

Stress, the Superwoman Schema, and Cardiovascular Wellbeing Among Rural and Medically Underserved African American Women

by

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Dissertation submitted in partial fulfillment of
the requirements for the degree of Doctor
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ABSTRACT

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Abstract

Cardiovascular disease is the leading cause of death among African American women. CVD risk factors that contribute to poorer health are higher among rural and medically underserved communities; highlighting racial and geographic disparities exist. The ideal cardiovascular health (ICH) tool was developed by the American Heart Association (AHA) to serve as a measure of cardiovascular wellbeing and address the need for prevention and treatment of CVD. Meeting the ideal standard for these metrics is associated with lower CVD risk and overall improved cardiovascular wellbeing. Yet to date, there is a dearth of literature evaluating ICH scores among rural and medically underserved African American women.

Further, social conditions such as neighborhood cohesion and safety can lead to chronic exposure to stress and have been associated with increased risk for CVD and earlier onset of disease. The multidimensional Superwoman Schema framework provides further understanding on how African American women process stress and may serve to enlighten the mechanisms in which chronic stress becomes biologically embedded among this population.

This dissertation explored factors related to cardiovascular wellbeing among rural and medically underserved African American women for the purpose of better understanding and thus informing efforts to reduce cardiovascular health disparities among this population. In chapter 2, we completed a scoping review of psychometric scales evaluating the strong black woman/superwoman construct in relation to stress-related health disparities. In chapter 3, a pilot study was conducted to assess the feasibility of using the MyChart patient portal to collect electronic health data and recruit

rural African American women to collect self-report data on social neighborhood conditions and the Superwoman Schema. Finding from this study revealed strengths and limitations of EHR recruitment and qualitative interviews reported the experience of African American women in using MyChart. Qualitative findings from Chapter 4 revealed emerging factors that are embedded within the Superwoman Schema framework that help to better understand the stress and coping experience of rural and medically underserved African American women. Chapter 5 summarizes the results across all three chapters and provides implications for future research and practice.

Dedication

I dedicate this dissertation to all who have prayed without ceasing on my behalf.

To my father, Muhirwa Nkuba, who dreamed of greatness and sacrificed for its realization through his children, every degree has your name on it.

To my mother, Eomba Pungu, the smartest nurse I know. Your prayers have kept me protected and encouraged. May this milestone be a reflection of answered prayers and all you have poured into me.

To my siblings, Dr. Nyira Lucy Muhirwa, Mutia Muhirwa, Luc Muhirwa, and Glory Muhirwa. There's just something so special about being a part of the Muhirwa crew. May we all continue to reach great heights, together.

To mama Kabibi Makoso, no matter the distance, your prayers have not only reached me but have kept me. Thank you for dreaming far beyond your fears. This degree is a direct result of all you have sacrificed.

To my best friend Dr. Shekila Melchior, you helped to carry me through this journey. There was not a moment when you were not there.

To my baby boy, Josiah Wa Nzambi Kanku. Papa, I did this for you.

Now unto him who has kept me from falling and lifted me from the dark to the bright mountain of hope. From the midnight of desperation to the daybreak of joy. Father God, you have kept every promise. I give you all power and praise for ever and ever.

Amen.

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1. Introduction

1.1 Cardiovascular Disease and African American Women

Cardiovascular disease (CVD) is the leading cause of mortality in African American women (Arnett et al., 2019; Benjamin et al., 2018; Shay et al., 2012). Commonly used interchangeably with “heart disease,” cardiovascular disease (CVD) is a broad term used to describe a variety of blood vessel diseases known as atherosclerosis, and structural diseases of the heart muscle (e.g., arrhythmias, cardiomyopathy) (Virani et al., 2021). CVD encompasses a variety of conditions including coronary heart disease, cerebrovascular disease, peripheral artery disease. Rheumatic heart disease, congenital heart disease and deep vein thrombosis and pulmonary embolism (Benjamin et al., 2018, 2018).

Approximately 57.1% of African American women aged 20 and older have some form of CVD compared to 43% in White women (Benjamin et al., 2018; Fryar & Zhang, 2017). Although nearly 90% of women have one or more risk factors for CVD (Benjamin et al., 2018), there are racial and geographic disparities in the prevalence of CVD risk factors. In general, rural communities exhibit greater cardiovascular disease and higher prevalence of cardiovascular disease risk factors than larger urban areas due to a combination of factors such as poorer access to health care and lower socioeconomic status (Cross et al., 2020). Further, nearly 40% of African American women have been diagnosed with hypertension compared to 23% of white women (Fryar et al., 2017). The rate of obesity further highlights this disparity with nearly 60% African American women being obese (Havranek et al., 2015; Kalinowski Jolaade et al., 2019a; Virani et al., 2021); the highest rate among all racial and ethnic groups in the US.

Risk factors for CVD can be categorized as modifiable or non-modifiable. Factors such as age, race/ethnicity, genetics and family history can increase risk for CVD but cannot be altered (Arnett et al., 2019). Although the influence of genetics and family history is significant, CVD is largely attributable to modifiable risk factors such as hypertension, diabetes, and obesity (Arnett et al., 2019; Benjamin et al., 2018). Furthermore, health risk behaviors such as unhealthy diet, physical inactivity and stress are predictive of modifiable CVD risk factors. Rural and medically underserved African American women face several challenges in preventing and reducing CVD risk factors due to poor socioeconomical conditions that create barrier for cardiovascular health which can perpetrate CVD risk factors (L. S. Abbott et al., 2019; James, 2017; J. I. Kim et al., 2013a). Factors such as longer distance to health care services, lower social economic status and lack of adequate insurance coverage (Weaver & Gjesfjeld, 2014) are just a few of the barriers that these medically underserved African American women encounter that can negatively impact their cardiovascular health.

1.1.2 Medically Underserved and Rural Communities

Medically underserved urban and rural communities are at increased CVD risk because of a high prevalence of risk factors such as poverty, which is associated with poorer cardiovascular health outcomes (Carnethon et al., 2017; Yang et al., 2012). In addition, African American women residing in these communities face additional challenges to maintaining cardiovascular wellbeing compared to their counterparts (Bennett et al., 2016; Diez Roux et al., 2016). For instance, access to care is limited, as there is documented shortage of primary care providers available to serve these residents (Abbott et al., 2019; Douthit et al., 2015). Studies have demonstrated that individuals that are more likely to lack medical coverage and less likely to receive

preventative care and services for health conditions such as CVD (Mouton et al., 2017; Williams et al., 2014). The Health Resources and Services Administration (HRSA) defines an area or population as medically underserved based on factors such as limited access to health care providers and high poverty (HRSA 2021). Using the Index of Medical Underservice (IMU) score, HRSA assigns a score between 0-100 to denote an area facing a shortage of primary care providers (HRSA, 2022). A score less than or equal to 62 is considered medically underserved. The USDA developed the Rural-Urban Continuum Codes (RUCC) for defining rurality. A RUCC classification of four and above is considered rural based on factors such as population density and proximity to metro areas (USDA, 2020). Often plagued by poverty and other structural barriers that significantly restrict social, cultural, and economic resources (James, 2017), the rural environment can have grave implications for overall health, including cardiovascular health (Abbott et al., 2019; Kim et al., 2013b). According to the USDA, nonmetropolitan counties (i.e., rural) have higher rates of poverty (16.1%) than metropolitan counties (12.6%), with African American households experiencing the greatest rate of poverty across all racial/ethnic groups from both rural and non-rural counties (31.6%) (USDA, 2022).

Thus, a better approach to understanding and addressing the cardiovascular health disparities among rural African American women is through an intersectional approach that accounts for the complex nature in which rural and medically underserved African American women experience stress factors from multiple systems and how these factors intersect to impact their cardiovascular health.

1.1.3 American Heart Association Measure of Cardiovascular Wellbeing

The American Heart Association (AHA) developed the Ideal Cardiovascular Health (ICH) metrics to serve as a measure for cardiovascular wellbeing (Djoussé et al., 2015; Lloyd-Jones et al., 2010). ICH metrics include four modifiable health behaviors measures (smoking, nutritional intake, physical activity and BMI) and 3 biomarker measures (blood pressure, blood glucose and total cholesterol) (Djoussé et al., 2015; Efoe et al., 2017; Kim et al., 2013b). High scores on the ICH metric have been associated with lower CVD risk and increased life expectancy (Efoe et al., 2017; Lloyd-Jones et al., 2010; Swanson et al., 2019). However, African American women continue to be underrepresented in studies examining ICH (Bambs et al., 2011; Kim et al., 2013b).

1.1.4 Stress and Cardiovascular Health

Chronic exposure to stress may be a significant contributor to the cardiovascular health disparity seen among African American women. There is an established understanding of the relationship between stress and cardiovascular disease. To provide a brief overview, chronic exposure to stress causes the body to release stress hormones, that when elevated for extended periods of times can cause earlier onset of CVD-related risk (American Psychological Association, APA Working Group on Stress and Health Disparities, 2017). However, this relationship is complex in that there are differences in the types of stress African American women experience which can best be understood through an intersectional approach (Woods-Giscombé & Lobel, 2008)

African American women have several intersecting social identities that influence their cardiovascular health (Crenshaw, 1991; Griffith et al., 2013; Mwangi & Constance-

Huggins, 2019). For instance, sexism and racism are stressful systems that intertwine and impact someone that is both woman and African American (Crenshaw, 1991; Griffith et al., 2013; Mwangi & Constance-Huggins, 2019). Thus, experiencing stress from multiple systems simultaneously creates a cumulative stress experience that is unique to this minority group. Therefore, cardiovascular health disparities among African American women are not solely explained by one social identity, but rather the ways in which multiple identities interact to impact the lived experiences of this population. Further, environmental context is a significant social category that have been found to impact the cardiovascular health of African American women (Diez Roux et al., 2016; Islam et al., 2020). Environments that are medically underserved, for example, are often plagued by poverty and other structural barriers that significantly restrict social, cultural, and economic resources (James, 2017). As a result, impacting cardiovascular health.

Various stress models and frameworks have been used to conceptualize the mechanism by which exposure to stressors can lead to adverse health outcomes such as cardiovascular disease (CVD). According to the widely used Transactional Model of Stress and Coping, stress results from the interaction between an individual and their environment when one appraises stressors as taxing or surpassing their available resources (Folkman, 2013; Lazarus & Folkman, 1984). For underserved African American women, who experience intersecting stressors, residing in underserved communities can further exacerbate their stress exposure due environmental conditions such as having limited social and physical resources (James, 2017; Mwangi & Constance-Huggins, 2019).

Schemas are cognitive models that operate subconsciously and influence how we perceive and interpret information we receive from our environment (Folkman, 2013;

Toren, 2014). They begin to develop early in life and continue to be shaped from our experiences and become part of our core beliefs. The Superwoman Schema is a multidimensional framework that is unique to African American women and shapes the way they process stress (Woods-Giscombé, 2010). According to the Superwoman Schema framework, some African American women may endorse the following characteristics: (1) a perceived obligation to manifest strength; (2) a perceived obligation to suppress emotions; (3) resistance to being vulnerable or dependent; (4) determination to succeed, even in the face of limited resources; and (5) a perceived obligation to help others (Woods-Giscombé, 2010).

According to this framework, historically, African American women have been encouraged to value their ability to overcome adversity through slavery, segregation, and current persistent racism (Beauboeuf-Lafontant, 2005; King, 1988). Thus, to avoid the stereotypical angry, neck-rolling caricature that is often the perception of Black women in America; this population of women has continued to fight to change the narrative to one of strength and resilience (Beauboeuf-Lafontant, 2005; Woods-Giscombé, 2010). However, Superwoman Schema characteristics may not be sustainable and may be placing African American women at greater risk for stress-related health outcomes, such as CVD.

The appraisal of stressors as safe or threatening is strongly influenced by schemas and can trigger coping responses that may have cardiovascular implications (Allen et al., 2019; American Psychological Association, APA Working Group on Stress and Health Disparities, 2017; Markus, 1977). For underserved African American women, who are more likely to be exposed to higher rates of stress due to the intersection of their race, gender, and geographical context, the Superwoman Schema may result in

internalization or embodiment of stress that may be contributing to the cardiovascular health disparities seen in this population because it influences not only how African American women perceive stress, but it also impacts the resulting coping mechanisms that can lead to adverse cardiovascular health outcomes.

1.2 Theoretical Framework

The socio-ecological model (SEM) was originally introduced by psychologist Urie Bronfenbrenner (Kilanowski, 2017) as a conceptual model of human development. The model demonstrated nesting circles that place the individual as a central figure surrounded by multiple interrelated systems that interact to impact the individual. Bronfenbrenner's SEM include a total of five systems organized in order of impact to human development (Kilanowski, 2017): (1) microsystem, (2) mesosystem, (3) exosystem, (4) macrosystem and (5) chronosystem. The *microsystem* is closest to the individual and includes people and relationships with the strongest impact on the. The *mesosystem* encompasses the interactions between the factors in the microsystem. The *exosystem* describes both formal and informal social structures that indirectly have an impact on human development, such as, the parents' place of employment. The *macrosystem* involves cultural factors of human development (i.e., class, poverty). Finally, the *chronosystem* encompasses environmental changes that occur during a lifetime that have influence on human development (i.e., divorce, major moves, historical events).

The Center for Disease Control (CDC) adapted the SEM for use in health promotion by acknowledging the multilevel factors that impact health (CDC, 2002; Lee et al., 2017). The CDC's version of the SEM will be used to guide this dissertation. This

model includes the following four systems: 1) individual, 2) Relationship, 3) Community, 4) Societal. *Individual* level factors of the SEM, includes personal characteristics that increases risk or contributes to a health outcome, such as age, income, and education (Lee et al., 2017) This level also includes cognitive models such as the SWS that influence our attitudes, beliefs and personality and are influenced by the environment around us (i.e. relationship, community and society). The second level of the SEM includes those *relationships* closest to the individual that may have influence on a person's health behaviors or increase their risk of disease (Lee et al., 2017). These relationships include family members, partners and friends. The *community* level considers the setting in which they has their life experiences (Lee et al., 2017). This includes neighborhood, school, and place of employment. When considering community level factors, it is important to uncover how they are interconnected to the health of the individual. The last level of the SEM examines the *societal* factors that influence health; including norms (cultural and social), and policies as larger systems that greatly contribute to the health experience of individuals (Lee et al., 2017).

The SEM theorizes that there are multiple systems that interact to impact an individual's health. This prevents significance from being placed on one factor as the sole culprit for health outcomes. This proposition acknowledges the social and physical aspects of the environment and its effect on wellbeing, which is especially useful for research seeking to understand communities from a multilevel perspective to inform future interventions that are both holistic and realistic. The adapted SEM model by the CDC will be used to guide our understanding of the multilevel factors that can influence cardiovascular wellbeing among medically underserved and rural African American women. This framework can easily be integrated with components of other theories and

models. Thus, can comprehensively be used to design health promotion and disease prevention research and interventions.

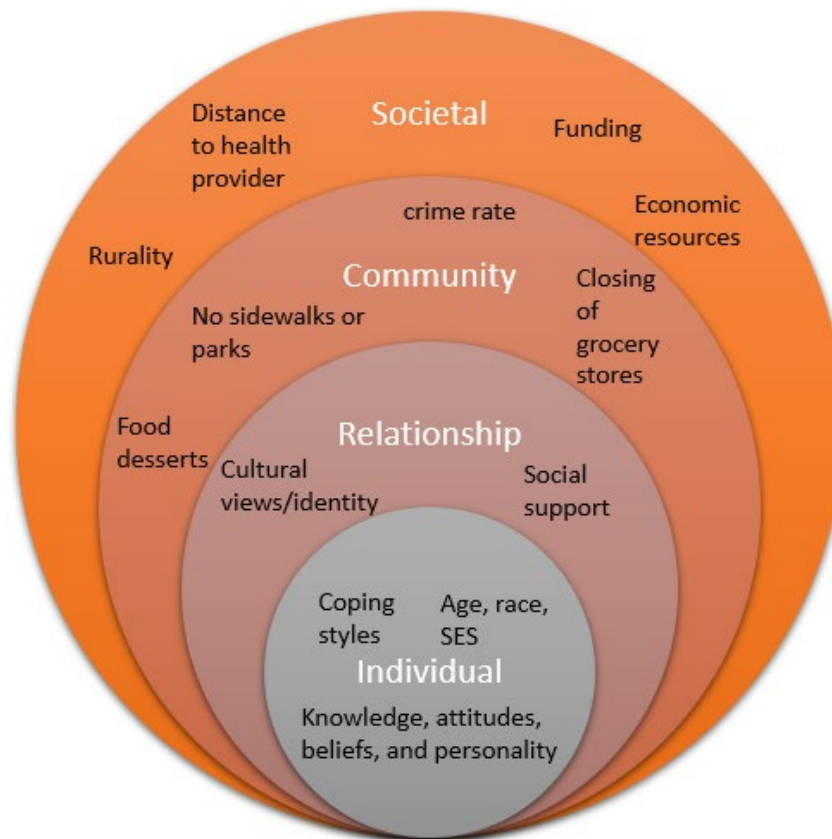


Figure 1: Modified Socio-ecological Model adapted from CDC

1.3 Overview of Dissertation

The purpose of this dissertation is to develop knowledge of stress and cardiovascular health among rural and medically underserved African American women by: 1) examining the state of cardiovascular health and exploring their perspective of cardiovascular wellbeing; 2) understanding cardiovascular health and the stress experience of this population of African women through the complex convergence of their identities; 3) assessing the Superwoman Schema conceptual framework as a

potential pathway to understanding the stress and coping experience among this population. The following five chapters were used to accomplish the overall aims:

1.3.1 Chapter 1

The first chapter includes an overview of the research problem and the gaps to be addressed in the dissertation.

1.3.2 Chapter 2

Chapter two includes an examination of psychometric scales of the strong black woman construct applied within the context of stress-related health disparities in African American women. The aim of this scoping review is to identify the extent and nature of research published in this area, identify significant knowledge gaps, and provide recommendations for future studies.

1.3.3 Chapter 3

The third chapter includes a report of the pilot study examining the feasibility of recruiting and collecting self-report and electronic health record (EHR) data from rural African American women to describe Ideal Cardiovascular Health (ICH) and describe its association with social neighborhood conditions (neighborhood safety and neighborhood cohesion) and the Superwoman Schema. Lastly, we report the experience of rural African American women utilizing the MyChart system through qualitative interviews.

1.3.4 Chapter 4

The focus of the fourth chapter will be on examining ICH of a larger cohort of medically underserved urban and rural African American women and describing their experiences of stress and coping related to culture, community, and cardiovascular

health, as guided by the Superwoman Schema conceptual framework (the SWS framework).

1.3.5 Chapter 5

The final chapter will conclude with the implication of study findings and describe how the potential new knowledge can contribute and inform future policies, research, and clinical practice. Further, there will be a discussion on study limitations and recommendations.

2. Psychometric Scales of the Strong Black Woman Construct Evaluating Stress-Related Health Disparities Among African American Women: A Scoping Review

2.1 Background

African American women experience disproportionately high rates of stress-related chronic health conditions compared to white women (Agyemang, 2013; Benjamin, 2018; Smilowitz, 2016). African American women are more likely to be overweight or obese and have higher rates of chronic diseases such as diabetes and cardiovascular disease as well as morbidity related to a variety of other stress-related conditions (Benjamin, 2018). Multiple studies on stress-related physiologic aging have found higher risk for accelerated aging among African American women as a result of repeated and prolonged exposure to stressors (Allen et al., 2019; Geronimus et al., 2010). Over the past twenty years, mounting evidence has demonstrated links between psychological stress and adverse health outcomes among African American women (Berger & Sarnyai, 2015; D. R. Williams, 2018). The relationships among stress, health behaviors, and psychophysiological processes that influence a range of mental and physical health outcomes have been described (Park & Iacocca, 2014; Suls et al., 2019). Psychological stress in African American women, including race- and gender-related stress, has been linked with inadequate physical activity and stress-related eating behaviors that may increase the risk for obesity and influence biomarker activity associated with increased risk for chronic illness including cortisol, C-reactive protein, and blood pressure (Hammadah et al., 2018; Sumner et al., 2018).

The strong Black woman (SBW) and superwoman are frequently used interchangeably. The strong Black woman has been defined as the image of Black

womanhood (Woods-Giscombé, 2010) and she is described as being the pillar of strength and resilience for her family and community. She has the ability to simultaneously perform concurrent roles and endure through pain and oppression while neglecting her own needs (Huddleston-Mattai, 1995). Silent suffering and multiple role stress are central components at the foundation of the strong Black woman and superwoman. Silent suffering is frequently referenced in health as the process of not vocalizing the need for medical attention due to the stigma associated with having an illness (Lekan, 2009). The pressure on African American to appear strong forces them to cope with their burdens in silence without assistance or they seek an alternative method of coping that is many times not efficient but maintains their status quo within their respective communities (Jefferies, 2022; C. Woods-Giscombe et al., 2016; Woods-Giscombé, 2010). Multiple role stress is the conflict of maintaining multiple identities as a woman (Sumra & Schillaci, 2015). These components are significant in understanding the cumulative stress that is faced by African American women.

Researchers have argued that the superwoman/SBW role represents a posture of resilience and self-efficacy adopted as a way to confront and survive life adversity, and that understanding it is critical to grasping a more complete picture of the intrapersonal, interpersonal, and sociohistorical dynamics of African American women's physical and emotional health (Beauboeuf-Lafontant, 2005; Edge & Rogers, 2005; Harrington et al., 2010; Woods-Giscombé & Black, 2010). However, despite this growing body of research, more research is needed to understand the mechanisms linking stress to health outcomes in African American women and this requires measures of stress that are contextually and culturally relevant. Thus, the aim of this scoping review is to identify studies that have used psychometric measures of the 'strong Black Woman' or

“superwoman” construct to assess stress-related disparities among African American women.

2.2 Methods

2.2.1 Design

A scoping review of the literature was utilized, guided by the methodological framework of (Arksey & O'Malley, 2005) to identify relevant gaps in the literature and current research standing of the topic. The population identified studies involving adult women who identify as Black and/or African American, aged 18 years and over, and psychometrically measured the SBW/superwoman construct. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) reporting guidelines for scoping reviews were followed (Moher et al., 2009). Following the PRISAM guidelines (Moher et al., 2009), a search was conducted in three electronic bibliographic databases, that is, PubMed, Ovid MEDLINE, and Cumulative Index to Nursing Allied Health Literature (CINAHL) to identify relevant articles. The search terms comprised of the key words in a variety of combinations: "Strong black woman, superwoman, stereotypical role, gender role, gendered racism, psychological, stress, stressors. The search was limited to only peer reviewed articles, articles in English language, published between 2000 and 2020, and measuring the SBW/superwoman construct.

Two phases were used to complete the scoping review. The first phase included title and abstract screening and the second phase included a full-text screening of the selected articles. Figure 2 outlines the results of the literature search and screening process. After reviewing the articles' titles and abstracts, 41 articles were available for full-text review. After the full-text screening was conducted, it was determined that 12

articles met all inclusion criteria. From each study meeting the inclusion criteria, information on: author, year, and journal of publication, country in which study was conducted, the measure of SBW/superwoman used in the study and psychometric properties of the measure (if documented) were extracted and charted into Microsoft office Excel. For psychometric data, we extracted Cronbach's alpha, intra-class coefficient of correlation (ICC) or any other correlation coefficient, if reported, when documenting the reliability of a given measure. Where a study explored validity of a given measure of SBW/superwoman, we documented the type of validity examined such as construct, content, criterion, concurrent, divergent, or convergent validity, alongside supporting statistics.

2.2.2 Data Extraction

The application Covidence was utilized to screen articles by title and abstract. Two researchers undertook the process of screening the articles independently and discussed any disagreement to reach a final resolution. Full text articles were then screened, and all included articles used in the final analysis of the scoping review. Due to the nature of the review, critical appraisal of study quality was not performed (Pham et al., 2014). Further, full text review of all studies was assessed for scales used to measure the SBW/superwoman construct. Both researchers examined the questions used on the scale. Table 1 summarizes the inclusion and exclusion criteria used: SBW/superwoman scales were included. Scales examining partial characteristics of the SBW/superwoman construct were also included.

Table 1. Inclusion and Exclusion Criteria for Scoping Review

Inclusion criteria	Exclusion criteria
English-language studies published in a peer-reviewed journal between 01/01/2000 and 12/31/2020	Studies examining only psychometric properties of strong black woman/superwoman scales, including validation, development, and assessment
Quantitatively (objectively) measuring strong black woman/superwoman construct	Qualitative assessment of strong black woman/superwoman
Participants women identifying as Black and/or African American woman aged 18 and older	Outside of US
Association to some stress related health outcome	

2.2.3 Data Analysis

To guide the literature analysis, two researchers met regularly to examine all included scales resulting from the full text review to identify the main topics and themes between scales. This stage of the analysis involved charting key items of information obtained from the primary research reports being reviewed. Charting (Hackett & Strickland, 2018) is a technique to synthesize and interpret data by organizing them into key topics and themes. Analysis included descriptions of what scales were intended to measure, as stated by journal authors. Further, researchers charted author(s), year of publication, study location, study populations characteristics, aims of the study, methodology, outcome measures, and important results. To maintain consistency of construct definitions, both researchers judged whether scales should be included, and what they measured, based on rigorous definitions agreed between all authors.

2.3 Results

2.3.1 Study Selection

A total of 119 articles were included in the search for scales (see Figure 2); reasons for exclusion are summarized in Figure 2. From these articles, 41 studies were included in the full-text review, of which 12 were included in the final analysis.

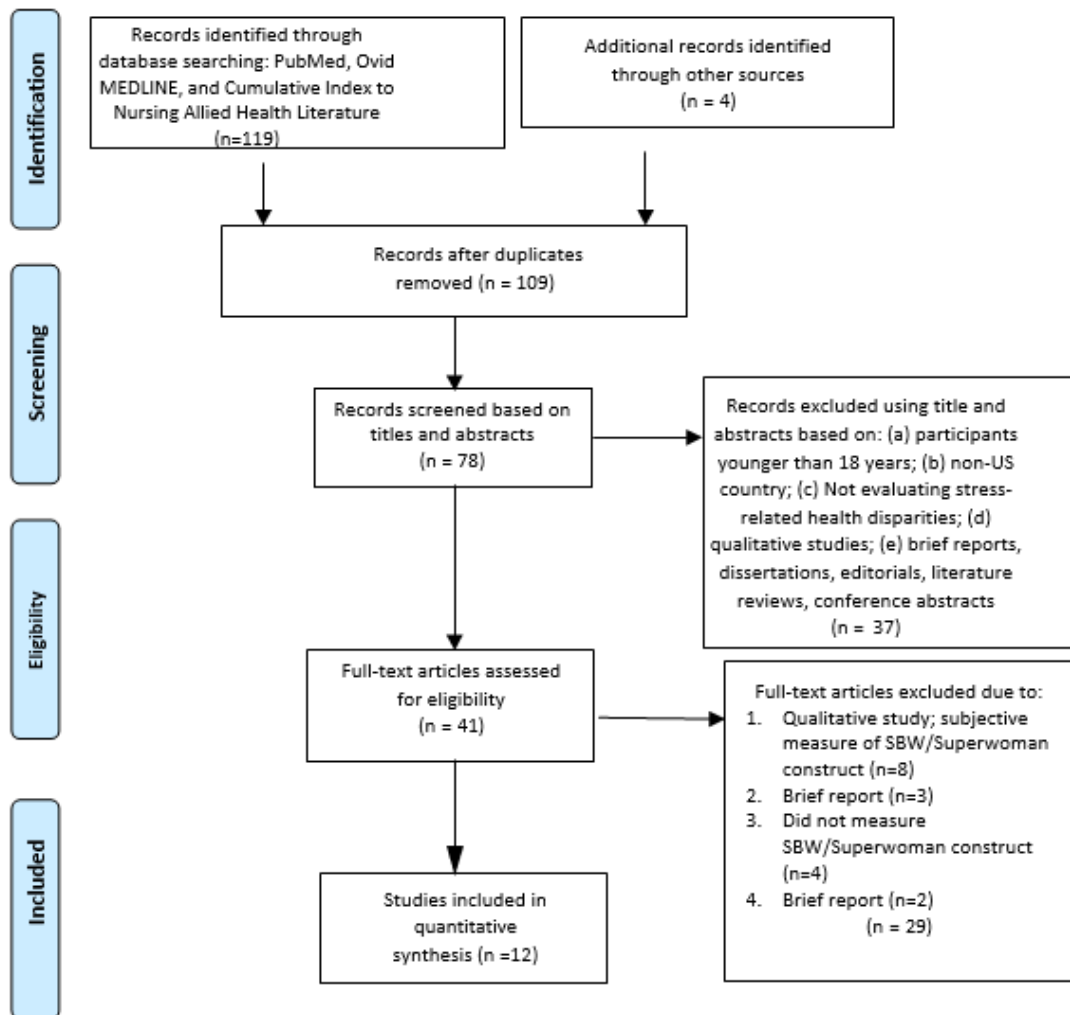


Figure 2: PRISMA Flow Diagram of Scoping Review

Table 2. Key Finding Across Studies

Author(s), Year	Scale	# of Items	Psychometric Properties	Study Location and population	Aims/purpose
Knighton et al., 2020	Modified Stereotypical Roles for Black Women Scale (Strength/Suppress Emotions): 4-point Likert scale ranging from 1 = strongly agree to 4 = strongly disagree.	10	$\alpha = .88$	Historically Black Colleges and Universities (HBCUs), colleges and universities in a southern state (USA) 243 African American women 19 to 72 years-olds (M=39.49, SD = 12.59)	Investigating obligation to show strength/suppress emotion as a potential mediator between racial microaggressions and psychological distress among middle-class African American women.
Abrams, Hill, Maxwell 2018	Stereotypic Roles of Black Women Scale (Superwoman Subscale): 5-point Likert Scale ranging from 1 (Strongly disagree) to 5.	11	$\alpha = .78$	USA 194 African American women 18 to 82 years-old (M = 37.53, SD = 19.88)	Investigated whether self-silencing mediates the relation between perceived strength obligations and depression.
Allen et al., 2019	The Giscombe Superwoman Schema Questionnaire (G-SWS-Q) 4-point Likert scale ranging from 0 = "This is not true for me" to 3 = "This is true for me all the time"	35	$\alpha = .76-.89$	San Francisco Bay area 207 African American women 30-50 years-old (M=41.72)	Examined whether the superwoman schema (SWS), modifies the association between racial discrimination and allostatic load

Dale et al., 2019	GRMs Scale—black women (GRMS-BW): 5-point Likert scale ranging from 0 = never, to 5 = once a week or more 5-point Likert scale ranging from 0 = never happened to 5 = extremely stressful).	32	appraisal $\alpha = 0.93$ and frequency $\alpha = 0.92$)	Large urban city in the Southeastern United States 100 African American M=49.25 (SD = 10.89, 22–67)	Aimed to bridge the gap in the literature by providing insight into the relationships between racial discrimination, HIV-related discrimination, and GRMs and barriers to HIV-related care among BWLWH
Dale & Safren 2019	Gendered Racial Microaggressions Scale for Black Women 5-point Likert scale ranging from 0 = never, to 5 = once a week or more 5-point Likert scale ranging from 0 = never happened to 5 = extremely stressful).	26	Cronbach's alpha appraisal $\alpha=.95$ Frequency $\alpha=.92$	Large urban metropolitan area in the Southeastern United States 100 BWLWH M=49 (range = 22 – 67)	Investigated the associations between GRM, race- and HIV-related discrimination, and trauma symptoms among BWLWH and explored whether gendered racial microaggressions contributed uniquely to trauma symptoms above the contribution of race- and HIV-related discrimination.
Jerald, 2017	Modern Jezebel Scale adapted from the Stereotypic Roles of Black Women Scale To assess women's awareness of the Jezebel and	12 (Jezebel) 12 (Sapphire) 9 (Strong Black Woman Scale—Endorsement)	Jezebel subscale $\alpha= .95$ Sapphire subscale $\alpha=.97$	Two college campuses in the United States 609 African American Woman M=22.13 (SD = 5.32).	Examined how Black women's metastereotype awareness, that is, awareness that others hold stereotypes of their group, influences mental health, self-

		Sapphire stereotypes 5-point point Likert Scale ranging from 1 (Strongly disagree) to 5.			care, and substance use for coping. Also examined the moderating role of racial identity in these associations	
		Modified version of Strong Black Woman Scale— Endorsement: To assess women's awareness of the SBW ideology 5-point point Likert Scale ranging from 1 (Strongly disagree) to 5.				
Lewis et al., 2017		Gendered racial microaggressions: 6-point Likert-type response ranging from 0 (never) to 5 (once a week or more). Gendered racial identity centrality: modified version of the 10-item Multidimensional Inventory of Black Identity Centrality subscale to measure	26 (Gendered microaggression); 10 (Gendered racial Centrality)	Cronbach's alpha reliability estimate $\alpha = .92$ (Gendered microaggression) Cronbach's alpha coefficient $\alpha = .80$ (Gendered racial Centrality)	Online US Survey (54% Southeast, 18% Midwest, 17% Northeast, and 10% West Coast 231 Black women 37 years (SD =12.38)	The purpose of this study was to apply an intersectionality framework to explore the influence of gendered racism (i.e., intersection of racism and sexism) on health outcomes

Watson 2015	<p>the intersection of racial and gender identity centrality.</p> <p>7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). <u>SBW race–gender schema:</u></p> <p>5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree).</p>	11-item Superwoman subscale ; 5-item Mammy subscale were combined to measure the SBW race–gender schema	Cronbach’s alpha reliability $\alpha = .77$	Local Midwest university and rural community for the study 95 African American women 18 and 65 years (M=20.91, SD = 7.27)	Investigated whether African American women’s endorsement of the SBW race–gender schema predicted increased symptoms of anxiety and depression and whether attitudes toward professional psychological help-seeking intensified psychological distress Examined generational differences in the endorsement of modern depictions of the Jezebel, as well as the relationship between racial-ethnic esteem and endorsement of this sexualized image.
Brown 2013	<p>Modern Jezebel stereotype: 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5).</p>	7	Cronbach’s alpha $\alpha = 0.82$ Test-retest correlation ($r = .45$, $p, 0.001$) at six months	Online Survey-Midwest region of the USA 249 African American women 18 to 78 years (M = 38.98, SD= 13.64)	

Donovan & West, 2015	Stereotypic Roles for Black Women Scale (SRBWS) 5-point Likert-type scale ranging from 1 = strongly disagree to 5 = strongly agree.	34	Superwoman ($\alpha = .67$), Jezebel ($\alpha = .72$), Sapphire ($\alpha = .70$), Mammy ($\alpha = .53$)	New England University 92 African American women 18 to 47 (M = 23.32, SD= 6.02)	Examine factors that may be related to African American trauma survivors' binge eating and to identify mechanisms of the associations among trauma, SBW ideology, and binge eating.
Harrington et al, 2010	Stereotypic Roles for Black Women Scale 5-point scale (strongly disagree to strongly agree)	11 (Superwoman); 5 (Mammy)	NR	USA: midsized urban hospital internal medicine clinic (27.7%), undergraduate courses at a Midwestern university (52.0%), faculty/staff mailings (14.1%), and word of mouth (6.2%). 179 African American female trauma survivors M= 29.6 years, SD =12.8	The goals of this study were to examine factors that may be related to African American trauma survivors' binge eating and to identify mechanisms of the associations among trauma, SBW ideology, and binge eating.

2.3.1.1 Scales Used to Operationalize SBW/Superwoman

Out of the 12 final studies identified, seven utilized the Stereotypic Roles for Black Women Scale (SRBWS) (Thomas et al., 2004). The SRBWS was one of the first instruments designed to empirically assess the SBW/superwoman construct and was the most utilized scale among the studies, one study used the Giscombe Superwoman Schema Questionnaire (G-SWS-Q; Woods-Giscombe et al., 2019), and three used the Gendered Racial Macroaggressions Scale for Black Women (GRMS) (Dale et al., 2019; Dale & Safren, 2019; J. A. Lewis et al., 2017). The following sections report common features on the identified scales examining the SBW/superwoman construct, including how scales are structured, what components of construct were measure, and how they were measure.

2.3.1.2 Stereotypical Roles for Black Women (SRBWS)

The SRBWS is a 34-item measure, to assess endorsement of common stereotypes about African American women with four subscales corresponding to the following stereotypes about African American women, (a) Mammy (*“feel guilty when I put my own needs before others,” “People often expect me to take care of them,” and “I am always helping someone else”*), (b) Sapphire (*“Black women are usually angry with others” and “People respond to me more if I am loud and angry”*), (c) Jezebel (*“Black women will use sex to get what they want” and “Black women are often treated as sex objects”*), and (d) Superwoman (*“Black women have to be strong to survive” and “If I fall apart, I will be a failure”*). Items are rated using a 5-point Likert scale ranging from 1 = “strongly disagree” to 5 = “strongly agree.”

Not all components of the SRBWS were used among all seven studies. Watson and Hunter (2015) and Harrington et al., 2010 both used the Mammy and Superwoman subscales to test their hypothesis of the SBW. One study only incorporated the Jezebel scale to examine the perception and acceptance of the Jezebel depiction between younger (ages 18 to 34), middle-aged women (35 to 54) and older generations of Black women (ages 55 to 78) (Brown et al., 2013) and the remaining three studies varied in their use of the SRBWS to investigate the relationship between the SBW/Superwoman role and a variety of other psychosocial factors. One study used the entire SRBWS without any modifications to examine the moderating effect of the SBW between stress and mental health (anxious and depressive symptoms) (Donovan & West, 2015), while the study by Knighton et al., 2020 modified the questions of the entire scale based on the Superwoman Schema Conceptual Framework. The last study only used the Superwoman subscale from the SRBWS to analyze the mediating role of self-silencing between perceived strength obligations and depression (Abrams et al., 2019).

2.3.1.3 The Giscombe Superwoman Schema Questionnaire (G-SWS-Q)

Empirically, the Superwoman Schema is defined by five characteristics: (1) obligation to manifest strength, (2) obligation to suppress emotions, (3) resistant to being vulnerable or dependent, (4) determination to succeed, despite limited resources, and (5) obligation to help others. These five factors were hypothesized by Woods-Giscombe (2010) from the results of research studies conducted with geographically and ethnically diverse African American women. The SWS conceptual framework posits that these five characteristics have both perceived benefits such as self-, family-, and community-preservation, as well as liabilities such as stress embodiment, delayed health seeking, stress-related health behaviors that may increase risk for illness, and relationship strain.

Previous literature has described the superwoman as a sacrificial, motherly-type woman who takes on the trials and burdens of her loved ones. She provides unlimited support to others, while often suppressing her own emotional needs in anticipation of the needs of others (Harris-Lacewell, 2001)Harris-Lacewell, 2001; Woods-Giscombe, 2010). Allen et al. (2019), examined whether the superwoman schema (SWS), modified the association between racial discrimination and allostatic load among 30-50 years-old African American women.

Developed from eight focus groups consisting of a demographically diverse sample of African American women (Woods-Giscombe et al., 2019), the G-SWS-Q is a 35-item scale comprising five subscales, each representing a different dimension of the SWS: (1) obligation to present an image of strength (6 items, e.g., “I try to present an image of strength”, $\alpha = 0.76$); (2) obligation to suppress emotions (7 items, e.g., “My tears are a sign of weakness”, $\alpha = 0.87$); (3) resistance to being vulnerable (7 items, e.g., “Asking for help is difficult for me”, $\alpha = 0.84$); (4) intense motivation to succeed (6 items, e.g., “No matter how hard I work, I feel like I should do more”, $\alpha = 0.77$); and (5) obligation to help others (9 items, e.g., “I put everyone else’s needs before mine”, $\alpha = 0.89$). Responses are coded on a 4-point Likert scale ranging from 0 = “This is not true for me” to 3 = “This is true for me all the time”

2.3.1.4 The Gendered Racial Macroaggressions Scale for Black Women (GRMS)

The *Gendered Racial Macroaggressions Scale for Black Women (GRMS)* (J. A. Lewis & Neville, 2015) is an intersectional framework applied to gendered racism theory (Essed, 1991) and a model of racial microaggressions (Sue et al., 2007) to develop the GRMS. An initial pool of 32 items was developed with input from one community-based focus group consisting of 12 demographically diverse Black women and a panel of

doctorally-prepared Black and White women with expertise in research on racism and sexism using a Likert response format ranging from “never” (0) to “once a week or more” (5) to assess frequency of experienced events ($\alpha = .92$). The scale also included a stress appraisal component ($\alpha = .93$) that asked participants to rate the stressfulness of each event with responses ranging from “not at all stressful” (0) to “extremely stressful” (5). The psychometric properties of the preliminary scale were assessed with two studies using independent, geographically diverse samples that employed exploratory (study 1, $n=259$) and confirmatory (study 2, $n=210$) factor analysis suggesting support for the overall GRMS and its four factors: (a) Assumption of Beauty and Sexual Objectification, (b) Silenced and Marginalized, (c) Strong Black Woman Stereotype, and (d) Angry Black Woman Stereotype with internal consistence ranging between .74 and .88 for the subscales. The Strong Black Woman Stereotype subscale included items such as “Someone assumed I was sassy and straightforward,” “I have been told that I am too independent,” “Someone made me feel exotic as a Black woman,” “I have been told that I am too assertive,” “Assumed to be a strong Black woman” (Lewis & Neville, 2015, p. 295). Respondents are asked to select how often in their lifetime (ranging from ranging from 0=*never* to 5=*once a week or more*) they experienced a microaggression and to rate how stressful the experience was for them (ranging from 0= never happened to 5=extremely stressful). The GRMS-BW has shown good validity (Lewis & Neville, 2015) and reliability (Cronbach’s alphas of .93 (appraisal) and .92 (frequency) in the literature.

Three studies used the GRMS to evaluate the impact of gendered racial microaggression (GRM) and discrimination on mental and physical health outcomes. In two separate studies among 100 Black women living with HIV (BWLWH), Dale et al.

(2019) evaluated the association between racial discrimination, HIV-related discrimination, gendered racial microaggression, and barriers to HIV-related care (e.g., transportation, finance, community stigma). Results indicated that higher race-related discrimination, HIV-related discrimination, and GRM significantly predicted higher total barriers to care controlling for age, education, and income. In their second study exploring the association between GRM, race and HIV related discrimination and symptoms of trauma among 100 BWLWH, Dale and Safren (2019) found that GRM and HIV-related discrimination predicted higher symptoms of PTSD, and higher GRM and race related discrimination predicted higher post-traumatic cognitions. The last study by Lewis (2017) examined the relationship between GRM and health outcomes among 231 Black women. The authors also explore coping strategies as a potential mediator and gendered racial identity centrality as a potential moderator. Results demonstrated a positive correlation between GRM and self-reports of poor mental and physical health outcomes. Participants with higher GRM, had lower gendered racial identity that resulted in lower engagement of coping strategies and was associated with poorer mental and physical health outcomes. These findings demonstrate the potentially protective mechanisms of having high gendered racial identity.

2.4 Discussion

Current SBW/superwoman scales have a wide range of lengths: from 7 to 35 questions. For context, there are also other SBW/superwoman scales with far less questions that were excluded from the final analysis, such as the Belgrave Gender Role Inventory (BGRI) (Belgrave et al., 2016) and the African American Women's Shifting Scale (Johnson et al., 2016) due to studies only qualitatively assessing those measures.

There are pros and cons to the number of questions in a scale. Having too many questions increases the risk of respondent dropout or respondents not fully completing the questionnaire. On the other hand, shorter questionnaire lengths have been shown to make response more likely (Edwards et al., 2002). For online questionnaires, it has been found that longer questionnaires had statistically significantly more “don’t know” responses and semi completed questionnaires, suggesting reduced engagement and response quality with longer questionnaires (Deutskens et al., 2004). Shortened scales are often published after originally longer questionnaires. Thus, questionnaires with too many questions should be avoided or brief versions of questionnaires also developed. On the other hand, a scale with too few questions risks not measuring “enough” to accurately assess the key components SBW/superwoman construct. In summary, a scale that is too long may risk participant fatigue, and a scale that is too short may risk not asking enough information. For these reasons, it is a strength that the scales used to operationalize the SBW/superwoman construct all have subscales that are accessible to create long, and short modifications based on the research question.

Also, Likert and Likert-like scale questions were by far the most common, and most measures used only such scales. Why other question types (Yes/No, Multiple choice, etc.) are underrepresented is unclear, but it may be speculated that Likert type scale questions offer the ideal mix of characteristics. Yes/No questions suffer from a limited range of responses and does not determine how much respondents agree or disagree with a statement. Multiple choice offers more freedom, depending on the context of the question. Descriptive questions make mass administration of the scale difficult, as a lack of standardization means that each response will need to be analyzed;

this is challenging for quantitative analysis, although it provides rich qualitative data in small samples.

2.4.1 Implications

Psychological stress in African American women, including race- and gender-related stress, has been linked with inadequate physical activity and stress-related eating behaviors that may increase risk for obesity and influence biomarker activity associated with increased risk for chronic illness including cortisol, C-reactive protein, and blood pressure (Geronimus et al., 2010; Guyll et al., 2001; T. T. Lewis et al., 2010; Pascoe & Smart Richman, 2009; Sims et al., 2012; Woods-Giscombé et al., 2015). Despite this growing body of research more research is needed to understand the mechanisms linking stress to health outcomes in African American women. It is likely that without attention to the cultural and contextual factors of African American women's lives, simple, health promotional messages to engage in healthier behaviors, such as increase physical activity, eat better, and rest more, will be inadequate to address the complex relationships between health behaviors and undesirable health outcomes.

2.4.2 Limitations

The search for SBW/superwoman scales was intended to be comprehensive but focused, but some literature will be missed, and therefore, there are scales that are not included. To consider more SBW/superwoman scales is outside of this review's aims but is certainly an area for further exploration. Articles only from peer-reviewed journals were included, leading to a potential publication bias. Additionally, papers that refer to SBW/superwoman using other terminology or phrases may have been missed, as well as other studies that happened to omit the terms "strong black woman" or "superwoman"

and its synonyms. Furthermore, the literature search only searched titles. Future, studies were not appraised for quality, in favor of identifying as many scales as possible and not looking into the research carried out with them. Some scales reviewed may be low quality or biased, which could in turn bias the results and conclusion of this paper.

This study was also not designed to determine the reasoning behind design choices in SBW/superwoman scales, focusing on observing trends in current scales instead. Scoping reviews are intended to be a narrative overview of the literature (Arksey & O'Malley, 2005; Pham et al., 2014); follow-up work may produce more detailed recommendations based on usability and design.

2.5 Conclusion

Three instruments were found to operationalize the SBW/superwoman construct to assess stress-related disparities among African American women. These assessment tools have made important contributions to the empirical research on the superwoman/SBW construct. Out of three scales identified, the G-SWS-Q seems to be the only scale that addresses methodological and conceptual areas not represented by the others. These areas include having: 1) comprehensive representation of SBW/SW concept, 2) consistency of response scales, and 3) use of a diverse (e.g., age, educational background, geographic location) sample of African American women for item development and content validity assessment. Specific emphasis must be placed on the cognitive, emotional, social, and behavioral factors that influence African American women's life experiences and in turn, their health and healthcare decision-making (e.g., engagement in healthy behaviors and utilization of healthcare services). In addition, the sociohistorical backdrop (context) that influences health behaviors and

health outcomes is also critical to consider. Studies suggest that the most effective and sustainable interventions have been culturally tailored to meet the specific needs of the target population (Fisher & Kalbaugh, 2011; Waheed et al., 2015; Wallace & Bartlett, 2013). Therefore, a framework that considers the intersection of gender and race/ethnicity may be the most effective for informing interventions intended to improve health outcomes among African American women.

3. Utilizing MyChart Patient Portal to Examine Stress and Cardiovascular Wellbeing Among Rural African American Women: A Pilot Study

3.1 Background

To date, cardiovascular disease (CVD) remains the leading cause of death among women in the United States (US) (Arnett et al., 2019; Shay et al., 2012). Nearly 655,000 Americans die from CVD each year, which averages approximately 1 in every 4 deaths (Virani et al., 2021). In the past decade, there have been significant advancements made in the understanding and treatment of CVD. The recently released Healthy People 2030 objectives (Angell et al., 2020; Pronk & Kleinman, 2030), continues to highlight the need to not only decrease cardiovascular disease among US adults but also address the health disparities that impact the most vulnerable populations. However, there are persistent racial and gender disparities in CVD, with African American women being among the most high-risk group (Havranek et al., 2015; Kalinowski Jolaade et al., 2019a; Virani et al., 2021). Compared to their White counterparts, African American women have more CVD risk factors, earlier onset of the disease and worse outcomes (Kalinowski Jolaade et al., 2019a). There are also geographic disparities related to the prevalence of cardiovascular disease. Rural African American women are especially vulnerable to CVD due to a variety of factors. They have lower socioeconomic status than their rural white counterparts and experience fragile health infrastructures that makes it difficult to access to health care (Abbott et al., 2018; James, 2017). Physical barriers, such as longer distances to health providers combined with the lack of CVD specialists (Douthit et al., 2015), all contribute to the cardiovascular disparities in this population.

A method of assessing cardiovascular wellbeing is by using the American Heart Association Ideal Cardiovascular Health (ICH) metric. The ICH metric is composed of 4 modifiable health behaviors (physical activity, nutrition, smoking and body mass index) and 3 cardiovascular biomarkers (blood pressure, cholesterol, and blood glucose). Scores on the ICH metric has been found to have cardiovascular implications, with higher scores being associated with lower CVD risk and increased life expectancy (Angell et al., 2020; Lloyd-Jones et al., 2010). African American communities have been found to have poorer ICH over time with African American women having the lowest ICH compared to women in all other racial/ethnic groups (Brewer et al., 2018; Djoussé et al., 2015). Further, compared to 18.7% of white women, only 4.2% of African American women met the standard of ideal cardiovascular wellbeing (Bambs et al., 2011). This burden of CVD morbidity and mortality continues to disproportionately affect African American women.

Chronic exposure to stress may be a significant contributor to the cardiovascular health disparity seen among African American women. There is an established understanding of the relationship between stress and cardiovascular disease. To provide a brief overview, chronic exposure to stress causes the body to release stress hormones, that when elevated for extended periods of times can cause earlier onset of CVD-related risk (American Psychological Association, APA Working Group on Stress and Health Disparities, 2017). However, this relationship is complex in that there are differences in the types of stress African American women experience which can best be understood through an intersectional approach.

The environmental context is a significant social category that have been found to impact the cardiovascular health of African American women (Diez Roux et al., 2016;

Islam et al., 2020). Neighborhood cohesion and neighborhood safety are two features of a social neighborhood environment that can help promote cardiovascular wellbeing (Islam et al., 2020) but when found to be poor in socioeconomically disadvantaged environments, can be detrimental to cardiovascular health (Kim et al., 2014; Kuipers et al., 2012). The relationship between neighborhood cohesion and safety and ICH have not been extensively studied among rural African American women. Vance county in North Carolina, the rural county we will recruit from for the current study, has higher poverty (26% vs. 14%) (U.S. Census Bureau, 2019) and crime rates compared to overall state averages (2.76% vs. 3.79%) (NC Bureau of Investigation, 2020). Poverty is linked to higher risks for several health problems, including CVD (Tawakol et al., 2019) and stress is more prevalent among those with lower socioeconomic status (Hobson-Prater & Leech, 2012). This further demonstrates the potential impact of residing in disadvantaged and poor communities. Low neighborhood cohesiveness is associated with higher CVD events such as myocardial infarctions and coronary heart disease (Kim et al., 2014), and is associated with poor health outcomes (Hobson-Prater & Leech, 2012). Yet, more knowledge is needed on the extent of neighborhood cohesiveness and safety on ICH among this population.

The Superwoman Schema (SWS) is a multidimensional framework that aims to describe the unique process in which African American women experience and respond to stress (Woods-Giscombé, 2010). This framework incorporates historical context of systematic oppression towards African American women to inform the unique characteristics of stress and coping among this population. The five characteristics of the SWS conceptual framework are: a perceived obligation to manifest an image of strength, perceived obligation to suppress emotions, resistance to being vulnerable or depending

on others, prioritization of caregiving over self-care and motivation to succeed despite limited resources.

The use of patient portals, such as MyChart, has risen dramatically in the past 5 years (Hong et al., 2020); and have shown to have the possibility to facilitate relationships between patients and providers, increase the awareness of health status and improve treatment adherence (Sherman et al., 2022). Further, patient portals have also been used as an efficient tool for the recruitment of research participants, as they aid in targeting specific populations for study enrollment (Hong et al., 2020; Sherman et al., 2022). For populations who are often underrepresented in research studies, such as rural African American women, the use of patient portals combined with advancement in broadband access for these communities, could prove to be beneficial in improving health outcomes through specifically tailored health interventions.

3.2 Study Purpose

There recently has been an explosion of telemedicine in rural communities and initiatives to close the rural digital divide by expanding broadband across America (RHI, 2021). This provides an opportunity to reach underrepresented rural African American women and learn more about their cardiovascular wellbeing to inform future research and interventions. Thus, the purpose of this pilot study is to assess the feasibility of recruiting and collecting self-report and electronic health record (EHR) data via the MyChart Portal to describe the prevalence of Ideal Cardiovascular Health (ICH) and assess its association with social neighborhood conditions (neighborhood conditions and neighborhood safety) and the Superwoman Schema. The study aims were to:

AIM 1: Describe the feasibility of using EHR data and survey to determine ICH among rural women recruited via MyChart at rural primary care clinics within a university healthcare system located in Henderson, Oxford and Butner-Creedmoor, North. Feasibility will be defined as the ability to recruit 50 women to participate in the MyChart survey over a 3-month period.

AIM 2: Describe the association between ICH with social neighborhood conditions (neighborhood cohesion and neighborhood Safety) and the SWS.

AIM 3: Describe the experience of rural African American women utilizing the MyChart system.

3.3 Methods

3.3.1 Research Design

This pilot study was conducted utilizing a descriptive design. Data were collected using a combination of self-report and electronic health record (EHR) data. For Aim 1, we assessed the feasibility of using EHR data and survey to determine ICH among rural women recruited via MyChart at three rural primary care clinics within a university healthcare system located in Henderson, Oxford and Butner-Creedmoor, North Carolina between January 1, 2019, and January 1, 2020. Feasibility was defined as the ability to obtain EHR data and collect survey data for 50 people using MyChart. For Aim 2, participants who agreed to participate in the study and provided signed consent forms were asked to complete an electronic survey that included measures of cardiovascular wellbeing, neighborhood cohesion, neighborhood safety and Superwoman Schema. For Aim 3, follow up interviews were also conducted to assess the experience of participants using the MyChart system to identify any potential barriers to utilization. The study

obtained the required Institutional Review Board approvals from was obtained at the affiliated university health system of the first author.

3.3.2 Subjects and Setting

The proposed pilot study recruited and conducted a retrospective analysis utilizing EHR patient portal records from rural primary care clinics within a university healthcare system located in Henderson, Oxford and Butner-Creedmoor, North Carolina between January 1, 2019, and January 1, 2020. These clinics are located in Vance and Granville counties, both rural counties defined using the Rural-Urban Continuum Codes (RUCC) developed by the US Department of Agriculture for delineating residential groups as metro- and nonmetropolitan (USDA, 2020). RUCC classifications of 4 and above is considered rural based on a combination of factors such as population density and proximity to metro areas (USDA, 2020). Participants were asked to complete the survey questions in Qualtrics prospectively. If participants did not complete the survey, they were called and asked if they were interested in participating in the survey over the telephone.

3.3.3 Procedures and Measures

3.3.3.1 Quantitative

Identification of eligible participants began with data query through the Maestro Care. African American women with a recent primary care visit between January 1, 2019, and January 1, 2020, at the rural clinics affiliated with the university healthcare system with available ICH biomarker measures (blood pressure, cholesterol, and blood glucose) were contacted for participation in the study. The patient opt-out status was reviewed prior to contacting eligible participants through MyChart. Patients with an active

MyChart account received a MyChart message, which for most recipients generated an automatic email notification that they had an awaiting message in MyChart. The message described the study and gave recipients the opportunity to click the survey link. All participants completing the survey received a \$10 compensation. Sample characteristics and key study variables are described in Table 3.

Table 3. Key Study Variables

Measure	Definition	Data Source	
Ideal Cardiovascular Health			
Health Behavior measures	Abstracted from EHR when available; otherwise self-reported		
	Poor [0 point]	Intermediate [1 point]	Ideal [2 points]
Diet	≤2 servings of fruit and vegetables per day	3 to 4 servings of fruit and vegetables per day	≥5 servings of fruit and vegetables per day
BMI	≥30.0 kg/m ²	25.0–29.9 kg/m ²	<25.0 kg/m ²
Smoking	Current smoker	Former <1 y	Never or former >1 y
Physical Activity	None	1–149 min/wk moderate intensity	≥150 min/wk moderate intensity
Biomarker measures	Abstracted from EHR		
	Poor [0 point]	Intermediate [1 point]	Ideal [2 points]
Blood Pressure	≥140/≥90 mm Hg	120–139/ 80–89	<120/<80 mm Hg
Fasting Glucose	≥126 mg/dL	100–125 mg/dL	<100 mg/dL
Total Serum Cholesterol	≥240 mg/dL	200–239 mg/dL	<200 mg/dL
	Poor	Intermediate	Ideal
TOTAL score	0-6	7-8	9-14
ICH		1=Yes (≥9)	0=No (<9)
Community Stressors			
Neighborhood Cohesion			
<p>Neighborhood cohesion scale: 5-items for social cohesion were rated on a 4-point Likert scale ranging from strongly disagree (1) to strongly agree (4). Items 3 and 5 will be reverse-coded. Higher score indicating higher neighborhood cohesion and lower scores indicated lower neighborhood cohesion. Scores ranged from 5 to 18.</p> <p>This is a close-knit neighborhood People around here are willing to help their neighbors People in this neighborhood generally don't get along People in this neighborhood can be trusted People in this neighborhood don't share the same values</p>			
Neighborhood Safety			
<p>Neighborhood Violence Scale: Response options for neighborhood violence were on a 4-point Likert scale ranging from never (1) to often (4). Higher score indicating more violence and lower scores indicating less violence in the neighborhood. Scores ranged from 5 to 10.</p> <p>How often was there a fight in this neighborhood in which a weapon was used? How often was there a violent argument between neighbors? How often were there gang fights? How often was there a sexual assault or rape? How often was there a robbery or mugging?</p>			
Superwomen Schema (the SWS)			

The Giscombe Superwoman Schema Questionnaire (GSWS-Q) is a 35-item scale that evaluates the varying subscales of the SWS. SWS overall score was the mean of the 35 SWS items, with a possible range of 0.0 to 3.0.

Obligation to present an image of strength	6 items, e.g., "I try to present an image of strength," $\alpha = 0.76$
Obligation to suppress emotions	7 items, e.g., "My tears are a sign of weakness," $\alpha = 0.87$
Resistance to being vulnerable	7 items, e.g., "Asking for help is difficult for me," $\alpha = 0.84$
Intense motivation to succeed	6 items, e.g., "No matter how hard I work, I feel like I should do more," $\alpha = 0.77$
Obligation to help others	9 items, e.g., "I put everyone else's needs before mine," $\alpha = 0.89$

Ideal Cardiovascular Health (ICH). ICH was used to evaluate cardiovascular wellbeing based on the criteria developed by the American Heart Association (AHA) (Ford et al., 2012) with modifications to the diet metric. Our study only asked participants their daily consumption of fruits and vegetables according to the DASH Diet (Kim et al., 2013b). This approach followed a similar approach followed by previous studies analyzing ICH among rural populations. For this study, we calculated an ICH composite score, as previously outlined by Thacker and colleagues (Brewer et al., 2018; Thacker et al., 2014) by assigning 2 points for ideal, 1 for intermediate and 0 points for poor for each metric and summing all metrics to obtain a composite total score ranging from 0 to 14. ICH total scores were categorized as poor (0–6), intermediate (7–8), or ideal (9–14) for descriptive purposes. Additionally, ICH total scores were dichotomized to further describe whether the participant met ideal ICH, coded as no (0, score of <9) and yes (1, score of ≥ 9).

Community Stressors. Neighborhood cohesion (Neighborhood Cohesion Scale) and neighborhood safety (Neighborhood Safety Scale) are validated scales (Barber et al., 2016; Mujahid et al., 2007) derived from previous literature (Raudenbush & Sampson, 1999; Richards et al., 1999; Sampson et al., 1997) that capture related, yet distinct, neighborhood level social processes that tend to arise as neighborhood socioeconomic conditions decline, such as that of rural communities and have been

found to be associated with both CVD risk factors and disease onset (Barber et al., 2016; Mujahid et al., 2007). Consistent with previous literature that utilized these scales among African Americans from disadvantaged neighborhoods, Neighborhood cohesion scores ranged from 5 to 18, with higher score indicating higher neighborhood cohesion and lower scores indicated lower neighborhood cohesion. Neighborhood safety scores ranged from 5-10, with higher scores indicating more violence and lower scores indicating less violence in the neighborhood. Scores ranged from 5 to 10. Both scales were self-reported by participants.

The Giscombe Superwoman Schema Questionnaire (GSWS-Q) is a validated 35-item scale developed specifically for African American women to use to analyze the five subscales of the superwoman schema (Woods-Giscombe et al., 2019; Woods-Giscombé, 2010); (1) obligation to present an image of strength, (2) obligation to suppress emotions, (3) resistance to being vulnerable, (4) intense motivation to succeed, and (5) obligation to help others. All responses were coded on a 4-point Likert scale with score ranging from 0 = “This is not true for me” to 3 = “This is true for me all the time.” The SWS overall score per participant is the mean of the 35 SWS items, with possible 0.0 to 3.0, with higher scores representing higher endorsement of the SWS.

3.3.3.2 Qualitative

We conducted brief follow-up qualitative interviews by telephone with 8 patients who had completed the online survey to understand their experiences with utilizing the MyChart system. Participants for the study were selected through convenience sampling (Glesne, 2016). Data collection included one semi-structured interview per participant, using a pre-prepared interview guide. Semi-structured interviews were the most appropriate method to obtain detailed responses and generate an extensive scope of

information (Guest et al., 2017). Interviews lasted approximately 10 minutes. A total of 4 questions were included in the interview guide: 1. What are your thoughts about the MyChart system? What are your thoughts about the MyChart system, how do you use MyChart, how much time does it take you to navigate MyChart and how would you describe your experience with using MyChart.

3.3.4 Statistical Analysis

3.3.4.1 Quantitative Data

Descriptive statistics were used to describe the patient characteristics and key analytic variables for Aim 2. For each continuous measure, the median and 25th, 75th percentile (IQR) was used to describe the central tendency and variability due to skewness of the data distributions. Spearman correlation analyses were conducted to examine interrelationship of the self-report measures and their relationship with ICH total scores. Non-parametric Kruskal–Wallis tests were used to test for ICH category (poor, intermediate, ideal) differences in the self-report measures (neighborhood safety, neighborhood cohesion, SWS overall, and SWS subscale scores). Additionally, we employed Wilcoxon Two-Sample Tests to test for dichotomized ICH (ideal vs not) differences in the same self-report measures. All data were analyzed using the SAS 9.4 software (SAS Institute, Cary, NC). Non-directional statistical significance was set at 0.05 per test.

3.3.4.2 Qualitative Data

Directed content analysis was used for the qualitative interview data supported by a general inductive approach that included: familiarization with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and

producing a final report of the findings. The Software program NVivo V.12 was used to code and review the data. Following the completion of initial coding of the data, all authors discussed and refined throughout the process as required. The final framework was discussed and agreed by all authors. A coding scheme was developed using preexisting codes informed by concepts from the interview guide that had the overall objective of identifying barriers and facilitators of MyChart utilization through the experiences of rural African American women.

3.4 Results

3.4.1 Aim 1 Feasibility

We sought to recruit a total of 50 African American women from three the rural, primary care clinics. Feasibility was determined by the ability to obtain EHR data and collect survey data for 50 patients using MyChart over a 3-month period. The target recruitment goals were not met, as a total of 68 women were recruited and completed the online survey; however, the recruitment period was approximately 8 months. All participants completed self-report measures for physical activity, nutrition status, neighborhood social conditions (neighborhood safety and neighborhood cohesion) and the SWS. Of the 68 patients that completed the online survey, 16% (11 participants) did not complete the demographic questionnaire. Our initial recruitment plan was for participants to be contacted through MyChart only, however, a modified version of the Dillman Tailored Design Method (TDM) was implemented to maximize response rate for the survey. The TDM allows for various recruitment strategies to be employed via several avenues (Dillman et al., 2008). For this pilot we added phone and email contact options.

3.4.2 Aim 2 Self-Report Measures and ICH

A total of 68 women completed the online survey. Tables 4 and 5 detail the patient characteristics and survey scores. The median age of participants was 44 years (range: 32 to 50) and 50% had completed post-secondary education degrees. Nearly half were married, 42% had an annual income of \$50,000 or less, and over 78% had full-time employment.

Table 4. Patient Characteristics (N=68)

Characteristic	<i>n</i> (%)
Education Level	
Some High School	1 (1.7%)
High School	18 (31.5%)
Trade School	9 (15.7%)
Bachelor's Degree	15 (26.3%)
Master's Degree	14 (24.5%)
PhD or higher	0 (0.0%)
Married	26 (45.6%)
Annual Income	
Less than \$25,000	11 (19.3%)
\$25,000 - \$50,000	13 (22.8%)
\$50,000 - \$100,000	20 (35.0%)
\$100,000 - \$200,000	13 (22.8%)
Employment Status	
Employed Full-Time	44 (78.5%)
Employed Part-Time	2 (3.5%)
Seeking opportunities	7 (12.5%)
Retired	3 (5.3%)
Age, in years	
Median (25 th , 25 th)	44 (38.5, 48.0)

*N=57 for demographics other than age due to 11 patients not completing that section of the questionnaire.

Table 5. Self-report Measures (N=68)

Characteristic	Statistics
Neighborhood Safety Total Score	N=66
Median (25 th , 75 th percentile)	4.0 (4.0, 5.0)
Minimum, maximum	5.0, 10.0
Neighborhood Cohesion Total Score	N=65
Median (25 th , 75 th percentile)	13.0 (11.0, 15.0)
Minimum, maximum	5.0, 18.0
SWS Overall Score	
Data Available	N=62
Median (25 th , 75 th percentile)	1.9 (1.7, 2.3)
Minimum, maximum	0.1, 3.0
SWS Strength Subscale Score	
Data Available	N=66
Median (25 th , 75 th percentile)	2.5 (2.0, 2.8)
Minimum, maximum	0.0, 3.0
SWS Suppression Subscale Score	
Data Available	N=65
Median (25 th , 75 th percentile)	1.6 (1.1, 2.0)
Minimum, maximum	0.0, 3.0
SWS Vulnerable Subscale Score	
Data Available	N=66
Median (25 th , 75 th percentile)	2.0 (1.6, 2.3)
Minimum, maximum	0.0,3.0
SWS Succeed Subscale Score	
Data Available	N=65
Median (25 th , 75 th percentile)	2.2 (1.8, 2.5)
Minimum, maximum	0.0, 3.0
SWS Help Subscale Score	
Data Available	N=64
Median (25 th , 75 th percentile)	1.9 (1.4, 2.3)
Minimum, maximum	0.0, 3.0

N=Data Available; SWS = Superwoman Woman Schema; SWS Overall Score = Overall score per participant is the mean of the 35 SWS items, with a possible range 0.0 to 3.0.

Table 6 summarizes the ICH scores. The majority of participants met the ideal category of ICH (44.1%), with 16.1% and 39.7% categorized as poor and intermediate respectively. For the individual ICH metrics, the ideal category was the predominant group for total cholesterol, glucose, and smoking. The intermediate category was the predominant group for physical activity and blood pressure, while the poor category was the predominant group for nutrition and body mass index.

Table 6. Ideal Cardiovascular Health (ICH) Metrics and Total Score (N=68)

ICH Metrics	Poor n of 68 (%)	Intermediate n of 68 (%)	Ideal n of 68 (%)
Physical Activity	11 (16.1%)	44 (64.7)	13 (19.1%)
Nutrition	40 (58.8%)	23 (33.8%)	5 (7.3%)
Blood Pressure	11 (16.1%)	30 (44.1%)	27 (39.7%)
Body Mass Index	45 (66.1%)	17 (25.0%)	6 (8.8%)
Total Cholesterol	3 (4.4%)	15 (22.0%)	50 (73.5%)
Glucose	5 (7.3%)	14 (20.5%)	49 (72.0%)
Smoking	8 (11.7%)	6 (8.8%)	54 (79.7%)
ICH Total Score	Total Sample		
Median	8		
25th, 75 th percentile	7, 9		
Minimum, maximum	4, 13		
	Poor n of 68 (%)	Intermediate n of 68 (%)	Ideal n of 68 (%)
ICH Total Score Categories	11 (16.1%)	27 (39.7%)	30 (44.1%)

N=68, no missing data; ICH Poor = score 0-6; Intermediate = score 7-8; Ideal = score 9-14

Spearman correlations were performed to examine the associations with the self-report measures of neighborhood safety, neighborhood cohesion, and SWS overall scores. We also examined the relationship of each of these measures with the ICH total score. Statistically non-significant minimal to small correlations were indicated, with the exception that a statistical significantly inverse relationship was observed between the neighborhood safety and ICH total scores ($r_s = -0.25$, $p = 0.0396$). Specifically, greater self-reported neighborhood violence was associated with lower ICH total scores (poorer ICH).

Table 7. Self-report Measures and ICH Total Scores: Spearman Correlations Coefficient

	Safety Total Score	Cohesion Total Scores	SWS Overall Score	ICH Total Score
Safety Total Score		+ 0.14	+ 0.07	- 0.25*
Cohesion Total Scores			+ 0.06	+ 0.02
SWS Overall Score				-0.01
ICH Total Score				

SWS = Superwoman Schema; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

The results of the Kruskal–Wallis tests did not indicate any statistically significant differences in the three ICH categories with regard to neighborhood safety, neighborhood cohesion, and SWS measures (Table 8).

Table 8. Ideal Cardiovascular Health (ICH) Categories and Self-Report Measures

Self-report Measures	ICH Total: Poor	ICH Total: Intermediate	ICH Total: Ideal	p-value
Safety Total Score	N=11	N=26	N=29	
Median (25 th , 75 th)	4.0 (4.0, 7.0)	4.0 (4.0, 5.0)	4 (4.0, 4.0)	
Mean Rank	39.3	36.1	28.8	0.0890
Cohesion Total Scores	N=11	N=25	N=29	
Median (25 th , 75 th)	14.0 (9.0 16.0)	12.0 (11.0, 14.0)	12.0 (11.0, 15.0)	
Mean Rank	36.4	31.2	33.2	0.7425
SWS Total Scores	N=11	N=22	N=29	
Median (25 th , 75 th)	1.9 (1.8, 2.3)	1.9 (1.7, 2.3)	1.9 (1.7, 2.2)	
Mean Rank	31.8	30.7	31.9	0.9691
SWS Strength Score	N=11	N=26	N=29	
Median (25 th , 75 th)	2.7 (2.0, 2.8)	2.5 (2.2, 2.7)	2.3 (2.0, 2.8)	
Mean Rank	36.7	33.3	32.3	0.8092
SWS Suppression Score	N=11	N=25	N=29	
Median (25 th , 75 th)	1.7 (1.4, 2.0)	1.6 (1.0, 2.0)	1.7 (1.1, 2.1)	
Mean Rank	36.0	30.4	31.0	0.6561

SWS Vulnerable Score	N=11	N=26	N=29	
Median (25 th , 75 th)	2.0 (1.6, 2.3)	1.9 (1.6, 2.3)	2.0 (1.4, 2.6)	
Mean Rank	32.9	31.9	35.1	0.826 1
SWS Succeed Score	N=11	N=25	N=29	
Median (25 th , 75 th)	2.2 (1.8, 2.5)	2.2 (1.8, 2.5)	2.0 (1.7, 2.5)	
Mean Rank	32.3	34.3	32.1	0.907 1
SWS Help Score	N=11	N=24	N=29	
Median (25 th , 75 th)	1.8 (1.2, 2.1)	1.9 (1.4, 2.2)	1.9 (1.7, 2.6)	
Mean Rank	N=27.4	N=31.5	N=35.2	0.472 1

N=68, Data Available; SWS=Superwoman Schema; Non-parametric Kruskal-Wallis Results

We also examined the association between the dichotomized ICH score (ideal vs not) and the group self-report measures. The Wilcoxon Two-Sample Tests results also did not indicate any ICH group (Ideal vs not ideal cardiovascular health) differences for the self-report measures, except for neighborhood safety mean of the rank score were significantly higher for those in the not ideal group (poor/immediate) compared to those with ideal group ($p=0.0382$).

Table 9. Dichotomized Ideal Cardiovascular Health (ICH) and Self-Report Measures

Self-report Measures	Not ideal	Ideal	p-value
Safety Total Score	N=37	N=29	
Median (25 th , 75 th)	4.0 (4.0, 6.0)	4.0 (4.0, 4.0)	
Mean Rank	37.1	28.8	0.0382
Cohesion Total Scores	N=36	N=29	
Median (25 th , 75 th)	13.0 (9.5, 15.0)	12.0 (11.0, 15.0)	
Mean Rank	32.7	33.2	0.9263
SWS Total Scores	N=33	N=29	
Median (25 th , 75 th)	1.9 (1.7, 2.3)	1.9 (1.7, 2.2)	
Mean Rank	31.1	31.9	0.8605
SWS Strength Score	N=37	N=29	
Median (25 th , 75 th)	2.5 (2.2, 2.8)	2.3 (2.0, 2.8)	
Mean Rank	34.3	32.3	0.6831

SWS Suppression Score	N=36	N=29	
Median (25 th , 75 th)	1.6 (1.1, 2.0)	1.7 (1.1, 2.1)	
Mean Rank	32.1	34.0	0.6830
SWS Vulnerable Score	N=37	N=29	
Median (25 th , 75 th)	2.0 (1.6, 2.3)	2.0 (1.4, 2.6)	
Mean Rank	32.2	35.1	0.5531
SWS Succeed Score	N=36	N=29	
Median (25 th , 75 th)	2.2 (1.8, 2.5)	2.0 (1.7, 2.5)	
Mean Rank	33.7	32.1	0.7409
SWS Help Score	N=35	N=29	
Median (25 th , 75 th)	1.9 (1.3, 2.1)	1.9 (1.7, 2.6)	
Mean Rank	30.2	35.2	0.2928

Not ideal=poor/intermediate cardiovascular health; SWS=Superwoman Schema; Non-parametric Wilcoxon Two-Sample Test.

3.4.3 Qualitative Data

Three major themes emerged from the data analysis of the 8 interviews:

Perception of the MyChart patient portal, perceived use and purpose of MyChart, and length of time to navigate MyChart. As participants discussed their experience using MyChart, it became abundantly clear that there was an overall positive experience navigating the patient portal due to its routine ease of use for clinical related activities. Participants shared the manner in which they accessed MyChart and the average length of time they spent in the system. The following sections further elaborate on these themes and subthemes along supported by descriptive quotes. Table 8 summarizes the major themes and subthemes that emerged.

Table 10. Themes and Sub-themes

Themes	Sub-themes
Theme1: Perception of the MyChart patient portal	
Theme 2: Perceived use and purpose of MyChart	<ul style="list-style-type: none">• Appointment reminders• Lab results• Communication with care team members• Making medical payment
Theme 3: Length of time to navigate MyChart	

3.4.3.1 Theme 1: Perception of the MyChart patient portal

When asked about their perceptions of the MyChart patient portal, most participants described positive experiences. One participant stated, “It’s okay, I have no concerns about using it. I haven’t had any problems.” Another woman reported when she knew to check MyChart, “You know, I don’t have any problems with it...I get my notifications and I check it.” Without receiving a notification, participants also reported having the routine of checking MyChart following medical appointment and procedures.

I would say my experience is good. I know I need to check it after my appointment or when I have labs done.

Despite the positive experiences and ease of navigation using MyChart, participants described having difficulty with locating the invitation to participate in our research study. Most reported not seeing the invitation at all, while some planned saw the invitation but could not easily locate it at the time they were ready to complete the survey.

No problems with my experience...I didn’t see this study though (laughs)...maybe I just missed it, I don’t know how though but I’m glad you called.

Good thing you called, cause I had planned to do it but just forgot. I aint see it again after you said you sent it out.

This seemed to be the consensus among all participants; the MyChart system operated in a consistent manner for patient use and all appeared to be familiar with navigating the patient portal.

3.4.3.2 Theme 2: Perceived use and purpose of MyChart

There were four major uses for MyChart reported by participants: Appointment reminders, lab results, sending questions to care team members and making medical payment.

Appointment reminders

When patients with active MyChart accounts have an upcoming appointment, a reminder is generated that automatically sends an email to the address linked to the MyChart as well as a push notification to the electronic device with the MyChart application. One patient noted that in addition to the appointment reminder they also check MyChart to check more details about the appointment, such as, location/direction, electronic check-in and pre-appointment directions, “I use my GPS to get me everywhere, my bad with direction. I look up the address so I know where I’m going.”

Lab results

Checking MyChart for lab results was also common among participants. Participants noted that after an appointment that required labs, they don’t always remember which labs were ordered. Thus, when they receive a notification of lab result in MyChart this becomes an opportunity to see check the types of labs and if the results are within normal ranges. One patient noted, “I’m watching my sugar so I like to keep up with my bloodwork that way I can ask questions if I need to.”

Communication with care team members

With the MyChart system, there is the capability within for patients to communicate with their care team directly. Most participants reported using MyChart to communicate with their healthcare team about such aspects of their care as follow up visits, medications changes and symptom management.

Sometimes calling takes too long, at least with a message on there [referring to MyChart] I have proof [something written down] to show they got my message

Making medical payment

The option to make medical payments directly through MyChart was another reported use for the patient portal. One participant stated, "I don't save my card on there though, but I can pay my bill quick."

3.4.3.3 Theme 3: Length of time to navigate MyChart

Participants reported short duration of time being spent on navigating through MyChart. One participant reported "Not long at all...I go in and get the information that I am looking for and that's all," while a second participant reported, "I would say a few minutes...maybe longer if I need to send a message or something...look at lab results." The devices commonly used to access MyChart were phone (i.e smartphone device), computer and Ipad/tablet.

3.5 Discussion

The present pilot study examined the feasibility of recruiting and collecting information using EHR data on a subsample of 50 rural African American women seen at rural primary care rural clinics. Results indicate that the MyChart patient portal system can be a valuable tool in increasing research participation of rural African American women in cardiovascular health related studies. However, to maximize the efficiency of

this recruitment tool, the use of MyChart must be combined with other recruitment strategies (i.e., phone and email) to overcome the barriers experienced by participants in navigating the EHR portal for research purposes. Patients with an active MyChart account still received a MyChart message in the Research Studies section of their MyChart account. We learned that this message did not get sent to their MyChart Message Inbox per design of the patient portal system. For participants who did not respond to the first message, a reminder message was sent four days later. Non-responders to both MyChart and reminder email messages were contacted via phone call to gauge their interest in the study and if interested were provided with the option to receive a link to the survey via a message to their MyChart account, an email to their preferred personal email address, or a text to their preferred personal cell phone number.

Through qualitative interviews, patients reported an overall positive experience with MyChart. However, their experience was mainly limited to clinical related uses rather than for research purposes. For instance, the most common reasons patients used MyChart was for such activities as, making appointments, checking lab results, and communicating with their care team members. Using MyChart for research purposes did not emerge as a theme during our interview with participants. We received the majority of our survey completion when we combined recruitment strategies that both reminded patients of the study invitation and provided them with multiple avenues to receive the survey link. This technique prioritized convenience and helped build familiarity with the study team which later facilitated with conducting the interviews.

Cardiovascular health disparities among rural African American women are a complex problem that requires multifaceted solutions that can emerge through

innovative health research practices. Advances in the use of technology, such as the use of EHR patient portal systems allows studies to recruit groups that have typically been underrepresented in research, such as rural African American women. This is significant, as it helps to determine whether advances in cardiovascular health care benefit all groups in an equitable manner. However, the use of EHR alone may not offer adequate reach for rural populations due to documented internet access challenges such as poor connectivity, slow internet speeds, and lower rates of digital communication device ownership among rural residents compared to urban residents (Hammack-Aviran et al., 2020; N. H. Kim et al., 2021). Results from our study provided that the use of other recruitment strategies (i.e. phone and email) in combination with using EHR proved to be more successful to our recruitment efforts. Further, clinics included in our study were approximately 45 minutes from the main medical center, a geographical barrier for in-person research approaches. Future research should seek to develop ways in which incorporate the combination of MyChart recruitment with other recruitment methods to decrease survey error and increase engagement by mitigating the factors that may affect response numbers and/or usable responses. An emerging theme through the qualitative interviews was the perceived use and purpose of MyChart for mainly clinical reasons where patients can access their health records and complete tasks essential to managing their care. The structure of MyChart proved to be a barrier because members reported not being able to easily see study invitation messages. This illuminates an opportunity to restructure the patient notification process for research related activities.

Findings from the pilot study also revealed a relationship between ICH and neighborhood safety. Thus, indicating that participants who reported more violence in

their neighborhoods had poorer ICH. Previous literature has found that significant associations of increased neighborhood crime with increased fasting glucose and blood pressure among communities of African American women (Baldock et al., 2012; Mujahid et al., 2011; Sprung et al., 2019). This corroborates our findings and provides an opportunity for interventions to be implemented at the community level to promote neighborhood safety.

Most participants met the ideal category criteria for ICH. This result is promising in that it demonstrates that this age group of rural African American women have not experienced early detrimental health effects of CVD-risk factors. Women in the ideal ICH category met the AHA's requirement for total cholesterol, glucose and smoking, all significant risk factors for CVD. Nutrition and body mass index were among the main metrics among participants who had poor ICH. This finding is consistent with previous studies that have reported results demonstrating that African American women are disproportionately affected by the negative health outcomes associated with being overweight or obese (Godbolt et al., 2022; Woods-Giscombe et al., 2021). Further, binge-eating has been frequently reported as a coping mechanism to race related stress among African American women (Longmire-Avital & Finkelstein, 2022, Salami et al, 2019). Studies seeking to improve ICH among rural African American women, should seek to target nutrition and BMI improvement through interventions that addresses maladaptive coping mechanisms and stress reduction. Clinically mental health clinicians, health educators, and researchers should seek to become more aware of structural and social stressors that significantly contribute to cardiovascular health disparities in this population of women.

3.5.2 Limitations

This study has several limitations. First, participants and electronic health data for measuring ICH were from the same healthcare system (although from different clinic locations). Thus, limiting the generalizability of the study findings. Second, being a pilot study, our sample size is small and statistical findings cannot be considered reflective of the larger population. Third, we only examined the use of MyChart patient portal system, since that is the EHR used in the healthcare system recruited and collected data from. However, patient experiences may differ from those using other patient portals.

3.6 Conclusion

In conclusion, our findings suggest that recruiting through the MyChart patient portal has the potential to be an effective approach to recruitment. For studies seeking to increase representation of rural African American women, recruitment efforts should become increasingly personalized and targeted to reach historically excluded populations in research. Patient portals, such as MyChart, can assist to recruit this population of women efficiently and successfully. Further, preliminary findings provide strong implications for the design of a larger study to evaluate the relationship between ICH and rural neighborhood social conditions using culturally informed interventions and measures of stress.

4. Stress, the Superwoman Schema and Cardiovascular Wellbeing Among Rural and Medically Underserved African American Women.

4.1 Introduction

Cardiovascular disease (CVD) is the leading cause of mortality in African American women (Benjamin et al., 2018; Virani et al., 2021). Approximately 57.1% of African American women aged 20 and older have some form of CVD compared to 43% in White women (Benjamin et al., 2018; Fryar & Zhang, 2017). Although, nearly 90% of all women have one or more risk factors for CVD (Fryar & Zhang, 2017), there are racial and geographic disparities in the prevalence of CVD risk factors (Abbott et al., 2018; Mouton et al., 2017; Mwangi & Constance-Huggins, 2019). For example, nearly 40% of African American women have been diagnosed with hypertension compared to 23% of white women (Fryar & Zhang, 2017). The rate of obesity further highlights this disparity with nearly 60% African American women having obesity (Agyemang & Powell-Wiley, 2013; Flegal et al., 2012); the highest rate among all racial and ethnic groups in the US. In addition, hereby referred to as underserved, rural and medically underserved African American women experience additional risk factors such as low income, lack on insurance coverage and poor access to health care providers (Abbott et al., 2019; Douthit et al., 2015; Weaver & Gjesfeld, 2014). Rural residents who are medically underserved for instance, are particularly vulnerable to health disadvantages due to increased rates of physical inactivity, fat consumption and smoking (Bolin et al., 2015; Matthews et al., 2017).

To address the need for improved cardiovascular health, the American Heart Association developed the Ideal Cardiovascular Health (ICH) metrics to serve as a

measure for cardiovascular wellbeing (Lloyd-Jones et al., 2010). These metrics include 4 modifiable health behaviors measures (smoking, nutritional intake, physical activity, and BMI) and 3 biomarker measures (blood pressure, blood glucose and total cholesterol) (Effeo et al., 2017; Lloyd-Jones et al., 2010; Swanson et al., 2019). Higher scores has been associated with lower CVD risk and increased life expectancy (Effeo et al., 2017; Swanson et al., 2019). Yet to date, most literature evaluating ideal cardiovascular health primarily focuses on populations with low representation of African American women (Bambs et al., 2011; Shay et al., 2012; Yang et al., 2012). Given the prevalence of predominant CVD risk factors remains high in underserved African American women, further research is needed.

Social environmental stress may in part explain the disparity in CVD risk among this population. The social environment is recognized as an important social driver of cardiovascular health and underserved environments can present various stressors for African American women due to socioeconomic disadvantages such as less access to care, poverty and poorer education (American Psychological Association, APA Working Group on Stress and Health Disparities, 2017; Diez Roux et al., 2016; Kalinowski Jolaade et al., 2019a). Chronic exposure to stress increases risk for cardiovascular disease (CVD) (Kalinowski Jolaade et al., 2019b). As a significant social driver of health, stress is influenced by cultural, economic, and social factors and may contribute to CVD disparities among underserved African American women (Davis et al., 2014; Havranek et al., 2015). Social stress, such as poor socioeconomic (SES) status has been associated with poor cardiovascular health and African American women who are underserved medically and from disadvantaged communities have high rates of poverty and poor health outcomes (Brewer et al., 2018; Davis et al., 2014; Perry et al., 2013).

Additionally, African American women are known to process and respond to stress differently (Allen et al., 2019; Woods-Giscombé, 2010; Woods-Giscombé & Black, 2010) yet few studies have examined this unique stress and coping process in medically underserved African American women as it relates to their overall cardiovascular health and social environment. The Superwoman Schema (SWS) is a multidimensional framework that captures the cultural-specific process African American women engage in to respond to stress (Woods-Giscombé, 2010; Woods-Giscombé & Black, 2010). This framework outlines how African American women learn to manifest an image of strength and suppress emotions, and inadvertently makes them vulnerable to prolonged internalized stress (Sumra & Schillaci, 2015; Watson & Hunter, 2016) that is potentially detrimental to cardiovascular wellbeing.

Research consistently has documented that the relationship between age and stress varies across different life spans (Marcia, 2010; Sundag et al., 2018). The Superwoman Schema was developed across age groups to measure the superwoman characteristics in African American women (Woods-Giscombe et al., 2019; Woods-Giscombé, 2010). Since then, there have been differences found in how the women in different age groups endorse the Superwoman Schema characteristics (Allen et al., 2019; Woods-Giscombé & Black, 2010). According to the socioemotional selectivity theory (Carstensen, 1992; Hicks et al., 2012), women in the 30-50 age group are particularly vulnerable to stress given in the stage of their lives when they may have multiple responsibilities and serve many roles that may lead to neglecting their own needs (Liao et al., 2020; Marcia, 2010). Further, despite overall declines in CVD mortality rates over the past several decades, African American women in the 30-50 age group are not experiencing a decline in CVD mortality (Kalinowski Jolaade et al., 2019b;

Smilowitz et al., 2016). Historically, we have seen African American women serve as the matriarchs and pillars of their families with responsibilities such as primary caretakers of both offspring and older adults in the family, in addition to working outside of the home (Hamilton-Mason et al., 2009; Liao et al., 2020). Considering socioeconomic adversity and the additional burden of stress related to the intersectionality of their race and gender, there appear to be a need for further exploration among African American women in this age group. This limited knowledge provides an important opportunity to gain vital information on the stress experience of African American women by centering their voices and perspectives to create meaning and knowledge of their experiences and by evaluating how social drivers of health interact to influence cardiovascular wellbeing and create the environment for health disparities to exist and persist.

Taken together, published reports suggest that cardiovascular health among underserved African American women could be influenced by the complex interplay of social environmental stressors influenced by social drivers of health and psychosocial internalizing stressors (the SWS). This relationship has not been examined from a cultural perspective, like the SWS, that recognizes the unique manifestations of stress in underserved African American women. Further exploration is needed to understand how these factors impact cardiovascular health. Therefore, the specific aims of this are to:

Aim 1: Describe the ideal cardiovascular health, defined as ICH total score of ≥ 7 derived from five ICH metrics [blood pressure (BP), total cholesterol, smoking status, body mass index (BMI), blood glucose] among rural and medically underserved African American women.

Aim 2: Describe the experiences of stress and coping related to culture, community, and cardiovascular health among underserved African American women, as guided by the Superwoman Schema conceptual framework (the SWS framework).

4.2 Methods

4.2.1 Design

This study utilized qualitative descriptive design to describe ICH among underserved African American women. Participants were selected based on a dichotomized ICH score, representing the absence (0) or presence (1) of cardiovascular wellbeing among underserved African American women. Guided by the SWS framework, qualitative interview data was subsequently collected to better understand the experiences of stress and coping related to culture, community, and cardiovascular health among underserved African American women. Institutional review board approval for this study was obtained at the affiliated university health system of the first author.

4.2.2 Sample and Setting

The study extracted retrospective data from rural and medically underserved clinics within a university healthcare system's Epic electronic health records (EHR) referred to as DEDUCE. Primary care clinics with a HRSA Medical Underservice (IMU) score less than or equal to 62 and RUCC of 4 or higher were included. Non-probability population-based sampling was used to select charts from clinics servicing African American women meeting the inclusion criteria. Inclusion criteria will include: (1) Women who self-identify as Black/African American, (2) Able to read and understand English, (3) Between the ages of 30-50, (4) Patient within Primary Care Clinics located in medically underserved area as defined by the HRSA Medical Underservice (IMU) score or patient

seen in rural clinics with a RUCC of 4 or higher, (5) Have cardiovascular biomarker measures available through EHR system between January 1, 2019 and January 1, 2021, and (6) have not opted out of research contact. Key study variables were available in DEDUCE and the data pull yielded approximately 11,948 charts that met the eligibility criteria of the study. We selected the first 200 patient charts to analyze ICH and from those charts selected participants to interview.

Applying the above inclusion criteria, stratified purposeful sampling was used to select participants for qualitative interviews based on their ICH total scores. This sampling technique helped to yield high informational representation and each stratum constituted samples of individuals whose ICH total score falls in the following two categories: ideal and non-ideal. To stratify this sample and ensure that each subgroup (strata) of our given sample population was adequately represented we randomly selected proportional amounts of people from each ICH total group.

4.2.3 Procedures

A retrospective chart review was conducted utilizing the patient portal EHRs from Primary Care clinics with a HRSA IMU score less than or equal to 62 between January 1, 2019, and January 1, 2020. Identification of eligible participants began with data query through DEDUCE. Chart reviews were used to extract data for ICH metrics (blood pressure, smoking status, cholesterol panel, blood glucose). Each eligible participant's chart was provided with an anonymous subject ID number (e.g., 0001). Further, we used a qualitative descriptive design to purposively sample rural and medically underserved African American women based upon their ICH total scores. Through semi-structured interviews, we explored the community stress of this population to better inform our

findings. Appendix A depicts semi-structured interview guide. Each interview began with general questions: “When I say the word stress, what does it mean for you?” Next, guided by the Superwoman Schema core concepts, the stress experiences of participants were further explored. For example, resistance to being vulnerable or depending on others for help were explored to capture relationship dynamics and perceptions of stress (ex. “Explain your relationship with your neighbors and others in your community.”). Interviews closed with the question, “what do you think are some ways Black women can create change in their lives to improve their health?” to allow for participants to provide Black women advice on stress, coping and health.

Eligible participants were contacted by phone for recruitment. Participants were provided with further information about the study, address any questions or concerns, gather any additional contact information, and schedule the interview with participants’ preferred date, time, and location. There was an option to conduct interviews remotely via telephone. Sample sizes ranging from 15 to 30 are found to be acceptable to reach data saturation in qualitative research; however, we planned to continue sampling until we reach theoretical saturation (Creswell & Clark, 2017; Guest et al., 2017). It was estimated that a sample size of N=15 underserved African American women would be needed to reach saturation

4.2.4 Measures

Sample characteristics and key study variables for the quantitative analysis are described in Table 11.

Table 11. Key Study Variables

Ideal Cardiovascular Health (ICH)			
ICH Metrics	Abstracted from EHR		
	Poor [0 point]	Intermediate [1 point]	Ideal [2 points]
BMI	≥30.0 kg/m ²	25.0–29.9 kg/m ²	<25.0 kg/m ²
Smoking	Current smoker	Former <1 y	Never or former >1 y
Blood Pressure	≥140/≥90 mm Hg	120–139/ 80–89	<120/<80 mm Hg
Fasting Glucose	≥126 mg/dL	100–125 mg/dL	<100 mg/dL
Total Serum Cholesterol	≥240 mg/dL	200-239 mg/dL	<200 mg/dL
	Poor	Intermediate	Ideal
TOTAL score	0-5	6-7	8-10
ICH		1=Yes (≥7)	0=No (<7)
Demographic Characteristics Stressors			
Age	Age, in years		

Ideal Cardiovascular Health (ICH): ICH was used to evaluate cardiovascular wellbeing, based on criteria developed by the American Heart Association (AHA) (Ford et al., 2012) with modifications to include only metrics readily available in the EHR. Our study evaluated 5 out of the 7 ICH metrics recommended by the AHA, namely (1) BP, (2) total cholesterol, (3) smoking status, (4) BMI, and (5) blood sugar. For each of the five metrics, 2 points were assigned for ideal, 1 for intermediate, and 0 points for poor. As previously outlined by Thacker and colleagues (Thacker et al., 2014), the five metric scores were summed to derive a ICH total score, with a possible range of 0 to 10 and higher scores representing better cardiovascular health. The ICH total scores was also categorized as poor (0–4, intermediate (5–7), or ideal (7–10) for the purposes of describing the cardiovascular health of the sample. The primary outcome for Aim 1 will be a dichotomous ICH total score, whereby a total score of 0 to 6 will indicate the absence of ICH (0) and 7 to 10 will indicate the presence of ICH (1). These categories were used to select qualitative interview participants.

4.3 Data Analysis

4.3.1. Aim 1 Data Analysis

Descriptive statistics including the mean, standard deviation and 25th, 75th percentile (IQR) detailed the sample characteristics and the ICH dichotomous score along with the ICH total score, ICH total score categories, and ICH metric scores to describe the central tendency and variability due skewness of the data distributions. Statistical analyses will be performed using SAS ® 9.4 (SAS Institute Inc., Cary, NC).

4.3.2. Aim 2 Data Analysis

A directed qualitative content analysis (Hsieh & Shannon, 2005) was conducted to describe the experiences of stress and coping related to culture, community, and cardiovascular health among rural and medically underserved African American women, as guided by the Superwoman Schema conceptual framework (the SWS framework) (N=13) to better understand how these experiences are linked to cardiovascular health outcomes. Directed qualitative content analysis was the most appropriate analytical method because it allowed for an existing theoretical framework or theory to be utilized in focusing the research question by guiding the initial coding process (Hsieh & Shannon, 2005). The Superwoman Schema core concepts were used as initial coding categories. This *a priori* coding will be combined with inductive coding in which we will search for ways in which women think about themselves, their culture, community, and health. However, we purposely looked for new ideas and new ways that these women think and any text that cannot be categorized with the initial coding scheme would be given a new code. Significant statements were extracted, and meaning was formulated for each significant statement. Data analysis began following the transcription and

coding of the first interview. Without taking notes or coding of the data, we read the transcribed interview in its entirety to better immerse with the data and gain a general sense of important features (Sandelowski, 1995; Walby, 2015). Key statements were underlined and a brief description of these statements written in order to capture their significance. Next, coding of the data was conducted using open coding to ensure accuracy of the initial coding scheme. Using the Superwoman Schema subscales as a guide, a coding scheme was generated. We then operationally defined the codes and organized them into clusters of themes. Any data that was unable to be categorized in the initial coding scheme, emerged as a new code. A codebook was used to record codes, definitions and thoughts on emerging codes and themes during data analysis. Table 12 describes strategies to ensure rigor and trustworthiness of qualitative data.

Table 12. Methods for Assuring Trustworthiness of Study Design

Credibility (Validity or authenticity of results)	<ul style="list-style-type: none"> • Each research personnel will review and analyze transcribed interview. • Each research personnel will review commit to outlined data collection and analysis procedures. • Study biases will be reviewed and discussed by each member of research team
Dependability (Consistency of findings)	<ul style="list-style-type: none"> • Code book will be maintained to ensure consistency during data analysis. • Emerging codes and themes will be compared and contrasted with study team
Confirmability (Objectivity of data)	<ul style="list-style-type: none"> • Co-sponsor and mentee will correspond on a consistent schedule during data analysis and development of initial coding themes
Transferability (Generalizability of findings)	<ul style="list-style-type: none"> • Results of data analysis will be guided by the five subscales of the Superwoman Schema Conceptual framework • Participants demographic information will be utilized for broader understanding of emerging concepts.

4.4 Results

4.4.1 Descriptive Statistics

A total of 202 women retrospective EHR data were analyzed. Tables 13 and 14 detail the patient characteristics and ICH descriptions. The mean age of participants was

44 years (SD=5.4, range: 31 to 50). Most participants met the intermediate category of ICH (44%), with 24.7% and 31.1.7% categorized as poor and ideal respectively. For the individual ICH metrics, the ideal category was the predominant group for total cholesterol, glucose, and smoking. For both the intermediate and poor category were the predominant group for blood pressure and body mass index.

Table 13. Patient Characteristics (N=202)

Characteristic	
Age, in years	
Mean (SD)	44 (5.4)
Minimum, maximum	31,50

Table 14. Ideal Cardiovascular Health (ICH) Metrics and Total Score (N=202)

ICH Metrics	Poor n (%)	Intermediate n (%)	Ideal n (%)
Blood Pressure	45 (22.8%)	79 (39.1%)	78 (38.6%)
Body Mass Index	132 (66.3%)	52 (25.7%)	18 (8.9%)
Total Cholesterol	13 (6.4%)	40 (19.8%)	149 (73.7%)
Glucose	23 (11.3%)	45 (22.2%)	134 (66.3%)
Smoking	22 (10.8%)	17 (8.4%)	163 (80.6%)
	Ideal	Not Ideal	
ICH Total Score	95 (47.0)	107 (52.9%)	
	Poor n (%)	Intermediate n (%)	Ideal n (%)
ICH Total Score Categories	50 (24.7%)	89 (44.0%)	63 (31.1%)

ICH Poor = score 0-5; Intermediate = score 6-7; Ideal = Score 8-10. ICH Total = Not Ideal <7; Ideal ≥7

4.4.2 Qualitative Data

Three major themes emerged from the data analysis of the 13 interviews:

Culture, community, and health. As participants discussed their experience of stress and coping, it became overwhelming clear that varying SWS characteristics were embedded within each major theme and contributed significantly to the interconnection of culture, community, and health to better inform the experience of stress and coping within this population. There were no major differences between those who met and did not meet

ICH. However, among those who were in the ideal category, there were more discussions of them actively incorporating coping skills such as meditation, yoga and therapy into their routine. Thus, there were similarities in past experiences but how these experiences impacted their lives to produce positive change differed from those who did not meet ICH. The following sections further elaborate on these themes and subthemes along with illustrative quotes. Table 15 demonstrates the major themes and subthemes and highlights the corresponding SWS characteristics.

Table 15. Themes and Sub-themes

Themes	Sub-themes	SWS Characteristics
Theme 1: Community	<ul style="list-style-type: none"> • Who's considered part of the community • Neighbors • Family/friends • Health Providers • Community Environment 	<ul style="list-style-type: none"> • Obligation to manifest strength • Obligation to suppress emotions • Obligation to help others • Motivation to success despite limited resources • Resistance to being vulnerable or dependent
Theme 2: Culture	<ul style="list-style-type: none"> • Definition of stress • Sources of stress • Coping with stress <ul style="list-style-type: none"> ○ Prayer/faith ○ Meditation techniques/therapy ○ Engaging in health behaviors ○ Suppression/Avoidance • Lessons learned 	<ul style="list-style-type: none"> • Obligation to suppress emotions • Obligation to manifest strength • Obligation to help others • Motivation to success despite limited resources • Resistance to being

		vulnerable or dependent
Theme 3: Health	<ul style="list-style-type: none"> • Health knowledge • How stress impacts health • Advice for Black women 	<ul style="list-style-type: none"> • Obligation to help others • Obligation to suppress emotions

4.4.2.1 Theme 1: Community

Interview questions inquired about participants relationships with their neighbors as the basis for understanding community relationship and involvement. However, it became apparent that there were other individuals that participants identified and considered to be part of their community. These individuals include family members, friends, co-workers, and health care professionals.

Who's considered part of the community (Relationships and role in the community)

Neighbors. Relationships with neighbors were commonly described as being surface level and lacking in friendship and deep connection. However, participants reported still looking after one another and being able to identify few members in their neighborhood to form a bond with. One participant described herself as a homebody and how her living alone as a Black woman played a contributing role in her lack of relationship with her neighbors,

I live by myself. I do speak to my neighbor downstairs sometimes because she's another black woman so I will, you know, we'll spend time together or get together for lunch but I don't know. I'm pretty much a home body. I work from home so that's made me super introverted.

We're not close but we are, we look out for each other...well when any of us go out of town we watch each other's house for each other or if we see something suspicious we all contact each other.

Personality trait also emerged as contributing factors of whether participants sought to form relationships with their neighbors:

I'm not a mingler...I'm just particular about my energy and about my personal space so like I don't want to be, no, I don't want you coming to my house.

But I love my community, but I'm not an activist or anything. I go in and come out when I need to.

I am a hello, how are you, have a good day type neighbor. Because...we're fairly new we don't know a lot of the people. The neighbors on my left they're like a young couple so pretty close to them because...we cat sit for them like when they're out of town.

There were participants who had either formed relationships with their neighbors or were open to forming a connection. These individuals had lived in their communities for longer periods of time, shared similarities with their neighbors, and/or lived in smaller neighborhoods.

We do have new neighbors that's across from us, they're very nice. They are a family of four and that's the only kids, like I said, my daughter is seven. They're the only kids that we really see across the street, but you know, we'll speak and say hey and everything, but you know, we haven't had no play dates or nothing together because me and my daughter, we're talking about home bodies.

It's just a home, small hometown feel where everybody knows everybody. Everybody tries to help everybody out. We have a, a really good relationship. We check on each other especially when it's like bad weather and things like that. During the pandemic we just tried to make sure we increased like contact you know in the yard and stuff like that.

Family and friends. Family and friends were the most reported members of the participants' community. Family relationships were formed from childhood and evolved throughout adulthood to include their immediate family like children and spouses. Friendships at times included family members but also included those considered

'chosen families' such as friendships developed through childhood, school and coworkers.

My relationship, I think, as any of them, any of my siblings, my mom, my husband, my kids I'm a mother figure. That's who I am. I'm everybody's mom.

Well thankfully my community, my community came personal to me, my personal space, my immediate friends, we're all Christians so we have faith and we speak faith and even when we, you know, when stressful times do come right?

That I'm used to but then I'll be like you know what, I try to be a little more true to my feelings and the way that I'm feeling and I have people that I'm accountable to that are, that are, have become like, like you were saying, like a pseudo-family.

Relationships with family and friends highlighted all five characteristics of the SWS: Resistance to being vulnerable to dependent, motivation to succeed despite limited resources and obligation to suppress emotions, manifest strength, and care for others. Within these relationships, Black women experience with prioritizing self-care and being resistant to vulnerability, carried the weight of being the go-to person their families and friends and used this often led to emotional suppression.

Health providers. When it came to relationships with their health care professionals, participants repeatedly reported having a positive experience with their providers (i.e. primary care providers, specialists and therapists). These positive experiences helped to shape relationships between participants and providers and cultivated a deeper trusting connection.

They're really, they're really good. I can talk to them; I feel comfortable about talking to them about anything...She laughs. It's just really good whenever I see her. I don't have to see them often, thank God. I am gonna have to call my primary care soon to, for them to check my iron again.

So she's been my cancer doctor for years. I love her. My rheumatology team. I love my rheumatology team. I like the doctors that I have now but I had one

doctor that I started off with and I just loved but he went to (state). Then my, my transplant team they're just awesome. I love all of them.

Along with describing what she loved about her care time, this participant goes on to describe factors that have helped to facilitate this positive relationship with her providers.

I think because most of them maybe it's because its specialty and they're just very personable but and if that's the case then we can have that relationship. I have a relationship with many of them. I can text them or email them at any time and they get, you know, right back with me and if they can't they'll make sure somebody from their office does so.

Lastly, mental health providers, such as therapists, were also identified as significant members of participants' community, particularly those within the ideal ICH category.

I loved her. I don't even remember her name but she was the best and I was going once a week for about three months and then I was going twice a month for about two months until I moved back home. So it's about eight months I was in therapy and then I moved back to North Carolina.

Community Environments. The community environment was also reported as an important factor of stress and coping. Participants described the generational changes observed as having both positive and negative impact within their community. Some reported the condition of childhood neighborhoods as being a motivating factor to create change for themselves and their families in adulthood.

So where I grew up from it was rough, tough and I didn't want to raise my kids in that type of environment... Shooting, fighting, all of that stuff...But where I'm at now at the age that I am and looking at how things are now and if I was young, it's totally different.

Generational changes from communities when participants were younger versus in adulthood was also reported to have challenges. The younger years were reported with more communal nostalgia and while the changes that were observed with the newer generation was described to have less neighborly interaction, and increased violence and infrastructural barriers which hindered health behaviors participation, such as physical activity and eating behaviors.

It's just, it's so different, you know...where I come from is we, like I said we're a small town but so much goes on...we have twelve- and thirteen-year-old kids and they're out here shooting people and fighting with each [other], breaking in people's houses. You know, there's just a lot going on where I was growing up we didn't have too much of that going on. Everybody played together. We was outside. Summertime everybody outside in the dark. Now they just on their cellphones or, you know, making a TikTok dancing around. They don't really communicate with each other like that, on a level that we did when I was growing up.

I walk around my neighborhood. Yeah, I go outside in my neighborhood. It's just going yeah like to the gym and stuff is like I said, we have a small town and everybody goes to one gym so it's packed. It's, you know, it's a lot going on and then you have to go to the nearest gym that's next, it's probably about 45, 50 minutes away.

Yeah, the pricing is one thing and stuff being available in the stores around this...We don't really have a lot of options, so we only have one store and they have the same things so this really, and then like I said time.

4.4.2.2 Theme 2: Culture

The culture of stress and coping emerged as a second theme during the interviews. The definition of stress (including signs and symptoms), and coping mechanisms were all derived from unique experiences in childhood that modeled for participants how to perceive stress and the level to which to cope with stress.

Definition of stress. There was a common definition of stress among the women. Repeatedly, women described stress as 'overwhelming, pressure, and anxiety.' Participants reported they only noticed stress when they were at their 'breaking point,'

which aligns with the SWS characteristics of perceived obligation to manifest strength and suppress emotion.

It's where I can't take it. I'm the type of person where it takes a lot for me to get stressed. It has to be something really bad where I can't do nothing at all about [it] cause usually, usually, when I get stressed I try to figure out what I can do or what I can do to help it.

Stress to me is just being like completely overwhelmed with life, like family, work and social life. Like just everything like is happening at once.

Stress was also perceived as a part of life in a manner that depicted one's experience of stress as the norm. Thus, regardless of how overwhelming stress may have felt the longevity of its suppression made stress seem normal, especially among individuals who did not meet ICH. In the following exemplar quote we see the SWS characteristics of emotional suppression, strength, and caregiving presented through the introduction to caregiving at a young age and how that evolves into being the source of strength for those in your community. Thus, creating a culture in which stress is normalized.

My point of view on stress is it's a part of my lifestyle and it's sad to say but because, I became a mom at age one and two weeks. Now me and my sister we're a year and two weeks apart...So...the only thing I know is living under that lifestyle I'm trying to learn how not to and it's really very hard to switch it up because I am a first born so I'm responsible, or I feel like I'm responsible for not only my household but my mom. Not only my mom but for my sisters. I'm the person everybody calls so the word stress it doesn't, it's not a bad thing to me because it's something I've learned to come to live with to be honest.

Sources of stress. Family responsibilities and work were the most frequently reported sources of stress. Through the interviews, participants reported their motherly role and being the 'go-to-person' for those in their community as causing them stress. "I absolutely love it, but it is a tremendous amount of stress," one women stated about her

job and how work stress can lead to self-neglect, a common theme in the SWS characteristic of caring for others and prioritizing their needs over your own. She goes on to say, “anytime you’re taking on someone else’s problems it’s stressful...Because it doesn’t erase your own challenges.” The following two quotes are of family responsibilities being sources of stress.

I know my husband had had some, has had some health problems and dealing with that for over a number of year, I, I, that’s one reason why I stress, I ate while I was stressed.

It can become very overwhelming. When I see my phone ring if I see a specific aunt who I know, especially the one that’s always calling about her grandchildren, it kind of gets on my nerves. I don’t, sometimes I just, I get hesitant and anxious to answer the phone but it’s out of respect that I do answer the phone so it gets tiring but if they didn’t call me I would probably feel some kind of way, but.

Coping with stress. Commonly identified coping strategies were; prayer/faith, engaging in health behaviors, mediation techniques/therapy, avoidance/suppression, and using social support in family and friends.

Prayer/faith

The use of prayer and faith was by far the most reported coping tool reported between both ideal and non-ideal ICH groups. The women described their use of prayer as a learned practice from their childhood and having it serve as the basis for navigating stressful experiences. Prayer also provided an opportunity to forego the SWS characteristic of perceived obligation to manifest strength because participants used it as an opportunity to submit to a powerful entity. Further, through meditation techniques and therapy participants also had an opportunity to release the perceived obligation to suppress emotions as they

recognized it no longer served them, thus learning to cope in a more constructive manner.

And my motto is as long as you have a pulse you have a purpose and when you put your two fingers on your wrist like that and you feel a pulse, you got a purpose. So no matter what comes, every days not going to be good but I, I just, I just trust God. I have faith in God. I pray every day. I read my Word. I say the Word and I look to God. So, that's, that's what gets me through.

Meditation techniques/therapy

Utilizing meditation techniques was more common among participants in the ideal ICH category. These participants reported having learned these techniques later in life through therapy or through their profession.

You know what I do to relax? Relax, relaxing for me is reading.

You know, the, I was having heart palpitations, so the deep breathing helped me to calm down to, you know.

I would say that, you know, as I got older for some reason things started bothering me more and so I found out that too that I would stress eat...to control my emotions so I got a therapist and she helped me realize that I was stress eating and that, yeah.

Used to be food when I was in my 20's. My 20's to early 30's I would say it would be food...Later on I learned that that wasn't good. So now the way I'm dealing, dealing with it is meditation, prayer. Like I said, exercise. Stuff that makes me happy. Reading, painting. Just kind of things that helps me relax and learning how to say no. That's the biggest one. It's the biggest one and the hardest one but I'm learning how to say no.

Engaging in health behaviors

Among those that reported using health behaviors to cope with stress, using food to cope was most reported as a negative coping strategy among the women. Weight gain was most commonly reported as the trigger to re-evaluate eating behaviors. Using alcohol and sex to cope were also reported.

Incorporating physical activity was also described as a method of coping with

stress. These realizations provided the women insight into how their embodiment of the SWS suppression of emotion had manifested to maladaptive coping mechanisms. Among both categories of women, lack of time was a frequently perceived barrier to healthy behaviors such as physical activity and eating healthy due to working long hours, having multiple jobs and family responsibilities.

Since that time, I noticed I have not had a Pepsi since 2017. So, I had to, I had to get some other skill. Yes, that was my go-to but now when the weather is good, like spring, summer and fall I can walk. I love nature, I love going to the recreational center to walk outside. During the winter I can't do it because cold air is my asthma trigger.

Yeah. I was drinking, smoking pot. I was having sex with multiple partners to just kind of like not feel what I was feeling then.

Suppression/Avoidance

The suppression of stress emotions and avoidance techniques was often reported by those participants who had learned this behavior in childhood, had multiple responsibilities and/or used their faith as their main coping mechanism. Most participants who used suppression/avoidance and prayer as tools of coping often did not meet ideal ICH which further perpetuated the SWS characteristics of resistance to being vulnerable and perceived obligations to suppress emotions and present an image of strength.

I really don't. I do not. I don't like where it takes me. I don't like how it makes me feel you know, I, I do get stressed, but like I said, I don't stay in that stress. I don't stay in that for very long especially if I'm like okay, I, I don't have time to deal with this. I can't fix it. I, I'm not gonna, I'm just gonna give it to God. I pray all the time, give it to Him, will you take it away. You know, I pray every night and every morning, like Lord, any stress come my way, take it away. You're not gonna put nothing on me more than I can bear and that's my motto. You're not gonna put nothing on me that I couldn't bear. You know, I feel like I, sometimes I think I'm a brick you know, but the brick can break any time.

It can be good, cause like I said, I don't let nothing bother me. So that it strains, where I want to be sick or you know, ready to have a heart attack or you know, cause like we talking about the heart stuff. The bad thing about it is that I don't let nothing get to me. If that makes sense...And sometimes it's not good for your health you know, you hold onto things. Like not holding a grudge, but I'm not gonna speak on it, I'm not gonna react on it, I'm not going to you know, you either breathe or I'm just gonna hold it in there and deal with it later or something you know, or don't deal with it at all. A lot of things that I see, I just don't react to and don't deal with at all because...Who needs all that? You know?

The perception of their childhood experiences also impacted how the women coped with stress. In the following example, two participants described their experience of sexual assault in childhood and their journey of coping. The first participant from the non-ideal ICH category described using humor to cope with her experience, while the second participant from the ideal ICH category detailed her journey of mental illness as result, that landed her in a psychiatric ward seeking treatment. In these examples, the use of emotional suppression is very prominent among the participant who did not meet ideal ICH, while in the participant who met ideal ICH realized that the perceived obligation to suppression emotion and present strength SWS characteristics were no longer healthy options.

I had a good childhood until like my teenage years like I said 15 or 16 cause that's when my mom started doing drugs and it was like we all split up but then it was like, you know, a lot of tragic from my younger years like I got molested at eleven and, you know, and my mom started using drugs and we all split up...I evaluate each thing because like I don't like stress. I've been stressed before. That's the reason why I use laughter as much as I do. To keep me away from stress.

I spun out of control. I dealt with a lot of molestation, stuff in my life...and I never told my mom about it because I wasn't really, I knew that, well my biological father's side of the family that's where a lot of the molestation was coming from... So at that point I just hit rock bottom and then I was, I was on the suicidal ward and all I could do was, I couldn't do anything. I was being watched 24 hours. I just stayed in my room...I remember the only thing that I could have in that room was a radio and I just played

sermons that had been recorded from my church and that my mom and my aunt had brought me and I just kept playing those over and over and over and over again until I just began to start praying again and that was at that moment that I started praying and then I began to say okay I got to start doing something different.

Lessons Learned. Sources of stress and coping mechanisms all coincided with lessons learned from childhood. Frequently when asked if and how stress was discussed in childhood, participants in both ideal and non-ideal ICH categories reported family members demonstrating three main SWS characteristics: emotional suppression, motivation to succeed despite limited resources and the perceived obligation to present an image of strength.

No. Absolutely not. I was raised by my grandmother. My mother was a teen mom so my grandmother did most of my raising so it was...like I said being in church so we hear the Lord put no more on you than you can bear, you know, so that's what you do. You bear it. You push through it. You, you don't, I don't have the option to have a nervous breakdown. I don't have the option to bow down to my anxiety or my stress. I don't, I don't have the option so I just keep pushing. Is it good? No. Obviously the older you get you realize that it's not fair and it's not good but you, you, you become friends with it basically because you, you just learn how to, it's just a part of your life and you have to learn how to deal with it.

You had to get up, you had to go to school, whatever your extracurricular was you had to go ahead and do it. If you had a job, you had to go ahead and do it and it was just, you know, it was no time. Like stress for what? We have to get money; we have to live. But over the years, I was blessed to, you know, to go to school and learn about things and really grow. Coming from the rural community is, it's difficult to say the least.

4.4.2.3 Theme 3: Health

Participants' knowledge of cardiovascular and overall health was demonstrated in three sub-themes: 1) knowledge of their own health and 2) how stress impacts overall health, which included symptoms and risk factors of poor cardiovascular and overall health, and 3) Advice for Black women.

Health knowledge (from experiences and lessons learned from those in their community). Health knowledge emerged as a sub-theme based on lessons learned from women's community, primarily family, health professionals) and their own personal health history. Among those that gained health knowledge from their engagement with a health professional, there were reports of this engagement having a positive health outcome (i.e losing weight and getting off medications) while others demonstrate the sometimes long stepwise approach of monitoring health symptoms and outcomes.

Well I think the only other thing is...when I went for my physical previously my blood pressure was up...She said we need to monitor your blood pressure so she had me to order this blood pressure monitor, whatever. Now I've been checking it or whatever and then I decided I'm not going to check it cause I know it's up, you know. But she didn't put me on any medication so when I went to the doctor this time she was, my blood pressure was up again and I was like what's going on?

Oh, my goodness. They had me, they started me with a nutritionist last year for which I just, I lost the amount of time to squeeze the nutritionist in, honestly. They counseled me with my weight and we've done like some weight loss in the past, like some phentermine or something a few years back. It did work. I think it was 2016. Oh, it worked so well. I lost about 35 pounds; I came off of the medication. It had been about three months, I was still losing, you know?

This knowledge of health also contributed to their health behaviors and coping mechanisms they engaged in. When asked about her decision to make changes to her health and lifestyle, one woman stated her motivation came from "Looking at my pathology, my genealogy, my family." She goes on to describe her family history coupled with being diagnosed with cancer motivated her to make health changes:

I tell people, all the time they tell me (name) you done lost so much weight you look good, but I tell them that, you know, I only had one option. Two options. Either I get healthy or I go straight to morbidly obese. We don't have fat or fat, obese or super, morbid. It goes straight from morbid to super. I have an aunt that weighs about 600 pounds because that's the way she felt. That's how she decided to cope and, and looking at her I'm like nah I can't and then you look at all the stuff that, you know,

being black we have to deal with diabetes, high blood pressure. I'm a cancer survivor. I found out I had cancer when I was 34.

How stress impacts health. Participants knowledge of how stress impacts health was further categorized into signs and symptoms of stress and physical and psychological impact of stress on overall health. This was seen when one woman described the results of stress on her body as, "I was just gaining weight, gaining weight, and I was getting more sluggish, more sluggish." Others reported stress impacting appetite, sleep, causing headaches, anxiety and even causing a stroke, "I think it's really impacted my health. I think that's the reason why I had the stroke because there's no reasoning besides being stressed, I guess."

Other participants described their experiences of difficulties on the quest to seek out health knowledge from health professionals and how this experience delayed care but did not deter them from seeking for the types of care that they needed as Black women. Once they found a provider that matched their needs, most participants reported having a positive and trusting relationship with their health providers as previous mentioned.

I've had bad experiences with doctors where I've tried to advocate for myself and it didn't, that's why I stayed with my other doctor for so long and what took me so long to find another primary care doctor because, you know, just also being a black woman like I, I need a certain type of support from my medical, from my mental professional.

Further, participants described the challenges of having health knowledge but being unable to incorporate this knowledge in stressful moments which could lead to the neglect of one's health. This was especially present among individuals for which the prioritization of caregiving and emotional suppression SWS characteristics emerged.

You forget those things when you're stressed. You go ahead and you eat, you lie down because you're so mentally drained from handling everybody else's problems. So, you just, you eat whatever you eat and you lie down. And there are times that they'll wake me up out of my sleep, I really need this by in the morning, can you please help me? So, I'm getting up out of, you know, out of the middle of the night out of my sleep and helping somebody like proofread a paper or type a letter or something and it's even like that with my older sister with her job. I mean, there's certain things with her, she won't send an email sometimes if I don't help her proofread it or listen to her read it to me or give her something, information for it. So, I've definitely neglected my health as far as exercising and trying to do better with eating. Sometimes I'll cook dinner and because I've had such a long day I won't eat then, cause you know, sometimes you just feel tired and then you cook and you smell it; you can't eat. So, I let my son eat and I'll probably go to sleep and I'll wake up in the middle of the night and then I'll eat.

Advice for Black women. Lastly, all participants were asked "What do you think are some ways Black women can create change in their lives to improve their health?" This provided an opportunity for the women to provide advice for other Black women. Responses shared were based on shared experiences, lessons they've learned and current challenges they were experiencing. The women encouraged other Black women to reevaluate the aspects of the SWS that are harmful and embrace prioritizing self-care in order to better serve those in their community.

I think the one thing that I wish somebody had told me early was that it's okay to take care of you. It's okay to make sure that you're okay. We have a girl in the gym. She brings her little girl. Her little girl like she's maybe about six and she does the workout that we do. I wish somebody had explained to me taking care of my physical health early.

First I would tell them because you know, that a black woman, we could get tear down so easily and not just by a different race, but from family members, loved ones, kids, I would say to first love yourself. If you don't love yourself you can't get nothing done...you can't be a mom, you can't be a sister, you can't be an aunt, you can't be nothing if you don't love yourself...people want to always talk about you. Let them talk. If you know it's not true, don't hover on it, don't stress on it. People are always gonna talk and also when I say love yourself where you, you know, to where you won't get sick you know, like with health-wise, health issues, diabetes, blood pressure, you know, I really don't, I think, what's the number one killer with black women.

I really think that, that we should come together and talk more openly about these

things and, and be willing to learn more so that we can help ourselves be better and

not just ourselves but our children and the next generation coming up because it's,

it's just so different now then when our parents were our parents.

4.5. Discussion

This qualitative study presented factors associated with the stress and coping experience of underserved and rural African American women to better inform cardiovascular health. Three major themes emerged. Firstly, the concept of community was very present throughout the interviews. Most women reported that their community consisted of family and friends and these individuals helped to shape their perception of stress and how they engaged in coping mechanism. Health providers also were identified as significant contributors to the health of the women as they navigated their various roles within their community. The concept of neighbors being active members of a woman's community was based on a number of factors. Primarily, the length of time living within the neighborhood and the participants' personality. Living in a neighborhood that you've grown up in provided some ease in creating deeply rooted relationships. Most participants described themselves as busy and as individuals who kept to themselves. This introverted personality was especially perpetuated during the height of

the COVID-19 pandemic, where isolation was necessary. Regardless, most women detailed way in which neighbors looked out for each other by checking in on one another. Future studies seeking to conduct community-based interventions to improve cardiovascular health should seek to incorporate members of the individual community that is closest to them. Further experiences with healthcare providers were overwhelming positive, thus researchers should further invest in strategies to benefit from the foundation of trust and confidence among underserved patients with their providers.

The second theme to emerge was culture. The culture of stress and coping was primarily guided by generational experiences that later in life shaped perception and engagement of stress and coping. Generationally, we saw how the characteristics of the SWS was mightily present. Modeling of the acknowledgement of stress and the utilization of coping mechanisms was similar across those in the ideal and non-ideal ICH categories. There was a common culture throughout communities in childhood of suppressing stress, avoiding the appearance of weakness through motivation to succeed due to limited resources (i.e poverty, single parent household), discrediting coping mechanisms that involved vulnerability and a strong prioritization of caregiving that resulted in self-neglect. This culture, particularly among those that did not meet ICH metrics, continued to manifest into avoidance and suppression of stress and maladaptive coping mechanism regardless of the knowledge that stress was detrimental to one's health. This knowledge would be beneficial in informing how providers create treatment plans for underserved African American women that incorporates factors that appear to combat the extreme embodiment of the SWS, such as, prayer/faith, and meditation techniques. The knowledge seems to be present, however, the need to break

habits and transform from traditional ways of health behaviors seem to be difficult among this population of underserved women. Thus, it is not enough to tell underserved African American women to go for walks, sleep more and eat healthy. These findings illuminate the need for providers and others interested in reducing stress-related disparities such as CVD, to become familiar with historical background and culture of these women and understand how it informs their present-day lifestyle.

The final theme was health. Knowledge of health, stress risk factors, signs and symptoms was high among both groups of women. Participants easily identified the health impact of stress and even used their own medical experiences of stress and health consequences. It was more common among individuals who met ideal ICH to use past health experiences from their family members as a motivating source to create health changes within their lives. Disparities in CVD risk factors among underserved African American women continue to exist. Results of this study identifying health knowledge as a significant theme provides the support needed to create multipronged interventions focused on individual and community levels of change. Researchers should seek to develop interventions that are culturally tailored for CVD risk reduction through the incorporation of stress reduction and coping strategies that considers the complex interplay of the lives of African American women and their unique stress experience and needs.

Findings from this study corroborate and extend previous examinations of concepts of strength, caregiving, and family focus among African American women (Watson & Hunter, 2016; C. Woods-Giscombe et al., 2016; Woods-Giscombé et al., 2015), regardless of how stressful life may have been in childhood or continues to be in adulthood (i.e., limited financial resources, competing roles, demanding work

schedules). Many of the women delighted in their role as the 'mother' of their community despite also identifying the challenges of being the sole or primary matriarch. For those women who strongly identified with presenting an image of strength and caregiving for their family members, they identified their 'reward' coming from the outpouring of themselves for the betterment of others. A consistent source of strength to cope from stress came from prayer and faith, which is consistent with previous literature (Chatters et al., 2008; Holt et al., 2012; Taylor et al., 2014) which reported that African American women cited religion more frequently as their main resource of coping. Among these participants, seeking the presence of God was a necessary practice to accessing protection, peace and a secured place of 'laying down one's burden.' This practice was reported as being helpful in participants deriving meaning of their stressful experiences. Several studies have demonstrated the benefits of incorporating spirituality in health promotion behaviors (Marshall & Archibald, 2015; Taylor et al., 2014), thus future interventions should seek to do the same while also centering a strength-based, faith- and family-centered approach.

4.5.1 Limitations

This study has several limitations. Firstly, the generalizability or transferability of study findings are limited to underserved African American women between the ages of 30-50 who are receiving care from the clinic locations identified in the data search. Thus, findings may not be applicable to communities of African American women receiving care from clinics that differ structurally and in their process of providing care and to those outside the age range. Further, we used a modified version of the AHA's measure of cardiovascular wellbeing (ICH). Information on participants' physical activity level and

nutrition status could not be objectively measured from the electronic health record, thus we relied on subjective data from their interview. Due to this modification, the true status of cardiovascular wellbeing could not be adequately reflected. Lastly, we acknowledge that there could be significant changes made in the cardiovascular health of the participants from the time period between when ICH was calculated and time of interviews.

4.6 Conclusion

Despite advances in cardiovascular health knowledge and treatment, African American women continue to be disproportionately impacted with poorer cardiovascular health outcomes. This disparity is further perpetuated among communities that are underserved and experience socioeconomic difficulties (Carnethon et al., 2017; Mouton et al., 2017). This study identified the complex interplay of factors related to stress and coping that interact to impact cardiovascular health among underserved African American women. Through qualitative interviews, we gained a deeper insight to the culture of stress and coping and how it is informed and guided by the SWS. Further, qualitative data also provided differences between those who met the metrics of cardiovascular wellbeing versus those who did not. All of which has the potential to inform future research in designing culturally tailored intervention to improve the cardiovascular health of underserved African American women.

5. Conclusion

This dissertation explored factors related to cardiovascular wellbeing among rural and medically underserved African American women for the purpose of better understanding and thus informing efforts to reduce cardiovascular health disparities among this population. The American Heart Association (AHA) developed a measure for assessing cardiovascular wellbeing, ideal cardiovascular health (ICH), that can easily be assessed using readily available EHR data along with self-report variables. We implemented a multidimensional, culturally relevant conceptualization of stress by using the Superwoman Schema (SWS) conceptual framework that recognizes the unique manifestations of stress in rural African American women to investigate its' influence of cardiovascular health. The current body of literature on cardiovascular wellbeing has underexamined the impact of community stressors on ICH among rural and medically underserved African American women. Further, this relationship has not been examined from a cultural perspective, like the SWS. Thus, it was necessary for this study to evaluate the complex interplay of community stressors (neighborhood cohesion and neighborhood safety) through a culturally sensitive lens.

The modified social ecological model (SEM) of health adapted from the Centers for Disease Control (CDC), was used to guide the progression of this dissertation. The original model was developed to explain the relationship between an individual and their environment and how this influences human development and behavior. The SEM is composed of subsystems that are consistently impacting one another. The individual is placed at the center of the framework and is enclosed within a multilevel system. At the individual level, African American women have several intersecting social identities that influence their cardiovascular health. For instance, sexism and racism are systems that

intertwine and impact someone that is both woman and African American. Thus, experiencing oppression from multiple systems simultaneously creates a cumulative stress experience that is unique to this minority group. Therefore, cardiovascular health disparities among African American women are not solely explained by one social identity, but rather the ways in which multiple identities interact to impact the lived experiences of this population. Further, environmental context is a significant social category that have been found to impact the cardiovascular health of African American women. The rural environment, for example, is often plagued by poverty and other structural barriers that significantly restrict social, cultural, and economic resources, thus impacting cardiovascular health. This chapter provides a summation of the study, a discussion of the research questions investigated within the study, implications for the findings, as well as limitations and suggestions for future research.

5.1 Psychometric Scales of Strong Black Woman/Superwoman

There are several different scales that have been developed to measure the strong black woman/superwoman ideology. Not only is it important to consider how this ideology is conceptualized in research but also how it has been used in relation to stress related health disparities such as cardiovascular health. A scoping review was conducted as a first step to understand how this unique ideology experienced by African American women was psychometrically evaluated to assess stress-related disparities. Various stress models have been used to conceptualize the mechanism by which exposure to stressors can lead to adverse health outcomes such as cardiovascular disease (CVD). Our review found several commonalities between the scales, such as the use of Likert Scales and the ability of each component to be adapted to measure

varying components of the SBW/superwoman ideology. The scales varied in how they were psychometrically developed. With the exception of the G-SWS-Q, most scales were not based on a diverse (e.g., age, educational background, geographic location) sample of African American women for item development and content validity assessment. Nonetheless, future studies should seek to incorporate frameworks and measures that are tailored for African American women and considers the intersection of their gender and race/ethnicity to improve cardiovascular health outcomes.

5.2 MyChart Recruitment Feasibility

In chapter 3 we examined the feasibility of using the MyChart patient portal to recruit and collect self-report data among rural African American women seen at rural clinics within a university healthcare system. Participants were women between the ages of 30-50. They provided demographic information and completed the G-SWS-Q, the neighborhood cohesion and neighborhood safety scales. The pilot study sought to answer the following questions: (1) Is it feasible to use the MyChart patient portal to recruit rural African American women to provide self-report data on community stressors and the SWS? (2) What is the preliminary status of ICH and its association with social neighborhood conditions (neighborhood cohesion and neighborhood Safety) and the SWS (3) What is the experience of using MyChart among this population?

Results from the pilot highlighted the barriers in using MyChart for recruitment but also presented an opportunity for combining various recruitment strategies to attain a successful recruitment goal. Rural African American women are often underrepresented in research and efforts to maximize the efficiency of recruitment tools are needed to increase research participation. Our preliminary findings show that most participants in

the 30-50 age group met the ideal category of ICH; a promising result and more reason to strive for continued preventative efforts among this population because modifiable health risk factors such as the ones included in ICH are important determinants of CVD morbidity and mortality and studies have shown that these risk factors are interrelated and often co-exist. Stress is also a risk factor for CVD and have been found to be associated with health behaviors that also increase risk for CVD. Thus, the onset of CVD may be prevented or delayed by interventions that target multiple health risk behaviors simultaneously. In our evaluation of ICH and community stressors, an inverse relationship was found between ICH and neighborhood safety. Future research and policies should seek to expound on these findings to increase neighborhood safety and promote cardiovascular wellbeing. Qualitative interviews with participants revealed that the MyChart portal was easily navigated by the women for clinical care. The majority of participants found the platform to be accessible for their perceived intended use. Using MyChart for research related activities was not common among participants, with many reporting to have missed the study invitation message. Thus, additional recruitment strategies such as reminder phone calls, texts, and emails in combination with MyChart recruitment seem to better serve the recruitment goals for this community.

5.3 Stress, Coping and Cardiovascular Health

There are unique cultural and historical factors that influence how African American women experience stress. The Superwoman Schema (SWS) has regularly encouraged African American women to embody strength in the face of adversity; however, the endorsement of this role may often lead to the suppression of emotions which may leave African American women vulnerable to greater internalization of stress.

Much of the research on the SWS has focused primarily on mental health. As part of the SWS, African American women are believed have a dedication to caregiving, exhibit emotional suppression and have a perceived obligation to manifest strength and independence; all of which serve can serve as unique stressor for this group. These unique stressors are believed to increase engagement in avoidant coping, postponement of self-care and other maladaptive health behaviors and experience premature health deterioration. In Chapter 4 we used the SWS to guide qualitative interviews with the purpose of gaining greater understanding of the stress and coping experience of rural and medically underserved African American women. Participants were selected based on whether they met or did not meet ICH ideal category.

Results identified major themes of community, culture and health that can contribute to poor stress and cardiovascular health but also have the potential serve to serve as protective factors in the stress and coping process. Through the emerging themes, the interviews revealed how the SWS continues to serve as the cognitive process through which rural and medically underserved African American women experienced stress and coping. Relationships such as ones with family and friends seemed to being a motivating factor for the women to either improve their lives or adapt to behaviors of coping that can be detrimental to cardiovascular wellbeing. Further, the culture of health, stress and coping seemed to be shaped both from past childhood experiences and from communities we form in adulthood. Understanding that schemas are cognitive models that operate subconsciously and influence how we perceive and interpret information we receive from our environment it is important to further explore how concepts from community, culture and health of this underserved population can be

utilized to reduce stress and strengthen their coping mechanisms in regard to cardiovascular health.

5.4 Limitations

This dissertation study had a few limitations which should be considered for understanding and interpreting the results. First, African American women were recruited via MyChart for this study and our age range for recruitment was narrow. In the pilot study, for instance, participants' age, educational attainment, and socio-economic status, were from a small sample and may be strongly represented by African American women between the ages of 30-50 and not generalizable to other groups of African American women. . Further, given we only utilized MyChart data for some analysis, we were limited to the available in the patient portal. The lack of these additional information further limits the generalizability of this dissertation.

5.5 Future Directions for Research and Practice

The purpose this dissertation study is to evaluate factors related to cardiovascular wellbeing among rural and medically underserved African American women. This study is innovative in many ways. To our knowledge it is among the few studies to evaluate cardiovascular wellbeing using the American Heart Association's ICH metrics exclusively among rural and medically underserved African American women. We also used data from electronic health records (EHR) instead of self-report data along to assess cardiovascular wellbeing, which is a great opportunity for reusing EHR data to improve health research of rural and medically underserved African American women. Implications for research, practice and policy are outlined below.

5.5.1 Implications for Nursing Practice

Changes to health practice that could potentially be informed through the study findings. First, training for providers in recognizing early signs of stress and screening for stress specific to African American women. This would include using culturally tailored stress scales for use in African American populations and during common health care visits. Also, creating a team-based approach with every medical encounter in the primary care setting with mental health providers and social workers readily available for consultation would help create effective stress management for the patient.

5.5.2 Research

Findings from this dissertation identified an overall positive relationship with healthcare professionals and this relationship being integral to learning about health and coping. These findings should be explored by assessing the barriers and facilitators of building positive relationships with healthcare providers and how these relationships can be cultivated to address stress reduction to better inform efforts to reduce cardiovascular health disparities in rural and medically underserved African American women. Also, our pilot study found an inverse relationship between neighborhood cohesion and ICH and nearly half of the participants having an annual income of 50,000 or less. Future studies could be replicated with a larger sample size and a more evenly distribution of demographic characteristics of the study participants including variables that impact neighborhood safety. Lastly, information gained from the qualitative interviews in chapter four identified community, culture and health as emerging themes that are embedded with the SWS. Future studies should seek to measure the SWS using the G-SWS-Q and

develop in intervention that explore how these factors can be modified to impact cardiovascular health among rural and medically underserved African American women.

5.5.3 Policy

Several policy proposals can be created from the knowledge gained from this dissertation. First, would be to increase funding for non-profit health care organizations such as federally qualified health centers (FQHC) to provide preventative cardiovascular screening and care to uninsured, underinsured, and vulnerable patients regardless of ability to pay. An additional policy would be the expansion of healthcare training programs to increase health provider in underserved populations through the creation of partnerships with training schools and health clinics located in this communities. The health professional students would be a part of an interdisciplinary team of providers (physicians, nurses, pharmacists, social workers, medical assistants, physician assistants etc.) who have the shared mission of improving access to health care for these communities. This clinical rotation would include seminars and training sessions on the unique needs of this community, how to reduce implicit bias and better connect with patients as well as community engagement. This will provide opportunities to participate in mobile clinics that go into the communities to reach more people. The goal of this training program will be to create exposure to this population and increase interest from upcoming healthcare professionals to consider practicing in rural underserved communities.

5.6 Conclusion

The purpose of this dissertation was to explore and describe factors impacting cardiovascular wellbeing among rural and medically underserved African American

women. Through our feasibility pilot study, we found preliminary findings on the state of ICH among rural African American women for which we recruited through MyChart. Identifying optimal strategies to recruit this population is significant for ensuring this group of women are properly represented in studies seeking to reduce cardiovascular health disparities. Qualitative interviews helped to identify factors that impact the experience of stress and coping among rural and medically underserved African American women. This is important because the stress experience of this community of women is unique and should be assessed through a culturally sensitive perspective. Findings from this dissertation provide an opportunity for future research and practice to explore and address cardiovascular health risk using tailored interventions, treatment, and education.

Appendix A: Interview Guide for MyChart Pilot Study

Script to be read to participant: Thank you for your participation today. My name is [Interviewer name], a PhD student at Duke University School of Nursing. This interview is being conducted as part of a research project discussed with you. The interview will take about 10 to 15 minutes and will be audio recorded so I may accurately document the information. The audio recording and anything else that you share with me today is going to be used for purpose of the research study and will not be shared with anyone outside of the study team. Names, places, or other identifiers that can be used to reveal your identity will not be used. If at any point you feel comfortable in responding to one of the questions, you can choose to not answer it. At this time, we will begin the interview. Is it okay to start recording?

- 1. What are your thoughts about the MyChart system?**
- 2. How do you use MyChart?**
- 3. How much time does it take you to navigate MyChart?**

Probe: What device do you use to access MyChart.

- 4. How would you describe your experience with using MyChart**

Probe: What challenges have you face while using MyChart

Probe: What changes would you suggest to make your experience better?

Briefly discuss what happens next in the process and ask the interviewees if they have any final questions. Thank you for your time and thoughtful comments.

Appendix B: Interview Guide for Stress and Coping

Script to be read to participant: Thank you for your participation today. My name is [Interviewer name], a PhD student at Duke University School of Nursing. This interview is being conducted as part of a research project discussed with you. The interview will take about 45 to 60 minutes and will be audio recorded so I may accurately document the information. The audio recording and anything else that you share with me today is going to be used for purpose of the research study and will not be shared with anyone outside of the study team. Names, places, or other identifiers that can be used to reveal your identity will not be used. If at any point you feel comfortable in responding to one of the questions, you can choose to not answer it. At this time, we will begin the interview. Is it okay to start recording?

Opening Comments:

- a. Restate the purpose of the study and the importance of the interviewee's role in the process.
- b. Inform the interviewee of the potential risk involved in the study. Remind each person that they can stop the interview at any time without any harm. Also remind the interviewee that the interview will be taped and professional transcribed. Their identity will remain anonymous.

Background Information:

- a. How long have you been living in this community?
- b. Where were you born and where were you raised?
- c. What do you do for a living?
- d. Do you consider yourself a community activist?

Opening Question:

1. How long have you been living in this community?
2. What are your thoughts about the community you live in?
3. When I say the word stress, what does it mean for you?

Perceived obligation to present an image of strength:

1. How does stress, if any, affect your health?

Perceived obligation to suppress emotions:

1. What were your thoughts growing up about stress?
2. How do your family, friends, and community talk about stress? Probe: How do people in your family deal with stress
Probe: What were the messages and attitudes regarding stress and health have you heard? Probe: What did these messages mean to you?
Probe: How did these messages and attitudes affect you?

Resistance to being vulnerable or depending on others for help:

1. Explain your relationship with your family.

2. Explain your relationship with your neighbors and others in your community.
Probe: What makes you close (or not)
3. How do you feel about working with others in your community to decrease your stress and/or improve your health?

Prioritization of caregiving over self-care:

1. How do you cope with *stress*? Probe: How is this helping (or not)?
2. How would you describe your role in the community?
3. How would you describe your role in your family?
Probe: Can you make any correlations between your role(s) and how you cope with stress?

Motivation to succeed despite limited resources:

1. How has your community helped (or not helped) with how you cope with stress?
Probe: In what ways do you believe this has impacted your health
Probe: What are the things in your community that are barriers to coping with stress

Summary Questions:

1. What do you think are some ways Black women can create change in their lives to improve their health?
2. Please share any additional thoughts you have about stress and health.
3. What were your initial thoughts about participating in this study?

Briefly discuss what happens next in the process and ask the interviewees if they have any final questions. Thank you for your time and thoughtful comments.

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Biography

Amnazo Muhirwa is originally from the Democratic Republic of Congo and grew up in Charlotte, North Carolina. In 2012, she earned her Bachelor of Arts degree in Psychology from Pfeiffer University and in 2015, she completed the accelerated Bachelor of Science in Nursing degree program from Winston-Salem State University (WSSU) in Winston-Salem, North Carolina. She would return to WSSU in 2016 to pursue her Master of Science in Nursing to become a family nurse practitioner. During her graduate studies, Amnazo was accepted as a scholar in the WSSU-Duke University School of Nursing Bridge to the Doctorate program. Through this rigorous program, Amnazo completed additional hours of research-intensive courses and completed her master's thesis by conducting a secondary analysis examining the relationship between cardiovascular risk factors (obesity and depression) and access to care among rural women. She presented the results of her thesis at both the Southern Nursing Research Society and the Society of Behavioral Medicine conferences. Amnazo also received the WSSU School of Health Science Graduate Student Achievement award, highlighting her academic excellence throughout her graduate program. Amnazo enrolled into Duke University School of Nursing (DUSON) PhD program in the Fall of 2018 where she continued her work in cardiovascular health research from the Bridges program. She will receive her PhD in nursing in May 2023 and plans to continue making strides in building an independent program of research aimed at understanding stress biomarkers to address chronic disease reduction and prevention that can be translated to improve the health of African American women in rural and medically underserved communities.