Placing a Health Equity Lens on Non-Communicable Diseases in Ghana

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Abstract

Using the World Health Organization Study on Global Ageing and Adult Health (SAGE), Wave 1, this paper examines how factors at the micro, meso, and macro levels of society affect the odds of being diagnosed with a non-communicable disease (NCD) in Ghana. Focusing on angina, diabetes, heart disease, and stroke, the central questions driving this investigation are: What is the pattern of NCDs in Ghana? How, if any, do NCDs vary by sociodemographic factors as well as factors within communities and Ghana more broadly? Further this paper tests the *Equitable Longevity Framework*; a framework the author is developing to examine how factors at the macro, meso, and micro levels shape non-communicable diseases, particularly in Ghana. Preliminary findings suggest that Ghanaian men and women differ in types of NCDs diagnosed as well as risk exposure and health equity measures.

Introduction

This paper examines how factors at the micro, meso, and macro levels of society affect the odds of being diagnosed with a non-communicable disease (NCD) in Ghana. The central questions driving this investigation are: What is the pattern of NCDs in Ghana? How, if any, do NCDs vary by sociodemographic factors as well as factors within communities and Ghana more broadly? A major part of this paper is to utilize the *Equitable Longevity Framework,* a framework the author is developing as part of her dissertation, to examine how factors at the macro, meso, and micro levels shape non-communicable diseases in Ghana.

Background

Like many Sub-Saharan African countries, Ghana's current epidemiological profile is one that consists of a double burden of communicable and non-communicable diseases (Agyei-Mensah and de-Graft Aikins 2010). Diseases like HIV/AIDS and malaria coexist with conditions like diabetes and hypertension. Recent WHO estimates indicate that NCDs account for approximately 39 percent of all deaths in Ghana and communicable diseases account for about 53 percent with injuries accounting for the remaining 8 percent (WHO 2011). Recent estimates indicate that NCDs kill approximately 80,000 people in Ghana each year (Bosu 2013). Among all NCDs, cardiovascular diseases (including heart disease and stroke) are the leading cause of death with an estimated 35,000 deaths annually or 15% of all deaths in Ghana (Bosu 2013). Further, reported outpatient cases of hypertension in public and mission facilities indicate that hypertension cases increased from 60,000 cases in 1990 to approximately 700,000 cases in 2010 (MOH 2012). Finally, the Ghana Health Services' 2011 Annual Report showed a four-fold increase in the number of reported diabetes cases by outpatients within the span of five years; from 47,464 cases in 2006 to 193,079 cases in 2011. Consistent with the literature on the rising tide of non-communicable diseases in LMICs like Ghana, the figures below show a market increase in the prevalence of heart disease for both males and females in Ghana even within the span of four years.

Fueling Ghana's increasing NCD burden are structural factors such as industrialization, urbanization, and globalization that are linked to changing behavioral practices that increase the risk of NCDs, namely, sedentary lifestyles, diets high in saturated fat, salt, sugar, tobacco and alcohol use (Abubakari et al. 2009; Amoah 2002; Bosu 2013; de-Graft Aikins 2007; Stuckler 2008; Stuckler et al. 2012). An aging population is another major factor contributing to the rise in non-communicable diseases in LMICs like Ghana. Recent WHO estimates indicate that by 2050, there will be approximately two billion people in the world aged 60 years and, with 400 million aged 80 and over (WHO 2014). The vast majority of this projected older population—about 80%—will reside in LMICs. In 1950 those aged 60 years and older comprised only 4.1 % of Ghana's population. Fifty years later in 2000, that proportion had increased by only a percentage point to 5.2% of the population. However, by 2015 the percentage Ghanaians aged 60 years and older is expected to be about 7.2%. And in less than 50 years from 2015, i.e. by 2050, the percentage of the Ghanaian population 60 years and older is expected to increase to 11.9%. This increase in age also varies by gender, with a higher proportion of Ghanaian women living to age 70 and over compared to their male counterparts. (WHO 2014). At the same time, NCDs are affecting adults in LMICs at relatively younger ages compared to the experiences of high income countries. For instance, among the newly diagnosed cases of diabetes in 2011, 57.9% were among Ghanaians aged 20 to 59 years (GHS 2011).

Like most LMICs, Ghana's rising NCD morbidity and mortality is outpacing its socioeconomic development and ability to plan for and meet the demands of a significant aging population. The human and economic costs of NCDs and their concomitant complications are

cripplingly expensive. For example, the 2007 monthly cost of treating diabetes ranged from $106 to $638, while the monthly cost of treating diabetes complications such as dialysis for end stage renal failure was $1,383. Meanwhile, the minimum daily wage in 2007 was $2 and the average monthly salary for a civil servant was $213 (de-Graft Aikins 2007).

Ghana has made a concerted effort to address the rising tide of NCDs in its population. Its most recent effort, the National Policy for the Implementation of Chronic Non-communicable Diseases (NCD Policy), was inspired by Ghana's broader national health policy and by the health objectives of the Ghana Shared Growth and Development Agenda 2010-2013, a national development policy framework aimed at achieving and sustaining macroeconomic stability and poverty reduction (NDPC 2010; MOH 2012). The basic mission of Ghana's NCD Policy is to reduce avoidable NCD morbidity and mortality through health promotion, provision of enabling environments, strengthening of health systems, provision of health resources, partnerships and empowerment of communities (MOH 2012). In 2006, the MOH implemented a National Health Insurance Scheme (NHIS), Ghana's version of universal health coverage that includes medicines for NCDs. These national policies and programmatic efforts indicate that Ghana has laid important foundations for addressing NCDs. At the same time, a strengthening and scaling up of these foundations and integration with other programs across agencies is critically needed. As such, this paper will emphasize the policy implication of its findings.

Conceptual Framework: The *Equitable Longevity Framework*.

A major emphasis of this paper is the development of an *Equitable Longevity Framework* (Figure 1), which integrates sociological theories strategies, and empirical findings on health and illness to conceptualize the role health (in)equities play in disease and mortality (Bronfenbrenner 1994; Blumer 1980; Cooley 1902; Erickson 1995; Nettleson 2013; Stryker and Vryan 2006, Stuckler 2008). A major purpose of this paper is to test this framework as it relates to NCDs in the Ghanaian context. As a social ecological model, the *Equitable Longevity Framework* asserts that achieving longevity (i.e. optimal human life expectancy) involves person-environment interactions along all levels of social life; namely, the macro, meso, and micro levels. To better understand how factors at each level contribute to people's life chances, it is important to define each and how they interact. Reading the *Equitable Longevity Framework* from top to bottom and left to right, the first are macro level factors. These include national and global policies (health, social, economic, or otherwise), national health systems, political economy, globalization, and other factors that stratify populations hierarchically. Next are meso level factors, which include neighborhood context, community structures and facilities such as hospitals and health centers as well as familial and social networks. Finally, micro level factors include individual characteristics, such as meaning making of health, illness, and death, the individual's awareness of the context in which he/she lives, and the individuals sense of efficacy to affect his/her life chances.

It is also important to note that there are certain factors important to the aims of this project that cut across all levels of social structure. These include, among other things, nativity, immigrant status, race, ethnicity, socioeconomic status, age and gender. While it is relatively easy to see how age, gender, nativity, race and ethnicity influence how individuals' within the micro level make sense of disease and illness, these same factors matter at the macro level to the extent that societal attitudes, ideologies, and directives stratify individuals into groups based on these factors. Ultimately, variables conventionally measured at the individual/micro-level such as race, ethnicity, or nativity, may only be meaningfully understood in the context of how individuals are related or interact with each other in groups or societies (Diez-Roux 2000).

The *Equitable Longevity Framework* acknowledges that a given society is arranged hierarchically with some individuals, communities, and organizations possessing more power than others. As the framework illustrates, individuals and institutions operating at the macro level wield the most power because they exert direct influence—signified by solid arrows—on individuals and institutions at the meso and micro levels. Following, individuals and institutions operating at the meso level exert direct influence on micro level individuals and institutions. While it is possible for individuals and institutions at lower levels of social structure to influence those at higher levels, it is a much more difficult undertaking—signified by the dashed arrows from micro to meso and macro levels.

Further, factors at each level of social arrangement shape people's risk of life threatening diseases and conditions. More importantly, however, factors at each level also influence health equity. Health equity is at the center of the *Equitable Longevity Framework*. The framework defines health equity from social justice perspective (Kawachi et al. 2002; Marmot 2012; Whitehead 1990): "Equity in health implies that ideally everyone should have a fair opportunity to attain their full health potential, and more pragmatically, that no one should be disadvantaged from achieving this potential, if it can be avoided" (Whitehead 1990:7). As such, achieving health equity is more than access to health care, but requires access to life affirming resources and necessities such as food, water, shelter, transportation, and information. It is important to note that factors within each of the three levels of social arrangement are equidistant to these life affirming resources, denoting how each level is equally important to achieving health equity. Finally, the *Equitable Longevity Framework* asserts that it is through health equity that factors at each level of social arrangement impact longevity.

Ultimately, this paper's incorporation of health equity into traditional sociological understandings of social structure has cross-contextual, cross-disease implications. It is critical to emphasize that the *Equitable Longevity Framework* is not disease, population, or country specific. It can be used to address other disease conditions such as communicable disease and injuries in different populations residing in other countries. This is because the framework's primary focus is on how factors across multiple levels of society interact to create the conditions that make disease and death more or less likely for certain groups within that society. "While still considering multiple levels, we must come back to the understanding that disease occurs in individuals, yet interventions can occur at any level, including individual-level, family-level, community-level, national-level, global-level, resulting in healthy people in healthy communities" (Defo 2014:10-11). This paper's focus on NCDs is due to dearth of research available to guide policy interventions addressing the alarming rise of these particular sets of diseases in Ghana.

Data & Methods

I use the World Health Organization Study on Global Ageing and Adult Health (SAGE), Wave 1 to examine the issues posed by this paper. The sampling method Ghana's SAGE Wave 1 was based on the design of the 2003 World Health Survey, which constitutes SAGE Wave 0 or the pilot wave for Ghana. The succinct goal of SAGE is strengthen, gather, process and manage data on older persons to respond to identified needs via policy, planning, and research. The sampling design aimed to obtain a nationally representative cohort of adults aged 50+ years, with a smaller cohort aged 18-49 for comparison. The topics covered by SAGE Wave 1 are especially suited for the current investigation using the *Equitable Longevity Framework* to examine NCDs in Ghana. Respondents answered questions about their household and related characteristics, individual socio-demographics, income and work history, health and disability status, health

services coverage, health care utilization, subjective well-being and quality of life, and social networks.

Given the broad definition of longevity from the ephemeral *Equitable Longevity Framework* as optimal life expectancy, it is necessary to provide a more specific operationalization of longevity for the purposes of subsequent analyses. Here, the primary outcome of concern is the presence or absence of non-communicable disease. For this analysis, I focus on the first four conditions: angina pectoris, diabetes, hypertension, and stroke. These conditions fall under the general umbrella of cardiometabolic disorders, a constellation of diseases that, while distinct, share similar characteristics and have related causal origins/risk factors (Mezuk 2010).

Recalling that this paper takes a social justice perspective on health equity, I include variables that signal access to basic life affirming resources such as access to/availability of food, health insurance status as well as respondents' rating of health system responsiveness—at the community level as well as at the national level. At the community level, health system responsiveness measures include indicators of the interaction between individuals and their health system. Finally, I include two measures to assess the responsiveness of the general health care system at the national level. The first asked respondents to rate their general satisfaction with Ghana's health care system. The second asked respondents to rate how well they felt Ghana involved its populations in decisions regarding the provision and location of health services.

Risk factors that I include in the analyses are tobacco use, daily alcohol consumption, physical activity, and body mass index (BMI). Demographic and socioeconomic measured at the individual level that I include are age, gender, educational attainment, marital status, employment status, ethnicity. I include a social cohesion measure that asked respondents about their opinions about their community and the social and political aspects of their involvement in their communities. Finally, factors at the macro level that may impinge on the odds of having an NCD include region of residence and whether or not a respondent lives in an urban or rural area. I also include a measure of indicating in which income quintile respondents fall.

Analytic Strategy

Using data from the WHO SAGE, I evaluate the extent and sociodemographic correlates of NCDs in Ghana. The purpose is to determine the extent to which the correlates at the various levels explain whether a respondent reported having each of the four NCDs examined here.. My analysis plan for the Ghana SAGE data has three goals: 1) to assess how, if any, micro, meso, and macro level variables/factors directly influence to the probability/odds of having an NCD, 2) to examine whether meso and macro level factors modify the effects of micro level factors on odds of NCDs, and 3) to examine whether factors linked to health equity mediate the effects of micro, meso, and macro factors on the odds of NCDs. To accomplish these goals, I will generate descriptive statistics for all study variables by comparing means and proportions for males and females. To establish the relationship between non-communicable diseases, micro/sociodemographic characteristic, meso/community characteristics, and macro/national characteristics, I will estimate a series of logistic regression models, using a similar method as Christie-Mizell and Erickson (2007). This method allows me to build models that first consider the effects of sociodemographic or individual level factors before adding additional factors operating and the meso and macro levels in subsequent models. Consistent with the *Equitable Longevity Framework*, this approach allows me to assess if and how measures of health equity affect factors on different levels of society in the odds of being diagnosed with an NCD in Ghana.

Preliminary & Expected Findings

Preliminary descriptive characteristics are shown in Table 1. They reveal that Ghanaian women have significantly higher rates of angina pectoris and hypertension compared to Ghanaian men. The rates for diabetes and stroke do not differ by sex. As is the case in many population, there are significantly greater proportions of Ghanaian women in the older age groups (65+) compared to men. There are significantly greater proportions of women with no formal education and significantly greater proportions of men who have completed college or graduate schooling. Moving to risk factors, while a greater proportion of men consume alcohol and use tobacco more than women, a larger proportion of women are obese compared to men. With respect to meso/community factors, women report significantly greater social cohesion than men. With respect to macro level factors, greater proportions of Ghanaian women live in urban areas compared to men, but a larger proportion of men are in the top fifth quintile the income distribution. Finally, with respect to health equity measures, men report significantly more months in the year where they have gone hungry because they could not afford food. While there is no differences between sexes with respect to health insurance status, men report higher levels of health system responsiveness and general satisfaction with Ghana's health system.

The series of logistic regressions for the four NCDs examined in this paper: angina, diabetes, hypertension, and stroke are expected to provide important insight into the questions guiding this paper and goals set out in the analytic strategy. Consistent with prevailing research on NCDs, I expect that sociodemographic factors such as age and risk factors like obesity and tobacco use to be associated with increased odds of all four NCDs. The impact of marital status may be mixed, and depend on gender given findings that men benefit more from marriage than women. Differences in health outcomes by Ghanaian ethnicity is not a common area of study. As such, I am hoping this paper provides some new insight into this area. Results may also be mixed with social cohesion. Sociologically, social integration is often seen as protective against illness. At the same time, findings in the stress process literature also note that social cohesion/social support can be a source of stress that may not be beneficial to health. At the macro level, it will be interesting to see the effects of urban vs. rural residence in the odds of NCDs. While globalization and industrialization occurring in Ghana's urban areas place urban dwellers in close proximity to the processed sugary and salty foods, sedentary lifestyles, and tobacco products that increase one's risk for developing an NCD, the poverty and isolation of rural residence may also pose a significant risk. Finally, the health equity measures are expected to mediate or at the very least moderate the effects of some of the risks associated with having an NCD. Ultimately, the findings of this paper will not only help in clarifying the *Equitable Longevity Framework*, but are expected to help in providing evidence that will inform policy considerations as Ghana continues to tackle non-communicable diseases.

Equitable Longevity Framework.

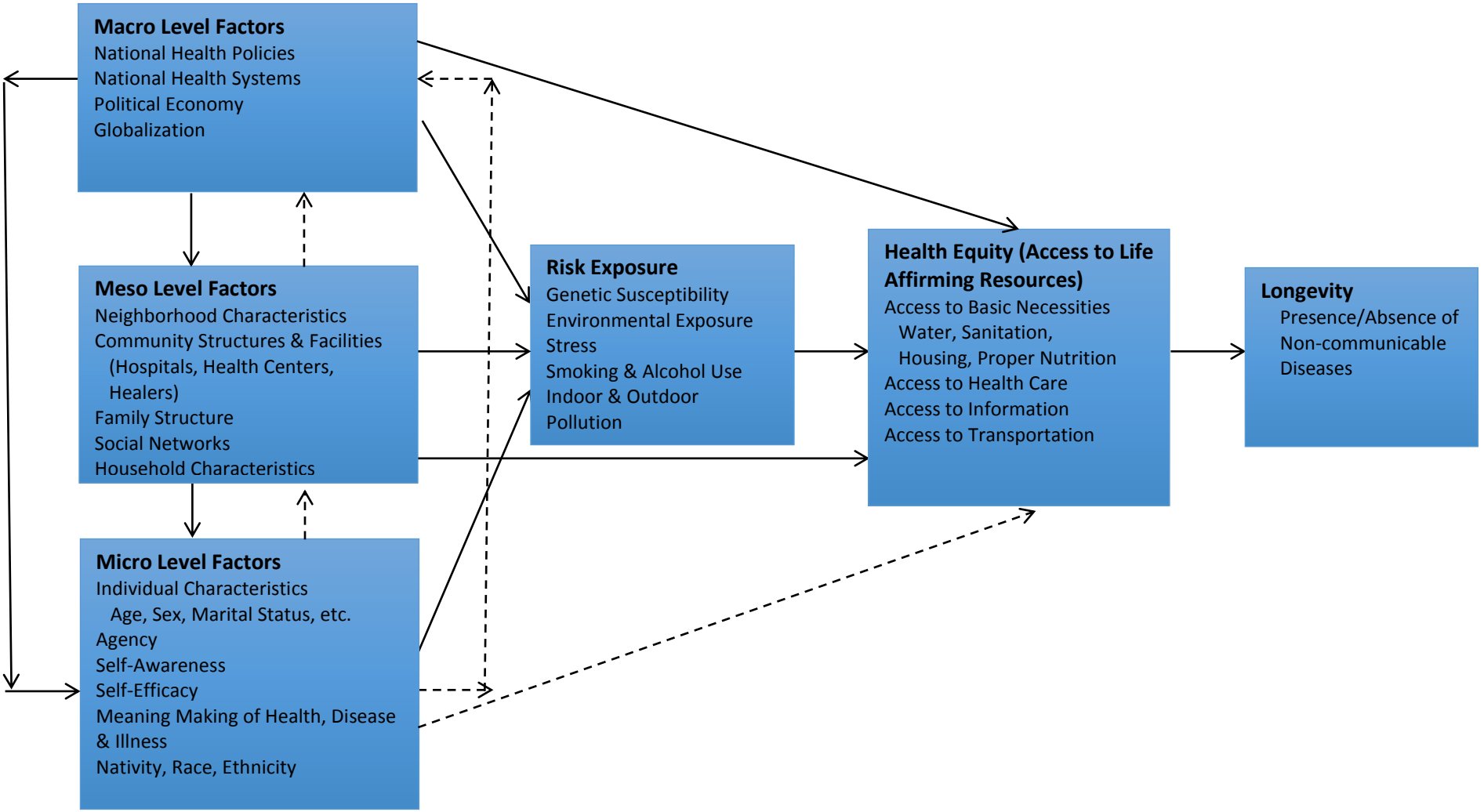

Table 1: Descriptive Characteristics (Means and Percentages) for Adults Aged 18+; Ghana SAGE Wave 1 (N=4,762)

	Both Sexes		Females		Males		
Variables	**Mean/Per.**	**SD**	**Mean/Per.**	**SD**	**Mean/Per.**	**SD**	**Sig.**
Non-Communicable Diseases							
Angina	2.73	--	3.44	--	2.02	--	**
Diabetes	3.36	--	3.65	--	3.07	--	
Hypertension	11.17	--	13.81	--	8.53	--	***
Stroke	2.16	--	2.02	--	2.31	--	
Micro Level/Socio-demographic Factors							
Sex							
Female	50.02	--	--	--	--	--	--
Male	49.98	--	--	--	--	--	--
Age							
18 to 24 Years	1.05	--	1.13	--	.97	--	
25 to 44 Years	10.18	--	9.19	--	11.18	--	*
45 to 64 Years	50.40	--	48.11	--	52.69	--	**
65 to 84 Years	34.00	--	36.61	--	31.39	--	***
85+ Years	4.37	--	4.95	--	3.78	--	*
Educational Attainment							
No Formal Education	49.87	--	61.46	--	38.28	--	***
Less than Primary School	11.55	--	12.47	--	10.63	--	*
Primary School	11.26	--	9.36	--	13.15	--	***
Secondary School	6.11	--	3.53	--	8.70	--	***
High School	17.66	--	11.34	--	23.99	--	***
College+	3.55	--	1.85	--	5.25	--	***
Employment Status							
Employed	65.04	--	57.68	--	72.39	--	***
Unemployed	23.81	--	27.16	--	20.46	--	***
Marital Status							
Single	2.92	--	2.85	--	2.98	--	
Married/Cohabitating	60.79	--	37.70	--	83.91	--	***
Separated/divorced	12.24	--	17.34	--	7.14	--	***
Widowed	24.04	--	42.11	--	5.97	--	***
Ethnicity							
Akan	45.57	--	49.12	--	42.02	--	***
Ewe	5.31	--	5.29	--	5.34	--	
Ga Abangbe	8.74	--	8.82	--	8.66	--	
Gruma	4.54	--	4.66	--	4.41	--	
Grusi	.90	--	1.26	--	1.26	--	**
Guan	1.43	--	1.18	--	1.68	--	
Mande Busanga	1.45	--	1.05	--	1.85	--	*
Mole Dagbon	2.37	--	1.51	--	3.24	--	***
Other Ethnicity	18.65	--	12.72	--	24.58	--	***
Risk/Exposure Factors							
Moderate Phyical Activity (days per week)	3.05	1.45	2.98	1.30	3.10	1.54	
Number of Drinks Consumed Daily	1.96	2.24	1.51	1.93	2.19	2.36	***
Body Mass Index (BMI)							

Underweight (BMI<18.5)	23.79	--	28.13	--	19.45	--	***
Normal Weight (BMI 18.5 to 24.9)	49.50	--	41.23	--	57.77	--	***
Overweight (BMI 25.0 to 29.9)	16.88	--	17.84	--	15.92	--	
Obese (BMI ≥ 30.0)	9.09	--	12.01	--	6.18	--	***
Tobacco Use							
Currently Use Tobacco	10.16	--	3.95	--	16.39	--	***
Currently Do Not Use Tobacco	10.11	--	2.23	--	19.79	--	***
Meso Level/Community Factor							
Social Cohesion (1:low to 5:high)	3.29	.76	3.41	.74	3.18	.76	***
Macro Level/National Factors							
Region							
Ashanti	14.47	--	14.74	--	14.20	--	
Brong Ahafo	10.29	--	9.99	--	10.59	--	
Central	11.09	--	12.68	--	9.50	--	***
Eastern	11.15	--	12.55	--	9.75	--	**
Greater Accra	12.18	--	12.80	--	11.55	--	
Northern	8.42	--	5.88	--	10.97	--	***
Upper East	7.03	--	5.67	--	8.40	--	***
Upper West	3.40	--	2.64	--	4.16	--	**
Volta	9.26	--	10.20	--	8.32	--	*
Western	12.70	--	12.85	--	12.56	--	
Urban vs. Rural							
Urban	41.81	--	45.38	--	38.24	--	***
Rural	58.19	--	54.62	--	61.76	--	***
Income Quintile							
Q1 (bottom fifth)	19.00	--	19.94	--	18.07	--	
Q2 (lower middle fifth)	19.17	--	20.11	--	18.24	--	
Q3 (middle fifth)	19.97	--	20.32	--	19.62	--	
Q4 (upper middle fifth)	20.56	--	20.19	--	20.92	--	
Q5 (top fifth)	21.10	--	19.23	--	22.98	--	**
Health Equity Measures							
Availability of Food (past 12 months)							
Hungry for 1+ months	27.51	--	25.36	--	29.66	--	***
Never Hungry	62.66	--	60.58	--	64.75	--	**
Health Insurance Status							
Health Insurance	36.96	--	37.87	--	36.05	--	
No Health Insurance	63.04	--	62.13	--	63.95	--	
Health System Responsiveness (1:low to 5:high)	2.70	.56	2.66	.55	2.74	.56	***
Satisfaction with Ghana Health System (1:low to 5:high)	3.53	1.34	3.37	1.50	3.70	1.14	***
Satisfaction with Healthcare Decision Making (1:low to 5:high)	3.24	1.35	3.11	1.49	3.37	1.18	
Sample Size (N)	4,762		2,382		2,380		

*** p <.001 ** p <.01 * p <.05.

Note: Percentages may not add to 100 due to rounding and missingness on some variables.

Source: Study on the Global Ageing and Adult Health (SAGE), Wave 1.

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