NON-COMMUNICABLE DISEASES IN GHANA: RISK FACTORS, PREVALENCE AND SOCIAL SUPPORT SYSTEMS

By

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Abstract

The aim of this thesis is to examine the effects of individual and neighborhood socioeconomic status (SES) on hypertension, establish an association between non-communicable diseases (NCDs) and disability and examine the role of social support systems in management of NCDs in Ghana. Specific focus is given to the burden of hypertension, diabetes, and stroke. The study is motivated by the scarcity of research on NCD-related risks among women in Ghana. Similarly, there is paucity of academic literature on relationships between NCDs, disability, and social support systems available to people living with these chronic conditions. In examining these issues, a mixed methods sequential explanatory research design is adopted using the World Health Organization's Commission on Social Determinants of Health (CSDH) as a conceptual framework. Specifically, data from the Women's Health Study of Accra (WHSA-I) and the Ghana Global Ageing on Adult Health Survey (SAGE) are analyzed using multilevel logistic regression and ordinary least squares (OLS) regression respectively. In addition, qualitative interviews were undertaken in two teaching hospitals in Ghana with 33 patients living with NCDs, who were recruited for the study using purposive sampling technique.

Results from the quantitative analyses reveal that wealthy women are more likely to be hypertensive compared to poorer women. However, the effects of neighborhood SES/wealth was attenuated after adjusting for individual-level SES/wealth. In addition, respondents with higher education reported higher levels of disability compared to those with no education, while stroke emerge as the major contributor to disability among Ghanaians. Thematic analysis of the interview data further indicate that the nuclear family is the main source of social support for the self-management of NCDs.

The results suggests that efforts aimed at the prevention, control and management of hypertension should focus on changing individual behavioral lifestyles. Health promotion programs should also focus individual factors (engaging in physical activity and adoption of healthy diet with an emphasis on fruit and vegetable consumption etc) in the prevention, control and management of hypertension in Ghana. This research also offers innovative contributions to the extant literature by confirming that the International Classification of Functioning, Disability and Health (ICF) can be effectively used to classify individuals with disabilities living in Ghana not only based on their medical conditions, but also by their functioning level. This research further demonstrates that the ICF framework can be used within the healthcare setting to promote inclusiveness within the broader community. Finally, the study findings demonstrates that social support can be used as a strategy in the promotion of the physical and mental well-being of these NCD patients.

Keywords: Disability, Ghana, Hypertension, NCDs, SES.

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Co-Authorship Statement

This thesis is presented as a collection of manuscripts that have been accepted or currently under review in peer-reviewed academic journals. It commences with the description of the study problem and research objectives, which are presented in Chapter 1, while the study context and methods are provided in Chapter 2 and 3, respectively. The remainder of the thesis comprises of three manuscripts, the details of which are given below:

Chapter 4: Banchani Emmanuel, Tenkorang Y. Eric, Midodzi William. (2020). Examining the effects of individual and neighborhood socioeconomic status (SES)/wealth on hypertension among women in the Greater Accra Region of Ghana. *Health & Social Care in the Community*. https://doi.org/10.1111/hsc.13185.

Chapter 5: Banchani Emmanuel, Tenkorang Y. Eric, Midodzi William. (Under Review). Activity limitations and participation restrictions among people with non-communicable diseases (NCDs) in Ghana. *Ageing & Society*. Revise and resubmit.

Chapter 6: Banchani Emmanuel, Tenkorang Y. Eric, Sarfo-Kantaka Osei, & Sarfo Fred Stephen. (2020). Social support systems and the self-management of non-communicable diseases in Ghana. *Journal of Health Care for the Poor & Underserved*, 31(3), 1191 – 1212. doi:10.1353/hpu.2020.0089.

I declare that this work is a result of my own research and that the manuscripts are written in collaboration with my supervisor and other authors named above. I also declare that none of the work described in this thesis has been presented by anyone for any academic award at this or any other university. Furthermore, I certify that I have conducted original research, which involved problem identification, literature review, data collection and analysis, and culminated in the

writing of this thesis. All extant sources used in this research have been fully acknowledged and are included in the references.

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List of Abbreviations

Accra Metropolitan Area	AMA
Africa Development Bank	ADB
Commission on Social Determinants of Health	CSDH
Community Health Officer	CHO
Community-Based Health Planning and Services	CHPS
Economic Recovery Program	ERP
Framework Convention on Tobacco Control	FCTC
Free Compulsory Basic Education	FCUBE
Ghana Health Service	GHS
Ghana Statistical Service	GSS
Global Ageing on Adult Health Survey	SAGE
Institute of Statistical Social, and Economic Research	ISSER
International Classification of Functioning, Disability, and Health	ICF
International Monetary Fund	IMF
Low- and middle-income countries	LMICs
Ministry of Finance and Economic Planning	MOFEP
Ministry of Health	MOH
National Health Insurance Scheme	NHIS
Non-communicable diseases	NCDs
Non-Communicable Diseases Control and Prevention	NCDCP
Persons with disabilities	PWDs
Population and Housing Census	PHC
Principal Component Analysis	PCA
Provisional National Defence Council	PNDC
Regenerative Health and Nutrition Program	RHNP
Social Determinants of Health	SDH
Social Security and National Insurance Trust	SSNIT

sub-Saharan Africa	SSA
United Nations Development Programme	UNDP
Women Health Survey of Accra	WHSA
World Health Organization	WHO

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Chapter 1: Introduction

The aim of this thesis is to gain a better understanding of the effects of both individual and neighborhood socioeconomic status (SES) associated with non-communicable diseases (NCDs), disability prevalence, and the role of social support systems in the self-management of NCDs in Ghana.

This thesis is organized into seven chapters. The first chapter provides a broad introduction to the thesis. In the second chapter, the focus is on the study context, which is provided by reviewing the structure of the Ghana Heath System and its implications for NCDs. An empirical review of the responsiveness of the health system to NCDs in Ghana is also provided. The chapter concludes by reviewing a profile of Ghana, focusing on the economy, education, and health indicators. In the third chapter, the study methodology is briefly discussed, outlining the advantages and disadvantages of mixed methods research design adopted in the present investigation. In the study reported in the first of these papers, quantitative data is employed to examine the effects of both individual and neighborhood socioeconomic status (SES) on hypertension among women in the Greater Accra Region of Ghana. The aim of these investigations is to fill the void in the pertinent literature by conducting multi-level analyses to elucidate the effects of individual and community-level SES on hypertension among Ghanaian women. Beyond the prevalence of hypertension among women, the work reported in the second manuscript delves into the prevalence of disability and its association with NCDs among the Ghanaian population. In this work, quantitative data and the ICF framework are employed in order to determine how NCDs contribute to the disability burden in Ghana. The aim of this investigation is to contribute to the extant literature on this topic by applying the ICF framework to the data on disability in SSA, and Ghana in particular. The final manuscript examines the role

of social support in improving the living conditions of those affected by NCDs in Ghana. By analyzing the qualitative data sourced from two teaching hospitals in Ghana, the aim of this part of the study was to explore the current understanding of the role of social support in the self-management of NCDs in Ghana. In the final chapter of this thesis, conclusions are drawn based on the findings reported in the three manuscripts described above by identifying the common themes and unifying arguments. In what follows, I present an overview of the stand-alone related manuscripts.

Overview of three related studies

In low- and middle-income countries (LMICs), public health challenges, specifically communicable diseases, such as malaria, HIV/AIDS, tuberculosis, cholera, or even Ebola are given much priority, while less attention is paid to the effects of NCDs (Banteyerga et al., 2010; Ezechi et al. 2012; Figuie, 2014; Gonzalez et al., Herbreteau et al., 2005; Heymann et al., 1999; Hotez et al., 2006). Owing to the high prevalence and adverse outcomes of such communicable diseases in the Global South, they have attracted a disproportionate amount of the international community's attention and resources. Consequently, the effects of NCDs in LMICs remain insufficiently understood (Baatiema, et al., 2017; Boateng et al., 2017; Kane et al., 2017; Renzaho, 2015). The burden of NCDs in developing and transitional countries, including those in sub-Saharan Africa (SSA), is already significant and is projected to increase in the future. According to the World Health Organization (WHO), in 2016, NCDs contributed to about 85% of mortality in LMICs (WHO, 2018). Thus, it can be expected that, in LMICs, the NCD burden will soon become overwhelming, accounting for 46% of all deaths by 2030, according to the World Bank (2011). Considering the devastating consequences that NCDs have on the population, they have recently been recognized as a global health challenge that requires

immediate prevention and treatment (Giles, 2010; Lins et al., 2010; Mendis, 2010). Of particular relevance for the present investigation is the increasing prevalence of NCDs, as they threaten the viability of the existing health systems in sub-Saharan Africa (SSA) that already lack the resources and capabilities required for dealing with challenges posed by communicable diseases (Allen et al, 2018: Kane et al., 2017; Maher et al., 2012).

In Ghana, evidence provided by Ghana Health Service (GHS), shows that the NCD prevalence is increasing annually. For instance, in 2016, the prevalence of adult hypertension ranged from 19% to 48%, while diabetes is estimated at 13% among the Ghanaian population (GHS, 2017). Given the overwhelming effects of NCDs on the national health system in Ghana, the aim of this doctoral research is to examine the risk and prevalence of NCDs, as well as their association with disability, and finally, explore the role of social support systems in the self-management of NCDs in Ghana. Specific attention is paid to the effects of stroke, diabetes, and hypertension.

The current NCD burden in SSA and Ghana indicates the need for new research directions, focusing on insufficiently explored themes. For example, the links between individual and neighborhood level SES and hypertension among Ghanaian women have not received much attention in extant studies. Similarly, there is paucity of academic literature on relationships among NCDs, disability, and social support systems available for people living with these chronic conditions. The limited information and empirical data is particularly prominent in Ghana, thus hindering efforts aimed at addressing NCDs and examining the associated risk factors among women. Similar data constraints have been attributed to the lack of understanding of linkages between NCDs and disability in Ghana. It is equally important to address issues of support programs, particularly those offered by informal caregivers, geared toward helping

people manage their chronic conditions. These informal forms of assistance have proliferated in the country as a result of the under-resourced health system (Frimpong-Manso, 2017). To date, this issue has received limited attention in studies focusing on sub-Saharan Africa, including Ghana. The present study was motivated by these shortcomings, which are addressed in three major papers comprising this thesis. The first paper focuses on the prevalence and risk factors for hypertension among women in Ghana. In the second paper, disability measured by activity limitations and participation restrictions among people with NCDs in Ghana are explored, while support systems for people with chronic conditions in Ghana is the topic of the third paper. In what follows, I present a brief synopsis of the relevance of the three integrated manuscripts comprising this thesis.

Manuscript 1: The effects of individual and neighborhood socioeconomic status (SES)/wealth on hypertension among women in the Greater Accra Region

NCDs are recognised as the leading cause of morbidity and mortality among women, contributing to about 75% of deaths globally, with the majority occurring in LMICs (Peters et al., 2016; WHO, 2011a, 2016). Despite the burgeoning public health challenge, previous and current efforts to improve the health of women globally have focused on maternal, sexual, and reproductive issues (Byrne et al., 2014; Dawson et al., 2017; Elmusharaf et al., 2015; Temmerman et al., 2015).

The case for women is SSA is particularly troubling. For example, in contrast to the West, where accurate data for women are available (Sliwa et al., 2014), in Ghana, female hypertension has only recently become a development and public health issue (Addo et al., 2012; Bosu, 2010; 2016). The increasing prevalence of hypertension in Ghana has been discussed in the context of Ghana's economic, epidemiological, and demographic transitions (Tenkorang, Kuuire et al., 2015). The rapid economic transformation in Ghana also has implications for the

changing fertility and mortality trends. Evidence suggests that there has been a decline in infant and child mortality in Ghana with implications for the age structure (Ghana Demographic and Health Survey, 2015). Thus, declines in fertility and child mortality rates suggest that the aging population is projected to increase at a faster rate. Consequently, with an aging population, NCDS, including hypertension become common in Ghana.

Despite the abundance of literature on relationships between SES and hypertension at the individual level (Antignac et al., 2018; Steyn et al., 1997; Tenkorang & Kuuire, 2016), no research has yet to examine relationships between both individual and neighborhood-level SES and hypertension in Ghana. Evaluating SES differences at both the individual and neighborhood-level and their effects on hypertension could inform public health policies, treatment guidelines and interventions in Ghana.

Manuscript 2: Activity limitations and participation restrictions among people with NCDs in Ghana

Evidence shows that, in 2016 NCDs contributed about 61.4% to the disability-adjusted life years (DALYS) from ischaemic heart disease, cerebrovascular disease, diabetes, and sense organ diseases among others globally (GBD 2015 DALYs & HALE Collaborators 2016; GBD 2016 DALYs and HALE Collaborators, 2017). Although emerging, anecdotal evidence indicates that NCDs contribute to the burden of disability, meanwhile, infectious diseases such as malaria, HIV/AIDs, tuberculosis maternal complications still remains the largest contributor to disability in SSA (GBD 2016 Disease & Injury Incidence & Prevalence Collaborators, 2017; Mensah, 2016). This evidence clearly indicates that, in SSA countries, including Ghana, NCD-related disability places a considerable burden on the healthcare system.

Similarly, disability, as an adverse consequence of many chronic conditions, is an increasing public health concern. However, epidemiological studies tend to focus on the

identification of risk factors associated with NCDs without providing sufficient attention to disability that often accompanies these health issues (Ezzati & Riboli, 2013; Pan et al., 2014). In order to examine the health-related consequences of NCDs, and disability in particular, the International Classification of Functioning, Disability, and Health (ICF) was developed by the World Health Organization (WHO, 2002) and has become a framework for understanding various health-related conditions (Kjeken et al., 2005; Rusch et al., 2004). The ICF classifies the consequences of diseases into three main categories, related to impairment, activity, and participation, respectively (WHO, 2002). While the applicability of this model has been tested and verified in Western and Asian countries (Basu & King, 2013; Kjeken et al., 2005; Rusch et al., 2004; Zhao et al., 2013), the suitability of this framework for broadening the understanding of how NCD-related conditions limit a person's function and participation in everyday activities in SSA, particularly in Ghana, remains to be established.

Although the percentage of the Ghanaian population affected by disability as a result of NCDs, such as diabetes, stroke, and hypertension, is presently unknown, a recent Ministry of Health (MOH) (2011) report acknowledges that NCD-related disabilities have negative impact on the affected person’s mobility, participation in social activities, ability to work, and quality of life in Ghana.

Manuscript 3: Social support systems and the self-management of non-communicable diseases in Ghana

Despite extensive evidence supporting the important role that social support plays in the self-management of chronic diseases in the Western countries (Nausheen et al., 2009; van Dam et al., 2005), the effects of social support on self-management of chronic illness in SSA, including Ghana, remain insufficiently explored (Asante, 2012; Glozah & Pevalin, 2014). The present study aims to fill this important gap in the literature by examining how social support

assists in the self-management of NCDs—specifically hypertension, diabetes, and stroke—in Ghana. Long-term chronic conditions, such as diabetes, cancer, hypertension, and cardiovascular diseases, pose a challenge to health systems worldwide, but their burden is particularly evident in developing countries, as these diseases represent an emerging trend in the epidemiological transitions of these countries (de-Graft Aikins & Mark, 2007). The burden of NCDs in low- and middle-income countries is overwhelming, with these diseases projected to account for about 46% of all deaths in in sub-Saharan Africa in 2030 (World Bank, 2011).

Given the limitations of formal health care, which is often inaccessible for majority of Ghanaians who suffer from chronic illnesses, affected individuals may have to rely on informal caregivers to manage their conditions (Maher et al., 2012). In pertinent literature, the role of social networks and social support in the reduction of morbidity, mortality, and adverse health outcomes associated with chronic illness, such as diabetes, and stroke, is consistently documented (Gallant, 2003; Skinner et al., 2000; Tsouna-Hadjis et al., 2000). Owing to the limitations of the formal long-term care systems and programs in Ghana, informal healthcare has emerged as a strategy that many individuals with NCDs rely on for illness management. Ability to receive assistance from family and community members has many benefits for people with long-term chronic conditions, including improved quality of life (Koetsenruijter et al., 2014).

Research Objectives

The main objective of this research is to examine the risk factors, disability prevalence, and social support systems for NCDs in Ghana. To achieve this aim, the following specific objectives guided the investigation:

1. Examine the effects of individual and neighborhood SES on hypertension among women in Greater Accra Region of Ghana

2. Examine the prevalence of and associations between activity limitations and participation restrictions in persons living with NCDs in Ghana.
3. Explore how social support systems in Ghana impact on the self-management of chronic conditions.

In addressing the first research objective, I seek to determine the relevance of both individual and neighborhood-level SES on hypertension as previous research has only focused on individual-level determinants. Consequently, I test the effects of SES/wealth status on the risk of becoming hypertensive at the individual and neighborhood levels. The second objective examines the likelihood of living with disability among persons with NCDs compared to those who do not. In the last objective, I seek to explore how those living with NCDs receive social support from both the formal and informal networks. Overall, these objectives are addressed by adopting the WHO's Commission on Social Determinants of Health (CSDH) as the conceptual framework. I first, provided a description of Omran's epidemiological transition theory which has often guided the analysis of NCDs. In what follows next, a discussion is given on why the Omran's theory does not fit Ghana's current epidemiological transition, and why the social determinants of health framework was adopted.

Conceptual Framework: Social Determinants of Health (SDH)

Although the epidemiological transition model developed by Omran (2005) has been used widely by researchers to describe the historical morbidity and mortality trends in advanced Western countries, it has also been criticized for its lack of precision on the timing of the morbidity and mortality transition in developing countries, including those in SSA (Santosa et al., 2014). Omran (2005) formulated the model as sequential stages of high mortality attributed to infectious diseases, which are eventually replaced by chronic and degenerative diseases, as these are also associated with high mortality. The first stage, denoted as "the age of pestilence and famine," is characterized by high, fluctuating mortality rates, and low life expectancy (Caselli et al., 2002; McKeown, 2009). The second stage, titled "the age of receding pandemics," pertained to a period in human history characterized by a decline in infectious disease mortality in developed countries. At this stage, prevalence of infectious diseases declines and is gradually displaced by degenerative and man-made diseases as the main causes of morbidity and mortality. This transition was mainly driven by advancement in medical science and technology in Western countries (Omran, 2005). The third stage, described as the "era of degenerative and human-made diseases," emerges once the infectious disease pandemics are fully replaced by degenerative diseases as major causes of death.

Identically, Omran's epidemiological transition theory has been confirmed in most Western European countries, such as Sweden, United Kingdom, and France, where the three stages can be identified in recent history (Santosa et al., 2014). Several researchers, however, point to considerable deviations from this model in transitional countries, specifically those in SSA, including Ghana (Defo, 2014a). For instance, Defo (2014a, 2014b) suggested that, many SSA countries, and thus Ghana, have not been able to complete the third stage of the transition,

due to inefficient health systems, slow economic development, and political instability. Thus, in order to describe the epidemiological transition of these countries more accurately, the protracted polarized model has been proposed. The protracted model, for instance, is based on the premise that the co-existence of infectious and chronic diseases leads to a partial change in the morbidity and mortality trends, resulting in high mortality and morbidity for chronic diseases. The polarized model emphasizes the linkages between socio-economic factors and the risk of being exposed to diseases (Agyei-Mensah & de-Graft Aikins, 2010, British Academy, Royal Society and Ghana Academy of Arts and Sciences, 2010, Kabudula et al., 2017, Kahn et al., 2007). According to this model, chronic diseases tend to be more prevalent in higher socio-economic strata, while those in the lower socio-economic segment of society experience a double burden of infectious and chronic diseases.

This model as applies to Ghana is consistent with current evidence that indicates the co-existence of infectious and degenerative diseases is highly prevalent (de-Graft Aikins, 2007; de-Graft Aikins et al., 2012). According to the available evidence, Ghana's epidemiological transition can be described as a "double burden of diseases," that is characterized by a high prevalence of infectious diseases and an increasing burden of NCDs (de-Graft Aikins & Koram, 2017, Agyei-Mensah & de-Graft Aikins, 2010). This current situation is often due to the unaddressed health and social challenges, such as communicable diseases, poverty, malnutrition, high maternal mortality rates, poverty, and illiteracy (Agyei-Mensah & de-Graft Aikins, 2010; Santosa et al., 2014). Past research indicates that, some NCDs are among the leading causes of mortality and morbidity in Ghana alongside some infectious and communicable diseases (Defo, 2014a; Mensah, 2016). For example, according to the Ghana AIDS Commission (2017, 2019) estimates, HIV prevalence declined from 2.4% in 2016 to 1.7% in 2018. On the other hand,

malaria remained the leading cause of morbidity in Ghana, constituting 25.1%7% of hospital admissions, while hypertension is the third cause of all morbidity (4.0%) and sixth cause of all mortality (4.6%) respectively in 2016 (GHS, 2017).

Another important deviation from the epidemiological transition model as proposed by Omran seen in Ghana's epidemiological experience stems from its emphasis on the role of socio-economic development as a main determinant of health. While this phenomenon has already been experienced by industrialized countries in their transition patterns, Ghana has yet to follow this trend in its transition. Omran also assumes in his theory that the ways in which most western industrialized countries experienced their social and economic development will be similar to those of LMICs including Ghana. In essence, Omran's theory fails to account for the differential experiences of specific countries given the differences in history, culture, and stage of economic development (Agyei-Mensah & de-Graft Aikins, 2010, McKeown, 2009).

Given these limitations, the present study uses the SDH framework (Marmot et al., 2008; Schulz & Northridge, 2004). The framework identifies broad socio-economic, demographic, and cultural factors contributing to diseases or promoting healthy living among populations (Weiss & Lonnquist, 2012). Thus, to improve population health, key indicators, such as the socioeconomic factors, structural level factors, personal health behaviors, individual capacity and coping skills, and health services are examined (Schulz & Northridge, 2004).

When there are many different versions of the SDH (Krumeich & Meershoek, 2014; Wilkinson & Marmot, 2003) in this thesis, I adopt the WHO's CSDH framework to understand the drivers of NCDs outcomes in Ghana. The first component of the CSDH consists of structural determinants of health. These structural determinants are defined in terms of individual socioeconomic position (as determined by one's education, occupation, income) embedded

within macro political and social context (governance, macroeconomic policies, social policies, political policies etc). According to the CSDH model, these structural determinants operate through intermediary determinants—material circumstances (living and working conditions, neighborhood characteristics, etc), psychological circumstances (stress factors, social support), behavioral (nutrition, alcohol consumption, tobacco use, physical activity etc) and biological factors (genetic)—to produce health outcomes. The CSDH framework also incorporates health systems, social cohesion, and social capital, as these are perceived as essential elements in shaping health outcomes (Solar & Irwin, 2010; WHO, 2008).

The CSDH model has been used to explain the relationships between different determinants of health (including NCDs), and determine priorities and targets for policy interventions (World Bank, 2011). The framework seeks to elucidate how the health system, social, and environmental conditions interact to influence the health status of the general population of a given country. Given its relevance for the aims of the present study, this framework provides direction for the work described in the three papers presented in the subsequent chapters using specific theories that fall within the SDH. The SDH when applied to NCDs elucidates the root causes and distribution of NCDs among the population.

As shown in figure 1, the CSDH primary focus is on how social factors influence NCD outcomes. I also addressed how selected SDH theories are applicable to CSDH and their conceptual links to NCDs. The first component consists of structural determinants of health comprising of the global (such as global public health policies), socioeconomic and political context (comprising macro-economic policies, social policies, public policies) that determine the space for national governments to implement such policies. Complex bidirectional interactions link both global/macro structures (policies) and micro structures at the individual level (income,

education, employment etc). It must be emphasize that although the SDH is the overarching framework adopted for this research and in order not to be repetitive, I used some selected SDH theories that guide the various manuscripts that form this study. They include the WHO's International Classification of Functioning, Disability, and Health (ICF), the double jeopardy theory, collective resource theory, fundamental cause theory and the concept of social support. For instance, the WHO's International Classification of Functioning, Disability, and Health (ICF) is the most recently accepted framework in global public health for measuring disability that has been ratified, adopted and being implemented by member countries. The socioeconomic and political context then generate, configure and maintain individual socioeconomic position (income, education, occupation). For instance, individual socioeconomic status could serve as a guide in formulating policies that ensure healthcare coverage to reduce NCDs inequalities. Previous studies consistently demonstrate that NCDs has been found to follow a social gradient where the prevalence of NCDs is strongest among those of lower socio-economic status in Western countries (Allen al., 2017; Biswas et al., 2016). However, in LMICs, the relationships between socio-economic status and the prevalence of NCDs are mixed and inconclusive (Di Cesare et al., 2013; Remais et al., 2012). While some recent studies have found a strong association between NCDs and those of higher socioeconomic status, other research has found an inverse relationship (Biswas et al. 2016; Vellakkal et al., 2013; Yin et al., 2017).

The second component focuses intermediary determinants that deals with the direct effects of material circumstances (living and working conditions, neighborhood characteristics, food availability, health services etc.), biological, behavioral, environmental, health systems and social network factors. The effects of material circumstances on NCDs have been established widely in the literature (Braveman, Egerter et al., 2011; Braveman, Egerter, & Williams, 2011).

In extant research, it has been established that social conditions (where people live, grow and work) could initiate the onset of NCDs (Hiatt & Breen, 2008). Besides material circumstances, neighborhood conditions can influence NCDs. Neighborhood features such as access to exercise and leisure facilities, which may be associated with higher physical activity, high quality schools, good roads, availability of grocery stores selling healthy foods, etc is associated with low prevalence of NCDs (Chaix et al., 2007; Wagner et al., 2016). In addition, wealthy individuals living in affluent neighborhoods can use their collective social resources such as their knowledge, power, prestige, and social connections to influence other residents to embrace preventive health measures or lobby health promotion programs (Cho et al., 2016; Diez-Roux, 2004). Whereas those who lack these resources are at high risk of NCDs and their risk factors. Some notable SDH theories that has been used to understand material circumstances and neighborhood characteristics are the Double Jeopardy Theory (DJT), Collective Resource Theory (CRT) and Fundamental Cause Theory (Cockerham et al., 2017). The CSDH conceptual framework is depicted in the diagram below:

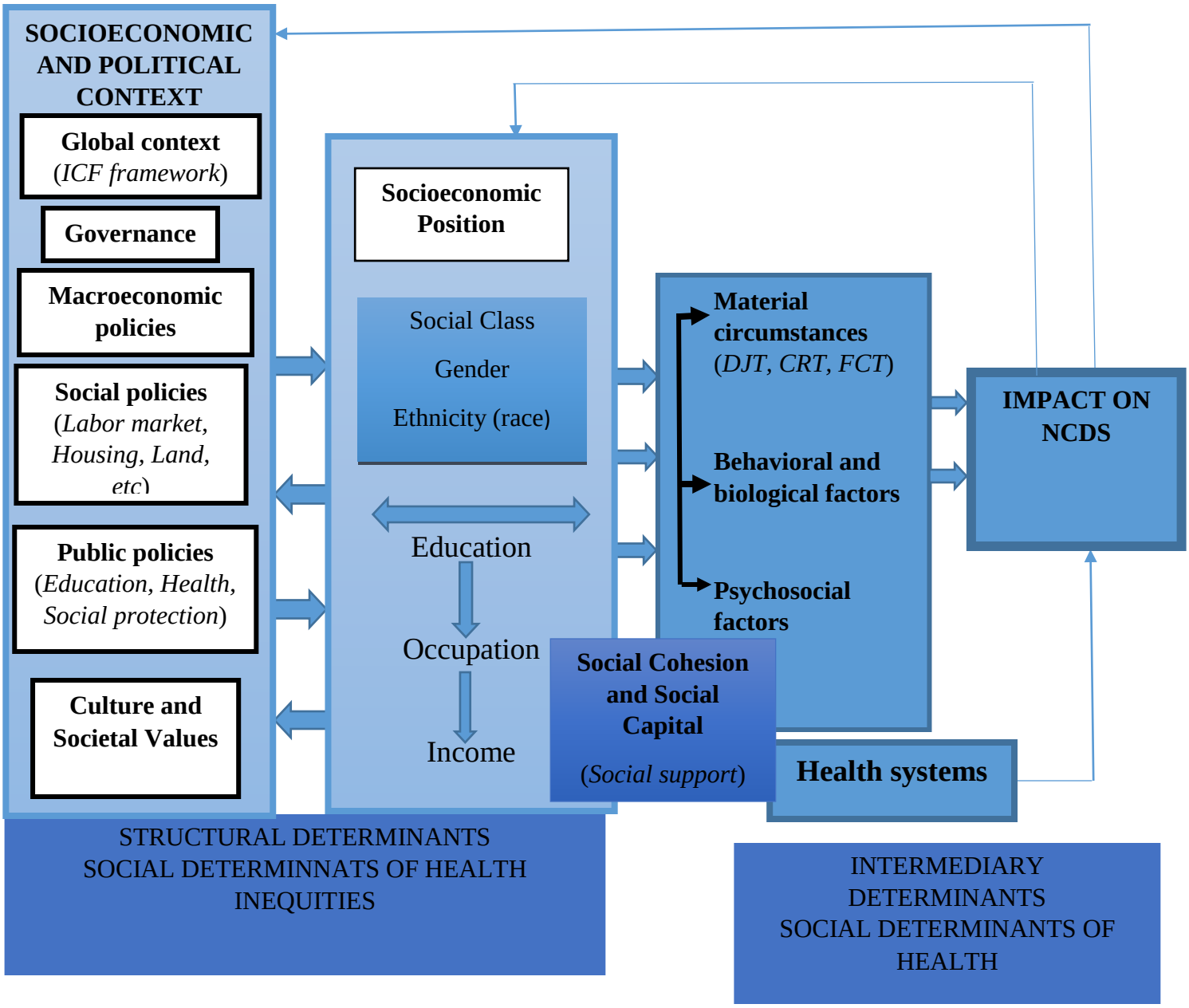

Figure 1. 1: The WHO's Commission Social Determinants of Health

The next chapter will provide a broad context to the work reported in the three manuscripts by examining the health system in Ghana and its focus on the treatment of communicable diseases, thus neglecting the growing burden of NCDs.

Chapter 2: The Ghanaian Context

This chapter commences with a brief profile of Ghana and an overview of its health system. This is followed by a detailed discussion of the way the Ghanaian health system responds to NCDs, including pertinent policies, programs, and strategies. Finally, the NCD financing system in Ghana is described.

Profile of Ghana

Ghana is located in the Gulf of Guinea in the West African sub-region. It covers an area of 239,460 km^2 and is bordered by the republic of Togo to the east, Ivory Coast to the west, and Burkina Faso to the north. The landscape is mainly tropical, stretching from the middle belt to the coast zone, while the northern part is mainly savannah (GSS/GHS/ICF International, 2015). According to the 2010 Population and Housing Census, Ghana has a population of 24,658,823, with males constituting 48.8% of the population, and females constituting 51.2%, with an annual population growth rate of 2.5% (GSS, 2013).

At the macro-economic level, Ghana has one of the highest GDP growth rates in the region. With an overall GDP annual growth rate of 5.5%, it is ranked as a lower-middle-income country by the International Monetary Fund (IMF) with a GDP per capita of 2.19 thousand US dollars (IMF, 2020; Ministry of Finance and Economic Planning [MOFEP], 2019). The country is also rich in natural resources, including cocoa, timber, gold, bauxite, diamond, and manganese, which are its major exports (Africa Development Bank [ADB], 2016). In 2007, an estimated 3 billion barrels of oil reserves were discovered on the shores of Ghana, adding to its income earning potential. Throughout its rich history, Ghana has undergone several economic and agricultural sector transformations. Agriculture, which used to be the mainstay of the economy, has been overtaken by the service sector, which contributes 51% to the total GDP output, while

agriculture accounts for about 30% (GSS/GHS/ICF International, 2015). Unemployment is estimated at 8.41%, (GSS, 2019). In terms of health indicators, according to the Ghana Demographic and Health Survey (GDHS) conducted in 2014, life expectancy is estimated at 62 years at birth with an under-five mortality rate of 41 per 1,000 live births. The current maternal mortality rate is estimated at 31 per 10,000 live births (Ghana Maternal Health Survey (GMHS), 2018).

Social Support Structure in Ghana

Given the deficiencies in the formal healthcare system in dealing with NCDs, social support networks represent an important resource for the self-management of NCDs in limited resource settings, such as Ghana. In addition, patients suffering from these conditions have the benefit of being part of an established network in times of need (Koetsenruijter et al., 2014). Within the Ghanaian context, large family units comprising of extended and nuclear family members have been found beneficial in promoting health and wellbeing of vulnerable populations. Such large support networks can pool resources due to the familial obligations placed on members to provide assistance to those in need (Wilson & Somhlaba, 2016). Boon (2007), for instance, pointed out that the extended family system in Ghana has always provided social and economic security for its members. The traditional family system is based on the principles of reciprocity and solidarity on the part of the members, who feel obligated to support each other in times of need (Aboderin, 2004a; Aboderin, 2004b; Boon, 2007).

Structure of Ghana's Health System

Ghana's healthcare system operates in two distinct domains, as medical care rooted in scientific approaches to health, disease prevention, and treatment runs in parallel to traditional medicine, still sought by many individuals (Asante & Avornyo, 2013). Scientific medical

treatment in Ghana is offered by the public health system (largely funded by the state) and in a few private medical practices with developed infrastructure and human resources (Agyepong, 1999; Frimpong, 2013).

The Ministry of Health (MOH) is responsible for overseeing the entire public healthcare system, as well as for developing and formulating pertinent policies, and ensuring equity and efficiency in service access and delivery (Abor et al., 2008; Agyepong, 1999). The main goals of the MOH include efficient policy formulation, coordination and monitoring of the delivery of healthcare services among stakeholders, and prudent resource mobilization and utilization (Couttolenc, 2012; MOH, 2007a; Pehr, 2010). Consequently, the MOH is also responsible for the overall development of effective and efficient policies for NCD surveillance, prevention, control, and management in Ghana.

The Ghana Health Service (GHS), while governed by the MOH, operates as a semi-autonomous organization responsible for the implementation of government policies as well as regulating public health institutions (Abor et al., 2008; Couttolenc, 2012). The GHS receives public funding for its operations, which is under government control. The roles performed by the GHS include developing strategic guidelines to achieve national policy goals and objectives, establishing and promoting an effective disease surveillance system, and providing in-service training for healthcare personnel (Agyepong, 1999; MOH, 2007a). Thus, the GHS is also responsible for implementing the NCD-related policies and programs developed by the MOH. This is done by designing effective NCD interventions within the public health facilities under the GHS. GHS is organized into three administrative tiers, namely the national, regional, and district levels (Pehr, 2010). At the national level, the work of the GHS is complemented by that of the Teaching Hospital Board, which is responsible for overseeing and regulating the teaching

hospitals as well as implementing government health policy (Abor et al., 2008; GHS, 1996). Healthcare delivery within the public sector is presently regulated by the Medical and Dental Council, the Food and Drugs Board, and the Pharmacy Council (Abor et al., 2008).

One of the GHS mandates pertaining to NCDs is to develop health promotion programs that emphasize adoption of healthy lifestyle and elimination of behavioral risk factors among Ghanaians. To this end, several national and international events are organized each year, such as World Diabetes Day, World No Tobacco Today, and National Breast Cancer Screening Day, among others. In addition, a number of programs pertaining to specific health issues operate independently from the GHS such as the Non-Communicable Diseases Control and Prevention (NCDCP) program, Reproductive and Child Health Program, the Malaria Control Program, the National AIDS/STI Control Program, the Occupational Health Program, the Parasitic Disease Control Program, and Family Planning Services, among others (Ghana Statistical Service [GSS]/Ministry of Health [MOH]/ORC Macro, 2003).

In Ghana, health services are decentralized and are delivered via a top-down approach, spanning from the national to the sub-district level (Agyepong, 1999). As a result, healthcare services are presently delivered by tertiary (teaching hospitals and other specialized institutions), secondary (district and regional level), and primary (community and sub-district level) healthcare institutions. The teaching hospitals are responsible for providing complex curative healthcare, and setting standards for quality of care and treatment protocols, as well as for conducting research, teaching, and training. They also serve as referral centers for health services at other levels of hierarchy that operate across the country (GSS/MOH/ORC Macro, 2003). At the regional level, curative services are delivered by public hospitals which are under direct oversight of the Regional Health Directorate, also responsible for the management and

supervision of the district and sub-district level healthcare institutions and services. Similarly, the District Health Management Team is responsible for the provision of curative health services at district hospitals and other mission-based facilities. At the sub-district level, curative and preventive health services are provided through community health centers and other health programs, such as the Community-Based Health Planning and Services (CHPS) (GHS, 2008; MOH, 2007b).

In Ghana, private health sector is also thriving and is regulated by the Private Hospitals and Maternity Homes Board, which grants operating licenses to private physicians. Evidence suggests that more than 50% of health services in Ghana are provided by the private sector (Makinen et al., 2011; Pehr, 2010). Thus far, the focus of institutions operating in the private sector has been on the provision of curative services rather than disease prevention and health promotion initiatives. Most of the private-sector healthcare services are provided by mission-based institutions, such as Christian and Muslim-owned hospitals, and private medical and dental practitioners (Couttolenc, 2012; GSS/MOH/ORC Macro, 2003). Traditional medical practice is also popular among Ghanaians and is governed by the Department of Traditional and Alternate Medicine, which is responsible for oversight of traditional medical providers, alternative medicine practitioners, and faith healers (Abor et al., 2008). Recently, traditional medicine provision has been integrated into the formal healthcare delivery system (Asante & Avornyo, 2013). Some researchers argue that most Ghanaians believe that illness and disease are caused by supernatural powers or the spirit world (Tsey, 1997; Twumasi, 1979). Hence, such illnesses are considered to be caused by extraordinary influences that are beyond human control (Boateng et al., 2016). Consequently, rather than seeking help in medical institutions adopting Western-based disease model, patients and their families rely on herbs and plants. In response to this prevalent

trend, the government of Ghana has started to endorse traditional medicine through various ministries, departments, and agencies, and through various research institutions and universities. Moreover, to formally legislate the practice of traditional medicine, in 2000, the government of Ghana has passed the Traditional Medicine and Practice Act (Act 575) as a commitment to establishing a legal framework to guide the practice of traditional medicine in Ghana. For instance, under the Act, the Traditional Medical Council is mandated to register all practitioners, to set standards, and to license traditional medical institutions (MOH, 2000). A traditional medicine policy has been vigorously developed and is currently used as a guideline to integrate the practice of traditional medicine into the formal healthcare delivery system (MOH, 2005). The aim of the policy is to ensure that all traditional practitioners operate within a well-defined structure in terms of their management and organization, to standardize and ensure quality production of traditional medical products, and to promote biodiversity conservation, among other topics. In sum, in Ghana, traditional medicine is presently recognized as having a complementary role in healthcare delivery (Asante & Avornyo, 2013).

Health System Response to NCDs in Ghana

Anecdotal evidence suggests that, despite several strategies and guidelines for the management of NCDs being issued at the national level, their implementation at the facility level is weak (GHS, 2012). Currently, only two of the three teaching hospitals operating in the country have specialist centers for managing diabetes, while none exist at regional and district level (Nyarko et al., 2016). At the tertiary and secondary levels of care, NCD awareness among the general population is very low, resulting in delays in seeking treatment and suboptimal utilization of available services (MOH, 2011a). This issue is further exacerbated by insufficient resources for NCD interventions, such as screening or diagnostic equipment, and inadequate

treatment guidelines for NCDs. For instance, de-Graft Aikins Boynton, & Atanga, (2010) noted that most secondary health facilities in Ghana lack the resources needed to treat NCDs. de-Graft Aikins and Mark (2007) similarly reported lack of specialist training among health professionals, high cost of treatment associated with such conditions, and a very small number of specialist centers offering NCD treatment. Evidence provided by the GHS (2012) suggests that, at the secondary level of healthcare, guidelines for the screening and management of NCDs are non-existent. However, at the secondary level of healthcare, lack of funding remains a major challenge to the adoption of health promotion activities aimed at NCD control (GHS, 2012).

The primary healthcare is the first point of contact between the client and the formal healthcare delivery and is governed by the CHPS (Nyonator et al., 2005). CHPS aims to provide low-cost, high quality, and effective health services at the primary level of care to individuals and households within communities (GHS, 2008). Under the CHPS system, patients can access curative and preventive health services, such as immunization, family planning, maternal health, and treatment for basic health conditions (Nyonator et al., 2005). The CHPS program focuses on the delivery of health services at remote and community-based centers, rather than in centrally located points (GHS, 2008).

Research has demonstrated that, the prevention control and management of NCDs at the primary level is inadequate (de-Graft Aikins, 2003, 2004; de-Graft Aikins et al., 2014: Nyarko, 2016). Thus, despite evidence indicating high NCD prevalence in rural communities in Ghana, NCD interventions have not been developed and incorporated at the primary level of healthcare (de-Graft Aikins et al., 2010; de-Graft Aikins et al., 2014; Bosu, 2012; Gatimu et al., 2016). Consequently, NCDs tend to be diagnosed when already in advanced stages, complicating the treatment and compromising patient outcomes. In sum, while NCD policies and programs have

been developed at the national level, as no budget is specifically designated for NCD prevention, management, and treatment, their implementation at the facility level remains a major challenge (MOH, 2011).

This issue is further compounded by the prevalent view among Ghanaians that NCDs are caused by supernatural forces, due to which they seek help in the traditional and alternative medicine sector, which is ill-equipped to manage chronic diseases (de-Graft Aikins, 2003; Anarfi et al., 2016). Moreover, as noted by de-Graft Aikins (2005), most individuals suffering from NCDs prefer traditional and faith healing to the modern healthcare system owing to the high costs associated with the latter, while mistakenly believing that traditional or faith healers are experts in addressing such complex medical conditions.

Policies, Programs, and Strategies for Responding to NCDs in Ghana

Efforts towards creating a comprehensive NCD program started in the 1990s when the MOH established the Non-Communicable Diseases Control and Prevention (NCDCP) program (Bosu, 2012). The functions of the NCDCP program include planning, advocacy, coordination, research, health promotion, development of clinical guidelines, and mobilizing resources toward NCD prevention. The overall aim of the program is to reduce morbidity, complications, and disability among individuals affected by NCDs, and to improve the quality of life and increase longevity among the Ghanaian population (Bosu, 2012). The diseases that are targeted for prevention and control under the NCDCP program include cardiovascular diseases, diabetes, cancer, chronic respiratory diseases, and sickle cell anemia (Bosu, 2007). However, one major challenge facing the NCDCP is lack of funds designated specifically for program delivery, as most of the funds are being sourced from other vertical programs managed by the MOH, such as HIV, TB, and immunization programs, among others.

Over the last decade, attempts have also been made to establish the Regenerative Health and Nutrition Program (RHNP), which was initiated by the Ministry of Health in 2005 and was first implemented in 2006 (MOH, 2008, 2009). The RHNP aims to promote healthy lifestyle as a means of health promotion and disease prevention, with emphasis on healthy diet, food and water safety and quality, active lifestyle, and improving environmental sanitation and personal hygiene, among others (GHS, 2008, 2009; MOH, 2008, 2011b). The RHNP aims to engage with local communities through outreach programs, such as community forums, media outreach, schools, matrons, midwives, among others. However, recent reports suggest that, as the RHNP is operating under the MOH (which is a policy formulation agency), instead of being governed by the Department of Public Health (which is mandated to implement health policies), there is no coordination in ensuring its effective implementation (MOH, 2008, 2009).

Recently, a draft national NCD policy was formulated with the aim of better NCD control and prevention in Ghana (MOH, 2011b). In particular, the policy objective was to strengthen the regulatory bodies in Ghana to ensure strict adherence to quality standards in the entire food chain. The regulatory bodies charged with ensuring this mandate are the Food and Drugs Board and the Traditional Council. In addition, the NCD policy seeks to strengthen current legislation on guidelines on food labelling. The policy also incorporates several healthy lifestyle focusing on the major NCD (hypertension, diabetes, and stroke) risk factors.

The NCD policy also incorporates an element of public education on the importance of healthy diet, while seeking to increase access to healthy foods, and better regulate fast-food advertising in the media. This initiative is supported by mandating more accurate labelling of food products by the manufacturers, in line with global standards (MOH, 2011b). The NCD

policy emphasizes the importance of the WHO`s standard of consuming five servings of fruit and vegetables per day, as recommended by the WHO.

The NCD policy also emphasize the promotion of physical activity through school-based and work-based interventions, and calls for creation of safe environments for recreation. As noted previously, tobacco control and restricting alcohol consumption are highly important components of the NCD policy, as manifested by the enforcement of the Framework Convention on Tobacco Control (FCTC) that led to the drafting of a tobacco bill in 2005 (Brenya, 2014; Owusu-Dabo, McNeill, Lewis, Gilmore, & Britton, 2010). This is accompanied by greater investment into public education on the dangers of smoking and harmful use of alcohol, higher taxation of tobacco and alcohol products, and banning smoking in public places. The tobacco control bill mentioned above was passed into law in 2012. In addition, Food and Drugs Board's (FDB) regulatory requirements are imposed on the tobacco manufacturers and importers, who are legally mandated to register their products and use appropriate labels (Owusu-Dabo et al., 2010).

In 2013, a nutrition policy was launched. The aim of the nutrition policy was to provide a strong connection between nutrition outcomes and food security and safety (GHS, 2009; MOH, 2013). The nutrition policy focuses on maternal and infant nutrition by promoting breastfeeding, nutritious food choices, and healthy lifestyle (GHS, 2010; MOH, 2013). Although the nutrition policy focuses mainly on certain aspects of nutrition, it does not provide any guidelines for recommended consumption of fruits and vegetables as outlined by the WHO. The nutrition policy also focuses heavily on women and children, but neglects the elderly, who are at the highest risk of developing NCDs. Likewise, the national alcohol policy was launched with the aim of regulating the production, distribution, and advertisement of alcoholic products in the

country. The policy also seeks to reduce harmful consumption of alcohol among the Ghanaian population. The strategies that have been laid out in the policy to achieve these objectives include increasing taxation on alcoholic products, regulating the availability and use of alcohol, and strictly enforcing measures against driving under the influence of alcohol.

In sum, although great strides have been made in the prevention, control, and management of NCDs in Ghana though the adoption of the aforementioned policy documents and strategies, their implementation remains suboptimal, largely due to weak coordination.

Financing of NCDs in Ghana

Research consistently indicates that healthcare financing is one of the pillars of an effective health system (Duran & Khot, 2011; WHO, 2000). In Ghana, healthcare funding has been subject to several reforms, some of which date back to the pre-colonial era (Addae-Korankye, 2013; Agyepong & Adjei, 2008). Once Ghana achieved independence in 1957, the government was committed to providing free healthcare for all citizens, which would be financed through a general tax-based system. However, this model was unsustainable as a result of competing demands from other sectors of the economy (Agyepong & Adjei, 2008). In the 1970s, user fees were introduced by the government but an exemption was made for certain treatment categories, such as antenatal care, family planning, and communicable diseases (Agyepong, 1999). In 1971, the Hospital Fees Act (Act 387) was also introduced, allowing government to raise the fee-for-service to a minimal level and to discourage unnecessary use of health services by the Ghanaian population (Tagoe, 2012). Due to economic challenges in the 1980s, coupled with the implementation of the Economic Recovery Program (ERP), government subsidies for healthcare services were withdrawn, where patients were charged full cost of healthcare delivery. This system was popularly referred to as the “user fees system” or “cash and carry” system.

The user fees system led to several challenges, including low healthcare utilization among the Ghanaian population who could not afford basic healthcare services. In response to this issue, the National Health Insurance Act (Act) was created in 2003 and was implemented in 2005 paving the way for the National Health Insurance Scheme (NHIS) (Addae-Koranye, 2013). The main sources of finance for the operation of the NHIS, include —a 2.5% value added tax which constitutes the major source of funds, a monthly payroll deduction of 2.5% from the formal workers from the Social Security and National Insurance Trust (SSNIT), and annual premium contributions from members in the informal and formal sectors not covered under SSNIT (Agyepong & Adjei, 2008; MOH, 2007b, 2008). The NHIS covers outpatient treatments, including diagnostic tests and operations, maternal health services, dental health, emergency care, and the list of drugs indicated under the National Health Insurance Act (National Health Insurance Authority [NHIA], 2011). However, certain healthcare services that incur higher cost have been excluded from the NHIS, such as cancer care (excluding breast and cervical cancer), cosmetic surgery, and organ transplants, among others. According to Abuosi et al. (2015), introduction of the NHIS has improved access to healthcare, as it has reduced the financial burden for those that can afford the premium rates, thus increasing the utilization of health services in Ghana (Abuosi et al., 2015). Although the NHIS provides financial protection for those registered under the scheme, patients living with NCDs continue to bear a huge financial burden of their disease management.

For example, de-Graft Aikins et al. (2014) noted that the NHIS does not cover all medicines required for NCD treatment and management, due to which these drugs must be purchased by the patients, many of whom cannot afford them. Similar findings have been reported for managing diabetes and its complications (Abuosi et al., 2015; Baatiema et al., 2017;

Kratzer, 2012; Tagoe, 2012). Quaye et al., (2015), for instance, estimated that the annual mean cost of managing diabetes at a clinic in Ghana was $372.65, in 2010. Kratzer (2012) noted that testing devices for monitoring the glucose level of diabetes patients were not covered under the NHIS and could not be afforded by those in the lower socio-economic group. More recently, Amissah and Dunyah (2016) reported that the annual out-of-pocket cost of diabetes for patients in Ghana (including medications and tests) ranged from $332.58 to $362.98. Owing to poor access and high NHIS registration fees, Agyepong et al. (2016) noted that only 40% of Ghanaian population is enrolled in the scheme, as most of the non-exempt population cannot afford the cost of premiums and renewal rates, despite the fact that these are designed on a sliding scale based on the ability to pay. In practice, premiums are at a flat rate irrespective of one's income level.

Conclusion

This chapter provides a broad overview of health services in Ghana, which are mainly driven by the public sector, with limited private sector participation. The health system in Ghana has generally been geared towards the treatment of infectious diseases rather than NCDs. Most NCD-focused interventions are not delivered at the primary level of care, which is crucial for early detection and control of NCDs. At the secondary and tertiary levels of care, the number of healthcare professionals with adequate knowledge to deliver NCDs interventions is insufficient. Moreover, due to the lack of awareness on the diagnosis, management, and treatment of NCDs among the Ghanaian population, their prevalence and burden on families and society is rapidly growing. Over the years, several policy documents have been developed in response to the high prevalence of NCDs in Ghana. However, the major challenge is ineffective implementation of this policy documents at the facility level. Finally, financing of NCDs has not received the

necessary attention, as most funds are designated for the fight against infectious diseases. In the next chapter, a brief discussion of the methods used for this is outlined.

Chapter 3: Methods

The methods employed in this research are described in this chapter. Although this thesis comprises of stand-alone manuscripts, each pertaining to specific methodologies that are described in detail in subsequent chapters, a brief description of how the different methods were implemented to achieve the overall objectives of this study is given here. The chapter commences with a discussion on the types of study designs used in mixed methods research. This is followed by the description of the specific design used for this research and the reasons for this choice. The reasons for using mixed methods research are also presented, along with the challenges commonly encountered in mixed method research. Lastly, the field activities undertaken by the researcher in Ghana are described in narrative form.

Mixed Methods Study Designs

While there are several mixed methods research designs, namely parallel, fully integrated, embedded, and conversion, a sequential research design was adopted in the present study (Creswell & Clark, 2011; Hollstein, 2014). In sequential mixed methods research, either a quantitative or qualitative methods are used first, where the results of the first component are employed to explain those yielded by the second approach. Moreover, conclusions are drawn from the results yielded by the first method, allowing the research questions to be formulated. This then drives the choice of the data collection and analysis methods employed in the next phase of the study.

Mixed methods design is typically employed in research in order to achieve triangulation (Archibald, 2016; Fielding, 2012). The objective of triangulation is to obtain convergence of results from multiple sources, to corroborate the findings of each phase and to achieve greater validity of concepts and measures (Doyle et al., 2016; Johnstone, 2004; Sosulski & Lawrence,

2008; Turner et al., 2013; Turner et al., 2015). Besides, mixed methods research is to elaborate, expand, deepen, and enhance the interpretations of results and generate strong inferences from a single study (Greene, 2007). This is often necessary, as most social phenomena are complex and can benefit from the use of complementary mixed methods research design (Gibson, 2017; Tariq & Woodman, 2010). Mixed methods research is also used for the purpose of theory development, where the results yielded by one method inform the other method or help develop theoretical models (Kelle, 2006, Kong et al., 2016; Tariq & Woodman, 2010). Thus, when using mixed methods research for the purpose of theory development, researchers seek to develop measures, constructs and concepts that can be tested through the development of hypotheses and data collection instruments (Greene, 2008). Mixed methods research is also used to ensure credibility of findings, as the use of multiple methods enhances the integrity of results (Heyvaert et al., 2013; Mckim, 2015). This is done by simultaneously collecting multiple data types from a variety of sources, concurrently assessing the information gathered through parallel constructs. This is accompanied by analyzing the data sets separately, comparing the results, and finally transforming the qualitative data into quantitative constructs, or converting the quantitative data to narratives and themes (Doyle et al., 2009).

While the strengths of mixed methods research are widely known, it is important to note the challenges encountered when using a mixed methods design. One such challenge arises due to the different paradigms and incompatibility between quantitative and qualitative research methods (Yardley & Bishop, 2015). According to Gelling (2014), as quantitative and qualitative research represent different worldviews, it may be inappropriate to combine these methods in a single study. Hence, the two approaches provide divergent perspectives on the manner in which a phenomenon should be investigated. Another challenge posed by mixed methods research is that

it is time consuming and expensive to undertake, since it requires expertise and experience in both qualitative and qualitative methods (Kroll & Morris, 2009; Mckim, 2015).

Sequential Designs.

Explanatory research design starts with a quantitative study phase, followed by a qualitative phase (Ivankova, Creswell & Stick, 2006). The major philosophical underpinning underlying the quantitative components is the postpositive perspective mandating that the data gathered by the research are based on quantified concepts and measures (Creswell & Clark, 2011: Hollstein, 2014). In the qualitative phase, the researcher adopts a constructive perspective, with the emphasis on in-depth descriptions. However, in some studies, the qualitative component can be undertaken independently to enrich the research (Hollstein, 2014). This design is also employed when a researcher is interested in investigating a group of participants based on similar characteristics, where the pertinent quantitative data can be further examined via qualitative analyses performed on the same group. Thus, this design is most beneficial when the aim is to establish relationships between constructs and a phenomenon of interest by adopting a quantitative method, followed by a qualitative phase, the purpose of which is to explain the trends identified in the quantitative component (Creswell & Clark, 2011). In addition, this design is mostly suitable when one method cannot be used to address multiple research questions, thus the use of a second method is required in order to fully answer the research questions (Creswell & Clark, 2011).

In contrast, in exploratory sequential research, the first study phase focuses on qualitative data collection and analysis, whereby the results generated are used to measure related qualitative concepts (Doyle et al., 2016). The aim of this research design is to use the quantitative component to build on the findings yielded by the qualitative analyses (Castro,

Kellison et al., 2010; Leech & Onwuegbuzie, 2009). When deciding whether an explanatory or exploratory design should be employed in a research study, the sample size for each method should be the driving factor, along with a careful consideration of the results to use from the first method. In exploratory design, the sample used for the qualitative component is usually not the same as that employed in the quantitative component to allow for generalization of the results. Similarly, a large sample size is used for the quantitative component in order to test hypotheses and draw conclusions (Creswell & Clark, 2011).

Implementing the research design used.

I used a sequential explanatory research design to address the research and objectives of this study. The ultimate goal was to confirm the results of the quantitative phase by conducting a qualitative study. In addition, the objective was to explore, in detail, the experiences of NCD patients receiving social support and how that impacts overall general health. In the first phase of the design, quantitative data were analysed from secondary sources: the Ghana Global Ageing on Adult Health Survey (SAGE) wave 1 and the Women Health Study of Accra (WHSA-II) wave 2. The SAGE data was implemented in six countries, including China, Ghana, India, Mexico, The Russian Federation, and the Republic of South Africa. The Ghana SAGE Data aims to strengthen, gather, process, and manage data of older persons and to respond the needs through effective policy planning, management, and research. A total of 5,266 households were sampled for interviews. WHSA-I was carried out to determine and quantify the burden of disease attributed to communicable and NCDs among Ghanaian women aged 18 years and older in the Greater Accra Region of Ghana. A total of 2,814 women were sampled and interviewed. The data was analyzed using linear and multilevel logistic regression. These were used to predict the risks of NCDs and prevalence of disability as a result of an NCD among the Ghanaian

population. In the quantitative phase, the research utilized a number of dependent and predictor variables. Some of the dependent variables were constructed using principal component analysis (PCA), and due to their continuous nature linear regression, was employed, while logistic regression analysis was used for those with binary outcomes. Based on the predicted results, conclusions were drawn from the quantitative phase and to serve as a foundation for the qualitative component. The data collection for the qualitative phase was undertaken in two teaching hospitals in Ghana. Interviews were carried out with patients living with hypertension, diabetes, and stroke. A purposive sampling technique was used to select of 33 patients for interview. An interview guide was used to explore themes related to the meaning and types of social supports, quality of social support on general health of patients, sense of belonging as a result of social support, and how social support impacts activity limitations and participation restrictions.

The initial phase of this research used quantitative data from the Ghana SAGE and WHSA-I to examine and explore NCDs by identifying the risk factors and prevalence of disability as a result of living with an NCD in Ghana. In the analysis of data for the quantitative phase, the results were to determine the risk and prevalence of NCDs and disability among the Ghanaian population. Based on the results yielded from the quantitative component, in-depth individual interviews were conducted in two teaching hospitals in Ghana to explore the role of social support in the self-management of NCDs in Ghana. This is to answer questions that could not be answered by the quantitative phase and to explore whether the qualitative findings confirms the qualitative findings. Some of the questions on disability based on the SAGE data were incorporated in the qualitative phase. While a quantitative approach could have provided

generalizations to the study, it would not have provided a deeper understanding of the experiences of people living with NCDs and the role that social support plays in their daily life.

The flow chart below provides a quick summary of samples used for the study (see figure 2).

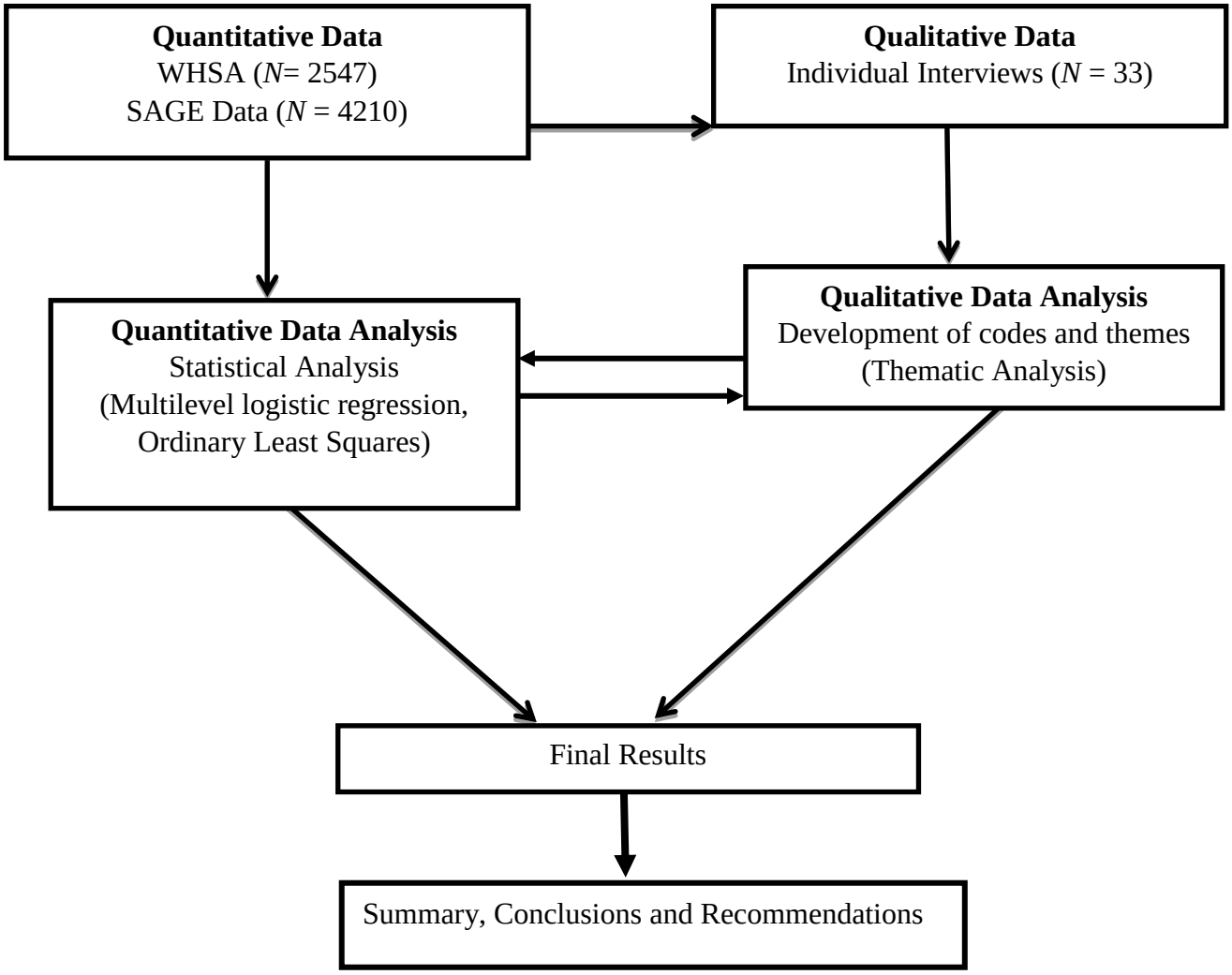

Figure 3. 1: Study Design Used.

Field Trip to Ghana

Prior to arriving in Ghana for the qualitative phase of the project, I made a few contacts with the Tamale Teaching Hospital. During these initial exchanges, I was informed of the necessary documents that I would need to present to start my research. However, I had

challenges with establishing contacts with the Korlebu and Komfo Anokye Teaching Hospitals. I left St. John's, Newfoundland, Canada, on May 23rd, 2016 and arrived in Ghana the next day. As a Ghanaian, I was fortunate to be met at the airport by my family and friends. I rested for two days before reporting at the Korlebu Teaching Hospital to begin my research. On submitting my supporting documents for permission to conduct research, I was informed that I would have to apply for ethics clearance from the hospital. I was also informed that the ethics clearance process would take a month to complete, and that I would need to obtain the approval before starting my research. I was further told that, if I wished to expedite the process, I would have to pay twice the amount I was initially quoted for the cost of application. Moreover, while the first Ethics Board meeting was scheduled for June, my application would also have to be considered by Internal Review Board (IRB), which was meeting for the first time in September. This meant that, by the time the entire process was completed and I received the required approvals, it would be November, 2016. This was concerning, as I planned for my fieldwork to be completed by the end of September, 2016. I attempted to explain these restrictions to the research officer, hoping that my ethics application could be expedited, but was told that nothing could be done about it. Due to these bureaucratic obstacles, I was forced to exclude the Korlebu Teaching Hospital from the study.

Considering the limited time available, I had to quickly begin the ethics application for Komfo Anokye and Tamale Teaching Hospitals, as their ethics application processes followed similar procedures to that outlined above. At the Komfo Anokye Teaching Hospital, on introducing myself to the medical director, I was informed that, according to the hospital policy, I was obliged to work with two local supervisors (a medical doctor resident in the hospital and an academic researcher) who would guide my data collection initiatives. I encountered obstacles in

finding those local supervisors, since I had not established contacts with the hospital before arriving to Ghana. I thus contacted my research supervisor and explained the challenges I was experiencing in getting local supervisors. He suggested that I contact Michael Asamoah-Boaheng—a student he was recruiting as a PhD student, who had some contacts with some medical doctors in the hospital. I contacted Michael, who kindly reached out to one of the medical doctors named Sarfo-Kantaka, who agreed to act as my local supervisor. Through the efforts of Dr. Sarfo-Kantaka, I managed to secure Professor Sarfo Mensah as my academic supervisor. The ethics application process and approval took five weeks to complete, as explained later in the thesis. While waiting for the ethical approval, I had to train two research assistants who are fluent in the local languages to help with the translation of the interview questions.

While waiting for the ethics approval from Komfo Anokye Teaching Hospital, I had to travel to the Tamale Teaching Hospital to present the ethics application there. As the ethics application for permission to conduct research at the Tamale Teaching Hospital was approved in two weeks, I started the interviews at this facility on July 5th and completed them by August 7th, 2016. Similarly to the above, at the Tamale Teaching Hospital, I had to train a research assistant to help in the translation of data collection instruments to the local languages.

Conclusion

In this chapter, the methods used in this research, as well as the study design, were described in detail. The study purpose and challenges in undertaking mixed methods research were discussed next, concluding with a detailed elaboration on the field activities undertaken as a part of this research. In the next chapters, the individual manuscripts comprising this study are introduced. The first of which pertains to the effects of individual and neighborhood SES on

hypertension among women in the Greater Accra Region of Ghana. The second paper delves into the prevalence of disability and its association with NCDs, while the last manuscript explores the role of social support and living with NCDs in Ghana. In the final chapter, conclusions are drawn by identifying the common themes and unifying the key arguments presented in the thesis.

As noted earlier, the work reported in the first paper focuses on the effects of individual and neighborhood SES on hypertension among women in the Greater Region of Ghana. Using the findings yielded by this part of the study, the prevalence of disability and its association with NCDs in Ghana is examined. Finally, in the last manuscript, the role of social support systems in the self-management of NCDs in Ghana is explored.

Chapter 4: Examining the effects of individual and neighborhood socioeconomic status (SES)/wealth on hypertension among women in the Greater Accra Region of Ghana

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Introduction

The work reported in the first paper focuses on the effects of individual and neighborhood SES on hypertension among women in the Greater Region of Ghana. The aim of this present research is to examine the effects of individual and neighborhood SES on hypertension among women in the Greater Region of Ghana.

Abstract

Hypertension is one of the leading causes of morbidity and mortality among women in SSA. Although research on the relationship between individual-level SES and hypertension exists, to the best of our knowledge, limited empirical studies examined the effects of neighborhood-level SES/wealth on the risks of living with hypertension in Ghana. Using data from the 2009 Women's Health Study of Accra (WHSA-II), and applying multilevel logistic regression, this study investigates the effects of both individual and neighborhood wealth status on hypertension among women in the Greater Accra Region of Ghana. The results show that individual-level SES/wealth is a significant determinant of hypertension among women in the Greater Accra region of Ghana. Specifically, wealthy women are more likely to be hypertensive compared to poorer women. However, the effects of neighborhood SES/wealth was attenuated after adjusting for individual-level SES/wealth. These findings suggest that it is important to develop health promotion programs targeted at those of higher SES in the prevention, control and management of hypertension among women in the Greater Accra Region of Ghana.

Keywords: Ghana; hypertension; neighborhood, SES; Women

Background

Hypertension remains a global public health challenge and is recognized as a major risk factor for cardiovascular diseases (Choi et al., 2017; Seedat, 2015). Global estimates indicate that, in 2015, 1.13 billion individuals were living with hypertension, 529 million (46.81%) of whom were women (Zhou et al., 2017). Extant research focusing on hypertension in women is limited, because this condition has been previously considered to primarily affect men (Gudmundsdottir et al., 2012). However, the prevalence of hypertension among women is expected to increase in the long term, due to their higher life expectancy relative to men (August, 2013; Geraci & Geraci, 2013). Although gender differences in hypertension are not clear, it has been suggested that menopausal women are at higher risk of developing hypertension compared to their non-menopausal counterparts (August, 2013; Gudmundsdottir et al., 2012). Besides, previous studies have also found that that the use of contraceptives, the shorter arterial tree in women which induce faster heart rates, and pregnancy-induced hypertension (pre-eclampsia and eclampsia) are known risk factors for hypertension among women (Abramson & Melvin, 2014)

In Ghana, hypertension is the leading cause of morbidity and mortality, including outpatient attendance and hospital admissions (Sanuade et al., 2014). Due to limited epidemiological data, accurate prevalence of hypertension among women in Ghana is lacking. However, findings yielded by existing cross-sectional studies indicate that hypertension affects 13.1% to 50.3% of Ghanaian women (Nyarko, 2016; Tenkorang, Kuuire et al., 2015; Tenkorang, Sedziafa et al., 2015). Also, due to the limited health system capacity and a high rate of female illiteracy, early awareness, screening, and diagnosis of hypertension is low among women (Agyemang, 2006; Bosu, 2016; Bosu et al., 2017). Meanwhile, available evidence indicates that rapid urbanization, sedentary lifestyle, aging population, and globalization are among the main contributors to the high prevalence of hypertension in Ghana (de-Graft Aikins et al., 2012).

The conventional risk factors for hypertension include excess alcohol consumption, physical inactivity, obesity, smoking, and age. Extant research indicates that these conventional risk factors do not fully explain the development of hypertension (Psaltopoulou et al., 2017). In pertinent literature, it has been noted that individuals' socioeconomic conditions and their neighborhoods characteristic (Lucumi et al., 2017) are associated with the risk of living with hypertension. However, studies, mostly from Western industrialized countries, report mixed findings on the relationships between SES[1] mainly operationalized as income/wealth and hypertension at the individual level (Leng et al., 2015; Minor et al., 2008). For instance, while some report an inverse relationship between SES/wealth and hypertension (Conen et al., 2009; Cuschieri et al., 2017), others find positive relationships between the two variables (Baek et al., 2015; Tareque et al., 2015).

Beyond the individual-level, neighborhood-level SES/wealth is often considered a strong determinant of hypertension (Chaix, Rosvall, & Merlo, 2007; Dubowitz et al., 2012; Guwatudde et al., 2015). Some studies mostly from Western countries demonstrate higher prevalence of hypertension for individuals who reside in poor neighborhoods compared to those in wealthy neighborhoods (Chaix et al., 2008; Chaix, Bean et al., 2010; Dubowitz et al., 2012). At the moment, studies in Ghana and SSA, focus on the relationships between individual-level wealth and hypertension (Guwatudde et al., 2015; Tenkorang, Sedziafa et al., 2015b). Not many have explored the contributions of neighborhood-level SES (NSES)/wealth on the risks of living with hypertension and in particular among women. Also, studies that explore interactions between individual- and neighborhood-level wealth are lacking. Meanwhile, examining the effects of neighborhood-level SES/wealth on hypertension could yield relevant public health knowledge

[1] The most common indicators of socioeconomic measures are income, education, and occupation.

that can be utilized when designing health policies, treatment guidelines, and interventions aimed at the prevention, control, and management of hypertension in Ghana. We fill this important research gap. Specifically, we investigate the effects of both individual- and neighborhood-level SES/wealth on hypertension among women in Ghana. We also explore the extent to which individual level SES/wealth moderates the effects of neighborhood level SES/wealth on the risks of living with hypertension.

SES and Hypertension: Theoretical and empirical considerations

The mechanisms linking both individual and neighborhood level SES to health outcomes, including hypertension remains poorly understood. Nonetheless, several theoretical models have been developed to explain these relationships and the interactions between the two. These include, *the double jeopardy model*, the *collective resources framework*, and the *fundamental cause model* (Boylan & Robert, 2017). The *double jeopardy model (DJM)* posits that individuals of lower SES who reside in poor neighborhoods are more likely to have poor health outcomes (Chuang et al., 2007; Wen & Christakis, 2005). This assumption is rooted in the fact that lower SES implies fewer resources, meaning that residing in neighborhoods with fewer resources is likely to exacerbate the negative effects that lower SES confers on the individual. For instance, some empirical studies from the West show evidence of poor health for individuals living on low income in poor neighborhoods compared to more affluent ones (Chaix et al., 2010; Wagner et al., 2016). Findings from other studies demonstrate that poor neighborhood characteristics, such as inadequate physical and social resources, limited social interactions, insufficient health knowledge, lack of access to information, and high crime prevalence, contribute to the risks of living with hypertension among individuals of low SES (Agyeman et al., 2007; Chaung et al.,

2007). Thus, for the DJM it is expected that poorer women living in poor neighborhoods will have poor health outcomes (in this case, higher risks of living with hypertension).

The *collective resources theory (CRT)* places more emphasis on neighborhood resources, considering it as the most important determinant of health even beyond SES at the individual level. Proponents of this theory argue that, irrespective of their socioeconomic standing, individuals residing in wealthy neighborhoods can benefit from the neighborhood resources (Boylan & Robert, 2017; Wee & Koh, 2011). Empirical studies testing the assumptions of the collective resource theory using data primarily from the United States indicate that, individuals who reside in affluent neighborhoods have lower risk of developing hypertension irrespective of their income levels (Booth & Jonassaint, 2016; Boylan & Robert 2017). Thus, based on these assumptions, it is expected that wealthy or poorer individuals living in wealthy neighborhoods will have positive health outcomes (in this case low risks of living with hypertension). Finally, unlike the CRT, the *fundamental cause model (FCM)* places emphasis on the individual's SES considering it as more influential (Phelan et al., 2010). It argues that wealthier individuals will always have access to the resources needed to mitigate the negative consequences of poor health that living in wealthy neighborhoods may confer. Thus, they may be largely unaffected by the neighborhood conditions. Similar to the others, empirical research on the FCM on hypertension shows that the individual's SES provides a wide range of resources and could be potential sources of power, prestige, privilege, and social connections, which can be protective against the development of hypertension (Link et al., 1998). Individuals of higher SES are also able to use their resources to engage in preventive health behaviours. Based on this theory, it is expected that the wealthy will have better health outcomes (low risks of living with hypertension) irrespective of the neighborhood. The forgoing theoretical postulations suggest complex

interactive relationships between individual and neighborhood level SES/wealth on health. We use data from the Women's Health Study of Accra to explore these relationships.

Data

To examine the assumptions underlying the various theoretical models, this study draws on data from the Women's Health Study of Accra, Wave II (WHSA-II) 2009, conducted by the Institute of Statistical Social, and Economic Research (ISSER) at the University of Ghana and the Department of Global Health and Population, Harvard School of Public Health. The WHSA aims to determine the prevalence of communicable and non-communicable diseases among women of reproductive age, 18 years and above, residing in the Accra Metropolitan Area (AMA). The specific objectives of this study are to gather data on the general health of women, determine the prevalence of morbidity among women within the AMA, and create a baseline for a longer-term cohort of women's health. Greater Accra Region was chosen as the study site because just like any urban city, Accra is a cosmopolitan city that shares the features of a rapidly growing urban center within the West African sub-region (Hill et al., 2007).

The WHSA-II builds on the detailed work from WHSA-I. Wave I of the WHSA was conducted in 2003 and included a sample of 3,200 women. The WHSA-I collected information on the reproductive and general health, comprehensive clinical history and physical examinations, screening for heart diseases, cervical and breast cancers, diabetes, anemia and HIV of the interviewed households. In the WHSA-I participants were selected by a two-stage cluster probability sample. In WHSA-I, the 2000 Census frame was used to identify a representative sample of women in Accra aged 18 years and above. The women interviewed in 2003 were asked for consent to be revisited in the future, and women who consented were contacted for re-interview between October 2008 and March 2009 for the WHSA-II. When a participant in

WHSA-I could not be contacted or has moved out of Accra, a woman of similar age, socioeconomic status and geographic location was replaced as the initial participant of WHSA-I. In the WHSA-II, 995 women were replaced and a total sample of 2,814 women were successfully interviewed. Ethics approval for WHSA was granted by the ethical review board at the Noguchi Institute for Medical Research, University of Ghana and the Harvard School of Public Health Human Subjects Committee.

Just like the WHSA-I, the WHSA-II is a multi-staged representative sample of women aged 18 years and above. The study consists of 11 municipal areas and 1 metropolitan city of Accra. At the first stage of sampling, the sample was determined using the Enumeration Areas (EAs) as primary sampling units using probability sampling proportional to size from 1,731 EAs from 1,254 households. All women aged 18 years and older were listed and an extensive mapping was carried out in the selected EAs to ensure representation. The listed women formed the frame for the second stage of selection. The sample for this current research was limited 2,504 women whose information blood pressure measurement was available.

Measures

Individual-level and Neighborhood-level Variables.

Given our interests, the outcome variable measures whether a respondent is hypertensive or not. The Ghana Health Service (GHS) (n.d.) and World Health Organization's (WHO, 2010a) cut-off points were adopted for measuring hypertension. An individual was considered hypertensive if her systolic blood pressure measurement was equal or greater than 140 mm Hg or her diastolic blood pressure measurement was equal or greater than 90 mm Hg (Duda et al., 2007; Friedman-Gerlicz & Lilly, 2009; Tenkorang, Sedziafa et al., 2015). The WHSA-II used the Adult-sized Mercury Aneroid Manual Sphygmomanometer (American Diagnostic, Jansen

Medical Supply, LLC) for the biometric measures of systolic blood pressure (SBP) and diastolic blood pressure (DBP) of study participants. Trained nurses took the biometric measures of systolic blood pressure (SBP) and diastolic blood pressure (DBP) on four occasions, with the first measurement taken 30 minutes after starting the interview. The second and third measurements were taken after the interview had ended, while the fourth measurement was taken in case of any discrepancy between the second and third measures. For the purposes of this research, the average of the last three biometric measures was used as an indicator of hypertension. The first measurement was not used because it could be higher or lower due to the initial interview nerves, respondents might have engaged in a physical activity prior to the interview, might have taken medication or a stimulant such as caffeine that could affect the reading within 30 minutes before blood pressure measurement (Frese, Fick, & Sadowsky, 2011). The dependent variable was then created as a binary outcome based on the averages of the systolic and diastolic measurement, and was coded as 1 if the individual was hypertensive, and 0 otherwise.

Given the theoretical models employed, we use individual SES and neighborhood SES as focal independent variables. Individual SES (see Table 4.1) which was principally defined by wealth status of the respondent was coded as (0 = poorest, 1 = poor, 2 = middle, 3 = rich, 5 = richest). This study uses Enumeration Areas (EAs)[2] to represent neighborhoods. Thus, the neighborhood SES (NSES) variable was created by aggregating the wealth score index at the individual level. The wealth score index was constructed using principal component analysis (PCA) from data (see Table 4.1 on how this was created) on household assets and durable goods (e.g Sewing machine, Mobile telephone, House phone, refrigerator, television, private car etc).

[2] An Enumeration Area is a geographic area covering an average of 145 households (Ghana Demographic and Health Survey, 2014)

We calculated neighborhood level SES data by aggregating the continuous wealth score index at the individual level. Thus, the variable represented the aggregated mean scores of women nested in EAs used as neighborhoods. Positive values on the scale indicate affluent neighborhoods, while negative values indicate poor neighborhoods. This method of generating aggregate data is commonly used in the literature (see Koenig et al., 2006; Tenkorang, 2019). Other variables tapped into respondents' educational background (0 = no education, 1 = primary education, 2 = middle school/JSS education, 3 = secondary/SSS education, 4 = higher education). The final variable pertaining to other SES was the main occupation of respondents (0 = unemployed, 1 = government employee, 2 = private business, 3 = self-employed, 4 = other).

Lifestyle factors included nutrition (four important measures which included vegetable consumption, fruit consumption, protein consumption and fat consumption), physical activity, smoking, alcohol consumption, Body Mass Index (BMI), and psychosocial variables (see Table 1). Control variables included sociodemographic characteristics tapping into the respondent's age (measured as a continuous variable) and ethnicity (0 = Akan, 1 = Ga-Adangbe, 2 = Ewe, 3 = northern languages, 4 = other ethnic group). Marital status of respondents was also acquired (0 = never married, 1 = currently married, 2 = separated/divorce/widowed), as was religious denomination (0 = Christian, 1 = Muslim, 2 = No religion).

Analysis

We adopted binary logistic regression because the dependent variable was dichotomous. In a hierarchical data structure, where individuals are nested within households, and households were nested within EAs, this could potentially bias the standard errors. Multilevel modeling was employed to for data analysis. Multilevel modeling also allows for the estimation of the significance and magnitude of clustering within the data, and produces results that can be used to

elucidate heterogeneity at both the individual and neighborhood levels. Clustering violates the assumption of independence underlying standard logit models that, if not controlled, may confound statistical inferences (Guo & Zhao, 2000; Tenkorang & Owusu, 2010).

Results

Univariate Results.

The descriptive statistics pertaining to the study sample are given in Table 4.2. As can be seen from the tabulated data, only 22.18% of the respondents who had their systolic and diastolic blood pressure were hypertensive. Compared to the poor (20.30%), about 19.75% of study participants belong to the richer wealth quintile, and 20.30% belong the richest wealth quintile. Negative neighborhood SES/wealth indicates poorer neighborhoods. Moreover, 11.87% of respondents had primary education, while 16.73% and 9.91% had secondary and higher education, respectively. In terms of nutrition, the descriptive statistics reveal that 33.74% of participating women consume only one type of vegetable, and 14.66% consumed two or more vegetables, whereas 5.68% did not consume any protein in their diet, but 47.88% consume two or more sources of protein. Lifestyle factors related to smoking and alcohol consumption reveal a vast difference in smoking prevalence, as 99.26% of participating women claim to have never smoked and only 0.74% indicated that they are smokers. On the other hand, 52.98% of the sample consumed alcohol. Those who are underweight constitute 3.49% of the sample, while 27.98% and 37.34% of participating women are overweight and obese, respectively. Finally, 32.37% and 13.79% of respondents belong to the Akan and Ewes ethnic groups, respectively while 40.67% belong to the Ga-Adangbe ethnic group.

[TABLE 4.2 ABOUT HERE]

Bivariate Results.

The findings yielded by bivariate analysis or unadjusted odd ratios (Model 1) shown in Table 4.3 indicate that individual SES/wealth status is significantly associated with the risk of becoming hypertensive. For instance, women in the richest quintile had higher odds of becoming hypertensive than women in the poorest quintile. Similarly, at the neighborhood level, women in wealthy communities are more likely to be hypertensive than those in poor communities. Other socioeconomic variables demonstrate that those with secondary and higher levels of education are less likely to be hypertensive than those with no education. Nonetheless, overweight and obese women are significantly more likely to be hypertensive than those who are underweight. Similarly, women that engage in highly intensive exercise are less likely to be hypertensive than those who do not exercise. Findings related to the effects of sociodemographic variables show that members of the Ga-Adangbe ethnic group are significantly more likely to be hypertensive than women in the Akan ethnic group. Age is significantly associated with the risk of being hypertensive.

[TABLE 4.3 ABOUT HERE]

Multivariate Results.

Table 4.3 shows the multivariate analysis results related to the risks and prevalence of hypertension among women in the Greater Accra Region. The second Model examines the relationship between Individual level SES and the risk of being hypertensive. This Model also adjusted for lifestyle, psychosocial and sociodemographic factors as controls. The third Model considers the effects of both individual and neighborhood SES on hypertension; while the fourth Model considers the effects of neighborhood SES on hypertension. Finally, the fifth Model included interaction of individual and neighborhood SES.

The second Model examined the effects of individual-level SES/wealth on the risk of becoming hypertensive among women in the Greater Accra Region. Lifestyle factors and sociodemographic factors also are added. The multivariate analysis results reveal that women in the richest quintile are two times more likely to be hypertensive than those in the poorest quintile. For the control variables, we found no significant difference in the risk of hypertension between those who smoke and consume alcohol and those who do not. However, overweight and obese women are 2.3 and 4.6 times more likely to be hypertensive than their underweight counterparts. Similarly, those who participated in low/moderate exercise are 47% less likely to be hypertensive than those women that do not exercise at all. The third Model shows the effects of both individual and neighborhood SES on hypertension. At the individual level, wealthy women were significantly more likely to be hypertensive compared to poorer women. Unlike the bivariate results, the neighborhood level SES was not statistically significant. However, the direction of the coefficient suggest women in wealthy communities are more likely to be hypertensive than those in poorer communities. The fourth Model shows only the effects of neighborhood SES on hypertension, controlling for relevant covariates. Women who live in more affluent neighborhoods are 1.3 times more likely to be hypertensive. It is noteworthy that further analysis indicates that the significant impact of neighborhood SES diminishes when individual-level SES is controlled. Meaning individual-level SES suppresses the effects of neighborhoods SES. Thus, the effects of neighborhood SES on hypertension was attenuated after controlling for individual SES (see Model 4 in Table 3). The final Model adds cross-level interactions between neighborhood SES (scalar measure) and individual SES (categorical); these cross-level interactions were not statistically significant.

[TABLE 3 ABOUT HERE]

Discussion

Hypertension is now considered a public health concern in Ghana, as it is the leading cause of high mortality and morbidity (Addo et al. 2012; Agyemang, 2006). This trend has been linked to the rapid demographic and economic changes in Ghana over the past decade (Mensah, 2016). This current research examined the effects of both individual SES/wealth and neighborhood SES on the risk of becoming hypertensive among women in the Greater Accra Region of Ghana. It also investigated the interactive effects of individual SES/wealth status and neighborhood SES on hypertension in the Greater Accra Region of Ghana.

We tested three competing theoretical models that explained relationships between individual and neighborhood-level SES/wealth status on hypertension. One of these is the *DJM*, based on the premise that individuals of lower SES who reside in poor neighborhoods are more likely to have poor health outcomes (Chuang et al., 2007). The model based on the *CRT*, on the other hand, posits that, irrespective of their SES, individuals that reside in wealthy neighborhoods can benefit from the neighborhood resources (Boylan & Robert, 2017). Finally, the *FCM* posits that individuals of higher SES tend to live in wealthy neighborhoods (Phelan et al., 2010). Consequently, they have access to both neighborhood and social resources, which in turn improves their health outcomes. Contrary to expectations, we did not find support for the *DJM* and *CRT* models. Results obtained in this present research are rather consistent with the *FCM*. However, bivariate associations show women living in wealthy neighborhoods have higher odds of becoming hypertensive. Taken together, these results suggest strong socio-economic influences on the risks of developing hypertension among women in the Greater Accra region of Ghana (Tenkorang & Kuuire, 2016).

Previous studies on the relationship between both individual and neighborhood SES on hypertension have emphasized the growing recognition of contextual and compositional effects

on hypertension (Hamano et al., 2011; McGrath et al., 2006). Contextual effects emphasize the relevance of neighborhood characteristics (physical, social and built environment) on health (Roux 2002). On the other hand, compositional effects acknowledge the role of individual-level SES on health (Ross & Mirowsky, 2008). Meanwhile a relationship exists between individual and neighborhood SES. It is likely that individuals with high SES will live in affluent neighborhoods (Roos et al., 2004).

Although much of the research in western countries found a relationship between neighborhood contextual factors and hypertension (Chaix et al., 2007), this study found no such evidence. Similarly, our research did not find significant interactive effects of individual SES/wealth status and neighborhood SES on hypertension, although previous research indicates a positive association between neighborhood SES and cardiovascular health among lower SES residing in poor neighborhoods and a negative relationship among lower SES residing in affluent neighborhoods (Boylan & Robert, 2017).

The results of this present research demonstrates that after adjusting for neighborhood-level SES, wealth at the individual level was significantly associated with hypertension among women in the Greater Accra Region. It must be emphasized, however, that neighborhood level wealth was also significant until wealth at the individual level was controlled. The weakened association between neighborhood SES and hypertension after controlling for individual-level SES re-enforces the idea that the individual's SES may be the most important determinant of hypertension among women in Ghana (Tenkorang & Kuuire, 2016). Previous researchers demonstrate that the odds of hypertension among wealthy Ghanaians may be linked to increasing urbanization and lifestyle changes, specifically, those related to poor dietary intake (fat and salt consumption) and physical inactivity in an era of rapid economic transformation (Tenkorang,

Kuuire et al., 2015; Tenkorang & Kuuire, 2016). This rapid economic transformation implies a major shift from manual or labor-intensive work to capital-intensive work. This could lead to the adoption of sedentary lifestyles among the wealthy population and increase their risks of living with hypertension (Tenkorang, Sedziafa et al., 2015). This finding goes contrary to the established literature in western countries where wealth is associated with lower risks of living with cardiovascular diseases (Baek et al., 2015; Dragano et al., 2007; Jenkins & Ofstedal, 2014; Schulze et al., 2003). Meanwhile, the finding is consistent with others in several parts of sub-Saharan Africa. Blakely et al. (2005) found health risks and disease burden to be higher for wealthier individuals in early stages of their development. They argued further that as countries develop, health behaviours that expose the wealthy to diseases are abandoned by the wealthy and adopted by the poor, mostly through lifestyle changes.

Lifestyle behavioral risk factors have been shown to be associated with hypertension. Research supports the links between physical activity, obesity and hypertension (Tenkorang, Kuuire et al., 2015a; Victor et al., 2008). Our results do indicate that overweight and obese women are significantly more likely to be hypertensive than their underweight counterparts. Authors of other studies have identified obesity as a significant contributor to many NCDs, including hypertension, in SSA (Biadgilign et al., 2017; Price et al., 2018). In addition to obesity, we found evidence that engaging in high intensive physical activity is associated with the low prevalence of hypertension among women in the Greater Accra Region. Our results are largely consistent with other studies elsewhere that have demonstrated the potential protective effects of physical activity on hypertension prevention (Hedge & Solomon, 2015).

There is a known link between hypertension and psychological wellbeing (Trudel-Fitzgerald et al., 2014). For women with psychosocial issues, the risk of becoming hypertensive

is not surprising. In extant research, it has been demonstrated that psychological stressors such as occupational stress, mental health issues, being socially isolated and insomnia are known risk factors for the development of hypertension (Cuffee et al., 2014). For instance, some studies found that mental health factors (depression, anxiety, exposure to traumatic events and stress) are associated with elevated risk of blood pressure (Ford et al., 2016).

Besides SES, lifestyle and psychological factors, we found some sociodemographic factors such as age, to be associated with the risk of becoming hypertensive among Ghanaian women in the Greater Accra Region. Consistent with previous research, hypertension accounts for the bulk of morbidity among older adults (Bosu et al., 2017).

Conclusion

Our results generally suggest that individual SES/Wealth levels is an important determinant of hypertension among women in the Greater Accra Region. Specifically, after adjusting for neighborhood SES, wealthy women more likely to be hypertensive than poorer women. Findings yielded by the present study call for the development of both primary and secondary health promotion programs that target specific SES groups, particularly, middle and upper class women. Primary level intervention includes providing education and information on risk factors associated with hypertension. Secondary level of intervention will entail early diagnosis, treatment and management of hypertension.

Our study has some limitations that should be acknowledged. Specifically, as we used cross-sectional data, we were not able to make causal inferences. In addition, due to data limitations, we focused on one NCD condition (hypertension) only. In the future studies on this topic, researchers should thus examine other NCDs, such as diabetes, stroke, and cancer, to determine their impact on women. In this current research, wealth status served as a measure of

SES at the neighborhood level. Hence, we failed to capture other dimensions of neighborhood SES, such as neighborhood level of education (collective human capital) and neighborhood level employment (collective levels of productive occupation), providing a further avenue for future research in this domain. Further research is needed to take into account other neighborhood characteristics related to the physical and built environment such the presence of health facilities, environmental conditions, availability of recreational facilities, etc.

Table 4. 1. Description of Lifestyle and Psychosocial variables

Variable	Description	Measurement
Wealth index	The wealth index was created from all household assets and utility services: type of dwelling, main roofing, tenure type, water supply, type of toilet, source of cooking, type of kitchen, bathing, liquid waste, nets, sewing machine, mobile telephone, house phone, refrigerator, television, private care, washing machine, computer, radio and electric iron. All indicator variables were dichotomized. A wealth index was created from these variables using principal component analysis to create an index score. The resulting index score are standardized (calculating z-scores)	
Individual wealth quintile	Using the standardized scores (normal standard distribution with a mean of zero and a standard deviation of one), the distribution is divided at the points that form the five 20-percent sections. These standardized scores are used to create the break points that define wealth quintiles.	0= poorest, 1= poor, 2= middle, 3= richer, and 4= richest.
Nutrition		
Vegetable consumption	Three dummy variables used to create a summative index scale by asking respondents if they regularly ate foods in the following categories: cooked beans such as black-eyed peas, beans, and koose[3] other fresh/salad vegetables such as lettuce, carrots, and tomatoes; and dark leafy vegetables such as kontomire[4], aleefu[5], ayoyo[6], kale, and cassava leaves. All questions were coded as (0= "no", 1= "yes").	0 = does not consume any nutritional food, 1 = consumes at least one source of nutrition, 2 = consumes two or more sources of nutrition).
Fruit consumption	Three dummy variables used to create a summative index scale by asking respondents if they regularly ate fruit (such as pawpaw, mango, orange, or pineapple), whether they drank 100% fruit juice (such as orange or grapefruit juice), and whether they drank other sweetened beverages (such	0 = does not consume any nutritional food, 1 = consumes at least one source of nutrition, 2 = consumes two or more sources of nutrition).

[3] Fried balls made of black eyed peas

[4] Cocoyam leaves

[5] , *Amaranthus cruentus*

[6] *Corchorus olitorious*

	as soda, tea with sugar, or fruit-flavored drinks). All questions were coded as (0= "no", 1= "yes").	
Protein consumption	Seven dummy variables used to create a summative index scale by asking respondents if they regularly ate the following: yoghurt; red meat such as beef, pork, goat, grasscutter, or bush meat; chicken, fish, eggs, or agushie[7]; and ground nuts. All questions were coded as (0= "no", 1= "yes").	0 = does not consume any nutritional food, 1 = consumes at least one source of nutrition, 2 = consumes two or more sources of nutrition).
Fat consumption	Four dummy variables used to create a summative index scale from questions asking respondents whether they ate fried chicken, fish, or vegetables; used butter or margarine on bread or in other foods; ate ground nuts, cashews, seeds, or other nuts; or consumed fast food and unhealthy snacks. All questions were coded as (0= "no", 1= "yes").	0 = does not consume any nutritional food, 1 = consumes at least one source of nutrition, 2 = consumes two or more sources of nutrition).
Physical activity	Five dummy variables used to create a summative index scale by asking respondents whether they engaged in moderately intense physical activities, such as brisk walking or carrying light loads; whether their work involved vigorous activity, like heavy lifting, digging, or heavy manual labor; whether they did vigorous activities in their free time, like playing basketball, running, competitive swimming, or playing ball; and whether they participated in moderately intense activities, like brisk walking, gentle swimming, or exercising in their free time. All questions were coded as (0= "no", 1= "yes").	0= no exercise, 1= low/moderate exercise, 2= high/intensive exercise
Smoking	"Do you currently smoke cigarettes?"	0 = No, 1 = Yes
Alcohol consumption	"Have you ever consumed a drink that contains alcohol such as beer, wine, gin, bitters, palm wine, or schnapps?"	0 = No, 1 = Yes
Body mass index (BMI)	BMI variable was created from anthropometric measures (height and weight of respondents)	0 = underweight, 1 = normal, 2 = overweight, or 3 = obese
Psychosocial	Six dummy variables used to create an index scale by asking respondents whether, in the last month, they had felt nervous, hopeless, restless or fidgety; so depressed that nothing could cheer them up; or that everything was an effort and seemed pointless. All questions were coded as (0= "no", 1= "yes"). 0= "none of the time" 1= "a little of the time", 2= "some of the	0 = none of the time, 1 = all the time, 2 = most of the time, 3 = some of the time, and 4 = a little of the time

[7] *Cucumeropsis mannii* is a species of melon native to tropical Africa

	time", 3= "most of the time" 4= "All of the time"	

Table 4. 2. A univariate analysis on the risks and prevalence of hypertension among women in the Greater Accra Region, Ghana

Dependent variable	%
Hypertension	
No	77.82
Yes	22.18
Independent Variables	
Educational level	
None	21.90
Primary	11.87
Middle/JSS	39.58
Secondary/SSS	16.73
Higher	9.91
Wealth Status	
Poorest	20.26
Poor	19.83
Middle	19.83
Richer	19.83
Richest	20.26
Main occupation	
Unemployed	26.21
Government employee	4.90
Private Business	8.46
Self-employed	52.31
Others	8.11
Vegetable Consumption	
None	51.61
At least 1	33.74
Consume 2 or more	14.66
Fruits consumption	
None	35.62
At most 1	43.38
Consume 2 or more	21.00
Protein consumption	
None	5.68
At most 1	46.43
Consume 2 or more	47.88
Fat consumption	
None	61.13
At most 1	28.80
Consume 2 or more	10.07
Smoke	
No	99.26
Yes	0.74
Alcohol consumption	
No	47.02

Yes	52.98
Body mass index	
Underweight	3.49
Normal	31.19
Overweight	27.98
Obese	37.34
Psychosocial factors	
None of the time	32.60
A little of the time	13.24
Some of the time	13.52
Most of the time	8.19
All of the time	32.45
Ethnicity	
Akan	32.37
Ga Adangbe	40.67
Ewe	13.79
Northern	5.45
Others	7.72
Marital status	
Never married	50.71
Married	30.60
Separated/Divorce	18.69
Religion	
Christian	82.80
Muslim	12.70
No religion	4.51
Age (mean)	-.45
Residence	
Rural	11.83
Urban	88.175
Neighborhood SES (NSES) (mean)	-4.80

Table 4. 3. A Multivariate Analysis of the Effects of Individual and Neighborhood SES on Hypertension among Women in The Greater Accra Region of Ghana

	Model 1	Model 2	Model 3	Model 4+	Model 5
	Unadjusted Model		Adjusted Models		
Socio-economic status					
Individual wealth status					
Poorest	1	1	1		1
Poorer	1.128(0.192)	1.494*(0.284)	1.485*(0.282)		1.542(0.362)
Middle	1.187(0.203)	1.332(0.257)	1.312(0.256)		1.301(0.288)
Richer	1.408*(0.242)	1.834**(0.360)	1.788**(0.361)		1.710*(0.383)
Richest	2.108***(0.377)	2.152***(0.454)	2.046**(0.472)		2.408***(0.640)
Educational level					
None	1	1	1	1	1
Primary	0.571**(0.102)	1.246(0.257)	1.250(0.258)	1.301(0.268)	1.258(0.260)
Middle/JSS	0.508***(0.0672)	1.168(0.197)	1.164(0.196)	1.264(0.209)	1.153(0.194)
Secondary/SSS	0.361***(0.0637)	1.421(0.321)	1.416(0.320)	1.649*(0.360)	1.410(0.320)
Higher	0.271***(0.0630)	1.058(0.300)	1.052(0.299)	1.312(0.356)	1.034(0.295)
Main occupation					
Unemployed	1	1	1	1	1
Government employee	0.432***(0.109)	1.052(0.316)	1.045(0.314)	1.019(0.305)	1.072(0.324)
Private business	0.162***(0.0428)	0.740(0.225)	0.734(0.224)	0.718(0.219)	0.733(0.224)
Self-employed	0.418***(0.0481)	0.898(0.132)	0.897(0.132)	0.875(0.127)	0.905(0.133)
Others	0.617*(0.120)	1.255(0.298)	1.250(0.297)	1.260(0.298)	1.286(0.307)
Lifestyle factors					
Vegetable consumption					
No vegetables	1	1	1	1	1
At least 1 vegetable	1.027(0.115)	1.016(0.131)	1.014(0.131)	1.023(0.132)	1.023(0.133)
2 or more vegetables	1.142(0.172)	1.467*(0.268)	1.473*(0.269)	1.489*(0.271)	1.491*(0.273)
Fruit consumption					

No fruits	1	1	1	1	1
At least 1 fruit	0.948(0.108)	1.000(0.133)	1.002(0.134)	1.018(0.135)	1.016(0.136)
2 or more fruits	1.049(0.144)	1.083(0.177)	1.081(0.177)	1.108(0.181)	1.102(0.181)
Protein consumption					
No protein consumption	1	1	1	1	1
At least 1 protein	1.028(0.221)	0.813(0.201)	0.819(0.203)	0.817(0.201)	0.832(0.207)
2 or more protein	0.799(0.177)	0.746(0.188)	0.752(0.190)	0.761(0.191)	0.769(0.196)
Fat consumption					
No fat consumption	1	1	1	1	1
At least 1 fat	0.870(0.0976)	1.015(0.135)	1.021(0.136)	1.007(0.134)	1.030(0.138)
2 or more fats	0.637(0.118)	1.010(0.223)	1.010(0.223)	0.985(0.217)	1.017(0.225)
Smoking status					
No	1	1	1	1	1
Yes	0.826(0.486)	0.792(0.509)	0.788(0.507)	0.834(0.534)	0.809(0.521)
Alcohol consumption					
No	1	1	1	1	1
Yes	0.926(0.0941)	0.934(0.118)	0.936(0.118)	0.923(0.116)	0.935(0.118)
Body Mass Index (BMI)					
Underweight	1	1	1	1	1
Normal	1.012(0.365)	1.562(0.631)	1.562(0.631)	1.559(0.625)	1.554(0.630)
Overweight	1.903(0.680)	2.299*(0.922)	2.301*(0.923)	2.392*(0.951)	2.263*(0.910)
Obese	4.127***(1.448)	4.614***(1.824)	4.620***(1.826)	4.855***(1.903)	4.594***(1.821)
Physical activity					
No Exercise	1	1	1	1	1
Low/Moderate exercise	0.348***(0.0715)	0.574*(0.141)	0.574*(0.141)	0.590*(0.144)	0.563*(0.139)
High/Intensive exercise	0.238***(0.0483)	0.643(0.162)	0.642(0.162)	0.650(0.164)	0.637(0.161)
Psychosocial factors					
None of the time	1	1	1	1	1
A little of the time	1.084(0.181)	1.365(0.264)	1.363(0.263)	1.366(0.262)	1.347(0.261)
Some of the time	1.343(0.214)	1.533*(0.282)	1.536*(0.283)	1.532*(0.281)	1.528*(0.282)
Most of the time	1.136(0.223)	1.476(0.329)	1.470(0.328)	1.450(0.322)	1.473(0.329)
None of the time	1.223(0.157)	1.560**(0.236)	1.562**(0.236)	1.522**(0.228)	1.571**(0.238)

Demographic factors					
Ethnicity					
Akan	1	1	1	1	1
Ga-Adangbe	1.783*** (0.224)	1.128(0.165)	1.141(0.169)	1.141(0.168)	1.142(0.169)
Ewe	1.352(0.224)	1.146(0.215)	1.146(0.214)	1.098(0.203)	1.137(0.213)
Northern languages	0.731(0.206)	0.631(0.243)	0.637(0.246)	0.667(0.257)	0.636(0.246)
Others	1.042(0.230)	0.901(0.296)	0.905(0.298)	0.876(0.286)	0.910(0.300)
Marital status					
Never married	1	1	1	1	1
Married	2.134*** (0.234)	0.883(0.122)	0.882(0.122)	0.842(0.115)	0.878(0.121)
Separated/Divorced	0.126*** (0.0325)	0.377*** (0.105)	0.376*** (0.105)	0.371*** (0.104)	0.372*** (0.104)
Religious affiliation					
Christian	1	1	1	1	1
Muslim	0.835(0.136)	1.029(0.297)	1.032(0.298)	0.989(0.284)	1.033(0.298)
Traditionalists	0.658(0.178)	0.648(0.196)	0.651(0.196)	0.639(0.193)	0.655(0.198)
Age	1.061*** (0.00360)	1.058*** (0.00538)	1.058*** (0.00538)	1.058*** (0.00530)	1.058*** (0.00539)
Place of residence					
Rural	1	1	1	1	1
Urban	0.804(0.121)	1.083(0.192)	1.086(0.192)	1.120(0.197)	1.083(0.192)
Neighborhood SES (NSES)	1.347*** (0.0789)		1.080(0.153)	1.286* (0.150)	1.111(0.333)
ISES X NSES					
Poorer X Poor NSES					1
Poorer X Advantaged NSES					1.150(0.493)
Middle X Advantaged NSES					0.944(0.376)
Richer X Advantaged NSES					1.268(0.489)
Richest X Advantaged NSES					0.739(0.276)
Community-level variance		0.0697	0.0255	0.00259	0.0718
Individual-level variance		0.210	0.227	0.239	0.214
Observations		2547	2547	2547	2547
AIC		2196.5	2198.2	2202.6	2203.3
BIC		2459.4	2467.0	2448.0	2495.5

ICC	0.0599	0.0647	0.0678	0.0610
ll	-1053.3	-1053.1	-1059.3	-1051.7

Exponentiated coefficients; Standard errors in parentheses

[*] $p < 0.05$, [**] $p < 0.01$, [***] $p < 0.001$

NSES (Neighborhood SES)

[+] Model 4 excluded individual SES

Chapter 5: Activity Limitations and Participation Restrictions among People with Non-Communicable Diseases in Ghana

Under Review (*Ageing & Society*)

Introduction

Using the findings yielded in the previous study which was to estimate the effects of both individual and neighborhood SES on hypertension, the prevalence of disability and its association with NCDs in Ghana is examined in this study. The aim of this part of research is to determine the association and prevalence of NCDs and disability among the Ghanaian population.

Abstract

Non-communicable diseases (NCDs) including hypertension, diabetes, and stroke have been identified as significant causes of disability. Major NCDs contribute to disability through impairments, amputation, blindness, and mobility and speech difficulties. This compromises a person's capacity to function and participate meaningfully in society. However, as the contribution of certain diseases to the burden of disability in sub-Saharan Africa (SSA) remains insufficiently explored, the estimates of its prevalence as a result of disease in these parts of the world are scant. Anecdotal evidence suggests that NCDs contribute substantially to mortality, morbidity, and disability in Ghana. Nonetheless, no data is presently available on Ghanaians with disability from major NCDs, such as hypertension, diabetes, and stroke. Using data from the Ghana Study on Global Ageing and Adult Health Survey (SAGE) and applying Ordinary Least Squares (OLS) techniques, the prevalence of and associations between activity limitations and participation restrictions in Ghanaians with NCDs are examined in the present study. The results show that, while all NCDs contribute to disability in Ghana, stroke is the major contributor to activity limitations and participation restrictions among the Ghanaian population with NCDs. The study results further revealed that respondents with higher education reported high levels of disability compared to those with no education. Disability is not limited only to bodily

impairments of the individual but extend to include the functioning of the individual within society.

Keywords: Disability, NCDs, activity limitations, participation restriction, Ghana.

Background

Globally, about one billion people live with disability, representing 15% of the world's population (WHO, 2011b). In Ghana, the 2010 Population and Housing Census (PHC) estimates that 3% of the population lives with a disability (Ghana Statistical Service, 2013). Evidence suggests the prevalence of disability is higher among older adults and those with NCDs (Rowland et al., 2014).

Disability is a multi-dimensional concept; therefore, its conceptualization and measurement can be complex, varying across time and context (Agaronnik et al., 2019; Brandt et al., 2014; Meekosha, 2011; Parnes et al., 2009; Pongiglione et al., 2017; Theis et al., 2019). There are two competing models of disability: medical and social (Anthony, 2011; Swain & French, 2000). The medical model focuses on an impairment or a health condition as the cause of disability (Anthony, 2011; Swain & French, 2000). Medical interventions, including diagnosis and treatment, aim to restore the individual to a functioning level (Marks, 1997; Sullivan, 2011). In contrast, in the social model, disability is socially constructed, the consequence of negative labels, prejudice, and discriminatory societal attitudes directed at persons with bodily impairments (Anthony, 2011). These discriminatory societal attitudes create barriers for persons with disabilities (PWDs) preventing them from participating fully in society (Goodley, 2001; Llewellyn & Hogan, 2000; Shakespeare & Watson, 2002; Sullivan, 2011).

Both models of disability have made significant contributions to our understanding of disability, but they have limitations. For instance, the medical model focuses on impairment as an important determinant of disability with the assumption that PWDs are dependent, weak, needy, and defective, while the social model ignores diseases and injuries as contributing factors (Owens, 2015; Retief & Letšosa, 2018). The WHO has proposed the International Classification of Functioning, Disability, and Health (ICF) model to combine the strengths and deal with the

weaknesses of these two competing models (Pinilla-Roncancio, 2015). This paper employs a variant of the ICF model to examine relationships between NCDs and disability in Ghana.

The ICF Model

The ICF model integrates medical and social perspectives of disability using a biopsychosocial approach where health conditions and structural factors mediate how disability is experienced (Mitra & Shakespeare, 2019; Peterson, 2005), making it a universal framework for understanding, assessing, and measuring disability and functioning (WHO, 2002). The validity of the ICF as a tool for understanding disability has been confirmed in Western countries (Almazán-Isla et al., 2014; Andrews et al., 2009; Luciano et al., 2010; Papelard et al., 2019), but it has not been applied in non-Western contexts, for example, sub-Saharan Africa and Ghana. This gap motivated the present study.

The ICF model has two distinct components (Resnik et al., 2009). The first distinguishes four concepts that operationalize disability: *body functions*, *body structures*, *activity limitations*, and *participation restrictions* (Benson & Oakland, 2011). *Body functions* refer to the physiological functions of body systems, while *body structures* refer to the anatomy of the body, such as organs, limbs, and their components (Benson & Oakland, 2011). *Activity limitations* refer to difficulties an individual may have executing activities, while *participation restrictions* deal with problems he or she may experience in life situations (Aljunied & Frederickson, 2014). Domains of activity limitations and participation restrictions include learning, mobility, self-care, domestic life, interpersonal interactions and relationships, major life areas, and community, social, and civic life. The second component of the ICF model examines contextual factors, at both the structural and the individual level. Structural factors include support and relationships, services and policies, and attitudes. These factors act as facilitators of or barriers to functioning

in society (Loke et al., 2015). Individual level factors include age, gender, education, religion, and lifestyle characteristics.

The ICF uses a hierarchical nested classification system and coding scheme to define dimensions of disabilities (see Table 5.1). For instance, the classification systems changing and maintaining body position, carrying, moving, and handling objects, and walking and moving are nested within the mobility domain which, in turn, is nested within activity limitations. The self-care domain is also nested within activity limitations. Similarly, interpersonal relationships and informal relationships are nested within domestic life domains, while community, civic, and social life are nested within the major life areas; both, in turn, are nested within participation restrictions. Finally, the classification system health services is nested in the systems, services, and policies domain, which, in turn, is nested in the structural level. Because of data limitations, we did not include body functions and body structures in this analysis; we only considered activity limitations and participation restrictions as measures of disability.

Based on the ICF model, we developed a conceptual framework to explain the links between NCDs and various dimensions of disability (see Figure 5.1). The framework begins with a health condition (disease) mediated by structural and individual factors. These three variables (health condition, structural factors, and individual level factors) affect how disability is experienced and produced.

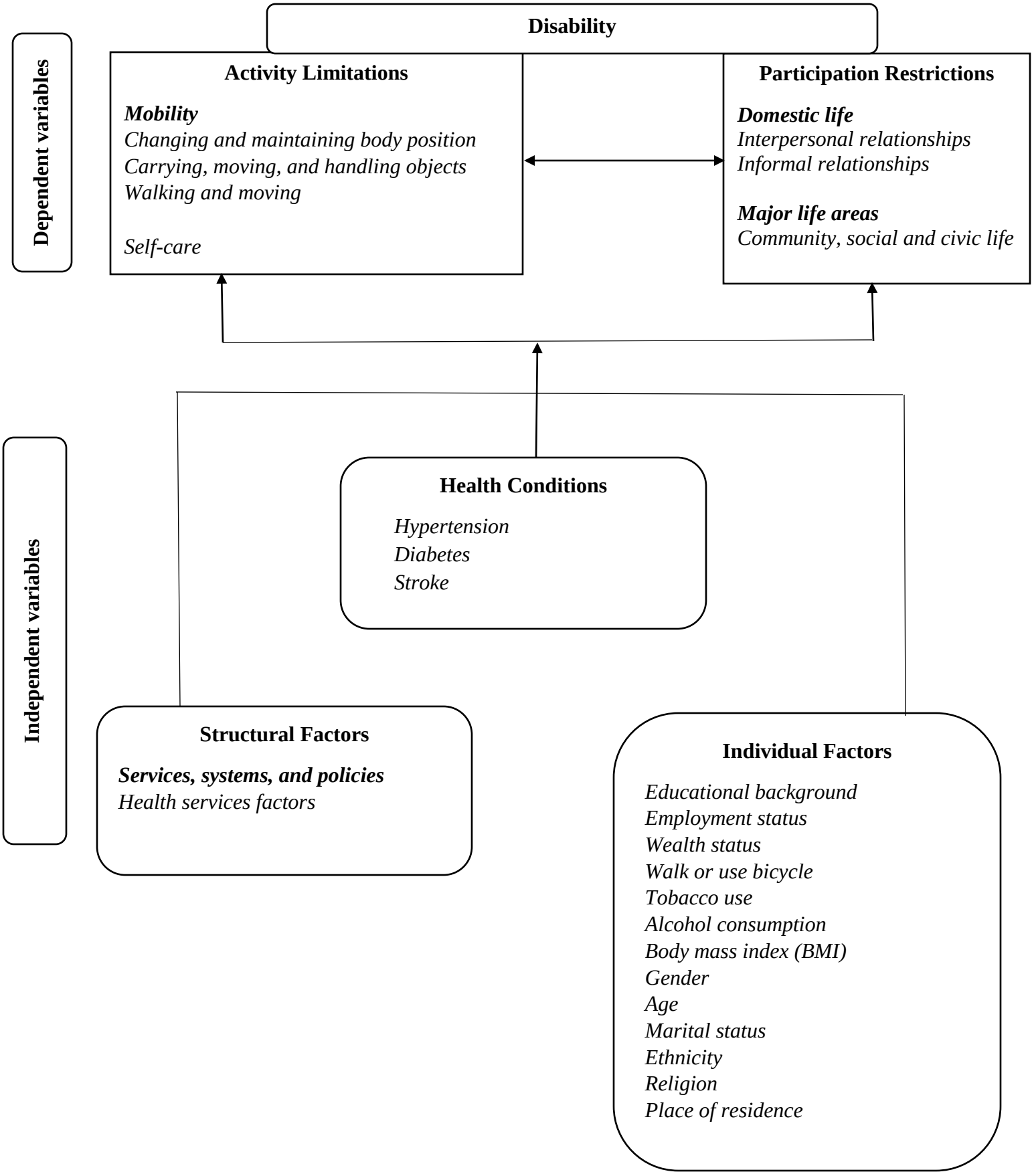
Dependent variables
Disability
Activity Limitations
Mobility
Changing and maintaining body position
Carrying, moving, and handling objects
Walking and moving
Self-care
Participation Restrictions
Domestic life
Interpersonal relationships
Informal relationships
Major life areas
Community, social and civic life
Independent variables
Health Conditions
Hypertension
Diabetes
Stroke
Structural Factors
Services, systems, and policies
Health services factors
Individual Factors
Educational background
Employment status
Wealth status
Walk or use bicycle
Tobacco use
Alcohol consumption
Body mass index (BMI)
Gender
Age
Marital status
Ethnicity
Religion
Place of residence

Figure 5. 1: Conceptual framework of the links between NCDs and disability (Adapted from WHO, 2001).

NCDs and Disability

NCDs, including hypertension, diabetes, and stroke, are the main contributors to disability in Western countries (Klijs et al., 2011; Richards et al., 2016). The resulting functional limitations, such as amputations, blindness, and speech difficulties, create challenges in self-care, mobility, and social participation (Elias & Elias, 2007; Gregg et al., 2000; Sturm et al., 2002). Even though some policy documents acknowledge the contributions of NCDs to morbidity, mortality, and disability in Ghana (Ministry of Health (MOH), 2011a; MOH, 2011b), accurate knowledge is lacking because epidemiological data are limited. Besides, NCDs contributing to the burden of disability, pertinent literature clearly shows that disability is sometimes a result of natural causes, including birth defects, and is thus present throughout childhood and beyond (Boyle & Cordero, 2005). However, many disabilities arise due to environmental factors or injuries (Hung et al., 2011; Krahn et al., 2015; Mock, Boland, Acheampong, & Adjei, 2003; Yokota et al., 2015). The most common causes of disability in Ghana are road accidents, amputation, cataracts, leprosy, measles, and polio (Adjei-Amoako, 2016). The most common types of disability are visual impairment, hearing impairment, and intellectual and learning disabilities (Adjei-Amoako, 2016; Slikker, 2009). Currently, there is dearth of research that has examine the links between NCDs and disability in Ghana.

While NCDs are major risk factors in disability, the opposite may also be true: some evidence indicates PWDs are at risk of developing NCDs, for example, because of sedentary lifestyles (Dixon-Ibarra & Horner-Johnson, 2014; Krahn et al., 2015). Another risk factor is socioeconomic status: PWDs with low socioeconomic status may have poor nutrition and face challenges in accessing preventive health programs and affordable health services (WHO,

2011b). This may in turn increase their likelihood of living with NCDs. In this paper, we use data from the World Health Organization to examine relationships between NCDs and disability in Ghana.

Data

Data for the study came from the Ghana WHO Study on Global Ageing and Adult Health (SAGE). SAGE is an ongoing program monitoring the wellbeing of older persons in six countries (China, Ghana, India, Mexico, Russia, and South Africa). The goal is to provide, strengthen, gather, process, and manage data on older persons to facilitate policy planning and monitoring. SAGE includes adults aged 50 years and older, as well as a small group of persons aged 18 years. The SAGE survey asks respondents about their household characteristics, sociodemographic characteristics, perceived health status, preventive and risky health behaviors, chronic conditions, health services coverage and utilization, subjective wellbeing, and social networks. Anthropometric measurements, blood pressure, and dry blood spots (DBS) for biomarkers are also collected. In addition, respondents are asked if they have had a stroke, cancer, diabetes, or hypertension.

To select participants, the SAGE study employed a multi-stage sampling technique, selecting households from 251 Enumeration Areas, with a final 5,373 individuals chosen for interviews. The sample was stratified by administrative region and type of locality, resulting in 20 strata. The final SAGE sample comprised 5,348 individuals (a response rate of 93.8%). The sample for the present study was limited to 4,209 respondents who answered questions on various domains of disability.

Measures

The dependent variables measuring disability included variables for activity limitations and participation restrictions. Based on the ICF model (WHO, 2001), we created four categories of activity limitations. The first three are under the mobility domain of the ICF model (changing and maintaining body position; carrying, moving, and handling objects; walking and moving), and the last is self-care (See Table 5.1). The questions on the mobility and self-care domains asked participants, overall, how much difficulty they had in the last 30 days executing an activity in either domain. The responses were rated on a five-point Likert scale, with 1 = None, 2 = Mild, 3 = Moderate, 4 = Severe, and 5 = Extreme/Cannot do. Because there were very few "Extreme/Cannot do" answers, they were merged with the "Severe" category. Latent variables were created using Principal Component Analysis (PCA), as shown in Table 6. Positive values on the scale indicated the participant had a severe/extreme disability, while negative values indicated mild to no disability. Factor loadings from these scales range from 0.45 to 0.91 and the reliability coefficient Cronbach alpha ranges from 0.62 to 0.93.

To determine participation restrictions, we used the ICF model categories for domestic life (interpersonal relationships and informal relationships) and major life areas (community, civic, and social life). Participants were asked to recall how often they had been involved in the community in the last 12 months. The responses were rated on a five-point Likert scale, with 1 = Never, 2 = Once or twice per year, 3 = Once or twice per month, 4 = Once or twice per week, and 5 = Daily. Positive/negative values on the scale indicated that participants had higher/lower participation. PCA was used to create all latent variables (see Table 5.2).

The focal independent variables were based on the ICF framework that identifies a health condition (disease), environmental factors, and personal factors as contributing to disability. We conceptualized three NCD conditions, i.e., hypertension, diabetes, and stroke, as health

conditions (diseases) and used them as focal independent variables. Following the WHO and Ghana Health Service cut-off points, we defined normal systolic blood pressure as equal to or greater than 140 mm Hg and diastolic blood pressure as equal to or greater than 90 mm Hg (Ghana Health Service (GHS) (n.d.); WHO, 2010a). The SAGE data include systolic and diastolic measurements taken at three time points by trained interviewers using a Boso Medistar Wrist BP Monitor Model S (Minicuci et al., 2014). We used the average of the biometric measures as an indicator of hypertension. Thus, the hypertension measure was created as a binary outcome based on the averages of the systolic blood and diastolic pressure measures and coded 1 if the individual was hypertensive and 0 otherwise. This technique has been used by previous research examining the validity of hypertension measures (Duda et al., 2007; Friedman-Gerlicz & Lilly, 2009; Tenkorang, Sedziafa et al., 2015). For the diabetes and stroke variables, study participants were asked if they had ever been diagnosed by a health professional with these conditions. As the responses were binary, "yes" was coded as 1 and "no" as 0. Health services and health insurance were conceptualized as environmental factors, while socioeconomic and demographic factors and lifestyle variables were personal measures (see Table 5.2).

Health services factors were derived using WHO's "Monitoring the Building Blocks of Health Systems: A Handbook of Indicators and their Measurement Strategies" (2010b, p. 3). We used three key characteristics to measure health services. The first was person-centeredness, i.e., when services are organized around the person, not the disease; when services are person-centered, users perceive health services to be responsive to them. The second was comprehensiveness, i.e., when health services are provided for and appropriate to the needs of the target population. The third was quality. Respondents were asked about their experiences and were instructed to provide answers on a five-point Likert scale, from 1= Very good, to 5= Very

bad. These responses were reverse-coded for easy interpretation; positive/negative values indicated very good/poor health services.

Analysis

We used ordinary least squares regression (OLS) models because the dependent variables were continuous. Before performing the analysis, we performed diagnostic tests to determine whether the variables met the assumptions of the OLS technique. Because of the hierarchical nature of the SAGE data, with respondents nested within households, and as most regression models are built under the assumption of independence, we imposed a cluster variable to ensure the standard errors were not biased and to produce robust parameter estimates. We used STATA 14.SE for the analysis and adopted the following OLS model:

$$\Upsilon_j = \alpha_0 + \beta_1 HYP + \beta_2 DIAB + \beta_3 STR + \beta_4 EDU + \beta_5 X_5 \ldots + \beta_6 P_6 + \varepsilon$$

where Υ_j represents the level of disability reported by a respondent j; α_0 is the intercept; $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5 \ldots \beta_6$ are coefficients; and HYP, $DIAB$, STR, EDU, β_5, and P_6 are the independent and control variables.

Results

Descriptive Results.

Table 5.3 shows the distribution of the study variables. The univariate analysis results clearly show the study participants reported higher activity limitations in all categories (changing and maintaining body position; carrying, moving and handling objects; walking and moving; self-care) and lower participation (community, civic, and social life; informal relationships). Results also show that 46.13% of the participants who had systolic and diastolic blood pressure measured were hypertensive. Study participants who reported being diagnosed with diabetes or stroke conditions constituted 3.47%, and 2.04% of the sample, respectively. Turning to the

environmental factors, respondents generally reported good people-centered and quality health services, but poor comprehensive health services. As for the personal/individual level factors, those engaging in vigorous work or walking/ biking comprised 48.55% and 76.98% of the sample, respectively. Body mass index (BMI) measurements indicated 13.80% of the respondents were underweight, and 11.50% were obese. Those with no education represented 47.79%, while those with secondary/higher education comprised 28.19% of the study sample; 74.18% were employed, and 25.82% were not. The majority were married, male, and lived in rural areas.

[TABLE 5.3 ABOUT HERE]

Bivariate Results.

The bivariate results are presented in Table 5.4. As the table shows, respondents with NCD conditions (hypertension, diabetes, and stroke) reported severe/extreme activity limitations than those with no NCD conditions. For instance, respondents affected by stroke reported lower levels of participation in their community, civic, and social life and in their informal relationships than those unaffected by stroke. Those who reported receiving very good person-centered and comprehensive health services reported lower levels of activity limitations and lower levels of participation in their interpersonal relationships. However, they reported higher levels of participation in their community, civic, and social life. Compared to those without health insurance, those with health insurance reported higher levels of activity limitations. In terms of personal/individual level factors, compared to those who were underweight, those who were obese reported lower levels on activity limitations when carrying moving and handling objects and lower participation in their interpersonal relationships. Similarly, those who engaged in vigorous work or walking/biking reported no/moderate activity limitations and high

participation in their community, civic, and social life and in their informal relationships than those who did not. Participants with higher education and those who were employed reported no/moderate activity limitations and high participation in their community, civic, and social life than whose without education or who were unemployed. Females reported more severe/extreme activity limitations and lower participation in their community, civic, and social life than their male counterparts. Finally, older peopled reported a higher prevalence of disability (activity limitations and participation restrictions).

[TABLE 5.4 ABOUT HERE]

Multivariate Results.

Tables 5.5 and 5.6 show the multivariate results for the three models. The first model incorporated NCDs as health conditions; the second included structural factors, and the third added individual-level factors (lifestyle, socioeconomic, and demographic factors).

As Model 1 shows, individuals with diabetes and stroke reported severe/extreme activity limitations (changing and maintaining body position (diabetes = .333, $p < .01$; stroke = 1.252, $p < .01$), carrying moving and handling objects (diabetes = .406, $p < .01$; stroke = 1.253, $p < .001$), walking and moving (diabetes = .287, $p < .01$; stroke = 1.515, $p < .001$), and self-care (stroke = 1.390, p <001[8]) and higher participation in their interpersonal relationships than those without diabetes and stroke. Specifically, those reporting a stroke indicated lower participation in their community, civic, and social life (stroke = -0.473, $p < .001$; hypertension = .235, $p < .001$) and in their informal relationships (stroke = -0.434, $p < .01$) than those who did not. The direction of the coefficients, for instance, indicates that stroke patients, have higher coefficients pertaining to

[8] No significant association was observed for diabetes.

activity limitations and lower coefficients pertaining to participation restrictions, thus contributing the highest burden of disability.

Structural factors, including health services characteristics and health insurance, were incorporated into Model 2. As the model shows, study participants who found person-centered health services to be very good reported lower activity limitations (maintaining and changing body position, carrying, moving, and handling objects, walking, and moving); they also reported low participation in their interpersonal relationships. Interestingly, further analysis revealed that those who indicated person-centered and comprehensive health services as very good had higher participation in their community, civic, and social life.

Model 3 included individual level factors. Compared to the underweight, the obese reported severe/extreme activity limitations on maintaining and changing body position and walking and moving. Compared to those without education and the unemployed, those with a secondary/higher level of education and the employed reported low activity limitations and low participation restrictions in their interpersonal relationships. In contrast, those with higher education and the employed had high participation in their community, civic, and social life or in their informal relationships. Females had higher activity limitations and participation restrictions than males. As seen in the final Models for activity limitations domains, after controlling for relevant covariates, stroke remained a significant predictor in changing and maintaining body position (stroke = .894, $p < .001$), carrying moving and handling objects (stroke = .989, $p < .001$), walking and moving (stroke = 1.066, $p < .001$), and self-care (stroke = 1.182, $p < .001$). However, both the hypertension and diabetes variables lost their statistical significance, except for carrying, moving and handling objects (diabetes = .266, $p < .05$). Turning on to participation restrictions, the statistical significance of stroke remained robust in the final model for

community, civic and social life (stroke = -0.311, $p < .001$). However some significant relationships are also observed for informal relationships (hypertension = .149, $p < .001$), and interpersonal relationships (diabetes = .239, $p < 05$)

[TABLES 5.5 AND 5.6 ABOUT HERE]

Discussion

We used the ICF model to clarify how NCDs contribute to disability in Ghana. The ICF model provides a common language to understand disability worldwide (Resnik & Plow, 2009; WHO, 2002). It serves as a framework to conceptualize how human functioning related to body structures, functions, and activities (at the level of the person) and participation (at the level of society) interact with the environment and personal factors.

The sudden onset of such NCDs as hypertension, diabetes, and stroke could disrupt a persons' life, but most interventions focus on organ damage (impairment), with little attention to other aspects of human functioning (Algure´n et al., 2009). In this study, stroke emerged as a major contributor to disability; it limited people's functioning and participation in daily activities and in society as a whole. Research in Western countries notes that about 90% of stroke survivors have some disability, with compromised neurological functions (motor, sensory, visual) and/or limited ability to perform daily activities (Carvalho-Pinto & Faria, 2016; Glässel et al., 2010; Silva et al., 2015; Sumathipala et al., 2011). Research conducted in SSA finds stroke survivors have decreased social interactions with neighbors and other relatives and experience difficulty participating in social gatherings (Algure´n et al., 2010; Urimubenshi, 2015; Vincent-Onabajo, 2013). In our study, individuals living with diabetes and hypertension did not report severe disability, but such conditions are usually asymptomatic. Participants may not have

detected these conditions because of inadequate education, limited access to healthcare, or delayed diagnosis (de-Graft Aikins, 2003; Lins, Jones, & Nilson, 2010).

Studies in Western countries have demonstrated that individuals with higher education are able to delay the onset of disability or postpone disability to a greater extent than those with less education (Chatzitheochari & Platt, 2019; Jones & Latreille, 2009; Montez et al., Zajacova, & Hayward, 2017). However, educational level may have less effect once a disability is present. Our results suggest socioeconomic factors have a significant effect. For instance, in our sample, those with a higher level of education and the employed were less likely to report disability than those without education and the unemployed. This finding is partly explained by the fact that education enhances knowledge, and those with adequate health knowledge are likely to seek out healthy lifestyle behaviors and healthcare (Checkley et al., 2014; Lee et al., 2018; Schulz et al., 2016; Zühlke & Engel, 2013).

In the ICF model, certain structural-level factors are considered to be contextual factors affecting the functioning of an individual. For instance, in this study health systems had an impact on disability. We found that those who received good person-centered and comprehensive health services were less likely to report disability. Previous research demonstrates that those with disability are more likely to utilize healthcare and rehabilitative services to address their functional level (Jones et al., 2016; Reichard et al., 2019).

Finally, we found some individual-level variables affected disability. For instance, women reported more disability than men; this may be related to women's primary responsibility for the household and their more limited participation in social life (WHO, 2011). We also found that older people were more likely to report activity limitations and participation restrictions. This has been documented elsewhere; research in Western countries has established

a strong association between ageing and disability, with decreased functioning in cognitive, physical, and sensory domains having a major impact on older adults (Freedman et al., 2002).

Conclusion

In this research, we investigated the prevalence of activity limitations and participation restrictions among Ghanaians living with NCDs including hypertension, diabetes, and stroke. The results clearly show stroke is the largest contributor to disability in the Ghanaian population. We also found those with higher socioeconomic status, particularly those with higher education, reported no/moderate disability. Our findings have policy implications. For example, interventions to reduce the burden of disability in the Ghanaian population should include the provision of accessible public spaces for those with activity limitations.

Despite the interesting findings, it is important to acknowledge the limitations of the study. First, the use of self-reported data may have introduced subjective interpretations of the survey items by respondents, biased by their experiences and culture. Second, we did not examine the issue of reverse causality, even though it could affect the interpretation of the results. We do not know, for instance, whether the disability causes the NCDs or the NCDs cause the disability, and future research should certainly address this issue. Unfortunately, the cross-sectional nature of the SAGE data did not allow us to make causal inferences. This can be pursued by other research using other data.

Table 5. 1. Domains of International Classification of Functioning, Disability and Health (ICF)

Body Functions[9]	**Body Structures**[10]	**Activities and Participation**[11]	**Environmental Factors**[12]
Mental functions	Structure of the nervous system	Learning and applying knowledge	Products and technology
Sensory functions and pain	The eye, ear and related structures	General tasks and demands	Natural environment and human-made changes to environment
Voice and speech functions	Structures involved in voice and speech	Communication	Support and relationships
Functions of the cardiovascular, haematological, immunological and respiratory systems	Structure of the cardiovascular, immunological and respiratory Systems	***Mobility***	Attitudes
		Changing and maintaining body position	
		d410 Changing basic body position	
		d415 Maintaining a body position	
		d420 Transferring oneself	
		Carrying, moving and handling objects	
		d430 Lifting and carrying objects	
		d435 Moving objects with lower extremities	
		d440 Fine hand use	
		d445 Hand and arm use	
		Walking and moving	
		d450 Walking	
		d455 Moving around	
		d460 Moving around in different locations	
		d465 Moving around using equipment	
Functions of the digestive, metabolic, endocrine systems	Structures related to the digestive, metabolic and endocrine systems	*Self-care*	*Services, systems and policies*
		d510 Washing oneself	e580 Health services, systems and policies
		d520 Caring for body parts	
		d530 Toileting	
		d540 Dressing	
		d550 Eating	
		d560 Drinking	
		d570 Looking after one’s health	
Genitourinary and reproductive functions	Structure related to genitourinary and reproductive systems	***Domestic life***	
Neuromusculoskeletal and movement-related functions	Structures related to movement	*Interpersonal interactions and relationships*	
		d710 Basic interpersonal interactions	
		d720 Complex interpersonal interactions	
		d730 Relating with strangers	
		d740 Formal relationships	
		d750 Informal social relationships	
		d760 Family relationships	
		d770 Intimate relationships	
Functions of the skin and related structures	Skin and related structures	***Major life areas***	

[9] Code letter is *b*
[10] Code letter is *s*
[11] Code letter is *d*
[12] Code letter is *e*

Community, social and civic life
d910 Community life
d920 Recreation and leisure
d930 Religion and spirituality
d950 Political life and citizenship

Table 5. 2. Operationalization of scalar and categorical variables

Activity Limitations	**Description**
Changing and maintaining body position	A summative index weighted by factor loadings derived from these variables. Overall in the last 30 days, how much difficulty did you have: in standing up from sitting down?; in standing for long periods?; with climbing one flight of stairs without resting? with stooping, kneeling or crouching? with getting up from standing up? Factor loadings ranged from 0.683 to 0.871. Reliability coefficient Cronbach's alpha =0.897
Carrying, moving and handling objects	A summative index weighted by factor loadings derived from these variables. Overall in the last 30 days, how much difficulty did you have: in picking up things with your fingers (such as picking up a coin from a table)?; with carrying things?; in extending your arms above shoulder level? . Factor loadings ranged from 0.695 to 0.845. Reliability coefficient Cronbach's alpha= 0.645
Walking and moving	A summative index weighted by factor loadings derived from these variables. Overall in the last 30 days, how much difficulty did you have: with moving around?; in vigorous activities (vigorous activities require hard physical effort and cause large increases in breathing or heart rate)?; in walking 100 meters?; in walking a long distance such as a kilometer? with moving around inside your home (such as walking across a room)?; with getting where you want to go, using private or public transport if needed? Factor loadings ranged from 0.643 to 0.846. Reliability coefficient Cronbach's alpha= 0.848.
Self-care	A summative index weighted by factor loadings derived from these variables. Overall in the last 30 days, how much difficulty did you have: with self-care, such as bathing/washing or dressing yourself?; in taking care of and maintaining your general appearance (for example, grooming, looking neat and tidy)?; in staying by yourself for a few days (3 to 7 days)?; in bathing/washing your whole body?; in getting dressed?; with eating (including cutting up your food)?; with getting to and using the toilet? ? Factor loadings ranged from 0.799 to 0.889. Reliability coefficient Cronbach's alpha= 0.933
Participation Restrictions	
Interpersonal relationships	A summative index weighted by factor loadings derived from these variables. Overall in the last 30 days, how much difficulty did you have: with personal relationships or participation in the community?; in dealing with conflicts and tensions with others?; with making new friendships or maintaining current friendships? with dealing with strangers? Factor loadings ranged from 0.894 to 0.921. Reliability coefficient Cronbach's alpha= 0.929
Community, social, and civic life	A summative index weighted by factor loadings derived from these variables. How often in the last 12 months have you: attended any public meeting in which there was discussion of local or school affairs?; met personally with someone you consider to be a community leader?; attended any group, club, society, union or organizational meeting?; worked with other people in your neighborhood to fix or improve something?. Factor loadings ranged from 0.719 to 817. Reliability coefficient Cronbach's alpha =0.738
Informal relationships	A summative index weighted by factor loadings derived from these variables. How often in the last 12 months have you: had friends over to your home?; been in the home of someone who lives in a different neighbourhood than you do or had them in your home?; socialized with coworkers outside of work?; attended religious services (not including weddings and funerals)?; gotten out of the house/your dwelling to attend social meetings, activities, programs or events or to visit friends or relatives?. Factor loadings ranged from 0.450 to 0.841. Reliability coefficient Cronbach's alpha= 0.689.
Health Services Factors	
Person-centered	A summative index weighted by factor loadings derived from these variables. For your last visit to a health care provider, how would you rate the following: your experience of being greeted and talked to respectfully?; experience of how clearly health care providers explained things? your freedom to choose your health care provider? the way the health services ensured you could talk privately to the health care providers? Factor loadings ranged from 705 to 808. Reliability coefficient Cronbach's alpha= 0.738.

Comprehensiveness	A summative index weighted by factor loadings derived from these variables. For your last visit to a health care provider, how would you rate the following: the amount of time waited before being attended to?; the amount of time waited before being attended to? experience of being involved in making decisions about his health care or treatment? Factor loadings ranged from 0.584 to 0.795. Reliability coefficient Cronbach's alpha= 0.234
Quality	A summative index weighted by factor loadings derived from these variables. For your last visit to a health care provider, how would you rate the following: how satisfied are you with how the health care services?; the way health care in your country involves you in deciding what services it provides and where it provides them? Factor loadings ranged from 0.856 to 0.856. Reliability coefficient Cronbach's alpha= 0.622.

Variable	Description	Measurement
Health insurance	Whether the person was a registered member or not with the National Health Insurance Scheme	0 = No, 1 = Yes
Socioeconomic variables		
Educational background	Highest level of education completed by participants	0 = no education, 1 = primary education, and 2 = secondary/higher education
Employment status	Whether respondents were currently employed.	0 = No, 1= Yes
Wealth status	Income quintiles were derived from the household ownership of durable goods, dwelling characteristics, and access to services such as improved water, sanitation and cooking fuel. sing a Bayesian post-estimation (empirical Bayes) method, households were arranged on the asset ladder, where the raw continuous income estimates are transformed into quintiles	0 = Poorest, 1 = Poorer, 2 = Middle, 3 = Richer, 4 = Richest.
Lifestyle variables		
Walk or use bicycle	Walk or use a bicycle (pedal cycle) for at least 10 minutes continuously to get to and from places	0 = No, 1 = Yes
Tobacco use	Ever smoked tobacco or used smokeless tobacco?	0 = No, 1 = Yes
Alcohol consumption	Have you consumed alcohol in the last 30 days?	0 = No, 1 = Yes
Body mass index (BMI)	BMI variable was created from anthropometric measures (height and weight of respondents)	0 = underweight, 1 = normal, 2 = overweight, or 3 = obese
Sociodemographic variables		
Gender	Whether participant is a female or male	0= Male, 1= Female
Age	Age of participants in years	Continuous scalar measure
Marital status	Current marital status of study participants	0= married/cohabiting, 1= never married, 2= divorced/widowed/separated
Ethnicity	What is your background or ethnic group?	0= Akan, 1= Ewe, 2= Ga, 3= Adangbe, 4=

		Northern languages, 5= Other
Religion	Religious denomination of participants	0= None, 1= Christian, 3= Islam, 4= Traditional, 5=Other
Place of residence	Current residential place of participants	0= rural, 1= urban

Table 5. 3. Univariate Distribution of Variables

	%	Mean	Std. Dev.	Min	Max
Dependent variables					
Changing and maintaining body position		.547	1.20	-.68	4.06
Carrying, moving and handling objects		.436	1.21	-.59	5.09
Walking and moving		.512	1.23	-.67	4.55
Self-care		.264	1.23	-.42	6.06
Interpersonal relationships		.405	1.27	-.56	3.76
Community, civic and social life		-.122	1.04	-2.05	3.42
Informal relationships		-.017	1.03	-2.62	2.05
Independent variables					
NCD Conditions					
Hypertension					
No	46.13				
Yes	53.87				
Diabetes					
No	96.53				
Yes	3.47				
Stroke					
No	97.96				
Yes	2.04				
Structural factors					
Health services					
Person-centered		.067			
Comprehensiveness		-.056			
Quality		.008			
Insurance					
No	63.37				
Yes	36.63				
Individul factors					
Lifestyle factors					
Body Mass Index					

Underweight	13.80
Normal	55.87
Overweight	18.84
Obese	11.50
Vigorous work	
No	51.45
Yes	48.55
Walk or bike	
No	23.02
Yes	76.98
Tobacco use	
No	76.10
Yes	23.90
Alcohol consumption	
No	41.59
Yes	58.41
Socioeconomic factors	
Education level	
No education	47.79
Primary	24.01
Secondary/Tertiary	28.19
Employment status	
No	25.82
Yes	74.18
Wealth status	
Poorest	18.50
Poorer	19.14
Middle	20.19
Richer	21.19
Richest	20.97
Sociodemographic factors	
Gender	

Male	52.40	
Female	47.60	
Age		60.08
Marital status		
Married/Cohabitating	60.19	
Single	2.45	
Divorce/Separated	37.36	
Ethnicity		
Akan	51.08	
Ewe	6.02	
Ga-Adangbe	10.24	
Northern Languages	11.89	
Other	20.78	
Religion		
None	4.66	
Christian	70.71	
Islam	15.11	
Traditional	8.69	
Other	0.83	
Place of residence		
Rural	58.93	
Urban	41.07	

Table 5. 4. Bivariate Analysis of Activity Limitations and Participation Restrictions among People with NCDs in Ghana

NCD Conditions	Activity Limitations				Participation Restrictions		
	Changing and maintaining body position	*Carrying, moving, and handling objects*	*Walking and moving*	*Self-care*	*Interpersonal relationships*	*Community, civic and social life*	*Informal relationships*
Hypertension							
No	0	0	0	0	0	0	0
Yes	0.106*	0.189***	0.206***	0.217***	0.238***	-0.143***	0.226***
	(0.0432)	(0.0415)	(0.0426)	(0.0439)	(0.0506)	(0.0386)	(0.0415)
Diabetes							
No	0	0	0	0	0	0	0
Yes	0.440***	0.523***	0.427***	0.363**	0.431***	-0.200*	-0.0799
	(0.120)	(0.143)	(0.111)	(0.132)	(0.123)	(0.0868)	(0.0892)
Stroke							
No	0	0	0	0	0	0	0
Yes	1.314***	1.343***	1.593***	1.464***	0.700***	-0.523***	-0.389*
	(0.164)	(0.198)	(0.191)	(0.241)	(0.169)	(0.0996)	(0.151)
Structural factors							
Health services							
Person-centered	-0.136***	-0.275***	-0.116***	-0.357***	-0.409***	0.303***	0.0300
	(0.0263)	(0.0297)	(0.0300)	(0.0381)	(0.0321)	(0.0250)	(0.0423)
Comprehensiveness	-0.0887**	-0.0905**	-0.0295	-0.0229	-0.173***	0.101**	-0.324***
	(0.0270)	(0.0296)	(0.0260)	(0.0292)	(0.0393)	(0.0313)	(0.0298)
Quality	0.0295	0.141***	0.0509	0.203***	0.181***	-0.0716**	0.233***
	(0.0297)	(0.0375)	(0.0324)	(0.0484)	(0.0358)	(0.0255)	(0.0302)
Insurance							
No	0	0	0	0	0	0	0
Yes	0.213***	0.153**	0.215***	0.0892	0.0757	-0.0235	-0.0849
	(0.0462)	(0.0475)	(0.0459)	(0.0510)	(0.0524)	(0.0401)	(0.0440)
Individual factors							
Lifestyle factors							
Body Mass Index							
Underweight	0	0	0	0	0	0	0
Normal	-0.398***	-0.367***	-0.442***	-0.251***	-0.385***	0.153**	0.162**
	(0.0640)	(0.0654)	(0.0671)	(0.0702)	(0.0748)	(0.0503)	(0.0541)
Overweight	-0.404***	-0.394***	-0.449***	-0.259**	-0.449***	0.187**	0.173*
	(0.0764)	(0.0788)	(0.0764)	(0.0787)	(0.0891)	(0.0669)	(0.0723)
Obese	-0.0951	-0.213*	-0.0615	-0.0716	-0.313**	0.0305	-0.0777
	(0.0891)	(0.0877)	(0.0938)	(0.101)	(0.0977)	(0.0730)	(0.0901)
Vigorous work							
No	0	0	0	0	0	0	0
Yes	-0.521***	-0.354***	-0.399***	-0.207**	-0.0505	0.230***	0.573***
	(0.0521)	(0.0575)	(0.0527)	(0.0640)	(0.0702)	(0.0523)	(0.0559)
Walk or bike							
No	0	0	0	0	0	0	0
Yes	-0.167*	-0.151*	-0.335***	-0.181*	-0.165*	0.234***	0.719***

	(0.0778)	(0.0727)	(0.0818)	(0.0801)	(0.0821)	(0.0659)	(0.0582)
Tobacco use							
No	0	0	0	0	0	0	0
Yes	-0.0156	0.0660	0.0325	0.0735	-0.0307	0.0786	0.0214
	(0.0532)	(0.0531)	(0.0525)	(0.0540)	(0.0564)	(0.0435)	(0.0540)
Alcohol consumption							
No	0	0	0	0	0	0	0
Yes	-0.129*	-0.139**	-0.130*	-0.100	-0.141*	0.164***	-0.119*
	(0.0546)	(0.0530)	(0.0524)	(0.0535)	(0.0593)	(0.0434)	(0.0477)
Socioeconomic factors							
Education level							
No education	0	0	0	0	0	0	0
Primary	-0.529***	-0.384***	-0.460***	-0.250***	-0.443***	0.295***	0.117*
	(0.0561)	(0.0538)	(0.0549)	(0.0539)	(0.0623)	(0.0517)	(0.0542)
Secondary/Tertiary	-0.731***	-0.582***	-0.605***	-0.403***	-0.646***	0.358***	0.115
	(0.0563)	(0.0569)	(0.0554)	(0.0570)	(0.0651)	(0.0529)	(0.0612)
Employment status							
No	0	0	0	0	0	0	0
Yes	-1.024***	-0.885***	-1.208***	-0.735***	-0.845***	0.640***	0.460***
	(0.0575)	(0.0607)	(0.0589)	(0.0612)	(0.0589)	(0.0449)	(0.0441)
Wealth status							
Poorest	0	0	0	0	0	0	0
Poorer	-0.0333	0.0214	0.0864	0.0788	-0.0711	0.142*	0.245***
	(0.0644)	(0.0636)	(0.0629)	(0.0680)	(0.0719)	(0.0632)	(0.0638)
Middle	0.000972	0.120	0.147*	0.270**	-0.0396	0.181**	0.422***
	(0.0790)	(0.0772)	(0.0744)	(0.0872)	(0.0850)	(0.0670)	(0.0682)
Richer	-0.178*	-0.0949	-0.0287	0.00755	-0.304***	0.199**	0.319***
	(0.0755)	(0.0707)	(0.0708)	(0.0773)	(0.0894)	(0.0709)	(0.0744)
Richest	-0.271***	-0.200**	-0.137	-0.146	-0.385***	0.226**	0.0568
	(0.0800)	(0.0752)	(0.0746)	(0.0803)	(0.0923)	(0.0759)	(0.0820)
Sociodemographic factors							
Gender							
Male	0	0	0	0	0	0	0
Female	0.435***	0.247***	0.381***	0.170***	0.338***	-0.410***	-0.0751
	(0.0398)	(0.0414)	(0.0395)	(0.0405)	(0.0445)	(0.0348)	(0.0400)
Age	0.0414***	0.0348***	0.0402***	0.0234***	0.0319***	-0.0145***	-0.00616***
	(0.00155)	(0.00170)	(0.00165)	(0.00168)	(0.00179)	(0.00129)	(0.00122)
Marital status							
Married/Cohabitating	0	0	0	0	0	0	0
Single	0.000136	0.106	0.123	0.391*	0.235	-0.305**	-0.110
	(0.133)	(0.138)	(0.141)	(0.172)	(0.139)	(0.105)	(0.121)
Divorce/Separated	0.653***	0.453***	0.616***	0.325***	0.500***	-0.453***	-0.0986*
	(0.0424)	(0.0474)	(0.0428)	(0.0480)	(0.0492)	(0.0372)	(0.0394)
Ethnicity							
Akan	0	0	0	0	0	0	0
Ewe	-0.140	-0.119	-0.0611	-0.330***	-0.106	0.563***	-0.402***

	(0.0720)	(0.0916)	(0.0831)	(0.0919)	(0.0853)	(0.109)	(0.0751)
Ga-Adangbe	-0.0997	-0.164*	-0.200**	-0.329***	-0.120	0.301***	-0.429***
	(0.0711)	(0.0760)	(0.0762)	(0.0793)	(0.0842)	(0.0900)	(0.0803)
Northern Languages	-0.203**	-0.196*	-0.208**	-0.264**	-0.241**	0.130	-0.0873
	(0.0672)	(0.0768)	(0.0710)	(0.0901)	(0.0808)	(0.0826)	(0.0917)
Other	0.0183	-0.00759	-0.0338	-0.0848	-0.0245	0.0848	-0.299**
	(0.0931)	(0.0878)	(0.0805)	(0.0901)	(0.118)	(0.0827)	(0.0947)
Religion							
None	0	0	0	0	0	0	0
Christian	-0.00140	0.0314	0.0305	0.0936	-0.203	0.333*	0.159
	(0.107)	(0.123)	(0.0940)	(0.0918)	(0.196)	(0.133)	(0.0842)
Islam	-0.0656	0.0323	-0.0557	0.0192	-0.305	0.396**	0.385***
	(0.135)	(0.146)	(0.119)	(0.117)	(0.220)	(0.152)	(0.101)
Traditional	0.136	0.0704	0.165	0.0931	-0.255	0.642***	-0.333**
	(0.159)	(0.152)	(0.126)	(0.114)	(0.247)	(0.155)	(0.120)
Other	0.123	0.272	0.187	0.219	0.0200	0.0163	0.154
	(0.209)	(0.200)	(0.209)	(0.229)	(0.269)	(0.217)	(0.176)
Place of residence							
Rural	0	0	0	0	0	0	0
Urban	-0.0313	0.000874	0.0243	0.00517	-0.150	-0.187**	-0.173*
	(0.0637)	(0.0728)	(0.0638)	(0.0856)	(0.0824)	(0.0653)	(0.0831)

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5. 5. Multivariate Analysis of Activity Limitations among People with NCDs in Ghana

	Changing and maintaining body position			*Carrying, moving and handling objects*			*Walking and moving*			*Self-care*		
NCD Conditions	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Hypertension												
No	0	0	0	0	0	0	0	0	0	0	0	0
Yes	0.0770	0.0427	-0.0608	0.159***	0.0865*	0.00308	0.173***	0.147***	0.0183	0.187***	0.101**	0.0347
	(0.0426)	(0.0413)	(0.0345)	(0.0406)	(0.0375)	(0.0351)	(0.0419)	(0.0413)	(0.0359)	(0.0426)	(0.0362)	(0.0370)
Diabetes												
No	0	0	0	0	0	0	0	0	0	0	0	0
Yes	0.333**	0.266*	0.155	0.406**	0.323*	0.266*	0.287**	0.223*	0.0952	0.231	0.144	0.104
	(0.120)	(0.118)	(0.0963)	(0.145)	(0.139)	(0.118)	(0.110)	(0.109)	(0.0945)	(0.132)	(0.124)	(0.116)
Stroke												
No	0	0	0	0	0	0	0	0	0	0	0	0
Yes	1.252***	1.246***	0.894***	1.253***	1.291***	0.989***	1.515***	1.513***	1.066***	1.390***	1.458***	1.182***
	(0.165)	(0.166)	(0.144)	(0.198)	(0.198)	(0.183)	(0.191)	(0.192)	(0.161)	(0.240)	(0.237)	(0.226)
Structural factors												
Health services												
Person-centered		-0.125***	-0.130***		-0.261***	-0.271***		-0.105***	-0.105***		-0.347***	-0.352***
		(0.0259)	(0.0225)		(0.0273)	(0.0251)		(0.0285)	(0.0257)		(0.0337)	(0.0317)
Comprehensiveness		-0.0741**	-0.0583*		-0.0614*	-0.0505		-0.0121	-0.0151		0.0145	0.0247
		(0.0279)	(0.0273)		(0.0297)	(0.0287)		(0.0261)	(0.0238)		(0.0287)	(0.0274)
Quality		0.0222	0.0482		0.129***	0.145***		0.0424	0.0662*		0.192***	0.191***
		(0.0271)	(0.0249)		(0.0315)	(0.0305)		(0.0293)	(0.0269)		(0.0395)	(0.0369)
Insurance												
No		0	0		0	0		0	0		0	0
Yes		0.182***	0.00456		0.106*	-0.0381		0.182***	-0.00290		0.0389	-0.0509
		(0.0461)	(0.0359)		(0.0454)	(0.0423)		(0.0449)	(0.0385)		(0.0461)	(0.0463)
Individual factors												
Lifestyle factors												
Body Mass Index												
Underweight			0			0			0			0
Normal			-0.0696			-0.122*			-0.123*			-0.0871
			(0.0524)			(0.0536)			(0.0534)			(0.0608)
Overweight			-0.00787			-0.106			-0.0761			-0.0471
			(0.0603)			(0.0670)			(0.0613)			(0.0671)
Obese			0.246**			0.0498			0.259***			0.138
			(0.0738)			(0.0735)			(0.0766)			(0.0838)
Vigorous work												
No			0			0			0			0
Yes			-0.254***			-0.128**			-0.0441			-0.00976
			(0.0429)			(0.0472)			(0.0444)			(0.0522)
Walk or bike												
No			0			0			0			0
Yes			0.102			0.0725			-0.0718			0.0161
			(0.0633)			(0.0641)			(0.0656)			(0.0759)

Tobacco use				
No	0	0	0	0
Yes	0.0343	0.0822	0.0804	0.110*
	(0.0469)	(0.0470)	(0.0498)	(0.0476)
Alcohol consumption				
No	0	0	0	0
Yes	0.0362	-0.00630	-0.00558	0.0111
	(0.0420)	(0.0452)	(0.0469)	(0.0508)
Socioeconomic factors				
Education level				
No education	0	0	0	0
Primary	-0.147**	-0.0810	-0.0802	-0.0766
	(0.0478)	(0.0478)	(0.0476)	(0.0525)
Secondary/Tertiary	-0.300***	-0.249***	-0.187**	-0.199**
	(0.0572)	(0.0613)	(0.0569)	(0.0626)
Employment status				
No	0	0	0	0
Yes	-0.554***	-0.521***	-0.784***	-0.517***
	(0.0525)	(0.0581)	(0.0572)	(0.0606)
Wealth status				
Poorest	0	0	0	0
Poorer	-0.00714	0.0293	0.0973*	0.0752
	(0.0538)	(0.0558)	(0.0471)	(0.0588)
Middle	0.0303	0.0936	0.162**	0.219**
	(0.0632)	(0.0632)	(0.0576)	(0.0678)
Richer	-0.0570	-0.00699	0.0659	0.0640
	(0.0627)	(0.0631)	(0.0572)	(0.0691)
Richest	-0.140*	-0.0912	-0.0461	-0.0752
	(0.0682)	(0.0721)	(0.0667)	(0.0812)
Sociodemographic factors				
Gender				
Male	0	0	0	0
Female	0.168***	0.0575	0.145***	0.0188
	(0.0425)	(0.0424)	(0.0406)	(0.0438)
Age	0.0297***	0.0255***	0.0280***	0.0157***
	(0.00181)	(0.00180)	(0.00185)	(0.00183)
Marital status				
Married/Cohabitating	0	0	0	0
Single	0.285**	0.292**	0.373***	0.428**
	(0.107)	(0.102)	(0.102)	(0.133)
Divorce/Separated	0.0995**	0.0125	0.0865*	0.00637
	(0.0381)	(0.0393)	(0.0372)	(0.0444)
Ethnicity				
Akan	0	0	0	0
Ewe	-0.137*	-0.0606	-0.0958	-0.291***

			(0.0630)			(0.0731)			(0.0700)			(0.0750)
Ga-Adangbe			-0.0816			-0.100			-0.204**			-0.280***
			(0.0706)			(0.0738)			(0.0738)			(0.0707)
Northern Languages			-0.0855			-0.0714			-0.0926			-0.129
			(0.0603)			(0.0704)			(0.0660)			(0.0778)
Other			0.0135			0.00128			-0.00526			-0.0446
			(0.0829)			(0.0773)			(0.0755)			(0.0741)
Religion												
None			0			0			0			0
Christian			0.0607			0.107			0.0833			0.148
			(0.0827)			(0.0903)			(0.0773)			(0.0833)
Islam			0.0238			0.121			0.0309			0.116
			(0.110)			(0.117)			(0.106)			(0.113)
Traditional			0.0779			0.134			0.139			0.229*
			(0.134)			(0.122)			(0.117)			(0.103)
Other			0.0832			0.228			0.194			0.199
			(0.174)			(0.166)			(0.147)			(0.186)
Place of residence												
Rural			0			0			0			0
Urban			-0.0999			-0.0384			-0.0796			-0.0371
			(0.0569)			(0.0664)			(0.0597)			(0.0693)
Constant	0.468***	0.427***	-0.748***	0.311***	0.326***	-0.664***	0.127**	0.183***	-0.360	0.127**	0.183***	-0.360
	(0.0405)	(0.0438)	(0.181)	(0.0373)	(0.0410)	(0.184)	(0.0399)	(0.0434)	(0.200)	(0.0399)	(0.0434)	(0.200)
N	4210	4210	4210	4210	4210	4210	4210	4210	4210	4210	4210	4210
r2	0.0277	0.0492	0.361	0.0327	0.0961	0.301	0.0357	0.140	0.260	0.0357	0.140	0.260

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5. 6. Multivariate Analysis of Participation Restrictions among People with NCDs in Ghana

	Interpersonal relationships			*Community, civic and social life*			*Informal relationships*		
NCD Conditions	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Hypertension									
No	0	0	0	0	0	0	0	0	0
Yes	0.221***	0.111*	0.0326	-0.131***	-0.0624	-0.000333	0.235***	0.167***	0.149***
	(0.0500)	(0.0432)	(0.0348)	(0.0388)	(0.0352)	(0.0329)	(0.0410)	(0.0316)	(0.0288)
Diabetes									
No	0	0	0	0	0	0	0	0	0
Yes	0.357**	0.265*	0.239*	-0.147	-0.0896	-0.000500	-0.0749	-0.0705	0.0268
	(0.125)	(0.113)	(0.104)	(0.0845)	(0.0788)	(0.0759)	(0.0880)	(0.0852)	(0.0767)
Stroke									
No	0	0	0	0	0	0	0	0	0
Yes	0.602***	0.664***	0.396**	-0.473***	-0.508***	-0.311***	-0.434**	-0.383**	-0.224
	(0.171)	(0.156)	(0.143)	(0.100)	(0.105)	(0.0928)	(0.152)	(0.144)	(0.123)
Structural factors									
Health Services									
Person-Centered		-0.387***	-0.404***		0.293***	0.268***		0.0672*	0.0464
		(0.0274)	(0.0249)		(0.0240)	(0.0233)		(0.0332)	(0.0259)
Comprehensiveness		-0.133***	-0.131***		0.0730*	0.0683**		-0.320***	-0.237***
		(0.0359)	(0.0339)		(0.0284)	(0.0257)		(0.0288)	(0.0280)
Quality		0.162***	0.152***		-0.0597*	-0.0750**		0.223***	0.160***
		(0.0278)	(0.0245)		(0.0251)	(0.0245)		(0.0272)	(0.0241)
Insurance									
No		0	0		0	0		0	0
Yes		0.0301	-0.0408		0.00132	0.0602		-0.100**	-0.0622
		(0.0476)	(0.0432)		(0.0356)	(0.0331)		(0.0376)	(0.0401)
Individual factors									
Lifestyle factors									
Body Mass Index									
Underweight			0			0			0
Normal			-0.129*			-0.00487			0.0547
			(0.0599)			(0.0447)			(0.0407)
Overweight			-0.123			0.0421			0.0894
			(0.0717)			(0.0586)			(0.0521)
Obese			0.0167			-0.0470			-0.0111
			(0.0794)			(0.0622)			(0.0633)
Vigorous work									
No			0			0			0
Yes			0.221***			-0.0152			0.347***
			(0.0621)			(0.0464)			(0.0434)
Walk or bike									
No			0			0			0
Yes			-0.0808			0.121*			0.385***
			(0.0697)			(0.0580)			(0.0553)

Tobacco Use			
No	0	0	0
Yes	0.0162	-0.0637	0.0259
	(0.0490)	(0.0378)	(0.0378)
Alcohol consumption			
No	0	0	0
Yes	-0.0141	0.00467	-0.0720*
	(0.0456)	(0.0407)	(0.0361)
Socioeconomic factors			
Education level			
No education	0	0	0
Primary	-0.140**	0.150***	0.0538
	(0.0473)	(0.0450)	(0.0433)
Secondary/Tertiary	-0.289***	0.180***	0.0887
	(0.0577)	(0.0519)	(0.0459)
Employment status			
No	0	0	0
Yes	-0.579***	0.461***	0.229***
	(0.0566)	(0.0422)	(0.0420)
Wealth status			
Poorest	0	0	0
Poorer	-0.0793	0.158**	0.185***
	(0.0615)	(0.0539)	(0.0522)
Middle	-0.0539	0.208***	0.308***
	(0.0695)	(0.0581)	(0.0481)
Richer	-0.166*	0.188**	0.270***
	(0.0688)	(0.0579)	(0.0552)
Richest	-0.153*	0.208***	0.108
	(0.0747)	(0.0618)	(0.0579)
Sociodemographic factors			
Gender			
Male	0	0	0
Female	0.147**	-0.236***	-0.00205
	(0.0473)	(0.0395)	(0.0414)
Age	0.0230***	-0.00621***	0.000245
	(0.00187)	(0.00137)	(0.00132)
Marital status			
Married/Cohabitating	0	0	0
Single	0.386**	-0.197*	-0.00710
	(0.126)	(0.0949)	(0.107)
Divorce/Separated	0.0286	-0.0970*	0.0126
	(0.0469)	(0.0379)	(0.0396)
Ethnicity			
Akan	0	0	0
Ewe	-0.00108	0.508***	-0.165*

			(0.0691)			(0.0995)			(0.0644)
Ga-Adangbe			0.00748			0.249**			-0.217**
			(0.0721)			(0.0814)			(0.0660)
Northern Languages			-0.0412			-0.00540			-0.146*
			(0.0718)			(0.0719)			(0.0672)
Other			0.0495			-0.0948			-0.326***
			(0.102)			(0.0743)			(0.0632)
Religion									
None			0			0			0
Christian			-0.107			0.371***			0.185*
			(0.120)			(0.0940)			(0.0730)
Islam			-0.216			0.481***			0.415***
			(0.153)			(0.122)			(0.0866)
Traditional			-0.177			0.621***			-0.0479
			(0.183)			(0.118)			(0.0963)
Other			-0.0409			0.0771			0.198
			(0.186)			(0.190)			(0.131)
Place of residence									
Rural			0			0			0
Urban			-0.150*			-0.145*			-0.0510
			(0.0645)			(0.0612)			(0.0603)
Constant	0.262***	0.329***	-0.197	-0.0369	-0.0910*	-0.648***	-0.133**	-0.0845*	-1.021***
	(0.0444)	(0.0488)	(0.204)	(0.0362)	(0.0399)	(0.155)	(0.0425)	(0.0395)	(0.141)
N	4210	4210	4210	4210	4210	4210	4210	4210	4210
r2	0.0165	0.141	0.331	0.00983	0.100	0.248	0.0158	0.153	0.281

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Chapter 6: Social Support Systems and the Self-Management of Non-Communicable Diseases in Ghana

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Introduction

Finally, in the last manuscript, the role of social support systems in the self-management of NCDs in Ghana is explored. The aim of this research is to explore the role of social support in the self-management of NCDs in Ghana.

Abstract

There is a large body of literature on the role of social support systems in the management of chronic conditions in the West, with limited research on the sub-Saharan Africa and Ghanaian context. In the past, the organization and delivery of formal health services in Ghana were geared towards the treatment of infectious diseases rather than non-communicable diseases (NCDs). We conducted qualitative interviews with a sample of 33 NCD patients purposefully selected from two teaching hospitals in Ghana. The information they shared indicated that the most common types of support received were instrumental and emotional. While a majority of stroke patients experience activity limitations related to bathing and cooking, they received the emotional support necessary to maintain their psychological well-being. Overall, we find that social connections and relationships were an important strategy in the promotion of the physical and mental well-being of these NCD patients.

Keywords: Ghana; NCD patients; social support; social network

Background

NCDs are a global public health threat, especially in low- and middle-income countries (LMICs) (Amuyunzu-Nyamongo, 2010), and are the leading cause of mortality and morbidity worldwide (WHO, 2011c). Many now advocate the involvement of patients and their families in managing, mitigating, and treating NCDs outside conventional medical care. This human-centered approach is important for maintaining patients' independence, responsibility, and identity (Bodenheimer et al., 2002). The family's involvement in the management of a patient's health – for both chronic and less serious conditions – is associated with reduced hospitalization rates, lower cost to the health system, reduced emergency department attendance and thus shorter wait times, and increased quality of life (Carryer et al., 2010; van Hooft et al., 2015). Most studies on the role of social support in the management of chronic diseases focus on Western countries, leaving areas such as Sub-Saharan Africa (SSA), including Ghana, insufficiently explored (Asante, 2012; Glozah & Pevalin, 2014). This paper fills an important research gap by investigating whether and how social support contributes to the management of NCDs in Ghana.

Social Networks, Social Capital, and Social Support

Social support is derived from social networks (Carpiano & Fitterer, 2014; Ferlander, 2007). The term social network refers to the links, size, proximity, and frequency of contacts between people (Moore et al, 2018). Social networks are typically situated within a structural context, with interaction and communication between the individual and the network (Stamnes, 2000). Social networks can be egocentric (local) or sociocentric (global) (Smith & Christakis, 2008). In an egocentric network, the individual is the center of attention or interest and connected to his/her social network, such as family, friends, and neighbors, among others (Berkman et al., 2000). A sociocentric network includes all members of a community and their

interrelatedness. Thus, social networks may be defined by their structural characteristics (size and density), interactional characteristics (the reciprocity of receiving and giving among members), and functional characteristics (emotional, instrumental, information, and appraisal support) (Israel & Rounds, 1987).

A social network can be an important source of social capital, or the resources available to members within the network (Carpiano & Fitterer, 2014; Hanley et al., 2018). Putnam (1993) defined social capital as "features of social organization such as networks, norms and social trust that facilitate coordination and cooperation for mutual benefit" (p. 167). Coleman (1990) defined it as "not a single entity, but a variety of different entities having two characteristics in common: they all consist of some aspect of social structure, and they facilitate certain actions of individuals who are within the structure" (p. 302). More recent definitions say social capital has two conceptual dimensions: social cohesion and network capital (Carpiano & Fitterer, 2014; Chuang & Chuang, 2008). The social cohesion component pertains to the resources available to an individual within a group and is associated with trust, norms, solidarity, and reciprocity, as well as sanctions embedded within a group (Alvarez et al., 2017). It is based on solidarity, closeness, and a sense of belonging to the social network. The network aspect of social capital focuses on the resources that are available to and accessed by group members (Legh-Jones & Moore, 2012), including social support.

In other words, social support may be derived from social networks. According to Turner and Turner (2013, p. 342), social support refers to "the transference of benefits through the presence and content of human relationships". It includes both structural and functional aspects and, in the health arena, it is provided by family members, friends, neighbors, colleagues, health professionals, and fellow patients. The *structural component* is usually quantified and is

comprised of the size of the network, attachment, homogeneity, and proximity. The *functional aspect* has more to do with the quality of support received (Nausheen et al., 2009). The functional aspect of social support can be further divided into four categories; emotional, appraisal, informational, and instrumental support (Clarke et al., 2006). People are emotionally supported when they receive nurturing, warmth, commitment, and assurance that they are valuable, and their behavior is approved and accepted (Sjolander & Ahlstrom, 2012). Appraisal support provides information for self-evaluation purposes, that is, constructive feedback and positive affirmation (Heaney & Israel, 2008). Informational support entails providing advice and suggestions to address a specific problem (van Dam et al., 2005), while instrumental support includes the provision of material aid and services to directly assist a person in need (Sjolander & Ahlstrom, 2012).

Research in the West shows social support plays a significant role in the management of chronic diseases (Clarke et al., 2006; Penwell & Larkin, 2010; Skinner et al., 2000). Persons with inadequate social support often experience poorer health outcomes than those with adequate social support (Driver, 2005). Authors posit that adequate social support is associated with better management of illness among chronic patients (Gallant, 2003; Skinner et al., 2000). It is also linked to improved health outcomes, including better adherence to medication, monitoring of blood glucose level, positive lifestyle behaviors, improved self-esteem, low depression, and empowerment (Tsouna-Hadjis et al., 2000). Social support from healthcare professionals leads to a timelier diagnosis and better management of chronic conditions which may require frequent follow-ups (Kadirvelu et al, 2012; Kim et al., 2015).

Overall, the literature finds social support from healthcare professionals, family members, and acquaintances provides important emotional, appraisal, informational, and

instrumental support to patients. This study adds to the literature by examining how social support assists in the management of NCDs—specifically hypertension, diabetes, and stroke—in Ghana.

Data Collection Methods

Data were collected at two major teaching hospitals (Komfo Anokye Teaching Hospital and Tamale Teaching Hospital) in Ghana. These hospitals are the major referral centers for healthcare delivery in the country. The study sample comprised 33 patients (Table 1) who were interviewed on their experiences of receiving social support as a result of living with NCDs. The data collection process started by obtaining ethical clearance from each hospital. In both hospitals, a formal application to conduct research was submitted to the Department of Medicine, along with a research protocol and a consent form. Each hospital had specific procedures to follow to get permission to conduct research in the facility. In the case of Komfo Anokye Teaching Hospital, the Head of the Department of Medicine had to give approval, and research clearance was issued by the research department of the hospital. For Tamale Teaching Hospital, the application to conduct research was formally submitted to the Chief Executive Officer (CEO). After approval was obtained from the CEO, the application was referred to the Institutional Review Board of the hospital for ethical clearance.

After obtaining clearance from the hospitals, we sent a memo to the units where the research would be conducted. Patient recruitment was conducted in consultation with the nurses in charge of the respective units. First, the nurse-in-charge made a formal announcement about the purpose of the research to the patients attending the outpatient clinic of each unit. Thus, the nurses were the main recruiters. At each hospital, patients with various NCDs attended their review and treatment appointments on specific days. The interviews were scheduled on the days

they attended the outpatient clinic for each NCD category. The recruitment of stroke patients was limited to those who had recovered and had clear speech. Interviews were conducted in the outpatient clinics after consultation with a doctor to avoid any interference in the treatment process.

Sampling Technique.

We employed a purposive sampling technique. Purposive samples are used in qualitative research to select participants who possess knowledge about or experience with a phenomenon of interest (Creswell & Clark, 2011; Palinkas et al., 2015). The criteria for participating in the study were as follows: patients had to have been diagnosed with an NCD for least five years and had to be 18 years and above. These inclusion criteria ensured selected individuals possessed knowledge and experience of the effects of social support networks on chronic illness management. The patients who met the study inclusion criteria were selected for interviews based on the order in which they attended consultations with their doctor.

Research Instrument

We used semi-structured interviews, as this allowed follow-up questions to be asked if certain questions were not answered clearly. Interviews lasted between 30 and 45 minutes. All interviews were conducted in the outpatient departments of the two teaching hospitals. The interview questions aimed to prompt the participants to discuss the meaning and types of support they received, explain how the support affected their health, and comment on the quality of support received from others. The interviews were in English and the local languages spoken in the areas served by the hospitals, Twi and Dagbani.

Data Analysis

Data obtained in the interviews were subjected to thematic analysis. According to Vaismoradi et al., (2013), thematic analysis identifies common patterns that extend across an entire interview or set of interviews. In the initial stage, the researcher listened to the audio-recorded interviews several times to ensure all words and phrases were properly heard. The interview recordings were then transcribed verbatim and compared to the audio-recordings to ensure the transcription was correct. Interviews in the local languages were translated by the first author with assistance from other native speakers of Twi and Dagbani. The sentences and paragraphs associated with the same questions were grouped and then condensed to generate meaningful codes. Coding was done by the researcher. Final codes for this study were developed after consensus had been reached by researcher and the supervisor. The codes were compared to the sentences and paragraphs, allowing several themes to emerge and resulting in the development of a codebook. Based on the codes, we developed several themes after reading through the transcripts and field notes several times, leading to the development of sub-themes. The analysis revealed six major themes and sub-themes in the data: *Meaning and types of social support, structure and size of support, role of social network, health and wellbeing, functional support* and *quality of support*. We used NVivo 11 software to analyze the data based on the codes and emerging themes.

Ethical Approval

Ethical clearance for this research was sought from the St. John's Health Research Ethics Board, Canada, as well as from each teaching hospital. For Komfo Anokye Teaching Hospital, ethical clearance was sought from the Committee of Human Research and Publication, and Ethics (CHPRE/AP/395) in the School of Medicine, Kwame Nkrumah University of Science and

Technology. For Tamale Teaching Hospital, ethical clearance was given by the Institutional Review Board (TTH/R&D/SR/16/208). Consent to participate in the interviews was orally sought from patients who agreed to take part in the interview. Participants were assured of the confidentiality of the information collected and told that pseudonyms would be used in any publications.

Results

Table 6. 1. Themes and sub-themes of social support in the self-management of NCDs in Ghana

Themes	Sub-themes
Understanding social support and their types	• Meaning of social support: "*support from relatives*." • Types of social support received: "*I have six children, only one is not working, the rest of them give me money*." *"I get information from my daughter who is a nurse"*
Structure and size of social support	• Types of social support received by gender and socioeconomic status • Social support network: "*yes, my wife is part, my children are also part*."
Role of social support network	• Trust and confidence in support network: "*because of those words he spoke to me, I was rest assured in my heart that I have someone supporting me*." • Continuity of support: *"it's okay, its the same"* • Adequacy of support systems: *"it got to a time, those I even expected to help me, they were not available. My own brother, even up to now he is not supporting me"* • Nature of social support before diagnosis and sense of belonging: *"that time I don't go to anybody's house [for help], because I was working."*
Health and wellbeing	• Depression: *"Not a such. It was when my wife passed on that I was nearly depressed."* *"There have been a time when in fact, I was thinking that, if I should leave this world, it is even better."*
Functional support	• Physical activity: *"yes, when I wake up in the morning, I go for a walk"* • Support groups: *"apart from [attending] the clinic monthly, I don't belong to any group"*

	• Activity limitations and participation restrictions: "*if I want to get up, they will lift me up. Where I want to go they will help me go there and bring me back."*
Quality of support	• Dealing with challenges: *"my aunt is around. Whenever I face difficult problems, … I call her on phone, or I will call her to come personally and we will discuss".* • Access to health professionals: *"yes, they treat me well".* • Adherence to treatment and nutrition advice: *"I have following the advice of the dietician and some of the medical staff".*

Study participants

The average age of study participants was 59 years (see Table 6.2). The data further revealed that majority were aged between 40 and 60, with a few older than 60. In addition, six of the study participants (18.2%) were employed in the public sector, while 16 (48.5) were employed in the private sector or owned a business enterprise. Twenty-one participants (64%) had no education/primary education, six had secondary education (18%), and five had tertiary education (15%). Eighteen were females (55%); 28 were married, four were widowed, and one was divorced.

Meaning and Types of Social Support

Meaning of social support.

The majority of the participants thought social support entailed help from family members in terms of financial assistance for drugs and practical assistance with household chores. Some participants perceived social support as a system of obligations imposed on their families, where family members must provide assistance to those in difficulty. Some also understood social support to include love and affection from close relatives and neighbors, as manifested by having someone listen to them and pay them an occasional visit to check on their

condition. Thus, social support was generally seen as a system of reciprocity where people assist others in times of difficulty. One patient said:

> *The help of humans could be in terms of money, or simply brotherly love . . . may be let's do it this way, doing it this way will be helpful, then all of you will share. That means, at any time, you have good relationship and also shows brotherly love. Maybe someone will be sick and lying down, bedridden . . . . His/her brothers/sisters will be looking after that person.*
>
> (Patient no. 3, Diabetes)

Another patient defined social support as follows:

> *Support from your family, support from government, and support from your mates. When I say "family," I mean your wife, children, and relatives. I happen to be a northerner, so sometimes we have a bigger family. If you are ill, there is some kind of contribution they have to make to support you. Last but not least, when the sickness is getting worse, they advise on where you should go and see a particular doctor. That kind of support actually makes you feel fine, if I should put it that way. You are not left alone to manage the disease. It is very very important. Actually, the family advise you and they actually make investigations to support where you go for medical treatment.*
>
> (Patient no. 16, Hypertension)

Types of support received.

Most participants said instrumental and emotional support were the most common types of support they received from their social network. Instrumental support was provided by their nuclear family members (spouse and children) only, while emotional support was also provided

by relatives, neighbors, and organizations. Instrumental support was mainly in the form of money for transportation to the hospital and medicine. Emotional support included words of encouragement. This type of support was described as follows by a participant:

> *Because it is my husband who gives me money to go to the hospital, even if I am lying down and I can't get up, he is the one that will cook for me. He gives me my drugs to take. And my children also cook for me. They are young, so they can't help with money, so it all boils down to my husband. He is the one who does everything for me. And excuse my language, but if I want to defecate, he holds my hands and takes me to free myself and he also bathes me because I feel pains in my legs. So, as for my husband, he is the one who does everything for me. Even when I am coming to the hospital, he is the one who brings me in his car.*
>
> (Patient no. 2, Diabetes)

Another patient described the emotional support from family members in the following way:

> *I live with one of my grandchildren. So, those who don't live with me, when they come, they encourage me with words . . . . When they come, I tell them that I am worried about this illness and they will say "it will be over, Mamy. It will stop, it will stop okay." This comforts me.*
>
> (Patient no. 25, Stroke)

When asked about informational support, most participants explained that they usually received it in the form of reminders from their spouses and children to take their medications. Some participants further noted that members of their close support network assisted them in

taking medications, and those with low educational background also received assistance in understanding the instructions written on the prescriptions. In the words of one participant:

> *They ask me "Mom, have you taken your medication. Mom, how are you?" Some will come and greet me "Maame, how are you," or "Grandma, how are you?" I will tell them by God's grace I am fine.*
>
> (Patient no. 23, Stroke)

According to 29 of the participants (88%), most of the informational support they needed, such as the time and quantity of medication to be taken, was provided by health professionals. The health professionals also provided information on nutrition and physical exercise. Only a few study participants (4), mainly those with little or no formal education, said they did not receive any information from their support network and had to rely on health professionals for information, such as the following:

> *We are not to eat too much salt and sugar. It's not like . . . don't put any salt at all. They said that we have salt and sugar in our body, so we should take it in moderation and I obey. So as I sit here, I don't eat a lot of sugar.*
>
> (Patient no. 15, Hypertension)

Participants also confirmed receiving appraisal support in the form of positive statements, usually from family members and friends. The encouragement mostly consisted of advising participants to put their trust in God as a way of coping with their illness. One participant said:

> *Yes, I get a lot of appraisal support. People tell me that many have had it [stroke] and the Lord has taken them through. I am not the first and I should not be the last person. So, I shouldn't think that it is only me or it is a curse from somebody.*
>
> (Patient no. 32, Stroke)

Types of social support received by gender and socioeconomic status.

Interestingly, the types of social support differed by gender. Males received more instrumental, informational, emotional, and appraisal support than females, and they had a more diverse social network. Social support also differed by socioeconomic status. The wealthy (working in the formal sector of the economy or owns a business) received more instrumental support from their spouses. In some instances, they were able to self-finance their medical bills. The wealthy also received emotional and appraisal support from neighbors and friends. In contrast, the poor or those of lower socioeconomic status (working in the informal sector and engaged in petty trading) said although immediate family members were part of their social support structure, those family members were not able to generate enough instrumental support to aid in their treatment and the management of their condition.

Structure and size of social support network

Social support network.

The social support network of most participants comprised their nuclear family members, i.e., spouse and children. The following two comments were typical:

> *Right now, I have the support of my wife and the children. They are the sole persons I'm closer to. They took care of me in the greater part of my ailment.*
>
> (Patient no. 29, Stroke)

> *For my support, it's been my children, they are five and three are supporting me.*
>
> (Patient no. 7, Diabetes)

A majority (29) said their extended family members, friends, and neighbors lived too far away to be of practical help. Any support they provided was emotional. Although most (22) explained they had a diverse social network structure that included extended family members, neighbors, and friends, only three said these network members provided instrumental support. One participant referred to instrumental help from his extended family:

> *My brothers and sisters, they give me that support a lot. Sometimes they bring me money and then buy the prescribed drugs and the food that I take. You know, we diabetes patients, we take a lot of vegetables. So, they buy all for me. Sometimes fruits.*
>
> (Patient no. 8, Diabetes)

Role of social support network

Trust and confidence in support network.

A majority of study participants (85%) had people in their social support network whom they trusted with sensitive information. When asked why they trusted these specific individuals, the participants explained they supported them when they least expected it, at a time when they were losing faith in themselves. In addition, these trusted individuals were always there for them, even when their condition worsened, and they were unsure if they would survive. These support network members motivated them with words of encouragement and positive statements. This type of encouragement was crucial in the recovery process, as explained by one of the participants:

> *Yes. That's my wife. I trust her. From the beginning, she felt that, whatever situation that I am in, she is with me, so I should not worry. Secondly, she has been telling me that, from her dreams, she knows that I will become better and*

actually she saw to the progression of my recovery, and it looks like her dreams are materializing.

(Patient no. 27, Stroke)

However, a few participants felt they could not rely on or trust anyone. When asked why they felt no one in their network deserved their trust, they explained that before they got to their present condition, there were people they considered trusted family members and friends. However, once they became ill, those they thought would support them simply abandoned them. For those reasons, they found it difficult to trust such people again. Two participants said:

As for humans, we are advised not to put our trust in them. You have to trust in God alone; so He is the only one I trust in. As for man, he can help you, but if God does not help you, you can't do anything. So, He says we should put our ways in his hands and trust in Him. God is the only one who can help you. As for humans, they . . . will help you, but a time will come when they will say, "If it weren't for me, you wouldn't have been this and that." So, as for me, it is God I depend on.

(Patient no. 23, Stroke)

For me, I don't like making friends. When a friend sees you, even though you haven't done anything bad, he or she will tell false information about you to others. This person has this and that, and if you are not lucky he will even tell some armed robbers and they can come and steal from you. So, for me, I don't like making friends.

(Patient no. 6 Diabetes)

Adequacy of support systems.

A few of the patients in this study were gainfully employed. Thus, they felt their support system was adequate, as they did not necessarily need financial assistance to manage their illness. Their spouses were also employed and could provide the necessary assistance at times when they were not able to provide for themselves. Two participants remarked:

I have been doing these things by myself, because I am on salary.

(Patient no. 27, Stroke)

Yes. Actually I'm not in need [of financial assistance].

(Patient no. 31, Stroke)

However, a majority of the patients working in the informal sector and those without employment explained that their support system was inadequate, as it did not meet their financial needs. They further noted that most of the time, they were unable to meet most of their medical expenses. A diabetic patient elaborated further:

Because when I was attacked by this sickness, I was bedridden. I am currently not working. So if I'm visiting the hospital, it is my children who give me money . . . the children too are not in any gainful employment, so when they prescribe the medicine for me, sometimes, I don't get money to buy them.

(Patient no. 1, Diabetes)

Nature of social support before diagnosis of condition and sense of belonging.

Most study participants stated that before they received a diagnosis, they did not need any form of support from others. They were independent and very active in their daily lives:

Before, I was strong, I was working, but I used to travel to places. So, sometimes, for a week, I won't be home; so sometimes, I don't even get food to eat. I believe

that's how come I had this sickness. . . . At that time, I was doing my own work and, during those times, my children were also going to school.

(Patient no. 6, Diabetes)

Study participants said they were loved and supported by their social support network members, and their sense of belonging had a positive impact on their health. They explained that their immediate family members, a few friends, and some neighbors were always available. They talked to them and encouraged them with positive statements that made them feel loved and accepted:

I have a strong sense of belonging to my family, friends, and relatives that are closer to me. . . . Yeah, I feel wanted and I feel that I'm within society and also that I'm loved. That gives me the moral support to push me to be well again.

(Patient no. 29, Stroke)

Health and wellbeing

Depression.

A majority of study participants, especially those living with diabetes and hypertension, mentioned times when they felt depressed because of financial difficulties, challenges with relationships, and family conflicts, none of which were due to their illness. In fact, most felt the depression stemmed from lack of control over their situation. The stroke patients experienced depression in the initial stages of their sickness because their cognition was compromised, and they could not make rational decisions. They added that they were not sure if they would recover to their former state. One said:

Sometimes I cry because there are things that, if I was fit and well, I could do without needing support. When that happens to me, I become sad and cry.

Sometimes I am always worried and sad. It looks like the condition, it has been long, and all along, I have been trying all means to get well. All they tell me is that, one day, I will also be well.

(Patient no. 30, Stroke)

In contrast, most of the diabetes and hypertension patients had never experienced any form of depression as a result of their condition.

Functional Support

Physical activity.

Most of the diabetes and hypertension patients indicated that they engaged in physical exercise, such as taking brisk walks or going for a run, either alone or with their spouses. A few said their spouses and children had been very influential in their decision to participate in physical exercise:

As for this sickness . . . even when I walk, I don't feel fine, so when it happens like that, then I become sad. But I am someone who was active, so when it gets to a point that you cannot even walk, then it becomes a burden. So, as a human being, you will think about it. But my husband has been encouraging me and helps me to go to the hospital so that I can be fine.

(Patient no. 2, Diabetes)

Because of their impaired condition, most of the stroke patients did not participate in any physical exercise, but they did do physiotherapy exercises:

I do exercises on my own. Some time just stretching my legs and arms around a little bit. And I walk around the house, but I don't go out to do jogging.

(Patient no. 24, Stroke)

At my age? 81. What I normally do is . . . I walk around the house . . . when I wake in the morning.

(Patient no. 31, Stroke)

Support group.

A majority of the study participants did not belong to any support group where they could meet and discuss health matters pertaining to their condition. When asked why this was the case, most noted that they were not aware that such groups existed, while some said they were not interested in joining any support groups. One was clear about this:

As for an association, . . . apart from the church I attend, personally I am not interested in clubs.

(Patient no. 12, Hypertension)

The diabetes patients in the Komfo Anokye Teaching Hospital were an exception, as they had formed a diabetes association. One said the benefit of joining such a group was that members always had access to their drugs on time, unlike those who were not part of the group. They attended monthly educational programs and said the information they received helped them manage their condition better. Comments included the following:

Sometimes they say, "Today, we will examine the eye;" at other times, they talk about how to cater for your health. Those are the things they teach us. (Patient no. 5, Diabetes)

When we come, for instance, they teach us about our health; that's what they normally advise us on. When you wake up in the morning, you have to exercise, jump, or do something like that, so that your blood can flow well. When we come

here, that is the advice they give to us. And they said we should come for a dental checkup every eight months. Whatever they say I observe it.

(Patient no. 6, Diabetes)

Activity limitations and participation restrictions.

Most of the diabetes and hypertension patients stated that they had never been confined to bed. They were able to do things without the assistance of others. For example, one participant said:

Nothing like that has ever happened to me. By the grace of God, I have not gone through such a situation where I would need someone to lift me up. When I come to the hospital, whatever medicines they give to me, I take them.

(Patient no. 6, Diabetes)

However, the stroke patients recalled that in the initial stages of their illness, they were confined to bed and needed assistance from their support network. Most had to rely on network members to assist them with daily activities, such as bathing, cooking, and going to the hospital and other places:

She [wife] is the one who bathes me, and one of my sons. So, if they [wife and son] are not available, . . . I struggle. I tried to get to the chamber pot, but I don't always want to do anything that will make them annoyed, like urinating on the ground or defecating. I try to comport myself just to encourage them to give me that help.

(Patient no. 28, Stroke).

Another stroke patient shared the following:

When the condition [stroke] happened, I couldn't do anything. They [children] wash my clothing, they cook for me to eat, they help me to get up. Wherever I'm going, they follow me.

(Patient no. 30, Stroke).

Quality of support

Dealing with challenges.

A majority of the patients in the study indicated that although they had personal challenges such as depression and insufficient funds, they dealt with those issues to the best of their ability and did not rely on their social network. One said he turned to his wife:

Any time I have a challenge, it is my wife I talk to. I don't discuss my challenges with people outside. When I talk to my wife, we will look for a solution that can help and will follow that one.

(Patient no. 27, Stroke)

Some patients said they discussed their health challenges with a health professional, especially if they noticed a complication related to their illness:

Yes. My doctor. Doctor Addo. He is the one I am here to see today. I have drugs, and I collapsed three days ago. So, I just want to ask him about my drugs, whether it is overdose because the thing is gone back.

(Patient no. 8, Diabetes)

Continuity of support.

Most of the participants said they had never lacked instrumental support in terms of financial assistance, and they received this from their nuclear family members. For example, one said:

For my children, they always support me. They send me money . . . . The way I took care of them when they were here, they are also taking care of me.

(Patient no. 7, Diabetes)

However, some participants said that although they received the required support, the support was not always provided at the time they needed it. Their support networks might be engaged in other activities that could delay the assistance they needed at the required time and place.

Access to health professionals.

Most participants thought their support network had been instrumental in taking them to a health professional and in some cases to traditional herbalists. Participants further said they had a cordial relationship with their health professionals, with whom they had developed inter-personal relationships. They particularly benefitted from information on nutrition and medications.

They have said that, for the food, you should eat no later than 5:30/6 pm. We should limit the intake of oil, limit the intake of palm oil, koobi [salted fish]. They have taught us a lot about food we should limit. They have taught us that some people will say, "I only have to take plantain, I won't eat cassava." But now that the prices of plantain are high, what will you do? You have to eat it in moderation but not to stop eating it outright.

(Patient no. 12, Hypertension)

If you go to the hospital and they are nice to you, even your sickness does not bother you as much. But if the person shouts at you, then you become worried, you may even lose hope.

(Patient no. 15, Hypertension)

Adherence to treatment and nutrition advice.

Most patients stated that their support networks had been very influential in their compliance with health professionals' advice on required medications and nutrition. Some said their family members monitored them closely to ensure that they took their drugs and ate properly:

> *Yes. They do well, especially my children. They encourage me to take the drugs. And then my daughter, she does cooking for me. She even advises me that, if you want to take a bottle of beer, cut it drastically, maybe to once a week, not because you can't afford it, but to make sure that your condition does not get worse.*
>
> (Patient no. 16, Hypertension)

However, a few patients who had financial challenges and a large family explained that, at times, they could not afford to follow the recommended diet:

> *My eating habits are not good because the food I want to eat, maybe I don't get it. Because I live with my child and my grandchildren, there are many of us in the household, and I can't say "I want to cook a separate food I want to eat." We cook together, so it becomes difficult to cook a separate meal for myself.*
>
> (Patient no. 25, Stroke)

Discussion

Research consistently finds social support benefits health and well-being (Neugebauer & Katz, 2004; Penwell & Larkin, 2010), and researchers underscore the role of social relationships, connections, and interactions throughout the life course (Kawachi & Berkman, 2001; Hanley et al., 2018; Saegert & Carpiano 2017).When people lack social connections and are isolated, they are likely to have worse health outcomes than those with strong connections (Harasemiw et al.,

2018). Most studies feature a Western context, however. The role of social support in the management of chronic diseases in LMICs, such as Ghana, is unclear (Avogo, 2013).

In resource-limited settings where financial protection schemes for NCD patients are inadequate, patients may have to rely on their social networks, including family, friends, neighbors, and communities (Assimeng, 2006; Mkhize, 2006). Although such ties are strong in SSA, the social network structure for the majority of the study participants was limited to immediate family members (spouse and children), and they were solely responsible for providing instrumental support. One possible explanation is the urbanized nature of the study areas where social relations are changing from closely-knit communities to more individualized relationships. Researchers conducting similar studies in SSA and Ghana have also found that the role of the extended family as a safety net for the vulnerable—such as orphans, the elderly, widows, and the sick—is diminishing rapidly because of migration, demographic change, education, and urbanization (Aboderin, 2004; Tanga, 2013).

Instrumental and emotional support were the most common types of support received by the study's NCD participants. Studies conducted in Western countries also find instrumental and emotional support are the most frequent types of support for individuals living with chronic diseases (Dwarswaard et al., 2015; Gallant, 2003). Instrumental support is an effective strategy in managing NCDs, as it gives patients access to financial resources, provides help with medication and meal preparation, and reduces the cost of hospitalization and treatment (Koetsenruijter et al., 2016; Vassilev et al., 2014). Similarly, the emotional support provided by family members restores psychosocial well-being, assists in the development of coping mechanisms, and aids in the recovery process (Husak et al., 2004).

The findings on network size were interesting. The qualitative interviews provide evidence that in some instances, the network size was not all that important. Our participants' networks were dominated by nuclear family members, and these networks provided both emotional and instrumental support. However, those who were able to obtain sufficient instrumental support from their nuclear family were of high socioeconomic standing. Keating and Dosman (2009) argue that while smaller social networks may lead to increased interpersonal contacts, such networks may not be able to generate enough resources (instrumental support) to support their members. Yet several of our participants had large networks, but said they did not generate enough resources to allow them to self-manage their conditions.

Based on our findings we argue the following. First, it is not necessarily the network size, but its ability to generate sufficient resources (social capital) to support its members that contributes to positive health outcomes. Second, a large network, even if it does not offer instrumental support, may be useful in providing informational, emotional, and appraisal support. Thus, different members of a person's social network serve different purposes. For instance, immediate family members may provide instrumental support, while friends and neighbors provide companionship, emotional, support, and appraisal support (Harasemiw et al., 2018).

Several study participants told us the healthcare providers gave them important support. This has been found in other studies as well. Healthcare providers disseminate the required information, and they monitor and review patients' condition to ensure they recover as quickly as possible (Kadirvelu et al., 2012). They also offer counseling, a role that family members cannot assume, especially counseling related to behavioral changes and lifestyle improvements (Kim et al., 2015). For instance, the provision of information by healthcare professionals to NCD patients

could lead to the modification of lifestyle and health behavior, as health professionals are authority figures and trusted sources of valuable information (Heisler, 2007).

Social support network members play an important role in influencing lifestyle behaviors and ensuring medical adherence in the management of chronic diseases. The results reported in this work are consistent with those of other authors; for example, social support as a management strategy has been associated with diet adherence, medication compliance, and physical promotion activities among chronic patients (Garay-Sevilla, 1995; Vassilev et al., 2014). Thus, there is an opportunity to integrate social support networks in the management of chronic conditions in Ghana through educational programs aimed at administering medication, managing nutrition, and making lifestyle changes. This is especially important, as we found the participants with functional limitations related to bathing, cooking, and mobility (in this study, the stroke patients) relied solely on their support network in the self-management of their condition (Suttajit et al., 2010).

Finally, the results revealed that men were more likely to receive social support from their nuclear family—which is the main support network for majority of NCD patients—than women. This is not surprising, as within the African cultural setting, women generally act as caretakers for the household. Even when women are afflicted with NCDs, in addition to being the primary caregivers, with their limited employment opportunities within the formal sector, they are not able to generate enough financial resources to meet their healthcare needs (WHO, 2011). Others similarly find social support differs by gender, and limited social support from network members is associated with poor health among women (Caetano et al., 2013; Ham et al., 2015).

Conclusion

The findings show that social support is an important component in the management of NCDs in Ghana. Social capital and social networks are deeply rooted in the Ghanaian social support system, with the nuclear family comprising the most important form of social capital in this context. In our study, the social networks were characterized by an egocentric network (individual-nuclear family dyad relationship) in the self-management of chronic illness. With the gradual diminishing of the extended family as a source of social protection for its members, the nuclear family has become a social network capable of providing resources to its members, assisting them in better self-management of their conditions.

Yet having the sense of belonging to a group can also have a positive impact on health and improve the overall well-being and self-management of chronic illness in Ghana. The results reported here show that instrumental and emotional support are vital in the recovery and rehabilitation of NCD patients, specifically stroke patients, and should be an integral part of the healthcare system in Ghana. It is important for government and healthcare providers to provide other dimensions of instrumental support, such as wheelchairs and walking aids for NCD patients, specifically stroke patients, to aid in their mobility and self-care. This practical assistance can go a long way toward enhancing their recovery. Emotional support is essential for NCD patients' psychological well-being; hence, there is a need for healthcare providers to integrate counselling services into treatment. Given the importance of the nuclear family, it is important for immediate family members to be educated and involved in NCD programs. Training them in diet management, home care, and rehabilitation should be part of social intervention programs that aim at reducing the emotional distress, social disintegration, functional limitations, and impairment encountered by some NCD patients.

When interpreting the findings, however, some limitations have to be acknowledged. First, the study sample was limited to the NCD patient population attending two hospitals in Ghana; hence, the results cannot be generalized for all NCD patients in Ghana or elsewhere. Second, the study considers the perspectives of those who have received social support, not those providing the support. Finally, the study sample was limited to outpatients, whose experience of social support may be different from that of inpatients, particularly those who stay in hospital for prolonged periods.

Table 6. 2. Participants' Demographic and Socioeconomic Characteristics

Category	N=33 (%)
Age	
40 – 60	20 (60.6)
61 - 80	11 (33.3)
81+	2 (6.1)
Gender	
Male	15 (45.5)
Female	18 (54.5)
Occupation	
Unemployment	5 (15.1)
Public sector	6 (18.2)
Private sector	16 (48.5)
Retired	6 (18.2)
Educational level	
No education	12 (36.4)
Primary	9 (27.3)
Secondary	6 (18.2)
Tertiary and higher	6 (18.2)
Marital status	
Married	28 (84.8)
Divorced	1 (3.0)
Widowed	4 (12.2)
Type of NCD conditions	
Diabetes	11 (33.3)
Hypertension	11 (33.3)
Stroke	11 (33.3)
Years since diagnosed with NCD condition	
5 - 10	30 (90.9)
11 - 15	3 (9.1)

Chapter 7: Summary, Conclusions, and Recommendations

The overall aim of the present study was to explore the association between NCDs and disability, examine the effects of neighborhood wealth status on hypertension, as well as elucidate the role of social support systems in the self-management of NCDs in Ghana. To achieve these objectives, a mixed-methods approach was adopted. In this chapter, an overview of the preceding chapters is provided, before delineating the study contributions and their implications for policy. Finally, the main limitations of this research are discussed, based on which recommendations for future research in this field are provided.

Overview of Thesis

In this present study, the WHO's CSDH (WHO, 2008) was adopted as a conceptual framework, as the aim was to elucidate the determinants of NCDs in Ghana. In extant research, the social determinants of health have been acknowledged as a useful concept in predicting the health and wellbeing of a population (Balaj, Huijts et al., 2017; Balaj, McNamara et al., 2017; Hajduchová & Urban, 2014; Lumagbas et al., 2018; Raphael et al., 2008; Raphael et al., 2012). The application of this framework determining the prevalence, incidence, control, and management of NCDs in SSA is, however, limited (Donkin et al., 2017). In the present study, various aspects of the social determinants of health were considered, namely the neighborhood SES characteristics, the ICF, and social support and social networks as crucial factors in influencing NCDs outcomes in Ghana. We find evidence that NCDs in the Ghanaian population are driven by structural determinants (socioeconomic conditions), intermediary determinants (lifestyle behaviors), health system factors, and social cohesion characteristics. Some research emphasized biological factors are not the only influence on health and diseases as evidence strongly suggests that health outcomes are also impacted by social factors such income,

education and employment status (Ansari et al., 2003; Braveman & Gottlieb, 2014; Hajduchová & Urban, 2014; Wolf, 2014; Koh et al., 2010). The Social Determinants of Health posits that the conditions in which individuals grow, live and work, predispose them to various diseases (Andermann, 2016; Braveman, Egerter, & Mockenhaupt, 2011). Rather than addressing NCD through a biomedical perspective, there is the need to take into consideration the individual structural determinants such as material conditions and resources (income and education). The major findings are thus summarized below as part of the manuscripts comprising this thesis.

To start with, in Chapter 1 of this thesis, the main problem to be investigated—the high burden of NCDs and their poor management in Ghana—was examined. The increasing prevalence of NCDs threatens the viability of the existing health systems in Ghana that already lack the resources and capacities required for dealing with challenges posed by communicable diseases. Specifically, focus is given to the burden of NCDs such as hypertension, diabetes, and stroke. While extensive body of literature on NCDs among the Ghanaian population exists, there is paucity of academic literature on relationships between NCDs and disability. Similarly, despite the persistent difficulties in dealing with NCDs, the effect of socioeconomic status on hypertension among women in Ghana remains insufficiently explored in academic research. Finally, research on social support systems available to people living with these chronic conditions are scarce.

Chapter 2 presented a review of pertinent literature to provide context for the current investigation. The chapter commenced by discussing the structure of the health system in Ghana. In this part of the thesis, it was revealed that the Ministry of Health is responsible for the formulation of health policies (including NCD policies) and holds the oversight and regulatory responsibility for health services in Ghana. On the other hand, the Ghana Health Services serves

as an implementing agency by delivering health services to the Ghanaian population. Health services are delivered on a three-tier level—at the tertiary, secondary, and primary levels of care. In this chapter, studies on policies and programs aimed at addressing the growing burden of NCDs in Ghana were also reviewed. The findings revealed that most of the policies formulated to date have included a national NCD policy, along with those pertaining to tobacco control and nutrition. The review revealed a substantial gap between the formulation of these policies and their practical implementation. Implementation challenges were found to stem from various factors, including inadequate coordination of the various stakeholders in the health sector. Moreover, a discussion of the financing of NCD programs in Ghana indicated that, although a National Health Insurance Scheme (NHIS) is in place to provide financial protection to the healthcare users, the NHIS does not cover all medical expenses for those suffering from NCDs.

In Chapter 3, the methods used for the thesis were outlined. Different study designs that could have been adopted in conducting research of this nature were examined to justify the decision to adopt mixed-methods approach in this research. In the next part of this chapter, the discussion focused on how the mixed-methods strategy was implemented in meeting the objectives of the thesis. Specifically, it was explained that quantitative data were obtained and analyzed from the Ghana's Global Ageing and Adult Health Survey and Women's Health Survey of Accra. Based on the results obtained from the quantitative data, an in-depth interview guide was developed for the qualitative research.

In Chapter 4, the first manuscript of the thesis was presented. The aim of this part of the project was to examine the effects of both individual and neighborhood SES on hypertension among women in the Greater Accra Region. The results obtained in this part of research revealed that individual SES/wealth was the significant contributor to hypertension among women in the

Greater Accra Region. Specifically, women in the richest wealth quintile were more likely to be living with hypertension compared to women at the poorest wealth quintile. The increasing prevalence of hypertension among urban wealthy women has been linked to risky health behaviors such as physical inactivity, poor dietary intake, alcohol consumption and tobacco use amidst rapid economic growth and development. In addition, analyses focusing on lifestyle factors, and specifically body mass index (BMI), revealed that compared to underweight women, overweight and obese women were more likely to be hypertensive. Similarly, those who engaged in intensive exercise were less likely to become hypertensive compared to those who do not engage in any physical exercise.

The manuscript presented in Chapter 5 was to examine the prevalence of disability and its association with NCDs in Ghana. These findings suggest that highly educated and employed Ghanaians are significantly less likely to report disability than poor and unemployed Ghanaians. Similarly, those with stroke reported higher disability (activity limitations and participation restrictions) compared to those without stroke. Again those with hypertension and diabetes compared to those without these conditions also reported higher disability but were not statistically significant.[13] Sociodemographic factors shows that females compared to males and older adults reported higher disability. The results reported in Chapter 5 further demonstrated that people who received good person-centered and comprehensive health services reported lower disability.

The last manuscript, presented in Chapter 6, explored the role of social support in the quality of life of NCD patients in Ghana. The analysis results revealed that the nuclear family is

[13] Except for: carrying, moving and handling objects (diabetes = .266, $p < .05$); informal relationships (hypertension = .149, $p < .001$); interpersonal relationships (diabetes = .239, $p < 05$)

the main source of social support for self-management of NCDs, as immediate family members tend to provide instrumental support to the study participants, while neighbors, friends, and relatives typically provide emotional, informal, and appraisal support. Thus, NCD patients derive social capital from their nuclear family, as these close relationships are built on the principles of reciprocity and trust.

The findings from this chapter further revealed that most study participants found instrumental and emotional support the most pertinent to their management of NCDs. In this context, instrumental support is required to help NCD patients meet the costs related to hospital visits and medications. Findings reported in Chapter 6 show that NCD patients have a strong sense of belonging to their social networks, which were homogenous and instrumental in the participants' self-management of their condition. Moreover, having such a homogenous network could have a positive impact on health through the generation of new knowledge, assisting with accessing healthcare services, and providing resources. Finally, findings demonstrated that most of the study participants have access to health professionals that can provide them with pertinent information regarding their treatment, medication, and adherence to prescribed diet and adequate nutrition. In addition, while majority of the participants were females, when survey responses were analyzed by gender, the findings revealed that women received less social support pertaining to instrumental, informational, emotional, and appraisal support than did men.

Contributions of this Study

As stated in Chapter 1, the main goals of the present study are to:

1. Examine the effects of individual and neighborhood SES on hypertension among women in Greater Accra Region of Ghana;

2. Examine the association and prevalence of NCDs and disability among the Ghanaian population; and
3. Explore the role of social support in the self-management of NCDs in Ghana.

Taken these objectives together, the present study makes a number of contributions worth emphasizing to the body of knowledge on disability and social support systems literature in Ghana.

Reframing disability through the ICF framework.

While extensive research on the application and operationalization of the ICF framework has been undertaken in Western countries, the use of the ICF in understanding the contribution of NCDs to disability has been under-researched in SSA (dos Santos-Zingale & McColl, 2006; Myezwa et al., 2009). The ICF offers an opportunity for reframing disability issues. Hence, there is a need to go beyond lay perceptions/sociocultural and medical aspects of disability as one of dependence and malfunction to one that places emphasizes on functioning in society. The medical model of disability has primarily focused on diagnostic procedures and interventions based on body impairments (Goering, 2015). Consequently, the definition of disability has been overly narrow, focusing on physical impairments, abnormality, and malfunction at the individual level (Muò et al., 2005; Raghavendra et al., 2007). The effect of this limited scope is that persons with disabilities (PWDs) are often excluded from the mainstream society and are solely seen as incapacitated and in need of assistance (Goering, 2015; Soffer & Chew, 2015).

This biased view of disability has led to the adoption of many negative labels and attitudes towards PWDs in SSA, including Ghana. Previous research indicates that, in most African societies, including Ghana, PWDs are stereotyped and stigmatized, as the cause of their

condition is often attributed to evil spirits (Anthony, 2011; Avoke, 2002; Mprah et al., 2014). This misconception has resulted in maltreatment and discrimination of PWDs (Abang, 1988).

The ICF seeks to bridge this gap by integrating the medical and the social models of disability (Boonen & Maksymowych, 2010; McDougall et al., 2010; Mitra, 2014; Reed et al., 2009; Schneidert et al., 2003). In an attempt to define disability in a manner that would foster easy and timely intervention, the ICF advocates for the need to go beyond the diseased or medical approach to disability and instead focus on the capabilities, function, behavior, and quality of life of the affected individuals (Alford et al., 2015; McDougall., 2010; McDougall et al., 2011). For instance, Schneidert et al. (2003) argued, based on the ICF framework, that the concept of disability be broadened to include:

> … a problem only at the body level (impairment), with no activity limitations or participation restrictions, problems in functioning at all three levels body (impairments), person (activity limitation) and society (participation restrictions), has an impairment and activity limitation but no participation restrictions, an activity limitation and participation restriction, but no impairment, and no impairment or activity limitations but does have participation restriction. (p. 592)

Thus, to reduce disability, it is important to focus on rehabilitation which aim to increase a person's functioning and improving the quality of life in society (Perenboom & Chorus, 2013; Stucki et al., 2002).

The aim of rehabilitation is not only to address the medical aspects of disability, but also extends to the manner in which disabilities are socially created through barriers, attitudes, social support services, etc. (Vargus-Adams & Majnemer, 2014). In addition, at the societal level, it is important to restore the functional status of the individual in terms of the range of activities that he/she can or cannot undertake (Üstün et al., 2003). This is achieved by removing barriers and introducing facilitators to enable PWDs to live independently as possible, or making adjustments to the environment in which these individuals reside to remedy any functional deficiencies

(Madden et al., 2014; Rimmer, 2006). For instance, Kassah (2008) reported that most PWDs have difficulties in acquiring mobility devices, such as wheelchairs, that would allow them to undertake daily activities, including commuting to/from workplace. Studies on employment opportunities for PWDs in Ghana show that discrimination, limited capital, and inadequate vocational training or skill acquisition are the main barriers to their employment (Naami, 2014, 2015; Yeo & Moore, 2003). More importantly, there is limited research on the application of the ICF in understanding the experiences of PWDs resulting from chronic conditions in SSA including Ghana. This thesis fills a research lacuna on how disability is framed within the Ghanaian context as one of dependence, exclusion and discrimination. The results yielded by the present study show that those with higher education and in employment reported moderate or no disability compared to those with no education and unemployed. Thus, there is a need to intensify educational campaigns aimed at changing the negative perceptions of PWDs in Ghana. The study also demonstrates that the use and application of the ICF is not only limited to bodily impairments of the individual but extend to include the detail functioning of the individual at the societal level. For stroke survivors who may face issues of activity limitations and participation restrictions, functioning can be restored by providing mobility aids and changing the perceptions of people who believed the cause of stroke is associated with evil spirits

Social support and social networks.

The theoretical discussions and empirical findings reported in this thesis contribute to the understanding of the conceptualization of social support, as well as help elucidate its positive contributions to health in the Ghanaian context. The present study findings show that social support is conceptualized as love, manifested through providing assistance and material support in times of need, as well as offering useful advice. Moreover, for the study participants, social

network was separated into two components—one comprising of the nuclear family members, who provided the material resources, and the other including extended family and close friends, who provided emotional and appraisal support. Hence, in Ghana, social support is a protective mechanism that can be used to reduce the impact of NCDs, as confirmed by the present study findings.

Policy Implications

This research also has practical contributions, in terms of the implications of the reported findings for health policy concerning health services delivery focusing on NCDs in Ghana.

The ICF and health services delivery.

The ICF framework can used within the healthcare setting to promote inclusiveness within the broader community. Based on the degree of disability, social services benefits (healthcare, employment, housing, transportation, and social insurance, among others) can be recommended and provided to PWDs. Finally, it is important to provide assistive technologies, such as wheelchairs, prosthetic limbs, walking aids, etc., that can enhance participation of PWDs in social and other everyday activities.

The role of social networks and support in the management of NCDs.

Extant research indicates that strong social support is associated with positive health outcomes, such as reduced mortality, increased quality of life, reduction in risky behaviors, and access to health services (Alvarez et al., 2017; Eriksson & Ng, 2015; Nieminen et al., 2013). To improve the living conditions of NCD patients, it is important for policy makers to concentrate on building strong social support network of NCD patients within the Ghanaian population. The concept of social support can be used as a strategy to build strong networks between NCD

patients and their caregivers who will provide first aid to patients by assisting with drug administration, adherence to medications, and nutrition. A network of NCD patients can also be beneficial in disease prevention, control, treatment, management, and rehabilitation. For instance, peer support among NCD patients can be vital in gaining information on medications, lifestyle changes, and other factors that can improve disease outcomes (Heisler, 2007). Strong civil society organizations dealing with NCDs issues in Ghana, such as the National Diabetes Association of Ghana (member of International Diabetes Federation), the Stroke Association Support Network–Ghana, and the Cancer Society of Ghana, can serve as channels to mobilize NCD patients into peer groups. The healthcare settings in which NCD patients receive treatment for their conditions can also serve as entry points in mobilizing such peer groups. As the findings yielded by the analysis of the qualitative interview data reveal, a majority of the NCD patients that took part in the current investigation do not belong to any peer social support groups. This could be due to the lack of information on the existence of such social support groups among NCD patients, indicating the need for better information dissemination. Finally, healthcare professionals should collaborate with family members in the delivery of healthcare services for patients with NCDs as facilitators, resource persons, and sources of referrals for network members.

The Effects of Individual and Community-level Factors.

The findings yielded by these analyses emphasize the importance of individual factors in influencing hypertension among women in the Greater Accra Region. In Chapter 5 of this thesis the findings established that higher wealth status was associated with higher prevalence of hypertension. Similar to other transitional countries, Ghana has experienced a rapid economic growth over the past decade. As consequence, there may be a major shift from manual labour to

adoption of a capital intensive means of work (Tenkorang, Kuuire et al., 2015a). Efforts aimed at the prevention, control and management of hypertension should focus on changing individual behavioral lifestyles. Health promotion programs should also focus individual factors in the prevention, control and management of hypertension in Ghana. For instance, to promote healthy behaviors, such as engaging in physical activity and adoption of healthy diet (with an emphasis on fruit and vegetable consumption) provision of physical space for exercise is needed in neighborhoods, as well as easy access to stores and supermarkets selling healthy food at affordable prices. Similarly, initiatives aimed at reducing risky health behaviors, such as smoking and alcohol consumption cessation programs, would benefit from raising taxes on tobacco and alcohol products that target poor neighborhoods.

Limitations of this Study

This study has some limitations that must be acknowledged. First, as the secondary data used for this research are cross-sectional, causal inferences between the dependent and independent variables cannot be drawn. Hence, the results reflect individual and community factors at a point in time. Thus, this study could not examine the trends and changes in NCDs over time. Second, the use of self-reported data is likely to introduce recall bias.

Further, one of the datasets used in the analyses was drawn from one specific region and pertained to a single NCD condition. As a result, it is not possible to generalize the findings to other NCD conditions and patient populations. Specifically, as only hypertension was analyzed in determining the risk and prevalence of NCDs among women, it cannot be ascertained how other NCDs—such as stroke, diabetes, and cancer—may affect Ghanaian women.

In addition, regression analysis was conducted to determine the relationship between NCDs and disability. However, the causal pathways by which disability may be contributing to

the burden of NCDs have not been established. Hence, a methodological limitation stems from the inability to use other statistical techniques such as reverse causality models to determine the extent to which the focal independent variables may be causing the dependent variables.

The present study only focused on activity limitations and participation restrictions to measure disability. Due to data limitations, body functions and structures which are considered part of impairments were not included in this current research. Similarly, environmental factors which serve as facilitators of or barriers to disability were only limited to health services factors. As a result, other broad environmental determinants such as products and technology, attitudes, the natural environment among others were not included in this present research.

The qualitative research was only limited to two hospitals in an attempt to explore the experiences of social support among NCD patients in Ghana. It is possible that the experiences of NCD patient's pertaining to social support may be different in other geographical regions in Ghana. In addition, a small sample size was drawn from each of the NCD conditions (hypertension, diabetes and stroke) which does not allow for statistical generalization on the relationship between NCDs and social support in Ghana. The current investigation also excluded health professionals who could have provided useful information pertaining to the management of NCDs within the Ghanaian health system.

Most of the qualitative interviews were conducted in the local dialect spoken in the selected study areas. It is possible therefore, to have not interpreted accurately certain words and key phrases in the local dialect to the English language.

Finally, the secondary data used for this research is outdated and its relevance to the current situation in SSA and Ghana is likely to be limited.

Recommendations for Future Research

While the findings yielded by this research have augmented the current understanding of the prevalence, control, and management of NCDs in Ghana, many areas that could be addressed in future research remain. For example, as stroke has emerged as the major contributor to disability among the Ghanaian population, further research should be undertaken to examine the experiences of stroke patients after recovery. Going forward, researchers should also examine the facilitators and barriers (rehabilitation, access to health services, employment, housing, transportation, etc.) that ensure successful integration of stroke patients in mainstream society.

It is also important to further explore how patients with NCDs use traditional medicine in the treatment of their condition. While this was not the focus of the present study, most participants talked about alternative treatments during the qualitative interviews. Indeed, many participants considered use of traditional medicine as beneficial in the treatment and management of their condition.

Future research should also focus on the economic burden of NCDs on the households in which affected individuals reside. Results of such research will be useful in conceptualizing financial schemes aimed at reducing the burden of NCDs on the Ghanaian population.

As this study has focused on the adult population, further research should also incorporate young patients, especially children, suffering from NCDs. Since NCD risk factors usually emerge in childhood and adolescence, it is important to elucidate the risks and prevalence of NCDs among children, as this will give a more accurate picture of the prevalence of NCDs in Ghana. This information may also assist in developing strategies that would limit the disease progression as these children develop and age.

Finally, authors of future studies in this field should also examine the link between NCDs and reproductive health issues among women in SSA, and Ghana in particular. Most NCDs are

associated with female reproductive health, yet this relationship has not been examined in the Ghanaian context.

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Appendices

Appendix A 1. Interview Guide for NCD patients

Meaning of social support and their types

1. What does social support mean to you?
2. What type of support have you received in your present condition (instrumental: provision of tangible goods and services, informational: providing information to assist

with problem solving, emotional: provision of care, love, empathy, and trust, and appraisal: affirms appropriateness of acts and statement).

Social support network

3. Who is part of your support system at the present time? Probe further for (partner, family member, neighbour, health professional). How is each person supportive in your present condition?
4. Do you have any person you can trust and confide in? If yes, can you tell me more about this person? How often do you talk to this person? Can you describe a situation in which this person was helpful? How important is having this person in your life?
5. Has there been a time where the supportive people have not been supportive? What did they do or say that is not supportive? How has this affected your health in general, your feelings and about yourself? How has this affected your ability to do the things you have to do daily?
6. Was there a time when you needed help and didn't know who to ask, or the person you usually ask was not available? Probe when, what happened, how did you feel?
7. Overall, how adequate do you think your support system is? Are you satisfied with the number and quality of your friendship, intimate relationship, family, neighbour, health professional etc.
8. What was your support system like before you received a diagnosis about your condition? Has this changed much? Who were the most important supportive people in your life? Are they still supporting you in your present condition? If what happened?

Health and wellbeing

9. How has been your general mood including depression, anxiety and psychological well-being since you were diagnosed with this condition? How has your support network been helpful?

Functional support

10. Are there people in your support system who go with you on a physical activity such as biking, walking or workout? How about belonging to a club that does physical activity?
11. Are there people available to help you with the following?; support if confined to bed, takes you to a health professional, help you with daily chores such as cooking and dressing up. How have all of these impacted on your health in general?
12. Do you belong to a social support group or educational meeting group? If yes, how have members in this group been supportive to you? Do you ask for help directly from members? (Probe: Join a risk reduction behaviour program).

Quality of social support

13. If you had challenges and didn't know what to do? Is there someone you could talk to about it?
14. How about adherence and treatment from your health care providers? How has your support network been influential in conforming to adherence?

15. How has been the uniformity of daily intake of prescribed diet? How about acceptance and compliance to prescribed diet?

Demographic Information

1. Age…….....
2. Occupation…….....
3. Educational level……
4. Marital status……..
5. Chronic condition……...
6. Number of years since diagnosed with disease……

Appendix A 2. Ethics Approval from the Health Research Ethic Boards, St. John's NL

Ethics Office

Suite 200, Eastern Trust Building

95 Bonaventure Avenue

St. John's, NL
A1B 2X5

May 02, 2016

Department of Sociology

232 Prince Philip Drive

St. John's, NL

A1C 5S7

Dear Mr. Banchani:

Researcher Portal File # 20162031
Reference # 2016.025

RE: "Non-communicable diseases (NCDs) in Ghana: social support systems, disability prevalence, and risk factors."

This will acknowledge receipt of your correspondence.

This correspondence has been reviewed by the Chair under the direction of the Health Research Ethics Board (HREB). ***Full board approval*** of this research study is granted for one year effective **March 3, 2016**.

This is your ethics approval only. Organizational approval may also be required. It is your responsibility to seek the necessary organizational approval from the Regional Health Authority (RHA) or other organization as appropriate. You can refer to the HREA website for further guidance on organizational approvals.

This is to confirm that the HREB reviewed and approved or acknowledged the following documents (as indicated):

- Application, approved
- Recruitment script, approved
- List of variables, approved
- Secondary use of data approval, acknowledged
- Budget, approved
- Interview guide, approved
- Consent form, approved

MARK THE DATE

This approval will lapse on March 3, 2017 . It is your responsibility to ensure that the Ethics Renewal form is submitted prior to the renewal date; you may not receive a reminder. The Ethics Renewal form can be found on the Researcher Portal as an Event form.

If you do not return the completed Ethics Renewal form prior to date of renewal:

- ***You will no longer have ethics approval***
- *You will be required to stop research activity immediately*
- *You may not be permitted to restart the study until you reapply for and receive approval to undertake the study again*
- *Lapse in ethics approval* ***may result in interruption or termination of funding***

You are solely responsible for providing a copy of this letter, along with your approved HREB application form; **to Research Grant and Contract Services** should your research depend on funding administered through that office.

Modifications of the protocol/consent are not permitted without prior approval from the

HREB. **Implementing changes without HREB approval may result in your ethics approval being revoked, meaning your research must stop**. Request for modification to the protocol/consent must be outlined on an amendment form (available on the Researcher Portal website as an Event form) and submitted to the HREB for review.

The HREB operates according to the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS2), the Health Research Ethics Authority Act (HREA Act) and applicable laws and regulations.

You are responsible for the ethical conduct of this research, notwithstanding the approval of the HREB.

We wish you every success with your study.

Sincerely,

Dr Fern Brunger (Chair, Non-Clinical Trials Health Research Ethics Board)

Ms. Patricia Grainger (Vice-Chair, Non-Clinical Trials Health Research Ethics Board)

CC: E. Tenkorang

Appendix A 3. Introduction Letter from the department of sociology, Memorial University

MEMORIAL UNIVERSITY

Faculty of Arts

Department of Sociology
Arts & Administration
St. John's, NL Canada A1C 5S7
Tel: (709) 864-7457 Fax: (709) 864-2275
sociology@mun.ca www.mun.ca/soc

To:	Whom it May Concern
From:	Dr. Ailsa Craig, Department Head, Sociology
Subject:	Emmanuel Banchani
Date:	May 20, 2016

Please be advised that Emmanuel Banchani is currently enrolled in full time studies in our PhD program at Memorial University of Newfoundland.

If you have any further questions, please contact me via sociology@mun.ca

Sincerely,

Dr. Ailsa Craig
Department Head, Sociology

Appendix A 4. Letter of Approval from the Tamale Teaching Hospital

Department of Research &Development
Tamale Teaching Hospital

TTH/R&D/SR/16/208
24/06/2016

TO WHOM IT MAY CONCERN

CERTIFICATE OF AUTHORIZATION TO CONDUCT RESEARCH IN TAMALE TEACHING HOSPITAL

I hereby introduce to you **Mr. Emmanuel Banchani** is currently enrolled in full time studies in a PhD program at Memorial University of Newfoundland. Who has been duly authorized to conduct a study on **"Non-communicable Diseases in Ghana: social support systems, disability prevalence, and risk factors".**

Please accord him the necessary assistance to be able to complete his study. If in doubt, kindly contact the Research Unit at the second floor of the administration block or on Telephone 0209281020. In addition, kindly report any misconduct of the Researcher to the Research Unit for necessary action, please.

Please note that this approval is given for a period of one year, beginning from 4th of July, 2016 to 30th of June, 2017.

Thank You.

ALHASSAN MOHAMMED SHAMUDEEN
(HEAD, RESEARCH & DEVELOPMENT)

Appendix A 5. Letter of Approval from Research Supervisor

MEMORIAL UNIVERSITY

August 3rd 2016

To whom it may concern

Dear Sir/Madam

Letter of Approval in support of Mr. Emmanuel Banchani's Fieldwork and Interviews

I write this letter in support of Mr. Emmanuel Banchani's fieldwork and interviews at the Komfo Anokye Teaching Hospital. I approve this work as the primary supervisor of his doctoral thesis. I am grateful for all the support given to Mr. Banchani so far, and count on your continued support even as he completes his interviews.

Very Sincerely

Eric Y Tenkorang, PhD
Assistant Professor
Department of Sociology
Memorial University
Phone: 709-864-2503
Email: eytenkorang@mun.ca

Appendix A 6. Letter of Approval from the Committee of Human on Human Research, Publications and Ethics, School of Medical Sciences, Kwame Nkrumah University of University of Science and Technology

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
COLLEGE OF HEALTH SCIENCES

SCHOOL OF MEDICAL SCIENCES / KOMFO ANOKYE TEACHING HOSPITAL
COMMITTEE ON HUMAN RESEARCH, PUBLICATION AND ETHICS

Our Ref: CHRPE/AP/395/16

31st August, 2016

Mr. Emmanuel [illegible]
Department of Sociology
Memorial University
St. John's NL, CANADA
A1C 5S7

Dear Sir,

LETTER OF APPROVAL

Protocol Title: *"Non-Communicable Diseases (NCDs) in Ghana: Social Support Systems, Disability Prevalence, and Risk Factors."*

Proposed Site: *Komfo Anokye Teaching Hospital, Medical Department.*

Sponsor: Principal Investigator.

Your submission to the Committee on Human Research, Publications and Ethics on the above named protocol refers.

The Committee reviewed the following documents:

- A notification letter of 2_th July, 2016 from Komfo Anokye Teaching Hospital (study site) indicating approval for the conduct of the study in the Hospital.
- A Completed CHRPE Application Form.
- Participant Information Leaflet and Consent form.
- Research Protocol.
- Interview Guide

The Committee has considered the ethical merit of your submission and approved the protocol. The approval is for a fixed period of one year, beginning 31st August, 2016 to 30th August, 2017 renewable thereafter. The Committee may however, suspend or withdraw ethical approval at any time if your study is found to contravene the approved protocol.

Data gathered for the study should be used for the approved purposes only. Permission should be sought from the Committee if any amendment to the protocol or use, other than submitted, is made of your research data.

The Committee should be notified of the actual start date of the project and would expect a report on your study, annually or at the close of the project, whichever one comes first. It should also be informed of any publication arising from the study.

Yours faithfully,

Osonwener Prof. Sir J. W. Acheampong, MD, FWACP
Chairman

Room 7 Block J, School of Medical Sciences, KNUST, University Post Office, Kumasi, Ghana
Phone: +233 3220 63248 Mobile: +233 20 5453785 Email: chrpe.knust.kath@gmail.com / chrpe@knust.edu.gh

Emmanuel Banchani

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Memorial University of Newfoundland
St. John's, NL A1C 5S7
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Appointments

Postdoctoral Fellow, Canadian Observatory on Homelessness, York University June, 2021 -

Education

Ph.D. in Sociology 2013 – 2021
Memorial University, St. John's, NL
Master's Degree (Sociology) 2012 - 2013
Memorial University, St. John's, NL
Master's Degree (Business Administration - Health Services Management) 2009 - 2012
University of Ghana, Legon, Ghana
Bachelor's Degree (Integrated Development Studies) 2003 - 2007
University of Development Studies, Tamale, Ghana

Research and Teaching Interests

Global Health
Population Health
Health Services Research
Social Epidemiology of Chronic Diseases
Social and Health Inequality
Social and Health Policy
Social Research Methods
Maternal and Child Health
Health Promotion

Publications

- **Banchani, Emmanuel**, Tenkorang, Eric Y. (2020) "Risk factors for cesarean section in Ghana: Evidence from the Ghana Maternal Health Survey." *Journal of Biosocial Science*. https://doi.org/10.1017/S0021932020000656.

- **Banchani, Emmanuel**, Tenkorang, Eric Y., Midodzi, W. (2020). "Examining the effects of individual and neighborhood wealth status on hypertension among women in the Greater Accra Region of Ghana." *Health and Social Care in the Community*. https://doi.org/10.1111/hsc.13185.
- **Banchani Emmanuel**, Tenkorang, Eric Y., Sarfo-Kantaka Osei, & Sarfo Fred Stephen (2020). Social support systems and the self-management of non-communicable diseases in Ghana. *Journal of Health Care for the Poor and Underserved*, 31(3), 1191-1212.
- **Banchani, Emmanuel**, Tenkorang, Y. Eric (2020). "Determinants of low birth weight in Ghana: Does quality antenatal care matter?" *Maternal and Child Health Journal*, 24(5), 668 – 667.
- **Banchani, Emmanuel**, Liam, Swiss. (2019). "The impact of foreign aid on maternal mortality". *Politics and Governance*, 7(2), 53 – 67. Special Thematic Issue: Aid Impact and Effectiveness.

- Adu Joseph, Tenkorang, Eric Y., **Banchani Emmanuel**, Mulay Shree, Adu Ivy (2018). "The effects of individual and community-level factors on maternal health outcomes in Ghana". *PLoS ONE*, 13(11): e0207942. https://doi.org/10.1371/journal.pone.0207942.
- Tenkorang, Eric Y., Luginaah, Isaac., Kuuire, Z. Vincent., **Banchani, Emmanuel**. (2015). Examining risk factors for hypertension in Ghana: Evidence from the Study on Global Ageing and Adult Health. *Global Health Promotion*, 24(1), 14 – 26.
- Tenkorang, Eric Y., Sedziafa, Pearl., Sano, Yuji., Kuuire Z. Vincent., **Banchani, Emmanuel**. (2015). Validity of self-report data in hypertension research: findings from the Study on Global Ageing and Adult Health. *Journal of Clinical Hypertension*. 17(2), 977 - 984.
- **Banchani, Emmanuel**, Tenkorang, Eric Y. (2014). "Implementation challenges of maternal health care in Ghana: the case of health care providers in the Tamale Metropolis".*BMC Health Services Research*, 14:7.
- **Banchani, Emmanuel**, Tenkorang, Eric Y. (2014). "Occupational types and antenatal care attendance among women in Ghana". *Health Care for Women International*, 35 (7-9), 1040-1064, Special Issue: Research on Women's Health in Africa: Issues, Challenges and Opportunities.

Under Review

- **Banchani, Emmanuel**, Tenkorang, Eric Y. "Activity limitations and participation restrictions among people with non-communicable diseases (NCDs) in Ghana." *Ageing & Society*. Revise and resubmit.

Work-in-Progress

- **Banchani, Emmanuel**, Tenkorang, Eric Y. "Women's knowledge and awareness of legality and obtaining abortion services in Ghana."
- **Banchani, Emmanuel**, Tenkorang, Eric Y. "Determinants of miscarriages among women in Ghana."
- **Banchani, Emmanuel**, Tenkorang, Eric Y. "Examining multimorbidity prevalence in South Africa."

Working Paper

Banchani, Emmanuel, Liam Swiss. "The Impact of Foreign Aid on Maternal Mortality" UNU-WIDER, WIDER Working Paper 2019/11, March 2019. 20 pages.

Awards and Scholarships

Canadian Population Society Travel Award	2019
Arts Doctoral Completion Award Scholarship, Fac. of Humanities and Social Studies, MUN	2018
Peter Mackey Memorial Graduate Scholarship, MUN	2015
Scotiabank Bursaries for International Study, St. John's, NL	2015
Canadian Sociological Association award for outstanding MA graduating student	2014
Graduate Studies Travel Grant, MUN	2013/2014
MA Research Paper Student Award, MUN	2014
Canadian Association for the Study of International Development (CASID) Travel Grant (declined)	2013
Population Change and Lifecourse Strategic Knowledge Cluster Travel Grant	2013

Conference Presentations

- Tenkorang, Eric Y., **Banchani, Emmanuel**. "Explaining Non-Communicable Diseases in South Africa: Does race and ethnicity matter?" Presented as a poster at the Annual meeting of the Population Association of America, Washington, DC, April 22nd – 25th. (2020). (Conference Cancelled).

- **Banchani, Emmanuel**, Tenkorang, Eric Y. "Examining the effects of individual and neighborhood wealth status on hypertension among women in the Greater Accra Region of Ghana: A multi-level analysis." Presented at the Annual Canadian Sociological Congress in a session titled "Women's Health Circles". University of British Columbia, June 3 – 6th. (2019).
- **Banchani, Emmanuel**. "Factors associated with adverse pregnancy outcomes in Ghana. Presented at Annual Conference of the Canadian Population Society in a session titled "Fertility". University of British Columbia, June 3 – 6th. (2019).
- **Banchani, Emmanuel**. "Antenatal care attendance and stillbirths among women in Ghana. Presented at 2019 Annual Aldrich Conference of the Graduate Student Union, Memorial University. March 23rd – 24th. (2019).
- **Banchani Emmanuel**, Tenkorang, Eric Y. Activity limitations and participation restrictions among people with non-communicable diseases (NCDs) in Ghana. Presented at the 2018 Annual meeting of the Population Association of America, Denver, Colorado, April 26th – 28th (2018).
- Tenkorang, Eric Y., **Banchani Emmanuel**. Effect of knowledge and perceptions of risks on Ebola - preventive behaviors in the Greater Accra Region of Ghana. Presented at the International Union for the Scientific Study of Population Conference, Cape Town, South Africa, October 29th – November 3rd. (2017).
- Tenkorang, Eric Y., **Banchani Emmanuel**. Physical activity, nutrition and hypertension in sub-Saharan Africa: The Case of Ghana and South Africa. Presented at the International Union for the Scientific Study of Population Conference, Cape Town, South Africa, Oct 29th – Nov 3rd. (2017).
- **Banchani Emmanuel**, Adiku Geraldine A. Remittances and maternal health utilization in sub-Saharan Africa. Presented at Annual Canadian Sociological Congress in a session titled "Sociology of Development IV: Gender and Development. University of Ottawa, June 1-5th. (2015).
- Tenkorang, Eric Y., Luginaah, Isaac., Kuuire, Z. Vincent., **Banchani, Emmanuel**. Hypertension in Ghana: prevalence and risk factors. Presented at the Health in Africa and the Post-Millennium Development Agenda: A Three Day Symposium, Champaign, IL, May 20-22nd . (2015).
- Tenkorang, Eric Y., Luginaah, Isaac., Kuuire, Z. Vincent., **Banchani, Emmanuel**. Examining risk factors for hypertension in Ghana: Evidence from the Study on Global Ageing and Adult Health. Presented at the 2015 Annual meeting of the Population Association of America, San Diego, April 30th – May 2nd . (2015).
- Tenkorang, Eric Y., Sedziafa, Pearl. A., Sano, Yuji., Kuuire Z. Vincent., **Emmanuel Banchani**. Validity of self-report data in hypertension research: findings from the Study on Global Ageing and Adult Health. Presented at the 2015 Annual meeting of the Population Association of America, San Diego, April 30th – May 2nd . (2015).
- **Banchani, Emmanuel**, Tenkorang, Eric Y. Examining the timing of domestic violence against married women in Ghana. Presented at the 2014 Annual Canadian Sociological Congress in a session titled "Social Problems, Development and Policy in Africa II". Brock University, May 26th-30th. (2014).
- **Banchani, Emmanuel**, Swiss, Liam. The impact of foreign aid on maternal mortality. Presented at the 2014 Annual Canadian Sociological Congress in a session titled "Sociology of Development III: Transnational Development, Processes and Actors". Brock University, May 26th-30th. (2014).
- **Banchani, Emmanuel**, Swiss, Liam. The impact of foreign aid on maternal mortality. Presented as a poster at the 2014 Annual meeting of the Population Association of America. Boston Marriott Copley Place, May 1-3rd. (2014).
- **Banchani Emmanuel**, Tenkorang, Eric Y. . "Implementation challenges of maternal health care in Ghana: the case of health care providers in the Tamale Metropolis". Presented at the Graduate Development Conference. Annual Conference of the Canadian Population Society. University of Victoria, June 4-6th. (2013).

- **Banchani Emmanuel**, Tenkorang, Eric Y. . "Occupational types and antenatal care attendance among women in Ghana". Presented at the Annual Conference of the Canadian Society for the Study of International Development. University of Victoria, June 4. (2013).

Invited Presentations

- 2019 "The impact of foreign aid on maternal mortality." with Liam Swiss. Invited presentation to the Center for Global Child Health. Toronto.
- 2017 "Sociology of Health" Invited to lecture for Sociology 1000 Introduction to Sociology with (Undergraduate Level, Professor Rochelle Côté), Memorial University of Newfoundland
- 2014. "Sociological Research Methods" Invited to lecture for Sociology 1000 Introduction to Sociology with (Undergraduate Level, Professor Rose Ricciardelli), Memorial University of Newfoundland.
- 2013. "Quantitative Paper and Sociology?" Invited to lecture for Sociology 6040 Methods of Sociological Research with Yujiro Sano (graduate level, Professor Liam Swiss), Memorial University of Newfoundland.
- 2013. "Quantitative Paper and Employment Relations?" Invited to lecture for Employment Relations 6010 Research Seminar in Employment Relations I: Quantitative Methods with Yujiro Sano (graduate level, Professor Liam Swiss), Memorial University of Newfoundland
- 2013. "Ordinary Least Square" Invited lecture for Sociology 6040 Methods of Sociological Research with Yujiro Sano (graduate level, Professor Liam Swiss), Memorial University of Newfoundland.
- 2013. "Ordinary Least Square for Employment Relations" Invited to lecture for Employment Relations 6010 Research Seminar in Employment Relations I: Quantitative Methods with Yujiro Sano (graduate level, Professor Liam Swiss), Memorial University of Newfoundland.

Ad-Hoc Reviewer

Journal of Health Care for the Poor and Underserved; *International Health*; *Health Education & Behavior*; *BMJ open (Global Heath), BMC Health Services Research*.

Community and Volunteer Experience

Departmental Services

Symposium Organizing Committee member, Department of Sociology, MUN	2020
Graduate Board member for Department of Sociology, GSU, MUN	2014 - 2015

University-wide Services

GradFest volunteer, Orientation for new graduate students	2018
Arrival Check-in for new international students, ISA, MUN	2014
GradFest volunteer, Orientation for new graduate students	2013
Arrival Check-in for new international students, ISA, MUN	2013