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The Effect of Income on Stroke Recovery in Urban Ghana

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Abstract

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by

Ida Dawson Amuah

MA, Strayer University, 2011

BA, University of Ghana, 2003

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Stroke recovery is a crucial public health issue in Ghana due to the high rate of mortality and morbidity associated with stroke. The significant role income plays in the onset of stroke has been empirically proven using quantitative research. However, the in-depth insights on the role income plays in stroke recovery are less known and less appreciated, particularly, in middle-income countries such as Ghana. The phenomenological study was purposed to provide in-depth insight into the effect which might exist between income earned by Ghanaian-families and stroke recovery. The theoretical framework underlining this qualitative study was a combination of the Dahlgren-Whitehead Rainbow model and the Ecological model. The research questions were a guide to uncover the perceptions and opinions of stroke survivors on income and environmental risks associated with stroke recovery in Ghana. Using purposive sampling approach, 15 survivors of stroke were interviewed. Data were coded using Nvivo software package and analyzed thematically. The results revealed that income influences the choice of residence of stroke patients and this increases their exposure to environmental risk which in turn prolongs stroke recovery. Furthermore, the income level of stroke patients influenced their ability to access healthcare delivery thus, receiving medical attention, buying prescribed medication and access to physiotherapy. Positive social change may be benefited through insights provided by this study to affect policy changes in healthcare delivery systems. Thus, incorporating environmental risk issues and income strategies into intervention programs during stroke recovery.

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Dedication

This work is dedicated to my father, Mr. Henry Benjamin Amuah. Dada, I love you. Your little girl has earned a Ph.D. I bet you can't contain your joy. To my husband Benjamin, you are one of a kind. This journey has been long like any journey that begins with small steps, and there have been many people who have selflessly contributed to my success, from the bottom of my heart, I say thank you and God bless you. My walk to this apogee academic degree took many turns, but God is faithful.

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Chapter 1: Introduction to the Study

Introduction

Stroke prevention can be considered one of the successful public health achievements of modern medicine (King, Murphy & Hoyo, 2015; Spencer, Thanh & Louise, 2013). Though the incidence of stroke has substantially declined in some developed nations due to rigorous intervention programs in high blood pressure control at the population level (Spencer et al., 2013), the burden of stroke has shifted to developing nations like Ghana. Currently, sub-Saharan African countries report three-fourth of stroke mortality cases (Greenham, Gordon, Anderson & McKay, 2016; Spencer et al., 2013). Poverty, sedentary lifestyles, malnutrition, poor prevention strategies and inadequate access to quality healthcare exert a toll on stroke incidence, prevalence, and recovery as a whole (Agyemang & Oluwatobi, 2012).

The World Health Organization (WHO; 2015) reported that stroke has become one of the leading causes of disability in Ghana and a fundamental cause of mortality. The WHO has ranked stroke as the second leading cause of death in sub-Sahara African countries with a reported annual mortality rate of 5.5 million (WHO, 2015). The stroke burden extends to the high morbidity rate, which results in an outcome of 50% of stroke survivors being disabled chronically in Ghana (WHO, 2015).

According to the Ghana Ministry of Health (2015), in a few decades, stroke in Ghana is likely to surge significantly due to epidemiological transition from infectious diseases to non-communicable diseases. Although hypertension is the leading cause of stroke, Manousakis et al. (2014) asserted that common bacterial and viral infections can

strengthen the susceptibility to stroke by leading to inflammation, local thrombosis, and atherosclerosis.

In Ghana, though prevention strategies have been put in place to manage the disease, multiple morbidities compounded by socioeconomic issues makes treatment and recovery for stroke increasingly complex (Nelson et al., 2017). The socioeconomic effect of stroke recovery in Ghana is a significant public health concern due to the likelihood of stroke survivors suffering another episode if basic intervention strategies are not put in place, and this can generate into pressure on existing public health resources (WHO, 2013).

In this study I explored the effects of socioeconomic status (SES) on stroke recovery in Ghana, with focus on the Stroke Association Support Network – Ghana (SASNET-GH), a not-for-profit organization focused on preventing stroke and providing support to stroke patients, caregivers, and families. Using a qualitative research approach, respondents were expected to provide an in-depth understanding of the effects of income on (a) exposures to environmental risk factors, (b) stroke patients' neighborhood deprivation and physical activity, (c) reducing stroke survivors' exposures to environmental risk and increasing self-rated health, and (d) income on accessing quality care delivery to ensure stroke treatment and recovery.

Background

Stroke recovery is a crucial public health issue in Ghana since increasing awareness and care towards stroke recovery can contribute to the reduction of stroke-related deaths (Agyeman et al., 2017). According to Agyeman et al. (2017), stroke-

related mortality is increasing because of lack of knowledge of the stroke risk factors by the patients and caregivers, particularly on hypertension, and lack of adequate stroke care facilities. In a related study, Baatiema et al. (2017) revealed that stroke-related deaths are increasing due to the lack of evidence-based acute stroke care in Ghana. The authors further explained that income disparity has a strong influence in ensuring the low functional stroke independence since patients with low-income levels are not able to access and afford the high cost of stroke treatment interventions compared to patients with high-income levels. This is to say that income level plays a significant role in stroke recovery in Ghana.

Nevertheless, delay in reporting stroke cases at the hospital is highly considered as stroke recovery risk factor since many stroke cases at the clinics and hospitals are reported late (Baatiema et al., 2017). According to Baatiema et al. (2017), some stroke cases are reported late at the hospitals due to a lack of awareness of stroke risk factors and characteristics. Thus, many stroke patients resort to faith-based care instead of professional medical care. Baatiema et al. explained that resorting to religious care instead of professional medical care can be accounted for by income disparity among stroke patients. Therefore, public awareness of stroke risk factors and characteristics is to be considered in improving stroke recovery in Ghana (Sarfo et al., 2014).

Stroke recovery can be influenced by post-stroke depression (PSD) among stroke patients (Sarfo et al., 2017). According to Sarfo et al. (2017), PSD is a significant determinant of functional stroke outcomes, quality of life, and mortality among Ghanaians since most stroke survivors show higher signs of depression which reflect in

their physical, psycho-social, cognitive and ecosocial domains that influence their quality of life. Although age is considered a key factor, perhaps, due to increasing disability recorded among adults, being divorced plays a significant role, particularly, among females. Age and marital status were revealed as the PSD characteristics in Nigeria by Ibeneme et al. (2017). However, Ibeneme et al. further explained that the level of employment (self-employed or unemployed) influenced PSD among stroke survivors, thus indicating the influence of income level on PSD and ultimately, stroke recovery.

Further, the environment for stroke rehabilitation after discharge from the hospital is critical since the survivor would be dependent and the frustration and stress of imminent recovery could exacerbate crisis on discharge, thus prolonging recovery (Lutz, Young, Cox, Martz, & Creasy, 2011). Lutz et al. (2011) revealed that the survivors would sometimes have to depend on persons they might have taken for granted before their stroke ailment, and this caused depression. Lutz et al. further indicated that depression could be stimulated by inadequate resources for physiotherapy at home resulting in worsening stroke disability and prolonged recovery.

From the preceding, it is evident that income levels and environment have played significant roles in functional stroke recovery. In this study I sought to explore the role of income on stroke recovery in Ghana.

Problem Statement

Studies on the effects of SES on stroke treatment and recovery has measured and compared income and educational levels as critical factors influencing stroke treatment and recovery (Bettger et al., 2014; Putman et al., 2007). Putman et al. (2013) established

that educational level influence in-patient stroke recovery such that patients with low educational level are less probable to improve Barthel Index (BI) and Rivermead Motor Assessment (RMA). Although no differences were found for income levels, researchers revealed that income level influences the BI and RMA levels of patients after discharge. It means that after discharge, stroke patients with low-income level are less likely to improve their BI and RMA levels, thus resulting to slow stroke recovery after discharge from the hospital. Bettger et al. (2014) used logistic regression to establish that income is a significant high predictor to poststroke disability among stroke survivors. This result was corroborated by Egan et al. (2015), which revealed that very low-income neighborhood communities influence community participation by stroke survivors due to lack of self-rated activities such as exercise. For this reason, Putman et al. (2007), Bettger et al. (2014), and Egan et al. suggested that future studies should provide more insights into the role of income (as a socioeconomic factor) plays in stroke recovery, mainly, among low-income countries or groups.

Although, the relationship between income and the possibility of getting a stroke has been established in some countries; no studies have been conducted in sub-Saharan African nations and none in Ghana on the impact of income on stroke recovery, thus creating a gap in the literature. This furthered research by Putman et al. (2007), Bettger et al. (2014), and Egan et al. (2015) to provide in-depth analysis on the role of income in stroke recovery in Ghana using a qualitative study approach. As a result, the gap in sub-Saharan Africa countries may be bridged and open doors for more research on stroke recovery in Ghana and other sub-Saharan African Countries.

Purpose of the Study

The purpose of this study was to offer a qualitative insight into the effect that might exist between income earned by families and how this contributes to stroke recovery which has become a public health concern. Though some qualitative studies have been conducted to evaluate stroke as an independent variable in stroke prevention and care (Agyemang et al., 2013), limited studies have probed into the life experiences of families and individuals regarding the effect income has on the recovery of the disease. This study sought to examine how income earned by Ghanaian families can have consequences on stroke recovery in the target population. For this study stroke recovery is defined as individuals who suffered a stroke in the past and have recovered with no impairment or disability and have resumed their average day to day lifestyle.

Research Questions

The research questions for this study were:

Research Question 1: How do stroke patients describe how income impacts a patient's exposure to environmental risk?

Research Question 2: How do stroke patients describe how income impacts a patient's neighborhood deprivation and physical activity?

Research Question 3: How do stroke patients describe how income impacts the environmental risk factors and increases the likelihood of stroke recovery?

Research Question 4: How do stroke patients describe how income impacts accessing quality stroke care?

Theoretical framework

The Dahlgren-Whitehead Rainbow Model

The Dahlgren-Whitehead rainbow (1991) model was utilized in this study. The Dahlgren-Whitehead rainbow model continues to be the most valuable illustration of health determinant (Dahlgren & Whitehead, 1991). This model has a widespread impact on research on health influences and inequality. Goran Dahlgren and Margaret Whitehead developed this model in 1991. This model maps the relationship between individuals, their environment, and their health. There are three constructs to this model. They are individual lifestyle factors, social and community networks, and general socioeconomic, cultural, and environmental conditions. In their explanation, they asserted that the overall health of individuals was the outcome of a set of interlocking causes running from broad societal level factors described as general socioeconomic, environmental and cultural conditions through both distal (living and working conditions) and proximal (lifestyle factors) determinants (WHO, 2006). In this model, individuals are placed at the center of the health problem, and they are surrounded by the various layers of influences of health these are community influences, lifestyle factors, level of employment and income, living and working conditions, and general social conditions. Dahlgren and Whitehead (1991) provided a visual representation of this model.

By connecting the concepts identified by Dahlgren and Whitehead (1991), this study acknowledged the basis of health determinants in retort to the research questions that motivate this study. Moreover, the utilization of the Dahlgren-Whitehead rainbow model aided in the understanding of how income influences stroke recovery from the

perspective of survivors and how public health professionals can tackle the wider social determinants of stroke recovery through the implementation of appropriate interventions tailored to the needs of the target population.

Ecological Model

The ecological model is a multidisciplinary approach used to determine the relationship between environmental risk factors and public health, education, anthropology, and other fields of study. However, the use of the approach to explain the relationship between environmental risk factors and personal behavior to health outcomes has gained much dominance in public health studies and practice (Richard, Gauvin & Raine, 2011). According to Richard et al. (2011), the ecological model or approach is a theory that defines and explains the relationship between personal behavior and the environment.

The model is built on five distinct but interrelated constructs, namely, intrapersonal, interpersonal, community, institutional, and policy factors (Barral, Logie, Grosso, Wirtz & Beyer, 2013; Golden & Earp, 2001;). An intrapersonal element is focused on knowledge, perceptions, attitude, and behavior. Interpersonal factors are focused on social networks or social groups such as income groupings, ethnicity, or racial groups. Community and institutional factors are focused on the life of people within a geographical setting while the policy is focused on governmental laws and by-laws at the local and national levels. This indicates that the ecological approach builds integrative collaboration to health promotion or health care delivery. The aim of using the ecological model was to help the study identify the environmental risk factors that influence stroke

recovery, on the one hand and the role of income in the interaction between the environmental risk factors and stroke recovery.

The Nature of the Study

This was a qualitative study with the phenomenological research design (Crosby, DiClemente, & Salazar, 2006). The phenomenological approach attempted to understand the study participants' understanding and perception, particularly on how income affects stroke recovery (Creswell, 2009; Rudestam & Newton, 2015). This approach aided in the gathering of information and perception through inductive, qualitative methods such as discussions, interviews and portraying these from the standpoint of the study participants (Crosby, DiClemente, & Salazar, 2006).

Qualitative methods and phenomenological design was the appropriate method. This enabled me to understand subjective experiences and gain insight into individuals' actions and motivations and draw upon the experiences of the target population in order to have greater insight and understanding of how income earned by individuals impact stroke recovery (Creswell, 2009; Rudestam & Newton, 2015)

Operational Definitions

Stroke perception: This relates to participants' beliefs, understanding, and interpretation of his/her journey through stroke recovery (Bettger et al., 2014).

Individual interviews: An interviewer talks with one participant for 30 minutes to an hour. One-on-one interviews allow you to probe their attitudes, beliefs, desires, and experiences to get a deeper understanding of the issue at hand

Focus group: A formal meeting with participants of 6 to 12 people to discuss a specific topic which is facilitated by an individual or an interviewer. The aim is to keep the participants focused on the issue at hand or the research questions (Creswell, 2009).

SASNET-GH: A not for profit organization in Ghana that provides services designed to impact stroke patients through education on risk factors and assistance through recovery (Agyemang et al., 2017).

Family income: The sum of financial resources generated by a household for its upkeep, taking care of other responsibilities and payment of bills. This includes all income earned as well as social security, pensions, alimony, child support, welfare, dividends, and capital gains (Greenham et al., 2016).

Stroke recovery: Any individual who has suffered a stroke within the past three years, has recovered and returned to some normal lifestyle and not in need of rehabilitation (Ibeneme et al., 2017).

Socioeconomic status: A combination of sociological and economic measures of an individual's economic, social and family position as well as work experience in relation to others income, occupation and education (Nelson et al., 2018).

Environmental risk: The influence level of income has on ecological issues such as choice of residence (avoidance of polluted areas and good security); thus the role interaction with the environment have on stroke recovery (King, Murphy, & Moyo, 2015).

Assumptions

It is assumed that the respondents provided accurate information to aid in the understanding of the effects of income on stroke recovery in Ghana. This assumption is critical since the reliability of the study was based on the credibility of the information provided by the respondents. The provision of accurate information is backed by the promise of confidentiality, thus discouraging the provision of misleading information among the respondents. Another significant assumption in this study was that respondents understood the questions as they were posed in English and that they responded to the best of their knowledge.

Scope and Delimitations

The scope of the study examined the role of income in the process and recovery of stroke in Ghana. This means the stroke recovery stages would be identified and the role of income in each process. This study examined the interplay between income and environment and their effects on stroke recovery. It means that the environmental risk factors that influence stroke recovery would be identified, and the role of income in the interaction between the environmental risk factors and stroke recovery would be critically explored.

Limitations

The choice of respondents limits the study since the role of income in the stroke recovery process was examined from the perspectives of stroke survivors. Thus, the views of other stakeholders such as public health leaders, health professionals, community, and family support systems were not considered by the study. Therefore,

further studies should focus on examining the role of community and family support in the stroke recovery process. Another limitation of this study was selection bias. Since Ghana is multilingual and interviews were conducted in English, there was the likelihood of selecting participants who understand English and such people are mostly people with a higher level of education and high social status.

Significance of the Study

In this qualitative study I addressed the importance as well as gave greater insight into the effect income has on a population of ethnically diverse adults residing in the Greater Accra region of Ghana who have survived a stroke through a qualitative examination of their perceptions. The results from this study may positively inform the discipline of public health, individuals, communities, and society as a whole by suggesting that, income earned by individuals needs to be incorporated into recovery strategies (Mapulanga, Nzala, & Mweemba, 2014). Furthermore, this study may serve as a positive catalyst for social change by recommending that policymakers adopt and regulate for policies which will lead to the growth in the national minimum wage. It may also allow healthcare policymakers to mobilize appropriate intervention programs as well as identify core groups for adequate health protection and improved well-being. It was the researcher's desire for this study to lay the foundation for future qualitative studies into how income affects stroke recovery in Ghana and potentially other African nations.

Summary

The study sought to examine the role of income in stroke recovery process in Ghana from the perspectives of stroke survivors using qualitative research. It is expected

to provide actual life experience among stroke survivors. The study was modeled after the Dahlgren-Whitehead rainbow model and the ecological model. The former sought to examine the role of the socioeconomic status on stroke recovery whiles the latter considered the role of the environment in stroke recovery. The socioeconomic status, income level of the respondents, as well as the environmental risk factors was determined and the interplay of income and environmental risk factors will be explored among stroke survivors.

Chapter 2 provides a literature review of stroke recovery. In this section I reviewed the stroke demographic trends in Ghana, previous research on stroke recovery in Ghana, the methodology for stroke recovery in Ghana, the Dahlgren-Whitehead rainbow, and the ecological model, and the correlation between socioeconomic status and stroke recovery.

Chapter 2: Literature Review

Introduction

This study examined the effects of income on the processes and outcome of stroke recovery among stroke survivors in Ghana. The effects were analyzed using a qualitative research approach to complement the results of previous studies which used quantitative research approaches and did not examine the impact of income only on chronic disease such as stroke. The study's theoretical foundation was modeled after the Dahlgren-Whitehead rainbow model and the ecological model. Both models indicated that social inequalities in health could be explained by the socioeconomic status of the individual and the level of environmental risk exposures respectively. Previous researchers justified the use of Dahlgren-Whitehead rainbow model and the ecological model to explain health outcomes. I also reviewed previous research on stroke recovery to understand and analyze the relationship between income and stroke recovery globally. A brief discussion on stroke recovery in Ghana was reviewed to provide geographical perspectives on stroke care in Ghana.

Literature Strategy

All of the literature utilized for this review were sourced from peer-review journals. To accomplish this literature review, I searched databases related to health sciences, psychology, nursing, and public health specifically. The study used PubMed extensively, Cumulative Index to Nursing and Allied Health Literature (CINAHL), MEDLINE with full text, Science Direct, PsycINFO, ProQuest Dissertation, and Thesis and Google Scholar to identify relevant literature. Google Scholar was used

predominantly due to its broad nature to search for scholarly literature in the public health discipline. Most of the literature reviewed was dated from 2013 to present.

Moreover, there is a unique search engine in Ghana called *Ghana Web* that retrieves articles and publications on topics as they relate to Ghana. This engine was employed to identify studies that have been carried out on stroke and stroke recovery in Ghana. All the reviewed articles from Ghana Web were limited to those published in the English Language. The keywords searched in all the utilized database were *stroke, stroke care, stroke recovery, and health services, stroke and personal behaviors, stroke and income, ecological model, rainbow model,* and *Dahlgren and Whitehead.*

Stroke Demographic Trends

Stroke is a cerebrovascular disease that significantly affects the arteries and eventually results in brain injury and death (Agyeman et al., 2017; Sarfo et al., 2014). Globally, stroke is ranked as the fifth leading cause of death and disability. In the United States, a high-income nation, the CDC ranks stroke as the fourth leading cause of disability and mortality (CDC, 2016). According to the WHO Stroke Information Publication, stroke trends vary in middle-income countries as compared to high-income countries due to some health conditions ranging from high levels of bad cholesterol, diabetes, and delayed interventions (WHO, 2015).

In Ghana stroke was noted to be the second most deadly disease after malaria, with a mortality rate of 26% according to the World Health Organization between 1990 – 2010 (Baatiema et al., 2017). Approximately 87% of deaths due to stroke occurs in the middle-lower income countries, including Ghana (Agyeman et al., 2017). These statistics

show that the incidence of stroke in the high-income countries is low compared to the middle-lower income countries, and this may be attributed to more extensive stroke prevention strategies, including public education on stroke risk factors and hypertension management at the population level (Sarfo et al., 2014). Stroke, then, has been noted as a public health concern such as tuberculosis, malaria, and diabetes since it is regarded as a lifestyle disease that can be prevented through public education on its risk factors.

The incidence of stroke and its associated mortality rate is reduced in the high-income countries compared to the middle-lower income countries due to the availability of quality and evidence-based care (Baatiema et al., 2017). According to Baatiema et al. (2017), stroke care in middle-income countries is characterized by a lack of knowledge and skills in stroke care among health providers and other caregivers. Other characteristics of stroke care in middle-income countries are a lack of medical equipment to handle strokes and to the extremely high cost of stroke treatment (Baatiema et al., 2017). This can be attributed to high cases of stroke death and stroke-related disability in most developing countries or middle-lower income countries (Agyeman et al., 2017; Baatiema et al., 2017).

In Ghana, stroke is noted to be the fourth leading cause of death in 32 sentinel sites between the period of 2012-2016 (Agyeman et al., 2017). Approximately 53.5% of the deaths were recorded among males aged 48 – 60 years, with the remaining 46.5% recorded among females aged 41 – 52 years (Agyeman et al., 2017). This implies that most of the stroke cases are recorded among middle-aged individuals, between 40 -60 years of age. The statistics noted here reflect the trend of stroke cases reported at the in-

patient departments of all 32 hospitals. According to Agyeman et al. (2017) Komfo Anokye Teaching Hospital (KATH) in Kumasi, Ghana, recorded a total of 1054 stroke cases at the in-patient department during the period January 2006 to December 2007. Of this more significant number, 537 were male (51.1%), and 513 (48.9%) were female, thus giving a male-female ratio of 1.0:0.96. The average age of the reported cases are 60 years among the male and 65 years among their female counterparts (Agyemang et al., 2017)

In contrast, at the same hospital Sarfo et al. (2014) (i.e., KATH) revealed that out of the 265 in-patients diagnosed of stroke in 2012, 150 (56.6%) were female, and the remaining 115 (43.4%) were male, thus recording a female-male ratio of 1.3:1.0. In this study, the mean age of the stroke cases was 65 years for a female. The difference in ratio arising from the studies from the same hospital was due to the difference in the objectives of both studies. Sarfo et al. (2014) examined the risk factors for stroke outcomes while Agyemang et al. (2017) examined stroke mortality and morbidity in Ghana. However, the conflicting results can be attributed to the large sample size of 1054 used by Agyeman et al. compared to the small sample size of 265 used by Sarfo et al.

Nevertheless, both studies revealed that the primary high-risk stroke factor is hypertension. But Sarfo et al. (2014) revealed further that hypertension was recorded more among women with long records of obesity or already obese compared to their male counterparts. It must be noted that even though Sarfo et al. revealed that hypertension, physical inactivity, and obesity are the high-risk factors with 85%, 73%, 58% prevalence among the cohort, the social aspect of stroke must be incorporated into public health intervention strategies. Furthermore, Sarfo et al. found that socioeconomic status plays a

significant role in the onset of stroke through to stroke recovery if patients survive. Consequently, disparities in the socioeconomic status of individuals account for both long-term and short-term outcomes after stroke (Sarfo et al., 2014).

Stroke Recovery in Ghana

Evidence from studies has established that there is a high incidence of morbidity and mortality in stroke-related cases in Ghana due to the unavailability of varied and limited services for stroke patients (Agyeman et al., 2017; Baatiema et al., 2017). According to Agyeman et al., (2017) out of the 60 deaths that occurred within 24 hours of admission at KATH hospital in 2013, 5.7% were cerebrovascular (CVD) related, including stroke. The study revealed that out of 343 deaths that occurred within seven days of admission, 32.7% were CVD related. For deaths recorded within 14 days of admission, the percentage increased to 42.8% (436 deaths) that were CVD related. It further revealed that out of the 449 deaths recorded within 21 days of admission, 42.8% were CVD related and out of the 454 deaths recorded with 28 days on admission 43.2% were CVD related. The aforementioned signifies that within a month, approximately 196 individuals die from stroke and other cerebrovascular diseases who were admitted to KATH. The situation is worse at Korle-Bu Teaching Hospital (KBTH), where 69% of death records in less than 24 hours on admission (Agyeman et al., 2017). These increasing trends of stroke death have severe implications for public health care delivery due to its high cost of treatment and the impact on productivity since most stroke patients are aged 65 years and below (Agyeman et al., 2017).

Nonetheless, the high incidence of stroke mortality is due to inadequate acute stroke diagnosis tools such as CT and MRI brain scan services as well as acute stroke care intervention and services such as thrombolysis revascularization, decompressive craniotomy, arteriovenous malformation treatment, surgery for aneurysm and the inability of patients to afford quality healthcare (Baatiema et al., 2017). According to Baatiema et al., (2017), the insufficiency of these interventions and services can further be attributed to the lack of stroke workforce. For example, out of the 11 hospitals sampled for the survey, only four (4) representing 36.4%, had neurologists to care for acute stroke cases whiles three (3), representing 27.3%, had neurosurgeons to care for severe stroke cases. Thus, reiterating the various limited interventions and services for stroke care in Ghana.

Another factor that militates against stroke recovery in Ghana is the belief that chronic diseases such as stroke, hypertension, and diabetes are spiritual attacks that require the intervention of traditional herbalist and or Christian clergy (Agyeman et al., 2017; Stroke Aid Foundation, 2017). In most cases, stroke cases are rarely reported or reported late resulting in death on admission at the hospitals (Baatiema et al., 2017; Stroke Aid Foundation, 2017). According to the Stroke Aid Foundation (2017), the late report of stroke cases at the clinics and hospitals result in high mortality on admission and disability among the patients, thus denying them functional independence.

To curb the high incidence of death associated with stroke, the Ghana Health Service has instituted a multidisciplinary approach to improve the functional outcomes of stroke care in Ghana (Morris, 2011). This collaboration requires the active involvement

of either specialists or experts such as neurology, neurosurgery, physiotherapists, dieticians, and speech therapists as well as nurses (Morris, 2011). The collaborative efforts call for an integrative approach which begins at the outpatient to the inpatient departments to ensure treatment is provided immediately the patient reports to the clinic or hospital to ensure functional outcomes and functional independence (Morris, 2011).

In retrospect, it can be said that low-income patients may not be able to access the full integrative services due to the high cost of treatment and financial constraint (Baatiema et al., 2017). According to Baatiema et al. (2017) most stroke patients or caregivers usually do not have money for transportation or pay for medical expenses, thus delaying recovery since most patients have to raise funds for more than two (2) weeks before accessing CT and MRI brain scan to aid diagnosis. Baatiema et al. (2017) reiterated that those with high-income level could seek early treatment, thus improving stroke recovery or functional outcome and independence. The studies by Baatiema et al., (2017) have indicated that lack of knowledge and awareness of the stroke risk factors together with low-income levels influence stroke recovery among patients.

Previous Research on Stroke Recovery in Ghana

Sarfo et al. (2017) established that most stroke survivors in Ghana are profoundly depressed, thus indicating a disability, and resulting in non-recovery from a stroke. Out of the 200 stroke survivors sampled for the study conducted between 2010-2015, 78.5% were diagnosed depressed based on Centre for Epidemiologic Studies Depression Scale (CES-D), 42.5% were diagnosed depressed Geriatric Depression Scale (GDS) whiles 36.5% on both CES-D and GDS. These depressed cases were associated with high odds

of depression and marital divorce at a 95% level of significance (Sarfo et al., 2017). According to the same study, the stroke survivors showed a high level of the significance level of physical, psycho-social and cognitive contractions that affected their quality of life. It means that most of the sampled stroke survivors experienced high-risk socioeconomic issues such as marital divorce, relationship dissolutions, unemployment or poverty, low income, and social exclusion. It indicates that stroke survivors with a high level of depression are likely not to recover, resulting in the low functional outcome and ongoing disability (Sarfo et al., 2017)

Sarfo et al. (2014) evidenced that the slow rate of recovery among stroke patients is attributed to the lack of awareness of the three (3) traditional risk factors of the disease, namely, hypertension, physical inability, and obesity. Among 265 stroke patients sampled for the study, 85% had systemic hypertension, 73% had a physical inability, and 58% were obese (Sarfo et al., 2014). The study further revealed that most of the patients who are aware of such risk factors lack the knowledge and skill in managing and controlling stroke recovery, even from its initial stage, thus resulting to approximately 43.4% mortality rate among survivors after discharge regardless of the type of stroke. The study indicated that due to a lack of knowledge and control of the risk factors, most in-patients had severe limitations which prevent the functional outcome of stroke (Sarfo et al., 2014).

The Methodology of Stroke Recovery Research in Ghana

Sarfo et al. (2017) conducted a cohort study among 200 stroke survivors at a prime neurology clinic in Ghana. Depression among the cohort was tested for using the Center for Epidemiologic Studies Depression Scale (CES-D) and the Geriatric

Depression Scale (GDS). Cohort units who scored 16 and above on the CES-D and greater than five on the GDS scales were considered depressed. Data collected ranged from demographic characteristics, stroke type, stroke severity and quality of life and were analyzed using a logistic regression model.

Sarfo et al. (2014) recruited 265 patients who were clinically diagnosed and were assessed of vascular factors and markers of stroke severity at Komfo Anokye Teaching Hospital (KATH). The study is an observational study where the recruits were aged 15 years and above. Other criteria for recruitment for the study were sudden stroke diagnosis, the onset of neurological symptoms lasting for more than 24 hours or leading to death when the non-stroke cause is not identified. Within 48 hours of admission, hematology and fasting biochemistry were conducted for each recruit. Data on socio-demographic, history and clinical examination on cardiovascular risk factors for stroke and stroke outcomes were collected and analyzed using univariate and multivariate regressions to investigate the influence of in-patient mortality after stroke (Sarfo et al., 2014).

Theoretical framework

Dahlgren-Whitehead Model

Dahlgren-Whitehead Rainbow Model, propounded by Goran Dahlgren & Margaret Whitehead (1991), is based on the premise that individuals' health status, which is the risk of getting ill, preventing illness and getting effective treatment as well as their recovery status is influenced by individual socio-economic status, community and social

networks, socio-economic, cultural and environment factors (Institute of Medicine, 2003, pp. 51-52).

According to the Institute of Medicine (2003), the rainbow model indicates that the public health system, including health care delivery, is influenced by interconnected factors that need the attention of all sectors of a country including education, agriculture, business communities, non-governmental organizations, academics as well as the health sectors (IOM, 2003). This implies that the health of the individual is primarily influenced by the individual behavior and lifestyle and the society in which the individual resides (Graham & White, 2016) and this places the individuals at the center of their health status.

The model was termed Rainbow due to the visual or pictorial representation of the model's constructs in layers to illustrate the three fundamental factors or determinants of an individual's health status. The first layer is focused on the individual's age, sex and personal behaviors that influence health status. The second layer is the social and community networks which define the family and community support systems that affect the health status of individuals considering their norms, values and belief systems (Quansah, Ohene, Norman, Mireku, & Karikari, 2016). The third layer is focused on general socioeconomic, cultural and environmental conditions which comprise of agriculture and food production, education, work environment, income, living conditions, unemployment, water and sanitation, health care services and housing.

The personal behaviors described in the first layer are linked to the individual's lifestyle and associated with physical ability and diet (Graham & White, 2016). The

industrial and technological age of today has resulted in less labor-oriented work and travel experience with an extreme shift to animal-based foods vis-à-vis plant-based foods (Graham & White, 2016; Farhud, 2015). Graham and White (2016) and Farhud (2015) have reiterated that this has resulted in the high incidence of non-communicable diseases, such as stroke, diabetes, and hypertension, which are considered lifestyle diseases. According to Farhud (2015), lifestyle diseases are ailments caused by the routine daily activities associated with job, diet, physical exercise and recreation. Several activities generate low metabolisms, hypertension, cardiovascular, overweight and sugar-related problems that usually require high income and other resources to cure.

Again, Farhud (2015) indicated that these problems are influenced by the diet and body mass index (BMI) of the individual, level of sleep gained per night and exercise, sedentary lifestyle, sexual behavior, substance abuse, medication abuse, application of modern technology, procreation and study. The above suggests that the individual ought to understand the functions and role of each of these factors to their health and apply them contextually to prevent the contraction of non-communicable or lifestyle diseases.

Related to the second layer which focuses on community and social networks, for example, there is a guideline for treating acute stroke cases developed by World Health Organization (WHO); however, its use among medical units globally is low, particularly, in a low-income country such as Ghana (Baatiema et al., 2017). According to Baatiema et al. (2017), there are different levels but limited evidence-based services for acute stroke care in Ghana, although they are aligned with global best practices. This means that social and community networks available for stroke recovery are available in Ghana.

Related to the third layer which is focused on the environment, the healthcare service environment is critical in stroke recovery among patients (Rosbergen, Brauer, Fritzhenry, Grimley & Hayward, 2017). According to Rosbergen et al., (2017), an enriched environment provides stroke patients with the mental well-being and physical strength to ensure stroke recovery. It indicates that without the 'enriched environment' which includes both the medical equipment and skills of health professionals critical to stroke recovery, the lack of these can increase the high incidence of stroke morbidity (Baatiema et al., 2017) (Agyeman et al., 2017).

The proposed study focused on all three layers due to their relation to the personal behaviors of an individual's health status and their general socio-economic status. It must be noted that the personal behaviors and general socio-economic status towards individual's health contribute immeasurably to stroke self-management and ultimately influences stroke recovery (Boger, Hankins, Demain & Latter, 2015). According to Boger et al. (2015), self-management activities are vital to promoting stroke recovery since it helps patients eat-well, exercise well, take medicines, manage and monitor recovery progress. It means that stroke recovery largely depends on the personal behavior and the socio-economic status of the individual patient. Invariably, the ability to adapt and modify personal behaviors of stroke patients is influenced by income since income provides personal empowerment and the wherewithal to eat well, access physiotherapy and improve family support care to hasten the recovery process (Trygged, Ahacic & Kareholt, 2011; Egan et al., 2015).

Review of Dahlgren-Whitehead Model

The Dahlgren-Whitehead rainbow model has been used empirically to establish the social determinants of health and well-being inequalities in developed countries such as in the United States. This is due to its ability to influence policy interventions to address different groups of individuals based on their social groupings to reduce social inequalities in health care delivery (Bambra et al., 2009). For example, Bambra et al. (2009) used the Dahlgren-Whitehead model as a trajectory of health inequalities by focusing on the third layer of the model, for example, the general socio-economic, cultural and environmental conditions. The first layer of the model focuses on the living and working conditions and access to essential goods and services such as water, sanitation, food, unemployment, and health care services. The study by Bambra et al. (2009) was based on 30 systematic reviews of published and unpublished interventions related to social determinants of health. The study revealed that the relationship between the interventions and health inequalities was ambiguous; however, the study traced evidence of health inequalities among disadvantaged groups based on their housing and work environment. This established a positive relationship between the interventions and health inequalities. It means that even though the inequity cannot be practiced in health care delivery or designing policy interventions, the work and the living conditions in the environment foster inequality among the populace, it means that any disparity arising in health care delivery is unintentional.

In another study, Putman et al., (2007) established that education and income (socioeconomic factors) influence stroke recovery across Europe, the study was

categorically developed on the Dahlgren-Whitehead rainbow model. The study which was conducted among 419 patients in six (6) Stroke Rehabilitation Units across Europe revealed that education and income have an immense influence on stroke recovery during the inpatient rehabilitation period and out-patient rehabilitation period respectively. Similarly, Egan et al. (2015) and Trygged et al. (2011) established that the income level of neighbors influenced the level of community support for stroke survivors and income and education influenced the ability of younger stroke patients to return to work, respectively. Moreover, these studies used purely quantitative models and referred to the Rainbow theoretical model.

These studies have confirmed the inequality in health care delivery based on socioeconomic status and personal behaviors of individuals, without referring to the Dahlgren-Whitehead rainbow model. This study will be modeled after the Dahlgren-Whitehead rainbow model to trace income inequality and its impact on stroke recovery patients in Ghana. This is to apply the model in a low-income country such as Ghana, using a qualitative study, thus drifting from the quantitative approach which has characterized previous studies of social inequality in health care delivery. It must be noted that previous studies which examined social disparities in health care delivery used quantitative analysis techniques, but the data collected for this study was analyzed based on themes and sub-themes associated with qualitative method.

Ecological Model

The ecological model is a multidisciplinary approach used to determine the relationship between environmental risk factors and public health, education,

anthropology and other fields of study. However, the use of the approach to explain the relationship between environmental risk factors and personal behavior to health outcomes has gained much dominance in public health studies and practice (Richard, Gauvin & Raine, 2011). According to Richard, Gauvin and Raine (2011), the ecological model or approach is a theory that defines and explains the relationship between personal behavior and the environment.

This approach to explaining personal behavior about health outcomes is significant due to the widely held belief that individuals are at different environmental risk exposures based on education, income, gender, social status, employment and even ethnicity (World Health Organization, 2010). This disparity in environmental risk exposures deepen the social health inequalities which have been explained by the Dahlgren-Whitehead rainbow model. This enhances the understanding of the concept of social health inequalities since individuals' places of residence influences the health outcomes (World Health Organization, 2010). This means that the ecological model or approach is ideal for health promotion in the public health discourse (Golden & Earp, 2012).

The model is built on five distinct but interrelated codes, namely, intrapersonal, interpersonal, community, institutional and policy factors (Golden & Earp, 20001; Barral, Logie, Grosso, Wirtz and Beyer, 2013). An intrapersonal element is focused on knowledge, perceptions, attitude, and behavior. Interpersonal factors are focused on social networks or social groups such as income groupings, ethnicity or racial groups. Community and institutional factors are focused on the life of people within a

geographical setting, while policy is focused on governmental laws and by-laws at the local and national levels. This indicates that the ecological approach builds integrative collaboration in health promotion or health care delivery.

Based on the five distinct and interrelated codes, it explains that an individual's environmental risk exposure is based on the individual's knowledge, perception, attitude and behavior, social groupings, geographical location, and government policies and laws on the environment. Again, it is vital to understand the individual's environmental risk exposure to understand the various response implemented to mitigate the exposures, the health outcomes and costs arising from the exposure (WHO, 2010).

Relating the model to stroke recovery, it is thus imperative to consider the effects of environmental risk exposure to the functional process, outcome, and independence to reduce the prevalence of stroke-related mortality. In view of this, this study focuses on the first two constructs (i.e. individual and network levels) since the individual's knowledge, perception, attitude, and behavior influence their social groupings. Together these have immeasurable influence on stroke functional outcomes and independence as evidenced by Egan et al. (2015) and Trygged et al. (2011). This is in line with previous studies using the model (Golden & Earp, 2012). According to Golden and Earp (2012) some studies which deployed the ecological model centered on interventions at the individual and network level for health promotions. The modeling of the study on the ecological approach is due to the assumption that income influences access to quality healthcare delivery and ultimately, individual well-being — the income of individual influences their social network with its peculiar way of life.

Review of the Ecological Model

Although the relative impact environment risk exposures and health outcomes are important, Golden and Earp (2012) and Richard, Gauvin, and Raine (2011) have reiterated that the extent to which the ecological model is applied to health promotion, globally, is vague. The multidisciplinary approach is complex in its application, and there is limited empirical evidence to support its use in health promotion (Golden & Earp, 2012; Richard et al., 2011). According to Richard et al. and Golden and Earp, the application of the model to health promotion is centered on the intrapersonal and interpersonal features of physical activity and nutrition. Golden and Earp's assertion is based on a systemic review of 157 papers in the Health Education & Behavior Journal after the two decades of its empirical use. Although Richard et al. conducted a systemic review of published articles on the ecological model, they recommended that future health interventions should be based on the model since they discovered that most of the interventions using the model were centered on physical activity and nutrition. Therefore, it is imperative to examine the impact of income on the environment and stroke recovery. This will help provide insights on how income levels influence place of residence and work of stroke patients and ultimately functional stroke outcomes.

Apart from physical and nutrition interventions, HIV risk factors were modeled after the ecological approach to examine the risk context of HIV epidemics by Barral, Logie, Grosso, Wirtz, and Beyer (2013). Barral et al. used the model to identify the various risk factors of HIV in parental transmission of HIV among drug injectors or people who inject drugs (PID) and men having sex with men (MSM) groups. Relating the

risk factors identified for HIV to stroke recovery processes and outcomes, then, at the individual level, income, education, ability to eat a well-balanced meal, ability to physically exercise, intake of medicines and other treatment therapies, duration of stroke and stroke type, as well as exposure to air pollution, are the noted ecological risk factors that influence stroke recovery.

At the network level, income, educational rankings and a network of stroke patients influence stroke recovery. At the community/institutional levels access to quality stroke medical care, availability, and access to physiotherapy units as well as the availability of nutritional plan for stroke patients, influence stroke recovery. At the public policy level, the general best practice in stroke care developed by WHO influences stroke recovery. It means that the extent of functional outcomes and independence among stroke patients is embedded in the societal structure which is rooted in an individual's implicit attitude and practice towards health promotion but can be more effective and efficient when it is integrated into the social network and community institutions and general government public policy.

Notwithstanding, there are studies on stroke recovery that did not focus on the ecological model per se but was applied within the socio-cultural and environmental contexts. For example, Ibeneme et al. (2017) examined the extent to which socio-cultural factors, i.e., vulnerable groups, reduces PSD as a way of enhancing stroke recovery. The study by Ibeneme et al. revealed that vulnerable groups susceptible to PSD are female, adults who are aged 27 -56 years, survivors living with spouses, survivors with severe stroke complication, survivors with left cerebral lesions and the youth (Ibeneme, 2017).

Among these groups, the age grouping had a significant distribution of PSD. From the preceding, it is clear that the ecological model has not been used to evidence stroke intervention, but some studies have analyzed stroke recovery within some of the features of the model.

The Interplay Between the Rainbow and the Ecological Models

Income is a crucial SES that influence health care delivery and functional health outcomes in both high and low-income levels as established by Ouyang et al. (2018) and Bettger et al. (2014). However, income cannot be treated as mutually exclusive in examining functional health outcomes since the individual's ecology regarding their environmental risk exposures provides the most prominent context within the functional results can be judged (Fairburn & Braubach, 2010). According to Fairburn and Braubach (2010) asserted that functional health outcomes are influenced by the individual's housing conditions and environmental risk exposures, of which the level of income plays a key determining factor. Fairburn and Braubach (2010) after reviewing more than 100 articles on health, housing, and environmental risk exposures concluded that people with low-income levels usually live in residential areas with high air and water pollutions, crowded houses, and communities with high levels of noise that militate against their health. Evans and Kantrowitz (2004), one of the articles reviewed, established an inverse relationship between environmental risk factors and income and other SES variables. It means that people with low-income level are increasingly exposed to environmental risk factors such as indoor air pollutants, hazardous wastes, lack of green spaces, crowded

houses, noise and hazardous work environments that are unfavorable to their health and well-being; the reverse is true (Evans & Kantrowitz, 2002).

Meanwhile, housing and environmental risk exposures are critical in determining functional health outcomes associated with coronary heart disease and other cerebrovascular disease such as stroke (Chaix, 2009). Based on the linkage between income and environment risk exposures espoused above, the study posits that:

1. Hypothesis 1 – high-income levels reduces stroke patients' exposures to environmental risk.

Apart from exposures to environmental risk, income level influences neighborhood deprivation and self-rated health which critical to stroke recovery (Fairburn & Braubach, 2010). Fairburn and Braubach (2010) reported that studies had established that environment of the poor is full garbage litters, dog feces and dump electronics that do not empower individuals to undertake physical activities that will improve their well-being. This means that if low income hinders stroke patients from accessing physiotherapy from the hospitals, the ecology of their inhabitations denies them to physical exercise to improve their well-being, thus influencing negatively their self-rated health. Therefore, the current study posits that

2. Hypothesis 2: high-income level reduces stroke patients' neighborhood deprivation and increases physical activity.

McCormack et al. (2018) established that the socioeconomic status of an individual, including income status influences a person's exposure to environmental risk

and ultimately health outcomes. The study revealed that persons who live in socioeconomically disadvantaged communities or neighborhoods are not exposed to walkability that increases their waist circumference, body mass index, and waist-to-hip ratio which in turns influence health outcomes such as obesity and hypertension. It means that stroke patients in such neighborhoods are more likely to experience prolong stroke ailments compared to stroke patients living in the socioeconomically advantaged neighborhoods, thus influencing functional stroke outcomes. This result corroborates the findings of Egan et al. (2015), which established that stroke patients living in low-income neighborhoods had decreased participation after two years of stroke, thus influencing stroke recovery. The study indicated that those living in high-income neighborhoods have a high score of walkability in the community that influences their emotional well-being. Based on this assertions, the current study posits that:

3. Hypothesis 3: high-income level reduces environmental risk factors that increase self-rated health and ultimately increase the likelihood of stroke recovery.

Studies in Ghana and other developing countries reviewed above have indicated that stroke mortality and morbidity increases due to financial constraints that hinder access to quality stroke care. It means that high-income levels influence access to quality stroke care and ultimately increases the likelihood of functional stroke outcomes – stroke recovery. Thus, the study posits that:

4. Hypothesis 4: High-income levels influence access to quality stroke care and increase the likelihood of stroke recovery

Conceptual Framework

Based on the hypothesis mentioned above, the conceptual model for the study is presented in Figure 1 below:

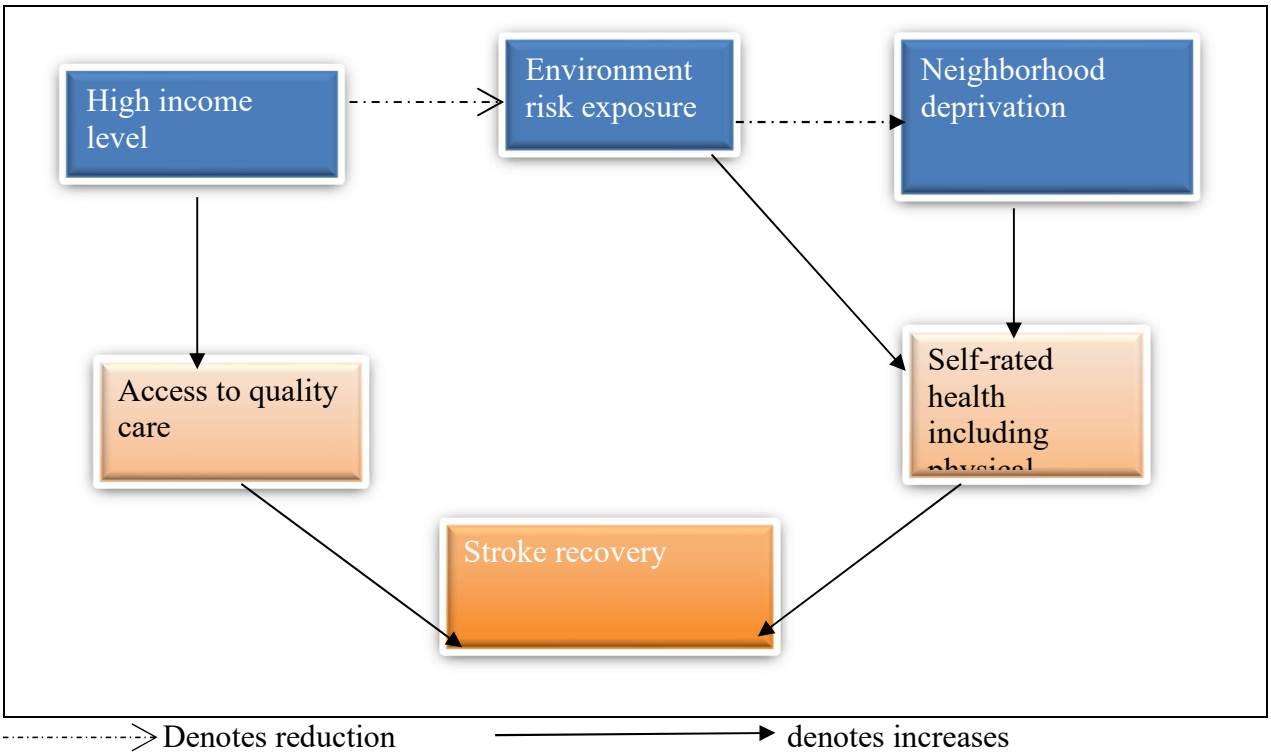

Figure 1. Conceptual framework.

Figure 1 above shows the conceptual model for the study which was developed based on the tenets of both the Dahlgren-Whitehead (1991) and ecological models. At the base of the model is stroke recovery which indicates the preferred state of stroke survivors. Both income and environmental risk exposure influence stroke recovery. All things being equal, high-income influences access to quality stroke care and stroke recovery. All things being equal, high-income levels reduces environment risk exposures, reduces neighborhood deprivation, increase self-rate health including physical activity and ultimately increases the likelihood of stroke recovery. From the above hypotheses, it

is evident that the Rainbow and the ecological models have not explicitly been used to model a study, but the underlying concepts have been used to demonstrate their varying influences on health outcomes and to promote health inequality.

Stroke Recovery Literature

The growing incidence of stroke morbidity and disability globally, especially among low-income groups, has motivated several studies on stroke recovery (Egan et al., 2015; Trygged, Ahacic, & Kareholt, 2012). The growing literature on stroke recovery is attributed to the extended period of health management that ranges from medicine intake and clinical treatment, lifestyle management including food and nutrition, exercise, emotional and psychological behaviors (Yan et al., 2016). According to Yan et al. (2016), the chronic nature of stroke requires a high level of positive personal behavior to complement the in-patient, family and community support to ensure recovery. Most importantly, studies on stroke recovery have increased since it is a public health concern due to the high cost of treatment and management of the disease.

Stroke recovery is determined by clinical, personal behavior, socioeconomic status and community-family support systems not forgetting general environmental and cultural factors. These factors are not mutually exclusive but interrelated since the speed of recovery, and the extent of recovery are primarily influenced by socioeconomic status, notably, income and education. Income is, therefore, an underlying determinant of access to professional health treatment and care including food and nutrition and physiotherapy care as revealed by Trygged, Ahacic, and Kareholt (2011).

Previous Research Stroke Socioeconomic Effects on Recovery

Previous research has indicated the growing importance of medical treatment in stroke recovery to prevent increasing incidence of disability associated with stroke as well as stroke-related death (Hammade et al., 2014). Perhaps, the increasing cost of stroke treatment has become a burden of the illness itself. Thus, research on stroke recovery is shifting to socioeconomic factors such as personal behaviors, income and education and their effects on stroke recovery (Marshall et al., 2015). For example, Cox, McKevitt, Rudd, and Wolfe (2006) established that populations with low socioeconomic status experience low stroke recovery and high stroke severity compared to the populations with high socioeconomic status. Cox et al. (2006) indicated that the cause of such disparity is unclear even though stroke risk factors were considered.

Among the group of stroke survivors, Bettger, et al. (2014) established a relationship between stroke disability and socioeconomic status. The study revealed that 58% of stroke patients have low educational status, 61% were unemployed, while 27% were of low-income status. Most of the stroke survivors were disabled after 3 months of in-patient rehabilitation at the hospital, and this was attributed to low-income levels, unemployment and low education status coupled with high-risk factors such as smoking, hypertension, and diabetes (Bettger et al., 2014). This result from the study of Bettger et al. (2014) corroborates with the evidence established by Marshall et al. (2015) which indicated that stroke patients with low socioeconomic status are less probable to receive quality health care at the clinic and the rehabilitation units, thus, reiterating the inequality to health care delivery among stroke patients. It means that stroke patients with low

socioeconomic status are less likely to recover completely compared to their counterparts with high socioeconomic status.

Putnam et al. (2007) established that the level of education has a positive relationship with stroke recovery at the hospital stay whiles income influences recovery at the stroke rehabilitation unit (SRU) (Putnam et al., 2007). The study revealed that stroke patients with low educational status are less likely to reach a high Barthel Index (BI) and River Mead Motor Assessment (RMA) when on admission. After discharge, stroke patients with low-income status were able to improve RMA of the leg, trunk and arm. The study by Putnam et al. (2007) further revealed that income was not a factor affecting stroke recovery at SRU whiles education was a factor influencing recovery after SRU discharge. The difference in the results is less attributable to 'center' or the environment of receiving treatment but mainly attributable to coping strategies and interpersonal strategies such as communication, which was the characteristics of the patients with high educational status. It means that education allows patients to adjust to treatment and empower patients to communicate to seek clarifications on the progress in recovery. Thus, there is a high level of inequality in service delivery at the SRU, but this inequality cannot be attributed to income alone.

Egan et al., (2015) examined the relationship between the income of neighboring communities and stroke recovery and revealed that stroke patients in high-income neighboring communities' level of community participation hasten the process of stroke recovery (Egan et al., 2015). Egan et al. (2015) conclusion was influenced by results of six (6) stroke patients, representing 9% of the total participants, who lived in very low-

income communities scored 25% or low of the Reintegration to Normal Living Index (RLNI) during follow-ups after discharge from the hospitals or SRUs. According to the study, stroke in higher-income communities was observed in the uptake of self-management activities such as exercise, emotional well-being and other self-rated health activities which were not common in the very low-income neighbor communities.

Trygged et al. (2011) measured stroke recovery on the likelihood to return to work after stroke and established that income and education are influenced by the probability of stroke patient to return to work after the first case of stroke. The study revealed that stroke patients with tertiary education are 13% more likely to resume work after stroke rehabilitation after controlling for income. Further, those in the higher income quartiles are twice more likely to resume work after stroke rehabilitation compared to those with lower income quartiles. Similarly, the study revealed that women with low-income quartiles are less likely to resume work after stroke rehabilitation. A review of the study indicates that income plays a vital role in stroke recovery among both men and women and influence the likelihood to resume work. It means patients with high tertiary education, but with low-income levels are less likely to recover from stroke and resume work.

Ouyang et al., (2018) established in their study that 50% of the stroke survivors with a functional impairment which could result in disability in deprived rural Southern China had low-income levels. Out of the 425-cohort group interviewed, 52.7% of the respondents were living beyond the poverty benchmark set by the local authorities in Southern China. The results were significant at the 95% confidence level. Ouyang et al.,

(2018) explained that most of the rural societies could not afford to neuroimage for stroke diagnosis compared to the rich who have the financial willpower to do so (Ouyang et al., 2018). In some circumstances, Ouyang et al., (2018) explained that the poor cut down medical expenses to avoid increasing expenditure by attending low-cost village clinics lacking equipment instead of well-equipped town clinics with functional and well-maintained equipment.

Ouyang et al., (2018) explained that the disparity in the results between low-income groups and the high-income groups concerning stroke recovery could not be explained by demographic characteristics, differential distribution of risk factors or unequal access to health care since these data were captured for the study. In their view, the disparity can be attributed to the severity of stroke as a factor nor investigated the relationship between stroke recovery and socioeconomic status (SES) nor the impact of stroke on the average family income due to the high medical costs associated to stroke treatment, which the study did not consider.

Song et al. (2017) established that ischemic stroke survivors with low-income levels experience poorer functional outcome than those with high-income levels. The study revealed that the functional outcome disparity is widened even among persons with low education and manually intensive occupations after three (3) month of stroke. Out of the 11,226 patients sampled for the study, 5.3% had mRS score of 5, 11.3% scored 4, 11.1% scored 3, 14.4% scored 2, 34.2% scored 1 and 23.7% scored 0. Those with higher mRS score were low-income groups, and the results were not significant contrary to the results of Ouyang et al., (2018). Those with less education and labor-intensive work

scored high significant mRS score compared those with high education and less labor-intensive work. It means that less education level and type of work were high-risk factors in acute stroke recovery than income.

The Methodology of Stroke and Socioeconomic Status Research

Bettger et al. (2014) used an Adherence Evaluation After Ischemic (AVAIL) longitudinal study among 1965 Ischemic stroke patients with functional outcomes after three (3) months. Data was collected from 106 hospitals with ischemic stroke patients who were eighteen (18) years and above. Using a modified ranking scale of 3 -5, information on educational status, employment status, disability, stroke status, and income status were collected. Patients with low-income levels were those who reported that their income s was not up to par with their fundamental Medicare needs and were considered to have low socioeconomic status. The data were analyzed using multivariate logistic regression (Bettger et al., 2014).

Putman et al. (2007) conducted a study among 419 stroke patients who were selected cross 6 SRU in four 4 countries in Europe, namely, Belgium, Germany, UK, and Switzerland. To ensure uniformity, data on education level, household structure, and monthly household income, as well as longevity of stay at the SRU were collected in a structured interview at the point of discharge. The BI and RMA were used to examine the motor and functional outcome of the patients during admission, at discharge and six (6) months after discharge. The educational status of the patients was altered to the International Standard Classification of Education (ICED). A status score of 0-2 was classified as lower secondary level whiles classification of 3, and above was categorized

as upper secondary level or higher (Putman et al., 2007). This means that patients with lower secondary level education were patients who attained compulsory education whiles those with upper secondary level or higher were those who attained tertiary level (i.e., bachelor, masters and doctoral degrees) education.

Income was measured based on the OECD modified scale with 3 categories, which are low, moderate and high-income levels determined based on the respective median national equivalent income for each country, Belgium, UK, Switzerland and Germany. The poor with a high risk of poverty had a national equivalent income of 23, 23, 24 and 25, respectively. The countries all had a uniform classification for upper limit low income which is 26 to 60%; moderate income level was classified at 60% - 120% whiles high-income level was classified with the median national equivalent income of 120% and above. The data were analyzed using cumulative odds ratios (OR), which measured the variances in recovery based educational status and income groups (Putman et al., 2007).

Egan et al. (2015) conducted the cohort study among 67 stroke patients who received acute care and discharged to the English and French-speaking communities in the Ottawa city, Canada – non-institutional setting. The communities had at least FIM™ scores 3 for comprehension, memory and problem-solving. Data collected for the cohort study were the date of birth, type, and severity of stroke as well as the part of body affected by the stroke and the median family income for the neighborhood based on 2006 census. The patients' level of participation in the neighborhood or community after 6, 9, 8, 12 and 24 months of discharge from the SRU was measured using RLNI. The income

level of the community was estimated based on the Canadian Median Family Income, and those with 20,000 Canadian Dollar Median Family income was considered very low-income communities. Out of the 67 stroke patients, only 6, representing 9%, resided in very low-income communities.

Trygged, Ahacic, and Kareholt (2011) conducted a cohort study among 7,081 stroke survivors who were discharged from the SRU between 1996 and 2000 in Sweden. The medical records were reviewed, and data on sex, age, duration of hospitalization, and stroke type were collected. Data on education and income levels were collected from the national census register. The link between a return to work and income and education was established using discrete-time hazard regression with time-varying baseline. Initially, 11,864 stroke survivors were recruited for the study, but 4,783 survivors were excluded from the study due to missing income levels before a stroke, income earnings less than €6,600 per annum prior to stroke, missing income level after stroke, missing information on education, the death of a patient at the hospital. These were excluded to ensure uniformity in data and ensure the relative objectivity and reliability of the study results.

Ouyang et al., (2018) conducted a cross-sectional study of 425 stroke survivors in deprived rural Southern China who were clinically diagnosed with a stroke. Data for the study was collected using the structured questionnaire in a door-to-door interview and Guangdong Province registry covering the period August 2014 to March 2015. Using a modified ranking scale of 3 – 5, the data collected were analyzed using univariate and

multivariate logistic regression to establish the relationship between SES and self-reported average family income and functional impairment.

Song et al. (2017) collected data from the China National Stroke Registry and analyzed it using ordinal logistic regression. The data which included both demographic and clinical characteristics such as age, sex, stroke type, and mRS to measure the functional outcome after 3 months follow-up were sampled among 11,226 consecutive patients with acute cerebrovascular events during the period September 2007 to August 2008.

The Implication of Past Research and Its Influence on This Study

Considering previous research on stroke recovery, it is evident that stroke recovery is influenced by the knowledge of the risk factors, such as hypertension, lack of physical activity and obesity that contribute to stroke ailment (Sarfo et al., 2014) and the lack of skills and equipment to enhance stroke recovery (Baatiema et al., 2017). Besides, the social status of stroke patients, such as marital status, relationship breaks, and unemployment, has a significant influence on stroke recovery among patients. It implies that in order to reduce the high stroke-related mortality and morbidity in Ghana as revealed by Agyeman et al. (2017) and Sarfo et al. (2014), it is important to increase awareness of the risk factors for contracting stroke and risk factors that impedes stroke recovery, thus making it high priority primary health care issue. It is important to improve the skills of health professionals in stroke management as well as the equipment that facilitate stroke recovery as revealed by Baetiema et al. (2017).

Critical analysis of the findings of the abovementioned studies indicates that the role of income status in contributing to stroke recovery is not explicitly evident; although Baetima et al. (2017) revealed that financial constraints are a key barrier to accessing optimum health care by acute stroke patients. Therefore, this study intends to investigate the role of income status in stroke recovery, mainly, from the perspective of the stroke patient, which was the limitation of Baetima et al. The results from the study conducted by Baetima et al. was from the perspective of health professionals and community health workers. Given this, Baetima et al. influenced the scope of the present study by focussing on stroke patients and their income levels in stroke recovery processes.

Furthermore, the qualitative research methods employed by Baetima et al. (2017) has influenced the research method for the present study. Similar to Baetima et al., the present study will be modeled as a qualitative research method whereby data will be analyzed based on themes. This is unique from previous studies by authors (Bettger et al. (2014); Egan et al. (2015); Putman et al. (2007); Song et al. (2017); Trygged et al. (2011) on socioeconomic status and stroke recovery which quantitative research techniques of univariate and multivariate logistic regression were utilized. It implies that the present study validates the results of the studies mentioned above as reviewed in the sections above (Trygged, Ahacic, & Kareholt 2011).

The above studies on socioeconomic status and stroke recovery revealed that social and environmental factors influenced stroke recovery. These studies were modeled after the Dahlgren-Whitehead Rainbow Model and the Ecological Model as clearly as in Bambra et al. (2009), which established a positive relationship between socioeconomic

inequalities and health outcome. Barral et al. (2013) propounded that the environment, working conditions and income of individuals recovering from a stroke have a high influence on the pace of recovery respectively. Again, the use of qualitative research method influences the uniqueness of the present study since Bambra et al. (2009) and Barral et al. (2013) used quantitative research methods and stated that the social aspect of socioeconomic status and stroke recovery need to be studied further.

Summary

This chapter reviewed literature related to stroke recovery and socioeconomic status in both Ghana and other areas of the world. It began by discussing the stroke demographic trends in Ghana which revealed that stroke is prevalent among young adults aged 40 – 65 years averagely. The sex distribution provided inconclusive results since in large sample size; stroke was more prevalent among males whiles it was prevalent among females in a small sample size. However, there is conclusive evidence that hypertension is a high-risk factor for stroke disease in Ghana.

Afterward, the discussion focused on income and health determinant theories of the Dahlgren-Whitehead rainbow model and the Ecological model which both reiterated that health inequalities could be attributed to the socio-economic status of an individual and the environmental risk factors, respectively. These models were related to stroke recovery outcomes. Previous research has concluded that persons with high-income levels with stroke cases have high recovery outcomes compared to persons with low-income levels (Putman et al., 2007). This conclusion was evident in communities with high-income levels and low-income levels. Apart from income, education influences

stroke recovery outcomes and those with high income stand a better chance of gaining a quality education. It must be noted that most of the studies reviewed did not explicitly use the Dahlgren-Whitehead rainbow model, but the concept of socioeconomic status and health inequality was widely used, thus evidencing the concept of health social inequality as characterized by the model

Further, a review of the literature indicated that the use of the ecological model had been evidenced in studies related to nutrition and physical activity, but previous research which was modeled after the ecological model revealed that environmental risk factors for example income earned by families influences the reduction in post-stroke depression (PSD) and enhances stroke recovery.

Moreover, the systematic review of the literature revealed that previous studies used a quantitative research method in data collection and analysis, with specific reference to the logistic regression model as the technique of analysis and never reviewed income solely and its impact on stroke recovery. It means that the focus of the present study on using qualitative research method of data collection and analysis influences the originality of this study (Baaetima et al., 2017). Hence, there is a gap in the literature concerning the effect of income on stroke recovery and attention must be drawn to enhance our understanding of this issue and information obtained can be used to design effective stroke recovery intervention programs. Chapter 3 will discuss the methodology for the study.

Chapter 3: Research Method

Introduction

In this study, I used a qualitative research method to explore the effects of income on stroke recovery in Ghana and the role public health leaders can play in throwing light on this issue. The study is necessitated by the lack of clear evidence on the role of income in stroke recovery in Ghana, although the relationship between income and stroke recovery has been established in the United States and other developed countries (Baatiema et al., 2017). Baatiema et al. (2017) indicated that income determines the functional outcomes among stroke patients since most stroke patients are not able to access optimal stroke care in Ghana due to financial constraints (Baatiema et al., 2017). This is becoming a public health dilemma because little is known about the public health perspective associated with the effect of income on stroke recovery (Baatiema et al., 2017). In this study, income was not the only factor to be considered. I focused on how the interaction of income with the environment influences stroke recovery. A review of the literature has revealed that income status affects the place of residence and access to adequate health care (Brenner, 2010) as well as diet (Golden & Earp, 2012), thus reiterating the significance of ecological factors on health outcomes, including stroke recovery.

This chapter provided a detailed methodology of the study by outlining the systematic and logical presentation of the processes undertaken to answer the research questions (Rajasekar, Philominathan, & Chinnathambi, 2006). According to Rajasekar et al. (2006), research methodology is the systematic procedure through which the

researcher solves the research problem, thus outlining the work plan of the study. The research methodology involves the research design, which is the rationale for the research method, the methods of data collection and analysis, and the limitations of the study (William, 2007). Therefore, this chapter included the research design and the research methods, including an explanation of the approaches to data collection, particularly sample and sampling techniques, and data analysis. Moreover, the reliability and originality of the study were elaborated further. I also explained ethical considerations to protect the identity of the respondents in this chapter.

Research Design

Research design is defined as the process involved in framing the research questions and collecting, analyzing, interpreting, and reporting data (DeVaus, 2001). According to DeVaus (2001), the research design is the blueprint that outlines the processes of data collection, analysis, and dissemination of the results in line with the research questions. The purpose of the research design was to ensure that the results of the study answer the research questions undoubtedly (DeVaus, 2001). The above allowed me to test the theories of the study proposed by the research questions. The research questions (RQs) for this study are as follows:

- RQ1: How do stroke patients describe how income impacts a patient's exposure to environmental risk?
- RQ2: How do stroke patients describe how income impacts a patient's neighborhood deprivation and physical activity

- RQ3: How do stroke patients describe how income impacts the environmental risk factors and increases the likelihood of stroke recovery?
- RQ4: How do stroke patients describe how income impacts accessing quality stroke care?

The goal of this study, as can be seen from the themes of the above questions, was to describe the experiences of stroke survivors in stroke management, in particular, the influence of income on stroke recovery and lifestyle decisions of stroke survivors. The study's design can be noted as descriptive (DeVaus, 2001). According to DeVaus (2001), the purpose of a descriptive research design is to describe a phenomenon, answering the question "what is going on?" as compared to explanatory research, which answers the question "why is it going on?" to explain the phenomenon; thus, descriptive and explanatory are the two basic styles of research questions. DeVaus reiterated that a good description of a phenomenon provokes the question *why* to enable inference of relationships and generalization of results. This can only be achieved through periods of interview sessions to understand and interpret issues arising from the phenomenon or situations under study (William, 2007). For example, to understand the extent to which income levels influence an individual's interaction with the environment and subsequently stroke recovery, it was imperative to engage respondents in long periods (1-2 hours) of interview to describe the events in stroke recovery and explain the role that income plays.

Nonetheless, it was not sufficient to describe the research design as descriptive, considering the explanations of DeVaus (2001), because the study aimed to understand

the issue of income and stroke recovery from the perspective of stroke survivors to unearth their perceptions, beliefs, and actual experiences in stroke recovery. The study then becomes more phenomenological (Rudestam & Newton, 2015; Salazar, Crosby, & DiClemente, 2015; William, 2007) in nature instead of a mere descriptive study. According to Salazar et al. (2015), Rudestam and Newton (2015), and William (2007) phenomenological approach intends to understand the concept of income and stroke recovery from the perspectives of stroke survivors based on their perceptions, beliefs and actual experiences. Therefore, it is more appropriate to describe the research design for this study as phenomenological instead of descriptive, considering the influence of the research design in framing the research questions stated above and, subsequently, the methods of data collection, analysis, interpretation, and dissemination.

Research Method

Research method refers to the approach used in collecting and analyzing data (DeVaus, 2001; Rajasekar et al., 2006). This is different from the research design, which defines the logic, structure, or nature of the study since it solely defines the approaches to collecting and analyzing data to answer the research questions (DeVaus, 2001). According to DeVaus (2001), how data is collected is not important to the logical structure of the study since any data collection approach used for any research design. However, DeVaus (2001) reiterated that it is imperative to distinguish between the research design and research methods, which can lead to inadequate evaluation of the results, thus leading to unclear conclusions drawn which is not in alignment to the research problem and questions. In other words, although the research design has nothing

to do with the method of data collection and analysis, the research method ought to be linked to the research design to ensure the research questions are answered clearly and undoubtedly. According to Salazar et al. (2015), both the research design and research method should help reduce risk and boost protection to improve public health outcome since that is the overarching goal of public health promotion research. Both the research design and research methods should help to enhance the understanding of stroke recovery risks and protective factors among stroke survivors (Salazar et al., 2015)

Considering the phenomenological nature of the study, the appropriate approach I used for collecting and analyzing the research data was qualitative, since it required the participative interaction with respondents using interviews and observation, thus unearthing the perceptions and beliefs of respondents based on actual life experiences (William, 2007). This made the qualitative method a textual approach to data collection and analysis compared to the numerical approach characterized by the quantitative method of research (William, 2007). A qualitative research method involves the use of semi-structured interviews using open-ended questions, which allows the respondents to provide clarifications that provide different answers (Reja, Manfreda, Hlebec, & Vehowor, 2003). My choice of qualitative research method for the study was therefore due to its ability to provide rich actual life experience in stroke recovery and the extent to which income influences functional independence among survivors. Also, I analyzed the data collected based on inductive reasoning (see William, 2007), linking the observative experience of the research to the theoretical models (see DeVaus, 2001) explained in Chapter 2, that is, the Dahlgren-Whitehead model and ecological model.

The Role of the Researcher

The qualitative nature of this research required me to conduct a series of interviews with stroke survivors to provide actual life experiences on the extent to which income level influence functional stroke independence (i.e., stroke recovery) in Accra, Ghana. In this qualitative research, the interview was semi-structured with open-ended questions, which allowed the respondents to give in-depth elaborations, as opposed to close-ended questions related to quantitative research, which restrict the respondents to provide exact answers without any elaborations (Fink, 2000; Sutton & Austin, 2015). In such interviews, the role of the researcher is critical since semi-structured interviews require interaction between the interviewer and the interviewee (Fink, 2000).

According to Fink (2000), a semistructured interview requires both verbal and non-verbal interaction between the interviewer and interviewee to provide critical explanations on the subject under study. The use of both verbal and non-verbal communication ensured that I would be reflexive so that their idiosyncrasies influenced the objectivity of the study results (Sutton & Austin, 2015). According to Sutton and Austin (2015) the subjective opinion and views of the respondents before and during qualitative research or phenomenological study process is intrinsically unavoidable; however, my views were carefully articulated to deepen understanding of the respondents' experience, thus, influencing the objectivity of the results or findings. Sutton and Austin (2015) further elaborated that the researcher's views; therefore, my view ought to be stated upfront because the results already reflect the subjective opinions of the respondents' life experiences. The purpose is that my role in collating and

interpreting data in this qualitative research was very critical since it helped to understand the complex experiences of the respondents (Sutton and Austin, 2015; Xu & Storr, 2012).

Based on the assertion of both Sutton and Austin (2015), my idiosyncrasies influenced the results of the study. My role of the researcher was considered as a participant-observer since I interpreted data together with the respondent on the field by agreeing to some implications of the responses by asking follow-up questions whiles taking notes and observing bodily language (Xu & Storr, 2012). According to Xu and Storr (2012), the interview process is not a mere conversation but a process of building good rapport and relationships to create stories using probes, silence, and follow-up questions. This addresses the challenge revealed by Bahrami, Soleimani, Yaghoobzadeh, & Ranjbar (2016) that creating an ambiance for effective communication through asking the right questions is a critical factor in considering the role of the researcher during semi-structured interviews.

In addition to being a participant-observer before and during the interview process, the researcher is also viewed as the instrument of research (Bahrami et al., 2016) (Barret, 2007). Bahrami et al. (2016) opined that the back and forth interpretive process involved in qualitative research or semi-structured interview through probes and follow-up questions makes me an instrument of research. Barret (2007) added that the role of the researcher as the instrument of research emerges from the use of intuitive knowledge and skills to transform the raw data into codes and themes that provide contextual analysis of issues arising from the interview or research. In this stead, I became the channel of discovery and explanation of meanings (Josselson, Lieblich, and McAdams, 2003 as cited

in Barrett, 2007). This moves away from the rule of the thumb and structure analysis and interpretations associated with quantitative research (Bahrami et al., 2016).

Study Population

Study population refers to the total number of units of analysis of similar characteristics or features (Banerjee & Chaudhury, 2010). According to Banerjee and Chaudhury (2010), population can be defined as the entire group of persons or objects of which information is collected and analyzed for a study. Banerjee and Chaudhury (2010) state that the choice of the population of a study should be linked to the research questions or objectives and be defined in a location and a group with similar beliefs. Considering the research questions stated above, the population of the study was defined by geographical location, which was the members of Stroke Association Support Network – Ghana (SASNET-GH), a not-for-profit organization focused on preventing stroke and providing support to stroke patients, caregivers and families. They work closely with Ghana Health Service and World Health Organization and other stakeholders both locally and internationally to ensure stroke prevention, treatment and rehabilitation through advocacy and educational campaigns across Ghana. SASNET-GH has registered stroke survivors at least in each of the 10 regions in Ghana to advocate for quality stroke treatment for stroke patients and create awareness of its risk factors for preventive purposes.

I chose the population due to ease in identifying stroke survivors instead of moving to the hospitals which may not have any reliable contacts with stroke survivors, thus making data collection reliable and less expensive. The justification for choosing Accra, the

capital city of Ghana is because, according to the World Health Organization Data on Urban Growth, many Lower Middle-Income Countries (LMIC) such as Ghana are expected to have major growth among the urban population (WHO, 2017). This, in effect leads to considerable challenges for governments and health care providers to keep up to pace and develop their social services and health care as these regions grow. It must be noted that Ghana Health Service has in recent times acknowledged and appreciated network groups such as SASNET-GH in its health promotion advocacy and educational/outreach campaigns due to its ability to provide testimony on the risk factors, treatment, and preventive services for stroke.

Sample and Sample Size

Sample refers to the subset of the population that is selected for the study since it is impossible to reach out to all the members of the population (Banerjee & Chaudhury, 2010; Salaria, 2012). According to Salaria (2012), a sample is a group chosen to provide information about the population since it is practically impossible to reach the entire population. Thus, the sample I chose was to ensure that the results of the study can be inferred and generalized onto the population. However, inference and generalization are not possible in qualitative research or a phenomenological study such as this since the sample size cannot generate defensible results and more particularly, the actual experiences of the respondents are different to each other (William, 2007). Therefore, the results of the study was peculiar and distinct of the actual life experiences of the respondents.

Since generalization is not the hallmark of qualitative research, it is imperative that I chose a small sample size that provided significant information on the relationship between income, ecology and stroke recovery in Ghana (Dworkin, 2012). According to Dworkin (2012), the sample size for qualitative research is usually small since it is not concerned with generalizations and testing of hypothesis associated with quantitative research but focused on the phenomenon of the study. It means that the sample size was determined by the quality of information available, which is usually, referred to as the saturated information (Dworkin, 2012; Boddy, 2016; Malterud, Sierma, & Guassora, 2016), thus determining the priori sample size was not encouraged (Sim, Saunders, Waterfield, & Kingstone, 2018). Saturated information is defined as the data collection process where new information has become non-existent or ample data has been collected to provide a detailed analysis (Dworkin, 2012).

Nonetheless, studies have revealed that the sample size for saturated information for qualitative research should not be more than 12 (Boddy, 2016), but this is defined as a homogenous response. In cases where the response is heterogeneous Dworkin (2012) has recommended for a minimum sample size of between 25 and 30; however, this minimum sample size is defined for grounded theory studies, which is focused on developing and building theories, this was not be considered for this study. For a phenomenological study where the interview is to unearth the actual life experiences of stroke survivors and to understand the role or effects of income on the stroke recovery process, the study would want to adopt the minimum sample size of 20 respondents since a homogenous response is expected. Also, the minimum sample size of 15 was chosen due to the analysis strategy

which was based on developing codes and themes for analysis (Malterud et al., 2016). According to Malterud, et al. (2016) the sample size to provide adequate information power for qualitative research should be influenced by the aim of the study and analysis strategy. Other factors mentioned by Malterud et al. (2016) are quality dialogue, sample specificity and use of established theory. Although Sim et al. (2018) argued that it is inherently problematic to determine the priori sample size, Sim et al. were emphatic that a priori sample size could be determined if the analysis is focused on themes, thus, further justifying the minimum sample size of 12 for the current study.

Sampling Strategy

Sampling strategy refers to the techniques used in selecting the respondents for the study (Banerjee & Chaudhury, 2010). For this study, I used purposive sampling technique in selecting respondents since the respondents were mainly stroke survivors who could provide information to help achieve the study objectives (Anum, 2016). According to Anum (2016), judgmental or purposive sampling techniques involves respondents who have significant information that can help achieve the research aims and objectives. More importantly, my choice of the respondents was influenced by the fact that their background related to the objectives of the study (i.e., they were stroke survivors) and they could easily relate to the extent to which income influenced their functional independence or recovery.

Recruitment

The respondents who participated in the study were recruited in Accra, the capital city of Ghana. They were members of SASNET-GH who resided in Accra. Therefore, the

rapport which was developed with the national coordinators was replicated at the regional level. Building rapport with individual participants through effective interaction as pertained to phenomenological study was widely used (William, 2007). During the recruitment process, my role as the participant-observer and research instrument as explained above ensured that participation was not based on compulsion or coercion but rather voluntary. As a result, 15 individual one on interviews was done. The recruitment process is as follows:

- SASNET-GH was identified by the researcher during a google search to find out if there is a stroke society in Ghana, similar to the diabetic society. A letter was mailed, emailed and faxed to the president of the organization informing them about my desire to work with them and I requested a response indicating their willingness to assist in any way they could, and the organization sent feedback on their willingness to assist in whatever way they could once I was ready.
- The President of the network was contacted to introduce the study.
- Moreover, a formal letter was sent explaining the study, and during the first meeting with the President, Walden IRB Approval was presented to assure the network that the study was purely academic, and the confidentiality of the information provided.
- I was invited to the group's monthly meeting sessions which comprised of the president, program coordinators, medical directors and health care providers

during which the members were briefed about the study and were given some flyers to distribute to prospective participants.

- A formal letter was requested from SASNET-GH to indicate their consent for me to undertake the study using participants from their network. Each of the participant or the respondent was made to sign the Walden University Institutional Review Board consent and approval form.

Pilot Study

Prior to the actual data collection process, a pilot study was done with 5 participants who were also members of SASNET-GH. The duration was for 1 week. The main aim of the pilot study was to provide valuable insight into the main study and to identify if any modifications to the study where needed. The results of the pilot study revealed that; the recruitment process had to be evaluated since some Ghanaian cultures presume that Stroke is a punishment from the gods hence are not comfortable coming out to discuss their recovery process. Hence, the flyers were distributed 2 consecutive times at SASNET-GH meetings in order to reach a broader audience.

Inclusion Criteria

The participants were 40 years and older and signed the consent form. The age selection criterion was influenced by the Agyeman et al. (2017) and Sarfo et al. (2014) which indicated that most stroke cases are recorded among middle-aged persons within the range of 40 – 65 years. They resided in the Greater Accra region of Ghana and were willing to declare their family income and give a brief background of their living conditions. The participant must have suffered a stroke in the past three years and have

regained functional independence and returned to some normal lifestyle as considered in Egan et al. (2015). The narrow time span was chosen since it is assumed that such persons have memories that are still fresh and can recall life experiences that can influence the achievement of the study objectives. The participants were able to communicate fluently in the English language. English language was chosen as the language for this study. Even though Ghana is a multilingual country, English language is the lingua franca in Ghana. Accra, where the study was conducted, is a melting pot of different cultures and languages and Accra serves as the major point of commercial activities attracting people from all over the nation with a population of about 5 million, making it the 11thlargest metro area in Africa. Exclusion criteria were those who still needed intense rehabilitation and are not in a steady-state.

Further, inclusion in the study was based on income levels. In Ghana, households with a minimum household expenditure of GH₵1,314 per year is considered poor based on the Ghana Living Standard Survey (GLSS 2005-2017). Households with a minimum expenditure above GH₵1,314 per year is deemed to be rich. Therefore, respondents with a minimum household expenditure of GH₵1,314 and above were considered for the study.

Data Collection and Management

I collected data for the study from a primary source using the semi-structured interview in the form of face to face interviews in line with phenomenological study and qualitative research method as described above. The duration of the conversational and interactive sessions with the respondents was more than one (1) hour due to the need to

uncover significant information on income levels and its effects on stroke recovery in Ghana. The duration for data collection lasted for 40 days. The interaction and conversational sessions began with questions such as “what are your experiences with the stroke ailments?”, “What are stages of stroke recovery you encountered?” and “What role does income play in each of the stroke recovery stages?” These questions were expected to unrestraint the respondent telling their story (Reja et al., 2003). Although Reja et al. (2003) admitted that open-ended questions could liberate the respondent in providing unlimited information, the authors also admitted that it could provide inadequate information, thus, encouraged researchers to choose the wordings of the questions that provide significant information relevant to the study. Also, to satisfy the saturated information point mentioned above, probing and follow-up questions were employed. This indicated the attentiveness of the interviewer to the interview process, thus encouraged the interviewee to share more meaningful information aimed at answering the research questions (Xu & Storr, 2012). According to Xu and Storr (2012), the ability to generate substantial or quality information relevant to the study depends on the interviewing skills of the interviewer such as probing and follow-up questions.

Another technique which I used to generate information during the interviews was the creation of an ambiance for conversation and interaction, which is known as the naturalistic setting (Xu & Storr, 2012). The naturalistic setting was a familiar environment which aided the respondents to feel relaxed and not be under duress. The participants were allowed to give their opinion on an appropriate location where they would be more comfortable to have the interview. This extended to the use of appropriate

language, particularly, the use of the English language, showing attention to details and sustaining a novice attitude (Xu & Storr, 2012). According to Xu and Storr (2012), these settings contribute to relevant information to answer the research questions.

I recorded the data collection in field notes and audiotapes. The interactions were noted in field notes to provide me with first-hand information to aid analysis. The audiotapes were also used to enable me recall to enhance further understanding of the issues which helped in the data analysis (Sutton & Austin, 2015). According to Sutton and Austin (2015), field notes and audiotapes complement each other. Additionally, the field notes helped me to remember the non-verbal cues and impressions of the interaction. The audiotapes enabled me to recall the exact words related to verbal cues and perceptions. Thus the audiotapes were used as tools for data verification outside the interview setting (Xu & Storr, 2012). I carefully labeled the data for storage purposes which will be at Walden University's disposal until five (5) years after which it can be destroyed in line with the data storage ethics used by Walden University guideline for data handling (Walden University, 2010). Furthermore, participants were informed that they could exit the study any time without any consequences. I also provided them with my information to contact me with any questions, concerns or summary of the findings.

Data Analysis

Data analysis is the process of developing the contextual understanding of the effects of income on stroke recovery using coding and indexing (Boateng, Hinson, Galadima, & Olumide, 2014; Sutton & Austin, 2015). According to Sutton and Austin

(2015), data analysis in qualitative research involves contextual understanding since the researcher echoes the retrospective life experiences to others to learn through transcribing and discussion. This was done by ascertaining discrepancies and uniformities related to the research propositions by coding and themes indexation (Boateng et al.,2014). The analysis was aided by Nvivo 12 computer software which provided an automated theme from the audiotapes efficiently.

Given this, the interactions with respondents were transcribed to identify codes related to the study. For this study three main codes, namely, income, environment, and stroke recovery were predetermined and identified. These codes were identified manually without using software since coding manually helps the researcher to be mechanically involved in the research process such that the research objectives are related to the findings and supported or refuted by literature (Xu & Storr, 2012). According to Xu and Storr (2012), this puts the researcher constantly in a reflective mood to ensure that the exact words of the respondent are communicated to their audience. This helped me to examine the responses based on their idiosyncrasies, so the results of the study were contextualized appropriately by the audience/readers (Sutton and Austin, 2015).

Out of these three (3) codes, namely, income, environment, and stroke recovery, themes and sub-themes were identified and discussed to establish the link between these codes. Thus, the theoretical views of the study were critically elaborated (Sutton and Austin, 2015).

Trustworthiness

Trustworthiness in qualitative research refers to the processes of verifying and validating the value of the findings or results of the study (Sinkovics, Penz, & Ghauri, 2008). According to Sinkovics et al., (2008) trustworthiness in qualitative research is imperative due to the difference in response patterns among the respondents arising from the open-ended questions, the interview setting and contextual explanations from data interpretation. Trustworthiness, according to Sinkovics et al. (2008), begins from the definition of the problem to data collection through to data preparation and data analysis since the process involved in defining the research problem, collecting, preparing and analyzing data to solve the problem is not the same across cultural borders. Therefore, it is imperative to continually validate the value of the findings or the process of the research to influence its reliability and objectivity. Trustworthiness was examined based on Guba's four (4) construct criteria, namely, credibility, transferability, dependability, and confirmability (Shenton, 2004).

Credibility

Credibility as a measure of trustworthiness is sought to measure the internal validity of the findings (Sinkovics et al., 2008; Shenton, 2004). According to Sinkovics, et al. (2008) and Shenton (2004) internal validity means that the findings of the study represent the real situations or actual experiences related to stroke recovery in Ghana. The credibility of the study is, therefore inherent in the research method adopted for the study, which is a qualitative research approach. Qualitative research as discussed above deploys semi-structured interview to collect and analyze data. In such a study the ability

to gather the intended information is driven by good interview skills facilitated by the right questions (Shenton, 2004). According to Shenton (2004), the internal validity of a study is measured by the use of appropriate questions to gather and analyze data, thus revealing the actual real experiences of the respondents.

To combat internal validity issues and establish credibility, I conducted member checking to determine the accuracy of the collected data. I had a follow-up interview with the participants to ensure that what they stated and what I recorded and took in as field notes were in agreement. Another strategy was to clarify any bias that could be introduced into the study by stating that the interpretation of my finding was not based on my culture, gender, history or my socioeconomic status and background. Another method I used to establish internal validity was using a peer review auditor. This was the vice president of the Stroke Foundation Network since he was an external auditor, he provided me with objective views and assessment, the framing of questions, how accurate the transcriptions were, and this eventually provided some credibility to the study.

Transferability

Transferability refers to the ability to use the findings of the study in other settings or contexts, without necessarily generalizing the results of the study to the entire population of stroke survivors in Ghana and around the globe (Shetton, 2004). To ensure the results are transferable, a description of the number of respondents used for the study was provided, the duration of the interview sessions and type of questions deployed was also provided. According to Shetton (2004), the essence of such descriptions is to ensure that stroke survivors in other areas of Ghana other than Accra and other geographical

settings will be able to relate to the findings of the study, thus ensuring the external validity of the study results/findings. For example, the respondents of the study were selected persons from SASNET-Ghana which was established with motivation from the stroke survivors' society in the UK. Therefore, stroke survivors in the UK should relate to the findings. It means that the results reflected their actual real experiences in stroke recovery and the role of income in the recovery process.

Confirmability

Confirmability refers to the ability to ensure that findings of the study reflect the actual experiences of the respondents whiles the personal idiosyncrasies of the researcher is subdued, thus reflecting the tenets of qualitative research (Shenton, 2004). According to Shenton (2004), confirmability ensures that the theoretical assumptions comply with related qualitative research. The theoretical assumptions of qualitative research approach require that the findings should represent the subjective opinion and views of the respondents on the extent to which income played a significant role in the stroke recovery process. Thus, although the personal idiosyncrasies of the researcher may enhance the understanding of the phenomenon, it was eradicated using follow-up questions. It means that any perceived implications of the actual experiences which were narrated and verified with the respondents to ensure that the respondent's subjective views and opinions were presented at all times (Shenton, 2004).

Dependability

Dependability refers to the ability of the study to produce the same results if it is replicated with the same respondents in the same naturalistic settings, thus, ensuring the reliability and objectivity of the study (Sinkovics et al., 2008; Shenton, 2004). One mechanism was to review the research process with the respondents, particularly, the process of coding and developing themes to ensure that the significant information on income and stroke recovery was captured by the research study (Sinkovics et al., 2008). Another mechanism which was used to provide an overview of the research process, from the choice of the research design, research method, process of data collection and analysis to ensure replicability, thus making the current study a prototype (Shenton, 2004, Sinkovics, et al., 2008). According to Shenton (2004) and Sinkovics et al. (2008), providing a brief report on the research process gives a positive experience for the researcher during the study to aid future researchers.

Ethical procedures

To ensure that the study meets ethical standards in research, the study obtained an IRB approval from Walden University to ensure that SASNET-GH provided me with the utmost cooperation to collect data among its members. Each respondent signed the consent form before participating to indicate their voluntary participation. The participants were given a 10 USD ($) incentive as appreciation for their time and willingness to attend the interview. It was further explained to them that their signature

on the form indicates that they understand the information presented and that they may withdraw from the study at any time. The consent form assured the respondents that their opinions and views were held with maximum confidentiality since it will be used for academic purposes and will not be for public consumption. Given this, the field notes and audiotapes will be kept under lock for five (5) years and destroyed afterward, according to Walden University data storage guidelines. All transcribed interviews were coded by me and any information that identified participants were removed from the transcripts prior to validation. No harm was done to any participant and they were informed that they would be referred to the nearest local facility for counseling in case the need arises.

Summary

The chapter represented the research methodology of the study, which described the systematic procedure that guided data collection and analysis to answer the research questions. The section described the research design of the study, which is phenomenological since it involved the gathering of actual real-life experiences of stroke survivors who elaborated the extent to which income levels influenced the stroke recovery process. The chapter further indicated that a qualitative research method was employed to collect and analyze data which was full of interaction and observation. It means that a semi-structured interview, in the form of crucial information interview was deployed as the data tool. Data was analyzed using coding and the development of themes arising from the interactions with respondents. My role as the researcher and as a participant-observer and instrument of research is explained. This section identified the

population of the study and explained the technique of sampling which was used to select respondents for the study. In this chapter, I also outlined the various measures of testing the trustworthiness of the study, namely, credibility, transferability, confirmability, and dependability. The next chapter will discuss the results for the outcome of the data collection process.

Chapter 4: Results

Introduction

Stroke recovery as noted in chapter one and chapter two is a public health issue due to its influence on the trends of mortality and morbidity among the stroke patients, particularly, in low-income countries (Agyeman et al., 2012; Agyemang et al., 2014; Baatiema et al., 2017A). This means that income may be a crucial factor that influences stroke recovery since the cost of treatment can be expensive to low-income earners (Song et al., 2017; Ouyang et al., 2018). Therefore, this study explored the effects of income on stroke recovery in Ghana. This chapter gathers analyses and interprets responses from 15 stroke survivors identified in Accra, Ghana. The participants responded to questions aligned to the research questions, which are as follows:

Research Question 1: How do stroke patients describe how income impacts a patient's exposure to environmental risk?

Research Question 2: How do stroke patients describe how income impacts a patient's neighborhood deprivation and physical activity?

Research Question 3: How do stroke patients describe how income impacts the environmental risk factors and increases the likelihood of stroke recovery?

Research Question 4: How do stroke patients describe how income impacts accessing quality stroke care?

The questions were posed to help understand the interplay between income and environmental risk factors in influencing stroke recovery among the stroke survivors. The

data collected was processed using Nvivo 10 software, which facilitated the analysis of data based on coded themes.

Recruitment

Recruitment of participants began after the receipt of Walden University IRB approval. Initially, the study had to group participants into 2 groups of Focus Group Discussion (FGD) comprising of eight participants each, but Walden University's Institutional Review Board rejected the video recording of Focus Group Participants due to ethical reasons. Given this, the study changed its strategy from FGD to one-on-one interview to reach out to respondents to ensure optimum information is gathered. Given this, participants were identified using purposive sampling technique, whereby the focus was on specific characteristics of the target population to assist in answering the research questions best. In addition, a recruitment flyer was distributed on behalf of the researcher by the Stroke Association Network of Ghana, and the Walden University Institutional Review Board preapproved this. Using the purposive sampling technique, 15 stroke survivors were identified and interviewed. Among the 15 participants, 1 opted out of the research due to nostalgic emotional stress that surfaced due to reminiscing the journey of the stroke ailment. All the participants were given the opportunity to select a convenient location. Some of the participants were more comfortable in their living rooms, some preferred to sit on their balcony, through it all, I ensured that their privacy was intact, and they were comfortable in their locations to provide responses which were best to their knowledge. Then responses were audio-taped to aid data analysis and interpretation as well as for storage purposes.

Variations from the Original Data Collection Plan

As noted earlier, the original idea for data collection was to have two sets of FGD with eight participants each with the SASNET-GH. However, IRB Approval was not given; hence, individual interviews with the approved questionnaire was utilized for this study. A pilot study was scheduled before the primary data collection. The sole purpose of the pilot study was to identify any potential issues as well as deficiencies in the study. The pilot study was done for me to become well versed with the processes in the protocol. Given this, 5 stroke survivors consented to be a part of the pilot study; a one-on-one interview was scheduled with the 5 stroke survivors who were members of the SASNET-GH using the purposive sampling technique. Through the results of the pilot study, I realized that most of the stroke survivors were concerned about the stigma attached to the disease. They were reassured of privacy and the voluntary nature of the study and were advised to opt-out anytime they were uneasy. Additionally, one of the survivors encountered during the pilot study was reluctant to give up his monthly income and wanted reassurance that this information will be kept private. Apart from these minor occurrences the pilot did not identify any other potential problems and the data collection continued to the final study.

The recruiting exercise was stressful and frustrating in the beginning since many survivors identified did not want to be part of the study due to the stigma associated with stroke disease in Ghana. In some Ghanaian cultures, it is believed that stroke disease is more of a spiritual attack, rather than a lifestyle disease. Those who participated in the study were informed of the purpose of the study by word of mouth and formally in writing

through the participant consent form, which was signed. Thus, their interest in the study was increased.

Inclusion criteria were that the participants spoke English fluently. However, some of the stroke survivors spoke English laden with an accent due to their frequent communication in vernacular, but they had a good command over the English language and were fluent. This was allowed since the purpose of engaging them was to create a good rapport that will drive effective communication for reliable, accurate and saturated information.

Demographic analysis

A total of 15 stroke survivors participated in the study, and the summary of the characteristics of the respondents is presented in Table 1 below

Table 1

Respondent Demographic Characteristics

Characteristics	**Male**	**Female**	**Total**
Sex	11	4	15
Age			
40 years	2	0	2
41-50 years	2	2	4
51-60	3	1	4
60+	4	1	5
Education			
Vocational Training	0	1	1
Primary Education	2	1	3
JHS/Middle School	3	0	3
Secondary	3	0	3
Tertiary	3	2	5
Years suffered from a stroke			
0 - 6 months	0	1	1

1-2 years	8	2	10
3-4 years	2	0	2
5-6 years	0	1	1
7 years	1	0	1
Years it took to recover			
6 months	3	1	4
1 year	5	2	7
2 years	1	0	1
3 years	0	0	0
4 years and above	2	1	3
Income status			
Low-income earners (≥GH₵1,314)	7	2	9
High-income earners (<GH₵1,314)	4	2	6

Note: Source: Field survey, 2019.

Table 1 above shows that a total number of 15 stroke survivors were interviewed, comprising of 11 men, representing 73.33% of the total number, and four women, representing 26.67% of the total number interviewed. The table shows that out of the total 15 respondents 2, representing 13.33%, were precisely 40 years old, four representing 26.67%, were within the age group 41-50 years, 4, representing 26.67%, were within the age group 51-60 years and 5, representing 33.33%, were within the age group 60 and above. The trend of the age distribution indicates that majority of the respondents were above the age 40 years, thus corroborating with the results of Agyeman et al., 2017, which stated that most of the persons affected by the stroke disease are middle-aged, i.e., above 40 years.

The table further indicates that most of the respondents have gained tertiary level education with the highest score of 5, representing 33.33% of the total respondents. Out of the remaining 10 respondents, 1, representing 6.67% of the total respondents, had

vocational education, 3, representing 20% of the total respondents had primary, JHS/Middle School and Secondary/High School level of education. This means that most of the respondents have attained some level of education.

The table showed that out of the total number of stroke survivors interviewed, 1, representing 6.67% of the total respondents suffered from stroke for at most six months. 10, representing 66.67% of the total respondents reached, suffered from a stroke within 1 – 2 years. Two, representing 13.33%, suffered from a stroke within 3 – 4 years, 1 each, representing 6.67% of the total respondents suffered from a stroke within 5 – 6 years and 7 years, respectively.

The table showed that out of the total number of stroke survivors interviewed, 4, representing 26.67% of the total respondents recovered from a stroke within six months. 7, representing 46.67% of the total respondents reached, recovered from a stroke within one year. One, representing 6.67% of the total respondents reached, recovered from stroke within 2 years. The remaining 3, representing 20% of the total respondents reached experienced a 7-year recovery period. This means that most of the stroke survivors reached experienced a 1-year recovery period.

The table showed that out of the total number of stroke survivors reached, 9, representing 66.67% of the respondents reached, are low-income earners with annual income less than or equal to GH₵1,314. The remaining 6, representing 33.33% of the respondents reached, are high-income earners with annual revenue of more than GH₵1,314. This means that majority of the respondents are low-income earners and are considered to be poor according to the GLSS 2017 report.

Data Processing

All respondents reached were asked to read, understand and sign the consent form on the voluntary nature of the study. The duration of the data collection process was for one month, and each interview averaged between 30 to 60 minutes. The data collected was processed manually to enable verbatim transcription. This provided accurate and reliable transcriptions. However, some of the participants had a heavy accent. Such interviews were played repeatedly to ensure the responses of the individuals are well coded in line with the themes generated by the software package. The codes generated by the software can be aligned to the four (4) research questions above. Table 4.2 below presents the themes and codes identified.

Table 4.1

Thematic area 1 – Experience of stroke	**Thematic area 2: Stroke recovery process**	**Thematic area 3: Factors influencing stroke recovery**
Nodes	Label 1- Accessing healthcare delivery	Label 1 - Income
• Numbness of the arm	***Nodes***	***Nodes***
• Inability to walk – paralyzed	• Buying bed	• Ability to access healthcare delivery
• Inability to speak	• First response - medicine	• Access to physiotherapy
• Severe headache	• Attention by healthcare providers	• Dieting
• High blood pressure	• Avoid disability	• Emotional and mental healing
• High cholesterol level	Label 2 - Buying and taking medication	Label 2 – support from family and friends
• Diabetic conditions	***Nodes***	***Nodes***
• Emotional and mental pain	• Prescribed medication	• Financial help
• Spiritual attack	• Regular taking of medicine	• Help access physiotherapy
	• Ability to speak	• Providing counseling
	• Get up from bed	• Serving meals – dieting
	Label 3 – Accessing physiotherapy	
	Nodes	

Thematic area 1 – Experience of stroke	Thematic area 2: Stroke recovery process	Thematic area 3: Factors influencing stroke recovery
	• Physical exercise • Walk • Movement of hands • Strength – stamina • Label 4 – Dieting ***Nodes*** • Leafy foods – kotonmire, ademe, gboma • Oil and fatty foods • Vegetables • Fruits • Functioning of medicine • Strength • More dry fish • Less meat and oily fish	• Buying medicine Label 2 – Environment risk exposures ***Nodes*** • Noise from quarry blast • Air pollution • Crowd • Smoke – aluminum melting, vehicular smoke

Thematic area 1 – Experience of stroke	Thematic area 2: Stroke recovery process	Thematic area 3: Factors influencing stroke recovery
	• Stroke recurrence • Eat what you are served Label 5 – emotional and psychological healing **Nodes** • Excessive thinking • Care and support • Lack of money • Not eating well	

Table of thematic areas from the interview Source: Field survey, 2019

Data Analysis

This section provides details of the data collected, and it is presented based on the themes identified above. These are experiences of stroke disease, the stroke recovery process, factors influencing the stroke recovery process, environmental risk exposures during the stroke recovery process and the influence of income on environmental risk exposures.

Thematic Area 1 – Experience of Stroke Disease

All the respondents were able to recount their experience of stroke disease. They recounted of numbness of the left or the right arm, inability to walk and speak, blurred vision, severe headache, incontinence, and weakness. According to the respondents, these experiences were very sudden since they appeared physically healthy. Thus, it is quite incomprehensible to be stricken by the disease. However, SRInGH2019 1 reiterated that he was not surprised since he has diabetes and does usually experience high blood pressure, thus was frequent at the hospital to check on his blood pressure and took medications seriously. SRInGH2019 3 recounted that her stroke experience might be attributed to eating oily foods consistently as breakfast and excessive stress of studying and working at the same time to cater to her educational needs. Although SRInGH2019 14 was stricken by the stroke disease a year after undergoing prostate cancer surgery, he could not attribute it to the stroke disease. This implies that stroke is a lifestyle disease associated with high levels of bad cholesterol, diabetes and delayed interventions as described by the World Health Organization (2015). Perhaps, those who experienced a sudden stroke could be noted to have limited knowledge on stroke risk factors and poor management of hypertension and sedentary lifestyle as pointed out by Sarfo et al. (2014).

Sarfo et al. (2014) revealed that most of the stroke cases recorded in Ghana are attributed to poor hypertension management, exiguous physical activity and obesity (mostly among the female patients).

Furthermore, due to the sudden experience, some of the respondents attributed their ailments to spiritual attack, thus, confirming the perception of stroke among Ghanaians. This strong perception influenced the recruitment of stroke survivors at the beginning of the study since most survivors did not want to be identified. In some Ghanaian cultures, they note the stroke ailment as a bad omen and not a medical condition.

Thematic Area 2 – The Stroke Recovery Process

Accessing Health Care

All the respondents revealed that the stroke recovery process begins with access to quality healthcare resources, buying and taking medications, access to physiotherapy, dieting and emotional and psychological healing. According to the respondents, mainly, those who experience recovery within six (months), the ability to recover from the stroke disease relies mostly on the ability to access immediate healthcare when the first experience occurs. SRInGH2019 1, SRInGH2019 2, SRInGH2019 3 and SRInGH2019 11 reiterated that without accessing healthcare as the first option, they would not have been able to recover from the disease. Related to this experience SRInGH2019 11 narrated

> I was working; I felt a sharp pain at my back, and I realized that I could not do anything…. I realized my talking had changed, so I told them to rush me to the hospital. They took me to a nearby clinic, and they

> provided first aid. They said there was no bed and I was still in pain. Everywhere we went they said there was no bed……. I was in the car for almost three hours until we got to Ridge Hospital and fortunately for me, someone had been taken from the emergency unit to the ward. I was given the bed, and that's when I started receiving treatment.

SRInGH2019 1 recounted his experience of accessing medical healthcare as a first option, and he narrated:

> I go for my regular checkup and collect my diabetes medicines at the SSNIT Hospital in Osu. On the 30th of December 2017, as I was en route and reached Danquah Circle, I experienced a sharp and unusual numbness in my left leg. Fortunately, I was the first patient to get to the hospital, so after collecting my diabetic medications, I saw the doctor and told him of my experience….. He asked me to do a CT Scan and that if there is anything like a stroke, it will be detected. After the scan, he prescribed a drug for me to prevent any trace of a blood clot that could cause a stroke. It was after three days of taking medicine when I started feeling hot and sweating profusely. I got paralyzed the next day, and I was rushed to the hospital again to receive treatment immediately.

From the above, it is indicative that the recovery of stroke begins with immediate access to the hospital for medical attention. Although SRInGH2019 4 mentioned that his treatment was facilitated by traditional herbs, he reiterated that accessing medical care as the first option helped in diagnosing the cause of his ailment and receiving quick medical response was very helpful. He narrated that:

> On one of my errands to the Commissioner of Oaths, I fell, and I was rushed to my post. I kept on falling off from my chair, so I was rushed to the hospital where I was informed that my high blood pressure was alarming. The doctor gave me a quick response and detained me for some hours, after which I was discharged when I stabilized. I went on to receive herbal treatment…...

This means that without accessing immediate medical attention, these stroke survivors could have died. This was reiterated by SRInGH2019 3 when she stated that "I was rushed to the hospital immediately the first sign, and the doctor noted too that I would have died if I had not been brought to the hospital since my brain was affected…"

The above statement conveys that delayed intervention is the key factor influencing stroke mortality and morbidity in Ghana, thus upholding the results of Agyeman et al. (2017) which established that delayed response increased the number of stroke-related deaths at the Komfo Anokye Hospital (KATH) and the Korle-Bu Teaching Hospital (KBTH) in the year 2015.

To conclude the interview session, SRInGH2019 3 stated that "to avoid disability, you have to go to the hospital and respond to treatment quickly," an indication that accessing healthcare as a first response to stroke helps curb the incidence of disability arising from the stroke disease, thus, ensuring functional independence hence supporting the evidence from the Stroke Aid Foundation (2017) that late report of stroke cases to the hospital accounts for disability among stroke survivors. According to the Stroke Aid Foundation (2017), reporting of a stroke late at the hospital can be attributed to spiritualizing the disease.

Buying and Taking Medicine

Another recovery process identified through the interaction with the respondents is the buying and taking of prescribed medications. All the respondents revealed that their ability to recover is due to the buyer taking the prescribed medication without fail. The respondents all stated that it is one of the recovery processes that cannot be taken for granted. SRInGH2019 3 recounted that:

> When I went to the hospital, the doctor told me that if I want rapid relief, I should buy and take the N&T medicine and another one (I think it is called aspirin). So I bought ten (10) boxes of the N&T medicine and took it, and within 13 days I was out of the bed and could walk with some assistance……

SRInGH2019 3 reiterated that without the regular intake of the prescribed medicine, there could be a lengthy recovery process and or death. The issue of the prolonged recovery process was testified by SRInGH2019 7 who narrated that:

> ……when I was admitted in Korle-Bu Hospital I was given four types of medicines….. after taking the medication, I was discharged and was asked to come for review…… I did not go for physio because I could walk with a stick……. Without taking the medication, the recovery process would have been prolonged. The above narratives are an indication that buying and taking the prescribed medication is a requisite for stroke recovery in Ghana.

Accessing physiotherapy

The interactions with all the respondents revealed that stroke recovery is not complete unless patients participate fully in physiotherapy activities both at the hospital and home. All the respondents reached except SRInGH2019 7 accessed physiotherapy at the 37 Military Hospital or the Korle Bu Teaching Hospital in Accra. SRInGH2019 1 reiterated that the key factor that influences stroke recovery is physiotherapy and without it, stroke patients may experience grave dysfunction in the legs and arms, thus, rendering the patient bedridden for a long time and prolonging the treatment and recovery process. SRInGH2019 1 narrated that:

> "When I got to Ameen Clinic, they asked me to come for physiotherapy each day, and so I was going… at the initial stage of the ailment, I could not walk nor move my hands, but the regular physiotherapy made it possible to reach this stage where I could walk and move my hands…at Ameen Clinic, they gave me some medicine and intensive physiotherapy. The full stroke treatment at the Hospital was physiotherapy and massaging and taking my prescribed medicine …."

SRInGH2019 3 narrated that:

> "At a point, I needed a private physiotherapist at home for a speedy recovery. The physiotherapy provided at the hospital was not enough. My late father devoted his time to take an early morning walk in the neighborhood…. So, when I was going to church, instead of walking, I would use the pedestrian walk even though it was risky with the speeding vehicles…. I was taking my drugs alongside the physiotherapy until I

> chose to focus on the physiotherapy solely since the medicines were costly and I could not afford them anymore".

The above narration indicates that physiotherapy is very critical in the stroke recovery process in Ghana.

Dieting

All the respondents were emphatic on the importance of dieting to the stroke recovery process. All of them said they have tried to stay away from oily and fatty foods and have instead relied so much on vegetables such as cucumber, cabbage, carrots and green foods such as kontomire, ademe, and gboma (these are local green leafy foods) with high contents of vitamins, fiber and minerals that promote good health among stroke survivors. Interaction with SRInGH2019 5 revealed that eating a balanced meal at least three times a day is very important since it helps in the functioning of the medicines in the body and helps build strength or stamina to aid physiotherapy. According to SRInGH2019 5 the recovery process can be slow when the stroke patient does not eat well or eats just one healthy diet once in a day. This means that dieting assists in hastening the recovery process and influence primarily on emotional freedom and physical strength. This was emphasized by SRInGH2019 3 by recounting that:

> "You see, I think what triggered the stroke in me was the stress of taking care of extended family members and working at the same time as well as eating waakye which is full of oil. I was eating waakye every day when I went to work. I would usually eat that for my breakfast. So when I went to the hospital, the doctor told me there are some blood clots on my brain. The doctor told me to stay away from the oily and fatty foods and focused

> on eating vegetables and fruits to help me recover fast. So I was eating vegetables more. Even right now I make sure I don't eat waakye often but once in a while because sometimes I feel for it. Abstaining from oily and fatty foods from the initial stages have been helpful".

All the respondents stated that it is strongly recommended to eat a well-balanced diet each day and stay away from oil and fatty foods to avoid the recurrence of the stroke condition. SRInGH2019 7 stated that

> "To avoid stroke recurrence and ensure quick recovery process, I think one should avoid drinking alcohol, eat more vegetables, avoid meat… they said when it is too much, it is fat. It is better to take fish, dry fish especially."

SRInGH2019 14 was earnest on the choice of food that helps in the recovery process. SRInGH2019 14 stated that:

> "When you get a stroke, you have to be watchful of what you eat. These salmon (fish), meat and oily foods are not good. So for me what I eat mostly is the dry fish and more vegetables…….to avoid stroke again, you have to check your diet seriously and don't eat everything presented to you as food.

This means both stroke patients and stroke survivors are to be careful what to eat during and after their rehabilitation process to ensure a speedy recovery and non-recurrence of stroke. This ratifies the results of Graham and White (2016) and Farhud (2015) which revealed that stroke is a lifestyle disease and the personal behavior towards dieting is critical in the stroke recovery process incongruent with the first layer of the

Dahlgren-Whitehead Rainbow Model. According to the model theory, an individual's behavior towards physical activity and diet influences the social inequalities related to healthcare delivery.

Emotional and psychological healing

Out of the 15 respondents, 2 reiterated that the recovery process included the healing of emotions and psyche. One of the participants (SRInGH2019 14) recounted emphatically that:

> "You see, the main thing that influences stroke recovery is the healing of emotions and the mind. When you have good people to take care of you, because I could not do anything for myself, you feel loved and do not think a lot. But if you don't get good people to take care of you, you will think a lot and will not be able to recover fast and well. I am just lucky; my wife was very caring and supportive, so I was able to mend my emotions quickly."

This assertion was supported by SRInGH2019 12 who narrated that:

> "When the children were going to school, I could not take care of their school fees and sometimes they were sacked to come home for non-payment of school fees (crying). This made me think a lot because I could not help them looking at my condition (crying). I think this made me sicker and weaker because I was stressed".

SRInGH2019 5 was emphatic about the emotional and psychological pain associated with stroke and expressed that:

> "You see this stroke condition brought poverty to me and made me think a lot. I had to rely on friends and families to go to the hospital, and that sent me out of gear (meaning thinking a lot) …… and this made the recovery process slow because my ego was bruised……."

This means that due to the stroke condition, most of the respondents were helpless and dependent contrary to their wish. As a result, this instantly affected their mind and emotions, thus, influencing the recovery process. As indicated above, it is quality care and support that helps to facilitate the emotional and psychological healing. Those patients who did not get good care and support from families and friends experienced a prolonged stroke recovery process.

Thematic area 3 – Factors influencing stroke recovery

Interactions with the respondents revealed four (4) major factors that affect stroke recovery, namely, income level, care, and support from family and friends and environmental risk exposures. These factors are discussed as follows:

Environment risk exposures

Out of the 15 stroke survivors reached, only 5 recounted experiences of environmental risk exposures, these are SRInGH2019 1, SRInGH2019 3, SRInGH2019 4, SRInGH2019 5, and SRInGH2019 7. RInGH2019 4 recounted a unique experience among the respondents. The place of residence is near a quarry site and any quarry blast "frightened me and increased my blood pressure," he said. This "disturbed me and prevented me from having good rest during the day, and interfered in my recovery process," he added. This confirmed the results of Sarfo et al. (2017) which established that high levels of cognitive contraction slow the stroke recovery process due to its

association to depression and hypertension among stroke patients. Arguably, if the stroke survivor were to be staying in a high-income community such as Cantonments, Spintex and or Teshie-Nungua estates, such experiences with quarry sites will not occur. The choice of the place of residence is attributable to the low-income level.

SRInGH2019 5 recounted residing in a low-belt forest area with erratic windstorms preceding rainfalls and or a rush wind during the cool of the day. In such situations, he shared that if he happens to be walking in the community, he will lose his walk balance and fall even with his aid-stick. As a result, he narrated that he could not risk participating in community events such as funerals and festivals since he could easily fall in the crowd, mainly, with a little rush of wind. Observably, the stroke survivor has a low self-rated health plan that improves his physical activity to hasten the stroke recovery process. As narrated earlier, he attributed the slow recovery process to lack of money. This means that as a low-income earner, he was exposed to environmental risk which slowed the stroke recovery process.

SRInGH2019 7 recounted that he used to work as an aluminum smelter with excessive heat and smoke and believed that the excessive smoke he inhaled contributed to him getting a stroke. The excessive smoke inhaled prolonged his stroke recovery. He expressed that:

> "Before the stroke, I was melting aluminum since 1984, and I was working hard to the amazement of everyone…… the excessive smoke I had inhaled from the aluminum work made the recovery process slow."

This means that environmental risk exposure such as smoke inhaled by a stroke survivor before getting a stroke could influence the stroke recovery process if the

damages caused by the smoke is not healed. It implies that stroke patients who may have exposure to smoke and heavy metals may need extra medical attention to repair the damages associated with the smoke inhaled and this requires money. SRInGH2019 7 revealed he exposed himself to so much smoke since his wife died eighteen (18) years ago and he needed to work hard to care for his children. This means that if SRInGH2019 7 were a high-income earner, he would not expose himself to excessive heat and smoke, which in later years influenced his stroke recovery process. However, during the period he suffered a stroke, he was not exposed to excessive smoke except smoke from vehicle exhaust pipes. He reiterated that the inhalation of smoke from cars happen mainly at vehicle traffic spots and the location of his home being near a landslide and a main highway, and during the recovery process, as he was traveling to and from the hospital. This means that his exposure to smoke was due to his low-income status.

Considering the testimonies shared by SRInGH2017 7, SRInGH2019 4 and SRInGH2019 5, the study fails to reject the proposition that:

High-income levels reduce stroke patients' exposures to environmental risk.

The finding that high-income levels reduce stroke patients' exposure to environmental risk corroborates with the results of Fairburn and Braubach (2016) and Kantrowitz (2015) that low-income earners usually live and work in places with high air pollutions and high level of noise that militate against their health.

Further, SRInGH2019 1 and SRInGH2019 3 identified residing and walking in a densely populated community as an environmental risk exposure. SRInGH2019 shared that he walks a lot despite the hilly nature of the community where he resides and did not complain of falling on any occasion but reiterated that he could only fall when someone

pushes him or walks among a crowd. As a result, he makes sure to stay away from walking in a crowded area so that he can be safe.

SRInGH2019 3 shared that recently, she walks to church instead of hailing a taxi to enable her to improve on her physical exercises but stated that this is risky since the community is highly populated with a lot of economic activities, particularly, lorry stations with teeming hawkers, vehicle commuters and pedestrians. She recounted that "I could lose my walk balance in the crowd," therefore, "I walk slowly and cautiously to maintain my balance and so I do not fall."

Both respondents did not attribute walking in the crowd as due to lack of money to hire a vehicle to their respective destinations. In their view, they willingly walk to improve their self-rated activities that could speed up the process of recovery. These testimonies lead to the rejection of the proposition which stated that: High-income level reduces stroke patients' neighborhood deprivation and increases physical activity.

This means that income level does not reduce stroke patients' neighborhood deprivation and increases physical activity. Although some of the respondents are low-income earners, they do not live in filthy communities with garbage litters, dog feces and dump electronics that discourages them from undertaking physical activities to improve their well-being contrary to the report by Fairburn and Braubach (2016). Moreover, the respondents' communities of residence have several people who access the streets for early morning walk, thus encouraging them to participate in such activities to improve their physical well-being even when they do not have money to access formal physiotherapy.

Considering the testimonies shared by the respondents on environmental risk exposures, it is evident that the income level of a stroke patient increases/decreases their exposure to environmental risk exposures that improves self-rated health and increases the likelihood of stroke recovery. This is because some of the respondents are poor and lived in low-income communities with excessive exposure to noise and air pollution that affected their well-being, and this prolonged the recovery process. Comparably, those who lived and worked in high-income neighborhoods are not exposed to environmental risk. Thus, they experienced a quick recovery process.

Nonetheless, environmental risk is not limited to exposures to air pollution, noisy environments and the rocky nature of the communities the individuals reside. It relates to dieting. In terms of dieting, most of the respondents narrated that their income level influenced what they eat as stroke patients. SRInGH2019 7 indicated that sometimes "you do not have a choice but to eat what you have been presented by your caretakers." It means that although the stroke patient is aware of sticking to particular foods, they are not able to comply since the caretakers, sometimes, based on food available and financial constraints provide whatever food they can afford at the moment. SRInGH2019 5 indicated that sometimes due to lack of money, "I have to eat only once." This means that level income influences the choice of food served to stroke patients and the number of times they can eat in a day.

Through observation, I realized that these incidents triggered emotional pain among the stroke survivors since they needed to eat a well-balanced diet to facilitate the functioning of the medicines to keep them healthy to benefit from the physiotherapy during their recovery process. From this evidence, the study accepts proposition three as

follows: High-income level reduces environmental risk factors that increase self-rated health and ultimately increase the likelihood of stroke recovery.

Care and support from family and friends

All the respondents revealed that care and support from family and friends are very critical to stroke recovery since it helps to reduce financial burdens, thus, reducing the amount of money the stroke patient may have dwell on from their income to access healthcare delivery, buying and taking medicines, physiotherapy, and dieting as discussed above. To some of the respondents, financial support from family and friends were either voluntary or was required as a last resort. Without such care and support, most of the stroke survivors reached out to would have experienced a lengthy recovery process. For example, SRInGH2019 3 was a graduate student before the illness, thus, had no money to cater for accessing healthcare at the hospital, the buying of medication and accessing physiotherapy. The parents and extended family members helped her in these ventures. SRInGH2019 3 recounted that:

> "I was going to school when I had the stroke…..so it was my cousins, aunties, uncles, and parents who mobilized money to pay for the hospital expenses and bought the medicine…..I was just happy they helped because I didn't have money to buy the drugs since I quit my job to focus on my education….."

SRInGH2019 14 recounted that:

> "When you get a stroke, you cannot do anything for yourself. I was not working, so it was my employer and my wife who helped me to access quality healthcare. Whiles my employer was paying the medical bills, my

> wife was buying the medicines. She made sure that every medicine is bought so that I could recover and that helped me to recover fast since they took the worry of the financial burden to themselves…"

SRInGH2019 1 recounted that:

> "When I got paralyzed my wife had traveled, so I called my brother……money was a problem….it was my brother-in-law who gave me something (money) to cater for the T&T (Transportation and Travel) and massaging expenses…at that time, my pension income for the month had not come….."

This means that the timely financial intervention of family and friends ensured that the stroke survivors had quick access to healthcare, and this sped the recovery process. Otherwise, the recovery process would have been prolonged, resulting in functional impairment and disability, as revealed by Ouyang et al. (2018). The state of the lengthy recovery process, functional impairment and a disability manifested in SRInGH2019 5 as a result of lack of help from family and friends. SRInGH2019 5 recounted that:

> "The recovery process was long. It made me go out of gear…poverty increased more than expected…first, you have to work for your income, as I didn't work when I had to go to the hospital unless someone had to donate money to me…my children started helping out with the medical expenses…. Because I didn't have the money personally to go to the hospital…I can say the recovery process was very slow for me…. now I can walk, but I use the stick sometimes because of old age."

This means that the financial support from families and friends should be timely to ensure that stroke patients access healthcare delivery to hasten the recovery process and prevent functional impairment that could result in disability.

Apart from ensuring a speedy recovery and preventing functional impairment and disability, another benefit of care and support from family and friends is that it gave the stroke survivors emotional and mental healing. SRInGH2019 14 emphasized that:

> "When you get a stroke, you cannot do anything for yourself. You have to rely on people to do everything for you. If you don't get a good person to take care of you, you will be thinking all the time, and you will not be able to recover well because of stress. I was lucky to have my wife to stand by me, so I did not have any emotional trauma. Other people had their spouses to live away from them without considering the state of their health, and usually, this will set you thinking, and you will not recover completely. I know some people who as a result of excessive thinking and stress have either remained in their bed or died as a result."

From the above evidence, it is clear that the financial help and caregiving by family and friends help to reduce or eliminate the emotional and mental pain associated with stroke, thus, hastening the process of recovery. This confirms the results of Egan, et al. (2015) that high-income communities help in stroke recovery by safeguarding their emotional well-being through self-management activities and providing financial help compared with low-income communities. This affirms the conclusion of the study, which accepts proposition 4 which stated that high-income level influences access to quality stroke care and increases the likelihood of stroke recovery.

Income

As part of the demographic characteristics, respondents were required to provide a range of income level. The purpose of collecting such data was to help understand the role income level played in the stroke recovery process for each respondent. All the respondents but one attested that income played a critical and significant role in their recovery process – accessing health care, buying and taking prescribed medication, accessing physiotherapy and dieting.

Accessing healthcare

The respondents admitted that stroke treatment is expensive and without money, it will be difficult for someone to recover since the drugs are expensive. Furthermore, without money, it is challenging to gain medical attention. The respondents reiterated that without money they could not have secured healthcare delivery. Given this, SRInGH2019 11 recounted that:

> "You know stroke treatment is expensive…. before I was taken to the hospital, I was able to do some business and raised about GH₵6,000 (emotional feelings), which was on my phone (mobile money wallet). That money saved a lot. Before I recovered completely from the stroke, that money was cleared from the phone. Friends had to raise money elsewhere. So, before I came home (from the hospital), we have spent about GH₵8,000…… had it not been that I had money on my mobile money wallet, I think I would have died (emotional feelings). The issue is that before they treat you, they require certain things such as drip (IV Fluids)

> and other medications so you have to make sure whatever they ask for you should be able to provide. So without money, you cannot do anything."

SRInGH2019 2 recounted that:

> "When you get to the hospital, you have to pay for a bed before they can take care of you…. The medicine they prescribe for you, you must make sure you buy it immediately else they will not take care of you…….and the rooms are allocated based on your ability to pay. Those in a single room pay GH₵100 per day. Where I stayed, we were three (3) in a place, and the charge is GH₵70 per day…. Without money, you will not be attended to by the nurse or the doctor.

From the above testimonies, it is evident that without money it is impossible to access health care delivery, particularly, at the initial stage and that could either delay the recovery process or result in an untimely death. This means that most of the prolonged stroke recovery and stroke-related death could be avoidable if adequate funds are available.

Apart from funds to access healthcare at the initial stage, some of the respondents indicated that they could not even afford the transport fares to go for reviews to assess their state of recovery. In recounting his experience SRInGH2019, 7 expressed that "after I had been discharged from the hospital, I took all my medicines as directed… then I was asked to go back to the hospital for review, but I could not go in time because of money". This means that the low levels of income of most stroke survivors influenced their ability to go back to the hospital for medical reviews after they had been discharged from the hospital. This could have caused the untimely death of the survivor if the condition was critical.

Sometimes due to the high cost of assessing orthodox medical attention, the stroke survivors recounted that they had to resort to herbs which are usually less costly. SRInGH2019 5 reiterated that "because I had no money I resorted to the use of herbs." SRInGH2019 4 recounted that "After I was discharged from the hospital, I went home, but I could not go back to the hospital because I did not have money hence, I resorted to the use of herbal medicine."

Buying and taking medicine

Further, in respect of purchasing medications, the respondents reiterated that you need money to be able to buy the prescribed medication since it is expensive. SRInGH2019 3 recounted that:

> "The N&T and Aspirin medicines were very expensive here in Accra. One box is sold at GH₵100.00, and I was supposed to take it for 20 days…. I could not afford it. The family and friends who volunteered to support withdrew their help because the medicine was too expensive".

Although the medicine was expensive, it is useful as SRInGH2019 3 recounted that "I was able to take the N&T medicine and after 11 days I was up from my bed and could walk" indicating that the ability of stroke patients to take the prescribed medicine ensures a speedy recovery. Comparing the state of recovery of SRInGH2019 3 and SRInGH2019 5 as at the time of the interview, it is insightful to know that income played a critical role in these individuals' recovery process. SRInGH2019 3 at the time of the interview recounted that he recovered and could walk without any help within six months. SRInGH2019 5 at the time of the interview recounted a slow recovery process and was

able to walk without aid after two years after he suffered the stroke. This means that income played a critical role in the recovery process of these stroke survivors.

Physiotherapy

Another stroke recovery process that income played a critical role among the respondents is the ability to access physiotherapy. Physiotherapy is essential in the stroke recovery process due to its ability to help strengthen the feeble bone joints of the legs and arms which are usually affected physically whiles the massaging helps in addressing issues of the mind and makes the human muscles flexible to aid movement (WHO, 2015). All the respondents reached accessed physiotherapy as part of the recovery process except SRInGH2019 7 who was physically active and could walk perfectly after taking the prescribed drugs. Moreover, some of the respondents indicated that they were able to access physiotherapy at the hospital but could not continue due to lack of money. SRInGH2019 14 recounted some experiences and stated that:

> "When I started going to Ameen Scientific Clinic, I was going for the physiotherapy each day, and I was regular… from my house to the healthcare I spend GH₵50 as transportation fare, and I was charged GH₵10 per day for the physio. So each day I spent GH₵60 per day… as at the time of my ailment, I had not gone for my pension income, so after the money, my in-law gave me finished I stopped going".

This means that the initial stage of the stroke ailment as recounted by all the respondents drew the attention of friends and families to help. This provided the respondents money to address the stroke to gain speedy recovery. However, the process of fast recovery was

truncated by lack of funds and what seemed to be speedy recovery turned to be slow.

Again SRInGH2019 10 recounted that:

> "When my pension came, I resumed to Ameen Clinic for physiotherapy and later moved to a Chinese Clinic. As for that place, they do the only physiotherapy, and they charge GH₵100 per day, but I had to stop going due to dwindling funds……. If I had continued with the Chinese people, I could have had rapid recovery because that place their physio is more effective than Ameen Clinic. I suffered for a long time because I did not have money to continue with the physio."

SRInGH2019 3 recounted that:

> "You know initially I was accessing physiotherapy at the public hospital with my National Health Insurance Card, but this was not effective. I needed a private physiotherapist to help, but I could not afford due to lack of money. So my late father volunteered to help me in the early morning walk in the community….. But if I had had the private physiotherapist, I wouldn't have suffered for long…

Still, SRInGH2019 12 recounted that:

> "Initially, I was accessing physiotherapy at the 37 Military Hospital for free because I was an officer of the British Military. I can still access the physiotherapy for free, but I did not have money for other expenses. Sometimes, hiring a taxi to and from the hospital could cost GH₵60, so we had to stop going".

From the above narrative captions, it is evident income level influenced the ability to access physiotherapy to ensure a speedy recovery. Though the respondents have recovered completely, some of them needed the aid of a walking stick because their older age took a toll on them. This finding corroborates with the results of Ouyang et al., (2018) which established that low-income level influences the functional impairment that results in disability among stroke survivors established in deprived rural Southern China.

This means that high-income levels influence access to quality care and increase the likelihood of stroke recovery, thus supporting the results of Song et al., (2017) which established that ischemic stroke survivors with low-income levels experience more unsatisfactory functional outcome compared with those with high-income levels. The findings of the study uphold the results of Marshall et al. (2015) which revealed that stroke patients with low socioeconomic status are less probable to receive quality health care at the clinic and the rehabilitation units, thus, reiterating the inequality to health care delivery among stroke patients. Income disparity was evidenced in the current study when some of the respondents indicated that beds were allocated based on income level.

In theory, the findings of the study fail to reject the assumptions of the Dahlgren-Whitehead model which indicated that socioeconomic status (including income level) is a major driver of inequalities in the access and provision of quality healthcare delivery. This reinforces the results of Putman et al., (2016) which established that income influenced stroke recovery during in-patient and out-patient rehabilitation period. The study was modeled after the Dahlgren-Whitehead theory as in this current study. On the contrary, the findings of the current study contradict the results of Ouyang et al. (2018)

which established that income does influence the recovery process, but the severity of the disease determines the speed of the recovery process.

Summary

The purpose of the study was to explore the effects of income on the stroke recovery process in Ghana using a qualitative research approach. The study received an IRB approval from the Walden University, which aided the recruitment of 15 stroke survivors and 5 participants for the initial pilot. All the participants consented to participate in the study by reading, understanding and signing the consent form. Interactions were recorded on an audio device and transcribed manually. Three themes were identified from the communications: the experience of stroke disease, the stroke recovery process, and factors influencing stroke recovery. From each theme, labels and codes were identified to aid analysis to the data collected.

The findings of the study revealed that the stroke recovery process comprises of accessing healthcare, buying and taking medication, accessing physiotherapy, dieting and emotional and psychological health. In each of the recovery process, the study revealed that income plays a critical role since high income-level will facilitate access to all the five components of stroke recovery, thus, ensuring a speedy recovery, on the one hand. On the other hand, low-income level or lack of income will rob the stroke patient from accessing all or some of the five components of the stroke recovery, thus, ensuring a slow recovery. The study revealed that apart from income, one of the key factors that influenced the stroke recovery process among the survivors is exposures to environmental risk. Three major environmental risk factors were identified, namely, crowd, noise from quarry blast, strong wind and air pollution (gas emissions from

vehicles). It revealed that income-level of the stroke survivor influenced exposure to these risks one way or the other and influenced the likelihood of stroke recovery among the stroke survivors. Therefore, the study suggested in line with Proposition one which states that the high-income level reduces exposure to environmental risk.

Interestingly, about 70% of the stroke survivors reached were poor, and their level of income did not deprive them of moving around in their communities to physically exercise, thus increasing the speed of recovery. The communities of the stroke survivors were either crowded with teeming noise or human activity that could derail their efforts in coming out of their homes for fresh air and physically exercise. Thus, the study suggested that high-income level does not reduce neighborhood deprivation and increase physical activity, contrary to Proposition two which states that high-income level reduces stroke patients' neighborhood deprivation and increases physical activity.

Although the income level of the stroke survivors did not deprive them of undertaking physical activity, income level influenced the exposure of stroke patients' to environmental risk which slowed the pace of stroke recovery. This suggested in line with proposition three that high-income level reduces ecological risk factors that increase self-rated health and ultimately increase the likelihood of stroke recovery.

Nevertheless, the findings of the study revealed that the income level of the stroke patients influenced their ability to access healthcare delivery. The healthcare delivery ranged from ability to secure a bed at the time the stroke patient's emergency was reported at the hospital, received medical attention, bought and took prescribed medicine, accessed physiotherapy, and dieting. This suggested in line with proposition four that

high-income level influences access to quality stroke care and increases the likelihood of stroke recovery.

These findings revealed denote the interaction between the Dahlgren-Whitehead Rainbow Model and the Ecological Model which explains the impact of socioeconomic status of individuals on the inequalities in healthcare delivery in low-income countries, and the effect of environmental risk exposures on the well-being of individuals respectively. Chapter 5 will delve into discussions, conclusions, the social change implications of this study and recommendations.

Chapter 5: Discussions, Conclusions, and Recommendations

Introduction

The purpose of the study was to explore the effects of income on the stroke recovery process in Ghana using qualitative research. Studies on income and stroke recovery process have received much attention, mainly, in the developed countries using a quantitative research approach. However, little attention has been paid to qualitative research approach which delves into the actual life experiences of the stroke survivors, particularly, in a developing country such as Ghana considering its high level of healthcare delivery inequalities arising from income status. Studies on stroke in Ghana have been focused on stroke care (Baatiema et al., 2017A; Baatiema et al., 2017B), stroke morbidity and mortality (Agyeman et al., 2016), traditional risk factors and stroke outcomes (Sarfo et al., 2014), and postdepression stroke (Sarfo, et al., 2017). Although Baatiema et al. (2017A) revealed through qualitative research that financial constraints is one of the key barriers to acute stroke care in Ghana, Baaetima et al. did not provide how financial constraints influence stroke recovery in Ghana among both in-patients and out-patients. Agyeman et al. (2016) revealed the identified financial constraints as one of the key profile factors influencing stroke mortality and morbidity in Ghana using hospital record data and indicated that further studies should focus on exploring issues of stroke from the perspective of stroke survivors. Therefore, this study provided an in-depth understanding on how income influences stroke recovery from the perspective of stroke survivors, thus, responding to the gaps identified by Baaetima et al. and Agyeman et al., respectively.

The study was critical since stroke has become a public health concern due to its contribution to the surging rate of health-related mortality and morbidity in Ghana. In Ghana stroke was noted to be the second most deadly disease after malaria, with a mortality rate of 26% according to the World Health Organization between 1990 – 2010 (Baatiema et al., 2017A). An approximately 87% of these deaths due to stroke occur in the middle-lower income countries, including Ghana (Agyeman et al., 2016). These statistics denote that the incidence of stroke in the high-income countries is low compared to the middle-lower income countries and this can be attributed to high stroke prevention strategies including public education on stroke risk factors and hypertension management at the population level (Sarfo et al., 2014). Stroke, then, has been noted as public health concern since it is regarded as a lifestyle disease that can be prevented through public education on its risk factors.

The targeted population for the study was stroke survivors residing in Accra and its environs (urban area). The participants had recovered from a stroke within the past 5 to 7 years. Data for the study was collected from selected 15 stroke survivors using a face-to-face interview within 1 month. The responses from the interview were tabulated in the form of themes, labels, and codes, as presented in table 4.2 above. The evidence from these themes, labels, and codes was analyzed in detail in Chapter 4. The results of the study indicated that income played a significant role in the stroke recovery process, identified to be accessing healthcare, buying and taking prescribed medication, accessing physiotherapy, dieting, and emotional and psychological healing. Low income may result

in prolonged recovery. These results were based on actual life experiences of the stroke survivors in line with the tenets of phenomenological study as described in Chapter 3.

This section presents a summary of the study, the conclusions and recommendations. The review of the study discusses the interpretation of the results of the Dahlgren-Whitehead Rainbow Model and Ecological Model. Implications of the result for social change were identified and explained as well as the limitations of the study which influenced recommendations for future research.

Summary of the Study

Stroke recovery is a crucial public health issue in Ghana since increasing awareness and care towards stroke recovery can contribute to the reduction of stroke-related death (Agyeman et al., 2012). According to Agyeman, et al. (2017) stroke-related mortality is increasing because of lack of knowledge of the stroke risk factors by the patients and caregivers, particularly, hypertension, and lack of adequate stroke care facilities. In a related study, Baatiema et al. (2017) revealed that stroke-related deaths are increasing due to the lack of evidence-based acute stroke care in Ghana, thus resulting in a few functional stroke independence. However, Baatiema et al. (2017) revealed that income disparity has a high influence in ensuring the low functional stroke independence since patients with low-income levels are not able to access and afford the high cost of stroke treatment interventions compared to patients with high-income levels. This is to say that income level plays a significant role in stroke recovery in Ghana.

Further, the environment for stroke rehabilitation, particularly, after discharge from the hospital is critical since the survivor would be dependent and the frustration and

stress of imminent recovery could exacerbate crisis on discharge, thus prolonging recovery (Lutz, Young, Cox, Martz, & Creasy, 2016). In an article by Lutz et al. (2016), the authors revealed that the survivors sometimes would have to depend on persons they might have taken for granted before their stroke ailment and this caused depression. Lutz et al. further indicated that the depression could be stirred by the lack of enough space for physiotherapy at home resulting in worsening stroke disability and prolonged recovery.

Previous studies in the developed countries have established the relationship between income and stroke recovery using quantitative research methods considering the works of Putman et al. (2015), Bettger et al. (2014) and Egan et al. (2015). However, there is little evidence on such relationship in Sub-Saharan Africa and none in Ghana. Thus, this study was conducted to bridge in the gap in the literature by exploring income and its effects on stroke recovery in Ghana using qualitative research method since the study intends to gather the actual real-life experiences of stroke survivors.

As a result, data was collected among 15 stroke survivors in Accra using purposive sampling techniques. The data was collected through face-to-face interactions (interview) which was guided by an approved questionnaire which requires probing into responses and demand clarifications to ensure that salient information related to the study is relayed accurately and objectively. Data collected was processed manually through the transcription of the audio recordings and were labelled using the alpha-numeric code assigned to each participant. Using the transcribed responses from the participants, themes, labels, and codes were identified. The themes identified were categorized into 3, namely, the experience of stroke disease, stroke recovery process and factors influencing

stroke recovery. In each category, participants were emphatic on the role income played to ensure stroke recovery. In relation to experience of stroke disease participants narrated the role income played in receiving medical attention at the hospitals. In relation to stroke recovery process, the participants recounted the role income played in accessing good healthcare delivery, purchase of medications for uptake, dieting, accessing physiotherapy and emotional and psychological stress resulting from lack of income. Concerning factors that influence stroke recovery, participants recounted that environmental risk exposures, care, and support from family and income were the key factors influencing stroke recovery. Regarding each factor, participants were sure that income played significant role in each factor. From each theme, labels and codes were identified to aid analysis for the data collected. The summary of the study's findings is presented based on research questions, stated in Chapter 1, as follows:

Research Question 1: How do stroke patients describe how income impacts a patient's exposure to environmental risk?

The findings of the study revealed that the stroke recovery process comprises of accessing healthcare, buying and taking medication, accessing physiotherapy, dieting, and emotional and psychological health. In each of the recovery process, the study revealed that income plays a critical role since high income-level will facilitate access to all the five components of stroke recovery, thus, ensuring a speedy recovery on the one hand. On the other hand, low-income level or lack of income will rob the stroke patient from accessing all or some of the five components of the stroke recovery, thus, ensuring a slow recovery.

Some of the stroke survivors reached are currently poor with income level even below the poverty threshold of GH₵1,314, thus are considered as poor (GLSS 2005-2017). According to the Ghana Living Standard Survey (GLSS, 2017), a household with a minimum annual expenditure of GH₵1,314 is deemed to be poor. This was ascertained since some of the respondents confessed that they are not engaged in any income generating activities and live on the financial support of families and friends because they are old now. They gave insights on estimated income they were earning before suffering from stroke. To most of these survivors, the current financial status or fate can be attributed to the stroke disease ushering in poverty in their lives since they had stopped an economic activity they were engaged in during the recovery process. This means that they became more dependent on the benevolence of family and friends through cash donations and presents to help access to health care delivery.

Besides, the low-income level of the respondents influenced exposures to environmental risk through their place of residence. As a result, some of the respondents were exposed to environmental risk factors such as crowded environment, noise from quarry blast or site, strong winds and air pollution arising from gas emissions from vehicles. With the crowd, there were reported cases where respondents wish to improve their physical therapy by engaging in a community, very often to the church and sometimes to the hospital. However, the teeming crowd is likely to push them, survivor, down since the crowd is full of briskly hawking, lorry, pedestrian, and commuter movement. Walking in such crowded locations could result in a sudden fall that could physically harm and cause brain damage resulting in the prolonged recovery process. As

a result, most of the survivors who engaged in community walk were accompanied by a family and friend supporter to aid on the road. With the noise from the quarry blast or site, there was a reported case of dynamite blast at a quarry site which was sudden and frightening, which resulted to high blood pressure, increasing the hypertensive state of the survivors thus, prolonging the recovery process. With the strong winds, there were reported cases where stroke survivors were taken unaware of the strong stormy wind usually associated with rain, which could have caused a fall, but the wooden-walking-aid saved the situation. Sometimes, due to the sudden gust of wind, the stroke patients reiterated that they preferred to stay indoors with less physical activity, which in turn prolonged the physical healing of the respondents. With air pollution, there were reported cases where stroke patients were exposed to vehicular gas emissions, particularly during traffic jams. The air pollution when inhaled had health repercussions, leading to lung-related diseases which could increase the blood pressure of the patients, resulting in the prolonged stroke recovery process.

The level of exposure to environmental risk is attributed to the income level of the respondents. Most of them were living in crowded residential areas with a high level of noise and air pollution that affected their health. Those respondents with the minimum household of GH₵1,314 per annum are living in well-structured residential communities with a controlled level of noise, air pollution and crowd and comparatively, they experienced fast recovery process (Richard, Gauvin, & Raine, 2016). According to Richard et al. (2016), the ecological model provides an understanding of environmental risk exposures and its relationship with personal behavior and health outcomes. The

environmental risk exposure influences stroke survivors drive to improve on their physical health since they do not want to engage in brisk walk in the community that could endanger their physical health. Those in the residential areas had enough rest during the day or at any time due to nonoccurrence of noise that could disturb their sleep and impact their emotional and psychological healing negatively, thus, improved the pace of the recovery process. This means that the rich and the poor have varying environmental risk exposures with different health outcomes in congruence to the ecological model that influence their behavior towards health, thus, deepening the social health inequalities discussed by the Dahlgren-Whitehead Model (World Health Organization, 2010; Farhud, 2015). According to Farhud (2015) stroke is a lifestyle disease which is caused by human behaviour towards physical activity and recreation such that lower physical activities and recreation, as well as dieting, generates into low metabolism, hypertension, cardiovascular diseases, obesity and sugar related diseases that are costly to cure and thus, require a higher income level. This assertion by Farhud (2015) is related to the first layer of the Dahlgren-Whitehead model which considers the relationship between personal behaviors and social inequalities towards health care delivery.

Nonetheless, the focus of the present study is on all the layers of the Dahlgren-Whitehead Rainbow Model, which features environmental risk and income or socioeconomic status' influence on social health inequalities. This is critical since an enriched environment is key to ensuring stroke recovery through mental well-being and physical strength (Rosbergen, Brauer, Fritzhenry, Grimley, & Hayward, 2017). The

‘enriched environment’ is characterized by low air pollution, low level of noise, living in a sparsely populated community which improved mental and physical well-being, thus, promoting good healthy living standard (Evans & Kantrowitz, 2015; Fairburn & Braubach, 2016). According to Fairbun and Brabach (2016) and Evans and Kantrowitz (2018), income plays a critical role in residing in an ‘enriched environment’ as described. It means that income-level of the stroke survivor influenced exposure to these risks one way or the other and influenced the likelihood of stroke recovery among the stroke survivors. Therefore, the study suggested in line with Proposition one which states that high-income level reduces exposure to environmental risk.

The finding that high-income levels reduce stroke patients’ exposure to environmental risk affirms the results of Fairburn and Braubach (2016) and Evans and Kantrowitz (2002) that low-income earners usually live and work in places with high air pollutions and high level of noise that militate against their health. It must be noted that the place of residence of most of the respondents was influenced by their income-level, which influenced the slow recovery process experienced. It corroborates with the results of Sarfo et al. (2017) that established that high levels of cognitive contractions slow stroke recovery process due to its association with depression and hypertension among stroke patients.

Research question 2: How do stroke patients describe how income impacts a patient’s neighborhood deprivation and physical activity?

About 80% of the stroke survivors reached were poor based on the criterion discussed above, and their level of income did not deprive them of moving around in

their community to physically exercise, thus increasing the speed of recovery. The communities of the stroke survivors were notable for being crowded with teeming noise and human activity that could derail their efforts in coming out of their homes for fresh air and physically exercise. Thus, the study suggested that low-income level does not reduce neighborhood deprivation and increase physical activity. It means that the Proposition two which states that high-income level reduces stroke patients' neighborhood deprivation and increases physical activity does not apply to this study since most of the participants engaged were poor and their level of income did not result into neighborhood deprivation nor reduce physical activities/exercises that influence the recovery process.

This means that income level does not reduce stroke patients' neighborhood deprivation and increases physical activity. Although some of the respondents are low-income earners, they do not live in filthy communities with full garbage litters, dog feces and dump electronics that discourages them from undertaking physical activities to improve their well-being contrary to the report by Fairburn and Braubach (2016). Observably, the respondents' communities of residence have several people who access the streets for early morning walk, thus encouraging them to participate in such activities to improve their physical well-being even when they do not have money to access formal physiotherapy.

It is worthy to note that the income level of the stroke patients did not result in neighborhood deprivation as expected. However, their low level of income helped to adopt stroke self-management strategies which are peculiar to their needs. It means that

the low level of income helped the stroke survivors to adopt personal behaviors, such as physical exercise and eating a well-balanced meal, which is not dependent on income contrary to the results of Egan et al. (2015) and Trygged, Ahacic, and Kareholt (2017). According to Egan et al. (2015) and Trygged et al. (2017) the ability to adapt and modify personal behaviors of stroke patients is influenced by income since income provides personal empowerment and the wherewithal to eat well, access physiotherapy and improve family support care to hasten the recovery process. It must be noted that some of the stroke survivors are poor and dependent on low-income earners, therefore, they had to modify their behaviors and self-management activities that will not make them less dependent and improve their emotional and psychological well-being whiles improving on their physical strength (Boger, Hankins, Demain, & Latter, 2015) an indication that the stroke survivors modified their behaviors due to low-income to improve on their stroke self-management activities ensuring speedy recovery from stroke, thus, reducing the level of social inequalities towards health. The results confirm the first layer of the Dahlgren-Whitehead model, which theorized that social inequalities towards health begin with the personal behavior of individuals as asserted by Graham and White (2016) and Farhud (2015).

In addition, the stroke survivors income level influenced their high level of exposure to environmental risk but used the community and social network system to help them develop personal behaviors to improve upon their stroke self-management activities, thus, ensuring their speedy recovery and reducing the social health inequalities (Quansah, Ohene, Norman, Mireku, & Karikari, 2016). The community and social

network system which supports health care are associated with the second layer of the Dahlgren-Whitehead model. According to Quansah et al., (2016), the community and social network system as modeled by the Dahlgren-Whitehead model is based on values, norms, and beliefs. The family and community support belief, of helping and supporting each other can help individuals reduce the mental and emotional stress associated with stroke, thus, ensuring speedy recovery (Quansah et al., 2016).

Research question 3: How do stroke patients describe how income impacts the environmental risk factors and increases the likelihood of stroke recovery?

Although the income level of the stroke survivors did not deprive them of undertaking physical activity, income level influenced the exposure of stoke patients' to environmental risk which slowed the pace of stroke recovery. Nonetheless, environmental risk is not limited to exposures to air pollution, noisy environments and the rocky nature of the communities the individuals reside. It relates to dieting. In terms of dieting, most of the respondents narrated that their income level influenced what they consumed as stroke patients.

Through observation, the study revealed that the inability to diet as required triggered emotional pain among the stroke survivors since they needed to eat a well-balanced diet to facilitate the functioning of the medicines and keeping them strong to benefit from the physiotherapy. This means that the personal behaviors of the stroke survivors were influenced by the inability to access the right food as required, thus, establishing a relationship between personal behaviors and the environment as asserted by the proponents of the Ecological Model discussed in chapter two (2) above. According to

the Ecological Model the extent to which an individual is affected by the environment is based on their level of knowledge and perception about the environment in which they live in as well as their attitudes and behavior towards the environment (Barral, Logie, Grosso, Wirtz, & Beyer, 2016; Golden & Earp, 2016).

Interaction with the stroke survivors revealed that they understand the ecological structure of Accra, a city, which is characterized by less farming activities and the hot climate and deforestation is not favorable for food production, compared to the forest belt cities such as Kumasi, Koforidua, Takoradi, Cape Coast, Sunyani, Tamale, Wa, Bolgatanga, and Ho. As a result, Accra is more of a market center for commercial activities and an individual is required to buy the food sometimes at a high cost to get a balanced meal. Comparatively, residents in the forest zones mentioned above can afford to have backyard gardens to grow some green vegetables to take care of their needs. Due to the ecological structure of the city, which is less fertile for food production, the stroke survivors reiterated that they had to spend a high amount of income on specialized food such as green leafy foods and vegetables, fruits, dry fish and high-rich fiber root foods such as potatoes (sweet and non-sweet potato). Income exposed the stroke survivors to high risk eating high carbohydrate food such as rice, banku and fufu, oily foods, salmon, gravy and jollof rice which may have high cholesterol and calories content that could slow the recovery process. Thus, the individual's behavior, during the stroke recovery process, was influenced by the level of interaction between income and environmental risk exposures as established by Golden and Earp (2015).

Here the interaction is not perceived as a relationship but a response of income to reduce environmental risk exposure, particularly, in terms of dieting among stroke survivors (World Health Organization, 2010). According to the World Health Organization (2010) relating environmental risk exposure to social health, inequalities are very crucial to comprehend due to the response measures adopted to reduce the risk exposures and the cost associated. Thus, the high cost of food in Accra, compared to other regional cities mentioned above, the low-income level of the stroke survivors could have provided adequate response to reduce the environmental risk exposures, thus, prolonged the stroke recovery process.

Further, relating the adequacy of income available to respond to the environmental risk exposures can be explained by the relationship between socioeconomic status and the environment in the third (3rd) layer of the Dahlgren-Whitehead model. One of the key factors that influence stroke recovery is an 'enriched environment' which affects the individual mental well-being and physical strength, thus influencing functional independence from stroke (Rosbergen et al., 2017). The 'enriched environment' comprises of access to right medical equipment, skilled health professionals, dieting well, physical exercise and good care (Agyeman et al., 2012; Baatiema et al., 2017A; Baatiema et al., 2017B). According to Agyeman et al. (2016), Baatiema et al. (2017A) and Baatiema, et al. (2017B) the ability of stroke patients to access these elements of 'enrich environment' may reduce stroke mortality and morbidity in Ghana. It must be noted that income plays a major role in obtaining these elements since it's a key response factor to stroke recovery.

This suggested in line with proposition three that high-income level reduces environmental risk factors that increase self-rated health and ultimately increase the likelihood of stroke recovery. This ratifies the results of Egan et al. (2015) and Trygged et al. (2016) that high-income communities help in stroke recovery by safeguarding their emotional well-being through self-management activities and providing financial help compared with low-income communities. This affirms the conclusion of the study which accepts proposition four which stated that high-income level influences access to quality stroke care and increases the likelihood of stroke recovery.

Research question 4: How do stroke patients describe how income impacts accessing quality stroke care?

Furthermore, the findings of the study revealed that the income level of stroke patients influenced their ability to access healthcare delivery. The healthcare delivery ranged from ability to secure a bed at the time the stroke patient' emergency was reported at the hospital, received medical attention, purchased and took prescribed medicine, access to physiotherapy, and dieting. This reaffirms the discussion on the 'enriched environment' which is a pre-requisite for ensuring functional independence from a stroke which was asserted by Rosenberg et al. (2017), Agyeman et al. (2014), Baatiema et al. (2017A) and Baatiema et al. (2017B). Again, the response of income in accessing this enriched environment is related to the 3rd layer of the Dahlgren-Whitehead model which postulates that socioeconomic status and the environment of the individual influences the social health inequalities towards health care delivery in low-income countries.

Although, one may argue that having the community and social networks such as hospitals and WHO guidelines that are intended to ensure functional independence among stroke patients, which is peculiar to the second (2^{nd}) layer of the Dahlgren-Whitehead model is crucial in ensuring functional independence from stroke and reducing the social health inequalities towards stroke health care delivery. However, this argument would only be meaningful if there are enough evidence-based services (Baatiema et al., 2017A; Baatiema et al., 2017B). According to Baatiema, et al. (2017A) and Baatiema, et al. (2017B) there is no evidence-based services for stroke care, and treatment is limited in some nations, even more, limited in developing countries such as Ghana due to financial constraints both at the government and individual level. This can be attributed to high stroke-related disability (Bettger et al., 2014) and low functional independence among stroke survivors, and ultimately, high stroke mortality and morbidity in Ghana (Agyeman et al., 2012). This re-echoes the significant role income plays accessing quality health care delivery in Ghana. This result aligns to Proposition 4, which states that the high-income level influences access to quality stroke care and increases the likelihood of stroke recovery.

The findings corroborate with results of Song et al., (2017), which established that ischemic stroke survivors with low-income levels experience poorer functional outcome compared with those with high-income levels. The findings of the study corroborate with the results of Marshall et al. (2015) which revealed that stroke patients with low socioeconomic status are less probable to receive quality health care at the clinic and the rehabilitation units, thus, reiterating the inequality to health care delivery among stroke

patients. Income disparity was evidenced in the current study when some of the respondents indicated that beds were allocated on income,

These findings reveal the interaction between the Dahlgren-Whitehead Rainbow Model and the Ecological Model which explains the impact of socioeconomic status of individuals on the inequalities in healthcare delivery in low-income countries, and the effect of environmental risk exposures on the well-being of individuals, respectively. This means that income cannot be treated as a mutual exclusive factor that influence stroke recovery since having the enriched environment as described by Rosenberg et al. (2017) and Baatiema, et al. (2017A) and Baatiema, et al. (2017B) is critical in ensuring functional health outcomes in stroke treatment and care.

Further, the interplay between Dahlgren-Whitehead and the Ecological Model evidenced from the work of Fairburn and Braubach (2015) which concluded that persons with low-income levels usually live in residential areas with high air and water pollutions, crowded houses, and communities with high levels of noise that militate against their health, on the one hand. On the other hand, it is evidenced in the works of Evans and Kantrowitz (2016) which persons' with low-income level are increasingly exposed to environmental risk factors such as indoor air pollutants, hazardous wastes, lack of green spaces, crowded houses, noise and unsafe work environments that are unfavorable to their health and well-being; the reverse is true. As noted earlier, some of the participants were living in crowded communities, with a high level of indoor air pollutants, hazardous wastes and lack of green spaces and high noise levels, which are hazardous. This means that stroke functional outcomes is highly dependent on the

response to environmental risk since environment risk plays a critical role in coronary heart disease and other cerebrovascular diseases such as stroke (Chaix, 2015).

Social Change Implications of the Study

The goal of the social change for this study is to contribute to the reduction of social health inequalities related to stroke care and treatment in Ghana. The study evidenced that income plays a significant role in the stroke recovery process in Ghana due to its ability to influence access to quality healthcare. Thus, the income level is a key driver of fueling inequalities towards health care delivery as promoted by the Dahlgren-Whitehead Rainbow Model. It implies that the government should design policies and programs that will reduce disparities in health care delivery and geared towards providing equitable health care delivery. This will help curb the increasing disability associated with stroke recovery as well as the increasing stroke mortality in the country. It must be noted that most of the respondents who reached out were not poor, but the stroke condition put them in a situation where they can neither do anything for themselves nor work. They were left with the option to depend on family and friends for help which was not sustainable.

The study evidenced that environmental risk exposures have the likelihood of hastening or prolonging stroke recovery since these risk exposures such as neighborhood deprivation due to the high population of an area, excessive noise including quarry blast and air pollution tends to increase the blood pressure of stroke patients and increasing hypertensive conditions. It means that the tenets of the Ecological Model which indicated that environmental risk exposures influence the well-being and health of individuals. This

calls for the need for stroke patients and their care providers (health workers, family and friends) to reduce exposure to any environmental risk that could affect their well-being. It calls for the need for education, as part of the treatment process, on environmental risk exposures that could prolong the recovery process and or increase the chances of disability, thus improving functional independence among stroke patients.

Limitations of the Study

The study was limited by choice of respondents since the role of income in the stroke recovery process is examined from the perspectives of stroke survivors. It means that the views of other stakeholders such as health professionals, community and family supporters were not considered by the study. Therefore, further studies should focus on exploring the role of community and family support in the stroke recovery process. The focus on the role of family and community support is imperative due to their influence on the emotional and psychological healing of the stroke patient. A face to face approach was used in interviewing the participants of their lived experiences. This makes the integrity of the results to be measured by the sheer honesty of the participants, and no assumptions were considered as far as the responses they provided. The validity of the answers given and the data collected were all grounded on the code of ethics and honesty.

Furthermore, this study was limited to participants 40 years and older, within a certain income bracket and can communicate in English language. Hence, the results of this study should not be generalized beyond the population of the criteria given. The participants had to answer questions based on a recollection of their memory.

Recollection bias to providing accurate experiences of stroke, their income and environmental risk factors might have unintentionally occurred.

Conclusion

To sum up, the study concludes that the income-level of a stroke patient profoundly influences the stroke recovery process due to its ability in helping to access healthcare delivery, buying medicine, access to physiotherapy and dieting. The study revealed that when stroke patients have money to take care of all these things, their emotional and psychological healing is hastened, resulting in a fast recovery process. It must be noted that stroke disease is associated with a blockade in the brain. Thus, any form of psychological pain can worsen an individual's stroke condition and prolong the recovery process. Moreover, the study concludes that the level of income of a stroke patient influences their level of exposure to environmental risks such as teeming crowd, excessive noise, and air pollution and this influences the recovery process.

Recommendation

As noted earlier, the study highlighted the role income plays in fuelling the inequality in healthcare delivery in Ghana. This requires the government of Ghana to work towards promoting equity in healthcare delivery. Fostering equity in healthcare delivery can be achieved through a revision of the National Health Insurance Policy so that stroke care is given the utmost attention. This means that stroke patients with health insurance card will receive treatment urgently since delayed intervention can result in death or impaired disability.

Further, the government must intensify its stroke awareness programs in the country to conscientize the people of the causes and dangers of stroke and the interventions available to ensure functional independence. Awareness and educational interventions should focus on the environmental risk factors that cause stroke and influences the stroke recovery process.

Further research on stroke recovery in Ghana should explore the role family and friends play in the recovery process using a qualitative research approach. Additional studies should focus on using quantitative research method to examine the relationship between stroke recovery and income in Ghana, with age, educational place level and level of environmental risk exposure as control variables, using logistic regression techniques. This may help confirm the results of the current study or otherwise.

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