

SOCIAL DETERMINANTS OF HEALTH INFLUENTIAL TO MEDICATION ADHERENCE  
IN HISPANIC WOMEN WITH CARDIOVASCULAR DISEASE

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## DEDICATION

To my amazing husband Joe Reid, whose tireless love and support made it possible for me to achieve my dream. You confronted my tears and moments of frustration with encouragement and prayers. Thank you for never giving up on me. I love you dearly.

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## ABSTRACT

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### SOCIAL DETERMINANTS OF HEALTH INFLUENTIAL TO MEDICATION ADHERENCE IN HISPANIC WOMEN WITH CARDIOVASCULAR DISEASE

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The purpose of this study was to investigate the relationship between social determinants of health (socioeconomic-related, patient-related, treatment-related, condition-related, and health system-related factors) and medication adherence in Hispanic women with cardiovascular disease (CVD). The World Health Organization (WHO) Dimensions of Adherence Model postulates that medication adherence is influenced by factors in those five dimensions. A predictive correlational design was used to collect data on the dimensions in this framework. Medication adherence was measured using the Medication Adherence Report Scale (MARS-5). Patient-provider communication was evaluated using the Patient-Centered Communication for Cancer Care (PCC-Ca), and the Short Acculturation Scale for Hispanics (SASH) was used to measure acculturation. The data was analyzed using descriptive statistics, hierarchical linear regression, and one-way ANOVA. The first regression model included patient-provider communication and acculturation as predictors. Step 1 of the regression was significant,  $F(2,80) = 7.09, p = .001$  and explained 15% of variance in medication adherence. Only patient-provider communication contributed significantly to the model ( $\beta = .385, p = <.001$ ). After entry of the demographic variables in Step 2, the model was found to be significant,  $F(11,71) = 4.42, p = <.001$  and that the total variance explained by the model was 40%. Patient/provider communication ( $\beta = .329, p = .004$ ) and retired employment status ( $\beta = .422, p = >.001$ ) were found to contribute significantly to the model. There was no significant difference in medication adherence between first, second, and third generation groups ( $F(2,81) = .418, p = .659$ ). CVD.

Assessment of the influence of social determinants of health on medication adherence is essential in the management of CVD. Nurses can play a valuable role in promoting adherence by collaborating with other members of the health care team and community partners to assess social determinants of health and develop strategies and programs to promote adherence behaviors. More research is needed to understand the causality of medication non-adherence in this, and other populations of patients diagnosed with chronic disease.

*Keywords: medication adherence, social determinants of health, cardiovascular disease*

*Hispanic women*

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## CHAPTER I

### INTRODUCTION

The Hispanic population is the fastest growing ethnic group in the US, consisting of over 60 million people (Centers for Disease Control and Prevention [CDC], 2020b). Cardiovascular disease is the leading cause of death for most racial and ethnic groups, including the Hispanic population (CDC, 2020b). In 2015, 20% of all deaths among individuals of Hispanic origin (IHOs) in the US were caused by CVD (CDC, 2020b). CVD is also the leading cause of death for women in the U S, killing 299,578 women in 2017, which accounts for approximately one in five female deaths (CDC, 2020a). CVD includes conditions such as atherosclerosis, heart attack, stroke, heart failure, arrhythmia, and valve disease (American Heart Association [AHA], 2020). IHO s are at increased risk for CVD because of the high prevalence of obesity and type II diabetes in this population (AHA, 2016). Hispanic women are likely to develop heart disease ten years earlier than non -Hispanic women and only one in three are aware that heart disease is their number one killer (AHA, 2020).

The World Health Organization (WHO) defines adherence as “the extent to which a person's behavior—taking medication, following a diet, and/or executing lifestyle changes corresponds with agreed upon recommendations from a healthcare provider” (WHO, 2003). Medication nonadherence for patients with chronic disease is extremely common, affecting as many 50% of patients who are prescribed medications for management of chronic conditions (Kleinsinger, 2018). Nonadherence to treatment results in at least 100,000 preventable deaths and \$100 billion in preventable medical costs (Kleinsinger, 2018). Medication adherence is a major consideration for the prevention and treatment of CVD. For optimum therapeutic efficacy,

medication adherence should be 80% (Kleinsinger, 2018). Individuals with chronic conditions, however, have been shown to demonstrate 50% adherence (Kim et al., 2018).

Medication adherence is influenced by socioeconomic-related, patient-related, treatment-related, condition-related, and health system-related factors (WHO, 2003). While significant research has focused on patient-related factors associated with nonadherence such as forgetting doses, lifestyle behaviors, and poor self-management, few studies have addressed socioeconomic-related barriers or social determinants of health (Wilder et al., 2021). The influence of social conditions contributes to a higher prevalence of chronic disease and may influence an individual's ability to manage health problems (Wilder et al., 2021).

Social determinants of health are the conditions of life that individuals are exposed to resulting from the ways society is built that affects health (Ratcliff, 2017). These conditions include how we live, work, move from place to place, and what we eat and drink. These circumstances may be triggered by governmental agencies, social structures, and the actions of powerful individuals, or organizations (Ratcliff, 2017). The influence of social determinants of health on medication adherence is significant. Unfavorable social and living conditions contribute to a higher prevalence of chronic disease and may influence an individual's ability to manage health problems (Wilder et al., 2021). Key terms, definitions, and associations to the WHO dimensions of adherence model can be found in Appendix A.

### **Problem of Study**

Studies examining differences in medication adherence between first, second, and third generation Hispanic women were not found in the literature. First-generation IHOs are defined as individuals born outside the US (Pew Research Center, 2021). Second-generation IHOs are defined as individuals born in the US to immigrant parents (Pew Research Center, 2021). Third-

or higher-generation IHOs are defined as individuals born in the US to US-born parents (Pew Research Center, 2021). Factors related to generational differences may be influential to adherence and health outcomes in the population of Hispanic women. For example, a significant demographic difference between first- and second-generation IHOs is the level of education. Half (55%) of first-generation IHOs have less than a high school education, compared to a quarter of second-generation IHOs. Second-generation IHOs are approximately two and a half times (42%) more likely to have attended or graduated from college than first-generation IHOs (16%; Pew Research Center, 2021).

The Hispanic population is a heterogeneous blend of individuals born in and outside of the US with varying social, cultural, and behavioral attitudes (Lopez et al., 2014). These beliefs and behaviors may influence health outcomes. Acculturation occurs when those experiencing an immigrant culture adopt the beliefs and practices of a host culture. Both positive and negative behavior changes occur that may result in the development of CVD, such as lifestyle changes (Lopez et al., 2014).

The Hispanic mortality paradox may explain generational differences in health outcomes and adherence behaviors in Hispanic women (Velasco-Mondragon et al., 2016). The paradox suggests that mortality rates are lower and health outcomes are better among foreign-born, newly arrived, and less acculturated ISOs compared to native-born ISOs (Velasco-Mondragon et al., 2016). It is possible that migrants and first-generation ISOs represent a self-selected healthier population. Another likely reason for the paradox is that negative health outcomes of undocumented or un-accultured ISOs may be underreported due to lack of access to health care services (Velasco-Mondragon et al., 2016).

Ogungbe et al. (2020) suggest that causes of poor medication adherence are complex with contributing factors at the patient, provider, and health system levels. Bandi et al. (2017) characterize medication adherence as “the extent of correspondence between a person’s medication-related behavior and healthcare provider recommendations” (p. 1). The authors suggest that providers partner with patients to establish a course of treatment that is mutually acceptable to both parties.

Poor adherence decreases the effectiveness of therapies and contributes to increased morbidity and mortality (Bandi et al., 2017). Additionally, poor medication adherence represents a substantial source of healthcare spending (Bandi et al., 2017). Ho et al. (2009) suggest that it is possible that medication nonadherence may be intentional whereby the patient makes a choice not to take their medications. In contrast, nonadherence may be unintentional, an occurrence in which a patient is careless or forgetful about taking prescribed medications.

Many medications exist to manage chronic illnesses. However, their effectiveness is reduced because half of all patients do not take their medication(s) as prescribed (Ho et al., 2009). Addressing and closing the medication adherence gap would significantly improve the ability of biomedical advances to reduce the burden and costs associated with chronic illness. When people are struggling with housing instability, food insecurity, and/or unemployment, they do not have the necessary emotional and material resources to devote adequate attention to their health and treatment regimen. Medication adherence typically includes two components: (1) whether patients take their medications as prescribed (e.g., one tablet daily) and (2) whether patients continue to take a prescribed medication (Ho et al., 2009).

### **Rationale for the Study**

Researchers addressing medication adherence acknowledge that the behavior is

determined by a variety of interrelated factors such as beliefs about medications, knowledge of the disease, access to healthcare, comorbidities, social support, and sociodemographic factors (Baghikar et al., 2019). While numerous studies have been published regarding barriers and facilitators to medication adherence relating to a variety of chronic diseases, no studies were found addressing these challenges as they apply to Spanish speaking and non-Spanish speaking Hispanic women with CVD. This gap in the literature is significant, as Hispanic women die disproportionately from CVD as compared to other ethnic women (AHA, 2023b). CVD remains the leading cause of death in this group, affecting 42.7% of Hispanic women (Gomez et al., 2022). An additional gap in the literature relates to differences in medication adherence between first, second, and third generation Hispanic women. Factors related to generational differences may be influential to adherence and health outcomes in the population of Hispanic women.

### **Theoretical Framework**

The WHO dimensions of adherence model (WHO, 2003) was used as the theoretical framework for this study. The model was created to categorize barriers of adherence to treatment commonly encountered by patients diagnosed with chronic disease. This model is based on the belief that adherence is a multidimensional phenomenon characterized by the interaction of five sets of factors: socioeconomic, condition, treatment health system, and patient-related barriers (WHO, 2003). These factors are interrelated, and each can affect the behaviors of individuals in achieving adherence with prescribed therapies. These categories are advantageous to health care providers because they are easy to remember and lead them to consider barriers at the individual patient level.

The model is logical and clearly developed, emerging from the work of the Adherence to Long-Term Therapies project, a global initiative launched in 2001 by the Noncommunicable

Disease and Mental Health Cluster of the WHO (WHO, 2003). Major concepts of the theory are distinctly defined. Relational statements are presented to describe the interplay of the concepts. Socioeconomic-related factors include disparities related to poverty, illiteracy, low level of education, unemployment, unstable living conditions, and lack of support systems (WHO, 2003). Additionally, prohibitive cost of medications, cultural practices and beliefs, and family dysfunction contribute to socioeconomic barriers to adherence. Therapy-related factors are those associated with complexity of the medical regime, duration of treatment, previous treatment failures, changes in treatment, and side effects. Frequency of dose, number of medications, and adverse effects of treatment can affect adherence. Condition-related factors are demands of treatment faced by patients. These determinants include severity of symptoms, level of physical and psychological disability, and the rate of progression of the disease (WHO, 2003). Patient-related factors include resources, knowledge, attitudes, beliefs, expectations, and perceptions experienced by the patient (WHO, 2003). Health system-related factors that have a negative effect on treatment adherence include poor patient-provider relationships, inadequate reimbursement by insurance providers, and poor medication distribution systems. Other determinants include lack of training of health care providers regarding the management of chronic disease, inability of the system to educate patients, failure to provide follow-up, and short consultations (WHO, 2003).

The WHO dimensions of adherence model has been used as the theoretical framework for studies addressing chronic conditions. Ghimire et al. (2017) conducted a qualitative study to explore factors associated with medication adherence in a population of hemodialysis patients. Fernandez-Lazaro et al. (2019) conducted a cross-sectional study to assess adherence to treatment and related factors among patients diagnosed with chronic conditions. The model is



represented in Figure 1.

### **Assumptions**

Assumptions for the study were as follows: (1) Participants will provide honest responses to questions; (2) Patient adherence with medication regimes can be intentional based on the influences of social determinants of health (socioeconomic-related, patient-related, treatment-related, condition-related, and health system-related factors); and (3) Medication adherence is a multidimensional phenomenon consisting of interrelated factors experienced by the patient.

### **Research Questions**

The research questions for this study were:

1. Do social determinants of health (socioeconomic-related, patient-related, treatment-related, condition-related, and health system-related factors) predict medication adherence in Hispanic women with CVD?
2. Are there differences in medication adherence between first, second, and third generation Hispanic women with CVD?

### **Definition of Terms**

Key terms selected for the study are recorded in Appendix A. Conceptual and operational definitions are provided. Each term is categorized to the appropriate theoretical construct of the WHO dimensions of adherence model.

### **Summary**

This chapter introduced the problem, rationale for the study, assumptions, research questions, described the theoretical framework, and provided a definition of terms. During a review of the literature, no studies were found addressing socioeconomic-related barriers or social determinants of health challenges as they apply to Spanish speaking and non-Spanish

speaking Hispanic women with CVD. In addition, generational differences in medication adherence behaviors between Hispanic women have not been previously studied. It was hoped that knowledge gained during this study would: 1) enhance the importance of including assessment of social determinants of health during comprehensive patient assessments, c) promote the development and use of interventions to improve medication adherence through patient self-management, and c) lead to the promotion and acceptance of techniques to improve patient/provider communication.

## CHAPTER II

### REVIEW OF THE LITERATURE

Medications are often used to effectively manage chronic disease. Medication adherence, however, presents a challenge for both patients and providers. Nonadherence to medication regimes can result in poor clinical outcomes, increased cost of healthcare, and increased hospitalizations (Cutler et al., 2018). Half of the 3.2 billion annual prescriptions dispensed in the United States are not taken as prescribed (Cutler et al., 2018). Annual health care costs associated with nonadherence are \$100–\$300 billion of US health care dollars (Neiman et al., 2017). Medication adherence requires the recognition that adherence involves a series of complex behaviors involving three phases: initiation- beginning a new medication, implementation- taking a medication as prescribed over time, and discontinuation- stopping a medication for any reason (Zullig et al., 2017). Barriers may exist across all phases of adherence. As with other chronic diseases, patients with CVD are challenged to achieve optimal medication adherence. Nonadherence to CVD medications has been documented to occur in >60% of patients (Baroletti & Dell’Orfano, 2010).

Numerous studies have been conducted to examine medication adherence in patients with diseases such as diabetes, HIV, and other chronic conditions to include CVD. IHOs and females are included in the populations being studied, but none were found specifically addressing the process of medication adherence in Hispanic women with CVD. Social determinants of health have been identified as influential factors of medication non-adherence in the literature, but no studies were found addressing these barriers in the population of Hispanic women with CVD.

## **Research Questions and Purpose**

The research questions which guided this literature review were: (1) Do social determinants of health (socioeconomic-related, patient-related, treatment-related, condition-related, and health system-related factors) predict medication adherence in Hispanic women with CVD? and (2) Are there differences in medication adherence between first, second, and third generation Hispanic women with CVD? The purpose of this literature review was to perform a synthesis of best evidence regarding social determinants of health influential to medication adherence in the population of Hispanic women diagnosed with CVD. Additionally, synthesis of the 16 articles will highlight the most impactful evidence to support conclusions drawn regarding these social determinants, and recommendations for interventions to increase medication adherence and the influence of acculturation on these behaviors.

## **Methods**

The literature search was performed using two databases: Cumulative Index to Nursing and Allied Health Literature (CINAHL) and PubMed. The search was initiated using key word search, and Medical Subject Headings (MeSH) terms. Inclusion criteria included studies focused on Spanish and non-Spanish speaking Hispanic women aged 40 and older with a diagnosis of CVD (atherosclerosis, heart attack, stroke, heart failure, arrhythmia, and valve disease), who have been prescribed medications for treatment and/or management of CVD. Studies were published in peer-reviewed journals between 2017 and 2022 and written using the English language. The population of women aged 40 and over was selected, as age is an important determinant of cardiovascular health. By 2030, approximately 20% of the US population will be aged 65 or older. CVD will result in 40% of all deaths in this population (North & Sinclair, 2021).

After applying the initial inclusion criteria, the search yielded no results. A search of the term ‘medication adherence OR compliance’ yielded 1,030 articles. The search was narrowed using the terms ‘medication adherence OR compliance AND women’ resulted in 414 articles. Combining the terms ‘medication adherence AND Hispanics’ resulted in 46 articles. Duplicate articles were removed. The following exclusion criteria were applied during the screening process of titles and abstracts: non-Hispanic populations, psychiatric diagnoses, renal disease, and diabetes. Sixteen articles were selected for review. Common themes included socioeconomic-related, patient-related, treatment-related, condition-related, and health system-related factors associated with medication adherence.

## **Results**

### **Definition of Medication Adherence**

Various definitions have been used to describe the complex process of medication adherence. According to the WHO (2003), adherence is the extent to which a person's behaviors corresponds with agreed upon recommendations from a healthcare provider and is influenced by socioeconomic-related, patient-related, therapy-related, condition-related, and health system-related factors. Adherence requires the voluntary and collaborative participation of the patient and provider in creating a mutually acceptable therapeutic plan to improve health outcomes (Bandi et al., 2017; Feehan et al., 2017; Mondesir et al., 2019; Sieban et al., 2019). Medication adherence can be quantified as 80% or more of prescribed medications taken to attain optimal therapeutic benefits (Jeminiwa et al., 2022; Pietrzykowski et al., 2020). The process can also be explained as two underlying constructs: the extent (how common) and reasons for (barriers to) medication non-adherence (Marcum et al., 2019). Pietrzykowski et al. (2020) describe adherence as the availability of evaluated drugs within 1 year after discharge from the hospital, according to

completed prescription data obtained from the National Health Fund. The common thread among the articles leads to the belief that medication adherence is a collaborative process established between the patient and provider based on a clearly communicated treatment plan.

### **Medication Adherence Measurement Tools**

The self-reported 8-item Morisky Medication Adherence Scale (MMAS-8) has widespread use in evaluating medication adherence in a variety of diseases, populations, and countries (Feehan et al., 2017). The MMAS-8 was designed to describe the medication taking behavior of patients. It has been validated against other adherence methods such as pharmacy dispensing database fill data and is accredited by the American Medical Association and American Pharmaceutical Association (Feehan et al., 2017). MMAS-8 scores can range from 0 to 8 with low adherence defined as a score <6, medium adherence as scores of 6 or 7, and high adherence with a score of 8 (Bandi et al., 2017; Feehan et al., 2017; Lor et al., 2019; Presseau et al., 2017; Sieban et al., 2019).

The Beliefs about Medicines Scale (BMQ) is an instrument used to evaluate patients' beliefs and perceptions about their medication (Sieban et al., 2019). Participants select their degree of agreement with each individual statement about medicines using a 5-point Likert scale. The necessity–concern differential (NCD) is calculated as the difference between necessity and concern scores. These scores have a possible range of –20 to 20. A positive difference indicates the patient perceives the benefits of medication outweigh the concerns. If the differential is negative, the patient perceives more costs than benefits (Sieban et al., 2019).

Electronic pill bottle caps (eCAP) are devices that fit on standard pill bottles and record the date and time each pill bottle is opened. Patients are adherent on any given day if the eCAP was opened the same number of times as prescribed (Cornelius et al., 2020; Liyanage-Don et al., 2021).

The proportion of days covered (PDC) is a validated measure of adherence to medications. Patients are considered adherent if PDC is at least 80% for medications. The Medometer is a pictorial scale with measures ranging from 0% (no dose taken) to 100% (all the doses taken) and up to 120% (extra doses taken). Adherence is measured by showing the patient a visual image of the Medometer and are asked to designate a mark on the image indicating the number that best estimates the total percentage of doses of all medications taken in the past 30 days. Adherence is determined by a score ranging from 80% to 100%. Nonadherence is determined with a score of <80% (Jeminiwa et al., 2022).

Numerous tools for the measurement of medication adherence were found in the literature, including direct and clinical assessments and self-report. Researchers must be aware that the selection of the measurement should be based on the goals of the study. For example, the study may be focused on the perceptions of the patient regarding adherence to medication, while other studies examine adherence based on actual doses of medications taken. The literature review yielded tools designed to meet the goals of both types of data.

### **Acculturation**

Acculturation is a multidimensional process that involves the adoption of behaviors of the host country and relinquishing the behaviors and attitudes of the original culture (Alba & Nee, 1997). Patients' acceptance of prescribed treatment plans, including medication use, can be influenced by beliefs regarding their health conditions. Health care providers must be cognizant

of these beliefs when providing medical treatment. Factors concerning patients can be conceptualized as illness perceptions (Shahin et al., 2012).

Acculturation of IHOs into US affects CVD risk factors in complicated ways. Acculturated immigrants have more risk factors for CVD including hypertension and obesity (Padilla et al., 2011). These risk factors are the result of negative behavior changes including diet and physical activity as immigrants become more integrated into US society. Those providing care in immigrant communities should consider such factors as language and nativity to assess CVD risk and promote behaviors to improve treatment adherence.

### **Theories Relative to Medication Adherence**

Several theoretical approaches to understanding medication adherence were found in the literature. The WHO multidimensional adherence model (WHO-MAM) was used as the theoretical framework for a study exploring factors influencing medication adherence among people with CVD risk factors (Mondesir et al., 2019). The model describes five dimensions that interact to influence medication adherence. These dimensions include social/economic factors (social support, family functioning, and costs); patient-related factors (self-efficacy, perceived health, beliefs about the efficacy of medications and knowledge of medications); treatment-related factors (side effects and dose complexity); condition-related factors (comorbidities); and health care system/health care team-related factors (support from healthcare providers, negative interactions with providers, and pharmacy access; WHO, 2003).

The theoretical domains framework (TDF) is composed of 14 theoretical domains: knowledge, skills, social/professional role and identity, beliefs about capabilities, beliefs about consequences, optimism, reinforcement, intentions, goals, memory/attention/decision processes, environmental context and resources, social influences, emotion, behavioral regulation (Presseau



et al., 2017). The domains synthesize the content of 33 theories of behavior change. The health action process approach (HAPA) suggests that behavior is developed in two phases: a motivational phase and a volitional phase (Presseau et al., 2017). During the motivational phase, an intention to perform a behavior is formed. This is determined by how confident the individual feels about enacting the behavior (self-efficacy). Outcomes that may result from engaging in the behavior must be considered (outcome expectancies) in addition to risk perceptions about performing the behavior. The volitional phase depicts how intentions are translated into behavior (Presseau et al., 2017).

The health belief model (HBM) illustrates which beliefs should be targeted in communication efforts to influence positive health behaviors (Presseau et al., 2017). Individuals who perceive negative health outcomes as severe perceive themselves to be susceptible. Those who perceive the benefits to behaviors that reduce the likelihood of that outcome to be high and perceive the barriers to adopting those behaviors to be low will experience the likelihood of that behavior (Carpenter, 2010).

The Gelberg-Andersen behavioral model for vulnerable populations was used to categorize variables in a study examining Medicare low-income subsidy beneficiaries with diabetes, hypertension, and/or heart failure (Tsang et al., 2021). Study variables in regression models were categorized into predisposing, enabling, and need factors. Predisposing factors predispose people to the use of medications (age, sex, race, ethnicity, marital status, income, health insurance, age, education level). Enabling factors enable an individual's use of medication (metropolitan statistical area, health professional shortage area, census regions). Need factors include the individual's need for prescription medications. This category includes a risk adjustment summary score created by the Centers for Medicare and Medicaid Services (CMS) to

adjust payments to Medicare Advantage plans based on patient clinical and demographic information. A higher score indicates worse health status (Tsang et al., 2021). Bandi et al. (2017) found that behaviors such as smoking, and alcohol consumption are influential to medication adherence.

Each of the theories are appropriate to guide studies examining medication adherence. The theories consider socioeconomic, environmental, and health behaviors which influence adherence to treatment. In addition to providing a theoretical framework for research, the theories assist researchers to better understand the factors that affect behavioral change resulting in improved compliance.

### **Socioeconomic-Related Factors**

In several of the articles reviewed, researchers identified socioeconomic factors relative to medication adherence. Level of education (Bandi et al., 2017; Pietrzykowski et al., 2020), computer literacy, insurance status (Bandi et al., 2017; Bhasin et al., 2020), household income (Bandi et al., 2017; Bhasin et al., 2020; Jeminiwa et al., 2022; LeBron et al., 2018; Pietrzykowski et al., 2020), and employment status (Bandi et al., 2017) have been associated with higher adherence. Other influential socioeconomic-related factors include age (Bhasin et al., 2020; Feehan et al., 2017; Tsang et al., 2021), gender (Bhasin et al., 2020; Cornelius et al., 2020; Tsang et al., 2021) marital status (Jeminiwa et al., 2022; Pietrzykowski et al., 2020; Tsang et al., 2021), race/ethnicity (Bhasin et al., 2020; Donneyong et al., 2020; Feehan et al., 2017; Jeminiwa et al., 2022; Lank et al., 2019; LeBron et al., 2018; Tsang et al., 2021), poverty and low income status (Feehan et al., 2017); and food insecurity (Donneyong et al., 2020). While effective communication between patients and providers contributes to medication adherence, social support and interaction between patients and their families supports the adoption of positive

health behaviors (Shahin et al., 2021). Social support can also be provided by friends and peers (Feehan et al., 2017; Lor et al., 2019; Marcum et al., 2019; Mondesir et al., 2019; Presseau et al., 2017).

### **Patient-Related Factors**

Intentional and nonintentional nonadherence were found to be associated with patient-related factors in the reviewed articles. Self-efficacy plays a decisive role in medication adherence and the adoption of positive health behaviors (Aldan et al., 2022). It is defined as the confidence of people in themselves to manage difficult situations successfully (Aldan et al., 2022). Self-efficacy regarding medication adherence is demonstrated when an individual believes medications are important to manage their health conditions (Lor et al., 2019). This behavior was the most described patient-related factor discovered in the review. Health literacy is a patient-related factor that has been associated with patient adherence (Lor et al., 2019; Mondesir et al., 2019; Presseau et al., 2017). Health literacy is a necessary skill to access, understand, and use information to maintain health (Lor et al., 2019).

### **Treatment-Related Factors**

The number of prescriptions, pills, and use of medication by injections are among the prescribed treatments necessary to manage chronic disease (Fernandez-Lazaro et al., 2019). Factors such as the concern about adverse effects, dislike for taking medications, cost of medications, number of medications taken and the inconvenience of taking medication have been identified in the literature (Marcum et al., 2019; Mondesir et al., 2019; Sieben et al., 2019). Lank et al. (2019), however, found that non-adherence was not associated with an increasing number of total medications and the total number of medications was only marginally significant.

## **Condition-Related Factors**

Researchers have investigated the influence of condition-related factors on medication adherence. Poor health related activity limitations and mental health status can be contributed to insufficient adherence (Bandi et al., 2017; Bhasin et al., 2020; Feehan et al., 2017; Tsang et al., 2021). Participants with aspirin nonadherence had less frequent medical checkups and lower rates of multiple comorbidities (Bhasin, 2020). Additionally, Pietrzykowski et al. (2020) found that patients with prior CABG more often had insufficient adherence. Higher risk adjustment summary scores, indicating worse health status, was associated with an increased likelihood of medication nonadherence (Tsang et al., 2021). Visits to primary care doctor every 2 years and frequent visits to the emergency department were found to be associated with medication non-adherence (Feehan et al., 2017).

## **Health System-Related Factors**

Health system-related factors are influenced by communication, trust in patient-provider relationships, adequate health care resources, and access to care (Kvarnström et al., 2021). Transportation to facilities for healthcare needs presents a barrier influential to medication adherence. (Feehan et al., 2017; Marcum et al., 2019). This barrier is significant when the patient utilizes more than one provider at separate locations (Feehan et al., 2017). Pharmacy access and ease of utilization was found to support medication adherence among people with CVD disease and CVD risk factors (Mondesir et al., 2019). A sense of trust and support from health care providers can promote positive health behaviors such as adherence to medication regimens (Mondesir et al, 2019).

## **Summary**

Poor medication adherence is a limitation in the treatment and secondary prevention of

CVD and leads to increased morbidity, mortality, and healthcare costs (Sieben et al., 2019). Researchers have acknowledged that a variety of factors influence patients' medication adherence decisions. However, evidence regarding factors influential to decisions specific to CVD medications in the population of Hispanic women is unknown. To fully understand the medication-taking experience among Hispanic women with CVD, further research is warranted. This review did not yield any studies regarding socioeconomic-related, patient-related, treatment-related, condition-related, and health system-related factors affecting medication adherence in Hispanic women with CVD. Future research is needed to identify and remove barriers to medication adherence in this population. The summary of search results is presented in Table 1.

## CHAPTER III

### PROCEDURE FOR COLLECTION AND TREATMENT OF DATA

The purpose of the study was to examine social determinants of health influential to medication adherence in Hispanic women with CVD and to determine if there are differences in adherence behaviors between generations of Hispanic women. A predictive correlational design was selected for the study to answer the research questions. This design is used to predict the level of the dependent variable from the independent variables (Grove et al., 2013). Independent variables effective in prediction are highly correlated with the dependent variable, but not with other independent variables in the study.

Rather than examining cause and effect relationships, correlational designs involve the systematic investigation of the nature of relationships, or associations, between and among variables (Sousa et al., 2007). Predictive correlational studies analyze the variance of one or more variables based on the variance of other variables and examine direction, degree, magnitude, and strength of the relationships between variables. (Sousa et al., 2007). The dependent and independent variables occur naturally and are not manipulated. The results from correlational studies can be used to generate hypotheses for future quasi-experimental and experimental studies to determine causality (Grove et al., 2013).

The use of a correlational design has several advantages. The design facilitates the identification of many interrelationships in a situation in a short time, and it is straightforward and inexpensive. The design may serve to guide important preliminary research for future studies to determine cause and effect. Additionally, it is useful for describing how one phenomenon is related to another in situations where the researcher has no control over the independent variables (Lappe, 2000).

The dependent variable under study was medication adherence. Independent variables were categorized into dimensions of adherence adopted from the WHO dimensions of adherence model (WHO, 2003). These categories included socioeconomic-related factors, patient-related factors, treatment-related factors, condition-related factors, and health system-related factors. The aim of analysis was to examine the relationship between the dependent variable and independent variables and to determine which variables predicted medication adherence in a population of Hispanic women with CVD.

### **Setting**

The study was conducted through distribution of online surveys to participants meeting inclusion criteria. The study was completed in a location of their choosing.

### **Population and Sample**

#### **Inclusion Criteria**

Inclusion criteria for the study included English or Spanish-speaking Hispanic women aged 40 and older diagnosed with CVD (atherosclerosis, heart attack, stroke, heart failure, arrhythmia, and valve disease), and who have been prescribed medications for treatment and/or management of CVD. Rationale for the selection of the inclusion criteria were identified by the researcher. Age is an important determinant of cardiovascular health. Women are at risk for developing CVD several years later than men. Significant increases in CVD risk in women are noted during midlife, a period which parallels the menopause transition (Khoudary et al., 2020). Compared with non-Hispanic White women, Hispanic women may experience menopause at a younger age (Khoudary et al., 2020). These differences may be associated with variations in socioeconomic, lifestyle, and health factors (Khoudary et al., 2020).

By 2030, approximately 20% of the population will be aged 65 or older. CVD will result in 40% of all deaths in this population (North & Sinclair, 2012). Heart disease is the leading cause of death for women in the US, killing 299,578 women in 2017, which accounts for approximately one in five female deaths (CDC, 2020a).

Hispanic women represent a risk group for cardiovascular disease because of the high prevalence of obesity and type II diabetes among this population (Entyne, et al., 2006). Medication adherence is a major consideration for the prevention and treatment of CVD and contributes to 50% of treatment failures, 125,000 deaths, and 25% of hospitalizations annually in the US (Russell et al., 2011). Adherence to prescribed medications is important for achieving therapeutic drug effects (Russell et al., 2011).

### **Exclusion Criteria**

Exclusion criteria for participation were as follows: (1) Individuals who have cognitive impairments: the ability of individuals to engage in self-administration of medications is necessary for this study. Individuals who have cognitive impairments which prevent them from performing self-administration of medications will be excluded from the study. (2) Those who are unable to care for themselves: the ability of individuals to engage in self-administration of medications is necessary for this study. Individuals having conditions that require care provided by others, such as the administration of medications, will be excluded from the study. (3) Those who are experiencing medical conditions (physical, visual) preventing them from participating in the study: individuals having medical conditions resulting in physical or visual impairments limiting their ability to engage in self-administration of medications will be excluded from the study.



## **Sample Size**

Sample size was calculated using G\*Power 3.1 (Heinrich Heine University, 2021). Linear regression analysis was used to estimate the value of the dependent variable based on the value of the independent variables. Setting for the analysis was based on a study by Turrise (2016), who examined treatment beliefs, medication adherence, and 30-day hospital readmission in adults with chronic heart failure. A moderate effect size ( $r = 0.30$ ), and alpha significance level of 0.05 was used to calculate power. The number of predictors was set at 22. A minimum sample of 91 subjects was required to ensure that power was adequate for the study. Results of the power analysis can be found in Figure 2.

## **Recruitment of Subjects**

The planned recruitment process involved the posting and distribution of flyers, with permission, on social media, in community organizations, and medical clinics. Once eligibility criteria were reviewed with the potential participants and recorded by the researcher, a determination was made regarding eligibility for participation in the study. Those interested in participating in the study who have email/internet access were contacted by email with study instructions. The researcher contacted those potential participants without internet access by phone. The flyers can be found in Appendix B.

The initial recruitment yielded few participants for the study. The restrictions placed on hospitals, clinics, and community organizations by the COVID-19 pandemic significantly limited the researcher's ability to recruit participants. Social media posts did not result in any interest in study participation. Ultimately, the researcher engaged the services of Centiment, an online survey platform that connects researchers with survey participants utilizing questions prepared by the researcher. The platform was used solely for recruitment purposes.

Respondents were selected from a pre-recruited pool of participants based on the inclusion criteria of the study. To ensure diversity in recruitment, Centiment recruits from Facebook and LinkedIn as well as other partner networks. All respondents go through a series of security checks before being introduced to a researcher's survey. Once a respondent agrees to join the panel, the profile is built by asking basic demographic questions, including age, income, employment status, and other information. Respondents were self-identifying based on closed-ended, quantitative demographic questions. A list of these questions can be found in Appendix C. Respondents were compensated by Centiment for survey participation. The respondent chose to either cash out via PayPal, or donate their survey rewards to a non-profit organization of their choice.

There were several advantages to the use of Centiment for recruitment of participants for this study. Due to recruitment constraints of the COVID-19 pandemic, use of the platform allowed the researcher to attain the appropriate number of participants for the study. The recruitment process was complete within 2 weeks, allowing for the analysis of data and interpretation of study findings. Survey completion was convenient for the participants, and accessible to them via desktop, laptop, and mobile devices.

The major disadvantage of the use of the platform was the cost. This expense was necessary due to the recruitment barriers imposed by the pandemic.

### **Protection of Human Subjects**

Potential risks to the human subjects involved in this research included risk of loss of confidentiality, risk of loss of anonymity, risk of coercion, and risk of COVID-19 exposure. Benefits and risks of participation were included in the consent form. The consent also included the researcher's contact information in case a participant had a question or concern. The signed

consent forms were stored separately from all collected information on a password-protected computer and will be permanently deleted 3 years after the study is completed. Copies of the signed consent forms will be provided to the Institutional Review Board (IRB) before they are deleted. English and Spanish versions of the consent form can be found in Appendix D.

### **Risk of Loss of Confidentiality**

Confidentiality was protected to the extent that is allowed by law. The completed questionnaires are stored on a password-protected computer in the researcher's office. Only the researcher and her advisor read the questionnaires. The results of the study may be reported in scientific magazines or journals but names or any other identifying information will not be included. There is a potential risk of loss of confidentiality in all email, downloading, electronic meetings, and internet transactions.

### **Risk of Loss of Anonymity**

Any personal information collected for this study will not be used or distributed for future research even after the researchers remove the personal or identifiable information (e.g., name, date of birth, contact information).

### **Risk of Coercion**

Participation in this study was completely voluntary. There was no pressure to participate. Deciding to participate or not to participate did not impact the relationship with family or friends of the researcher or the agency, church, or organization allowing recruitment. There was also no penalty for withdrawal from this study. Only the researcher knew if the participant decided or did not decide to participate in this study.

### **Risk of Exposure to COVID-19**

The initial plan for data collection included the adoption of Texas Woman's University

(2021) guidelines for minimizing the risk of exposure to COVID-19. If data collection had been conducted in person, the participants would have been notified of the precautions. These precautions are outlined below. Because recruitment was conducted by Centiment and the participants completed the surveys online, it was not necessary to implement the guidelines.

### **Minimizing the Risk of Exposure to COVID-19**

You will be asked to stay home if experiencing any symptoms. In addition, the researcher(s) will ask you if you have any COVID-19 symptoms upon your arrival. If you do, they will ask you to seek medical treatment and reschedule at least 10 days after the onset of symptoms, at least 24 hours fever-free without the use of medications, and other symptoms have improved. Any research team member who is sick or experiencing flu-like symptoms will stay home and will reschedule your meeting with another research team member, or after the researcher meets CDC requirements for release from isolation requirements.

The researcher(s) will take your temperature before the study begins. In addition, the researcher(s) will ask you again if you have any COVID-19 symptoms upon your arrival. If you do, they will ask you to seek medical treatment and reschedule at least 10 days after the onset of symptoms, at least 24 hours fever-free without the use of medications, and other symptoms have improved. The researcher(s) will wash their hands with soap using methods recommended by the CDC before and after the meeting and will ask you to wash your hands upon arrival and before you depart. If hand washing is not available, the researcher(s) will use and ask you to use hand sanitizer. If study participants and researchers prefer not to wear masks during the study, social distancing may be implemented at the researchers' and/or participants' preference. Although masks are no longer required on campus, clinical locations on campus may still require individuals to wear masks, as permitted by the Governor's executive order.

The form is an assessment tool to determine recent exposure to, and symptoms of, COVID-19 to evaluate your eligibility to come to campus. All faculty, staff, students, and visitors are required to self-screen daily prior to coming to campus. By coming to campus, you are acknowledging that you are free of all symptoms listed in the self-screening list below New loss of taste or smell, unexplained headache, nausea or vomiting, diarrhea unexplained congestion or runny nose, or close contact with anyone diagnosed with COVID-19.

### **Instruments**

The table of research instruments and their associated psychometric properties can be found in Table 2.

#### **Socioeconomic Questionnaire**

Demographic questionnaires provide researchers with an opportunity to gain background information on their participants. The questions afford context for the collected data, describing participants and providing researchers a means to better analyze their data (Dobosh, 2017). These questions include age, sex, race, ethnicity, education, and employment. Other questions may relate to any other background information of interest to the researcher.

A self-reported sociodemographic questionnaire was created by the researcher and was used to describe characteristics of the participants. Number of medications and CVD information was also collected. The questionnaire was available in English and Spanish. The Spanish version of the questionnaire was translated from English using Google Translate and reviewed by two Spanish-speaking individuals for accuracy. English and Spanish versions of the questionnaire can be found in Appendix E.

#### **Medication Adherence Report Scale**

The Medication Adherence Report Scale (MARS-5) was used to measure self-reported

medication adherence. The scale was developed by Horne and Weinman (2002) to measure medication adherence in asthma patients. The instrument has been used to measure medication adherence in patients with chronic diseases such as asthma, hypertension, and diabetes (Chan et al., 2020). The scale is comprised of five questions using a 5-point Likert scale, which measures intentional and unintentional medication non-adherence (Horne & Weinman, 2002). One item relates to unintentional medication non-adherence which is primarily associated with the individual's inadequate capacity to adhere. The remaining items address intentional non-adherence, which is deliberate and dependent on motivational behaviors. Chung-Ying et al. (2018) conducted a study to examine the psychometric properties of the questionnaire. All 5 items in the MARS-5 fit in the same construct (medication adherence). No differential item functioning items were displayed (Chung-Ying et al., 2018). Cronbach's alpha for the scale ranges from 0.67-0.89, indicating good reliability (Chew et al., 2021). The reliability of the scores of the Spanish version has been found to be appropriate in terms of internal consistency ( $\alpha > 0.77$ ), temporal stability ( $r > 0.72$ ), and inter-rater reliability ( $IC > 0.76$ ; Payo et al., 2019). Analysis of the reliability of the scale for this study was 0.74. English and Spanish versions of the questionnaire can be found in Appendix F.

### **Patient-Centered Communication for Cancer Care**

The Patient-Centered Communication for Cancer Care (PCC-Ca) instrument was used to measure communication with the health care provider (see Appendix F). The instrument is used to measure how well health professionals communicate with their patients. RTI International and the University of North Carolina at Chapel Hill developed this instrument, which is available in English and Spanish. The instrument is available in both a long form (36 items) and a short form (6 items). The short form was used for this study. The PCC-Ca was validated with a colorectal

cancer patient population. The purpose of the measure is to assess PCC in six core domains: (1) exchanging information, (2) making decisions, (3) fostering healing relationships, (4) enabling patient self-management, (5) managing uncertainty, and (6) responding to emotions. Each item included in the instrument consists of a question stem and five response options, scored from 1 to 5, with higher scores representing better communication (RTI International, 2019).

The PCC-Ca was validated in English with a group of colorectal patients. The survey differentiated between individuals with poor and good health (known-groups validity). Convergent validity was confirmed with the high correlation with the HINTS communication scale (Reeve et al., 2017). Cronbach's alpha coefficients of 0.90-0.94 are reported, indicating excellent reliability (RTI International, 2019). While the instrument is available in Spanish, no psychometrics were found for this version. For this study, reliability was determined to be 0.91.

The instrument has not been used to measure patient-provider communication in patients diagnosed with other diseases. The researcher obtained permission from the authors to use the scale for patients with cardiovascular disease. The instrument was selected because of the need to measure how consistently and reliably health care providers communicate with their patients. Patient-provider communication is essential to the provision of high-quality, patient-centered care. Validity and reliability analysis of the instrument in this study, however, may vary from documented psychometrics due to the use of the instrument with a different patient population. This may be a limitation of the study.

Patient-centered communication is an essential component of quality medical care. By providing trustworthy information that is attentive, responsive, and tailored to a patient's needs, clinicians can improve patient satisfaction, health-related quality of life, and other important health outcomes. The PCC-Ca encompasses three core values: (1) considering patients' needs,

perspectives, and experiences, (2) providing opportunities for patients to take part in their care, and (3) strengthening the patient-clinician relationship. English and Spanish versions of the questionnaire can be found in Appendix G.

### **The Short Acculturation Scale for Hispanics**

The Short Acculturation Scale for Hispanics (SASH) was used to measure acculturation. Acculturation refers to the culture learning that takes place when immigrants encounter a new group, nation, or culture (Marin et al., 1987). The scale was developed by Marin et al. (1987) to measure the changes in behavior that occur when Hispanics are exposed to the mainstream culture of the US. The 12-item scale assesses US acculturation including English language use, English language media, and social relations with non-Latino US Americans. The instrument uses a Likert-type scale rating responses from 1 (only Spanish) to 5 (only English). The instrument has been used to measure acculturation in Mexican and Central American populations, and compliance with colorectal screening among low-income Hispanics. In a study to assess the psychometrics of the scale, Ellison et al. (2011) analyzed the relationships between the scale and several common acculturation proxy variables. The SASH scale was highly correlated with variables commonly used as proxies for acculturation. Reliability has been demonstrated by overall Cronbach's alpha of 0.93, English version = 0.83, and Spanish version 0.85, indicating good reliability (Moreno et al., 2018). Reliability was determined to be 0.94 for this study. English and Spanish versions of the questionnaire can be found in Appendix H.

### **Data Collection**

Centiment uses a technology (fingerprinting) that combines IP address, device type, screen size, and cookies to ensure only unique panelists complete the survey. A fraud score is maintained on each participant based on historical completions (completion time as a percentage



of stated length of interview + any flagged poor completes) and consistency in responding to demographic questions. Those that breach a certain level are banned. Invisible ReCaptcha is utilized to defend against bots.

Participants who met the eligibility criteria indicated they agreed to voluntary participation in the study by signing the informed consent included in the questionnaire package. The participants typed their name and date to indicate consent. Additionally, there was a checkbox to indicate agreement or disagreement to participate in the study. Centiment provided participants a link to the survey in Qualtrics where they completed the demographic questionnaire, MARS-5, SASH, PCC-Ca. The four questionnaires are combined into one document (see Appendix I). Qualtrics is a web application for creating and managing online surveys and databases. Qualtrics uses Transport Layer Security (TLS) encryption for all transmitted data.

## **Treatment of Data**

### **Feasibility Study**

A feasibility study was conducted in April 2022. Inclusion criteria for participation included the following: Spanish and non-Spanish speaking Hispanic women aged forty and older, diagnosis of CVD (atherosclerosis, heart attack, stroke, heart failure, arrhythmia, and valve disease). Potential study participants were identified through advertising on social media. The recruitment process began by posting study flyers on the Hispanic Community and Hispanic Women's Network of Texas Facebook pages. Flyers contained information describing the study, voluntary participation, and the researcher's contact information. The researcher is not affiliated with the sites selected for participant recruitment. Nine women expressed interest in participating in the study. Seven participants consented and completed the survey. Completion time for

completion of the surveys did not exceed 30 minutes as anticipated.

### ***Findings***

The mean age of the sample was 59,  $SD = 11.195$ . Of the sample, 28.6% reported to be employed, 28.6% retired, and 42.9% unemployed. 57.1% reported an annual household income greater than \$75,000. Reported insurance status included 42.9% private insurance, 42.9% Medicare, and 14.3% no insurance. Most participants (71.4%) were high school graduates, with 14.3% having some college education. Of the participants, 57.1% were divorced, 28.6% were married, and 14.3% were widowed. Cronbach's alpha for the instruments was as follows: MARS-5 scale (0.77), PCC-Ca (0.94), and SASH (.0.66). The alpha values were anticipated due to the low sample size. The scales proved to be more reliable in studies found in the literature: MARS-5 (.97), PCC-Ca (0.90-0.96), and SASH (.83-.93). Due to the small sample size, results from hierarchical linear regression and one-way ANOVA were not meaningful. With the larger study, a sample size of 97 participants with a moderate effect size of 0.30 and power .80 will eliminate the risk of the consequences of the small sample encountered in this feasibility study.

### ***Evaluation***

Two significant challenges were encountered during the feasibility study. The IRB approval process was time consuming due to required revisions to the application. This process delayed the commencement of recruitment activities. The pandemic presented the most significant barrier affecting participant recruitment. The large health care systems in the Dallas-Fort Worth area were closed to outside research. No flyers were permitted in the hospitals or their associated clinics. Email and phone messages to physician offices and community agencies were not returned. Opportunities for in-person visits to clinics and community agencies for participant recruitment were limited by COVID-19 restrictions. For these reasons, recruitment

activities were limited to postings on social media.

### ***Lessons Learned***

The most important lesson learned was the importance of recruiting an adequate sample. A small sample would result in insufficient statistical power to answer the primary research questions and statistically nonsignificant results. Results drawn from samples are intended to be generalized to the population of study.

The onset of the COVID-19 pandemic was not anticipated. Recruitment activities were particularly challenging. To avoid unanticipated challenges of recruitment in the future, it is important that a variety of strategies are considered. For example, in addition to social media postings, efforts in planning and focusing on networking and community contacts should be employed. Focusing on a single method of recruitment can prove to be detrimental to the study if another pandemic is experienced. Encountering these barriers in recruitment led the researcher to engage the services of Centiment for recruitment purposes.

Another valuable lesson learned is related to the IRB approval process. Several revisions to the application were required. The resubmission and approval processes delayed data collection. In the future, IRB applications will be prepared and submitted early in the study process allowing adequate time for resubmissions and timely data collection.

### **Data Preparation**

The English and Spanish responses were merged into a single file for data analysis. The files were combined due to the low response rate of those completing the Spanish version of the survey. To prepare the data for analysis, several steps were performed in SPSS to ensure the data set was uniform and that corrupt or irrelevant information was removed. Examination of the data revealed no duplicates. A frequency distribution to include all variables was conducted to check

for impossible values. No variables were identified containing impossible values. Reliability analyses were performed for each scale. Cronbach's alpha analysis resulted in the following: MARS-5 (.740), PCC-Ca (.910), and SASH (.948) indicating acceptable to excellent internal consistency. To identify any missing values, multiple imputation was performed. One missing value was identified: "What is your heart condition"?

To check continuous variable distribution issues, a frequency analysis was conducted to determine if there were equal numbers of participants in each group. Histograms for each distribution were created. No issues were identified in the distribution of the variables. Kurtosis (0.38) and skewedness (0.19) were within the acceptable range between +1 and -1.

In order to prepare the generational question for analysis in the regression model, two dummy variables were created. The variable first generation was coded as 1 (born in the US), and all other generations as 0. The second dummy variable was coded as 1 and all others coded 0. The third generation was used as the reference group.

### **Description of the Sample**

Both descriptive and inferential statistics were used to characterize the sample. A frequency distribution was calculated to count the number of times each event occurred. Data were grouped (i.e., age, household income) in a mutually exclusive manner. Measures of central tendency were calculated to include the mean, median, mode, and percentages. Measures of variability were employed including range and standard deviation.

### **Hierarchical Linear Regression**

IBM SPSS version 28.0 software was used to analyze the data. Hierarchical linear regression was performed to determine if social determinants of health (independent variable [IV]) explain a statistically significant amount of variance in medication adherence (dependent

variable [DV]). This test determines if the independent variables predict the outcome of the response, or dependent variable. The line of best fit, drawn through the plotted scores, explains the best association between the variables (Grove et al., 2013). Hierarchical regression analysis is an extension of regression in which more than one independent variable is included in the analysis. Knowledge of the linear relationship allows the researcher to predict the value of one variable when the value of the other is known (Grove et al., 2013). In order to apply linear regression for analysis, three assumptions must be met: the two variables should be in a linear relationship, there should be homoscedasticity among the data, and the predictors are normally distributed (Green & Salkind, 2011). Linearity was examined using the creation of a scatterplot. A linear relationship was determined. To test for homoscedasticity, Levene's test was conducted. The test resulted in a  $p$  value of .508. The variances were not significantly different. Normality was determined by visualization of a histogram and p-p plots. The results of the tests of assumptions can be found in Appendix I.

Hierarchical linear regression was conducted to examine how patient-provider communication, acculturation, employment status, household income, insurance status, education level, marital status, number of other diseases, number of heart medications, side effects to medications, and access to health care predicted medication adherence. The first step of the regression included patient-provider communication and acculturation as predictors. The second step expanded the analysis to include demographic variables.

### **One-Way Analysis of Variance**

One-way analysis of variance (ANOVA) was used to examine differences in medication adherence scores between first, second, and third generational groups. ANOVA is a statistical procedure that compares data between two or more groups to explore differences between the

groups on a continuous dependent variable (Grove et al., 2013). The test computes two estimates of variance: differences among the data, and difference between the groups. Assumptions for ANOVA include: the measures of the characteristics constitute an independent random sample, the grouping variable has three or more categories, the variable measuring the characteristic of interest is normally distributed, and the variable measuring the characteristic of interest is a continuous interval or ratio level variable (Kellar & Kelvin, 2013). Aside from use of a non-random sample for the study, these assumptions were met. The test has been shown to be robust; if the variables do not strictly adhere to the assumptions the results may still be true (Kellar & Kelvin, 2013). The analysis was conducted to determine if medication adherence differed by generational status.

### **Summary**

This chapter presented the methodological procedures that were utilized to examine the relationship between social determinants of health and medication adherence in Hispanic women with CVD. An overview of the selected research design was presented. The following components of the study methodology were summarized: setting, population, and sample, the protection of human subjects, instruments, data collection, treatment of data, and implications for practice. Steps to prepare the data and analysis procedures were discussed. Results from the feasibility study and recommendations for revisions for the major study were reported.

## CHAPTER IV

### RESULTS

The purpose of this predictive correlational study was to investigate the relationship between social determinants of health and medication adherence in Hispanic women with CVD. The questions proposed in the study included: Do social determinants of health (socioeconomic-related, patient-related, treatment-related, condition-related, and health system-related factors) predict medication adherence in Hispanic women with CVD, and are there differences in medication adherence between first, second, and third generation Hispanic women with CVD? Data were gathered through the completion of an online survey containing four questionnaires. IBM SPSS version 28.0 software was used to analyze the data. In this chapter, results of data analysis are presented, to include a description of the sample and outcomes of hierarchical linear regression and ANOVA analyses.

A statistical database was created in IBM SPSS version 28.0 software. Prior to analysis, the data were reviewed for inconsistencies and outliers. An outlier was identified after analysis of “number of medications taken.” Analysis was conducted with and without the outlier to determine the existence of significant differences in the results. No differences are found, and the data point was included.

#### **Description of the Sample**

A total of 123 women accessed the survey with 97 completing the questionnaire. The mean age of the sample was 52.46, SD = 9.20, range = 40-76. Most of the participants identified to be of Mexican heritage (37.1%), with others identifying as Cuban (6.2%), Puerto Rican (23.7%), Central American (7.2%), and South American (12.4%) Of the sample, 38.1% reported to be employed, 26.8% retired, and 34.0 % unemployed. Of the participants, 27.2% reported an

annual household income greater than \$75,000. Reported insurance status included 37.1% private insurance, 29.9% Medicare, 28.9% Medicaid, and 3.1% no insurance. Most participants (43.3%) were college graduates, with 30.9% having some college education. 50.5% were married, 25.8% were divorced, 5.2% were widowed, and 17.5% were never married. For those born outside of the US, the mean of years living in the country was 28.46.

Reported diagnosed heart conditions included atherosclerosis (5.2%), heart attack (10.3%), stroke (3.1%), heart failure (19.6%), arrhythmia (28.9%), and valve disease (19.6%). The average number of heart medications reportedly taken by the participants was 2.42 (SD = 1.88, range = 1–9). The number of other reported diseases averaged 2.76 (SD = 2.06, range = 0–10). Of the participants, 82.5% reported having access to healthcare. 23.7% of the participants reported experiencing side effects to medications. Results of categorical variable analysis are found in Table 3. Continuous variable analysis results can be found in Table 4.

### **Hierarchical Linear Regression**

Step 1 of the regression was significant,  $F(2,80) = 7.09$ ,  $p = .001$  and explained 15% of variance in medication adherence. Only patient-provider communication contributed significantly to the model ( $\beta = .385$ ,  $p = .001$ ) were found to contribute significantly to the model. Results of the regression analysis are found in Table 5. Coefficient results are listed in Table 6. Regression ANOVA results are found in Table 7.

### **One-Way Analysis of Variance**

There was no significant difference in medication adherence between first, second, and third generation groups  $F(2,81) = .418$ ,  $p = .659$ . Tukey's HSD Test for multiple comparisons found that the mean value for medication adherence was not significantly different between first, second, and third generation groups. Results of the analysis can be found in Table 8.



### **Summary**

The data analysis included responses from 84 Hispanic females with CVD. In total, 36 predictors were tested using hierarchical regression and ANOVA analysis. Two variables significantly predicted medication adherence (retirement, patient/provider communication). No differences in medication adherence between generational groups of Hispanic women were found as a result of ANOVA testing.

## CHAPTER V

### RECOMMENDATIONS AND CONCLUSIONS

The objectives of this study were to investigate the relationship between social determinants of health (socioeconomic-related, patient-related, treatment-related, condition-related, and health system-related factors) and medication adherence in Hispanic women with CVD and to determine if differences in medication adherence varied among generational groups. This issue is significant as Hispanic population in the US has grown by 23% to 62.1 million individuals over the last decade as compared to 4.3% growth of other ethnic groups CVD is the leading cause of death in this group, affecting 52.3 of Hispanic women (Gomez et. al., 2022).

A review of the literature yielded no results regarding the study of medication adherence in Hispanic women, specifically related to the influence of social determinants of health. Additionally, no studies were found which examined differences in medication adherence between generational groups of Hispanic women. In this study, the researcher found that retirement and patient/provider education were significantly correlated with medication adherence in the population of Hispanic women with CVD.

### **Discussion of the Findings**

Of the sample, 27.2% reported an annual household income of >\$75,000. Only 10.3% reported an annual household income of <\$10,000. Median household income for the sample was \$35,000-\$49,000. Of the participants, 37.1% reported having private insurance, 50% were married, and 82.5% reported they have access to healthcare. These findings indicate that individuals with lower income, those lacking health care coverage, access to healthcare, and partner support were not represented in this study. Further, only 18 of the participants completed the Spanish version of the survey which limited inclusion of those who may be affected by

language barriers when seeking healthcare and the management of their disease. Due to these findings, the results cannot be generalized to the population of Hispanic women with heart disease.

Acculturation did not significantly correlate with medication adherence. This occurred since 80.4% of the participants were born in the US. The Hispanic paradox (mortality rates are lower and health outcomes are better among foreign-born, newly arrived, and less acculturated ISOs) cannot be considered based on the nativity of the participants. This finding may also explain why no differences in medication adherence were found among generational groups.

A significant correlation between patient provider communication and medication adherence was found ( $\beta = .329, p = .004$ ). Patient-provider communication expands the traditional medical approach to include patient values, beliefs, and an understanding of the need to manage their chronic disease and promote the provider/patient partnership. Peimani et.al. (2020) found that patients with diabetes who are engaged with their providers are more involved in decision making and are shown to comply with medical recommendations and self-care activities.

Retired employment status ( $\beta = .422, p = >.001$ ) was found to contribute significantly to the model. A review of the literature yielded no studies that validated this finding in a population of retired persons. Studies were found that addressed adherence in older populations. For example, researchers from the Kaiser Family Foundation found that older adults are at higher risk for nonadherence, as they are more likely to be on multiple prescription medications (Kirzinger et al., 2019). Future research is needed to examine medication adherence in the population of retired persons.

Most of the respondents reported good overall communication with their providers. In the

realm of comfort about asking providers questions, 33% responded “a great deal” and 20% responded “a lot”. Other positive findings include open and honest communication with providers (“Always”- 31%, “Often”-28%), Information regarding resources necessary to make decisions (“A great deal”- 40%, “A lot” - 22.7%), and communication about coping, fears of stress (“Very well”- 36%). 35.1 % reported provider communication always contributed to understanding the steps in their care. Additionally, 29% of the participants indicated that physicians and health care providers help them deal with the uncertainties about their CVD condition. While not a problematic finding in the study, 7.2% of the participants indicated that communication with providers regarding coping, fears and stress was poor.

### **Limitations**

The COVID 19 pandemic presented the most significant barrier affecting participant recruitment. The large health care systems in the Dallas-Fort Worth area were closed to outside research. No flyers were permitted in the hospitals or their associated clinics. Email and phone messages to physician offices and community agencies were not returned. Opportunities for in-person visits to clinics and community agencies for participant recruitment were limited by COVID 19 restrictions. For these reasons, initial recruitment activities were limited to postings on social media. These postings yielded no interest from potential participants.

Results of analysis of demographic information disclosed further limitations of the study. Of the sample, 27.2% reported an annual household income of >\$75,000. Thirty percent reported they had some college education, 37.2% have private insurance coverage, and 82.5% have access to health care. Examination of medication adherence in individuals who are low income, less educated, have little or no health care coverage, or no access to health care is limited. Further, 50% of the participants reported to be married. Analysis of medication adherence in individuals

without social and family support was not considered. Hispanics have been reported to have low rates of participation in studies (Sweeney, 2007). Several barriers to research participation exist for IHOs. Distrust of the research process, fear of discrimination, loss of confidentiality, or uncertainty of what the research entails may influence their willingness to participate.

Additionally, IHOs may avoid participation due to concerns about language barriers, fear of the discovery of immigration status, and perceptions of their cultural differences and those of the researcher (Garcia et al., 2016). The threat of detention and deportation discourages engagement in health and social services, delays seeking care, and negatively affects physical and mental health for immigrants (Cabral & Cuevas, 2020). Furthermore, these fears may prevent IHO's from participation in research. No information regarding citizenship was collected. While the participants were asked how long they have lived in the US if they were not born here, the results of this question were used to describe the sample and not included in the regression model. Future research should examine the relationship between years lived in the US and medication adherence to determine if acculturation contributes to adherence.

An additional limitation of the study was the use of an online survey for data collection. Potential participants without internet access did not have the ability to access the study. Vogels (2021) found that roughly 25% of individuals with household incomes below \$30,000 a year report they don't own a smartphone. Additionally, 40% of adults with lower incomes do not have access to home broadband services or a desktop or laptop computer (Vogels, 2021). This limitation may have affected the participation of low-income participants in the study, reducing the generalization of the findings to this population.

The study design presented limitations for the study. While a correlational research study allows the researcher the opportunity to uncover relationships that may have not been previously

known, causality is not determined. Causality can be determined by randomized controlled trials (RCTs) or the use of observational studies to reveal causal inferences (Gianiola et al., 2020). Further, the inclusion of a large number of independent variables in regression model 2 may have affected variance and impacted the findings of the study.

The findings are not generalizable to all individuals with CVD as the study was conducted with a population of Hispanic women. Future research should be conducted to include those of varying races, ethnicities, and genders. Additionally, only 4 of the participants completed the questionnaires in Spanish, limiting the generalizability of the findings to Spanish-speaking women with CVD.

### **Conclusions**

Addressing social determinants of health influencing medication adherence begins with assessments in the community and in healthcare settings. Understanding these factors can help determine strategies to help patients with disease management and compliance with treatment regimes. In healthcare settings, screening tools allow healthcare providers to assess social needs of patients and incorporate them into individualized plans of care.

Chukmaiyov et. al. conducted a pilot study to screen for social determinants of health (food, housing, and transportation) to address social needs in hospitalized patients in an urban academic medical center. Information from the patient screening survey and electronic health records were combined and reviewed for associations between food insecurity, housing, and transportation including demographic and clinical characteristics of patients.

Healthcare organizations must work with external community partners to address social determinants of health by participating in community health assessments. These partnerships include other health care organizations, health insurance companies, public health departments,

faith-based groups, and other social service agencies (Payerchin, 2022) It is also imperative that hospitals and clinic implement screening procedures for social determinates of health that can be included in initial patient assessments.

To improve rates of medication adherence in the treatment of CVD, we must begin by promoting recognition of the problem among health care providers. Screening procedures questions regarding medication adherence could be incorporated into each assessment during clinic visits and hospital admissions. When nonadherence is recognized, providers and patients can work collaboratively to develop strategies to address barriers to adherence.

Evidence-based strategies and tools exist that can assist patient with adherence, such as reducing the number of daily doses of medications, organizing medications in pill boxes, using motivational interviewing, and educating patients on the importance of medication adherence (Ho et. al., 2009). Follow-up phone calls to patients could be beneficial to ensure patients are taking their medications as directed.

In this study, a significant relationship between patient-provider communication and medication adherence was found. Changes in the health care environment have influenced patient-provider communication which may result in negative consequences. For clinicians, increased administrative tasks, staffing challenges, and provider burnout prevent the development of effective patient-provider relationships. As a result, negative behaviors toward patients may emerge, limiting time to gather information and understand the needs of the patient (Drossman & Ruddy, 2020). An effective patient-provider relationship must support communication that incorporates the patient's experience. Zullig et al. (2015) found patient-provider interactions to be a major determinant of medication nonadherence. Ineffective physician communication can be associated with an up to 19% higher risk of medication

nonadherence (Zullig et al., 2015). In contrast, effective patient-provider communication may improve adherence (Zullig et al., 2015). Findings of this study validated that effective patient-provider communication supports medication adherence.

Limited English proficiency (LEP) can contribute to critical communication barriers which influence patient/provider communication. This obstacle is enhanced when affected by factors such as low levels of acculturation, limited healthcare coverage, and socioeconomic status (McQuaid & Landier, 2018). Further, patients and families with LEP may be treated in healthcare settings lacking adequate resources, such as interpreter services. While additional time is required to translate health information, providers must ensure that messages are delivered clearly and in a manner that are understood. Healthcare organizations can support these efforts with education and training and assessment of needs to provide technological and human resources to enhance translation services.

### **Implications for Future Research**

Future research should focus on medication adherence in patients with chronic disease, especially those facing barriers due to social determinants of health. For example, studies examining medication adherence in patients diagnosed with HIV, diabetes, asthma, and autoimmune diseases would contribute to evidence to improve patient outcomes and disease management. Community research efforts with collaboration of interdisciplinary teams would allow for the implementation of programs and services to identify social factors influential to medication adherence and to reduce barriers to research participation by disadvantaged populations. Longitudinal and interventional studies should be conducted to examine causality and the discovery of other factors leading to improved medication adherence.

Health care researchers should continue efforts to design and improve assessment tools



aimed at improving the recognition of social determinants of health, and work to promote the adoption of these tools in all healthcare settings. This strategy will require the cooperation and collaboration of community partners and health care leaders.

Additionally, researchers should explore the qualitative nature of medication adherence. These studies could provide insight into patient experiences, perceptions, and decision-making processes as they relate to medication adherence. Qualitative studies could provide additional insight into the problem of medication non-adherence from the patient's perspective.

To promote effective patient/provider relationships, researchers should focus their efforts on studies to determine factors that are influential to effective communication between patients and their health care providers. McQuaid and Landier (2018) report that patient perceptions of acceptance and support from their healthcare providers may influence how well self-management recommendations are accepted. Quantitative research can explore perceptions and challenges from both the patient and provider standpoint. Hagiwara et al. (2019) suggest that the linking of epistemological frameworks and methodological tools from qualitative and quantitative traditions through mixed-method research is an effective approach for exploring addressing the complexity of these relationships. For example, in the study of racially diverse minority patients, the qualitative approach yields narratives on provider communication behaviors, and by patients are associated with patient outcomes (Hagiwara et al., 2019).

Further research regarding the patient-provider relationship and medication adherence and the dissemination of these findings would increase awareness of the importance of communication among patients and providers. In addition, evidence concerning the cultivation of effective communication skills can be the focus of educational efforts for patients and providers alike. When patients and providers are educated in effective communication, they demonstrate a

greater sense of control and preference for a active role in medical decision making.

Future research should be conducted to examine the relationship between patient/provider communication and social determinates of health. The outcomes of these studies can provide valuable evidence to support the need for interventions and training for both patients and practitioners to improve communication and instill trust to support patient engagement.

Additionally, future research should include studies which will provide a better understanding of culturally-influenced patient beliefs about medications leading to the development of interventions to promote the benefits of medications as an important element of cardiovascular disease management. According to Askim-Lovseth and Aldana, the quality of communication between providers and IHOs plays a role in the way they adhere to medications. Many IHOs use both conventional and alternative medicines according to the way they were used in their home countries (Askin-Lovseth & Aldana, 2010). Based on findings of these studies, healthcare organizations can implement training programs focused on culturally respectful provider communication skills.

Future research efforts regarding medication adherence should be conducted in collaboration with the American Heart Association's programs Go Red for Women and Professional Health Daily. Go Red for Women and Verily's Project Baseline have collaborated to begin Research Goes Red, an initiative inviting women across the country to contribute to health research (AHA, 2023a). The goal of this initiative is to become the world's largest health registry and platform for research.

Medication non-adherence is common and is not a patient problem alone. It can be impacted by health care providers and the healthcare system. Nonadherence is not solely a patient problem but is impacted by both care providers and the healthcare system. We must

increase awareness of the importance of medication adherence and work together with patients and the community to reduce barriers and promote successful strategies to improve adherence and promote positive patient outcomes.

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**Table 1***Literature Review Summary Table*

Author(s) Year Country	Purpose	Sample	Study Design	Methods	Theoretical Framework	Social Determinant Category	Medication Adherence Measurement Tool	Gaps
Bandi et al. 2017 US	To identify age-related differences in predictors of medication adherence among Hispanics.	community-dwelling Hispanic adults with hypertension living in 3 northern Manhattan neighborhoods from 2011 through 2012 (n=1,043)	Quantitative cross-sectional	Data from the Washington Heights/Inwood Informatics Infrastructure for Community-Centered Comparative Effectiveness Research (WICER) project (n = 10,11). Residents of 3 low-income, primarily immigrant northern Manhattan neighborhoods were recruited through a probability sample of households and snowball sampling, participated in an in-person administered by trained, bilingual	None	Socioeconomic-related factors: Education level, insurance status and employment status were positively associated with high adherence. Computer literacy was positively associated with high adherence in both younger and older adults. Patient-related factors: Only in younger adults were typical alcohol consumption vs nondrinkers, and smoking status related to high adherence. Among older adults, only blood pressure control knowledge scores vs low scores, and physical were positively high	Morisky Medication Adherence Scale (MMAS-8)	The cross-sectional nature of this study prevented causal claims regarding the relationship between the predictors and adherence. The study population was comprised mostly first-generation immigrants born in the Dominican Republic residing in northern Manhattan, limiting generalizations to other US Hispanic subgroups.

Author(s) Year Country	Purpose	Sample	Study Design	Methods	Theoretical Framework	Social Determinant Category	Medication Adherence Measurement Tool	Gaps
				(Spanish and English) community health workers from March 2011 through November 2012.		adherence. Condition-related factors: In younger adults, duration of hypertension was negatively associated with high adherence. Among HRQOL measures, recent poor physical health was negatively associated with high adherence in and older adults. Recent poor mental health was negatively related to adherence in younger and older adults. Poor health-related activity limitation was negatively related to high adherence only in older adults. In younger adults, those with poorer self-rated general health had a higher prevalence of high adherence.		
Feehan et al. 2017 US	To determine the level and correlates of self-reported medication low	Adults (aged 18+) who had filled at least three or more prescriptions	Quantitative population-based cross-sectional	The used a 30 min online English language only survey	None	Health system-related factors:  Transportation for	Morisky Medication Adherence Scale (MMAS-8)	A limitation of the study is its cross-sectional nature. Some limitations of

Author(s) Year Country	Purpose	Sample	Study Design	Methods	Theoretical Framework	Social Determinant Category	Medication Adherence Measurement Tool	Gaps
	adherence in the U.S. general population.	at a community pharmacy in the past 12 months (n =9,202)		instrument. Respondents were adults aged 18 years or older who had filled at least three or more prescriptions at a pharmacy in the past 12 months		<p>healthcare needs</p> <p>Utilization of more than two providers or more than two locations</p> <p>Difficulty with cost of health care</p> <p>Condition-related factors:</p> <p>Visits to primary care doctor every 2 years Frequent visits to the emergency department</p> <p>Care mostly delivered through a hospital or urgent care facility</p> <p>Health status</p> <p>Socioeconomic-related factors:</p> <p>Needs support of others</p> <p>Difficulty with medication costs</p> <p>Hispanic and African-American ethnicity Poverty or low income</p>		the study may suggest the low adherence estimates obtained may be an underestimate: a potential source of bias is that those who are less adherent may be less likely to participate in online surveys. The study is focused on adherence in general, rather than specific conditions or medications. The survey was administered in English language only. A Spanish language version may have produced better reporting of low adherence for the Hispanic respondents.
Presseau et	To compare the	Cross-	Mixed method	Two studies	Theoretical	Socioeconomic-	Structured	The cross-

Author(s) Year Country	Purpose	Sample	Study Design	Methods	Theoretical Framework	Social Determinant Category	Medication Adherence Measurement Tool	Gaps
al. 2017 Canada	utility of different theory-based behavioral approaches for identifying modifiable determinants of medication adherence post-MI that could be targeted by interventions.	sectional samples of patients 0–2 weeks, 3–12 weeks, 13–24 weeks or 25–36 weeks after their MI (n = 24)		were conducted to identify modifiable factors linked with medication adherence post-MI and whether these differ depending on time since MI. Both studies involved cross-sectional samples of patients 0–2 weeks, 3–12 weeks, 13–24 weeks or 25–36 weeks after their MI. In Study 1, semi-structured telephone interviews were conducted using the TDF. Study 2 involved structured telephone questionnaires to assess HAPA constructs and medication adherence.	Domains Framework (TDF)  Health Action Process Approach (HAPA)	related factors:  Adherence scores correlated with Self-efficacy, Social Support, Action Planning and Age, lending support to the volitional phase of the HAPA but not sex, age or Social Support.  Domains identified: Beliefs about Consequences, Memory/Attention/ Decision Processes, Behavioral Regulation, Social Influences and Social Identity.  During Study 2 Social Support and Action Planning predicted adherence at all time points, though the relationship between Action Planning and adherence decreased over time.	telephone questionnaires developed by the researchers  Morisky Medication Adherence Scale (MMAS-8)	sectional data limited the ability to conclude that time rather than other factors explained changes at different time points.  The uncertainty regarding actual treatment adherence limited the ability to confirm determinants of adherence.

Author(s) Year Country	Purpose	Sample	Study Design	Methods	Theoretical Framework	Social Determinant Category	Medication Adherence Measurement Tool	Gaps
LeBron et al. 2018 US	To examine racial/ethnic and socioeconomic differences in odds of antihypertensive medication use among people with hypertension.	Patients with hypertension participating in the Healthy Environments Partnership Community Survey (n =377)	Quantitative Correlational	Data was obtained from the 2002 Healthy Environments Partnership (HEP) Community Survey using a sample of occupied housing units in three geographical areas of Detroit. The total sample included face-to-face interviews including self-reported demographic and health data.  Blood pressure was measured at the time of the interview.	None	Socioeconomic-related factors  Odds of antihypertensive medication use were lower for people with  incomes 1.00–1.99 times the poverty level compared with those $\geq 2.00$  times poverty, and for Latinos and Whites compared with Blacks.	Questionnaire developed by researchers	The circumscribed range in socioeconomic position across racial/ethnic groups  among participants with hypertension limited examination of interactions between socioeconomic position, race/ethnicity, and gender.  The dataset did not allow direct tests of the role of health insurance and health care access in the racial/ethnic and socioeconomic patterning of antihypertensive medication use.

Author(s) Year Country	Purpose	Sample	Study Design	Methods	Theoretical Framework	Social Determinant Category	Medication Adherence Measurement Tool	Gaps
Lank et al. 2019 US	To investigate the increased stroke recurrence risk in Mexican Americans compared with non-Hispanic whites by assessing ethnic differences in medication adherence 3 months poststroke.	Ischemic stroke cases from 2008 to 2015 from the Brain Attack Surveillance in Corpus Christi, Texas (n = 1,114).	Quantitative  population-based study	Ischemic stroke cases from 2008 to 2015 from the Brain Attack Surveillance in Corpus Christi project in Texas were followed prospectively for 3 months poststroke to assess medication adherence. Medications in 5 drug classes were analyzed: statins, antiplatelets, anticoagulants, antihypertensives, and antidepressants. For each drug class, patients were considered adherent if they reported never missing a dose in a typical week.	None	<p>Treatment-related factors:</p> <p>Nonadherence was not associated with an increasing number of total medications or by number of medication classes (indicators of comorbidity). The total number of medications (continuous) was only marginally nonsignificant.</p> <p>Socioeconomic-related factors:</p> <p>The association between insurance status and nonadherence becoming marginally nonsignificant for antiplatelets.</p>	Questionnaire developed by researchers	<p>The study did not examine other factors other than ethnicity.</p> <p>The medication adherence data were self-reported and subject to participant social desirability bias, potentially artificially inflating the reports of medication adherence. No data on whether or for how long a patient was taking a drug before the stroke.</p> <p>The study was done in one community and should be validated in others.</p>
Lor et al. 2019	To investigate the association between health literacy level and	The study was part of a larger parent project, the	Quantitative  cross-	Participants completed the informed consent and the	None	<p>Patient-related factors:</p> <p>The majority of</p>	Morisky Medication Adherence Scale (MMAS-8)	The measures were self-reported and response bias



Author(s) Year Country	Purpose	Sample	Study Design	Methods	Theoretical Framework	Social Determinant Category	Medication Adherence Measurement Tool	Gaps
US	adherence to antihypertensive medications among Hispanic adults (n= 1,355).	Washington Heights/Inwood Informatics Infrastructure for Comparative Effectiveness Research (WICER) study  Involving Hispanic adults, primarily Dominicans, who self-reported hypertension.		WICER Community Health Survey (CHS) in their preferred language (English or Spanish) using validated measures in either English or Spanish.		<p>participants had low adherence levels to antihypertensive medications and inadequate health literacy.</p> <p>Health literacy was associated with a higher adherence score</p> <p>Socioeconomic-related factors:</p> <p>When controlling for age, sex, birth country, education level, recruitment location, depression, anxiety, and sleep disturbance, the full model explained 13.6% of the variance in medication adherence, but the contribution of health literacy to the model was minimal.</p>		<p>may have been present.</p> <p>There was limited variability in health literacy, and medication adherence measures.</p>
Marcum et al. 2019 US	To describe the prevalence of, types of, and characteristics associated with self-reporting multiple ( $\geq 2$ ) barriers to medication use in	Women who were using any chronic medication from 3 target classes (i.e., antilipemics, antihypertensive, oral	Quantitative cross-sectional	Women were asked to assemble their prescription and over-the-counter medications taken in the past 2 weeks	None	<p>Socioeconomic-related factors:</p> <p>Family discouraged me Friends discouraged me</p> <p>Concerned about missing work</p>	Questionnaire developed by researchers	Barriers to specific medications can vary from general barriers to medications. Constructs being measured

Author(s) Year Country	Purpose	Sample	Study Design	Methods	Theoretical Framework	Social Determinant Category	Medication Adherence Measurement Tool	Gaps
	older women using long-term cardiovascular and oral hypoglycemic medications.	hypoglycemic s) for at least 1 month and who had answered questions about barriers to medication use at year 4 (2009) of the study period ( $n = 59,054$ ).		and to write them down using information directly from the medication containers on a mailed form. The participants were also asked how long they had used each medication.		<p>Medication costs too much</p> <p>Treatment-related factors:</p> <p>Concerned about adverse effects.</p> <p>Do not like taking medications.</p> <p>Taking too many medications</p> <p>Taking medication is inconvenient.</p> <p>Health system-related factors:</p> <p>Problem getting to medical facility</p>		<p>should be clearly reported.</p> <p>The study design was cross-sectional and does not reflect patterns of barriers to medication use over time.</p>
Mondesir et al. 2019 US	To explore how factors related to the patient (e.g. self-efficacy), social/economic conditions (e.g. social support and cost of medications), therapy (e.g., side effects), health condition (e.g. comorbidities), and the healthcare	<p>Ambulatory care patients aged <math>\geq 45</math> years (8 black men, 5 black women, 2 white men, and 3 white women) who were using medications for diabetes, hypertension, dyslipidemia</p>	Qualitative	<p>In-depth qualitative interviews were conducted from April to July 2018 with ambulatory care patients aged <math>\geq 45</math> years (8 black men, 5 black women, 2 white men, and 3 white women)</p>	<p>World Health Organization</p> <p>Multidimensional Adherence Model (WHO-MAM).</p>	<p>Patient-related factors:</p> <p>Beliefs about medications as important for self and faith</p> <p>The desire to follow the advice of family, friends, and influential others.</p> <p>Self-efficacy.</p> <p>Socioeconomic-related factors:</p>	N/A	<p>All study participants had health insurance and prescription drug coverage.</p> <p>While the current study included participants with CVD, risk factors, other comorbidities may</p>

Author(s) Year Country	Purpose	Sample	Study Design	Methods	Theoretical Framework	Social Determinant Category	Medication Adherence Measurement Tool	Gaps
	system/healthcare team (e.g. support from healthcare providers and pharmacy access) influence medication adherence.	and/or CHD (n =18)		who were using medications for diabetes, hypertension, dyslipidemia and/or  CVD. thematic analysis to was used to analyze the data, and sub-themes emerged within each.  WHO-MAM dimension.		Observations of social network members and information received from them.  Social support for medication adherence  Pharmacy utilization  Economic influences.  Therapy-related factors:  Side effects  Medicine schedules  Healthcare system-related factors:  Support from doctors and pharmacists  Ease of pharmacy access and utilization		have influenced perceptions about medication adherence.
Sieben et al. 2019 Netherlands	To examine the process and effect of a nurse-led, web-based intervention based on	Patients referred to the Radboud University Nijmegen Medical	Quantitative  a single-center, prospective, three-arm randomized controlled clinical	Patients were randomly assigned to usual care (group I), usual care plus access to a	Health Belief Model (HBM)	Treatment-related factors:  Patients' beliefs and perceptions about their medication	Modified  Morisky Medication Adherence Scale (MMAS)	The researchers had to deal with missing pharmacy refill data. The

Author(s) Year Country	Purpose	Sample	Study Design	Methods	Theoretical Framework	Social Determinant Category	Medication Adherence Measurement Tool	Gaps
	behavioral change strategies to improve medication adherence in patients with CVD.	Center with a new diagnosis of acute coronary syndrome, myocardial infarction, peripheral arterial disease, an aneurysm of the aorta or transient ischemic attacks (TIA) or stroke over the last 6 months (n= 77)	trial.	personalized website (group II), or usual care, access to a personalized website plus a group consultation with a pharmacist and a nurse, followed by two individual nurse-led consultations at the outpatient clinic (group III).		.	Beliefs about Medicines Questionnaire (BMQ)	Dutch healthcare system does not provide a closed pharmacy system to a point of care. They were dependent on the willingness of the pharmacists to provide refill data. This led to missing data.
Bhasin et al. 2020 US	To identify the predictors of aspirin nonadherence in adults with prior myocardial infarction (MI).	A cohort of community-dwelling adults (age $\geq$ 18 years) with prior MI ( $n = 2173$ ).	Quantitative cross-sectional observational	The 2017 Centers for Disease Control's Behavioral Risk Factor Surveillance Survey was utilized to identify a cohort of community-dwelling adults prior MI.	None	Socio-economic-related factors:  Predictors of aspirin nonadherence included: Female sex Black race Hispanic Current employment Absence of homeowner status.  Condition-related factors:  Participants with aspirin nonadherence had less frequent medical checkups and lower rates of	Self-report adherence to aspirin therapy	Sample included only those patients living in community dwellings.

Author(s) Year Country	Purpose	Sample	Study Design	Methods	Theoretical Framework	Social Determinant Category	Medication Adherence Measurement Tool	Gaps
						multiple comorbidities including diabetes mellitus, hypertension, hyperlipidemia, and obesity.		
Cornelius et al. 2020 US	To determine whether partner status/partner presence in the emergency department (ED) were associated with patients' adherence to daily cardiovascular medications and whether effects differed by age/gender.	Patients evaluated for acute coronary syndrome at an urban academic ED (n =189)	Quantitative observational cohort study	Participants for the present analysis were drawn from an ancillary study examining the impact of psychological and hospital environmental factors on medication adherence post-acute coronary syndrome. Research assistants identified potentially eligible patients using the electronic health record and approached them in the ED to confirm eligibility and interest in participation. Participants completed a brief interview.	None	Socioeconomic-related factors:  For male patients, having a partner was associated with increased adherence in the first month post-discharge, , but having a partner present in the ED was associated with lower adherence. The opposite effect was evident for female patients.	Electronic pill cap	Results may not generalize to suburban or rural samples, or to other types of medical events (e.g., stroke) or medical encounters (e.g., primary care).

Author(s) Year Country	Purpose	Sample	Study Design	Methods	Theoretical Framework	Social Determinant Category	Medication Adherence Measurement Tool	Gaps
				At discharge, patients enrolled in the ancillary medication adherence study were mailed an electronic bottle cap (eCAP). They were instructed to place one of their cardiovascular medications (preferentially aspirin if prescribed) in the eCAP bottle and to take this medication exclusively from the bottle for up to 6 months post-discharge. Participants were then provided stamped envelopes in which they would return the eCAP after completing the monitoring period.				
Pietrzykowski et al. 2020	To evaluate changes in medication	Patients hospitalized for MI between May	Quantitative single-center, cohort	Educational measures were provided to	None	Socio-economic-related factors:	Availability of evaluated drugs within	The data retrieved for the study are limited only to

Author(s) Year Country	Purpose	Sample	Study Design	Methods	Theoretical Framework	Social Determinant Category	Medication Adherence Measurement Tool	Gaps
Poland	adherence and variability of adherence determinants during follow-up in patients after MI	2015 and July 2016 at the Department of Cardiology and Internal Medicine of the University Hospital No.1 in Bydgoszcz, Poland, treated with primary coronary intervention (n = 225)	observational study	<p>study participants. The availability of study medications within 1-year of hospital discharge was established on the basis of National Health Fund data regarding completed prescriptions.</p> <p>A cut-off point of 80% was applied.</p> <p>Based on a 1-year follow-up, an analysis was performed for each medication group separately and for all three groups together. For adherence variability assessment, the follow-up period was split into quarters. The influence of</p>		<p>Independent predictors of adherence:</p> <p>Age</p> <p>Prior CABG Level of education</p> <p>Place of residence</p> <p>Economic status</p> <p>Marital status</p> <p>Sufficient drug adherence:</p> <p>Married patients</p> <p>Hypertensive patients</p> <p>City inhabitants</p> <p>Patients with higher education</p> <p>Condition-related factors:</p> <p>Insufficient adherence:</p> <p>Patients having a history of prior CABG</p>	1-year after discharge from hospital, based on completed prescriptions data obtained from the National Health Fund.	medicines covered by the reimbursement program.

Author(s) Year Country	Purpose	Sample	Study Design	Methods	Theoretical Framework	Social Determinant Category	Medication Adherence Measurement Tool	Gaps
				<p>selected socio-demographic and clinical factors on</p> <p>adherence to treatment was verified, including age, sex, level of education, employment, economic status, place</p> <p>of residence, marital status, previous diagnosis of coronary artery disease (CAD), previous MI, PCI or coronary</p> <p>artery by-pass graft (CABG), previously diagnosed hypertension, diabetes mellitus and smoking.</p>				
Donneyong et al. 2020 US	To investigate the associations between anti-hypertensive medication (AHM) non-adherence,	The CDC Atlas of Heart Disease and Stroke (2014–2016 cycle) and the 2016 Community	Quantitative correlational	The Centers for Disease Control and Prevention (CDC) Atlas of Heart Disease and Stroke (2014-2016) and	None	<p>Socioeconomic-related factors:</p> <p>Poverty</p> <p>Food insecurity Lack of social support</p>	Proportion of days covered (PDC) with anti-hypertensive medication (AHM) < 80%, was considered as	While adherence is an individualized behavior, population-level adherence is an important



Author(s) Year Country	Purpose	Sample	Study Design	Methods	Theoretical Framework	Social Determinant Category	Medication Adherence Measurement Tool	Gaps
	mortality, and determinants of health.	Health Rankings (CHR) datasets were linked by unique, five-digit, Federal Information Processing Standard (FIPS) codes of the counties present in both datasets. The CDC Atlas consists of county-level estimates of all heart diseases, mortality, and hospitalizations based on data from the Deaths National Vital Statistics System and Centers for Medicare and Medicaid Services Medicare Provider Analysis and Review		the 2016 County Health Ranking (CHR) dataset were linked to investigate the associations between AHM non-adherence, mortality, and determinants of health. A proportion of days covered (PDC) with AHM < 80%, was considered as non-adherent.		Low social affluence  Residential instability  Socioeconomic disadvantage High crime  Social and economic domains were significantly inversely associated with the observed Black/African Americans (BAA) and non-Hispanic Whites (nHW) variations in medication adherence.	non-adherence	research outcome.  PDC does not reflect primary non-adherence and does not account for gaps in medication refills during hospitalization and out-of-pocket payment for medications.

Author(s) Year Country	Purpose	Sample	Study Design	Methods	Theoretical Framework	Social Determinant Category	Medication Adherence Measurement Tool	Gaps
		(MEDPAR) file, Part A.						
Liyanage-Don et al. 2021 US	To determine if Hispanic ethnicity and linguistic acculturation, as measured by English proficiency, were associated with nonadherence to cardiovascular medications.	Patients presenting to an academic medical center emergency department with suspected acute coronary syndrome between May 2014 and November 2017 (n = 332).	Quantitative prospective observational cohort study	Participants were given electronic pill bottle caps (eCAP) that fit on standard pill bottles and record the date and time of each pill bottle opening. They were considered adherent on any given day if the eCAP was opened the same number of times as prescribed.	None	Socioeconomic-related factors:  Hispanics had higher odds of medication adherence than non-Hispanics Among native Spanish-speaking Hispanics, greater English proficiency was associated with lower odds of medication adherence.	Electronic pill bottle	The electronic pill bottle could not confirm whether the medication was ingested after bottle opening.  The cross-sectional design, modest sample size, and single recruitment site limits the generalizability of the findings.
Tsang et al. 2021 US	To examine factors associated with the likelihood of medication nonadherence among Medicare low-income subsidy (LIS) recipients with type 2 diabetes, hypertension, or heart failure.	2012-2013 Medicare Parts A, B, and D claims were linked to the Area Health Resources Files. Beneficiaries aged 65 years or older with continuous Medicare coverage and receiving any	Quantitative retrospective analysis	This was a retrospective analysis of 2012-2013 Medicare Parts A, B, and D linked to the Area Health Resources Files.	Gelberg-Andersen Behavioral Model for Vulnerable Populations.	Socioeconomic related factors:  Younger age was associated with nonadherence Men were more likely to be nonadherent than women Compared with non-Hispanic Whites, racial/ethnic minorities had higher nonadherence. There were higher nonadherence rates among patients	Nonadherence was determined by the proportion of days covered less than 80% for specified oral type 2 diabetes, hypertension, and heart failure medications, as defined by the Pharmacy Quality Alliance.	This analysis used data from the Medicare LIS population, so the results may not be generalizable to the commercial population.

Author(s) Year Country	Purpose	Sample	Study Design	Methods	Theoretical Framework	Social Determinant Category	Medication Adherence Measurement Tool	Gaps
		LIS were included.				living in communities with lower socioeconomic characteristics, such as a metropolitan statistical area.		
Jeminiwa et al. 2022 US	(1) To examine individuals' preference for financial versus social incentives and (2) to explore the association between patient demographic and clinical characteristics with preferences for financial or social incentives.	A nationally representative sample of patients was conducted with Qualtrics panelists ( $n = 909$ ). U.S. adults taking at least 1 prescription medication for a chronic condition	Quantitative cross-sectional	Survey items included demographic information, clinical characteristics, and preference for financial or social incentives. Demographic information included sex, race, ethnicity, age in years, the highest level of education, and total annual household income. Clinical characteristics included the number of medications used, self-reported medication adherence, and number of chronic conditions.	None	Socio-economic-related factors:  Nonadherent individuals were less likely to prefer financial incentives over social incentives.  Those earning less than \$50,000 per year were less likely to prefer financial incentives compared with social incentives Females were more likely to prefer financial incentives Hispanic/Latinos were less likely to prefer financial incentives compared to non-Hispanics/non-Latinos	Self-report using the Medometer (Hansen RA)	The online study only included individuals who were taking medications for at least 1 chronic condition, limiting generalization to other populations. The authors did not determine if participants had other chronic conditions in addition to heart disease, hypertension, hyperlipidemia , diabetes, asthma or COPD. The study was limited to those who had

Author(s) Year Country	Purpose	Sample	Study Design	Methods	Theoretical Framework	Social Determinant Category	Medication Adherence Measurement Tool	Gaps
				Regression was performed to determine patient characteristics associated with participants' incentives.				internet access.

**Table 2***Research Instruments*

Instrument	Measure	Cronbach's Alpha
Medication Adherence Report Scale (MARS-5)	Self-reported medication adherence	$\alpha = 0.67-0.89$ Test-retest reliability: Pearson's $r = 0.97, p < .001$ English version  $\alpha > 0.77$ Spanish version
Patient-Centered Communication for Cancer Care (PCC-CA)	Communication with the health care provider	$\alpha = 0.90-0.96$ English version
Short Acculturation Scale for Hispanics (SASH)	Acculturation	$\alpha = 0.93$ English version $\alpha = 0.85$ Spanish version

**Table 3***Social Determinants of Health Categorical Variables*

Variable	N	%
Employment status		
Employed	31	38.1
Retired	26	26.8
Unemployed	33	34.0
Education Level		
Less than high school	3	3.1%
High school graduate	21	21.6
Some college	30	30.9
College graduate	42	43.3
Household income		
<\$10,000	10	10.3
\$10,000-\$19,000	12	12.4
\$20,000-\$34,000	22	22.7
\$35,000-\$49,000	10	10.3
\$50,000-\$74,000	20	20.6
>\$75,000	22	27.2
Insurance status		
Private insurance	36	37.1
Medicare	29	29.9
Medicaid	28	28.9
No insurance	3	3.1
Marital status		
Married	49	50.5
Widowed	5	5.2
Divorced	25	25.8
Never married	17	17.5
Side effects to medications		
Yes	23	23.7
No	61	62.9
Symptoms of heart disease		
Yes	55	56.7
No	29	29.9
Access to health care		
Yes	80	82.5
No	4	4.1
Hispanic heritage		
Mexican	36	37.1
Cuban	6	6.2
Puerto Rican	23	23.7
South American	7	7.2

Variable	<i>N</i>	%
Central American	12	12.4

**Table 4**

*Social Determinants of Health Continuous Variables*

Variable	<i>n</i>	Mean	Median	Variance	SD	Minimum	Maximum
Age	97	52.4	52.0	84.7	9.20	40	76
Years living in US	97	28.4	25.0	332.8	18.24	1.00	54.0

**Table 5**

*Summary of Hierarchical Regression Predicting Medication Adherence*

	Step 1			Step 2		
Variable	<i>b</i>	<i>SE</i>	$\beta$	<i>b</i>	<i>SE</i>	$\beta$
Patient-provider communication	.280	.075	.385	.277	.071	.312
Acculturation	.013	.065	.020	.018	.064	.029
Retired				.629	.184	.422
Unemployed				.535	.166	.384
Household income				.020	.016	.052
Private insurance				.479	.177	.351
College graduate				.005	.143	.004
Marital status				.329	.130	-.248
Number of heart medications				.039	.034	.110
Side effects				.282	.155	.190
Access to healthcare				.365	.317	.117

*Note.*  $R^2$  .151

**Table 6***Regression Coefficients*

	Model	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	3.205	.315		10.164	<.001		
	PCC mean	.280	.075	.385	3.717	<.001	.988	1.012
	SASH mean	.013	.065	.020	.197	.845	1.012	
2	(Constant)	1.990	.559		3.560	<.001		
	PCC mean	.227	.071	.312	3.208	.002	.805	1.242
	SASH mean	.018	.064	.029	.284	.777		
	Retired_d	.629	.184	.422	3.413	.001	.546	1.833
	Retired =1							
	Unemploy_d	.535	.166	.384	3.215	.002	.585	1.709
	What is your annual household income?	.20	.046	.052	.441	.660	.611	1.636
	Insurance_d	.479	.177	.351	2.707	.008	.498	
	private							
	College_grad _d	.005	.143	.004	.034	.973	.727	1.375
	College_grad =1							
	Marital status	-.329	.130	-2.48	-2.522	.014	.861	1.162
	Married =1							
	How many heart medications do you take?	.039	.034	.110	1.153	.253	.923	1.083
	Do you have any side effects to medications?	.282	.155	.190	1.820	.073	.763	1.311
	Do you have access to health care?	.365	.317	.117	1.150	.254	.801	1.249

*Note.* Dependent variable: MARS\_mean



**Table 7***Regression ANOVA*

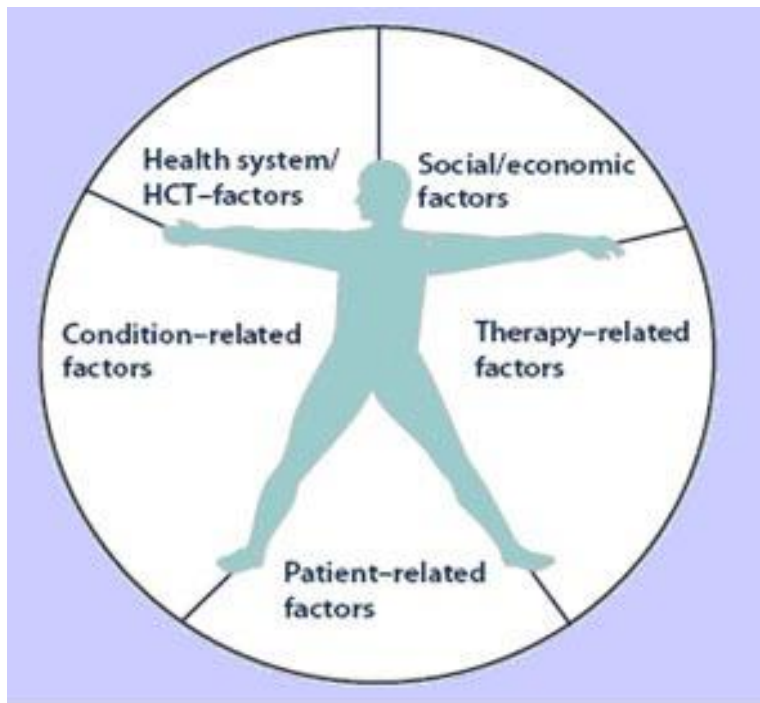
Model	Sum of squares	df	Mean square	F	Sig.
1 Regression	5.465	2	2.732	7.092	.001
Residual	30.822	80	.385		
Total	36.287	82			
2 Regression	14.761	11	1.342	4.426	<.001
Residual	21.526	71	.303		
Total	36.287	82			

**Table 8***ANOVA Means and Standard Deviations for Medication Adherence by Generational Group*

Variable	n	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>	Partial eta squared
Generational group				.418	.659	.010
First	16	4.42	.525			
Second	17	4.21	.816			
Third	51	4.32	.656			

**Figure 1**

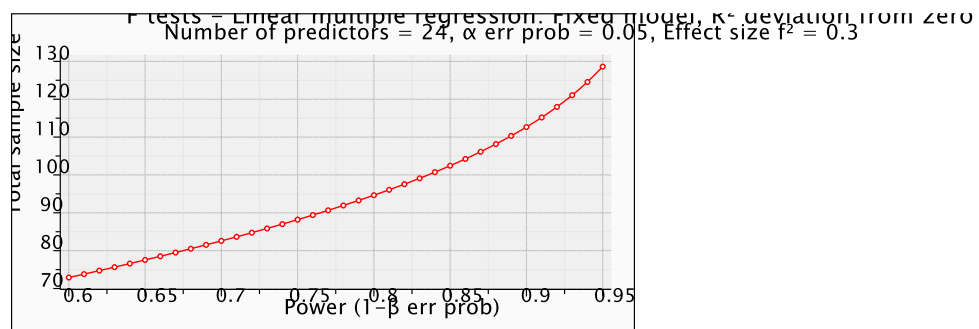
*World Health Organization Dimensions of Adherence Model*



*Note.* The figure shows the five dimensions of adherence as they relate to the person (WHO, 2003).

**Figure 2**

*G\*Power Analysis*



## APPENDIX A

### KEY TERMS, DEFINITIONS, AND ASSOCIATIONS TO WHO DIMENSIONS OF ADHERENCE MODEL

<b>Key Terms*</b> <b>DV/IV</b> <b>Level of</b> <b>Measurement</b>	<b>Conceptual Definition</b>	<b>Operational Definition</b>	<b>Theory Construct</b>
<b>Age</b> IV Ratio	Self-reported age in years	Self-reported age in years	Socioeconomic-related factors
<b>Employment Status</b> IV Nominal	Self-reported employment status	Self-reported employment status	Socioeconomic-related factors
<b>Household Income</b> IV Ordinal	Self-reported household income	Self-reported household income	Socioeconomic-related factors
<b>Insurance Coverage</b> IV Nominal	Self-reported insurance coverage	Self-reported insurance coverage	Health system-related factors
<b>Education Level</b> IV Ordinal	Self-reported education level	Self-reported education level	Patient-related factors
<b>Marital Status</b> IV Nominal	Self-reported marital status	Self-reported marital status	Socioeconomic-related factors
<b>Nativity Status</b> IV Nominal	Self-reported birthplace	Self-report	Patient-related Factors
<b>Country of Birth-Grandmother</b> IV Nominal	Self-reported birthplace of grandmother	Self-report	Patient-related factors
<b>Country of Birth- Mother</b> IV Nominal	Self-reported birthplace of mother	Self-report	Patient-related factors
<b>Cardiovascular Condition</b>	“Cardiovascular disease includes such	Self-reported cardiovascular	Condition-related factors

<b>Key Terms*</b> <b>DV/IV</b> <b>Level of</b> <b>Measurement</b>	<b>Conceptual Definition</b>	<b>Operational Definition</b>	<b>Theory Construct</b>
IV Nominal	conditions as atherosclerosis, heart attack, stroke, heart failure, arrhythmia, and valve disease” (American Heart Association, 2020a).	condition	
<b>Number of Comorbidities</b> IV Ratio	“The association of two distinct diseases in the same individual at a rate higher than expected by chance” (Bonavita & DeSimone, 2008).	Self-reported number of comorbidities	Condition-related factors
<b>Number of Medications Taken</b> IV Ratio	Self-reported number of medications taken	Self-reported number of medications taken	Condition-related factors
<b>Adherence</b> DV Interval	“The extent to which a person’s behavior-taking medications, following a diet, and/or executing lifestyle changes corresponds with agreed upon recommendations from a health care provider” (World Health Organization, 2003).	Medication Adherence Report Scale (MARS-5) $\alpha = 0.67-0.89$ Test-retest reliability: Pearson’s $r = 0.97$ , $p < .001$	Patient-related factors
<b>Communication with Health Care Provider</b> IV Ordinal	“The level of condition-related information exchange between patient and provider regarding the patient’s health status” (Strayhorn et al., 2020).	Patient-Centered Communication in Cancer Care Scale (PCC-Ca) $\alpha = 0.90-0.96$	Health system-related factors
<b>Access to Health Care</b> IV Nominal	"The timely use of personal health services to achieve the best health outcomes"	Self-report	Health system-related factors

<b>Key Terms* DV/IV Level of Measurement</b>	<b>Conceptual Definition</b>	<b>Operational Definition</b>	<b>Theory Construct</b>
	(Healthy People 2020, 2020).		
<b>Forgetfulness</b> IV Nominal	“A slightly increased incidence of episodic prospective memory loss, slower processing time and delayed recall” (Ballard, 2010).	Medication Adherence Report Scale (MARS-5) $\alpha = 0.67-0.89$ Test-retest reliability: Pearson’s $r = 0.97$ , $p < .001$	Patient-related factors
<b>Side Effects</b> IV Nominal	“Problems that occur when treatment goes beyond the desired effect, or problems that occur in addition to the desired therapeutic effect” (Stoppler, 2021).	Self-report	Treatment-related factors
<b>Lack of Symptoms</b> IV Nominal	Self-report of lack of symptoms of CVD.	Self-report	Treatment-related factors
<b>Acculturation</b> IV Ordinal	“A complex, multidimensional, and bidirectional process that involves the adoption of the behaviors and attitudes of the host country and relinquishing the behaviors and attitudes of the original culture” (Alba & Nee, 1997).	The Short Acculturation Scale for Hispanics (SASH) $\alpha = .93$ , English version $\alpha = .83$ , Spanish version $\alpha = .85$ .	Patient-related factors
<b>Dose Alteration</b> IV Ordinal	Self-report of dose alteration	Medication Adherence Report Scale (MARS-5) $\alpha = 0.67-0.89$ Test-retest reliability: Pearson’s $r = 0.97$ , $p < .001$	Patient-related factors
<b>Stop Taking</b>	Self-report of stopping	Medication Adherence	Patient-related factors

<b>Key Terms*</b> <b>DV/IV</b> <b>Level of</b> <b>Measurement</b>	<b>Conceptual Definition</b>	<b>Operational</b> <b>Definition</b>	<b>Theory Construct</b>
<b>Meds</b> IV Ordinal	medications	Report Scale (MARS-5) $\alpha = 0.67-0.89$ Test-retest reliability: Pearson's $r = 0.97$ , $p < .001$	
<b>Intentional Missed Doses</b> IV Ordinal	Self-report of intentional missed doses	Medication Adherence Report Scale (MARS-5) $\alpha = 0.67-0.89$ Test-retest reliability: Pearson's $r = 0.97$ , $p < .001$	Patient-related factors
<b>Less Than Instructed</b> IV Ordinal	Self-report of taking less medication than instructed	Medication Adherence Report Scale (MARS-5) $\alpha = 0.67-0.89$ Test-retest reliability: Pearson's $r = 0.97$ , $p < .001$	Patient-related factors

APPENDIX B  
RECRUITMENT FLYERS

Are You a Hispanic Woman Aged 40 or Older?

Do You Take Medications for Your Heart?

Volunteer for a Research Study!

What Do You Have to Do?

Complete online survey about making decisions about taking your heart medications. Completion of the survey will take no more than one half hour.

Criteria for study participation:

- Spanish and non-Spanish speaking Hispanic women aged 40 and older
- Diagnosis of heart disease
- Taking one or more medications for heart disease
- Having no medical condition that would prevent you from answering questions



For information about this research study please contact Amy Reid, 214-681-7792

[areid7@twu.edu](mailto:areid7@twu.edu)

There is a potential risk of loss of confidentiality in all email, downloading, electronic meetings, and internet transactions.



**¿Es usted una mujer hispana de 40 años o más?**

**¿Toma medicamentos o su corazón?**

**¡Ofrézcase como voluntario para un estudio de investigación!**

**¿Qué tienes que hacer?**

Complete cuestionarios en línea sobre cómo tomar decisiones sobre cómo tomar sus medicamentos para el corazón. La cumplimentación de los cuestionarios no tardará más de 30 minutos.

**Criterios para la participación en el estudio:**

- mujeres hispanas de habla hispana y no hispana de 40 años o más
- Diagnóstico de enfermedad cardíaca
- Tomar uno o más medicamentos para la enfermedad cardíaca
- Tener no tener ninguna condición médica que le impida responder preguntas



Para obtener información sobre este estudio de investigación, comuníquese con Amy Reid, 214-681-7792

[areid7@twu.edu](mailto:areid7@twu.edu)

Existe un riesgo potencial de pérdida de confidencialidad en todos los correos electrónicos, descargas, reuniones electrónicas y transacciones por Internet.

## APPENDIX C

### CENTIMENT RECRUITMENT QUESTIONS

What is your gender?		
	Male	<b>DISQUALIFY</b>
	Female	<b>PASS</b>
Are you of Hispanic, Latino, or Spanish origin?		
	No , not of Hispanic, Latino, or Spanish origin	<b>DISQUALIFY</b>
	Yes, Mexican, Mexican American, Chicano	<b>PASS</b>
	Yes, Cuban	<b>PASS</b>
	Yes, another Hispanic, Latino, or Spanish origin *** Argentina	<b>PASS</b>
	Yes, another Hispanic, Latino, or Spanish origin *** Colombia	<b>PASS</b>
	Yes, another Hispanic, Latino, or Spanish origin *** Ecuador	<b>PASS</b>
	Yes, another Hispanic, Latino, or Spanish origin *** El Salvadore	<b>PASS</b>
	Yes, another Hispanic, Latino, or Spanish origin *** Guatemala	<b>PASS</b>
	Yes, another Hispanic, Latino, or Spanish origin *** Nicaragua	<b>PASS</b>
	Yes, another Hispanic, Latino, or Spanish origin *** Panama	<b>PASS</b>
	Yes, another Hispanic, Latino, or Spanish origin *** Peru	<b>PASS</b>
	Yes, another Hispanic, Latino, or Spanish origin *** Spain	<b>PASS</b>
	Yes, another Hispanic, Latino, or Spanish origin *** Venezuela	<b>PASS</b>
	Yes, another Hispanic, Latino, or Spanish origin *** Other Country	<b>PASS</b>
	Prefer not to answer	<b>DISQUALIFY</b>
	Yes, Puerto Rican	<b>PASS</b>
What is your age?		
	Free Response - numeric values	
	Respondents who input an age of 39 or lower	<b>DISQUALIFY</b>
	Respondents who input an age of 40 or older	<b>PASS</b>
Have you, or someone for whom you provide care, been diagnosed with any of the following ailments or medical conditions? (Please select all that apply.)		

	Addiction	<b>DISQUALIFY</b>
	Allergy / Asthma / Respiratory	<b>DISQUALIFY</b>
	Arthritis / Joint Ailments	<b>DISQUALIFY</b>
	Autoimmune / Blood	<b>DISQUALIFY</b>
	Cancer	<b>DISQUALIFY</b>
	Cardiovascular / Heart	<b>PASS</b>
	Dental	<b>DISQUALIFY</b>
	Diabetes / Thyroid / Obesity	<b>DISQUALIFY</b>
	Gastric / Digestive / Urinary (e.g. Crohn's, Heartburn, Kidney Disease)	<b>DISQUALIFY</b>
	Male / Female Health (e.g. ED, Low T, Menopause, Osteoporosis)	<b>DISQUALIFY</b>
	Mental Health (e.g. Anxiety, ADD/ADHD, Depression)	<b>DISQUALIFY</b>
	Neurologic / Nervous (e.g. Migraines, MS, Stroke)	<b>DISQUALIFY</b>
	Pain (e.g. Fibromyalgia, Gout)	<b>DISQUALIFY</b>
	Skin / Dermatologic	<b>DISQUALIFY</b>
	Sleep Disorders	<b>DISQUALIFY</b>
	Vision / Hearing Impairments	<b>DISQUALIFY</b>
	None of the above	<b>DISQUALIFY</b>
	Prefer not to answer	<b>DISQUALIFY</b>
Do you take medication for your heart condition?		
	Yes	<b>PASS</b>
	No	<b>DISQUALIFY</b>

## APPENDIX D

### CONSENT FORMS

#### TEXAS WOMAN'S UNIVERSITY (TWU) CONSENT TO PARTICIPATE IN RESEARCH

Title: Social Determinants of Health Influential to Medication Adherence in Hispanic Women with Cardiovascular Disease

Principal Investigator: Amy Reid..... areid7@twu.edu 214-681-7792

Faculty Advisor: Misty Richmond PhD..... mrichmond4@twu.edu 940-898-2430

#### Summary and Key Information about the Study

You are being asked to participate in a research study conducted by Ms. Amy Reid, a student at Texas Woman's University, as a part of her thesis/dissertation. The purpose of the research is to examine social determinants of health influential to medication adherence in Hispanic women with cardiovascular disease.

You have been invited to participate in this study because you are a Hispanic female aged 40 or older diagnosed with cardiovascular disease. We estimate that 77 participants who are Hispanic females with cardiovascular disease will enroll in this study. Participants must be age 40 and older, Spanish and non-Spanish speaking, have a diagnosis of cardiovascular disease (atherosclerosis, heart attack, stroke, heart failure, arrhythmia, and valve disease), take medications for treatment and management of cardiovascular disease, have no cognitive impairments or unstable medical conditions that would prevent participation in the study. As a participant, you will be asked to complete four questionnaires regarding demographic information, medication adherence, patient/provider communication, and acculturation. The total time commitment for this study will be no more than 30 minutes.

Your participation in this study is completely voluntary. If you are interested in learning more about this study, please review this consent form carefully and take your time deciding whether or not you want to participate. Please feel free to ask the researcher any questions you have about the study at any time.

#### Description of Procedures

The survey consists of 4 questionnaires. Survey documents are available in English and Spanish. You will be asked which version you prefer. You will receive an email with a URL (link) to the survey from the Qualtrics platform to complete the questionnaires. Qualtrics is a web application for creating and managing online surveys and databases. Qualtrics always provides encryption for all account data. All participant survey data is similarly encrypted. Survey and participant data are treated with the maximum possible protection.

You may use a translator if necessary. The first 12 questions of the survey will ask for information about you, such as age, education level, and marital status. The Medication Adherence Report Scale (MARS-5) contains questions regarding how you use your medications. The Patient-Centered Communication (PCC) Scale measures your experiences with doctors and health care providers. The Short Acculturation Scale for Hispanics (SASH) measures behaviors that occur when Hispanics encounter the culture of the U.S. You will be asked to select the answer that best applies to you. You must answer all questions before continuing with the survey. As a participant in this study, you will be asked to spend no more than 30 minutes of

your time completing the four research questionnaires. You must answer each question to move along in the survey.

#### Potential Risks

##### Risk of Loss of Confidentiality

A risk in this study is the loss of confidentiality. Confidentiality will be protected to the extent that is allowed by law. The completed questionnaires will be stored on a password-protected computer in the researcher's office. The questionnaires will be permanently deleted within three years after the completion of the study. Only the researcher and her advisor will read the questionnaires. The signed consent form will be stored separately from all collected information on a password-protected computer and will be permanently deleted three years after the study is completed. The results of the study may be reported in scientific magazines or journals but your name or any other identifying information will not be included. There is a potential risk of loss of confidentiality in all email, downloading, electronic meetings, and internet transactions.

##### Risk of Anonymity

A possible risk in this study is a loss of anonymity. Any of your personal information collected for this study will not be used or distributed for future research even after the researchers remove your personal or identifiable information (e.g., your name, date of birth, contact information).

##### Risk of Coercion

Participation in this study is completely voluntary. There is no pressure to participate in this study. Deciding to participate or not to participate in this study will in no way impact your relationship with family or friends of the researcher or the agency, church, or organization allowing recruitment. There is also no penalty for withdrawal from this study. No one but the researcher will know if you decide or do not decide to participate in this study. The researchers will try to prevent any problem that could happen because of this research. You should let the researchers know at once if there is a problem and they will try to help you. However, TWU does not provide medical services or financial assistance for injuries that might happen because you are taking part in this research.

##### Risk of COVID-19 Exposure

You may be at risk of exposure to COVID-19 if you decide to complete the survey with the researcher at an outside location. The following precautions will be taken:

The researcher(s) will take your temperature before the study begins. In addition, the researcher(s) will ask you again if you have any COVID-19 symptoms upon your arrival. If you do, they will ask you to seek medical treatment and reschedule at least 10 days after the onset of symptoms, at least 24 hours fever-free without the use of medications, and other symptoms have improved.

The researcher(s) will wash their hands with soap using methods recommended by the CDC before and after the meeting and will ask you to wash your hands upon arrival and before you depart.

If hand washing is not available, the researcher(s) will use and ask you to use hand sanitizer.

If study participants and researchers prefer not to wear masks during the study, social distancing may be implemented at the researchers' and/or participants' preference.

Although masks are no longer required on campus, clinical locations on campus may still require individuals to wear masks, as permitted by the Governor's executive order.

The tablets will be disinfected with antiviral wipes before and after each use.

#### Participation and Benefits

Your involvement in this study is completely voluntary and you may withdraw from the study at any time. There may be no benefits to you for participating in this study. If you would like to know the results of this study, we will email or mail them to you.

#### Questions Regarding the Study

You will be given a copy of this signed and dated consent form to keep. If you have any questions about the research study, you should ask the researchers; their contact information is at the top of this form. If you have questions about your rights as a participant in this research or the way this study has been conducted, you may contact the TWU Office of Research and Sponsored Programs at 940-898-3378 or via e-mail at [IRB@twu.edu](mailto:IRB@twu.edu).

## Consentimiento informado

### UNIVERSIDAD DE LA MUJER DE TEXAS (TWU) CONSENTIMIENTO PARA PARTICIPAR EN LA INVESTIGACIÓN

Título: Determinantes sociales de la salud influyen en la adherencia a la medicación en mujeres hispanas con enfermedades cardiovasculares

Investigadora principal: Amy Reid..... [areid7@twu.edu](mailto:areid7@twu.edu) 214-681-7792  
Asesora de la Facultad: Misty Richmond PhD.....[mrichmond4@twu.edu](mailto:mrichmond4@twu.edu) 940-898-2430

#### Resumen e información clave sobre el estudio

Se le pide que participe en un estudio de investigación realizado por la Sra. Amy Reid, estudiante de la Universidad de la Mujer de Texas, como parte de su tesis / disertación. El propósito de la investigación es examinar los datos sociales de la salud que influye en la adherencia a la medicación en mujeres hispanas con enfermedades cardiovasculares.

Usted ha sido invitada a participar en este estudio porque es una mujer hispana de 40 años o más diagnosticada con enfermedad cardiovascular. Estimamos que 77 participantes que son mujeres hispanas con enfermedad cardiovascular se inscribirán en este estudio. Los participantes deben tener 40 años o más, hablar español y no español, tener un diagnóstico de enfermedad cardiovascular (aterosclerosis, ataque cardíaco, accidente cerebrovascular, insuficiencia cardíaca, arritmia y enfermedad valvular), tomar medicamentos para el tratamiento y manejo de la enfermedad cardiovascular, no tener deficiencias cognitivas o condiciones médicas inestables que impidan la participación en el estudio. Como participante, se le pedirá que complete cuatro cuestionarios con respecto a la información demográfica, la adherencia a la medicación, la comunicación entre el paciente y el proveedor y la aculturación. El compromiso de tiempo total para este estudio será de aproximadamente 30.

Su participación en este estudio es completamente voluntaria. Si está interesado en obtener más información sobre este estudio, revise este formulario de consentimiento cuidadosamente y tómese su tiempo para decidir si desea o no participar. Por favor, siéntase libre de preguntar al investigador cualquier pregunta que tenga sobre el estudio en cualquier momento.

#### Descripción de los procedimientos

La encuesta consta de 4 cuestionarios. Los documentos de la encuesta están disponibles en inglés y español. Se le preguntará qué versión prefiere. Recibirá un correo electrónico con una URL (enlace) a la encuesta desde la plataforma Qualtrics para completar los cuestionarios. Qualtrics es una aplicación web para crear y administrar encuestas y bases de datos en línea. Qualtrics siempre proporciona cifrado para todos los datos de la encuesta. Todos los datos de la encuesta de los participantes están encriptados de manera similar. Los datos de la encuesta y de los participantes se tratan con la máxima protección posible.

Se puede utilizar un traductor si es necesario. Las primeras 12 preguntas de la encuesta le pedirán información sobre usted, como la edad, el nivel de educación y el estado civil. La Escala de Informe de Adherencia a la Medicación (MARS-5) contiene preguntas sobre cómo usa sus medicamentos. La Escala de Comunicación Centrada en el Paciente (PCC, por sus siglas en inglés) mide sus experiencias con médicos y proveedores de atención médica. La Escala de Aculturación Corta para Hispanos (SASH, por sus siglas en inglés) mide los comportamientos que ocurren cuando los hispanos se encuentran con la cultura de los Estados Unidos. Se le pedirá



que seleccione la respuesta que mejor se aplique a usted. Debe responder a todas las preguntas antes de continuar con la encuesta. Como participante en este estudio, se le pedirá que no pase más de 30 minutos de su tiempo completando los cuatro cuestionarios de investigación. Debe responder a cada pregunta para avanzar en la encuesta.

#### Riesgos potenciales

##### Riesgo de pérdida de confidencialidad

Un riesgo en este estudio es la pérdida de confidencialidad. La confidencialidad estará protegida en la medida en que lo permita la ley. Los cuestionarios completados se almacenarán en una computadora protegida por contraseña en la oficina del investigador. Los cuestionarios se eliminarán permanentemente dentro de los tres años posteriores a la finalización del estudio. Solo el investigador y su asesor leerán los cuestionarios. El formulario de consentimiento firmado se almacenará por separado de toda la información recopilada en una computadora protegida por contraseña y se eliminará permanentemente tres años después de que se complete el estudio. Los resultados del estudio pueden ser reportados en revistas científicas o revistas, pero su nombre o cualquier otra información de identificación no serán incluidos. Existe un riesgo potencial de pérdida de confidencialidad en todos los correos electrónicos, descargas, reuniones electrónicas y transacciones por Internet.

##### Riesgo de anonymity

Un posible riesgo en este estudio es la pérdida del anonimato. Una parte de su información personal recopilada para este estudio no se utilizará ni distribuirá para futuras investigaciones, incluso después de que los investigadores eliminen su información personal o identificable (por ejemplo, su nombre, fecha de nacimiento, información de contacto).

##### Riesgo de coacción

La participación en este estudio es completamente voluntaria. No hay presión para participar en este estudio. Decidir participar o no participar en este estudio no afectará de ninguna manera su relación con la familia o amigos del investigador o la agencia, iglesia u organización que permite el reclutamiento. Tampoco hay penalización por retirarse de este estudio. Nadie más que el investigador sabrá si usted decide o no participar en este estudio.

Los investigadores tratarán de prevenir cualquier problema que pueda ocurrir debido a esta investigación. Debe informar a los investigadores de inmediato si hay un problema y tratarán de ayudarlo. Sin embargo, TWU no proporciona servicios médicos o asistencia financiera para lesiones que podrían ocurrir porque usted está participando en esta investigación.

##### Riesgo de exposición al COVID-19

Puede estar en riesgo de exposición al COVID-19 si decide completar la encuesta con el investigador en un lugar externo. Se tomarán las siguientes precauciones:

- El (los) investigador(es) le tomarán la temperatura antes de que comience el estudio. Además, el (los) investigador (s) le preguntará nuevamente si tiene algún síntoma de COVID-19 a su llegada. Si lo hace, le pedirán que busque tratamiento médico y reprograma al menos 10 días después del inicio de los síntomas, al menos 24 horas sin fiebre sin el uso de medicamentos, y otros síntomas han mejorado.
- Los investigadores se lavarán las manos con jabón utilizando los métodos recomendados por los CDC antes y después de la reunión y le pedirán que se lave las manos a su llegada y antes de partir.
- Si el lavado de manos no está disponible, el (los) investigador (s) usará y le pedirá que use desinfectante para manos.



- Si los participantes del estudio y los investigadores prefieren no usar máscaras durante el estudio, el distanciamiento social puede implementarse a preferencia de los investigadores y / o participantes.
- Aunque las máscaras ya no son necesarias en el campus, las ubicaciones clínicas en el campus aún pueden requerir que las personas usen máscaras, según lo permitido por la orden ejecutiva del Gobernador.
- Las tabletas se desinfectarán con toallitas antivirales antes y después de cada uso.
- Participación y beneficios

Su participación en este estudio es completamente voluntaria y puede retirarse del estudio en cualquier momento. Es posible que no haya beneficios para usted por participar en este estudio. Si desea conocer los resultados de este estudio, se los enviaremos por correo electrónico o por correo.

#### Preguntas sobre el estudio

You recibirá una copia de este formulario de consentimiento firmado y fechado para conservar. Si tiene alguna pregunta sobre el estudio de investigación, debe preguntar a los investigadores; su información de contacto está en la parte superior de este formulario. Si tiene preguntas sobre sus derechos como participante en esta investigación o la forma en que se ha realizado este estudio, puede comunicarse con la Oficina de Investigación y Programas Patrocinados de TWU al 940-898-3378 o por correo electrónico a [IRB@twu.edu](mailto:IRB@twu.edu).

## APPENDIX E

### DEMOGRAPHIC QUESTIONNAIRE

Q7 Age in years\_\_\_\_\_

Q8 What is your employment status?

☐ Employed (1)

☐ Retired (2)

☐ Unemployed (3)

Q9 What is your annual household income?

☐ < \$10,000 (1)

☐ \$10,000-\$19,000 (2)

☐ \$20,000-\$34,000 (3)

☐ \$35,000-\$49,999 (4)

☐ \$50,000-\$74,999 (5)

☐ \$75,000 or > (6)

Q10 What is your insurance status?

☐ Private insurance (1)

☐ Medicare (2)

☐ Medicaid (3)

☐ No insurance (4)

-----

Q11 What is your education level?

☐ Less than high school (1)

☐ High school graduate (2)

☐ Some college (3)

☐ College graduate (4)

Q12 What is your marital status?

☐ Married (1)

☐ Widowed (2)

☐ Divorced (3)

☐ Never married (4)

Q13 Where were you born?

☐ Born in the U.S. (1)

☐ Born in a foreign country (2)

Q14 Where was your mother born?

☐ Born in the U.S. (1)

☐ Born in a foreign country (2)

Q15 Where was your maternal grandmother born?

☐ Born in the U.S. (1)

☐ Born in a foreign country (2)

Q16 Where was your paternal grandmother born?

☐ Born in the U.S. (1)

☐ Born in a foreign country (2)



Q17 If you were not born in the U.S., how long have you been here?

Q18 Which of the following most closely aligns with your Hispanic heritage?

---

- ☐ Mexican (1)
- ☐ Cuban (2)
- ☐ Puerto Rican (3)
- ☐ Central American (4)
- ☐ South American (5)

Q19 What is your heart condition?

- ☐ Atherosclerosis (1)
- ☐ Heart attack (2)
- ☐ Stroke (3)
- ☐ Heart failure (4)
- ☐ Arrhythmia (5)
- ☐ Valve disease (6)

Q20 Number of other diseases you have been diagnosed with

---



Q21 How many heart medications do you take?

---

Q22 Do you have any side effects to medications?

☐ Yes (1)

☐ No (2)

Q23 Do you have any symptoms of heart disease?

☐ Yes (1)

☐ No (2)

Q24 Do you have access to health care?

☐ Yes (1)

☐ No (2)

*Skip To: End of Block If To show that you are paying attention, please select "All of the above". != All of the above*

**End of Block: Block 1**

---

**Start of Block: Block 2**

Q6 Nombre y fecha

---

*Display This Question:*

*If aid Is Empty*

Q7 Si desea conocer los resultados de este 109ardia, díganos a dónde desea que se envíen:

Correo electrónico dirección:

---

End of Block: Block 1

---

Start of Block: Block 2

Q8 Cuestionario demográfico





Q9 Edad en years:

---

Q10 ¿Cuál es su employment status?

☐ Desempleados (1)

☐ Jubilados (2)

☐ Ajena (3)

Q11 ¿Qué es un household income?

☐ (1)

☐ \$10,000-\$19,000 (2)

☐ \$20,000-\$34,999 (3)

☐ \$35,000-\$49,000 (4)

☐ \$50,000-\$74,999 (5)

☐ \$75,000 o mas (6)

Q12 ¿Cuál es su insurance status?

☐ Seguro privado (1)

☐ Medicare (2)

☐ Medicaid (3)

☐ Sin 112ardia (4)

Q13 ¿Cuál es su education level?

☐ Menos de la escuela secundaria (1)

☐ Graduado de la escuela secundaria (2)

☐ Algunos universitarios (3)

☐ Graduado universitarios (4)

Q14 ¿Cuál es su marital status?

☐ Casado (1)

☐ Divorciado (2)

☐ Nunca 112ardia (3)

☐ Viudo (4)

Q15 ¿Dónde naciste?

☐ Nacido en los Estados Unidos (1)

☐ Nacido en un país extranjero (2)

Q16 ¿Dónde nació tu madre?

☐ Nacido en los Estados Unidos (1)

☐ Nacido en país extranjero (2)

Q17 ¿Dónde nació tu abuela 113ardiac113?

☐ Nacido en los Estados Unidos (1)

☐ Nacido en país extranjero (2)

Q18 ¿Dónde nació tu abuela paterna?

☐ Nacido en los Estados Unidos (1)

☐ Nacido en país extranjero (2)

*Display This Question:*

*If ¿Dónde naciste? = Nacido en un país extranjero*

Q19 Si no naciste en los Estados Unidos, ¿cuánto tiempo llevas aquí?

---

Q20 ¿Cuál de las siguientes opciones se 113ardia más estrechamente con su herencia hispana?

☐ Mexican (1)

☐ Cubano (2)

☐ Puertorriqueño (3)

☐ Centroamericano (4)

☐ Sudamericano (5)

Q21 ¿Cuál es tucorazón?

☐ Aterosclerosis (1)

☐ Ataque 114ardiac (2)

☐ Accidente cerebrovascular (3)

☐ Insuficiencia cardiaca (4)

☐ Arritmia (5)

☐ Enfermedad valvular (6)

Q22 Número de otras enfermedades que le han diagnosticado

Q23 ¿Cuántos medicamentos para el corazón toma?

---

Q24 ¿Tiene algún efecto side de los medicamentos?

☐ Si (1)

☐ No (2)

Q25 ¿Tienesíntomas de enfermedad cardíaca?

☐ Si (1)

☐ No (2)

Q27 ¿Tiene unccess para el cuidado de lasalud?

☐ Si (1)

☐ No (2)

Q43 Para demostrar que está prestando atención, seleccione “Todas las anteriores”.

- ☐ Divertido (1)
- ☐ Emocionante (4)
- ☐ Fuerte (5)
- ☐ Atractivo (6)
- ☐ Feliz (7)
- ☐ Todo lo anterior (8)

## APPENDIX F

### MEDICATION ADHERENCE REPORT SCALE (MARS-5)

#### Q24 Questions About Your Medications

Here are some ways in which people have said that they use their medicines. For each of the statements, please click the box which best applies to you.

Q26 I forget to take them.

☐ Always (1)

☐ Often (2)

☐ Sometimes (3)

☐ Rarely (4)

☐ Never (5)

---

Q27 I alter the dose.

☐ Always (1)

☐ Often (2)

☐ Sometimes (3)

☐ Rarely (4)

☐ Never (5)

---

Q28 I stop taking them for a while.

☐ Always (1)

☐ Often (2)

☐ Sometimes (3)

☐ Rarely (4)

☐ Never (5)

---

Q29 I decide to miss out a dose.

Always (1)

☐ Often (2)

☐ Sometimes (3)

☐ Rarely (4)

☐ Never (5)

---

Q30 I take less than instructed.

☐ Always (1)

☐ Often (2)

☐ Sometimes (3)

☐ Rarely (4)

☐ Never (5)

**Q25 C PREGUNTAS SOBRE EL USO DE SU MEDICINAS** Aquí hay algunas formas en que las personas han dicho que usan sus medicamentos. Para cada una de las declaraciones,



marque la casilla que mejor se aplique a usted

---

Q26 Me olvido de tomarlos

☐ Siempre (1)

☐ Frecuentemente (2)

☐ A veces (3)

☐ Raramente (4)

☐ Nunca (5)

---

Q27 Altero la dosis

- ☐ Siempre (1)
  - ☐ Frecuentemente (2)
  - ☐ A veces (3)
  - ☐ Raramente (4)
  - ☐ Nunca (5)
- 

Q28 Dejo de tomarlos por un tiempo

- ☐ Siempre (1)
  - ☐ Frecuentemente (2)
  - ☐ A veces (3)
  - ☐ Raramente (4)
  - ☐ Nunca (5)
-

Q29 Decido perderme una dosis

- ☐ Siempre (1)
  - ☐ Frecuentemente (2)
  - ☐ A veces (3)
  - ☐ Raramente (4)
  - ☐ Nunca (5)
- 

Q30 Tomo menos de lo que se me indica

- ☐ Siempre (1)
- ☐ Frecuentemente (2)
- ☐ A veces (3)
- ☐ Raramente (4)
- ☐ Nunca (5)

## APPENDIX G

### PATIENT-CENTERED COMMUNICATION FOR CANCER CARE (PCC-CA)

#### Q33 Patient-Centered Communication-6

This survey asks about your experiences with doctors and other health care professionals such as nurses and physician assistants.

---

Q34 How much do your doctors and other health professionals make you feel comfortable about asking questions?

- ☐ Not at all (1)
  - ☐ Not very much (2)
  - ☐ Somewhat (3)
  - ☐ A Lot (4)
  - ☐ A great deal (5)
- 

Q35 How often do your doctors and other health professionals have open and honest

communication with you?

☐ Never (1)

☐ Rarely (2)

☐ Sometimes (3)

☐ Often (4)

☐ Always (5)

---

Q37 Many decisions need to be made in cardiac care, such as decisions about treatment choices, where to go for care, or how to manage side effects. Please think about all of the decisions there have been in your care. How much do your doctors and other health professionals give you

information and resources to help you make decisions?

- ☐ Not at all (1)
  - ☐ Not very much (2)
  - ☐ Somewhat (3)
  - ☐ A Lot (4)
  - ☐ A great deal (5)
  - ☐ Does not apply (6)
- 

Q38 How well do your doctors and other health professionals talk with you about how to cope

with any fears, stress, and other feelings?

- ☐ Poorly (1)
  - ☐ Not very well (2)
  - ☐ Fairly well (3)
  - ☐ Very well (4)
  - ☐ Outstanding (5)
- 

Q39 How often do your doctors and other health professionals make sure you understand the steps in your care?

- ☐ Never (1)
  - ☐ Rarely (2)
  - ☐ Sometimes (3)
  - ☐ Often (4)
  - ☐ Always (5)
-

Q40 Patients often face uncertainties about their disease. For example, patients may not know what will happen, how treatment is working, and how to make sense of different information and opinions. How well do your doctors and other health professionals help you deal with the uncertainties about your heart disease?

- ☐ Poorly (1)
- ☐ Not very well (2)
- ☐ Fairly well (3)
- ☐ Very well (4)
- ☐ Outstanding (5)
- ☐ Does not apply/have not been any uncertainties (6)



**Q31 Comunicación centrada en el paciente-6 ítems (PCC-6)** Esta encuesta pregunta sobre sus experiencias con los médicos y otros servicios de salud. profesionales como enfermeras y asistentes médicos. Esto no es una prueba, y no hay respuestas correctas e incorrectas.

---

**Q32** Cuánto te hacen sentir tus médicos y otros profesionales de la salud te sientes cómodo haciendo preguntas?

- ☐ Para nada (1)
  - ☐ No mucho (2)
  - ☐ Algo (3)
  - ☐ Mucho (4)
  - ☐ Una gran oferta (5)
- 

**Q33** ¿Con qué frecuencia sus médicos y otros profesionales de la salud tienen abierto y

comunicación honesta con usted?

- ☐ Para nada (1)
  - ☐ Nunca (2)
  - ☐ Raramente (3)
  - ☐ A veces (4)
  - ☐ A menudo (5)
  - ☐ Siempre (6)
- 

Q34 Es necesario tomar muchas decisiones en la atención profesional, como las decisiones sobre opciones de tratamiento, dónde acudir para recibir atención o cómo controlar los efectos secundarios. Por favor, piense en todas las decisiones que ha habido a su cuidado. ¿Cuánto le dan sus médicos y otros profesionales de la salud? información y recursos para ayudarle a tomar

decisiones?

- ☐ Para nada (1)
  - ☐ No mucho (2)
  - ☐ Algo (3)
  - ☐ Mucho (4)
  - ☐ Una gran oferta (5)
  - ☐ No aplica (6)
- 

Q36 Qué tan bien hablan con usted sus médicos y otros profesionales de la salud sobre cómo lidiar con los miedos, el estrés y otros sentimientos?

- ☐ Mal (1)
  - ☐ No muy bien (2)
  - ☐ Bastante bien (3)
  - ☐ Muy bien (4)
  - ☐ Sobresaliente (5)
  - ☐ No aplica (6)
- 

Q37 ¿Con qué frecuencia sus médicos y otros profesionales de la salud se aseguran de que

entender los pasos en su cuidado?

- ☐ Nunca (1)
  - ☐ Raramente (2)
  - ☐ A veces (3)
  - ☐ A menudo (4)
  - ☐ Siempre (5)
- 

Q38 Los pacientes a menudo se enfrentan a incertidumbres sobre su enfermedad. Por ejemplo es posible que los pacientes no sepan lo que sucederá, cómo está funcionando el tratamiento, y cómo dar sentido a diferentes informaciones y opiniones. Qué tan bien le ayudan sus médicos y

otros profesionales de la salud a lidiar con las incertidumbres sobre su enfermedad cardíaca?

- ☐ Mal (1)
- ☐ No muy bien (2)
- ☐ Bastante bien (3)
- ☐ Muy bien (4)
- ☐ Sobresaliente (5)
- ☐ No aplica/no ha habido ninguna incertidumbre (6)

## APPENDIX H

### SHORT ACCULTURATION SCALE FOR HISPANICS (SASH)

Q41 Short Acculturation Scale for Hispanics

---

Q42 In general, what language(s) do you read and speak?

- ☐ Only English (1)
  - ☐ English better than Spanish (2)
  - ☐ Both equally (3)
  - ☐ Spanish better than English (4)
  - ☐ Only Spanish (5)
-

Q43 What language do you usually speak at home?

- ☐ Only English (1)
  - ☐ More English than Spanish (2)
  - ☐ Both equally (3)
  - ☐ More Spanish than English (4)
  - ☐ Only Spanish (5)
- 

Q44 In what language do you usually think?

- ☐ Only English (1)
  - ☐ More English than Spanish (2)
  - ☐ Both equally (3)
  - ☐ More Spanish than English (4)
  - ☐ Only Spanish (5)
-



Q45 What language do you usually speak with friends?

- ☐ Only English (1)
- ☐ More English than Spanish (2)
- ☐ Both equally (3)
- ☐ More Spanish than English (4)
- ☐ Only Spanish (5)

**Q39 Escala corta de aculturación para hispanos (SASH)**

---

Q40 En general, ¿qué idioma(s) lees y hablas?

- ☐ Solo ingles (1)
  - ☐ Mas Ingles mejor que espanol (2)
  - ☐ Ambos igualmente (3)
  - ☐ Mas Espanol mejor que ingles (4)
  - ☐ Solo espanol (5)
- 

Q41 ¿Qué idioma sueles hablar en casa?

- ☐ Solo ingles (1)
  - ☐ Mas ingles mejor que espanol (2)
  - ☐ Ambos igualmente (3)
  - ☐ Mas espanol mejor ingles (4)
  - ☐ Solo espanol (5)
-

Q42 ¿En qué idioma sueles pensar?

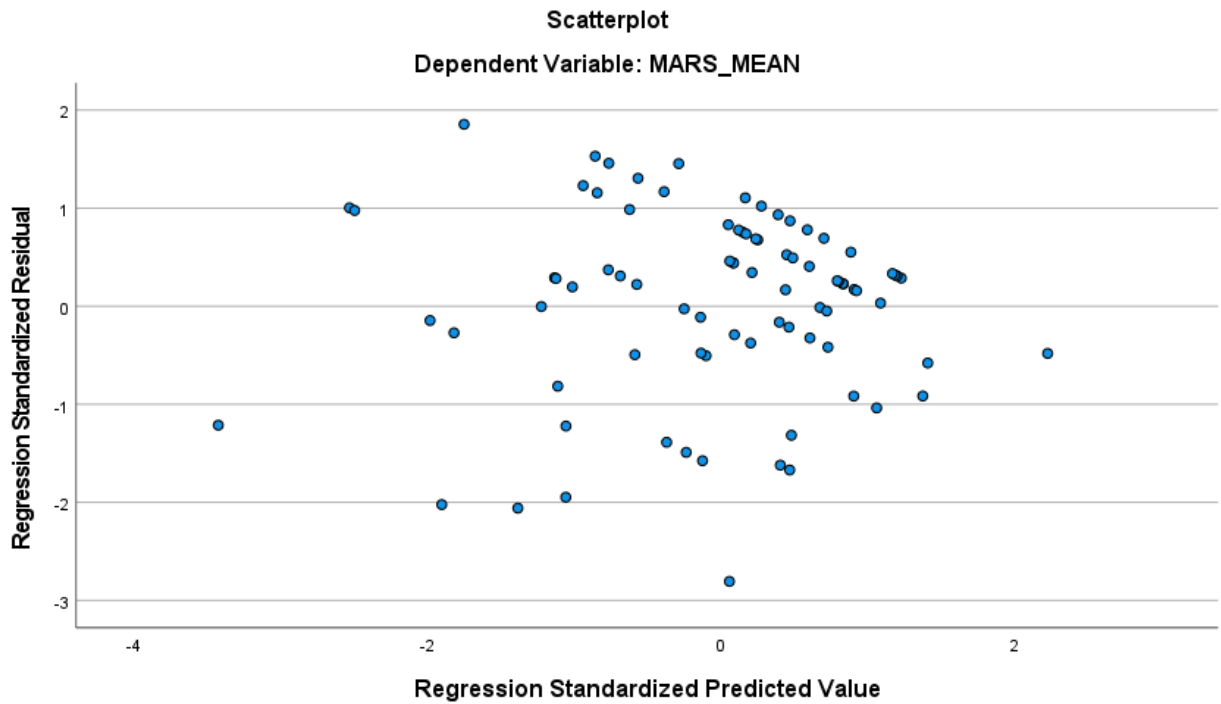
- ☐ Solo ingles (1)
  - ☐ Mas ingles mejor que espano; (2)
  - ☐ Ambos igualmente (3)
  - ☐ Mas espanol mejor que ingles (4)
  - ☐ Solo espanol (5)
- 

Q43 ¿Qué idioma sueles hablar con tus amigos?

- ☐ Solo ingles (1)
- ☐ Mas ingles mejor que espanol (2)
- ☐ Ambos igualmente (3)
- ☐ Mas espanol mejor que ingles (4)
- ☐ Solo espanol (5)

## APPENDIX I

### ASSUMPTIONS TESTING RESULTS



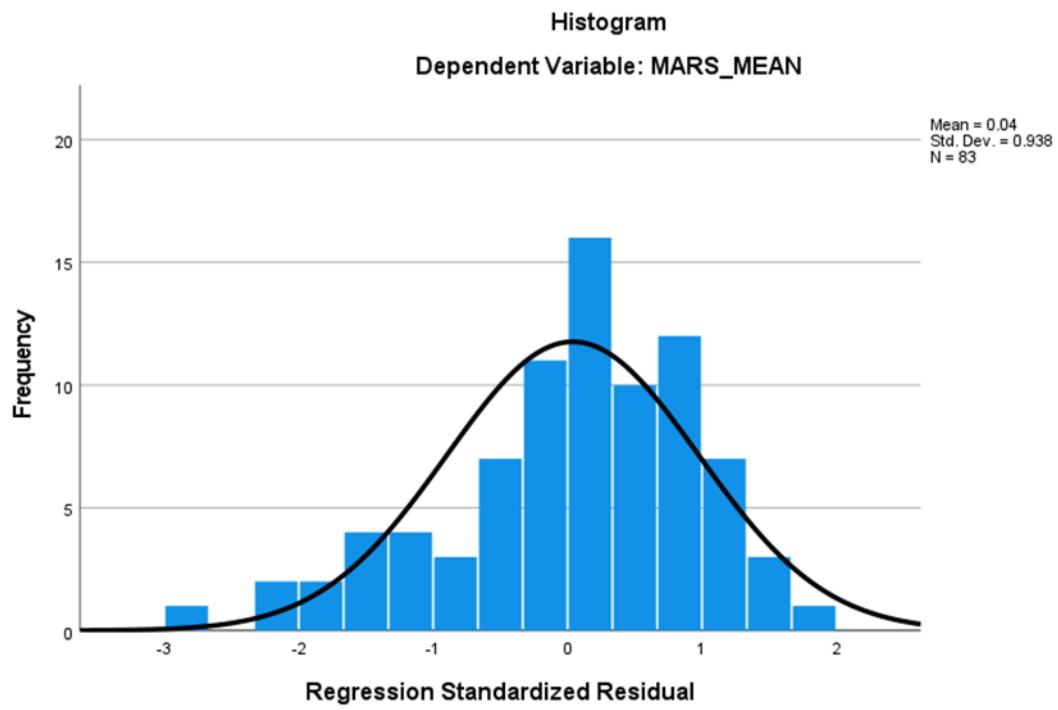
### Levene's Test of Equality of Error Variances<sup>a,b</sup>

		Levene Statistic	df1	df2	Sig.
MARS_MEAN	Based on Mean	.824	2	81	.442
	Based on Median	.451	2	81	.639
	Based on Median and with adjusted df	.451	2	75.147	.639
	Based on trimmed mean	.683	2	81	.508

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Dependent variable: MARS\_MEAN

b. Design: Intercept + generation



Normal P-P Plot of Regression Standardized Residual

Dependent Variable: MARS\_MEAN

