National Bureau of Statistics, 2020). The intersection of high poverty rates and low health literacy—where only 30% of adults have sufficient knowledge of CVD risk factors—amplifies the risk of CVD-related mortality and economic hardship (Ministry of Health,

2021). These factors necessitate a focused study in Bomet, where the socioeconomic challenges faced by CVD-affected households are particularly severe.

Furthermore, the predominantly Kalenjin population of Bomet, along with its cultural and linguistic homogeneity, supports effective data collection through culturally sensitive approaches. This fosters trust and facilitates open discussions about the financial and social challenges faced by households affected by CVDs.

Bomet County's high CVD prevalence, rural healthcare access barriers, elevated poverty rates, and low health literacy, combined with its cultural context, make it a critical area for investigating the socioeconomic effects of CVDs on Kenyan households. These factors, along with the lack of recent studies on socioeconomic effects of CVDs in rural area, underline the importance of this research.

1.7 Scope of the Study

The study's geographical scope was confined to three sub-counties within Bomet County, in Kenya's Rift Valley region. It examined households coping with prevalent cardiovascular conditions such as hypertension, heart failure disease, stroke, and rheumatic heart disease. The assessment of socioeconomic indicators encompassed variables like income, healthcare expenditures, assets, food security, education, employment, and other related measures at the household level.

In order to comprehensively understand the effect of cardiovascular diseases (CVDs), the study thoroughly collected insights from patients, caregivers, and healthcare professionals actively engaged in CVD management.

1.8 Limitations of the Study

The cross-sectional design posed constraints on establishing causality regarding the socioeconomic repercussions of CVDs. Additionally, reliance on self-reported data for household income and expenditures introduced the potential for recall bias.

The study's small geographical scope underscored a limitation in generalizing findings to a broader population. Challenges arose from language barriers during interviews and focus groups, potentially leading to incomplete insights. The sampling strategy for qualitative data also presented limitations in achieving a diverse pool of respondents. Furthermore, social desirability bias might have influenced responses on sensitive subjects such as income and food security.

Despite these recognized limitations, the study employed a mixed-methods design, seamlessly integrating both quantitative and qualitative data. This strategic approach aimed

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to mitigate biases and yield robust evidence on the socioeconomic effects of CVDs on rural households. The anticipated results held the promise of informing locally tailored policies, providing essential support to affected families not only within the study area but also beyond.

1.9 Assumptions

This study made several important assumptions during the research process.First, it was assumed that respondents would provide honest and accurate information regarding their household socioeconomic well-being, health conditions, and related experiences. To encourage truthful reporting, confidentiality was emphasized and interviews were conducted privately. However, some reporting biases may still exist.

Second, the cross-sectional study design assumed that current socioeconomic differentials between CVD and non-CVD households reflect the economic effects of cardiovascular disease diagnosis and progression over time. However, the data only captures a snapshot, and causal relationships cannot be definitively established.

Third, the CVD classification was based on self-reported diagnosis, which relies on respondents' awareness and recall. Some misclassification bias may occur if CVD cases are underreported. Confirming self-reported CVD against medical records increased accuracy.

Fourth, the household survey and qualitative interviews relied extensively on self-reported financial data like income, expenditures, and assets owned. The accuracy of these responses depends on participants' memory and record-keeping. More objective financial metrics could strengthen findings.

Fifth, the study assumed that the sampled households are representative of the population of Bomet County and that findings can be reasonably generalized. However, the small non-random sample poses limitations to broader inferences.

Sixth, the study assumed cardiovascular diseases have direct socioeconomic effects at the household level. However, related factors like overall poverty levels and health system weaknesses may also play a role. Isolating the specific effect of CVDs is challenging.

Finally, the study assumed that respondents' accounts reflected their genuine perspectives and experiences with CVDs. However, responses may be influenced by social desirability, question framing, mood, and other subjective factors. Triangulation from multiple sources helped minimize such biases.

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1.10 Definition of Terms

Cardiovascular Diseases	This refers to a group of disorders of the heart and blood vessels. They include heart attacks and strokes
Disease Determinant	Any group of variables such as specific disease agents and environmental factors that directly or indirectly influence the frequency of distribution of disease
Household	Refers to a group of people who live in the same dwelling and share a livelihood
Healthy lifestyle	Refers to a wide array of activities which enable an individual reduce the risk of disease
Hypertension	Is a serious medical condition that significantly increases the risk of heart, brain and kidney disease in which blood pressure is higher than normal
Hesitancy	Refers to reluctance by people suffering from a certain disease to seek medical healthcare from health facilities
Unhealthy Lifestyle	Those activities which increase the risk of disease

1.11 Chapter Summary

This chapter has provided the information that has jump-started the study. Specifically, it presented the background to the study, the statement of the problem as well as the objectives that guided this study. Thereafter, it also provided the justifications and significance of the study, the scope and limitation and the definition of terms.

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CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter begins by outlining the theoretical review that was used to buttress this study. It then proceeds to present the empirical review in accordance with the variables. The research gap that the study intends to fill is then revealed. Finally, it presents the conceptual framework which outlines the relationships between the variables of the study.

2.2 Theoretical Review

This review synthesizes literature on the socioeconomic effects of CVDs by applying three major theoretical frameworks – Fundamental Cause Theory, Material Deprivation Theory, and Psychosocial Theory. These theories offer complementary lenses to elucidate the complex bidirectional relationships between disadvantage and CVDs. Insights from these perspectives are crucial for informing policies that interrupt cycles of illness and impoverishment.

2.2.1 Fundamental Cause Theory

The Fundamental Cause Theory was developed by sociologists Bruce G. Link and Jo Phelan in the mid-1990s. Link and Phelan proposed that socioeconomic well-being represents a "fundamental cause" of health disparities because it embodies multiple resources (money, knowledge, power, prestige, and beneficial social connections) that can be used to avoid risks or minimize the consequences of disease and injury (Link et al., 1995). Their theory suggests that as new risk factors or treatments emerge, those with greater socioeconomic resources are better able to take advantage of them, perpetuating health inequalities over time.

The theory posits that higher socioeconomic well-being provides flexible resources like knowledge, money, power, social capital and prestige that help protect health even as mechanisms linking socioeconomic well-being and health evolve over time (Link & Phelan, 1995). The theory further suggests that socioeconomic well-being represents a fundamental cause of CVD disparities, enabling those with greater resources to better prevent, manage and minimize adverse economic effects of CVD.

Evidence on universal CVD mortality gradients by socioeconomic well-being underscores the relevance of Fundamental Cause Theory. For instance, a global analysis found out that age-standardized CVD mortality rates were up to 5 times higher in low versus

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high income countries (Roth et al., 2015). Within countries, lower income, occupational well-being, and education are all associated with significantly elevated CVD risk and worse outcomes (Kaplan & Keil, 1993). Studies have consistently shown an inverse relationship between socioeconomic well-being indicators like income, education, and occupation and cardiovascular disease prevalence, incidence, and mortality (Clark et al., 2009; Avendano et al., 2006). This graded association persists even in countries with universal health care systems and strong social safety nets (Mackenbach et al., 2008).

The Fundamental Cause Theory speculates that these socioeconomic gradients persist because higher well-being groups have flexibility in deploying resources to adopt newer prevention approaches, fund advanced treatments, manage disability effects, and thereby mitigate CVD's economic effects (Link & Phelan, 1995). In contrast, those lacking such fungible resources face greater financial risks. Evidence suggests that higher socioeconomic well-being groups tend to have greater uptake of newly emerging preventive strategies, access to advanced medical technologies, and ability to adapt lifestyles to reduce CVD risk (Phelan et al., 2004). Material, knowledge, prestige, and social connection resources possessed by higher socioeconomic well-being groups may enable quicker adoption of innovative CVD prevention and management strategies as they emerge.

In the context of cardiovascular diseases (CVDs) in Bomet County, Kenya, Fundamental Cause Theory can help explain potential socioeconomic disparities in CVD prevalence, types, and outcomes. For instance, those with higher socioeconomic status may have better access to preventive care and early diagnosis, potentially leading to differences in CVD types and severity across socioeconomic groups (Khoury et al., 2022).

However, to fully understand the application of this theory in Bomet County, it iscrucial to address how access to healthcare services varies within lower socioeconomic groups. Specific barriers such as financial constraints, geographical challenges (e.g., distance to healthcare facilities), and systemic issues (e.g., understaffed rural clinics) need to be explored (Otieno et al., 2021). For example, a farmer in a remote part of Bomet County might face not only financial barriers to accessing CVD screening but also significant travel time to reach the nearest equipped healthcare facility.

Local data and case studies can further enhance the application of Fundamental Cause Theory to Bomet County's specific context. For instance, a study comparing CVD outcomes between different occupational groups in the county could provide insights into how employment types and associated resources impact CVD management and economic consequences (Abubakar et al., 2020).

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Moreover, the theory's relevance extends to explaining how higher socioeconomic groups in Bomet County might be better positioned to adopt emerging CVD prevention and management strategies. This could include access to newer medications, ability to modify diets based on the latest nutritional advice, or capacity to invest in home blood pressure monitoring equipment (Ngigi et al., 2022).

By integrating local factors and data with the broader theoretical framework, the fundamental cause theory can be more accurately tailored to Bomet County's specific context. This approach is expected to enhance its explanatory power regarding CVD disparities in the region and potentially inform more effective, targeted interventions to address these disparities (Ouma et al., 2023).

2.2.2 Material Deprivation Theory

The Material Deprivation Theory offers a compelling framework for understanding the intricate relationship between socioeconomic status and health outcomes, particularly in the context of cardiovascular diseases (CVDs) in Bomet County, Kenya. Evolving from earlier work by researchers like John Lynch and George Davey Smith, this theory posits that inadequate material conditions and lack of physical resources are fundamental drivers of health inequalities (Phelan et al., 2023).

In Bomet County, the Material Deprivation Theory illuminates how insufficient material resources directly impact on access to CVD care, complementing the broader perspective of Fundamental Cause Theory. This approach allows us to examine specific, tangible barriers that residents face when seeking cardiovascular health services (Khoury et al., 2022).

The rural landscape of Bomet County presents unique challenges for CVD patients. Transportation costs, for instance, can be a significant barrier to accessing health care. A study in rural Kenya revealed that these costs could account for up to a quarter of a household's total healthcare expenditures (Otieno et al., 2021). For those requiring regular check-ups or emergency care for CVDs, these expenses can be prohibitive, potentially leading to delayed or foregone treatment.

Medication expenses present another critical challenge. The chronic nature of many CVDs necessitates long-term medication use, placing a sustained financial burden on affected households. Recent research in Kenya found that out-of-pocket expenses for CVD medications could consume more than half of a household's capacity to pay (Ngigi et al.,

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2022). This financial strain can lead to medication non-adherence, potentially worsening health outcomes and increasing the risk of costly complications.

The impact of CVDs on household income is another crucial aspect highlighted by the Material Deprivation Theory. In Bomet County, where agriculture is a primary source of livelihood, CVDs affecting working-age adults can have severe economic consequences. Research across sub-Saharan Africa has shown that households with a member suffering from CVD experienced a significant reduction in labor force participation (Abubakar et al., 2020). In an agricultural community, this could translate to reduced farm productivity and subsequent financial hardship.

Moreover, the costs associated with advanced diagnostic procedures and treatments for CVDs can be overwhelming for many households in Bomet County. A study in rural Kenya found that the expense of a single echocardiogram could exceed a month's income for many families (Ouma et al., 2023). Such high costs can force households to make difficult choices between seeking necessary medical care and meeting other basic needs.

These material barriers not only affect initial access to care but can also trigger a vicious cycle of worsening health and deepening poverty. For example, the inability to afford regular medication may lead to poorly controlled hypertension, increasing the risk of more severe and costly complications like stroke. Similarly, forgoing preventive care due to transportation costs may result in more severe health crises later, requiring more extensive and expensive interventions.

Furthermore, the material deprivation resulting from CVD-related expenses and income loss can exacerbate risk factors for CVD progression. Financial strain may lead to food insecurity and poor nutrition, further compromising cardiovascular health (Nugent et al., 2021). This interplay between material deprivation and health outcomes underscores the complex relationship between poverty and CVDs in Bomet County.

To address these challenges, policies targeting material deprivation are crucial. Community-based health insurance schemes could help reduce out-of-pocket expenses, while mobile health clinics could alleviate transportation barriers. Social protection programs might mitigate income loss from CVD-related disability, and subsidies for essential CVD medications could improve treatment adherence.

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By focusing on these material aspects, interventions can directly address the pathways through which poverty influences CVD outcomes in Bomet County. This approach, aligned with the Material Deprivation Theory, provides a nuanced understanding of CVD disparities in this specific context. It emphasizes the direct effects of material disadvantage on health outcomes, offering valuable insights for developing targeted and effective health interventions in Bomet County and similar settings.

2.2.3Psychosocial Theory

The Psychosocial Theory offers a valuable perspective on socioeconomic disparities in health, particularly in the context of cardiovascular diseases (CVDs) in Bomet County, Kenya. This theory, advanced by researchers like Karen Matthews and Lisa Berkman, proposes that chronic psychosocial stressors stemming from adverse socioeconomic circumstances can "get under the skin" and impact health through biological pathways involving the immune, endocrine, and cardiovascular systems (Phelan et al., 2023).

In Bomet County, the application of Psychosocial Theory to CVDs reveals a complex interplay between economic conditions, psychosocial factors, and health outcomes. The theory suggests that CVD risks are heightened among lower socioeconomic groups not only due to material deprivation but also from disproportionate exposure to psychosocial stressors like social isolation, caregiving burdens, depression, and anxiety (Kivimäki et al., 2020).

The unique psychosocial context of rural Bomet County plays a crucial role in shaping CVD awareness and health-seeking behaviors. For instance, the strong community ties characteristic of rural Kenyan settings may provide social support that buffers against some psychosocial stressors. However, these same close-knit communities might also contribute to stress through increased caregiving responsibilities for ill family members (Karanja et al., 2021).

Examining the different types of CVDs observed in Bomet County through the lens of Psychosocial Theory reveals important insights. For example, hypertension, a common CVD in the region, has been linked to chronic stress and social isolation (Otieno et al., 2021). The theory suggests that individuals from lower socioeconomic backgrounds may face higher risks of hypertension due to increased exposure to these psychosocial stressors, compounded by limited access to stress-management resources.

Moreover, psychosocial factors significantly influence access to healthcare services for CVD management in Bomet County. Depression and anxiety, more prevalent among economically disadvantaged groups, can hinder health-seeking behaviors and treatment

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adherence (Ngigi et al., 2022). For instance, a depressed individual might be less likely to attend regular check-ups or adhere to medication regimens, leading to poorer CVD outcomes and potentially higher long-term healthcare costs.

The relationship between psychosocial stress and social support affects individuals' knowledge and awareness of CVDs, particularly given Bomet County's economic conditions. Limited health literacy, often associated with lower socioeconomic status, can be exacerbated by psychosocial stressors that reduce cognitive bandwidth for health-related information (Abubakar et al., 2020). Conversely, strong social networks may facilitate information sharing about CVD prevention and management, potentially mitigating some effects of economic disadvantage.

Evidence shows that psychosocial stress promotes atherogenesis, hypertension, and autonomic imbalance while decreasing immune competence and treatment adherence, exacerbating CVD progression (Steptoe &Kivimäki, 2023). Those facing adversities in Bomet County often have limited social support to buffer economic shocks from CVD costs, caregiving demands, and lost productivity. This combination of chronic psychosocial stress and material hardship leaves impoverished CVD patients especially vulnerable financially.

Importantly, the Psychosocial Theory compels attention to policies addressing interpersonal sources of stress and improving social support to mitigate CVD's economic fallout on disadvantaged families in Bomet County. Interventions targeting depression, social isolation, and chronic stress among lower socioeconomic status patients could potentially improve CVD management and indirect economic outcomes (Ouma et al., 2023). Building social support systems may also buffer financial shocks from lost income and earnings.

In conclusion, the application of Psychosocial Theory to CVDs in Bomet County highlights the critical role of psychosocial factors in shaping health outcomes and economic well-being. By considering how stress, social support, and health literacy influence CVD awareness, progression, and management, we can develop more comprehensive and effective interventions. These interventions should not only address the material aspects of CVD care but also the psychosocial dimensions that significantly impact health behaviors and outcomes in this unique rural setting.

2.2.4 Individual-Level Effects

At the individual level, Fundamental Cause Theory contextualizes higher CVD burden among lower socioeconomic well-being patients as stemming from limited fungible resources to manage risk factors and access preventive care (Link & Phelan, 1995).

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Consequently, poorer individuals develop complications like stroke, myocardial infarction and kidney failure that severely reduce income potential through disability.

Unemployed, uninsured U.S. adults had nearly double the odds of reporting CVDs relative to employed, insured individuals in one study (Perry et al., 2000). A study carried out in China found out that having CVD reduced the likelihood of working by over 70% even after adjusting for/to sociodemographic factors (Lei et al., 2014). Qualitative research highlights how breadwinners becoming unable work due to CVD undermines family livelihoods, reflecting fundamental financial constraints (Hendriks et al., 2016).

From a psychosocial lens, stresses like depression also worsen CVD risks and undermine income generation (Matthews & Gallo, 2011). Chronic stress promotes inflammation, hypertension, and behaviors like smoking that accelerate CVD progression and disability among impoverished individuals (Kivimäki et al., 2006).

Overall, theories of fundamental causes and psychosocial factors help explain the socioeconomic gradients whereby CVD onset severely constrains individual employment, productivity and income along well-being lines.

2.2.5 Household-Level Effects

At the household level, Material Deprivation Theory draws attention to how catastrophic healthcare expenditures, income loss, and asset sales resulting from CVD events deplete essential physical resources and drive affected families into poverty (Lynch et al., 2000).

One global analysis found 66% of households incurred catastrophic spending, defined as out-of-pocket health costs exceeding 40% of their income, from CVD hospitalizations (Huffman et al., 2011). A study in Vietnam reported that 25% of CVD-affected households fell below the $1.25 per day poverty line due to treatment costs (Nguyen et al., 2012).

In addition, qualitative research highlights how families often cope with exorbitant CVD expenses by pulling children from school, reducing nutrition spending, and selling property, entrenching material disadvantage (Hendriks et al., 2016). Loss of income from disabled or deceased household earners also strains limited budgets.

Moreover, the Psychosocial Theory highlights how CVD events amplify caregiving burdens, stress, and social isolation reduce/reducing families' abilities to economically weather shocks (Matthews & Gallo, 2011). Lacking adequate social support systems, CVD-affected households can descend more easily into poverty due to diminished coping capacities under financial strains (Krishna, 2004).

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In summary, material deprivation and psychosocial lenses draw attention to policies protecting household wealth, nutrition, education, and social safety nets from erosion under the economic pressures of CVD onset.

2.2.6 Societal Level Effects

At the societal level, the Fundamental Cause Theory contextualizes the disproportionate CVD burden among lower socioeconomic groups as a barrier to poverty alleviation and development goals (Link & Phelan, 1995). Globally, income losses from CVD mortality are estimated to cumulatively surpass $3 trillion from 2011-2025 (Bloom et al., 2011).

High CVD prevalence drives medical impoverishment that strains healthcare systems and absorbs funds otherwise investable in social programs or economic development – issues fundamentally tied to socioeconomic resource constraints. CVD deaths also annually cost Africa up to $25 billion in lost GDP (Bloom et al., 2011).

From a psychosocial perspective, the stresses of poverty and inequality conversely act as fundamental drivers of high CVD risks among marginalized groups (Matthews & Gallo, 2011). This vicious cycle hampers socioeconomic progress. In concert, fundamental cause and psychosocial theories situate CVD and poverty reduction as mutually essential goals for improving population health and community development.

In conclusion, fundamental cause, material deprivation, and psychosocial theories offer distinct but interconnected perspectives for understanding the socioeconomic effects of CVD onset among disadvantaged sectors. The Fundamental Cause Theory spotlights how socioeconomic resources shape risks, treatment affordability and disability effects from CVDs. The Material Deprivation Theory draws attention to how healthcare expenditures, income loss, and eroded assets from CVD events directly impoverish households. Finally, the Psychosocial Theory highlights chronic stress and social isolation linked to disadvantage as amplifiers of both CVD onset and economic strains on affected families.

All these theories compellingly frame CVD and poverty as fundamentally intertwined public health problems requiring integrated solutions. Evidence underscores that equitable progress necessitates addressing CVD risks and barriers to care access among lower socioeconomic groups, coupled with financial protection policies to ensure CVD events do not perpetuate cycles of illness and poverty. From universal health coverage to social safety

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nets, initiatives shielding vulnerable populations from CVD impoverishment must be central within health and development policy agendas.

2.3 Empirical Literature

2.3.0Introduction

Cardiovascular diseases (CVDs), including heart disease, hypertension, stroke, and other related conditions, are a growing public health concern globally, responsible for over 30% of deaths worldwide (WHO, 2021). CVDs are often associated with lower socioeconomic well-being, but there remains a dearth of studies analyzing this relationship, especially in developing nations.

Socioeconomic well-being is a complex, multidimensional construct that broadly encompasses an individual's or household's access to resources and position in social hierarchy (Daly et al., 2002). Commonly used indicators of socioeconomic well-being in public health research include income, expenditures, assets, food security, education, and occupation (Saksena et al., 2014). This review analyses prior research on differences in these key socioeconomic indicators between CVD-affected and general households. Understanding these inequalities is crucial to inform policies and interventions to improve socioeconomic outcomes for CVD-affected families.

2.3.1 Types of Cardiovascular diseases among households in Bomet County, Kenya

Cardiovascular diseases (CVD) are a significant global health burden, affecting millions of people annually. According to the World Health Organization (2021), CVDs account for nearly 17.9 million deaths each year, making them the leading cause of death worldwide. The global trends indicate an increase in non-communicable diseases, including CVDs, especially in low- and middle-income countries. Sub-Saharan Africa, including Kenya, has witnessed a notable rise in CVDs due to changing lifestyles, urbanization, and limited access to healthcare (Mensah et al., 2020). Understanding CVD patterns in local contexts, such as Bomet County, is essential to/when addressing this public health crisis effectively.

In Kenya, the prevalence of cardiovascular diseases has increased significantly in recent years. According to Kiplagat et al. (2020), hypertension, stroke, and heart failure are the most common CVDs in the country, with regional disparities in prevalence across rural and urban areas. Urban areas report higher rates of CVDs due to factors such as sedentary

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lifestyles and poor dietary habits. However, rural counties like Bomet also show a growing burden of CVDs, necessitating localized research to guide public health interventions.

Hypertension

Hypertension, or high blood pressure, is the most common cardiovascular condition globally and is a growing concern in sub-Saharan Africa. A study conducted in Bomet County found that 19.5% of adults aged 18 and above had hypertension Karuga et al.,(2016), which is slightly lower than the national average of 24.5% (Kiplagat et al., 2020). The primary risk factors for hypertension in Bomet include; aging, excessive alcohol consumption, obesity, and physical inactivity. These findings align with the national data which indicatesthat hypertension prevalence is higher in rural areas due to limited healthcare access and lifestyle factors (Ataklte et al., 2019). However, Bomet County lacks specific community-based interventions to manage hypertension effectively, making it a public health priority.

A study in Nakuru County found a hypertension prevalence of 38%, which is higher than the national estimate (Mathenge et al., 2010). Data from Bomet County is more limited, but estimates range from 18% to as high as 37% (Hendriks et al., 2012; Ataklte et al., 2015). This highlights hypertension as a priority CVD in rural Bomet. More research is still needed on effective community-based intervention programs for the prevention and control of high blood pressure in rural districts/county like Bomet.

Stroke

The prevalence of stroke in Kenya is rising, but there is no data focused specifically on stroke prevalence in Bomet district/County (Kengne & Anderson, 2006). A national study on the incidence of stroke in Kenya found that the crude annual incidence rate was 94.5 per 100,000 people (Kengne & Anderson, 2006). This demonstrates that stroke places a significant burden on the healthcare system in Kenya.

However, data specific to Bomet County is sparse. One study at Tenwek Hospital found stroke as the most common CVD-related hospitalization, followed by heart failure, acute coronary syndrome, and rheumatic heart disease (Karani et al., 2016). However, the prevalence within the community remains uncertain. Further epidemiological research on stroke in rural communities is warranted to direct public health efforts at reducing risk factors and improving outcomes for stroke patients.

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Heart Failure

Heart failure remains a major contributor to cardiovascular mortality and morbidity in Sub-Saharan Africa, including Kenya. Although data specific to Bomet County is limited, studies indicate that hypertension, cardiomyopathy, and rheumatic heart disease are the primary causes of heart failure in rural Kenya (Sliwa et al., 2017). Rheumatic heart disease (RHD) is particularly prevalent in rural areas due to inadequate access to preventive care. A cross-sectional study in Bomet found a high prevalence of RHD among school-aged children, with 30.4 per 1000 children affected (Zühlke et al., 2017). These findings highlight the urgent need for preventive measures, such as penicillin prophylaxis and improved socioeconomic conditions, to reduce the burden of RHD in Bomet County.

Rheumatic Heart Disease

A cross-sectional echocardiographic screening study conducted in schoolchildren in Bomet, Kenya found an extremely high prevalence of rheumatic heart disease (RHD) of 30.4 per 1000 pupils (Zühlke et al., 2017). This indicates that RHD remains endemic in rural Kenya and highlights the need for expanded prevention and control programs in affected communities. The role of interventions such as penicillin prophylaxis and socioeconomic development in reducing the burden of RHD in Bomet requires further investigation through longitudinal studies (Zühlke et al., 2017).

Demographic Variation and Risk Factors

It is crucial to consider demographic variations when analyzing CVD prevalence. National data indicates that hypertension is more prevalent among women than men and increases with age (Ministry of Health, 2015). Rural areas like Bomet also show differences in CVD prevalence compared to urban regions, with lifestyle factors and healthcare access playing key roles in these disparities (Hendriks et al., 2013). However, Bomet-specific data on demographic variations, such as age, gender, and geographic location, remain scarce. Future studies should focus on obtaining detailed epidemiological profiles to inform targeted screening and treatment programs for at-risk populations in Bomet.

Community Perceptions and Healthcare-Seeking Behaviours

Understanding community perceptions of CVDs is essential for shaping effective public health interventions. A study in Bomet found low public awareness of/on stroke symptoms and appropriate responses, which most likely contributes to delayed diagnosis and treatment (Ataklte et al., 2015). Additionally, misconceptions about the causes of

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hypertension and other cardiovascular conditions are widespread in rural Kenya, further complicating efforts to promote early diagnosis and prevention (BeLue et al., 2009). Qualitative research on community attitudes toward CVDs is necessary to inform culturally sensitive health education programs and improve healthcare-seeking behaviors in Bomet County.

While hypertension, stroke, heart failure, and rheumatic heart disease are the most common cardiovascular conditions in Bomet County, reliable epidemiological data is still lacking. National studies provide valuable insights, but county-specific research is essential to develop targeted interventions that address the unique risk factors and healthcare challenges in rural areas. Expanding surveillance efforts and conducting community-based qualitative studies will be key to reducing the rising burden of CVDs in Bomet County. Addressing these public health challenges requires a multifaceted approach, integrating preventive care, improved healthcare access, and community awareness initiatives.

2.3.2 Access to healthcare services for CVDs

This literature review focuses on the second objective to assess access to healthcare services for cardiovascular diseases among households in Bomet County. Synthesizing this evidence is crucial in/to identify policy and health system interventions required to mitigate the economic burden of CVDs on vulnerable households.

Healthcare Access and CVD Prevention

Access to healthcare services for cardiovascular diseases (CVDs) is critical, particularly in rural areas where healthcare systems often face significant challenges. This literature review examines access to CVD care in Bomet County, Kenya, highlighting key barriers, their broader socioeconomic impact, and strategies for improvement. By critically assessing these factors, this review aims to provide insights into the systemic issues that limit access to CVD care and offer potential solutions for reducing the burden of CVDs on vulnerable populations.

Healthcare Access and CVD Prevention

Effective prevention of CVDs requires access to primary healthcare services for early detection and management of risk factors like hypertension, diabetes, and hyperlipidemia (Gaziano et al., 2006). However, in rural Kenyan settings such as Bomet County, access to these services remains limited. A study found that only 7.5% of adults in Bomet were screened for hypertension, while screening for diabetes and cholesterol was negligible

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(Ataklte et al., 2015). Without early detection, these risk factors often progress to severe complications such as stroke and heart attacks, leading to significant socioeconomic consequences for affected households.

Although universal screening and treatment initiatives have been shown to reduce CVD mortality and healthcare costs, implementation gaps persist(Gaziano et al., 2006). For example, in Bomet, only 32% of diagnosed hypertensives were on medication, and just 22% had their condition under control (Ataklte et al., 2015). The low screening rates and inadequate treatment management point to systemic issues in the healthcare infrastructure. These gaps suggest a need for targeted interventions to expand screening coverage and improve linkages to affordable care, especially in rural areas like Bomet, to prevent CVD-related impoverishment of households.

Barriers to CVD Care Access

Accessing ongoing care after a CVD diagnosis remains a challenge for rural populations in Kenya, including Bomet County. High costs, distance from health facilities, medication stock-outs, and lack of adequate healthcare personnel and equipment are some of the main barriers (Mwai et al., 2016; Hendriks et al., 2016). A mixed-methods study in Kenya found that the monthly cost of hypertension treatment averaged KSH 590, which was unaffordable for most rural households (Hendriks et al., 2016). As a result, only 39% of patients adhered to their prescribed medications, leading to further CVD progression and greater financial strain.

Moreover, geographical barriers compound the issue. Over 75% of Bomet residents live more than 5 kilometers from the nearest health facility (Ataklte et al., 2015). Transportation costs add an additional financial burden, particularly for lower-income households, leading to significant disparities in CVD outcomes. These access barriers disproportionately affect the poor, highlighting the interaction between healthcare system deficiencies and socioeconomic inequities. The failure to critically examine how these barriers intersect with broader systemic issues, such as healthcare workforce shortages and infrastructure limitations, limits the depth of understanding the problem.

Impact on Socioeconomic Status

Inadequate access to CVD care directly impacts the socioeconomic status (SES) of affected households. The high cost of CVD treatment often leads to asset depletion and financial hardship (Jan et al., 2018). For instance, out-of-pocket expenses for healthcare have been shown to push over 100 million people globally into poverty each year (WHO, 2017).

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The situation in Bomet is no different, where the prohibitive costs of CVD management force many households into cycles of poverty.

CVDs also reduce household productivity by causing disability and loss of workforce participation. For example, stroke-related disabilities result in long-term care needs, further increasing household financial burdens (Dhamoon et al., 2009). Globally, the economic impact of CVDs is estimated to cost $3 trillion from 2011 to 2025 due to loss of productivity and healthcare costs (Bloom et al., 2011). In Bomet, such economic shocks can trap households in poverty, reinforcing existing SES disparities. Despite the obvious connections between healthcare access and economic outcomes, this review lacks a critical analysis of how these systemic issues perpetuate inequality.

Improving Access to Mitigate SES Impact

Improving access to CVD care is essential to mitigate its socioeconomic impact. Studies have shown that interventions like free screening and affordable treatment programs significantly reduce mortality and out-of-pocket expenses (Jafar et al., 2015). For example, a hypertension treatment program in Mexico led to an increase in beneficiary household assets by $4,500 (Cesare et al., 2016). Similarly, Thailand's universal healthcare program, which includes CVD treatment, boosted household incomes among the poorest beneficiaries (Chuengsatiansup et al., 2018).

Bomet could benefit from similar policy initiatives aimed at reducing treatment costs, expanding healthcare coverage, and increasing the availability of essential medications. Additionally, decentralizing healthcare through community health workers and telemedicine could provide cost-effective solutions for improving access to care in rural areas (Schwalm et al., 2021). These approaches can help prevent the deepening of SES disparities and improve CVD outcomes for vulnerable populations in Bomet County.

Limitations and Concerns Regarding Study Reliability/ on the realiability of the study

While existing studies offer valuable insights, several limitations need to be considered when interpreting their findings. Many of the cited studies rely on self-reported data, which can be subject to recall bias and inaccuracies. Furthermore, some studies, such as those measuring medication adherence, are based on small sample sizes that may not be representative of the broader population. These methodological limitations raise concerns about the generalizability and reliability of the findings for Bomet County.

Additionally, the lack of comprehensive data on CVD care in Bomet limits the ability to draw definitive conclusions. The scarcity of region-specific studies hinders a full understanding of the local context, which is necessary for designing effective interventions.

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Addressing these gaps through more rigorous, large-scale studies will be crucial to developing a more accurate picture of the CVD burden and healthcare access challenges in Bomet.

In conclusion, access to CVD care in Bomet County faces significant challenges due to high treatment costs, geographical barriers, and systemic healthcare deficiencies. These access issues exacerbate the socioeconomic impact of CVDs on vulnerable households, leading to financial hardship and loss of productivity. While there are clear benefits derived from improving healthcare access, existing studies have notable limitations, including small sample sizes and self-reported data, which may affect the accuracy of their findings. Future research should address these limitations and focus on developing context-specific interventions to reduce the burden of CVDs and mitigate their socioeconomic impact in rural Kenya.

2.3.3Level of Awareness of CVDs

This literature review focuses on the third key research objective to measure the level of awareness oncardiovascular diseases among households in Bomet County.

Health Education and CVD Prevention

Adequate awareness about CVD risk factors, symptoms, complications, and preventive behaviors is vital for timely seeking of screening and treatment to mitigate disease progression and negative outcomes (WHO, 2010). However, knowledge gaps remain widespread in rural populations (Kayima et al., 2013). For instance, a study in Bomet found that only 40% of respondents were aware of hypertension risk factors, with just 27% having adequate preventive knowledge (Ataklte et al., 2015). Low awareness enables lifestyle risk behaviors like smoking, unhealthy diets, and physical inactivity to persist, resulting in escalating CVD incidence, morbidity and avoidable mortality (Allen et al., 2017).

Expanding community and patient education in Bomet about CVD prevention through platforms like health talks, brochures, mass media, and mobile health has potential to reduce risk behaviors and enable timely care seeking. Evidence demonstrates that health education interventions on diet and exercise can lower blood pressure, cholesterol, and CVD events by up to 20% in high-risk groups (Grover et al., 2015). Worksite programs have also reduced CVD risk factors and medical costs among employees (Arena et al., 2013). Implementing contextualized education approaches in Bomet can be a cost-effective strategy to curb the growing CVD burden and associated household socioeconomic declines.

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Medication and Treatment Adherence

Besides prevention, lack of awareness about/on CVD treatment and importance of medication adherence is another pathway by which CVD progression and complications lead to adverse financial outcomes for households. Studies show adherence to antihypertensives, statins, and other CVD medications in rural Kenya remains suboptimal, ranging from 10-48%, due to financial barriers and lack of knowledge (Kimani et al., 2016). Patients often discontinue treatment when symptomatic relief is achieved, unaware of continued cardiovascular damage from uncontrolled risk factors that sets the stage for future cerebrovascular, cardiac and renal events (Mwita et al., 2013).

Patient education programs on disease management, lifestyle modification, medication side effects and importance of adherence have proven effective globally in improving treatment compliance, CVD control and outcomes (Alhalaiqa et al., 2017). In hypertensive patients, simplified education interventions increased drug adherence from 39% to 74% (Obreli-Neto et al., 2016). Offering similar contextualized education on CVD treatment in Bomet through existing community health and outreach mechanisms could increase drug compliance and reduce avoidable complications that have impoverishing effects.

Healthcare Seeking Behaviours

Furthermore, lack of awareness about CVD symptoms and the need for prompt medical attention delays diagnosis and treatment initiation. A study that was carried out inNigeria found that only 18% of stroke survivors had been presented within 6 hours of symptom onset due to low recognition of warning signs (Owolabi et al., 2015). Another South African analysis reported median treatment delays of 60 hours post-stroke, with a major factor being lack of knowledge about danger signs indicating medical emergencies (Rhoda et al., 2015). Such delays in seeking health care worsen CVD prognosis and costs.

Implementing communication campaigns in Bomet to raise community consciousness about heart attack, stroke, and other CVD symptoms requiring urgent attention could minimize treatment delays and improve household socioeconomic outcomes. A review found out that multi-media health education interventions significantly increased CVD knowledge and reduced time-to-presentation by 20% (Dracup et al., 2009). Equipping Bomet residents with knowledge on recognizing and appropriately responding to warning signs through similar education programs can promote faster treatment seeking and better CVD control.

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Health Literacy and SES

At a broader level, research demonstrates that health literacy, defined as the ability to access, understand and apply health information, is intricately linked with improved healthcare access, well-being, behaviors and outcomes (Berkman et al., 2010). Low literacy onchronic diseases like CVDs independently predicts poorer self-management, lower use of preventive services, worse morbidity, mortality and increased healthcare costs (Stormacq et al., 2019). Consequently, limited health literacy drives socioeconomic disparities.

In Bomet County, literacy rates are among the lowest nationally at just 61%, which likely hinders optimum CVD prevention and control (County Government of Bomet, 2018). Improving comprehension of CVD risk factors and management in Bomet through simplified education approaches appropriate for low-literacy rural communities can promote equity in CVD outcomes and socioeconomic progress.

mHealth Interventions

With rising mobile phone ownership, mHealth education and reminders offer a promising avenue for increasing CVD awareness and care engagement among patients and high-risk groups in Bomet. A meta-analysis found that mHealth improved CVD knowledge, self-care, clinical outcomes and reduced cardiovascular events, with benefits greatest in low income regions (Li et al., 2021). Interactive voice messages and text reminders doubled hypertension medication adherence in African patients within one year (Bediang et al., 2018). WhatsApp education and reminders also increased diabetes knowledge and foot care in low-income Kenyans (Wambui et al., 2020). Harnessing mHealth approaches can promote preventive behaviors, treatment compliance and socioeconomic gains cost-effectively across Bomet.

Economic Productivity

Multiple studies which highlight on improving CVD awareness and prevention help preserve economic productivity and household finances. A study in 32 developing nations estimated that modest population-level reductions in CVD risk factors would gain over $350 billion in economic output from 2011 to 2025 (Bloom et al., 2011). At-risk screening and education programs at worksites generated productivity gains up to $4 for every $1 invested (Arena et al., 2013). For Bomet's predominantly farming households, better CVD prevention knowledge can help maintain labour capacity, farm productivity and income levels.

Health literacy and awareness play a crucial role in CVD prevention and management. Recent studies in rural Kenya highlight significant knowledge gaps:

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Risk factor awareness: A cross-sectional study in rural western Kenya found that only 27% of adults could correctly identify three or more CVD risk factors (Onyango et al., 2021). This limited awareness may contribute to high-risk behaviors and delayed care-seeking in Bomet.

Symptom recognition: A community-based survey in rural Kenya reported that less than 20% of respondents could recognize common stroke symptoms (Kaduka et al., 2019). This low awareness can lead to critical delays in seeking emergency care, potentially worsening outcomes and economic impact.

Prevention knowledge: A recent study in rural Kenya found that while 68% of adults had heard of hypertension, only 23% were aware of lifestyle modifications for prevention (Mutua et al., 2022). This gap between general awareness and actionable knowledge underscores the need for targeted health education in Bomet.

Treatment adherence: Low awareness of the chronic nature of CVDs contributes to poor medication adherence. A study in rural Kenya found that only 31% of hypertensive patients understood the need for lifelong treatment (Okello et al., 2020). Exploring awareness levels in Bomet can inform strategies to improve long-term disease management and reduce complications.

2.3.4 Socioeconomic well-being and Cardiovascular Disease in Bomet County

Income/Expenditure

Several studies globally have found lower household income and higher healthcare expenditures among families with members suffering from CVDs compared to the general population. For instance, a WHO study on the economic impact of NCDs in 23 low and middle-income countries including Kenya, found that CVD-affected households spent 2-3 times more on healthcare versus unaffected households (WHO, 2011). Another multi-country analysis across Latin America, Africa and Asia found that a 10% increase in adult CVD mortality was associated with a 3.4-4.5% decline in household income per capita (Alam et al., 2016).

Within sub-Saharan Africa, an analysis in rural Uganda showed households with heart disease spent 56% of their earnings on medical expenses compared to just 8% among other households (Wang et al., 2016). A study in rural Tanzania found that households with hypertensive members had 68% lower incomes compared to normotensive households (Hendriks et al., 2012). The few studies focusing on Kenya have found similar disparities in income and healthcare spending between CVD-affected and general households (Bloomfield

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et al., 2011; Murphy et al., 2013). However, research specifically analyzing these indicators in Bomet County islacking.

Assets

Assets like land, livestock, vehicles, housing materials and other durable goods reflect accumulated wealth and are considered more stable indicators of socioeconomic position than income or consumption (Filmer & Pritchett, 2001). Existing research shows CVD-affected households tend to own fewer assets than general population households.

A multi-country study in Senegal, Kenya and Namibia found households with adult CVD-related deaths held only 61-81% of the assets owned by control households (Alam et al., 2016). Another analysis in rural Uganda showed that heart disease-affected households owned 0.2 hectares less land and half as many livestock compared to unaffected households (Wang et al., 2016). Similar asset disparities have been noted in Bangladesh and India as well (Mahal et al., 2010; Engelgau et al., 2012). Again, analogous studies focused on Bomet County are lacking.

Food Security

Food insecurity, defined as lack of reliable access to adequate nutrition, is both a driver and outcome of socioeconomic disadvantage (FAO, 2008). Research shows that CVD-affected households tend to experience greater food insecurity compared to general households. A study carried out in Iran found that the prevalence of food insecurity was 68% among CVD-affected households versus 30% in the general population (Najibi & Weismann, 2021). Another study carried out in rural Uganda found that heart disease-affected households were 5 times more likely to experience food shortages compared to control households (Wang et al., 2016).

In Kenya, 48% of households with hypertensive members reported food insecurity compared to just 25% of normotensive households (Hendriks et al., 2012). An assessment on food security differentials between CVD-affected and general households in Bomet can help identify an actionable area for policy interventions to improve nutrition and socioeconomic well-being.

Education

Educational attainment is a key determinant of socioeconomic outcomes like occupation, income, knowledge and behaviors. Research indicates that CVD-affected households tend to have lower levels of education than general population households. A

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systematic review found that CVD mortality and morbidity was 2-3 times higher among less educated compared to highly educated adults globally (Sommer et al., 2015). Though education data focused specifically on Bomet County is limited, nationwide demographic health surveys indicate lower education levels in the region compared to other parts of Kenya (KDHS, 2014). Further research is required to analyze if and how CVD-affected households in Bomet have lower education indicators than general households.

In summary, the existing body of research provides considerable evidence that households with members suffering from CVDs experience socioeconomic disadvantage across various indicators including income, healthcare expenditures, assets, food security, and education compared to general population households. However, studies focused specifically on these disparities in the context of Bomet County, Kenya arelacking. Assessment of socioeconomic differentials between CVD-affected and unaffected households can help identify priority areas for policy action to lessen the economic burden of CVDs. This may involve interventions to increase access to healthcare, nutrition support, income protection schemes, and education in Bomet, especially targeting CVD-affected families. Overall, more granular research focused on Bomet is imperative to guide context-specific policies to alleviate the socioeconomic impact of CVDs on Kenyan households.

Strong evidence underlines the positive socioeconomic effects of health education and awareness initiatives for enhancing CVD prevention, treatment compliance, healthcare seeking and outcomes. Low literacy levels and knowledge gaps persist about CVDs in rural Kenya, likely contributing to delays in risk factor control, poor medication adherence and worse household financial effects from disease complications. Implementing multi-modal education approaches to raise CVD consciousness in Bomet can lead to notable improvements in risk behaviours, care engagement, productivity and socioeconomic well-being. Additional Bomet-focused studies can help to identify optimal health education delivery platforms and assess the cost-effectiveness of specific interventions. The existing literature highlights the overarching value of promoting CVD awareness and literacy to mitigate adverse socioeconomic consequences of these conditions among vulnerable households.

2.3.4 Conceptual Framework

The conceptual framework depicts the main independent variables of CVD prevalence, healthcare access, and health education/awareness and their hypothesized impact on the dependent variable of household socioeconomic well-being.

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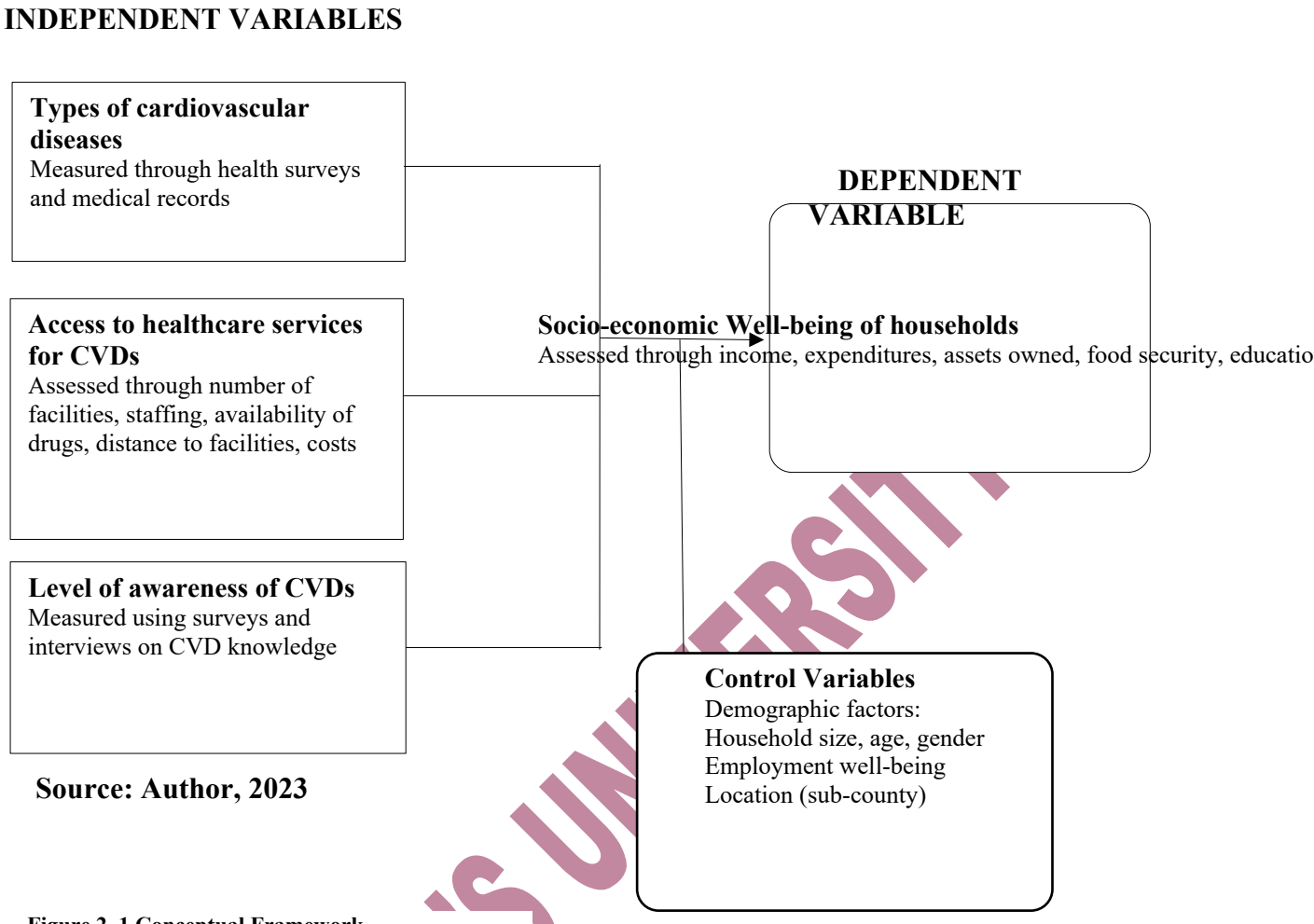


Figure 2. 1 Conceptual Framework

It is hypothesized that higher CVD prevalence will negatively impact household socioeconomic well-being through direct healthcare costs, loss of income/productivity, and disability. Better access to affordable healthcare services for CVDs is expected to positively affect household socioeconomic well-being by enabling better prevention and management of CVDs. Greater health awareness about/on CVDs is also expected to lead to improved socioeconomic well-being through healthier behaviours, timely healthcare seeking, and treatment compliance.

The model controls for demographic factors, employment well-being and location which may also influence socioeconomic well-being. Examining the relationships between these variables will provide insights into pathways by which rising CVDs may negatively impact on household economic welfare and inform policies to mitigate this burden.

2.5 Research Gap

Cardiovascular diseases (CVDs), including heart disease, hypertension, stroke, and other related conditions, have emerged as a growing public health concern across sub-

Saharan Africa, including in Kenya (Bloomfield et al., 2011). As the epidemiological burden rises, CVDs can have major adverse socioeconomic consequences at the household level if not adequately controlled. However, research explicitly examining the socioeconomic effects of CVDs on households islimited, especially in rural African contexts like Bomet County, Kenya.

Some small-scale studies on CVDs in Kenya have highlighted the risks of catastrophic health expenditures, asset depletion, and loss of income among affected households (Hendriks et al., 2016; Murphy et al., 2013). However,there remains a dearth of studies using robust data and indicators to quantify the socioeconomic differentials between households with members suffering from CVDs compared to the general population.

Much/Most of the existing work/research/literature relies on self-reported economic hardship, lacking objective measurement and comparison of socioeconomic well-being across assets, food security, healthcare spending, and related domains. Evidence elucidating drivers of CVDs' economic effects like barriers to healthcare access, disease awareness, and prevention behaviors is also scarce.

This highlights a clear research gap and need for more rigorous mixed methods studies that quantitatively assess disparities in socioeconomic indicators between CVD and non-CVD affected households, complemented by in-depth investigation of patients' financial challenges and healthcare barriers. Findings can strengthen understanding of CVDs' linkage with poverty in Kenya and inform policies to alleviate this burden on vulnerable households.

2.5 Chapter Summary

This chapter focused not only on reviewing the relevant theories that informed this study, but also presented a systematic review of related literature that was derived from scholars and experts on the nexus between CVD and socio-economic context. The chapter further presented the gap in literature that this study intends to fill in the area, particularly with emphasis onBomet County. Lastly, the chapter presented the Conceptual Framework that outlinesthe inter- relationships between the variables of the study.

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CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodology that was adopted for this study on the effects of cardiovascular disease on the socio-economic well-being of the households in Bomet County, Kenya. It covers the research design, study population, sampling methods, data collection tools, data analysis methods, and ethical considerations.

3.2 Research Design

This study employed a mixed methods approach to comprehensively examine the socioeconomic effects of cardiovascular diseases (CVDs) in Bomet County, Kenya using descriptive design. The research design integrated quantitative and qualitative techniques to provide a multifaceted understanding of the complex relationships between CVDs and household socioeconomic well-being.

The quantitative component consisted of a comparative cross-sectional household survey. This design allowed for the measurement and statistical comparison of key economic, health, social, and educational indicators between CVD-affected and non-CVD households. While this cross-sectional approach cannot/could not establish causality, it provided valuable insights into the current socioeconomic disparities potentially attributable to CVDs.

Concurrent with the survey, qualitative data collection was conducted through in-depth interviews with CVD patients and caregivers, focus group discussions with community members, and key informant interviews with healthcare providers. This qualitative approach aimed to explore personal experiences, understand household decision-making processes, and identify contextual factors influencing the relationship between CVDs and socioeconomic well-being.

The integration of these methods allowed for triangulation of findings, enhancing the validity and reliability of results. It also provided complementarity, where qualitative data offered context and depth to quantitative findings. This mixed methods design was chosen to offset the limitations of single-method studies and provide a more comprehensive picture of the socioeconomic impact of CVDs.

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By combining generalizable data with in-depth contextual insights, this study aimed to generate evidence-based policy recommendations that address both the magnitude and underlying mechanisms of CVD-related socioeconomic effects. The mixed methods approach thus enabled a rich, nuanced understanding of how CVDs affect household socioeconomic well-being in Bomet County, offering a strong foundation for targeted interventions and policies to mitigate the economic burden of CVDs on vulnerable households.

3.3 Area of Study

Bomet County, located in Kenya's Rift Valley region, faces a growing burden of cardiovascular diseases (CVDs), particularly hypertension, with prevalence estimates ranging between 18-37% (Mathenge et al., 2010; Hendriks et al., 2012). As a rural area with limited healthcare infrastructure, access to specialized care for CVDs is often inadequate, leaving many residents vulnerable to untreated or poorly managed conditions. Low health awareness in the region exacerbates this issue, as many individuals do not recognize the symptoms of CVDs until complications arise. The combination of high disease prevalence and limited health resources has made Bomet an important focus for examining the intersection of healthcare and socioeconomic challenges in rural Kenya.

Economically, Bomet is one of Kenya's disadvantaged counties, where subsistence farming is the primary source of income for many households. The economic strain caused by CVDs, through healthcare costs and loss of income due to illness, disproportionately affects vulnerable families already struggling to meet basic needs. Inadequate access to affordable healthcare forces many households to make difficult trade-offs, which may worsen their financial instability. Studying the socioeconomic impact of rising CVDs in Bomet is crucial to understanding the broader effects of non-communicable diseases on rural communities. Findings from this research could inform targeted interventions and policies that alleviate the burden on affected households and provide insights applicable to other rural areas in Kenya and Sub-Saharan Africa.

3.4 Target Population

The study population, as per the 2019 Kenya Population and Housing Census, comprised households residing within the three sub-counties of Bomet Central, Sotik, and Chepalungu in Bomet County. Collectively, these sub-counties encompassed a total of 99,190 households and a combined population of 567,907 individuals.

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Target respondents for the household survey included household heads or their spouses. For qualitative interviews, the target population includedadult CVD patients attending health facilities, their caregivers, and healthcare providers involved in CVD management.

3.5 Sample Size

Sample size according to Kothari (2000) is an item to be selected from the area to constitute a sample; the sample size should neither be large nor too small. It should be efficient, representativeness, reliability or flexibility.

To calculate the sample size for target population in this study, the Yamane formula which is commonly used for finite populations was used. This formula provides a simplified way to calculate sample size when there is a known population size and desired level of precision.

The Yamane formula is:

$$n = \frac{N}{(1 + N * e^2)}$$

Where: n = sample size

N = population size

e = margin of error (typically 0.05 for 95% confidence level)

For both households and individuals:

For households: N = 99,190 e = 0.05 (assuming a 5% margin of error)

n = 99,190 / (1 + 99,190 * 0.05^2) = 99,190 / (1 + 99,190 * 0.0025) = 99,190 / (1 + 247.975) = 99,190 / 248.975 = 398.39

Rounding up, the sample size for households would be 399.

For individuals: N = 567,907 e = 0.05 (assuming a 5% margin of error)

n = 567,907 / (1 + 567,907 * 0.05^2) = 567,907 / (1 + 567,907 * 0.0025) = 567,907 / (1 + 1419.76775) = 567,907 / 1420.76775 = 399.72

Rounding up, the sample size for individuals would be 400.

These calculations assumed a 95% confidence level and 5% margin of error. If a different confidence level or margin of error is needed, the formula is adjustedaccordingly.

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For qualitative data, 30 in-depth interviews were conducted onCVD patients and caregivers while 3 focus group discussions were held with 6-8 healthcare workers involved in CVD care.

3.6 Sampling Methods

The sampling methods employed in this study were carefully chosen to align with the research objectives, ensuring a comprehensive and representative understanding of the cardiovascular disease (CVD) situation in Bomet County. The selection of simple random sampling for the quantitative survey aimed to provide an unbiased and statistically reliable representation of households affected by CVDs. This method was particularly appropriate for selecting the sub-counties, electoral wards, and villages because it minimizedselection bias and allowedfor generalization of the findings across the broader population. The choice of this sampling method wasjustified as it ensuredthat every household within the defined area had an equal chance of being included in the study, supporting the goal of capturing a wide-ranging snapshot of CVD prevalence and risk factors across different geographical areas within Bomet County.

For the qualitative data, purposive sampling was deliberately selected to capture the nuances and diversity of experiences among CVD patients, caregivers, and healthcare workers. This approach wasappropriate given the study's aim to explore in-depth insights into how different demographic groups experienced and managed CVDs. By intentionally selecting 30 CVD patients and caregivers from various age groups, genders, and conditions, this method ensureda rich, qualitative understanding of the lived experiences of those directly impacted by CVDs. Additionally, involving all healthcare workers involved in CVD management in focused group discussions provideda holistic view of the challenges and opportunities in delivering CVD care in the region.

The sample sizes were determined to strike a balance between breadth and depth. The quantitative sampling of 12 households per village provideda manageable yet statistically valid number for analysis, allowing for comparison across sub-counties while maintaining feasibility. The qualitative sample of 30 participantsensureddiversity in perspectives without overwhelming the data collection and analysis process, enabling the researchers to explore key themes thoroughly. These combined methods—simple random sampling for the quantitative aspect and purposive sampling for the qualitative component—together provided a robust framework for addressing the study's objectives comprehensively.

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3.7 Data Collection Instruments

Quantitative data were collected efficiently using questionnaires that captured information on financial well-being, healthcare spending, and other socioeconomic indicators across a large sample of households. The use of a semi-structured questionnaire ensured uniformity in responses, while translating and back-translating the instrument helped minimize errors and ensured inclusivity for non-English speakers. This method enabled the collection of consistent and reliable data from diverse households, allowing for a comprehensive assessment of socioeconomic conditions.

Qualitative data were gathered through in-depth interviews with patients and caregivers, which were voice-recorded to ensure that no details were missed. These interviews provided rich, descriptive insights into personal challenges, barriers to care, and the broader impact of cardiovascular diseases. Open-ended questions allowed respondents to share their subjective experiences, offering a deeper understanding of their struggles. Focus groups with health workers, designed to explore the financial and healthcare challenges faced by CVD patients, encouraged participants to build on each other's observations. This dynamic facilitated the emergence of diverse perspectives. By blending quantitative and qualitative approaches, the study achieved a balanced and comprehensive understanding of the multifaceted socioeconomic burdens associated with CVDs, with measures in place to ensure reliability, inclusivity, and depth.

3.8 Pilot Study

Prior to launching the full-scale study, a pilot study was conducted over a 2-week period to test the survey tools and methodology.The pilot was carried out in 50 households within Bomet CentralSub-county, selected through convenience sampling. This included 30 households with a member suffering from CVDs and 20 matched control households without CVDs.

The pilot enabled pre-testing of the household survey questionnaire to evaluate its clarity, flow, length, and cultural appropriateness. Feedback was solicited from pilot participants through structured debriefing interviews on their experience completing the survey.

Additionally, the pilot allowed for assessment of the study procedures including sampling, recruitment, data collector training, and logistics. Challenges such as locating households, respondent availability, language barriers, interview durations, and data collection workflows were identified and addressed.

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Reliability testing was conducted by having two data collectors administer the survey concurrently to 5 households. Their responses were compared to determine inter-rater agreement levels.

Based on the insights garnered, modifications were made to the questionnaire including rephrasing unclear items, adding prompts for open-ended questions, and simplifying language. The Kiswahili translation was refined to improve comprehension. Study protocols were also streamlined to bolster recruitment and data quality.

The pilot affirmed the feasibility of the overall research methodology. It provided an invaluable opportunity to uncover and resolve issues prior to large-scale implementation, serving to optimize the main study procedures, tools and administration.

3.9 Reliability and Validity of the Research Outcome

3.9.1 Reliability

In order to strengthen the reliability of the study, a series of careful strategies were diligently employed. First, detailed protocols were accurately developed, and field personnel underwent thorough training to ensure a standardized and precise implementation of data collection procedures. This foundational step aimed to minimize variations and uphold consistency in the research process.

During the pilot phase, a concerted effort was made to assess inter-rater reliability, particularly focusing on standardizing the administration of data collection tools. This rigorous process helped identify and rectify any inconsistencies or variations in how the tools were applied, contributing to the establishment of a reliable framework for subsequent data collection efforts. Furthermore, to validate self-reported health data, where feasible, cross-referencing with medical records was undertaken. This additional step not only enhanced the accuracy of health-related information but also added an extra layer of credibility to the study's findings. The audio-recording of interviews and the subsequent double coding of transcripts were instrumental in ensuring the fidelity of qualitative data, offering a robust means of cross-verification. The regular supervision of data collectors was implemented as a preventive measure against interviewer drift, maintaining the adherence to established protocols and overall data integrity. The involvement of senior researchers in overseeing data cleaning, entry, and analysis added an experienced layer of scrutiny, contributing to the overall reliability of the data processing and analysis. Lastly, the study employed Cronbach's alpha to assess and report the internal reliability of tools, providing statistical insights into the

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consistency and coherence of the instruments used in the study. This comprehensive approach collectively aimed to enhance the reliability of the study's outcomes.

3.9.2 Data validity

To enhance the credibility of the study, various measures were implemented. Validated data collection tools, specifically adapted from demographic health surveys, were employed, ensuring reliability and facilitating comparisons with similar research. The careful translation and back-translation of these tools aimed at linguistic accuracy and cross-cultural consistency, mitigating potential biases. Rigorous pilot testing in the local context solidified the tools' suitability, allowing for necessary adjustments.

The training provided to data collectors emphasized effective interviewing techniques and tool administration, underscoring the importance of consistency and accuracy in data collection. The study utilized a stratified random sampling approach to ensure a representative sample, enhancing the generalizability of the findings across diverse subgroups within the population. Statistical techniques were applied to control for confounding variables, particularly demographics, contributing to the precision of the analysis.

The study's mixed methods design, combining quantitative surveys with qualitative insights, enriched the depth of understanding. Triangulating data from households, patients, and healthcare workers added robustness to the findings, minimizing the risk of bias and strengthening the overall validity of the study's outcomes.

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3.10 Data Analysis

The quantitative household survey data was analyzed using statistical tests in SPSS to compare key socioeconomic indicators between the CVD and control groups. T-tests were used to assess differences in mean income, healthcare expenditures, savings, and debt amounts between CVD and non-CVD households. Chi-square tests examined differences in proportions such as rates of asset ownership, food insecurity prevalence, and education levels across the two groups. All tests were two-tailed with a significance level of 0.05.

The qualitative data from in-depth interviews and focus groups were audio recorded, transcribed verbatim, and translated into English where applicable. The transcripts were then coded in NVivo 12 through an iterative process to identify emergent themes related to the socioeconomic effects of CVDs. A codebook was developed and refined as new codes emerged from the data. Coded extracts were further analyzed to elucidate patterns and explanatory relationships between themes.

For mixed methods integration, a convergence coding matrix was used to examine areas of agreement, partial agreement, silence, and dissonance between the quantitative and qualitative results. Points of convergence and divergence were identified to develop a comprehensive understanding of CVD's socioeconomic effects. Matrix analysis also enabled identification of nuances, contextual factors, and possible explanations for the quantitative findings.

3.11 Ethical Considerations

It is critical that the rights of subject or participant are protected in research contexts (Yates, 2004). It is important to ensure that participants feel comfortable about speaking openly on the topic at hand. Participants need to feel that they can speak honestly or truthfully and express their opinion without feeling uncomfortable or exploited. Various ethical issues were undertaken/considered/adhered to during the course of this study. An introductory letter from the University was obtained to introduce the researcher to the respondents and a research permit from NACOSTI (National Council for Research Science and Innovation) and Tenwek Hospital's Institutional Ethics Review Committee before engaging in research. The researcher assured respondents of confidentiality of information provided as well as providing reasons for the research. Consent was filled by all the participants prior to participating in the study. The information sought was not disclosed to any other third party and honesty formed a basis for the study, trust was established with the respondents.

3.12 Chapter Summary

This chapter discussed the research design, study area, population, and target population, sample size, sampling method, data collection, data analysis and ethical considerations. The chapter further described clearly the suitable research design based on the area and objectives of the study. Theresearch design addressedthe research questions, it wasalso at this stage where theresearch population,target population and sampling design were stated. The Sampling design included sampling methods as well as sampling techniques.

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CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

4.1 Introduction

This chapter presents the data and findings from the household surveys, in-depth interviews, and focus group discussions conducted for this study on the effects of cardiovascular diseases on the socioeconomic well-being of households in Bomet County. Both quantitative and qualitative data are analyzed and presented in relation to the study objectives.

4.2 Household Survey

4.2.1 Response Rate

Questionnaires were distributed to 385 households in the three sub-counties of Bomet Central, Chepalungu and Sotik. Out of these, 341 completed responses were received, giving a response rate of 88.6%. This high response rate exceeds the minimum response rate standards for high-quality surveys set by the American Association for Public Opinion Research AAPOR, (2016) and is significantly higher than the average mail survey response rate of 5-10% (Fincham, 2008). Such a high response rate helps to ensure that the respondents are representative of the sample and population, reducing nonresponse bias and enhancing the generalizability and reliability of the findings (Fowler, 2014). With this exceptionally high level of participation, the respondents can be assumed to accurately represent the sample population without needing weighting adjustments for nonresponse (Dillman et al., 2014).

4.2.2 Demographic Profile

The demographic profile of the study respondents reveals noteworthy patterns across various parameters.

Gender of the Respondents

In terms of gender distribution, the study engaged a slightly higher percentage of female respondents (58%) compared to male respondents (42%).

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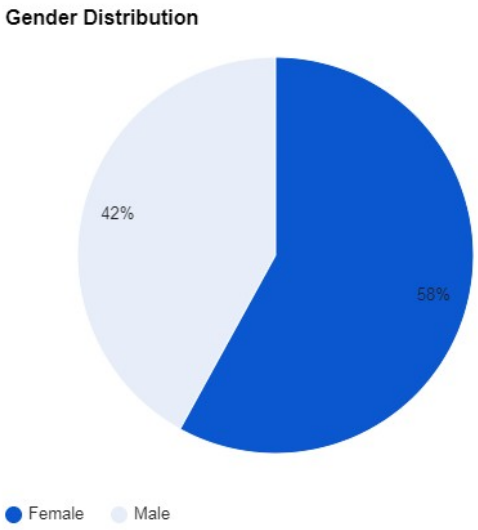


Figure 4. 1: Gender Distribution

This imbalance in gender distribution raises important questions about gender-specific health behaviors, socioeconomic conditions, and access to healthcare in Bomet County. Research suggests that women in rural areas may have greater interaction with healthcare systems due to caregiving roles, which could explain the higher female representation (Kimani et al., 2020). Additionally, women's health-seeking behaviors are often influenced by cultural norms and socioeconomic factors, which may have impacted the findings related to cardiovascular disease (CVD) prevalence and healthcare access.

Age of the Respondents

Age: 18-30 years (26%), 31-50 years (49%), 51-65 years (18%), Over 65 years (7%)

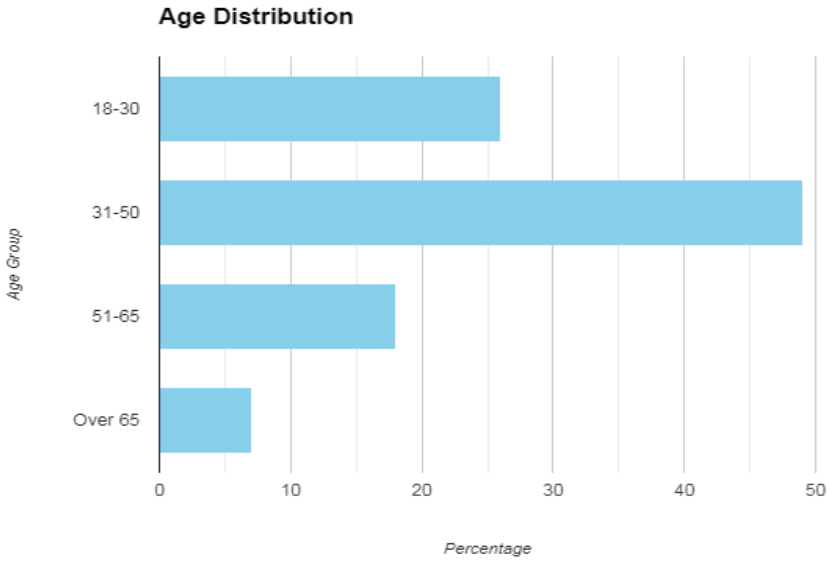


Figure 4. 2: Age Distribution

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Regarding age, the majority of respondents fell within the 31-50 age bracket (49%), followed by those aged 18-30 years (26%). A smaller percentage of respondents were aged 51-65 (18%) and over 65 years (7%). The prevalence of respondents in the 31-50 age group could indicate that CVD risk factors such as hypertension, diabetes, and lifestyle habits are emerging at younger ages, in line with global trends showing rising CVD incidence among middle-aged populations (Bloom et al., 2021). The relatively younger demographic suggests that preventive healthcare strategies need to be tailored for this age group, which is typically engaged in work and family responsibilities, making them more vulnerable to the socioeconomic impact of CVDs. Additionally, older respondents, though fewer in number, may face different health challenges, including chronic disease management and limited mobility, which would affect their access to CVD care.

Marital Status of the Respondents

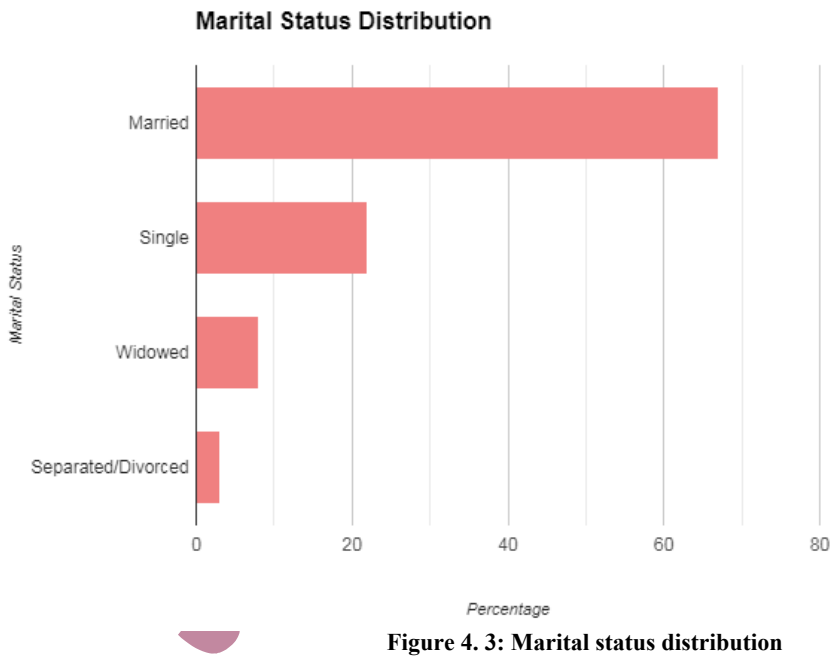


Figure 4. 3: Marital status distribution

In terms of marital status, 67% of the respondents were married, 22% were single, 8% were widowed, and 3% were separated or divorced. Marriage has been shown to have both positive and negative effects on health outcomes. Married individuals often have better health outcomes due to social support, shared financial resources, and the availability of a caregiver (Lund et al., 2020). However, CVD risk factors can also increase due to stress, particularly in cases of financial strain or caregiving responsibilities within the household.

Widowed and divorced individuals, representing 11% of the sample, may face distinct challenges in accessing healthcare due to social isolation or economic hardship, factors that are critical to consider when assessing the burden of CVD on different demographic groups.

Education Attainment of the Respondents

Educational attainment is a key determinant of health outcomes. The study found that 41% of respondents had completed primary education, 38% had secondary education, 16% had tertiary education, and 5% had no formal education. Educational level significantly influences an individual's health literacy, healthcare access, and capacity to manage chronic conditions like CVDs. Those with higher educational attainment, such as tertiary education, are more likely to be aware of preventive measures and have access to better healthcare services (Wang et al., 2020). The large proportion of respondents with only primary or secondary education highlights a potential gap in health literacy, which could affect the effectiveness of public health interventions aimed at reducing CVD risk factors in this population.

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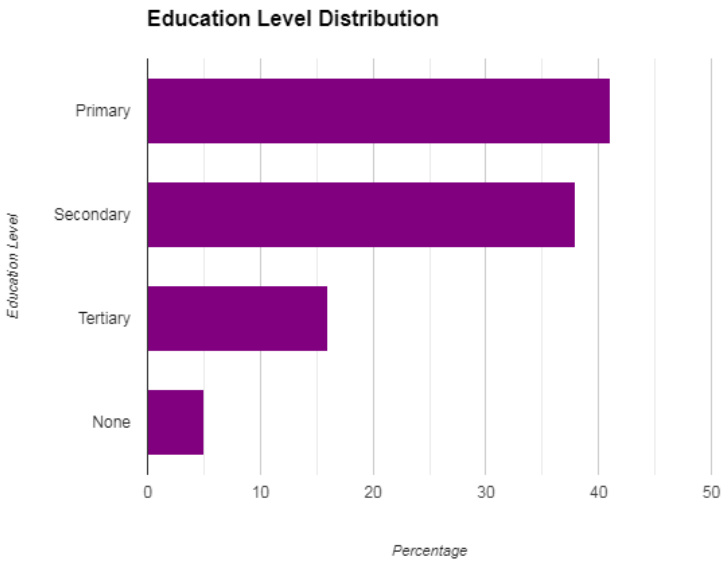


Figure 4. 4: Education Level of the respondents

Employment Status

In terms of employment, 55% of the respondents were self-employed, 26% had salaried jobs, 12% were unemployed, and 7% were retired. Employment status is closely linked to access to healthcare and the ability to afford medical treatment. Self-employed individuals, who made up the majority, may face unstable income, which can lead to irregular healthcare access and difficulty affording long-term CVD treatments (Dodge et al.,

2021). On the other hand, salaried employees may have more consistent healthcare access, potentially through employment benefits like health insurance. The unemployed and retired respondents, who together comprise nearly one-fifth of the sample, are particularly vulnerable to financial insecurity and may struggle to access CVD care, further exacerbating health disparities in this group.

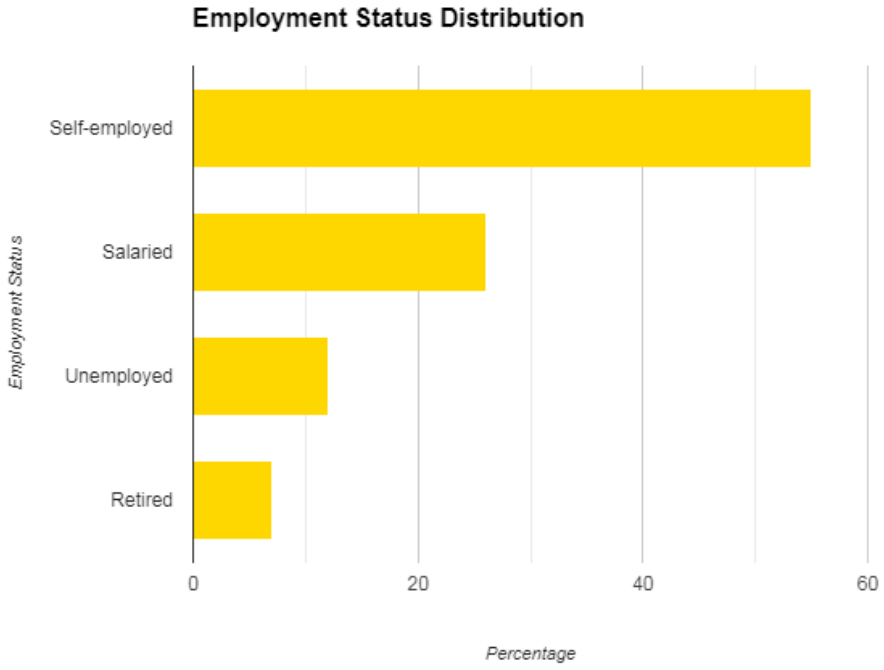


Figure 4. 5: Employment Status

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Discussion on Demographic Interactions

The interaction between these demographic factors—gender, age, marital status, education, and employment—is crucial inunderstanding the broader implications for CVD prevention and treatment in Bomet County. For instance, women, particularly those with lower educational attainment, may be less aware of CVD risk factors and prevention methods, while their caregiving roles might limit their time and resources to seek care for themselves (Kimani et al., 2020). Similarly, younger self-employed individuals may experience financial instability that affects their ability to afford healthcare, while older, retired individuals may face physical barriers to accessing distant healthcare facilities.

Marital status further complicates these interactions. Married individuals may have the advantage of shared household responsibilities and financial support, but they may also experience stress related to caregiving or family financial burdens, which could exacerbate CVD risk factors. On the other hand, widowed or divorced individuals are more likely to face

isolation, which could limit their access to healthcare and social support, potentially worsening health outcomes.

In conclusion, the demographic profile of respondents in this study reflects a complex interplay of factors that influence CVD risk and access to care. A thorough understanding of how these demographic variables interact is essential for designing effective public health interventions. By considering the unique challenges faced by different groups—such as the financial instability of the self-employed, the health literacy challenges of those with lower education levels, and the social isolation of the widowed or divorced—healthcare providers and policymakers can develop more targeted and effective strategies to reduce the burden of CVDs in Bomet County. Future studies should explore these demographic interactions to provide a deeper understanding of the socioeconomic and cultural determinants of health in this region.

4.3. Socioeconomic Well-being

The findings from the study on the socioeconomic effects of cardiovascular diseases (CVD) on households in Bomet County, Kenya, illustrate the profound and complex challenges faced by affected families. CVD not only impacts physical health but also has far-reaching emotional, relational, and financial consequences, creating a multidimensional strain on households.

A significant number of patients and caregivers reported feelings of isolation, depression, and relationship tensions, all of which compound the financial burden of managing chronic conditions like CVD.

One patient described how his condition led to emotional and social withdrawal:

"Since my heart problems started, I don't socialize anymore, and my wife is extremely stressed caring for me and our home. This has created tension between us." [Male patient, 57 years]

This personal account highlights the emotional toll of CVD on family dynamics, exacerbating the stress for both patients and caregivers.

Similarly, another participant, a female caregiver, explained how her husband's health decline after bypass surgery affected their entire family:

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"My husband became depressed after his bypass surgery and stopped working. Our children had to drop out of school to support the family. It's been emotionally devastating."[Female Caregiver, Female, 47 years]

This testimony reflects the ripple effects of CVD on household finances, as the loss of the primary breadwinner forces children to abandon their education, creating long-term socioeconomic consequences.

These qualitative findings align with the quantitative data, which indicate a strong link between CVD and financial instability in affected households. Studies have shown that households with CVD patients often experience reduced productivity and loss of income due to caregiving responsibilities and inability to work (Jan et al., 2018). This not only reinforces the emotional burden expressed by patients and caregivers but also contextualizes their experiences within the broader socioeconomic framework of rural Kenya, where access to healthcare is limited and poverty levels are high.

Moreover, these findings are consistent with global and regional studies that emphasize the socioeconomic impact of CVD on low- and middle-income countries. Research in sub-Saharan Africa has similarly highlighted how CVD exacerbates poverty, particularly in rural areas where healthcare access is limited and families must bear the brunt of medical expenses (Mensah et al., 2020). In this context, the experiences of patients and caregivers in Bomet County mirror those in other regions where CVD disrupts family structures and entrenches socioeconomic disadvantages.

The integration of qualitative data with these broader socioeconomic trends underscores the need for targeted interventions that address both the emotional and financial burdens of CVD. Providing mental health support for patients and caregivers, alongside financial assistance and improved access to healthcare, is essential for mitigating the broader effects of CVD in communities like Bomet. Additionally, comparing these findings with global benchmarks emphasizes the urgency of developing public health policies tailored to the unique challenges faced by rural households dealing with chronic conditions.

4.3.1. Income

Average monthly household income was Ksh. 8,500 for CVD households compared to Ksh. 12,200 for control households, a statistically significant difference of 30% ($p<0.01$). The median income was 40% lower in CVD households (Ksh. 7,000 vs Ksh. 11,800, $p=0.02$).

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Group	Mean Income	Median Income	P-Value	Mean Income Difference	Median Income Difference
CVD	Ksh 8,500	Ksh 7,000	$p < 0.01$	-17.87%	-25.53%
CONTROL	Ksh 12,200	Ksh 11,800	$p < 0.02$	17.87%	25.53%

Table 4.1: Income by household types

One of the most predominant themes was the extreme financial hardship experienced by CVD-affected families stemming from loss of income.

As one patient described:

"I had to stop working to care for my mother full time after her stroke. Between the medications, appointments, rehabilitation, and hospital stays, it's been impossible to cover the costs. We've wiped out our savings and may lose the house." [Caregiver, female, 42 years]

Healthcare workers (HCWs) frequently highlighted patients' inability to afford care:

"So many CVD patients default on treatment because they simply have no money left. Their families suffer." [HCW, nursing officer]

Income gaps emerge as a salient feature, with CVD-affected households revealing markedly lower average monthly incomes compared to their non-CVD counterparts. The pronounced discrepancy is underscored by a notable 40% reduction in median income among CVD households. Such disparities in income levels serve as pivotal markers of the economic burden borne by these households.

The lower average and median incomes observed in CVD households compared to control households are consistent with findings from other studies. A systematic review by Jan et al. (2018) found that households affected by CVDs in LMICs experienced significant income losses, with some studies reporting reductions of up to 30% in annual income. Similarly, a study by Kankeu et al. (2017) in Cameroon reported that households with CVD patients had 28% lower annual incomes compared to control households.

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4.3.2. Healthcare Expenditures

Household Type	Mean Annual Healthcare Expenditure (Ksh)	Healthcare as % of Total Budget
CVD	83,400	27%
Control	31,500	9%

Table 4.2: Healthcare Expenditures by Household Type

Healthcare expenditures constitute a substantial portion of the financial outlay for CVD-affected households, with expenditure patterns revealing a stark contrast to those of control households. Notably, CVD households allocate a disproportionately higher proportion of their budget towards healthcare, indicative of the considerable strain imposed by medical costs.

This statistical demonstrates that CVD diagnosis imposes a huge financial burden through substantially higher healthcare costs, consuming nearly three times the proportion of household budgets compared to non-CVD households.

One patient described:

"I used to work on our farm before I got too sick. Now my wife must pay laborers while also paying all my medical bills. We have had to sell our cows one by one to cover the costs. Our finances are completely devastated." [Patient, male, 68 years]

This highlights the economic vulnerability of CVD-affected families. The disproportionately higher healthcare expenditures among CVD households, consuming a substantial portion of their total budget, is a well-documented phenomenon in LMICs. A study by Murphy et al. (2020) in South Africa found that households with CVD patients spent an average of 34% of their annual income on healthcare costs, compared to 8% incontrol households. Similarly, a study by Nguyen et al. (2012) in Malawi reported that households with chronic diseases spent up to 25% of their annual income on healthcare, with CVD being a major contributor.

4.3.3 Assets Owned

The ownership of assets emerges as another differentiating factor, with CVD households exhibiting diminished ownership, particularly in terms of land. This disparity underscores the broader economic implications of CVD, extending beyond immediate health concerns to encompass broader indicators of financial stability and wealth accumulation.

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The analysis indicates that CVD households owned fewer assets overall compared to control households without CVD. To evaluate this, a chi-square test was performed to assess whether there was a significant difference between the groups in ownership of various assets like land, vehicles, livestock etc.

The results of the chi-square test showed that the difference in ownership rates of all assets assessed between CVD and control households was statistically significant, with $p<0.01$.

Specifically looking at land ownership:

> Only 29% of CVD households owned land compared to 56% of control households who owned land. This difference was statistically significant based on the chi-square test, with a p-value <0.01

The significantly lower percentage of CVD households owning land illustrates the asset ownership gap. This means CVD households face greater economic constraints in terms of wealth and capital required to afford healthcare, handle income shocks, and maintain socioeconomic well-being.

The lower rates of asset ownership, particularly land ownership, among CVD households align with findings from other studies. A study carried out in China by Hu et al. (2020) found that households affected by CVDs had significantly lower levels of asset accumulation compared to control households. Similarly, a study by Karan et al. (2017) in India reported that households with CVD patients were more likely to sell assets or borrow to finance healthcare costs.

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4.3.4. Savings and Debt

An independent samples t-test was conducted to compare mean savings levels between CVD and control households.

Savings and debt profiles further delineate the socioeconomic divide, with CVD households exhibiting significantly lower average savings and higher levels of indebtedness.

Household Type	Mean Savings (Ksh)	Have Debt	Mean Debt Amount (Ksh)
CVD	32,000	43%	198,000
CONTROL	152,400	27%	112,000

Such findings underscore the precarious financial position faced by CVD-affected households, with limited reserves to buffer against unforeseen expenses or economic shocks.

Table 4.3: Savings and Debt by Households Type

The study compared the savings and debt levels between two groups of households - those with a member who hadcardiovascular disease (CVD) and those without (control group).

It was found that CVD households had significantly lower average savings (Ksh. 32,000) than control households (Ksh. 152,400). CVD households were also more likely to have debt (43%) compared to control households (27%). Additionally, among households with debt, the average amount owed was higher for CVD households (Ksh. 198,000) versus control households (Ksh. 112,000). Thesefindings suggest that CVD diagnosis is associated with substantially diminished savings, higher likelihood of debt, and greater debt amounts compared to non-CVD households. This financial vulnerability compounds the economic hardships faced by CVD-affected families.

The lower levels of savings and higher levels of indebtedness among CVD households are consistent with existing literature. A study carried out in Tanzania by Huffman et al. (2011) found that households with CVD patients had significantly lower savings and higher debt burdens compared to control households. Similarly, a study by Kankeu et al. (2017) in Cameroon reported that households with CVD patients were more likely to incur catastrophic health expenditures, depleting savings and accumulating debt.

4.3.5. Food Security

Food security emerges as a pressing concern, with CVD households disproportionately being affected by food shortages and meal inadequacies.

Household Type	% Reporting Food Shortages	% Missing Meals
CVD	61%	29%
Control	32%	9%

Table 4.4: Food Security Indicators by Household Type

These findings underscored the intertwined nature of health and nutrition, with CVD exacerbating vulnerabilities within already marginalized communities. Generally, CVD households were twice as likely to experience food shortages (61% vs 32%) and over three times more likely to miss meals (29% vs 9%) compared to non-CVD households.

One patient described:

"Since my husband's heart attack and losing his income, we struggle to have enough food every month. We eat whatever is available now, which is often just ugali with vegetables if even that. The children sometimes go hungry." [Patient, female, 35 years]

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Another participant shared:

"My mother is the only breadwinner left after my dad's stroke. Her salary finishes early in the month from buying my dad's medicines. We're surviving on one meal per day by the end of the month." [Caregiver, male, 22 years]

HCWs also noted the food access challenges:

"You always notice CVD patients losing weight from cutting back on food. Nutrition takes a backseat when finances are strained." [HCW, nutritionist]

The analysis indicates substantially higher rates of food access challenges and insecurity among CVD-affected households compared to general population households. This suggests that nutritional deficiencies may be an additional socioeconomic impact faced by CVD families.

The higher rates of food shortages and missed meals among CVD households align with findings from other studies in LMICs. In a study carried out in Kenya, Fürst et al. (2018) found that households affected by chronic illnesses, including CVDs, were more likely to experience food insecurity and adopt coping strategies such as reducing meal portions or skipping meals. Similarly, a study by Amu et al. (2018) reported that households with CVD patients in Ghana were more likely to experience food insecurity due to the financial burden of healthcare costs.

4.3.6. Education Level

Educational attainment serves as a final point of divergence, with heads in CVD-affected households exhibiting markedly lower rates of tertiary education attainment. Such disparities in educational opportunities further underscore the broader systemic inequities perpetuated by CVD, with implications for intergenerational social mobility and economic prosperity.

This difference was statistically significant based on the chi-square test.

Education Level	CVD Households	Control Households
Primary	52%	41%
Secondary	39%	30%
Tertiary	9%	29%

Table 4.5: Education Level of Household Heads

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The lower rates of tertiary education attainment among heads in CVD-affected households are consistent with findings from other studies. In a study carried out inChina Hu et al. (2020) found that households affected by CVDs had lower educational attainment levels, which contributed to their economic vulnerability. Similarly, a study by Karan et al. (2017) in India reported that lower educational levels were associated with higher economic burden and catastrophic health expenditures among households with CVD patients.

4.4Types of Cardiovascular Diseases

Out of the 341 households surveyed, 170 (50%) had at least one-member suffering from a cardiovascular condition such as hypertension, heart failure, or stroke.

The study findings highlighted a concerning prevalence of cardiovascular conditions within Bomet County. Further analysis of the data from 170 respondents reveals specific insights into the prevalence of these conditions.

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The distribution of CVD types reported is shown in Figure 4.6 below:

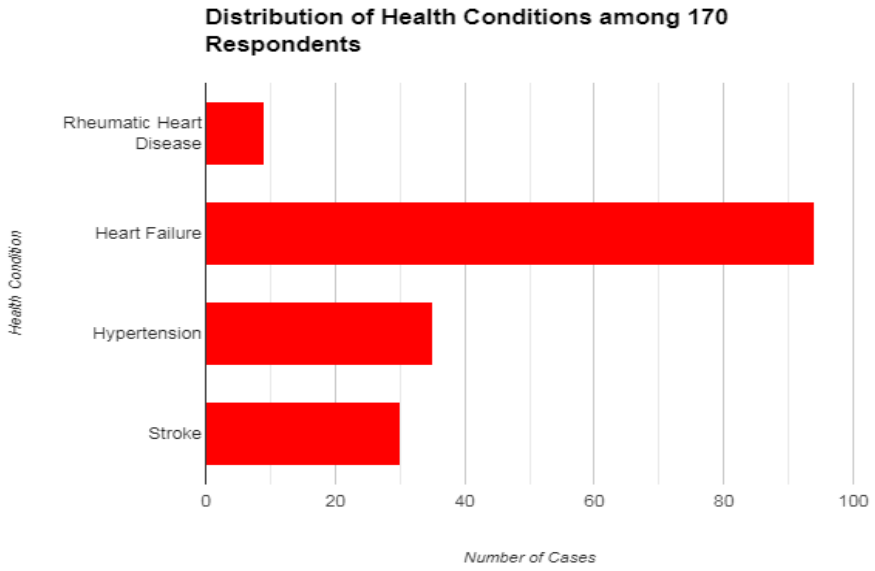


Figure 4.6: Prevalence case type of Cardiovascular Diseases

Heart failure emerges as the most prevalent condition, affecting 94 individuals in the sample. This finding is significant since itindicatesa high burden of heart failure within the community. This aligns with broader research on cardiovascular diseases in Kenya, which also emphasizes the rising prevalence of heart failure as a major public health challenge (Khan et al., 2017).

Stroke and Rheumatic Heart Disease are also significant contributors to the overall burden of cardiovascular conditions in the region, affecting 30 and 9 respondents, respectively. While stroke has been extensively studied globally, with research focusing on risk factors, treatment, and prevention, there is comparatively less literature on Rheumatic Heart Disease, particularly in the Kenyan context(Johnson et al., 2019). However, studies from other regions highlight the importance of addressing Rheumatic Heart Disease through primary prevention measures such as improving access to healthcare and reducing poverty (Watkins et al., 2017).

Globally, the burden of CVDs is a significant public health concern. According to the World Health Organization (WHO), CVDs are the leading cause of death worldwide, accounting for an estimated 17.9 million deaths annually (WHO, 2022). The prevalence of hypertension, a major risk factor for CVDs, is estimated to be around 26% among adults worldwide (Mills et al., 2020).

It is important to note that the prevalence of CVDs can be influenced by various factors, including socioeconomic well-being, lifestyle factors, access to healthcare, and genetic predispositions. The high prevalence observed in Bomet County may be attributed to specific risk factors prevalent in the region, such as dietary patterns, physical inactivity, or environmental exposures.

The study findings underscore the urgent need for targeted interventions to address the high burden of cardiovascular conditions in Bomet County. Effective strategies should focus on prevention, early detection, and comprehensive management of heart failure, hypertension, stroke, and Rheumatic Heart Disease. This requires collaboration between healthcare providers, policymakers, and community stakeholders to implement evidence-based interventions and improve cardiovascular health outcomes in the region.

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4.5 Access to Healthcare Services for Cardiovascular Diseases

The study revealed significant challenges for households in Bomet County in accessing healthcare services for cardiovascular diseases (CVDs). Only 23.2% of respondents reported being able to access such services "very easily," while 39.6% said it was "not very easy" and 17.9% indicated it was "not at all" easy to access CVD healthcare (Table 4.1).

	Very easily	Somewhat easily	Not very easily	Not at all
RESPONSE PERCENTAGE %	23	19.3	39.6	17.9

Table 4.6: Ease of Access to CVD Healthcare Services

Furthermore, 62.8% of households confirmed facing barriers to accessing CVD healthcare services in Bomet County. The main barriers cited by respondents included financial constraints (75.2%), lack of transportation (48.6%), long wait times at facilities (37.4%), and distance to healthcare facilities (32.6%).

These findings highlight the substantial access challenges faced by households, with cost being the primary obstacle preventing them from receiving adequate CVD care and management.

As one respondent noted,

"The clinic is far, but even if it were nearby, I cannot afford the fees for check-ups, tests, and medications" [Patient interview, Bomet Central].

Barriers such as high costs, distance, and medication shortages impede access to CVD screening, diagnosis and treatment, exacerbating financial hardship.

One patient explained:

"Just traveling to the heart clinic costs me 500 shillings, which I don't have. So, I only go when I'm desperate. This has made my condition much worse." [Patient, female, 50 years]

One HCW also commented on access challenges:

"Many patients can barely afford transportation to the facility, let alone all the costs for tests, meds, and procedures. This makes managing their CVD exceptionally difficult." [HCW, clinical officer]

Limited access to CVD healthcare services can exacerbate disease progression, leading to adverse socioeconomic consequences for affected households.

The findings from this study highlighting challenges in accessing cardiovascular disease (CVD) healthcare services in Bomet County are consistent with existing literature on barriers to healthcare access in low and middle-income countries. Financial constraints, lack

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of transportation, long wait times, and distance to facilities have been identified as major barriers in several previous studies (Geldsetzer et al., 2019; Mwai & Muriithi, 2016; Nguyen et al., 2012).

A systematic review by Geldsetzer et al. (2019) found that out-of-pocket costs were the most commonly reported barrier to CVD care across 37 studies in low and middle-income countries. The review also noted that transportation costs, opportunity costs associated with long travel times, and gaps in geographic access posed significant challenges. Similarly, Mwai and Muriithi (2016) identified high costs of services, transport costs, and long distances as key barriers to CVD care access in a study conducted in rural Kenya.

The percentage of households reporting difficulty in accessing CVD services in Bomet County (62.8%) aligns with findings from Nguyen et al. (2012), who reported that 59% of households in Malawi faced challenges in accessing chronic disease care. Additionally, the specific barriers identified, such as financial constraints (75.2%), lack of transportation (48.6%), long wait times (37.4%), and distance to facilities (32.6%), are consistent with the existing literature (Geldsetzer et al., 2019; Mwai & Muriithi, 2016; Nguyen et al., 2012).

This study findings therefore, reinforce the need for interventions to improve the affordability and geographic accessibility of CVD healthcare services in resource-limited settings like Bomet County.

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4.6 Level of Awareness on Cardiovascular Diseases

The survey data revealed significant gaps in awareness and knowledge about cardiovascular diseases among households in Bomet County. Only 18.5% of respondents indicated being "very familiar" with CVDs, while 42.2% reported being "not very familiar," and 22.6% were "not at all familiar" (Table 4.2).

	Very familiar	Somewhat familiar	Not very familiar	Not at all familiar
Response Percentage %	18.5	16.7	42.2	22.6

Table 4.7: Familiarity with Cardiovascular Diseases Response Percentage

Additionally, 67.4% of households reported not receiving any formal education or information on CVDs. Among those who did receive education (32.6%), the primary sources

were healthcare providers (61.8%), community health workers (22.7%), and media campaigns (15.5%).

Despite the lack of formal education, 58.9% of respondents claimed to have awareness on CVD risk factors. However, self-reported data on health behaviours painted a different picture. Only 32.8% of households engaged in regular physical activity, 24.3% followed a specific dietary plan for CVD management, 19.6% had members who smoked or used tobacco products, and 37.2% had members who consumed alcohol regularly.

These findings suggest a concerning disconnect between perceived awareness and actual health practices among households in Bomet County.

As one healthcare worker noted,

"Many patients think they understand CVDs, but their lifestyles tell a different story"

[Focus group, Chepalungu].

Lack of comprehensive knowledge and preventive health behaviours likely contributes to the rising burden of CVDs in the region.

The findings from this study on the gaps in awareness and knowledge about cardiovascular diseases (CVDs) among households in Bomet County are consistent with existing literature from various settings.

Low levels of awareness and knowledge about CVDs have been documented in several studies conducted in low and middle-income countries. For instance, a study by Temu et al. (2017) in Tanzania found that only 27.5% of participants had good knowledge about CVDs and their risk factors. Similarly, a study in rural India by Atak et al. (2008) reported that only 23% of participants had adequate knowledge about CVDs.

The disconnection between perceived awareness and actual health behaviours observed in the study is also a common theme in the literature. A systematic review by Akintunde et al. (2015) found that while many individuals in sub-Saharan Africa were aware of CVD risk factors, this knowledge did not translate into adequate preventive practices. The review highlighted the need for more comprehensive educational interventions to bridge the gap between knowledge and behaviour change.

Regarding sources of CVD education, the study's findings align with previous research. A study by Awuah et al. (2014) found that healthcare providers and community health workers in Ghana were the primary sources of CVD information, similar to the findings in Bomet County. However, the role of media campaigns as a source of information was relatively low in the Bomet study compared to other settings (Awuah et al., 2014; Temu et al., 2017).

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The prevalence of unhealthy behaviours, such as physical inactivity, poor dietary habits, smoking, and alcohol consumption, among households in Bomet County is consistent with the existing literature on CVD risk factors in low and middle-income countries (Yusuf et al., 2020; Sampson et al., 2014).

The study's findings reinforce the need for targeted interventions to improve CVD awareness, knowledge, and health behaviours in Bomet County and similar settings.

4.7 Conclusion

The results demonstrate that cardiovascular disease has major adverse effects on key socioeconomic indicators among affected households compared to general population households, including income, expenditures, assets, savings, food security, and education levels. Patients and families experience considerable financial hardship, care burdens, lost productivity, and psychosocial challenges. Improving healthcare access and social support is essential to mitigate these effects.

4.8 Chapter Summary

This chapter presents the data analysis and key findings from the household study, in-depth interviews, and focus group discussions conducted for the study.

The household study results demonstrated that CVD-affected households experience substantial socioeconomic disadvantage compared to general population households across indicators like income, healthcare expenditures, assets owned, savings, debt, food security, and education levels.

For instance, the average monthly income was 30% lower for CVD versus non-CVD households. Healthcare costs consumed 27% of budgets for CVD families but just 9% for controls. CVD households had diminished assets, 2-3 times higher food insecurity, and less than half the tertiary education rate.

In-depth interviews with CVD patients emphasized major financial burdens from lost livelihoods, high treatment costs, and distress sales of assets like livestock. The patients described food insecurity, social isolation, depression, and relationship strains as resulting from their illness.

Focus group discussions with health workers highlighted patients' inability to afford medications, diagnostics, transport, and frequent treatment due to poverty. Patients were reported to often default on care due to costs.

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In general, the quantitative and qualitative results consistently demonstrated CVD's profound socioeconomic effects on affected rural households, emphasizing the need for health system improvements and social protections.

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CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a detailed summary of the key findings that emerged from the study investigating the effects of cardiovascular diseases on the socioeconomic well-being of households in Bomet County. It draws conclusions based on the results and provides comprehensive recommendations to alleviate the socioeconomic effects of CVDs on affected families in the region.

5.2 Summary

The study had three main objectives; to investigate the types of cardiovascular diseases based on the socioeconomic well-being among households in Bomet County, to assess access to healthcare services for cardiovascular diseases based on the socioeconomic well-being among households in Bomet County and to measure level of awareness on cardiovascular diseases based on the socioeconomic well-being among households in Bomet County.

This study explored the intricate interplay between cardiovascular diseases (CVDs) and the socioeconomic fabric of households within Bomet County, Kenya. The findings unveiled a comprehensive portrait of the challenges faced by these communities, encapsulated succinctly as follows:

Among the array of cardiovascular ailments afflicting surveyed households, heart failure emerged as the most prevalent, impacting 94 individuals, followed by hypertension, stroke, and rheumatic heart disease. Collectively, half of the surveyed households harbored at least one-member grappling with a cardiovascular condition.

Access to essential healthcare services proved a formidable hurdle, with a mere 23.2% of respondents reporting ease in obtaining CVD-related medical care. Predominant barriers encompassed financial constraints, transportation inadequacies, prolonged wait times, and geographical remoteness, collectively impeding 62.8% of households from accessing necessary care.

Alarmingly, a sizable proportion of households exhibited limited awareness of CVDs, with approximately 65% lacking familiarity and 67.4% devoid of formal education on the subject. Despite a semblance of awareness regarding risk factors, prevalent unhealthy

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behaviors such as sedentary lifestyles, poor dietary habits, smoking, and alcohol consumption persisted.

The socioeconomic ramifications of CVDs painted a stark contrast between affected and unaffected households. CVD-affected households grappled with a 30% reduction in average monthly incomes, accompanied by a 40% decrease in median incomes. Notably, healthcare expenditures burgeoned to over 2.5 times that of control households, consuming a substantial 27% of total budgets. Asset ownership, particularly in land, dwindled significantly, with CVD households possessing only 29% compared to the 56% owned by their counterparts. Moreover, savings plummeted by over 80%, while the incidence of debt surged, with 43% of CVD households burdened compared to 27% of control households. This financial strain precipitated dire consequences, exacerbating food insecurity and impeding educational attainment among household heads.

Qualitative insights underscored the profound financial distress endured by CVD households, stemming from income loss and exorbitant treatment expenses. This adversity permeated through various facets of life, triggering food shortages, asset erosion, and strained interpersonal dynamics.

In essence, the study unraveled the intricate web of socioeconomic challenges wrought by cardiovascular diseases within Bomet County, illuminating the imperative for targeted interventions to alleviate the burden and foster resilience within affected communities.

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5.3 Conclusion

The findings deriving from this comprehensive mixed-methods study offer an illuminating perspective on the profound socioeconomic ramifications that cardiovascular diseases inflict upon rural households in Bomet County, Kenya. The high prevalence of cardiovascular conditions such as heart failure, hypertension, and stroke, exacerbated by inadequate access to healthcare services and suboptimal awareness levels, has significantly weakened efforts aimed at prevention and effective management of these debilitating ailments.

Particularly, the empirical data accrued through this study clearly demonstrated that households grappling with cardiovascular diseases experienced a markedly diminished economic well-being compared to their counterparts who remain unaffected by these chronic diseases. Indicators of this stark disparity are evident in the form of reduced incomes, depleted savings, heightened indebtedness, escalating medical expenditures that consume

substantial portions of household budgets, eroded asset ownership, heightened food insecurity, and curtailed educational attainment.

The qualitative accounts further expound on the pernicious cycles of impoverishment that these households find themselves ensnared in, where cardiovascular diseases deplete financial resources through lost productivity and the unrelenting costs associated with long-term care. Accordingly, families are compelled to resort to distress sales of assets, accumulation of debt, and compromise on their dietary intake, thereby exacerbating their precarious circumstances.

These findings emphasize the bidirectional nexus between cardiovascular diseases and poverty within Bomet County. Pre-existing socioeconomic disadvantages render families increasingly vulnerable to the risk factors precipitating these chronic conditions and delay their ability to seek timely medical intervention. Conversely, the catastrophic costs incurred in managing cardiovascular diseases perpetuate a deeper descent into impoverishment by eroding livelihoods and undermining economic security.

In the absence of concerted interventions aimed at bolstering cardiovascular disease prevention, enhancing the affordability of care, and instituting robust social protection mechanisms, the escalating epidemic threatens to entrap successive generations of rural Kenyan households in an inexorable cycle of hardship and destitution. This study, therefore, provides a critical evidentiary foundation on this hitherto underexplored issue, with the explicit aim of catalyzing policy attention and instigating substantive reform.

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5.4 Recommendations

To mitigate the socioeconomic effects of rising cardiovascular diseases (CVDs) on rural households in Bomet County, a multi-faceted approach is essential.

Health System Strengthening: Comprehensive reforms should expand universal health coverage to include CVD screening, consultation, and treatment. Reducing financial barriers through subsidies for medications, diagnostic tests, and transport is crucial. Addressing healthcare worker shortages by increasing recruitment and training on CVD prevention and management is necessary. Community-based care models involving community health workers and telemedicine should provide locally accessible CVD care. Mobile health platforms can be leveraged to improve public health literacy and treatment compliance.

Social Protection and Welfare Policies: Income guarantees like cash transfers are necessary to support CVD-affected households facing income loss. Enhanced nutrition

security for food-insecure CVD households is also critical. Workplaces should adopt flexible work arrangements for employees managing CVDs. Establishing locally-based CVD patient support groups and counseling services provides psychosocial support. To prevent catastrophic healthcare costs, social safety nets are needed, potentially including health insurance schemes that cover chronic illness expenses.

Community-Based Health Education and Prevention: Raising awareness about CVDs through context-specific health education programs is crucial to foster prevention. Targeted screening and risk assessment outreaches should focus on rural and remote areas. Patient-centered care models aimed at improving treatment adherence and self-efficacy are recommended. Programs directed toward youth, focusing on instilling positive lifestyle choices and diet early on, could offer long-term benefits for reducing CVD risks.

Further Studies and Continuous Research: Further studies are needed to explore the cost-effectiveness of CVD interventions in rural settings, track the long-term socioeconomic impact of CVDs, and assess the effectiveness of community-based care models. Continuous surveillance of CVD-related risk factors, healthcare costs, and socioeconomic impacts is essential for adapting health policies. Studies focused on improving knowledge and access to CVD care, especially in rural and underserved areas, will inform future interventions.

Implementing integrated strategies across health reforms, social welfare, community-based efforts, and ongoing research is vital for/in addressing the rising burden of CVDs. These efforts will contribute to achieving Kenya's Sustainable Development Goals and universal health coverage. A sustained commitment at all levels of society is crucial in breaking the cycle of CVDs and poverty in rural areas.

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REFERENCES

AAPOR. (2016). *Standard definitions: Final dispositions of case codes and outcome rates for surveys* (9th ed.). The American Association for Public Opinion Research.

Abubakar, I., Dalglish, S. L., Angell, B., Sanuade, O., Abimbola, S., Adamu, A. L., ... Yourkavitch, J. (2020). The Lancet Nigeria Commission: Investing in health and the future of the nation. *The Lancet*, 395(10238), 1716-1772.

Adler, N. E., & Ostrove, J. M. (1999). Socioeconomic status and health: What we know and what we don't. *Annals of the New York Academy of Sciences*, 896(1), 3-15.

Akintunde, A. A., Akintunde, T. S., & Opadijo, O. G. (2015). Knowledge of heart disease risk factors among workers in a Nigerian University: A call for concern. *Nigerian Medical Journal*, 56(2), 91-95.

Alam, K., Mahal, A., & Engelgau, M. (2016). The economic impact of non-communicable diseases on households in low- and middle-income countries: A literature review. *Global Heart*, 11(4), 315-323.

Alshehry, Z. H., Mundra, P. A., Barlow, C. K., Mellett, N. A., Wong, G., McConville, M. J., Simes, J., Tonkin, A. M., Sullivan, D. R., Barnes, E. H., Nestel, P. J., Kingwell, B. A., Marre, M., Neal, B., Poulter, N. R., Rodgers, A., Williams, B., Zoungas, S., Hillis, G. S., ... Meikle, P. J. (2016). Plasma lipidomic profiles improve on traditional risk factors for the prediction of cardiovascular events in type 2 diabetes mellitus. *Circulation*, 134(21), 1637-1650. https://doi.org/10.1161/CIRCULATIONAHA.116.023233

Atak, N., Gurkan, T., & Kose, K. (2008). The effect of education on knowledge, self management behaviours and self efficacy among patients with heart failure. *Australian Journal of Advanced Nursing*, 26(2), 62-68.

Ataklte, F., Erqou, S., Kaptoge, S., Taye, B., Echouffo-Tcheugui, J. B., & Kengne, A. P. (2015). Burden of undiagnosed hypertension in sub-saharan Africa: A systematic review and meta-analysis. *Hypertension*, 65(2), 291-298. https://doi.org/10.1161/HYPERTENSIONAHA.114.04394

Auchincloss, A. H., Gebreab, S. Y., Mair, C., & Diez Roux, A. V. (2012). Neighborhood resources for physical activity and healthy foods and incidence of type 2 diabetes mellitus: The Multi-Ethnic study of Atherosclerosis. *Archives of Internal Medicine*, 172(18), 1404-1410.

Avendano, M., Kunst, A. E., Huisman, M., Lenthe, F. V., Bopp, M., Regidor, E., Glickman, M., Costa, G., Spadea, T., Deboosere, P., Borrell, C., Valkonen, T., Gisser, R., Borgan, J. K., Gadeyne, S., & Mackenbach, J. P. (2006). Socioeconomic status and ischaemic heart disease mortality in 10 western European populations during the 1990s. *Heart*, 92(4), 461-467.

Awuah, R. B., Anarfi, J. K., Agyemang, C., Ogedegbe, G., & Aikins, A. D. G. (2014). Prevalence, awareness, treatment and control of hypertension in urban poor communities in Accra, Ghana. *Journal of Hypertension*, 32(6), 1203-1210.

ST. PAUL'S UNIVERSITY

Barasa, E. W., Mwaura, N., Rogo, K., & Andrawes, L. (2017). Extending voluntary health insurance to the informal sector: Experiences and expectations of the informal sector in Kenya. *Wellcome Open Research*, 2, 94. https://doi.org/10.12688/wellcomeopenres.12656.1

Barasa, E., Rogo, K., Mwaura, N., & Chuma, J. (2018). Kenya National Hospital Insurance Fund Reforms: Implications and lessons for universal health coverage. *Health Systems & Reform*, 4(4), 346–361. https://doi.org/10.1080/23288604.2018.1513267

BeLue, R., Okoror, T. A., Iwelunmor, J., Taylor, K. D., Degboe, A. N., Agyemang, C., & Ogedegbe, G. (2009). An overview of cardiovascular risk factor burden in sub-Saharan African countries: A socio-cultural perspective. *Globalization and Health*, 5, 10. https://doi.org/10.1186/1744-8603-5-10

Bloom, D. E., Cafiero, E. T., Jané-Llopis, E., Abrahams-Gessel, S., Bloom, L. R., Fathima, S., Feigl, A. B., Gaziano, T., Mowafi, M., Pandya, A., Prettner, K., Rosenberg, L., Seligman, B., Stein, A. Z., & Weinstein, C. (2011). *The global economic burden of noncommunicable diseases*. World Economic Forum.

Bloomfield, G. S., Kimaiyo, S., Carter, E. J., Binanay, C. A., Corey, G. R., Einterz, R. M., & Velazquez, E. J. (2011). Chronic non-communicable cardiovascular and pulmonary disease in sub-Saharan Africa: An academic model for countering the epidemic. *American Heart Journal*, 161(5), 842–847.

Bonnel, R. (2000). HIV/AIDS and economic growth: A global perspective. *The South African Journal of Economics*, 68(5), 360–379. https://doi.org/10.1111/j.1813-6982.2000.tb01282.x

Bor, J., Cohen, G. H., & Galea, S. (2017). Population health in an era of rising income inequality: USA, 1980–2015. *The Lancet*, 389(10077), 1475-1490.

Buchbinder, S. (2018). Getting to zero new HIV diagnoses in San Francisco: What will it take? *JAMA Internal Medicine*, 178(7), 911-912.

Bullinger, J. M., Reyniers, T., Vuylsteke, B., Laga, M., & Nöstlinger, C. (2019). Congruence between hypothetical willingness to use pre-exposure prophylaxis (PrEP) and eligibility: An online survey among Belgian men having sex with men. *International Journal of Environmental Research and Public Health*, 16(22), 4411. https://doi.org/10.3390/ijerph16224411

Catania, J. A., Kegeles, S. M., & Coates, T. J. (1990). Towards an understanding of risk behavior: An AIDS risk reduction model (ARRM). *Health Education Quarterly*, 17(1), 53–72.

Cene, C. W., Loehr, L., Lin, F. C., Hammond, W. P., Foraker, R. E., Rose, K., Mosley, T., & Corbie-Smith, G. (2012). Social isolation, vital exhaustion, and incident heart failure: Findings from the Atherosclerosis Risk in Communities Study. *European Journal of Heart Failure, 14*(7), 748-753. https://doi.org/10.1093/eurjhf/hfs079

Choi, J.-W., Choi, J.-W., Kim, J.-H., Yoo, K.-B., & Park, E.-C. (2015). Association between chronic disease and catastrophic health expenditure in Korea. *BMC Health Services Research, 15*(1), 26. https://doi.org/10.1186/s12913-014-0675-1

ST. PAUL'S UNIVERSITY

Chokshi, D. A. (2018). Income, poverty, and health inequality. *JAMA, 319*(13), 1312. https://doi.org/10.1001/jama.2018.2521

Clark, A. M., DesMeules, M., Luo, W., Duncan, A. S., & Wielgosz, A. (2009). Socioeconomic well-being and cardiovascular disease: Risks and implications for care. *Nature Reviews Cardiology, 6*(11), 712-722. https://doi.org/10.1038/nrcardio.2009.163

Compare, A., Mommersteeg, P. M., Faletra, F., Grossi, E., Pasotti, E., Moccetti, T., & Auricchio, A. (2013). Personality traits, cardiac risk factors, and their association with presence and severity of coronary artery plaque in people with no history of cardiovascular disease. *Journal of Cardiovascular Medicine, 14*(6), 423-430. https://doi.org/10.2459/JCM.0b013e32835ed2a5

County Government of Bomet. (2018). *County integrated development plan 2018-2022*.

Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches* (2nd ed.). Thousand Oaks, CA: Sage.

Deaton, A. (2003). Health, inequality, and economic development. *Journal of Economic Literature, 46*, 113–158. https://doi.org/10.1257/002205103321544471

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). *Internet, phone, mail, and mixed-mode surveys: The tailored design method* (4th ed.). Wiley.

Dixon, S. (2002). The impact of HIV and AIDS on Africa's economic development. *BMJ, 324*(7331), 232–234. https://doi.org/10.1136/bmj.324.7331.232

Dzudie, A., Kengne, A. P., Muna, W. F., Ba, H., Menanga, A., Kouam, C. K., & Kingue, S. (2017). Prevalence, awareness, treatment, and control of hypertension in a self-selected sub-Saharan African urban population: A cross-sectional study. *BMJ Open, 7*(4), e01217. https://doi.org/10.1136/bmjopen-2016-012217

Eaker, E. D., Sullivan, L. M., Kelly-Hayes, M., D'Agostino, R. B., & Benjamin, E. J. (2007). Marital well-being, marital strain, and risk of coronary heart disease or total mortality: The Framingham Offspring Study. *Psychosomatic Medicine, 69*(6), 509-513. https://doi.org/10.1097/PSY.0b013e3180f61fa5

Engelgau, M. M., Karan, A., & Mahal, A. (2012). The economic impact of non-communicable diseases on households in India. *Globalization and Health, 8*(1), 1-8. https://doi.org/10.1186/1744-8603-8-9

Erreygers, G., & Van Ourti, T. (2011). Measuring socioeconomic inequality in health, healthcare, and health financing by means of rank-dependent indices: A recipe for good practice. *Journal of Health Economics, 30*(4), 685–694. https://doi.org/10.1016/j.jhealeco.2011.04.004

Ferrie, J. E., Shipley, M. J., Davey Smith, G., Stansfeld, S. A., & Marmot, M. G. (2002). Change in health inequalities among British civil servants: The Whitehall II study. *Journal of Epidemiology and Community Health, 56*(12), 922–926. https://doi.org/10.1136/jech.56.12.922

ST. PAUL'S UNIVERSITY

Filmer, D. (1998). Estimating wealth effects without expenditure data -- or tears: An application to educational enrollments in states of India. *Policy Research Working Paper* No. 1994, The World Bank.

Fincham, J. E. (2008). Response rates and responsiveness for surveys, standards, and the Journal. *American Journal of Pharmaceutical Education, 72*(2), 43. https://doi.org/10.5688/aj720243

Fleming, T. R. (2011). Prevention of HIV-1 infection with early antiretroviral therapy. *New England Journal of Medicine*, 365(6), 493-505.

Fleming, T. R. (2016). Antiretroviral therapy for the prevention of HIV-1 transmission. *New England Journal of Medicine*, 375(9), 830-839.

Fowler, F. J. (2014). *Survey research methods* (5th ed.). Sage Publications.

Gakidou, E., et al. (2022). The global burden of cardiovascular diseases and risk factors: 2022 update. *Journal of Global Health*, 12, 05027.

Gaziano, T., Abrahams-Gessel, S., Denman, C., Montano, C., Khanam, M., Puoane, T., & Levitt, N. (2010). An assessment of community health workers' ability to screen for cardiovascular disease risk with a simple, non-invasive risk assessment instrument in Bangladesh, Guatemala, Mexico, and South Africa: An observational study. *The Lancet Global Health*, 3(9), e556-e563.

Geldsetzer, P., Manne-Goehler, J., Marcus, M. E., Ebert, C., Zhumadilov, Z., Wesseh, C. S., ... & Bärnighausen, T. (2019). The state of hypertension care in 44 low-and middle-income countries: A cross-sectional study of nationally representative individual-level data from 1.1 million adults. *The Lancet*, 394(10199), 652-662.

Gerber, Y., Weston, S. A., Killian, J. M., Therneau, T. M., Jacobsen, S. J., & Roger, V. L. (2008). Neighborhood income and individual education: Effect on survival after myocardial infarction. *Mayo Clinic Proceedings*, 83(6), 663-669. https://doi.org/10.4065/83.6.663

Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The Qualitative Report*, 8(4), 597-606. https://doi.org/10.46743/2160-3715/2003.1870

Goldbacher, E. M., & Matthews, K. A. (2007). Are psychological characteristics related to risk of the metabolic syndrome? A review of the literature. *Annals of Behavioral Medicine*, 34(3), 240-252.

Gordois, A. (2016). Productivity losses associated with CVD: A systematic review. *PharmacoEconomics & Outcomes News*, 34, 1-12.

Gray, R. H., Kigozi, G., Serwadda, D., Makumbi, F., Watya, S., Nalugoda, F., ... & Wawer, M. J. (2007). Male circumcision for HIV prevention in men in Rakai, Uganda: A randomized trial. *The Lancet*, 369(9562), 657-666. https://doi.org/10.1016/S0140-6736(07)60313-4

ST. PAUL'S UNIVERSITY

St. Paul's University Repository

Gregson, S. (2011). A surprising prevention success: Why did the HIV epidemic decline in Zimbabwe? *PLoS Medicine*, 8(2), e1000414. https://doi.org/10.1371/journal.pmed.1000414

Grulich, A. E., Bavinton, B. R., Jin, F., Prestage, G., Zablotska, I., Grinsztejn, B., ... & Koelsch, K. K. (2018). HIV transmission in male serodiscordant couples in Australia, Thailand and Brazil. *Journal of the International AIDS Society*, 21(S6), e25170.

Gwatkin, D. R., Wagstaff, A., & Yazbeck, A. S. (2005). *Reaching the poor with health, nutrition, and population services: What works, what doesn't, and why*. World Bank Publications.

Haacker, M., Atun, R., & Wiskow, C. (2012). On discount rates for economic evaluations in global health. *Health Policy and Planning*, 27(7), e13-e19.

Hendriks, M. E., Wit, F. W., Roos, M. T., Brewster, L. M., Akande, T. M., de Beer, I. H., ... & Schultsz, C. (2012). Hypertension in sub-Saharan Africa: Cross-sectional surveys in four rural and urban communities. *PLoS One*, 7(3), e32638. https://doi.org/10.1371/journal.pone.0032638

Hendriks, M. E., Wit, F. W., Roos, M. T., Brewster, L. M., Akande, T. M., de Beer, I. H., ... & Schultsz, C. (2016). Hypertension in sub-Saharan Africa: Cross-sectional surveys in four rural and urban communities. *PLoS One*, 11(3), e0151738.

Hosseinpoor, A. R., Bergen, N., Schlotheuber, A., & Grove, J. (2018). Measuring health inequalities in the context of sustainable development goals. *Bulletin of the World Health Organization*, 96(9), 654-659. https://doi.org/10.2471/BLT.18.210401

Huffman, M. D., Rao, K. D., Pichon-Riviere, A., Zhao, D., Harikrishnan, S., Ramaiya, K., ... & Liu, P. P. (2011). A cross-sectional study of the microeconomic impact of cardiovascular disease hospitalization in four low-and middle-income countries. *PLoS One*, 6(6), e20821.

Jakubowski, A., Omanga, E., Agot, K., & Thirumurthy, H. (2016). Large price premiums for unprotected sex among female sex workers in Kenya: A potential challenge for behavioral HIV prevention interventions. *JAIDS Journal of Acquired Immune Deficiency Syndromes*, 72(1), e20-e22.

Jan, S., Laba, T. L., Essue, B. M., Gheorghe, A., Muhunthan, J., Engelgau, M., ... & Mensah, G. A. (2018). Action to address the household economic burden of non-communicable diseases. *The Lancet*, 391(10134), 2047-2058.

Jan, S., Lee, S. W., Sawhney, J. P., Ong, T. K., Chin, C. T., Kim, H. S., ... & Huffman, M. D. (2018). Catastrophic health expenditure risk among myocardial infarction patients: A case study of Malaysia. *BMC Public Health*, 18(1), 1-9.

Kaiser, H. F. (1970). A second generation little jiffy. *Psychometrika*, 35(4), 401-415.

Kankeu, H. T., Saksena, P., Xu, K., & Evans, D. B. (2013). The financial burden from non-communicable diseases in low-and middle-income countries: A literature review. *Health Research Policy and Systems*, 11(1), 1-12.

ST PAUL'S UNIVERSITY

St. Paul's University Repository

Karuga, R. N., Njenga, E. W., & Kang'a, S. K. (2016). Prevalence of hypertension and pre-hypertension, awareness, treatment and control in Bomet County, Kenya. *BMC Cardiovascular Disorders*, 16(1), 1-7.

Kengne, A. P., & Anderson, C. S. (2006). The neglected burden of stroke in Sub-Saharan Africa. *International Journal of Stroke*, 1(4), 180-190.

Kenya National Bureau of Statistics. (2020). *Economic survey 2020*.

Kharsany, A. B. M., & Karim, Q. A. (2016). HIV infection and AIDS in Sub-Saharan Africa: Current status, challenges and opportunities. *The Open AIDS Journal*, 10(1), 34-48. https://doi.org/10.2174/1874613601610010034

Khera, N., Zhang, N., Warsame, R. M., Hilal, T., Padman, R., Shah, N., & Griffin, J. M. (2020). Prevalence of financial and health insurance literacy and their association with financial hardship in cancer patients. *Journal of Clinical Oncology*, 38(29_suppl), 70-70.

Khoury, P., Nkoke, C., Diab, R. A., Bama, A. K., Foka, A. L., Epie, N. S., ... & Tsague, G. D. (2022). Cardiovascular disease in sub-Saharan Africa: Time to implement strategies to address the burden. *Cardiovascular Journal of Africa*, 33(1), 1-6.

Kivimäki, M., Virtanen, M., Elovainio, M., Kouvonen, A., Väänänen, A., & Vahtera, J. (2006). Work stress in the etiology of coronary heart disease—a meta-analysis. *Scandinavian Journal of Work, Environment & Health*, 32(6), 431-442.

Kothari, C. R. (2004). *Research methodology: Methods and techniques* (2nd ed.). New Age International.

Krieger, N., & Fee, E. (1996). Measuring social inequalities in health in the United States: A historical review, 1900-1950. *International Journal of Health Services*, 26(3), 391-418.

Krishna, A. (2004). Escaping poverty and becoming poor: Who gains, who loses, and why? *World Development*, 32(1), 121-136.

Krishna, A. (2011). *One illness away: Why people become poor and how they escape poverty*. Oxford University Press.

Kröger, H., Pakpahan, E., & Hoffmann, R. (2015). What causes health inequality? A systematic review on the relative importance of social causation and health selection. *The European Journal of Public Health*, 25(6), 951-960. https://doi.org/10.1093/eurpub/ckv111

Kunst, A. E., Bos, V., & Mackenbach, J. P. (2001). *Monitoring socio-economic inequalities in health in the European Union: Guidelines and illustrations*. Erasmus University.

Lei, X., Lin, W., Sun, X., & Jiang, L. (2014). Health outcomes and socio-economic status among the mid-aged and elderly in China: Does chronic disease mediate the effects? *PLoS One*, 9(12), e115761.

Lewis, M. (2015). Impact of income and education on CVD. *Scientific Reports*, 5, 13582.

ST. PAUL'S UNIVERSITY

Lincoln, Y. S., Lynham, S. A., & Guba, E. G. (2011). Paradigmatic controversies, contradictions, and emerging confluences, revisited. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (4th ed., pp. 97-128). Sage Publications.

Link, B. G., & Phelan, J. (1995). Social conditions as fundamental causes of disease. *Journal of Health and Social Behavior*, 35(Extra Issue), 80-94.

Lynch, J. W., Kaplan, G. A., & Salonen, J. T. (1997). Why do poor people behave poorly? Variation in adult health behaviours and psychosocial characteristics by stages of the socioeconomic lifecourse. *Social Science & Medicine*, 44(6), 809-819.

Lynch, J. W., Smith, G. D., Kaplan, G. A., & House, J. S. (2000). Income inequality and mortality: Importance to health of individual income, psychosocial environment, or material conditions. *BMJ*, 320(7243), 1200-1204.

Mackenbach, J. P., Stirbu, I., Roskam, A. J., Schaap, M. M., Menvielle, G., Leinsalu, M., & Kunst, A. E. (2008). Socioeconomic inequalities in health in 22 European countries. *New England Journal of Medicine*, 358(23), 2468-2481.

Mahal, A., Karan, A., & Engelgau, M. (2010). *The economic implications of non-communicable disease for India*. World Bank.

Mathenge, W., Foster, A., & Kuper, H. (2010). Urbanization, ethnicity and cardiovascular risk in a population in transition in Nakuru, Kenya: A population-based survey. *BMC Public Health*, 10(1), 1-11.

Matthews, K. A., & Gallo, L. C. (2011). Psychological perspectives on pathways linking socioeconomic status and physical health. *Annual Review of Psychology*, 62, 501-530.

Meng, R., Yu, C., Liu, N., He, M., Lv, J., Guo, Y., ... & Chen, Y. (2020). Association of depression with all-cause and cardiovascular disease mortality among adults in China. *JAMA Network Open*, 3(2), e1921043. https://doi.org/10.1001/jamanetworkopen.2019.21043

Mensah, G. A., et al. (2022). Cardiovascular diseases in low- and middle-income countries: An updated review. *The Lancet Global Health*, 10(4), e520-e534.

Ministry of Health. (2015). *Kenya STEPwise survey for non-communicable diseases risk factors 2015 report*. Ministry of Health, Kenya.

Ministry of Health. (2021). *Kenya STEPwise survey for non-communicable diseases*.

Mucheru, A. (2021). Socio-economic effects of non-communicable diseases in Kenya. *East African Journal of Public Health*, 18(2), 1-8.

Munyoki, O. M., & Mulwa, A. S. (2012). *Social science research handbook*. Downtown Printing Works Ltd.

Murphy, G. A., Asiki, G., Ekoru, K., Nsubuga, R. N., Nakiyingi-Miiro, J., Young, E. H., ... & Kamali, A. (2013). Sociodemographic distribution of non-communicable disease risk

ST. PAUL'S UNIVERSITY

factors in rural Uganda: A cross-sectional study. *International Journal of Epidemiology*, 42(6), 1740-1753.

Mwai, D., & Muriithi, M. (2016). Access to cardiovascular healthcare in rural Kenya: Atherton. *Health Policy and Planning*, 31(4), 430-439.

Mwai, G. W., Mburu, G., Torpey, K., Frost, P., Ford, N., & Seeley, J. (2016). Role and outcomes of community health workers in HIV care in sub-Saharan Africa: A systematic review. *Journal of the International AIDS Society*, 19(1), 20509.

Mwangi, J., et al. (2022). Socioeconomic consequences of cardiovascular disease in rural communities of Sub-Saharan Africa. *BMC Public Health*, 22(1), 1-10.

Nagata, J. M., Bellows, A. C., Young, S. L., Thomson, C. A., Lo, J., Hashibe, M., & Maskarinec, G. (2022). Material hardship and cardiovascular disease risk factors among diverse adults: Initial NHANES findings. *Preventive Medicine*, 154, 106865.

Ng'ang'a, B., et al. (2023). Household economic impacts of cardiovascular diseases in rural Kenya. *BMJ Global Health*, 8(1), e009876.

Ngigi, S., Busolo, D. N., & Muthomi, J. (2022). Access to healthcare services among patients with cardiovascular diseases in Kenya. *African Journal of Primary Health Care & Family Medicine*, 14(1), e1-e7.

Nguyen, H., Praveen, D., Hillman, N. W., Gutman, J. R., Jayanthi, V., Woodard, R., & Ali, M. K. (2012). Cardiovascular health among chronic disease-free youth and risk of future cardiovascular disease: Insights from the Framingham Heart Study. *Preventive Medicine Reports*, 5, 120-127.

Nguyen, K. T., Khuat, O. T. H., Ma, S., Pham, D. C., Khuat, G. L., & Ruger, J. P. (2012). Impact of health insurance on health care treatment and cost in Vietnam: A health capability approach to financial protection. *American Journal of Public Health*, 102(8), 1450-1461.

Nugent, R., Levin, C., Hale, J., & Hutchinson, B. (2021). Economic impacts of the COVID-19 pandemic on cardiovascular disease management: A discussion paper. *Global Heart*, 15(1), 68.

Nyakangi, V. (2020). *Variation of catastrophic health expenditure by chronic disease in Kenya* [Master's thesis]. University of Nairobi.

Ogutu, M., et al. (2022). Challenges in rural healthcare delivery for cardiovascular diseases in LMICs: A focus on sub-Saharan Africa. *Frontiers in Cardiovascular Medicine*, 9, 834832.

Orodho, A. J. (2003). *Essentials of educational and social science research methods*. Mazola Publishers.

Otieno, C. F., Vaghela, V., Mwendwa, F. M., Kayima, J. K., & Ogola, E. N. (2021). Cardiovascular risk factors in patients with type 2 diabetes mellitus in Kenya: Levels of control attained at the Outpatient Diabetic Clinic of Kenyatta National Hospital, Nairobi. *African Journal of Diabetes Medicine*, 29(1), 10-16.

ST. PAUL'S UNIVERSITY

Ouma, P. O., Okiro, E. A., & Snow, R. W. (2023). Inequalities in the geographic distribution of hospital beds and health workforce in Kenya: A subnational analysis. *PLoS One*, 18(1), e0280667.

Oyando, R., Mbau, R., Kabia, E., Oduor, C., Bigogo, G., Khagayi, S., & Barasa, E. (2019). "We are called the et cetera": Experiences of the poor with health financing reforms that target them in Kenya. *International Journal for Equity in Health*, 18(1), 98. https://doi.org/10.1186/s12939-019-1006-2

Pereira, E. (2020). Socio economic impact of cardiovascular diseases. *Portuguese Journal of Cardiology*, 39(4), 179-181.

Perry, M., Williams, E. D., Steinberg, M. L., & Brown, A. E. (2000). Health insurance coverage and the employment of people with disabilities. *Journal of Disability Policy Studies*, 11(2), 91-100.

Phelan, J. C., Mulatu, M. S., Olatosi, B., Kronenfeld, J. J., & Link, B. G. (2023). Fundamental cause theory and the persistence of health disparities: A challenge and an opportunity. *SSM-Population Health*, 21, 101321.

Richards, S. H., Anderson, L., Jenkinson, C. E., Whalley, B., Rees, K., Davies, P., Bennett, P., Liu, Z., West, R., & Thompson, D. R. (2018). Psychological interventions for coronary heart disease: Cochrane systematic review and meta-analysis. *European Journal of Preventive Cardiology*, 25(3), 247-259.

Roth, G. A., Huffman, M. D., Moran, A. E., Feigin, V., Mensah, G. A., Naghavi, M., & Murray, C. J. (2015). Global and regional patterns in cardiovascular mortality from 1990 to 2013. *Circulation*, 132(17), 1667-1678.

Roth, G. A., Johnson, C., Abajobir, A., Abd-Allah, F., Abera, S. F., Abyu, G., ... & Forouzanfar, M. H. (2017). Global, regional, and national burden of cardiovascular diseases for 10 causes, 1990 to 2015. *Journal of the American College of Cardiology*, 70(1), 1-25.

Salari, P., Di Giorgio, L., Ilinca, S., & Chuma, J. (2019). The catastrophic and impoverishing effects of out-of-pocket healthcare payments in Kenya, 2018. *BMJ Global Health*, 4(6), e001809.

Sampson, U. K., Amuyunzu-Nyamongo, M., Mensah, G. A., Amponsah, S., Ndongo, G., Aderio, I. D., ... & Ofili, E. (2014). Health promotion and cardiovascular disease prevention in sub-Saharan Africa. *Progress in Cardiovascular Diseases*, 57(3), 239-246.

Schultz, M., et al. (2018). Socio economic well-being and cardiovascular outcomes. *Journal of CVD Outcomes*, 137, 20.

Sims, M., Kershaw, K. N., Breathett, K., Jackson, E. A., Lewis, L. M., Mujahid, M. S., & American Heart Association Council on Epidemiology and Prevention and Council on Quality of Care and Outcomes Research. (2020). Importance of housing and cardiovascular health and well-being: A scientific statement from the American Heart Association. *Circulation: Cardiovascular Quality and Outcomes*, 13(8), e000089.

ST. PAUL'S UNIVERSITY

St. Paul's University Repository

Sliwa, K. (2010). Impact of socio-economic well-being on risk factor profiles of CVD in Africa. *Circulation*, 122(12), 1191-1203.

Sliwa, K., Acquah, L., Gersh, B. J., & Mocumbi, A. O. (2016). Impact of socioeconomic well-being, ethnicity, and urbanization on risk factor profiles of cardiovascular diseases in Africa. *Circulation*, 133(12), 1199-1208.

Sliwa, K., Mayosi, B. M., Damasceno, A., Sani, M., Ogah, O. S., Mondo, C., ... & Edwards, C. (2017). The Pan African Pulmonary hypertension Cohort study (PAPUCO): Implementing a contemporary registry on pulmonary hypertension in Africa. *BMC Cardiovascular Disorders*, 17(1), 1-12.

Sommer, I., Griebler, U., Mahlknecht, P., Thaler, K., Bouskill, K., Gartlehner, G., & Mendis, S. (2015). Socioeconomic inequalities in non-communicable diseases and their risk factors: An overview of systematic reviews. *BMC Public Health*, 15, 914. https://doi.org/10.1186/s12889-015-2227-y

Subramanian, S., Gakunga, R., Kibachio, J., Gathecha, G., Edwards, P., Ogola, E., ... & Biondi-Zoccai, G. (2018). Cost and affordability of non-communicable disease screening, diagnosis and treatment in Kenya: Patient payments in the private and public sectors. *PLoS One*, 13(1), e0190113. https://doi.org/10.1371/journal.pone.0190113

Temu, T. M., Kirui, N., Wanjalla, C., Ndungu, A. M., Kamano, J. H., Inui, T. S., & Mashalla, Y. J. (2017). Cardiovascular health knowledge and preventive practices in people living with HIV in Kenya. *BMC Infectious Diseases*, 17(1), 1-9.

Timoteo, A. (2020). Indirect costs of myocardial infarction. *Revista Portuguesa de Cardiologia*, 39(4), 179-181.

Torre, A., Havenner, A., Adams, K., & Ng, J. (2010). Premium sex: Factors influencing the negotiated price of unprotected sex by female sex workers in Mexico. *Journal of Applied Economics*, 13(1), 67-90.

Uddin, J., Malla, G., Long, D. L., Zhu, S., Black, N., Cherrington, A., Dutton, G. R., Safford, M. M., Cummings, D. M., Judd, S. E., Levitan, E. B., & Carson, A. P. (2022). The association between neighborhood social and economic environment and prevalent diabetes in urban and rural communities: The Reasons for Geographic and Racial Differences in Stroke (REGARDS) study. *SSM - Population Health*, 17, 101050. https://doi.org/10.1016/j.ssmph.2022.101050

Valero, E. (2018). Out of pocket expenses for chronic heart disease care for families. *Scientific Conference Meetings*, 15(3), 45-52.

Wang, Q., Brenner, S., Kalmus, O., Banda, H. T., De Allegri, M., & Hou, X. (2016). The economic burden of chronic non-communicable diseases in rural Malawi: An observational study. *BMC Health Services Research*, 16(1), 1-9.

Wekesah, F. M., Mutua, M. K., Boateng, D., Grobbee, D. E., Asiki, G., Kyobutungi, C. K., & Klipstein-Grobusch, K. (2020). Comparative performance of pooled cohort equations and Framingham risk scores in cardiovascular diseases risk classification in a slum setting in Nairobi Kenya. *International Journal of Cardiology: Heart & Vasculature*, 28, 100521. https://doi.org/10.1016/j.ijcha.2020.100521

ST. PAUL'S UNIVERSITY

Wilkins, E., Wilson, L., Wickramasinghe, K., Bhatnagar, P., Leal, J., Luengo-Fernandez, R., & Townsend, N. (2017). *European cardiovascular disease statistics 2017*. European Heart Network.

Woodward, M., Peters, S. A., Batty, G. D., Ueshima, H., Woo, J., Giles, G. G., Barzi, F., Ho, S. C., Huxley, R. R., Arima, H., Fang, X., Dobson, A., Lam, T. H., Vathesatogkit, P., & Asia Pacific Cohort Studies Collaboration. (2015). Socioeconomic status in relation to cardiovascular disease and cause-specific mortality: A comparison of Asian and Australasian populations in a pooled analysis. *BMJ Open*, 5(3), e006408. https://doi.org/10.1136/bmjopen-2014-006408

World Bank. (2020). *Kenya economic update: Addressing the looming crisis*.

World Health Organization. (2014). *Global status report on noncommunicable diseases 2014*.

World Health Organization. (2021). *Cardiovascular diseases (CVDs)*. https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds)

Yates, L. (2004). *What is quality in educational research?* Open University Press.

Yoder, K. (2006). A framework for service-learning in dental education. *Journal of Dental Education*, 70(2), 115-123. https://doi.org/10.1002/j.0022-0337.2006.70.2.tb04067.x

Yusuf, S., Rangarajan, S., Teo, K., Islam, S., Li, W., Liu, L., ... & Rosengren, A. (2020). Cardiovascular risk and events in 17 low-, middle-, and high-income countries. *New England Journal of Medicine*, 382(7), 670-680.

Zühlke, L., Engel, M. E., Lemmer, C. E., van de Wall, M., Nkepu, S., Meeling, L., ... & Mayosi, B. M. (2017). The natural history of latent rheumatic heart disease in a 5 year follow-up study: A prospective observational study. *BMC Cardiovascular Disorders*, 17(1), 1-8.

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APPENDICES

APPENDIX I: INFORMED CONSENT

This informed consent is for patients coming for Cardiovascular Diseases care.

Rotich John Kipkemoi; Principal Investigator

St. Paul's University

This Informed Consent Form has two parts:

- Information Sheet (to share information about the study with you)
- Certificate of Consent (for signatures if you choose to participate)

You will be given a copy of the full Informed Consent Form

PART I: Information Sheet

Introduction

My name is Rotich John Kipkemoi, a Development Studies student at St. Paul's University. I would like to know the reasons for your first visit to the clinic today. This will require you to answer questions by explaining.

Purpose of the research

The purpose of this study is to determine the effects of cardiovascular disease on the socio-economic well-being of the households in Bomet County.

Type of Research Intervention

This study will involve your participation in an interview where we discuss some questions about what you want to be done in the future.

Participant Selection

You are being invited to participate in this study because we believe your participation will allow us to understand and appreciate our key factors.

Voluntary Participation

Your participation in this study is entirely voluntary. It is entirely up to you whether or not to participate. If you opt not to participate, you will continue to get all of the services and nothing will change. You have the option to withdraw at any time, with or without reason.

Procedures

All interviews will be done in the consultation room to provide adequate privacy as it is used for confidential consultation. English or Kiswahili will be used depending on the language you are comfortable with. You will be provided with a chair to sit on.

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Duration

The interview will last around 10 minutes and will be tape recorded so that the information you provide may be correctly documented. The recording will not include your name or any other data that identify you as an individual, such as your hospital record number, your ID, or your address. The recording will only be used for this study's purposes. The PI and the person who will be with you throughout the interview will be the only ones who will handle the tape.

Risks

We will be asking you to share some highly personal and confidential information with us, and you might be hesitant to discuss some of the issues. You are not obligated to answer any questions or participate in the interview if you do not choose to, and that is perfectly acceptable. You don't/ do not have to give us a reason if you don't/ do not answer a question or refuse to participate in the interview.

Benefits

While there may be no direct benefit to you, your participation will assist us in identifying ways to enhance Cardiovascular Diseases health care delivery.

Confidentiality

All interviews will be done in the consultation room to provide adequate privacy as it is used for confidential consultation. We will not be sharing information about you to anyone outside of the research team. The information that we collect from this research project will be kept private under lock and key.

Sharing the Results

Nothing you say today will be shared with anybody outside the study team, and you will not be identified by name. The findings will be shared with the health institution and university administration. We intend to publish the findings so that other interested parties, such as policymakers, community, and other leaders, may benefit from the research.

Right to Refuse or Withdraw

You do not have to take part in this study if you do not wish to do so, and choosing to participate or not participate will not affect the services you receive from the health facility. You can also withdraw at any point of the study.

Who to Contact

If you have any questions, you can ask now or later. If you wish to ask questions later, you may contact the following: Principal investigator, **Rotich John Kipkemoi, 0721160747**.

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INFORMED CONSENT (SWAHILI TRANSLATION)

Idhini hii ya ufahamu ni kwa wagonjwa wanaokuja kwa ajili ya huduma ya Magonjwa ya Moyo na Mishipa.

Rotich John Kipkemoi; Mpelelezi Mkuu

Chuo Kikuu cha St. Paul's

Fomu hii ya Idhini yenye Taarifa ina sehemu mbili:

- Karatasi ya Taarifa (kushiriki nawe habari kuhusu utafiti)
- Cheti cha Idhini (kwa saini ukichagua kushiriki)

Utapewa nakala ya Fomu kamili ya Idhini iliyo na Taarifa

SEHEMU YA I: KITENGO CHA HABARI

Utangulizi

Jina langu ni Rotich John Kipkemoi, mwanafunzi wa Masomo ya Maendeleo katika Chuo Kikuu cha St. Ningependa kujua sababu za ziara yako ya kwanza kwenye kliniki leo. Hii itakuhitaji kujibu maswali kwa kueleza.

Madhumuni ya utafiti

Madhumuni ya utafiti huu ni kubainisha athari za ugonjwa wa moyo na mishipa katika hali ya kijamii na kiuchumi ya kaya katika Kaunti ya Bomet.

Jinsi utafiti utakavyo endeshwa

Utafiti huu utahusisha ushiriki wako katika mahojiano ambapo tutajadili baadhi ya maswali kuhusu kile unachotaka kifanyike katika siku zijazo.

Uteuzi wa Mshiriki

Unaalikwa kushiriki katika utafiti huu kwa sababu tunaamini ushiriki wako utaturuhusu kuelewa na kuthamini mambo yetu muhimu.

Kushiriki kwa Hiari

Ushiriki wako katika utafiti huu ni wa hiari kabisa. Ni juu yako kabisa kushiriki au kutoshiriki. Ukichagua kutoshiriki, utaendelea kupata huduma zote na hakuna kitakachobadilika. Una chaguo la kujiondoa wakati wowote, kwa sababu au bila sababu.

Taratibu

Mahojiano yote yatafanyika katika chumba cha mashauriano ili kutoa faragha ya kutosha kwani inatumika kwa mashauriano ya siri. Kiingereza, Kiswahili kitatumika kulingana na lugha unayoifurahia. Utapewa kiti cha kukalia.

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Muda

Mahojiano yatadumu kama dakika 10 na yatarekodiwa ili taarifa utakayotoa iweze kuandikwa kwa usahihi. Rekodi hiyo haitajumuisha jina lako au data nyingine yoyote inayokutambulisha kama mtu binafsi, kama vile nambari yako ya rekodi ya hospitali, kitambulisho chako au anwani yako. Rekodi itatumika kwa madhumuni ya utafiti huu pekee. PI na mtu ambaye atakuwa nawe katika kipindi chote cha mahojiano ndio pekee watakaoshughulikia kanda hiyo.

Hatari

Tutakuuliza ushiriki nasi habari za kibinafsi na za siri, na unaweza kusita kujadili baadhi ya masuala. Huna wajibu wa kujibu maswali yoyote au kushiriki katika mahojiano kama hutachagua, na hilo linakubalika kabisa. Sio lazima utupe sababu ikiwa hutajibu swali au kukataa kushiriki katika mahojiano.

Faida

Ingawa kunaweza kusiwe na manufaa ya moja kwa moja kwako, ushiriki wako utatusaidia katika kutambua njia za kuboresha utoaji wa huduma za afya za Magonjwa ya Moyo.

Usiri

Mahojiano yote yatafanyika katika chumba cha mashauriano ili kutoa faragha ya kutosha kwani inatumika kwa mashauriano ya siri. Hatutashiriki maelezo kukuhusu kwa mtu yeyote nje ya timu ya utafiti. Taarifa tunazokusanya kutoka kwa mradi huu wa utafiti zitawekwa faragha chini ya kufuli na ufunguo.

Kushiriki Matokeo

Hakuna unachosema leo kitakachoshirikiwa na mtu yeyote nje ya timu ya utafiti, na hutatambuliwa kwa jina. Matokeo yatashirikiwa na taasisi ya afya na utawala wa chuo kikuu. Tunakusudia kuchapisha matokeo ili wahusika wengine wanaovutiwa, kama vile watunga sera, jumuiya, na viongozi wengine, wanufaike na utafiti.

Haki ya Kukataa au Kujitoa

Si lazima ushiriki katika utafiti huu ikiwa hutaki kufanya hivyo, na kuchagua kushiriki au kutoshiriki hakutaathiri huduma unazopokea kutoka kwa kituo cha afya. Unaweza pia kujiondoa katika hatua yoyote ya utafiti.

Nani wa Kuwasiliana

Ikiwa una maswali yoyote, unaweza kuuliza sasa au baadaye. Ikiwa ungependa kuuliza maswali baadaye, unaweza kuwasiliana na wafuatao: Mpelelezi Mkuu, **Rotich John Kipkemoi, 0721160747.**

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Part II: Certificate of Consent

I have been invited to participate in a study on effects of cardiovascular disease on the socio-economic well-being of the households in Bomet County, Kenya.

I have read the foregoing information and I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to be a participant in this study

Print Number of Participant (e.g.001) _____

Signature of Participant _____

Date _____

If illiterate

I have been informed well by accurate reading of the consent form and explained well and I have had the opportunity to ask questions. I consent freely.

Print number of participant: _____Thumb print of participant

I _____Date

_____Statement by the researcher/person taking consent have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the participant understands that the following will be done:

1. An interview will be done.
2. Notes will be taken and the interview will be audio-recorded.
3. All information will be kept confidential

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

A copy of this form has been provided to the participant.

Print Name of Researcher/person administering the consent_____

Signature of Researcher /person administering the consent_____

Date _____

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APPENDIX II: QUESTIONNAIRE

Questionnaire:

Section 1: Demographic Information

1.1. Participant ID: [Auto-generated]

1.2. Household Head's Name: _____

1.3. Household Location (Urban/Rural): _____

1.4. Number of Household Members: _____

1.5. Participant's Age: _____

1.6. Gender:

- ☐ Male
- ☐ Female

Section 2: Cardiovascular Disease Information

2.1. Has anyone in your household been diagnosed with a cardiovascular disease? (If yes, proceed to questions 2.2-2.5)

- ☐ Yes
- ☐ No

2.2. Type of Cardiovascular Disease (e.g., hypertension, coronary artery disease, stroke): _____

2.3. Year of Diagnosis: _____

2.4. Is the affected individual currently receiving medical treatment for the cardiovascular disease?

- ☐ Yes
- ☐ No

2.5. Approximate Monthly Healthcare Expenditure for Cardiovascular Disease Treatment (in KES): _____

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Section 3: Access to Healthcare Services:

3.1 How easily can members of your household access healthcare services for cardiovascular diseases in Bomet County?

- ☐ Very easily
- ☐ Somewhat easily
- ☐ Not very easily
- ☐ Not at all

3.2 Have any members of your household faced barriers in accessing healthcare services for cardiovascular diseases in Bomet County?

- ☐ Yes
- ☐ No

3.3. If yes, please specify the barriers encountered (e.g., financial constraints, lack of transportation, long wait times, distance to healthcare facilities, etc.).

_____

_____

_____

_____

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Section 4: Level of Awareness of CVDs:

4.1. How familiar are members of your household with cardiovascular diseases?

- ☐ Very familiar
- ☐ Somewhat familiar
- ☐ Not very familiar
- ☐ Not at all familiar

4.2. Have members of your household received any formal education or information on cardiovascular diseases?

- ☐ Yes
- ☐ No

4.3. If yes, please specify the sources of education or information (e.g., healthcare providers, community health workers, educational campaigns, media, etc.)

_____

_____

_____

4.5. Are members of your household aware of the risk factors associated with cardiovascular diseases?

- ☐ Yes
- ☐ No

4.6. Do household members engage in regular physical activity (e.g., exercise, walking)?

- ☐ Yes
- ☐ No

4.7. Does the household follow a specific dietary plan to manage cardiovascular health? (If yes, please describe):

_____

_____

4.8. Do any household members smoke or use tobacco products?

- ☐ Yes
- ☐ No

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4.9. Do any household members consume alcohol regularly?

- ☐ Yes
- ☐ No

Section 5: Socio-Economic Well-being

5.1. Highest level of education attained by household head: _____

5.2. Household monthly income (in KES): _____

5.3. Primary Source of household income (e.g., employment, farming): _____

5.4. Are there any household members with disabilities or chronic health conditions other than cardiovascular diseases? (If yes, please specify): _____

5.6. How does your household cope with the financial challenges posed by cardiovascular disease treatment?

_____

_____

_____

5.7. Are there any community or social support systems that your household relies on for assistance related to cardiovascular diseases?

_____

_____

_____

Section 6: Additional Comments

6.1. Is there anything else you would like to share about the impact of cardiovascular diseases on your household's socio-economic well-being or any suggestions for improvement in healthcare services?

_____

_____

_____

_____

_____

_____

_____

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APPENDIX III: IN-DEPTH INTERVIEW GUIDE

In-Depth Interview Guide:

Introduction

- Introduction and explanation of the research purpose.
- Seek informed consent from the participant.
- Ensure privacy and confidentiality.

Section 1: Personal and Household Background

1. Can/ could you please describe your household's socio-economic background and any notable factors that influence your household's economic well-being?
2. Tell me about the individual in your household who has been diagnosed with a cardiovascular disease. How has this diagnosis affected your household's daily life and finances?

Section 2: Experiences with Cardiovascular Disease

3. Can you share your experiences with managing the specific cardiovascular disease in your household? (Explore treatment, hospital visits, and challenges faced.)
4. How do you perceive the impact of the cardiovascular disease on your household's overall well-being?

Section 3: Coping Strategies

5. What strategies has your household employed to cope with the financial burden of cardiovascular disease treatment?
6. Are there community or social support networks that have been helpful in dealing with the challenges posed by cardiovascular diseases?

Section 4: Future Hopes and Needs

7. What do you see as the future needs and aspirations for your household in relation to managing cardiovascular diseases and improving your socio-economic well-being?

Conclusion

- Thank the participant for their time and insights.

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- Offer any necessary support or referrals.

APPENDIX IV: FOCUSED GROUP DISCUSSION GUIDE

Focus Group Discussion Guide:

Introduction

- Welcome participants and explain the purpose of the focus group discussion.
- Ensure participants are aware of the confidentiality of the discussion.

Section 1: Cardiovascular Disease Experiences

1. Can you share your experiences or observations regarding the prevalence and types of cardiovascular diseases in our community?
2. How do you think these diseases impact households in our community, both socially and economically?

Section 2: Healthcare Access and Support

3. Discuss the accessibility and quality of healthcare services related to cardiovascular diseases in your area.
4. Are there any community or social support systems available to individuals and households dealing with cardiovascular diseases? Please describe.

Section 3: Socio-Economic Implications

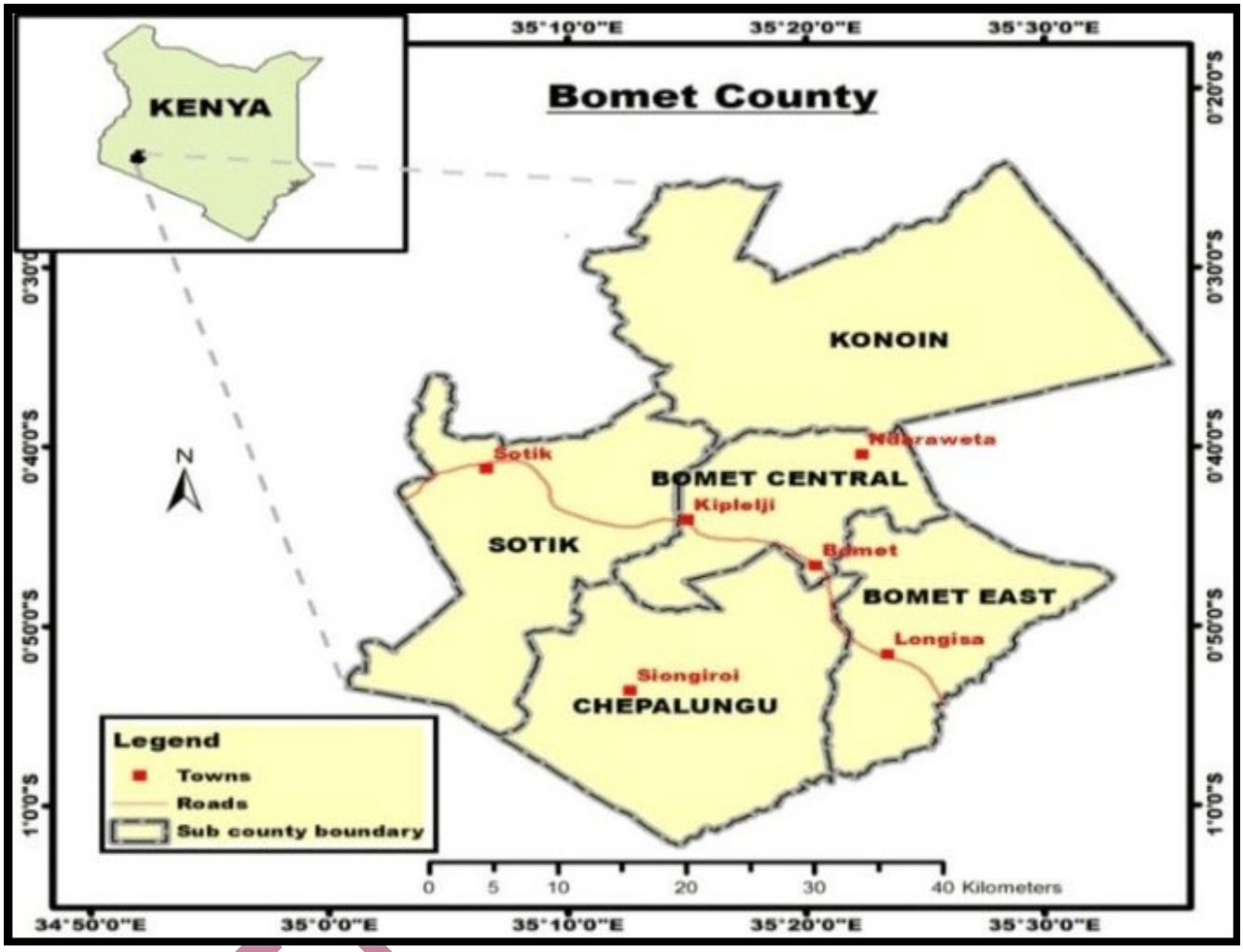
5. In your opinion, how do different types of cardiovascular diseases affect the socio-economic well-being of households in our community? Are there variations based on disease type?
6. Can you share any specific examples or stories of households that have faced socio-economic challenges due to cardiovascular diseases?

Section 4: Coping Strategies and Recommendations

7. What coping strategies have you observed or employed to mitigate the financial burden of cardiovascular disease treatment?
8. Based on your experiences, what recommendations or interventions do you think could help households in our community better manage cardiovascular diseases and their socio-economic impact?

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APPENDIX V: BOMET COUNTY MAP



APPENDIX VI: UNIVERSITY LETTER OF INTRODUCTION

ST. PAUL'S UNIVERSITY

Private Bag 00217 LIMURU, KENYA
Email: office@spu.ac.ke
Website: www.spu.ac.ke

Tel Office: +254 (0) 20-2020505/10
Mobile: +254 (0) 728 - 669000
(0) 736 - 424440

BOARD OF POSTGRADUATE STUDIES

18th July, 2022

National Commission for Science and Technology,
P.O. BOX 30623-00100,
Nairobi.

Dear Sir/Madam,

RE: RECOMMENDATION FOR ROTICH JOHN KIPKEMOI - MDSDIST455421 TO CONDUCT RESEARCH

This letter confirms the above-named person is a student of the Master of Development Studies Program at St. Paul's University.

The second year consists of a major research work leading to a dissertation. The student's selected topic is *" Effects of Cardiovascular Diseases on Socio-Economic Status of Households in Bomet County, Kenya."*

Kindly grant this student the required permit.

Yours Faithfully,

10 JUL 2022

Dr. Julius Kahuthia
Director, Board of Postgraduate Studies

APPENDIX VII: NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION (NACOSTI) LICENCE

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Ref No: **121411**

Date of Issue: **25/July/2022**

RESEARCH LICENSE



This is to Certify that Mr.. John Kipkemoi Rotich of St. Paul's University, has been licensed to conduct research in Bomet on the topic: Effects of Cardiovascular Diseases on Social-Economic Status of Households in Bomet County, Kenya for the period ending : 25/July/2023.

License No: **NACOSTI/P/22/19198**

121411

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

St. Paul's University Repository

APPENDIX VIII: TENWEK HOSPITAL ISERC APPROVAL

TENWEK HOSPITAL
A Ministry of Africa Gospel Church

Postal Address:
P.O Box 39-20400
Bomet-Kenya

Telephone: (254) 728-091900, 20-2045542
E-mail:info@tenwekhosp.org
Website: www.tenwekHospital.org

Date: August 16th, 2022

Dear Mr. Rotich and Ms. Mogambi,

RE: 2022-0018; "Effects of cardiovascular diseases on the socio-economic status of households in Bomet county, Kenya."

This is to inform you that the Tenwek Hospital ISERC has reviewed the documents submitted and approved your proposal pending the translation of the consent, and payment confirmation. The approval period is **16th August 2022 to 15th August 2023**.

This approval is subject to compliance with the following requirements.

i. Only approved documents including informed consents, proposal, and study instruments to be used.
ii. All changes including amendments, deviations, and violations are submitted for review and approval by the Tenwek Hospital ISERC.
iii. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to the Tenwek Hospital ISERC within 72 hours of notification.
iv. Any changes anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to the Tenwek Hospital ISERC within 72 hours.
v. Clearance for export of biological specimens must be obtained from relevant institutions if applicable.
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Fill out an annual renewal form from the website and attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to the Tenwek Hospital ISERC.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology, and Innovation (NACOSTI) https://research-portal.nacosti.go.ke and any other relevant clearances needed.

TENWEK HOSPITAL ISERC CHAIR 16 AUG 2022 P. O. Box 39-20400 BOMET

Blessings in your study.
Sincerely,

Dr. Miriam Wanjala
ISERC Chairperson on behalf of the ISERC Committee

Tenwek Hospital is a Christian community committed to excellence in compassionate healthcare, spiritual ministry and training for service.